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Revision of the Western Palaearctic Diplazontinae (Hymenoptera, Ichneumonidae)

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Abstract

I revise the subfamily Diplazontinae to include 99 Western Palaearctic species, review morphological characters useful for species delimitation and identification, and clarify the status of some morphologically similar taxa using molecular approaches. Illustrated, dichotomous keys to the Western Palaearctic genera and species of the subfamily are presented, and the utility of the molecular markers CO1 and ITS2 for species delimitation in Diplazontinae is discussed. Seven new species are described, *Diplazon flixi* **sp. nov.**, *Diplazon nordicus* **sp. nov.**, *Diplazon parvus* **sp. nov.**, *Diplazon zetteli* **sp. nov.**, *Eurytyloides umbrinus* **sp. nov.**, *Sussaba roberti* **sp. nov.**, and *Woldstedtius bauri* **sp. nov.** The Nearctic *Sussaba cultriformis* (Ashmead), formerly a subspecies of *Sussaba dorsalis* (Holmgren), is raised to species rank. The following taxa are valid species and hereby removed from synonymy: *Episemura ensata* (Bauer), **stat. rev.**; *Homotropus frontorius* (Thunberg), **stat. rev.**; *Syrphoctonus desvignesii* (Marshall), **stat. rev.**; *Syrphophilus scabriculus* (Holmgren), **stat. rev.**; and *Tymmophorus suspiciosus* (Brischke), **stat. rev.** Nineteen new synonyms are established: *Bioblapsis mallochi* Rotheray of *Bioblapsis cultiformis* (Davis), **syn. nov.**; *Bioblapsis tricincta* Ashmead of *Syrphophilus scabriculus* (Holmgren), **syn. nov.**; *Diplazon bachmaieri* Diller of *Diplazon angustus* Dasch, **syn. nov.**; *Diplazon fechteri* Diller of *Diplazon cascadensis* Dasch, **syn. nov.**; *Homocidus brevis* Hedwig of *Homotropus pictus* (Gravenhorst); *Homocidus rubiginosum* Schmiedeknecht of *Enizemum scutellare* (Lange), **syn. nov.**; *Homocidus simulans* Stelfox of *Homotropus collinus* (Stelfox), **syn. nov.**; *Homotropus crassicrus* Thomson and *Homotropus nudus* Dasch of *Homotropus dimidiatus* (Schrank), **syn. nov.**; *Homocidus asyntactus* Schmiedeknecht of *Homotropus crassicornis* Thomson, **syn. nov.**; *Homocidus subopacus* Stelfox and *Homotropus quadrangularis* Dasch of *Homotropus frontorius* (Thunberg), **syn. nov.**; *Homocidus impolitus* Stelfox of *Homotropus pallipes* (Gravenhorst), **syn. nov.**; *Homotropus incisus* Thomson and *Homotropus reflexus* Morley of *Homotropus pectoralis* (Provancher), **syn. nov.**; *Tryphon nigricornis* Zetterstedt, a former synonym of *H. dimidiatus* Schrank, is a synonym of *Homotropus pictus* (Gravenhorst), **syn. nov.**; *Homotropus fraudulentus* Dasch and *Homotropus neopulcher* Horstmann of *Syrphoctonus desvignesii* (Marshall), **syn. nov.**; *Homotropus eximius* Habermehl of *Syrphoctonus tarsatorius* (Panzer), **syn. nov.** The following new combinations are established: *Bioblapsis cultiformis* (Davis), **comb. nov.**; *Homotropus collinus* (Stelfox), **comb. nov.**; *Homotropus dimidiatus* (Schrank), **comb. nov.**; *Homotropus frontorius* (Thunberg), **comb. nov.**; *Homotropus pectoralis* (Provancher), **comb. nov.**; *Homotropus strigator* (Fabricius), **comb. nov.**; *Homotropus sundevalli* (Holmgren), **comb. nov.** The present revision is the first comprehensive treatment of the Western Palaearctic Diplazontinae, provides the basis for taxonomic, faunistic, ecological and evolutionary studies in these hoverfly parasitoids, and exemplifies an integrative approach to systematics and taxonomy.

Key words: identification key, species delimitation, parasitoid wasps, alpha-taxonomy, barcoding, cytochrome oxidase 1 CO1, internal transcribed spacer 2 ITS2, molecular, morphology, systematics

Introduction

Parasitoid wasps are among the most species-rich and at the same time most under-studied insect taxa (Quicke 1997; Jones *et al.* 2009). Even in the well-known fauna of the Western Palaearctic, new species are discovered at a regular pace, and most groups are still in need of thorough revisions. Consequently, identification of most parasitoid specimens can only be achieved by specialists. This situation is partly due to high levels of

morphological homoplasy found in this group, which often result from attacking ecologically similar hosts (Gauld & Mound 1982). Moreover, morphology is often of limited use in cases of very small species, where many otherwise useful character systems such as wing venation are reduced. These factors, however, do not always adequately explain the lack of up-to-date revisions in parasitoid wasps, and historical factors, including simply a lack of specialists, seem to be the principal reasons. Because of high levels of morphological homoplasy but also because of considerable dimorphism between the sexes and often large morphological variability in the haploid males (Gauld & Fitton 1987), molecular methods can be an ideal complement to morphological research. An integrative taxonomy approach, combining information from different character systems, might thus prove very valuable in parasitoid wasps and provide more adequate species hypotheses than any method alone could (Schlick-Steiner *et al.* 2010).

The subfamily Diplazontinae is morphologically well defined and of medium size, with 340 species described to date (Yu *et al.* 2012). Most species have been described from the Holarctic region, with boreal and alpine areas of especially high species richness (Manukyan 1995; Klopfstein 2007). Twenty-two recent genera are currently recognized, 17 of which occur in the Western Palaearctic. The five remaining genera have only been found in the tropics (*Ectomocolax* Diller, *Extenuosodalis* Diller, *Peritasis* Townes, *Schachticraspedon* Diller, and *Syrphidepulo* Diller). However, as is the case for most ichneumonid groups, especially the old world and Australasian tropics have been severely understudied, and several new genera and species can be expected from these areas. But previous studies (e.g., Dasch 1964b; Gauld *et al.* 1997) seem to suggest that the species richness at least does not increase as steeply as in other insect taxa, a phenomenon often referred to as the "latitudinal gradient anomaly" observed in several groups of parasitoid wasps (Gaston *et al.* 1996; Sime & Brower 1998; Bartlett *et al.* 1999; Poulin & Morand 2000; Willig *et al.* 2003). However, more recent studies suggest that this apparent anomaly was due to a sampling artefact (Quicke 2012; Veijalainen *et al.* 2012).

The host range of Diplazontinae seems to be very narrow, with all confirmed host records being from the hoverfly subfamily Syrphinae (Diptera, Syrphidae). Except for the two species of the derived genus *Bioblapsis* Förster, Diplazontinae furthermore only attack the aphidophagous species of this group. Many species have been reared from multiple hosts that are not necessarily closely related and are thus regarded as generalists but some seem to have narrower, more specialized host ranges (Rotheray 1981b; Fitton & Rotheray 1982; Rotheray 1984; 1990). However, our knowledge of host relationships is very limited, and reliable host records are scarce for many species and completely lacking for the genera *Campocraspedon*, *Daschia*, *Episemura*, *Eurytyloides* and *Xestopelta*. This situation arises because syrphid larvae are not reared on a regular basis, and those that are reared usually inhabit agricultural systems.

Only the Nearctic fauna of Diplazontinae have been thoroughly revised (Dasch 1964a), while a revision based on limited sampling efforts is available for the Neotropics (Dasch 1964b). At the country level, revisions based on reasonable numbers of specimens were conducted for Costa Rica (Gauld *et al.* 1997), Great Britain (Beirne 1941), the Russian Far East (Manukyan 2007), the Philippines (Baltazar 1954), among others. For the Western Palaearctic, taxonomic work with a more limited taxonomic and geographic scope have been published by Diller (1969; 1970; 1973; 1978; 1980; 1982; 1985; 1986; 1987) and by other researchers (Hedwig 1938; 1939; Beirne 1941; Bauer 1981; Teunissen 1943; Fitton & Boston 1988; Sebald *et al.* 1988; Kasparyan & Manukyan 1989; Rotheray 1990; Thirion 1994; Bordera *et al.* 2000). A key to the European genera was provided by Fitton & Rotheray (1982). To identify the Western Palaearctic species, one currently has to use the outdated work by Schmiedeknecht (1926), which relies too heavily on colour characters, or the keys by Beirne (1941) which follow an outdated taxonomy and only cover the species known from Great Britain at the time. Recent studies on the molecular and morphological phylogenetics of the group moreover revealed the necessity for revision of some of the generic concepts (Klopfstein *et al.* 2010a; Klopfstein *et al.* 2011).

I here revise the Western Palaearctic species of Diplazontinae using morphological and molecular data, and compare the respective success of those different character systems in providing well-supported species delimitations. The morphological characters used to delimit species are discussed, and illustrated keys to the Western Palaearctic genera and species are provided. This first comprehensive treatment of the Western Palaearctic Diplazontinae will hopefully stimulate faunistic, ecological, and evolutionary research on this group of parasitoids, which will eventually lead to a better understanding of the factors involved in their diversification.

Material and methods

Material studied and morphological analyses

I examined approximately 12,000 specimens, mainly from Switzerland, Sweden, Germany, Denmark, Finland and Great Britain, but also from all over the Western Palaearctic (as defined in Taxapad, Yu *et al.* 2012). No material could be examined from North Africa and only few specimens each from the Iberian Peninsula, Turkey and Israel. Although species richness in diplazontines appears to be highest in temperate, boreal and alpine environments, some taxa seem to be specialized to the Mediterranean climate, e.g. *Enizemum schwarzi* Diller and *Diplazon aubertiator* Diller. The Mediterranean region and the wider Near East thus deserve more detailed examination in the future. Furthermore, only some of the North American species have been studied, and additional synonyms with species described from that region might turn up in the future (cf. Dasch 1964a). Detailed locality data of more than 9,200 specimens are available as supplementary material [LINK]. Most of the material and the examined types are deposited in the following collections:

AEI	American Entomological Institute in Gainesville, Florida, USA
BMNH	Natural History Museum, London, United Kingdom
BNM	Bündner Naturmuseum in Chur, Switzerland
CAS	California Academy of Sciences, Department of Entomology, San Francisco, California, USA
ETHZ	Collection of the Eidgenössische Technische Hochschule in Zurich, Switzerland
FMNH	Finnish Museum of Natural History in Helsinki, Finland
SPRHU	Hokkaido University, Faculty of Agriculture, Sapporo, Japan
KZ	private collection of Kees Zwakhals, Leiden, Netherlands
MHNG	Muséum d'histoire naturelle in Geneva, Switzerland
MR	private collection of Matthias Riedel in Bad Fallingbostel, Germany
MZL	Musée de Zoologie in Lausanne, Switzerland
NatAar	Naturama Aargau in Aarau, Switzerland
NKME	Naturkundemuseum in Erfurt, Germany
NMBA	Naturhistorisches Museum in Basel, Switzerland
NMBE	Naturhistorisches Museum der Burgergemeinde Bern, Switzerland
NMF	Natur-Museum Senckenberg in Frankfurt, Germany
NMSZ	National Museum of Scotland in Edinburgh, United Kingdom
NRM	Naturhistoriska Riksmuseet in Stockholm, Sweden
RJ	private collection of Reijo Jussila in Turku, Finland
RMNH	Naturalis, Leiden, Netherlands
SDU	Suleyman Demirel University, Cunur-Isparta, Turkey
TAU	Tel Aviv University, National Museum of Natural History, Tel Aviv, Israel
TMA	Termeszettudomanyi Muzeum Allattara in Budapest, Hungary
USNM	National Museum of Natural History at the Smithsonian Institute in Washington, USA
UU	Uppsala Universitet in Uppsala, Sweden
UWL	University of Wyoming, Zoology Museum, Laramie, Wyoming, USA
ZIL	Zoologiska Institutionen in Lund, Sweden
ZIP	Zoological Institute, Academy of Sciences in St Petersburg, Russia
ZMUC	Københavns Universitet, Zoologisk Museum in Copenhagen, Denmark
ZMUO	Zoologisk Museum, Universitetets in Oslo, Norway
ZSM	Zoologische Staatssammlung in München, Germany

To denote body parts, I follow the nomenclature by Goulet & Huber (1993). Measurements were taken with a Leica Wild M10 stereo-microscope with a 10x ocular including an eye-piece micrometer. Because of the importance of the sculpture of the tergites, mesoscutum and mesopleuron for delimiting species in Diplazontinae, I examined all specimens under the same lighting, a 23W energy saving lamp which provided a uniformly soft light. To study and document the sculptural diversity and the morphology of several body parts, I used scanning electron

microscopy (SEM). The specimens used for examination were stored in 80% ethanol, and then were mounted, air dried and gold-sputtered for analysis. SEM studies were performed with a Philips XL30 FEG scanning electron microscope. For habitus images, specimens were photographed with a Canon EOS 7D with a Canon Macro lens EF 100mm, and the resulting images were stacked using Helicon Focus Pro.

Molecular methods

All the nuclear ribosomal internal transcribed spacer 2 (ITS2) sequences and 108 of the 188 cytochrome oxidase subunit 1 (CO1) sequences uses in this study were newly obtained, while the remaining CO1 sequences stem from two previous studies (Klopfstein *et al.* 2010a; Klopfstein *et al.* 2011). Genomic DNA was extracted from whole specimens preserved in 80% ethanol using the Promega Wizard kit for blood and tissue extractions. Vouchers and DNA samples are kept at the Natural History Museum in Bern and at the Naturhistoriska Riksmuseet in Stockholm (Appendix 1). Approximately 700 bp from the 5' end of CO1 (the "barcoding" region, Hebert *et al.* 2003) were amplified using the primers designed by Folmer *et al.* (1994) (LCO 5'–GGT CAA CAA ATC ATA AAG ATA TTG G–3', HCO 5'–TAA ACT TCA GGG TGA CCA AAA AAT CA–3'). To obtain between 800 bp and 1'100 bp of ITS2, I used the primers designed by Quicke *et al.* (2006) (forward: 5'–TGT GAA CTG CAG GAC ACA TG–3', reverse: 5'–ATG CTT AAA TTT AGG GGG T–3').

Polymerase chain reactions (PCR) were carried out in 20 µl final volumes using Promega GoTaq Flexi DNA Polymerase kits. Final volumes contained 30 pmol $MgCl_2$, 16 pmol of each primer, 4 pmol of each dNTP, 0.3 U Taq polymerase and 2 µl genomic DNA. PCR conditions were: 94°C for 2 min, 35 cycles of 30 s at 94°C, 30 s at the respective annealing temperature (51°C for *CO1* and 49°C for *ITS2*) and 1 min at 72°C, followed by a final extension at 72°C for 10 min. PCR products were either purified with the GFXTM DNA and Gel Purification kit (Amersham Biosciences) or by the purification service of Macrogen Korea. The PCR products were sequenced on an ABI 377 automated sequencer using Big Dye Terminator technology (Applied Biosystems). All sequences have been deposited in the GenBank database, the newly derived sequences under accession numbers JN626288 to JN626459 (Appendix 1).

The sequences of the protein-coding CO1 were manually aligned after translation into amino acids using Mega 4.0 (Tamura *et al.* 2007). Alignment was straightforward because no indels were detected. In ITS2, alignment posed more problems because of numerous indels of varying length. I thus aligned and analyzed the ITS2 data separately for the genera *Sussaba* Cameron, *Tymmophorus* Schmiedeknecht and *Woldstedtius* Carlson, using for the alignment the L-INS-I strategy included in the program MAFFT v6.240 (Katoh *et al.* 2002), a method that has been shown to outperform other methods in the presence of numerous large indels (Morrison 2006; Notredame 2007; Katoh & Toh 2008; Morrison 2009). Alignments and trees can be downloaded from TreeBASE (http://purl.org/phylo/treebase/phylows/study/TB2:S11994). The CO1 sequences were analyzed including ten ichneumonid species from other subfamilies as outgroups. Because the relationships among the pimpliform subfamilies, to which the Diplazontinae belong, are not known, I included many putative sister taxa to the Diplazontinae and in addition one species from a different ichneumonid clade as the functional outgroup (*Ichneumon* cf. *minutorius* Desvignes from the Ichneumoniformes, Quicke *et al.* 2009). Because of numerous indels detected in ITS2, I did not align these sequences at the subfamily level but instead obtained separate alignments for each genus of interest. I rooted these phylogenies according to prior knowledge about the intra-generic relationships obtained from the 28S data in a previous study (Klopfstein *et al.* 2011). Because 28S rRNA is very closely linked to ITS2, differences between gene histories should not pose a problem for this approach. Phylogenetic analyses were performed under maximum likelihood (ML) with the program RaxML, using the web-server interface (Stamatakis *et al.* 2008). The CO1 data were partitioned into combined first and second versus third codon positions. Clade support was assessed by 100 bootstrap replications. Pairwise distances were calculated in Mega 4.1 (Tamura *et al.* 2007) under the Kimura 2-parameter model (Kimura 1980) with pair-wise deletion.

Results

Molecular taxonomy

Morphological species delimitation was difficult in some species pairs or complexes, and I used molecular methods to test the morphology-based species hypotheses. The purpose of this analysis was not to obtain a phylogenetic hypothesis for the subfamily, which has been done elsewhere based on multiple genes (Klopfstein *et al.* 2011), but to delimit and circumscribe its species. The "barcode" region (Hebert *et al.* 2003) of the mitochondrial cytochrome oxidase subunit 1 (CO1) gene was sequenced for a large number of diplazontine species, and in the morphologically difficult cases, multiple specimens were included in the analysis. The resulting tree is shown in Figure 1, with the subtrees of those groups with a denser sampling compressed; the respective subtrees are shown in Figures 2–4 and 6. The subfamily Diplazontinae is not recovered as a clade on this CO1 tree, but its monophyly was demonstrated in previous studies (Klopfstein *et al.* 2010a; Klopfstein *et al.* 2011). At the genus and species level, the CO1 phylogeny reflects taxonomy well but with numerous exceptions. Some morphologically well-defined species of the genus *Diplazon* Nees share identical CO1 sequences. Resolution is also poor among several species of *Sussaba* and in the *Homotropus pictus* species group (sensu Dasch 1964a), and intra-specific pairwise distances among these taxa clearly overlap with the inter-specific, intra-generic distances. I thus added a nuclear marker to the study, the ribosomal internal transcribed spacer 2 (ITS2).

Using morphological methods, I found a second morphotype intermingled with the well-known *Sussaba erigator* (Fabricius), a parasitoid of the larvae of *Pipizella* species (Syrphidae) feeding on root-dwelling aphids (Fitton & Rotheray 1982). This new taxon is herein described under the name of *Sussaba roberti* **sp. nov.**, and females can be distinguished by several morphological characters (see species diagnoses). It proved very difficult to obtain fresh specimens of the new, rarer species for molecular analysis, and I could only include a single female specimen. The molecular analysis does not reveal a clear picture (Fig. 2A), with identical CO1 sequences of some specimens of *S. erigator* and the female *S. roberti* (range of pairwise distances of *S. roberti* to any of the *S. erigator* individuals: 0.000–0.005, intra-specific distances in *S. erigator*: 0.000–0.010). In ITS2 (Fig. 2B), the new species takes a basal position on the tree, and its minimum pairwise distance from any of the eight included *S. erigator* specimens is distinctly larger than any of their intra-specific distances (0.008 versus 0.003). The alignment reveals six bases and a single-nucleotide indel which differ between the two species, at least judging from this limited sample.

In the *Sussaba pulchella—Sussaba flavipes* clade of species, the identification of females based on morphology alone often causes problems (Diller 1980). Especially the distinction between *S. pulchella* (Holmgren) and *S. aciculata* (Ruthe) females requires some experience, while males can readily be distinguished by the shape and colouration of their tyloids. The molecular analysis shows that these two species are not sister species, but that the clade separates into two groups that are in accordance with tyloid morphology (Fig. 2A). *Sussaba aciculata* is very closely related to *S. flavipes* and to the Eastern Palaearctic *S. sugiharai* Uchida, from both of which it can readily be distinguished by the colour of the coxae and femora and the shape of the face (see species diagnoses). The two subspecies of *Sussaba dorsalis* (Holmgren), i.e. *S. dorsalis dorsalis* (Holmgren) with a European and Western North American range and *S. dorsalis cultriformis* (Ashmead) from Eastern North America, appear as distinct clades in both the CO1 and the ITS2 phylogeny (Fig. 2). Pairwise distances between the two subspecies range from 0.054 to 0.056, while intra-specific distances are below 0.002. But this large gap might be overstated because each subspecies was sampled at a single location only, the Swiss Alps in the case of *S. dorsalis dorsalis*, and Fairbanks in Alaska in the case of *S. dorsalis cultriformis*. However, the large inter-subspecific distance in any case suggests that *Sussaba cultriformis*, which is also morphologically distinct (Dasch 1964a), should be raised to species level (stat. rev.).

The genus *Tymmophorus* is represented in the Western Palaearctic by only four species and two of them are currently viewed as synonyms. *Tymmophorus suspiciosus* (Brischke) was treated as a variety of *Tymmophorus rufiventris* (Gravenhorst) by Hellén (1940) and accordingly interpreted by subsequent researchers (Dasch 1964a; Bordera *et al.* 2000). It went into synonymy with *Tymmophorus erythrozonus* (Förster) when this name was adopted for the taxon because *T. rufiventris* was found to be a primary homonym (Yu & Horstmann 1997). Morphological analyses revealed clear differences between the two taxa which allow reliable identification at least of females. Molecular analyses reveal the two species to be very closely related. In the CO1 tree, only *T. suspiciosus* is retrieved as monophyletic (Fig. 3), and intra-specific distances broadly overlap with the inter-

specific distances (0.000 to 0.008 and 0.003 to 0.008, respectively). The ITS2 tree is quite similar in that *T. suspiciosus* is nested within a non-monophyletic *T. erythrozonus*, but the molecular distances allow a clear separation of the two taxa (0.000 to 0.005 intra-specific compared to 0.030 to 0.036 inter-specific distance). As both species were sampled from multiple specimens both in Sweden and Switzerland (Supplementary Table 1), these distances can be interpreted as being truly inter-specific and not just reflecting inter-population distances. They stem from a total of 22 differing nucleotide positions and 5 indels found in ITS2. *Tymmophorus suspiciosus* (Brischke) is thus removed from synonymy with *Tymmophorus erythrozonus* (Förster) (stat. rev.).

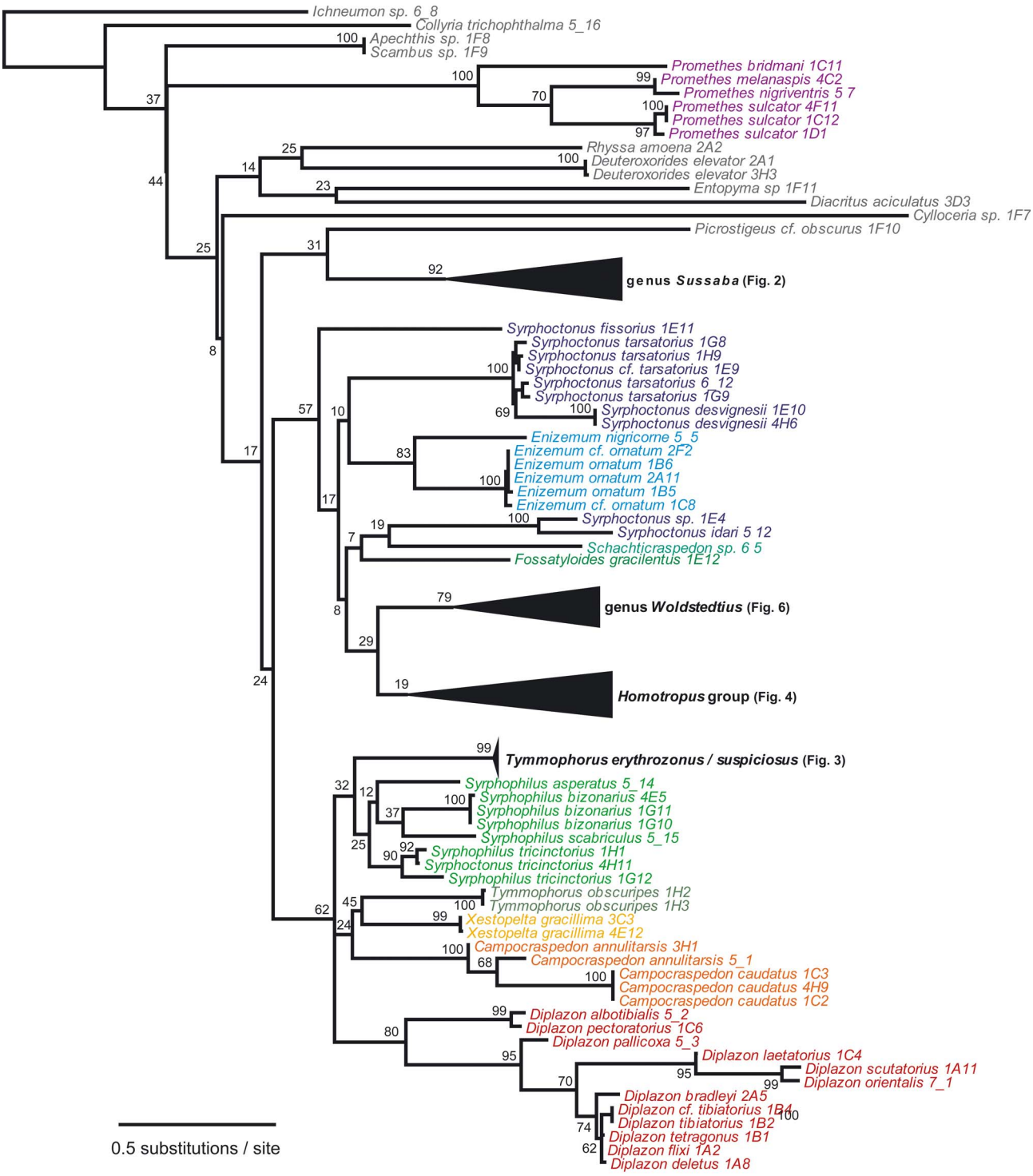

FIGURE 1. Phylogeny of Diplazontinae as obtained from cytochrome oxidase 1 (CO1) sequences, analyzed with RaxML. The tree with the highest likelihood score is shown with clade supports obtained by 100 bootstrap iterations. The black triangles represent subtrees shown in Figures 2–4 and 6. Places where the CO1 phylogeny does not reflect taxonomy were not recovered in a recent study that added other molecular markers.

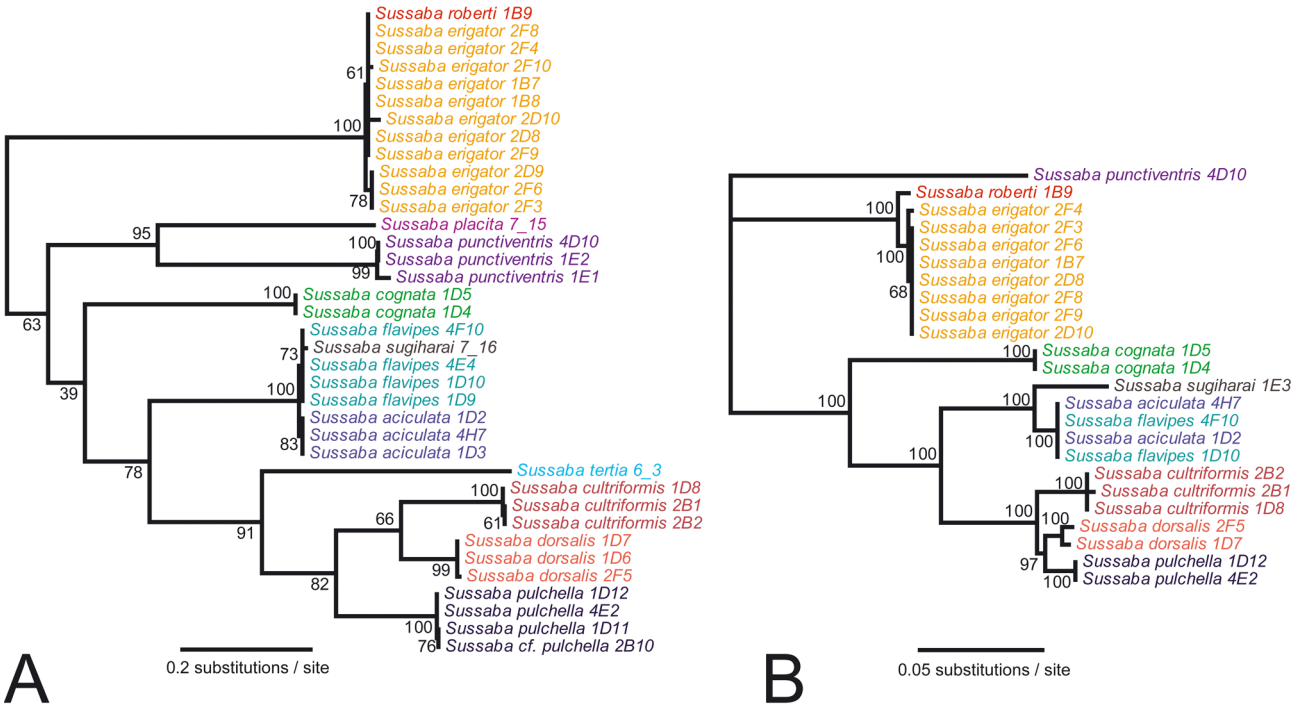

FIGURE 2. Phylogeny of specimens of the genus *Sussaba* as obtained from CO1 (A) and ITS2 sequences (B). The tree with the highest likelihood score is shown with clade supports obtained by 100 bootstrap iterations.

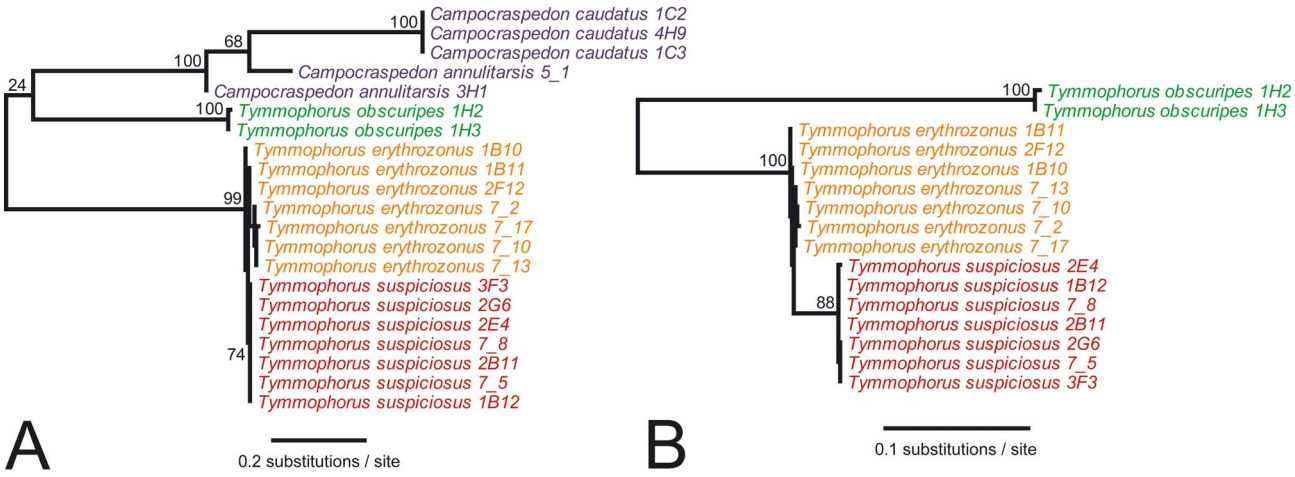

FIGURE 3. Phylogeny of specimens of the genus *Tymmophorus* as obtained from CO1 (A) and ITS2 sequences (B). The tree with the highest likelihood score is shown with clade supports obtained by 100 bootstrap iterations.

Especially the males of the *pictus* species group (as defined by Dasch 1964a) of the genus *Homotropus* Förster pose several problems for morphological identification. Although I could sample only part of the species, the molecular analysis allows confirmation of some species hypotheses, while it is inconclusive or even contradictory in others. Females of *Homotropus dimidiatus* (Schrank) can readily be identified by modifications of the ventral surface of the antenna (Fig. 5) which are not present in any other species with which it might be confounded. Males of this species are more difficult to place. In the CO1 phylogeny, *H. dimidiatus* is clearly separated from the other species of the species group (Fig. 4). The same applies to *Homotropus frontorius* (Thunberg). In this species, most females have characteristic orange markings on the lower mesopleuron and metapleuron, but these markings are missing in some specimens, as confirmed by such a specimen sharing an identical CO1 sequence with an individual having those markings (Fig. 4). The three species *Homotropus pictus* (Gravenhorst), *Homotropus longiventris* Thomson, and *Homotropus melanogaster* (Holmgren), however, cannot be readily separated on the

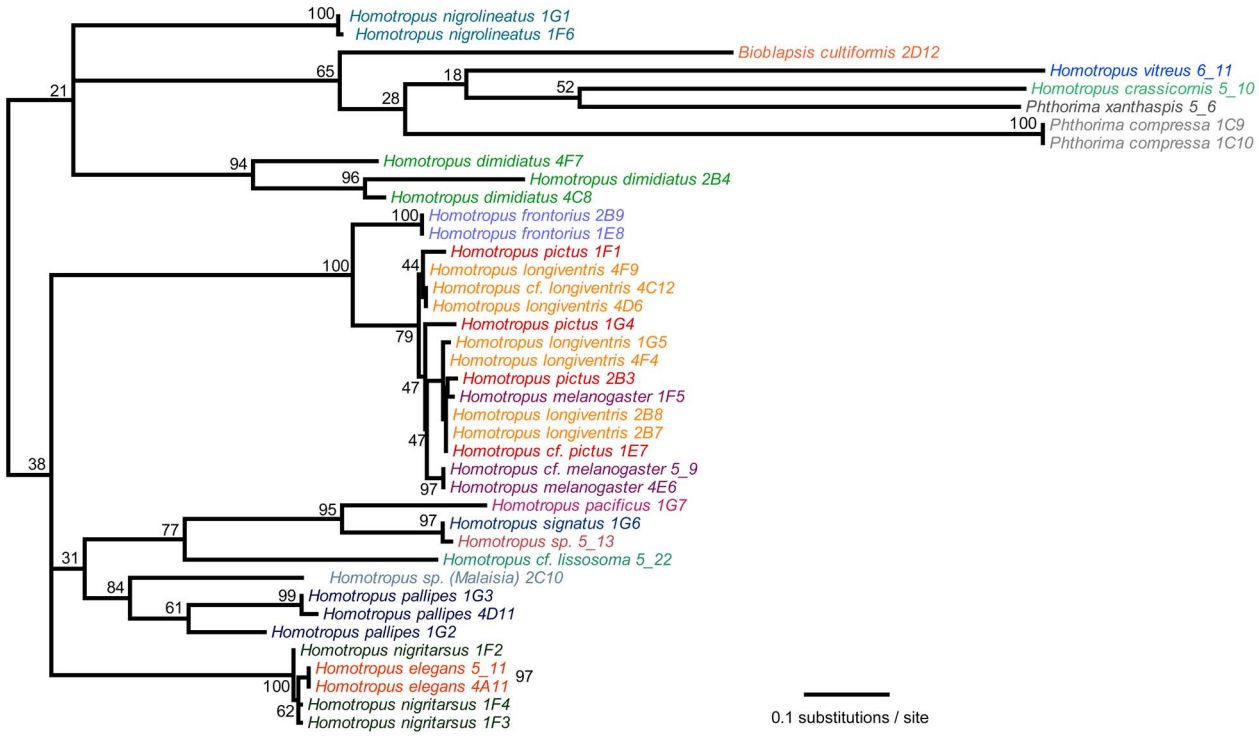

FIGURE 4. Phylogeny of specimens of *Homotropus* and related genera as obtained from CO1 sequences. The tree with the highest likelihood score is shown with clade supports obtained by 100 bootstrap iterations.

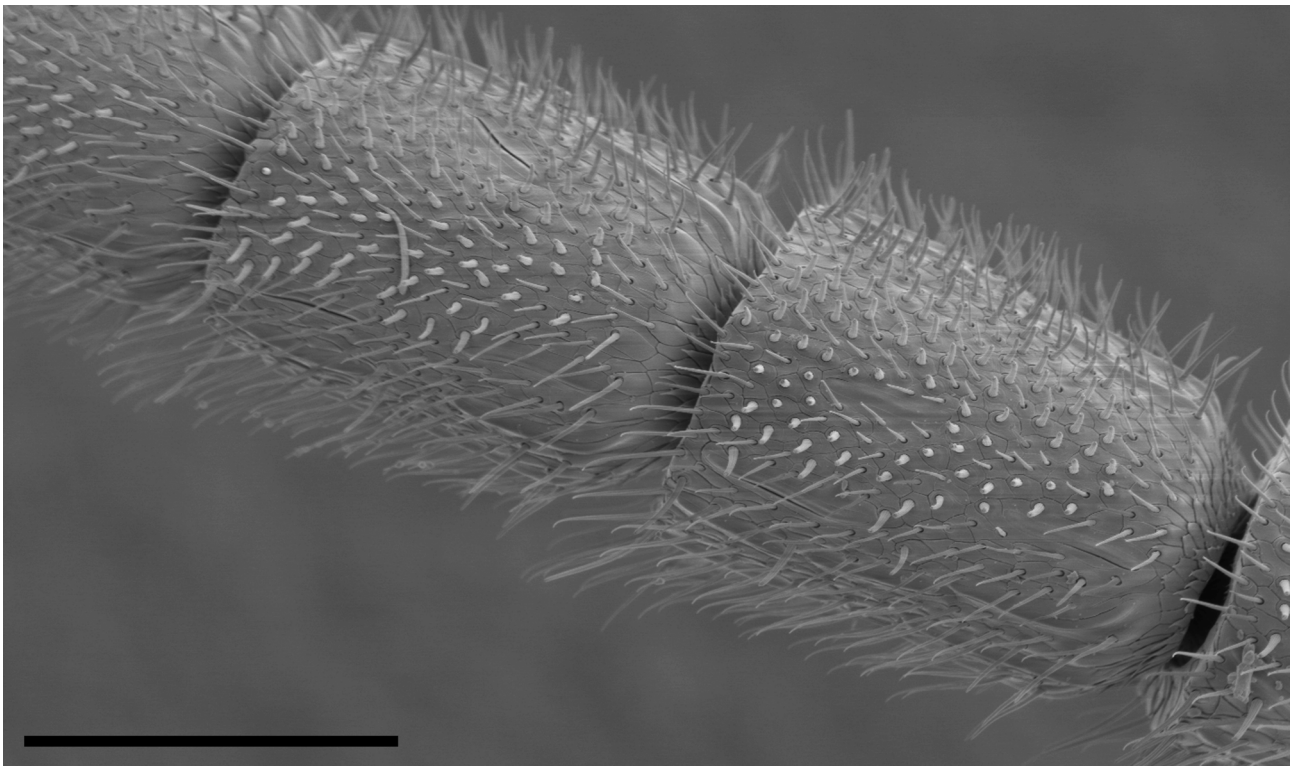

FIGURE 5. Ventral area of antennomeres 14 to 16 of a female *Homotropus dimidiatus* showing short, cone-like structures and the absence of multiporous plate sensillae, which in turn are abundant on the lateral and dorsal sides of the flagellomeres. The scale bar represents 100µm.

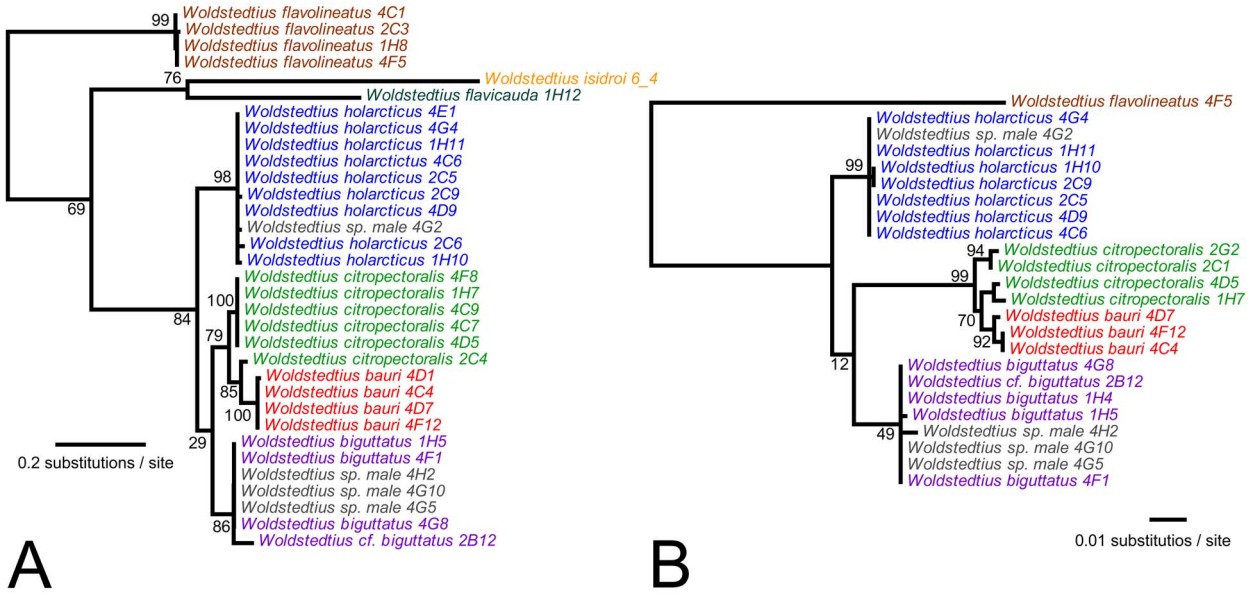

FIGURE 6. Phylogeny of specimens of the genus *Woldstedtius* obtained from CO1 (A) and ITS2 sequences (B). The tree with the highest likelihood score is shown with clade supports obtained by 100 bootstrap iterations.

basis of their CO1 sequences. Although the males of this species complex are difficult to place, several characters separate the females. Moreover, *H. pictus* and *H. longiventris* attack different hosts (*Platycheirus scutatus* (Meigen) and *Baccha elongata* (Fabricius), respectively; Rotheray 1984; G. Rotheray, pers. comm.), while nothing is known about the host relations of *H. melanogaster*. The fact that *Homotropus elegans* (Gravenhorst) clusters inside a paraphyletic *Homotropus nigritarsus* (Gravenhorst) further adds to the impression that CO1 sequences do not reflect species boundaries very well in this genus. ITS2 sequences of *Homotropus* could not be obtained for this study and further analyses using additional markers with an increased taxon sampling are necessary.

Most Western Palaearctic species of the genus *Woldstedtius* are very uniform in appearance. Morphological identification often has to rely on colour characters and obscure shape differences only, which can vary considerably, and reliable characters to place males in this genus are to date missing. On the other hand, both CO1 and ITS2 data reveal clear differences between the four most commonly encountered species, *Woldstedtius flavolineatus* (Gravenhorst), *Woldstedtius holarcticus* (Diller), *Woldstedtius biguttatus* (Gravenhorst) and *Woldstedtius citropectoralis* (Schmiedeknecht) (Fig. 6), and allow secure placement of some male specimens. Clustering with *W. citropectoralis* but forming an independent clade, are specimens belonging to a previously undescribed species, *Woldstedtius bauri* **sp. nov.** Although this species renders *W. citropectoralis* paraphyletic, both morphology and the molecular markers support the existence of this additional species. There are not many nucleotide substitutions which distinguish *W. bauri* **sp. nov.** from *W. citropectoralis*, but there is a 15bp deletion in ITS2 as a putative molecular synapomorphy of *W. bauri* **sp. nov.**

Subfamily Diplazontinae

Classis Hexapoda Blainville
Ordo Hymenoptera Linnaeus
Subordo Apocrita Latreille
Superfamilia Ichneumonoidea Latreille
Familia Ichneumonidae Latreille
Subfamilia Diplazontinae Viereck

The subfamily Diplazontinae is one of the more easily recognized ichneumonid subfamilies. Its monophyly with respect to members of Cylloceriinae, Orthocentrinae, and several other pimpliform subfamilies has recently been demonstrated based on data from four molecular markers (Klopfstein *et al.* 2011). Diagnostic features include the

three-toothed mandibles, the rectangular, box-like first tergite, comparatively short propodeum, short ovipositor, and transverse head. The only diplazontine species that lacks the typical, three-toothed mandibles and has a comparatively long ovipositor, *Episemura diodon*, might be difficult to place in this subfamily. The other characters, however, clearly show its affiliation with this group. For identification at the subfamily level, the keys in "Hymenoptera of the World" (Goulet & Huber 1993; Wahl 1993) or Townes' keys can be used (Townes 1969).
Seventeen of the 22 recent genera occur in the Western Palaearctic and are treated here. Fourteen of these have been included in recent molecular and morphological phylogenetic analyses of the subfamily (Klopfstein *et al.* 2010a; Klopfstein *et al.* 2011). These studies recovered three strongly supported genus-groups, the *Sussaba* group consisting of *Promethes* and *Sussaba*, the *Syrphoctonus* group including *Bioblapsis*, *Enizemum*, *Fossatyloides*, *Homotropus*, *Phthorima*, and *Syrphoctonus*, and the *Diplazon* group encompassing *Campocraspedon*, *Diplazon*, *Syrphophilus*, *Tymmophorus*, and *Xestopelta*. Even though these groups were treated as informal, some morphological and behavioural characters were suggested to circumscribe these groups (Klopfstein *et al.* 2010b; Klopfstein *et al.* 2011). I here use these informal groupings for reference, and add the three Western Palaearctic genera as follows: *Episemura* and *Eurytyloides* to the *Sussaba* genus group, based on a close association with *Sussaba* as suggested by, e.g., the lateral position of the spiracle of the second tergite, and *Daschia* to the *Diplazon* genus group based on the structure of the male terminal sclerites and several similarities to *Campocraspedon* (see genus diagnoses).

Assessment of morphological characters

For the identification of diplazontine genera, structural characters proved most useful, although colour patterns can also be very informative. Many genera, e.g. *Campocraspedon* Uchida and *Phthorima* Förster, can most easily be determined from the shape of the female metasoma, which is strongly modified, probably in order to reach their host in some substrate. These modifications are far less obvious in most male specimens, which also show a larger intra-specific variability than females in other characters. Males are thus often more difficult to place than females. An exception is the *flavipes-pulchella* species complex in the genus *Sussaba*. The shape and colour of the tyloids, i.e. male-specific structures involved in courtship behaviour, allow males to be distinguished very easily even in species where females are difficult to tell apart (Klopfstein *et al.* 2010b; Steiner *et al.* 2010). The sexual dimorphism can be quite extensive in many species, especially where colouration or metasomal shape is concerned. In general, females have a mostly black face, often with some yellow markings, while the face of most males is entirely yellow. However, there are numerous exceptions to this rule, and the external genitalia should be taken into consideration when determining the sex of a specimen. In the following, I discuss the utility, the different states, intra-specific variability and visibility of different morphological characters or character systems in order to facilitate the use of the identification keys and species diagnoses. After discussing measurements, sculpture and colouration in general, I arrange the characters according to their appearance on the adult wasp, starting with the antennae and proceeding back from there.

Measurements: I refrained from the extensive use of morphometry for delimiting and identifying diplazontine species, as it requires a lot of work from the user of the keys, and furthermore, many morphometric characters are fairly variable even within species of Diplazontinae. In general, length and width were measured at the longest or widest part of a body part. The relative length and width of the first three tergites proved very useful in several genera, and the observed range of ratios is given for those. Tergite length was always measured in lateral view and along the side of the tergites, and width at the broadest position in the posterior quarter of the tergite.

Sculpture: The macro- and microsculpture of the face, mesosoma and of the tergites is important, especially for identification at the species level. Some closely related species in the genera *Diplazon* and *Homotropus* can only be identified by careful examination of the sculpture, and although especially males often show considerable intra-specific variation in sculptural characters, it is usually constant enough to allow reliable determination. However, the nomenclature for sculpture varies extensively between authors. Eady (1968) published an illustrated guide that allows some standardization of sculpture terminology. Not all his categories fully reflect the sculpture found in Diplazontinae. In general, I follow Eady's nomenclature but additionally provide SEM micrographs showing the respective states as they are found in Diplazontinae (Fig. 7). Mostly, I use the terms "smooth" and "coriaceous" for microsculpture, and "rugose" and "punctate" for larger sculptural elements.

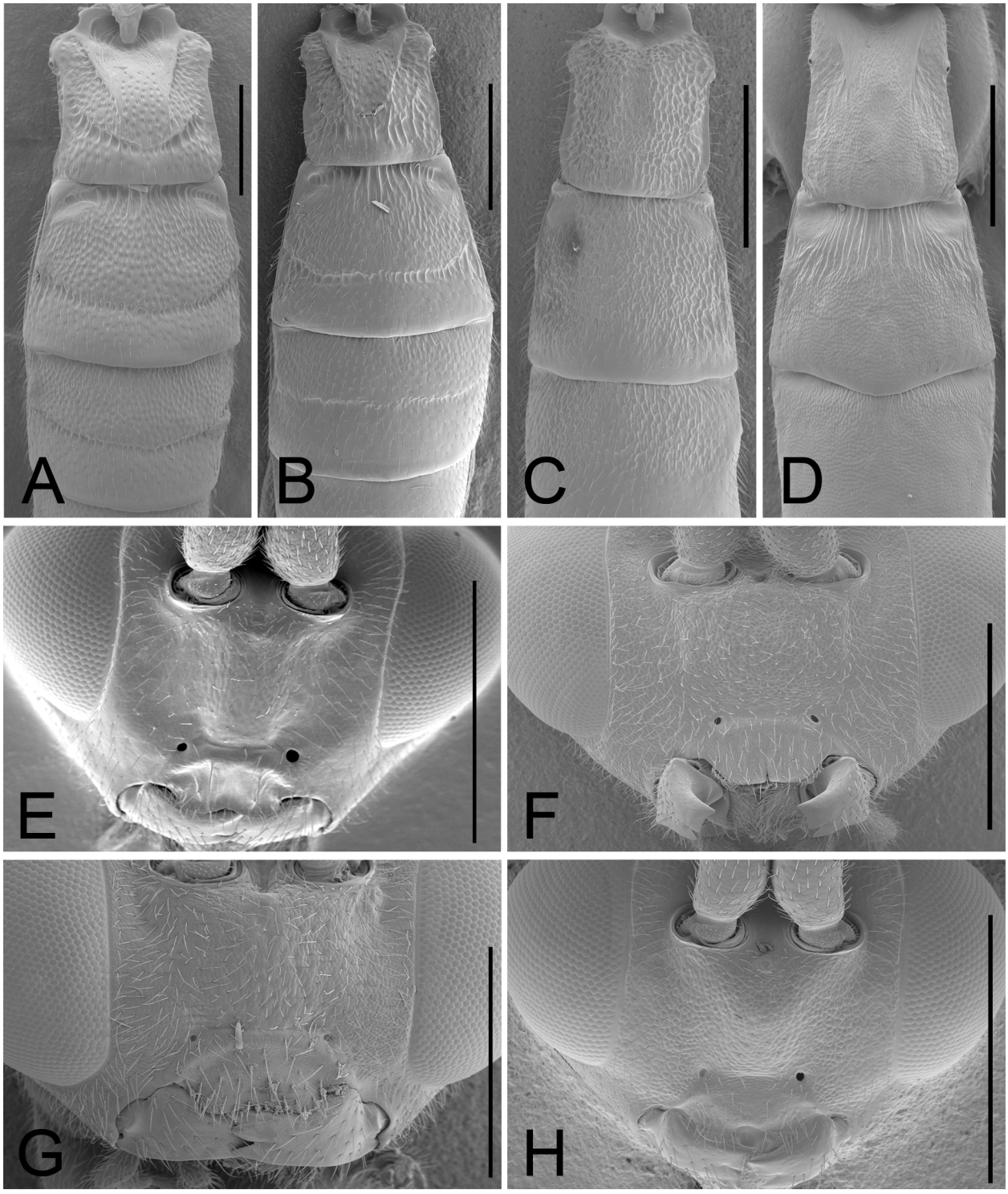

FIGURE 7. Macro- and microsculpture of diplazontine metasomas and faces. A–D: tergites 1–3 of the metasoma. A. *Diplazon scutatorius*, smooth and shining between the strong and dense punctures. B. *Diplazon tetragonus,* with partly rugulous sculpture basally on tergite 2, and coriaceous sculpture on tergite 3, both tergites bearing weak punctures on a smooth background behind the strong transverse impressions. C. *Tymmophorus obscuripes*, with rugose sculpture on tergites 1 and 2, becoming more coriaceous on tergite 3. D. *Woldstedtius holarcticus*, with coriaceous tergites and striae basally on tergite 2. E–H: faces showing sculpture and shape of clypeus. E. *Sussaba flavipes*, with a face that is coriaceous only on the middle elevation. F. *Woldstedtius holarcticus.* G. *Diplazon scutatorius.* H. *Homotropus signatus*. F.–H. all with strongly coriaceous and matt sculpture. Scale bars represent 500 µm.

Colouration: Colouration of diplazontines is particularly variable and thus provides a large number of characters, some of which are highly informative at species and even at higher levels. I use the same expressions as previous authors to denote colours in diplazontines, with the exception of using "orange" for a colour that was usually referred to as "red" in the literature. This is first in order to more accurately report the situation in the observed specimens, and second to distinguish this prevalent color from a darker, truly red colouration found in some species. When using colour characters, one should bear in mind that older specimens often lose a lot of their colouration, especially if kept in alcohol, and a black metasoma can thus appear brown and a yellow spot almost white in older material. The expressions "dark", "black" and "brown" can thus be interpreted as being largely interchangeable.

Antennal length: I here number the flagellomeres without counting the first two antennal segments (i.e. the scape and pedicel). The number of flagellomeres is a very important character in defining some of the species. Intra-specific variation was found to be relatively low, ranging between 0 to 3 flagellomeres. As expected, variation was lower in species with shorter and higher in species with longer antenna, and in general higher in males.

Ventral surface of antenna: Some females have the ventral surface of the middle to apical flagellomeres covered with conical sensilla of unknown function (Fig. 5). This character has been noted by Dasch (1964a) for *Homotropus dimidiatus*, but it is also present in many species of other genera and seems to be a rather homoplasious character. The conical sensilla are always distinctly shorter than the trichodeal sensilla and are often difficult to see in light microscopy, as they only appear as a matt, velvety pile. Their presence is more easily deduced from the absence of multiporous plate sensilla on the ventral surface, which can be assessed by comparing the ventral to the dorsal surface of the antenna.

Tyloids: In males, the presence or absence, location, shape and colouration of convex structures on the outer surface of the antenna, the tyloids, provide important characters for identification at the genus and species level. While the broad tyloids as found in the genera *Sussaba* and *Enizemum* Förster are very obvious, the narrow tyloids of *Promethes* Förster, *Homotropus* and *Syrphoctonus* Förster are more difficult to see, especially if the antenna is paler ventrally than dorsally, in which case the location of the colour transition often coincides with the tyloid location. Careful examination of the antenna from different angles is needed in such cases.

Face: The shape, microsculpture and colouration of the face provide some reliable characters. The shape is useful to delimit some species within the genera *Sussaba* and *Woldstedtius*, for which drawings are provided in the key. However, it has to be noted that some aspects of the shape cannot be captured by two-dimensional illustrations, as some distinct differences involve the third dimension as well. The face can be variously sculptured, ranging from being mostly smooth and shining to strongly sculptured and matt (cf. Fig. 7). Moreover, there is a varying degree of punctation of the face. In most species of the genera *Sussaba* and *Promethes*, there are vertical impressions starting from the tentorial pits and pointing towards the antennal bases, thus separating the median, often elevated part from the remainder of the face. The impressions are most distinct towards the clypeus and become indistinct about at mid height of the face. The colouration of the face is also a good character, especially in females where the presence and absence of yellow markings along inner orbits provide a good means to distinguish most genera of the *Diplazon* genus group from the remainder. The yellow central face patch found in some species of each of the three genus groups is in contrast less reliable because of a larger intra-specific variability but can still provide a good character in some species.

Clypeus: The shape of the clypeus is often genus-specific, and figures are provided along with the key. Besides the extent to which the apical margin is emarginate and thus forms two lobes, the shape of the clypeus when viewed from the side is especially important. In most genera, the apical margin of the clypeus is thin, while it is conspicuously thickened in the genera *Daschia* Diller, *Xestopelta* Dasch and *Campocraspedon*. This condition might represent a synapomorphy of these three genera and thus point to them being closely related. However, recent phylogenetic analyses of the subfamily did not include *Daschia*, and are somewhat equivocal about the placement of *Xestopelta* (Klopfstein *et al.* 2010a; Klopfstein *et al.* 2011). The clypeus is often either impressed right below a basal thickening, which gives it a concave appearance when viewed from the side, or it is impressed along the apical margin, which renders it convex basally. The former condition can be found in most genera of the *Sussaba* and *Diplazon* genus groups, the latter in *Fossatyloides*, *Homotropus* and *Phthorima*. However, there are a number of species which are intermediate to these two states, with the subbasal impression only present laterally and with an apical impression medially (e.g. in the genera *Syrphoctonus*, *Enizemum* and *Woldstedtius*). The clypeus characters thus require some experience, especially in those genera, and are often less stable in males.

Mesoscutal colouration: The mesoscutum of most species is either black or brown, or it bears two yellow or whitish spots at the anterolateral corners, which I call "shoulder marks". These can be very small spots to large, triangular shapes, and sometimes their inner corners extend back over most of the mesoscutum (cf. Fig. 13D).

Notauli: While reaching over the entire length of the mesoscutum in some other ichneumonids, the notauli in Diplazontinae, if present, are quite short and often only present on the inclining part at the front of the mesoscutum (Fig. 8). They should thus be searched for not only from a dorsal but also from a lateral view. Usually, they represent reliable characters but vary in some species, for which I tried to control in the species keys (e.g. some male specimens of *Syrphophilus tricinctorius* (Thunberg)).

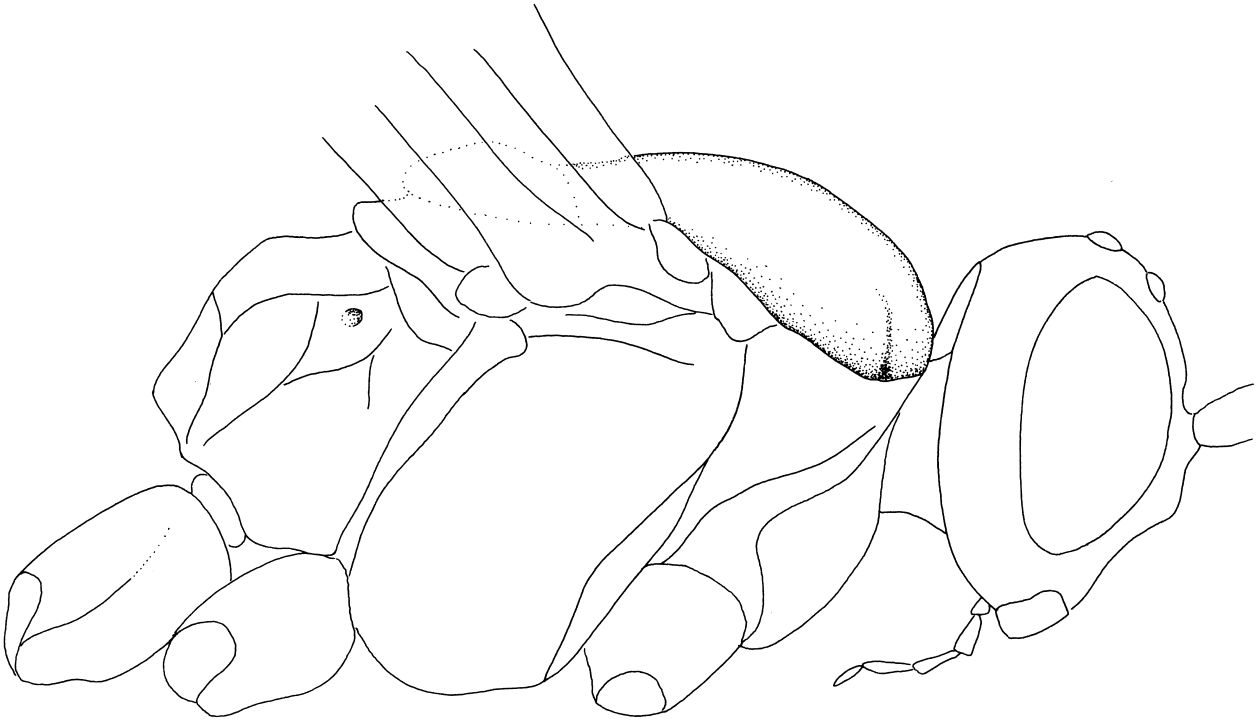

FIGURE 8. Line drawing of the head and mesosoma of a *Diplazon* species, showing the mesoscutum, emphazising the notauli, shallow impressions starting on the lateral front corner.

Scutellum: The scutellum often offers quite reliable color characters, as it can bear a yellow, whitish or even orange apical spot which can cover up to the entire scutellum, or it has an apical spot and two lines along its sides. Furthermore, the scutellum is often partly enclosed laterally by carinae in the *Sussaba* genus group, while it has very short lateral carinae which only just cross the prescutellar groove in other genera.

Colouration of coxae: The coloration of the coxae, especially the hind coxa, is a useful character for some species and species groups. However, it can exhibit a lot of intra-specific variation, again especially but not exclusively in males. In some species with orange hind coxae, individuals with partly dark coxae can be found at higher altitude, and individuals with intermediate states occur regularly, i.e. with the orange hind coxa dark only basally. In other taxa, e.g. the former subspecies of *Sussaba dorsalis*, analysis supports the value of this character for species delimitation. The variability of coxa colouration is discussed in more detail in the species concerned.

Colouration of hind tibia: Many species have a yellow or orange hind tibia, often with the apex dark to varying degrees. In the genera *Campocraspedon*, *Diplazon*, *Syrphoctonus* and *Homotropus* however, there are species with whitish hind tibiae that can be variously brown or black banded. In *Diplazon*, either only the apex or more usually the apex and the base are dark. In *Homotropus*, many species have a dark apex and a subbasal dark spot. These colour patterns can be less distinct in males. It can also be difficult to distinguish between yellow and white on the tibia, especially in older museum specimens, but a comparison with the yellow or orange front and mid tibia can help in such cases. In the genera *Woldstedtius* and *Enizemum*, most species have black hind tibiae with a white base. The white colouration in these genera can extend further down on the inner side of the tibia, especially in males.

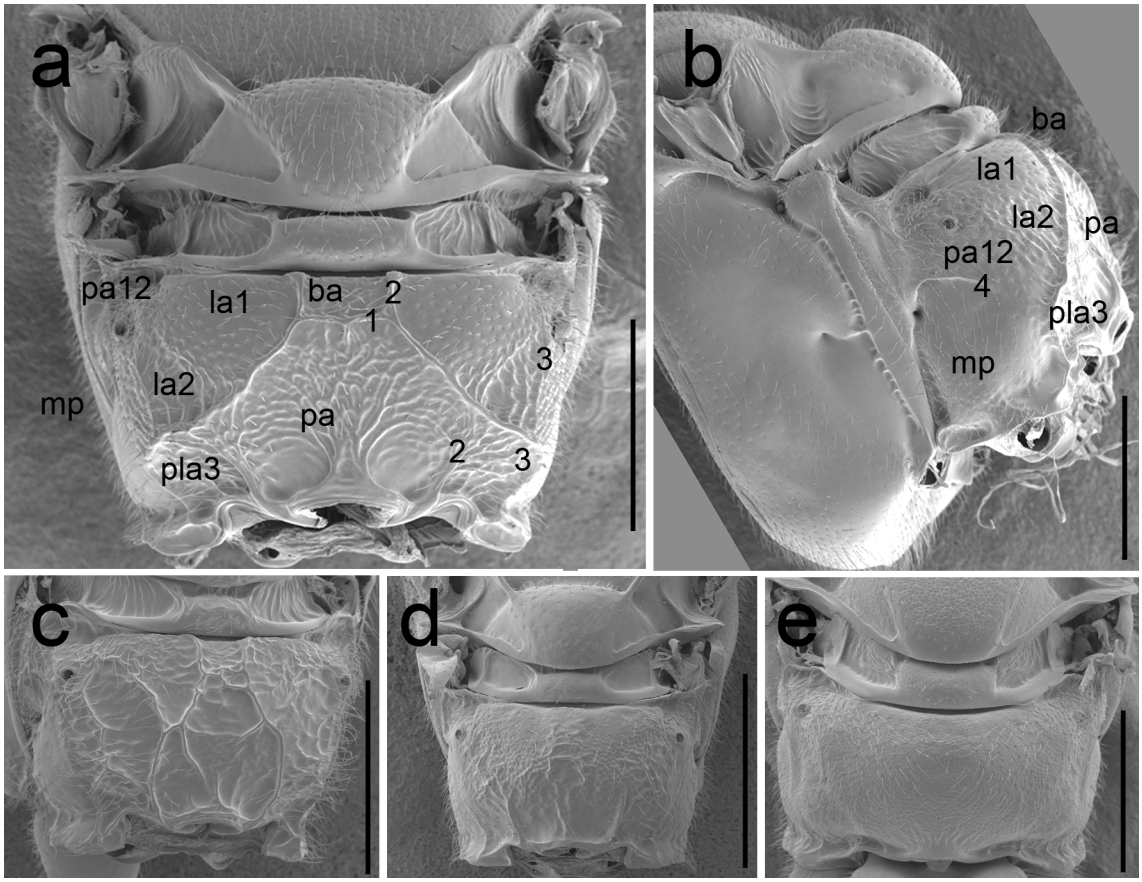

FIGURE 9. Propodeum of diplazontine species. A. propodeum of *Diplazon scutatorius* with areas and carinae as termed by Townes (1965) marked. ba=basal area, pa=petiolar area (fused with areola, see 9C), la1=first lateral area, la2=second lateral area, pla12=fused first and second pleural areas, pla3=third pleural area, mp=mesopleuron, 1=transverse carina, 2=median longitudinal carina, 3=lateral longitudinal carina, 4=pleural carina. B. same as A, but viewed laterally. C. Propodeum of *Tymmophorus obscuripes* with full carination and even an indication of the areola between the basal and petiolar areas. D. Propodeum of *Homotropus signatus* with carinae partly reduced but with the posterior ends of median and lateral longitudinal carinae present and transverse carina indicated by rugae. E. Propodeum of *Woldstedtius holarcticus* with carinae completely reduced. Scale bars represent 500 μm.

Wing venation: The venation both of fore and hind wings is very constant in diplazontines and ichneumonids in general when compared to other hymenopteran groups. In the fore wing, the presence or absence of the areolet (i.e., the presence or absence of vein 3rs-m) is useful for separating most specimens of the genera *Enizemum*, *Homotropus* and *Phthorima* from other genera. However, this character also shows considerable variation, with the outer vein (3rs-m) often not being pigmented at all. In some species (e.g. *Syrphoctonus tarsatorius*), I have even found individuals with the areolet open in the right and closed in the left fore wing, or vice versa. To account for this variation, I allow some species to be keyed through both parts of the couplets. In any case, if there is some indication of vein 3rs-m that closes the areolet, no matter how incomplete, it should be regarded as present. Otherwise, wing venation is of minor value for species identification, as it is very constant. The few variable characters, e.g. the position of vein CU+cu-a opposite or distal of vein M or the length and position of vein 2/Cu in the hind wing, which have been used in the past, usually vary a lot within a species and thus proved to be of little use. The same applies to the ratio between the length of vein 2rs-m and its distance from vein 2m-cu. This ratio is comparatively small in most species of the *Diplazon* genus group but often does not provide reliable means for identification.

Basal hamuli of hind wing: The number of basal hamuli present distal to the costella in the hind wing is a good character to separate most species of the *Sussaba* genus group from the remaining diplazontines. These species have only one basal hamulus, with the exception of some specimens of *Promethes nigriventris* and *P. melanaspis*. No species of the other genus groups have only a single hamulus, exept for the very distinctive *Bioblapsis polita*, which can have 1–3.

Propodeum: The naming of the propodeal carinae and areas follows Townes (1969) (Fig. 9). The propodeum in Diplazontinae is shortened compared to other ichneumonids and the carination is reduced. A complete set of carinae in Diplazontinae encloses along the midline only the basal area and a large petiolar area, while the areola present in other ichneumonids is fused with the large petiolar area, as deduced from some specimens of *Tymmophorus* where it is still indicated (Fig. 9c). The first and second lateral areas are only incompletely separated, and the third lateral and pleural areas are fused as well (Fig. 9a). In many species, this carination is futher reduced (Fig. 9d), up to an almost complete reduction of carinae in most *Syrphoctonus* and *Woldstedtius* species (Fig. 9e). If the propodeum is rugose, it can sometimes be difficult to distinguish between the presence and absence of particular carinae. Especially in species which have their carination partly reduced (e.g. *Homotropus signatus*), there is often considerable intra-specific variation. However, it is usually sufficient to assess whether the carination is reduced to traces of the lateral carinae, or if at least the basal and petiolar areas are fully enclosed by carinae.

Shape of metasoma: The metasoma of Diplazontinae is either dorsoventrally depressed or laterally compressed, or any state inbetween. In the genus *Sussaba* for instance, the metasoma of some species is laterally compressed only at the tip, gradually tapering from the third segment, while it is strongly compressed from the base of the third segment to the apex in others. The metasoma can be so strongly compressed that it is almost blade-like, visible only as a line when viewed from above. Lateral compression or strong depression is in some species combined with tergites that extend further back laterally than medially, rendering their hind margins concave when viewed from above. The functional significance of these modifications is not fully understood, but some species of *Phthorima* have been shown to be associated with syrphids that feed in aphid colonies which form galls or wax layers; they can only be reached with an especially thin or long metasoma. In *Xestopelta gracillima*, the degree of concavity of the tergites varies considerably between individuals, from indistinct to quite strong. For the other genera, this character is reliable at least in females. Concave hind margins of the tergites are also present in males of some species but are far less distinct, and males thus require special attention when it comes to this character.

Transverse impressions on tergites: In the genus *Diplazon*, tergites 1 to 3 or 4 bear transverse impressions that range in strength from deep impressions that bear transverse carinulae on the first tergite to a mere change in sculpture on the third and fourth tergites (cf. Fig. 7A and 7B). Although in general a reliable character, other genera of the *Diplazon* genus group can also have weak impressions on the first two tergites, which can make the distinction between these genera more difficult. For example, the impressions are rather weak in *Diplazon pectoratorius* (Thunberg) and *Diplazon neoalpinus* Zwakhals, where they are sometimes not stronger than in some specimens of *Syrphophilus* Dasch. I control for this in the keys.

Spiracles of the second and third tergites: The spiracles of both the second and third tergites vary in their location. In the genera *Sussaba*, *Episemura* Kasparyan & Manukyan, and *Eurytyloides* Nakanishi, they are both located on the laterotergites, below the lateral fold which separates the dorsal from the lateral part of the tergite; in *Promethes, Campocraspedon* and some *Homotropus* species, only the third spiracle is on the laterotergite; in all other diplazontines, they are both on the dorsal parts of the tergites, above the lateral folds. The laterotergite is usually inflexed in dried specimens; especially the spiracle of the second tergite might in such cases be difficult to see. Its location on the laterotergite can then be deduced from its absence from the dorsal part of the tergite, but care should be taken not to mistake the sometimes conspicuous, irregularly oval muscle insertion on the second tergite for a spiracle. For the third tergite, the situation is a bit more complicated. Especially in species with a laterally compressed metasoma, the fold separating the dorsal from the lateral part of the tergite is often indistinct at the level of the spiracle. The latter is then often located rather behind than below the lateral fold. However, if the spiracle is dorsal, it is often distinctly so, and in case of doubt, a positioning on the same level as the fold should be regarded as being below.

Shape of ovipositor sheaths: The shape of the ovipositor sheath, especially of the tip, can provide good characters for identification at genus level. In the genera *Woldstedtius* and *Enizemum*, the rather stout ovipositor sheaths are transversely truncate and open at the apex, not enclosing the ovipositor at the tip. In other genera, the ovipositor sheaths are closed at the tip and thus not exposing the ovipositor. In the genera *Homotropus* and *Syrphoctonus* however, there are a number of species that also have truncate ovipositor sheaths, but they are more tapered and thus narrower than in *Woldstedtius* and *Enizemum*. Futhermore, the truncation is more apical and thus only involving the already narrower part and not a broad truncation. Finally, the truncation is oblique rather than transverse in comparison to the axis of the ovipositor.

Terminal tergites and sternites of males: The use of the ninth and tenth tergites and the ninth sternite in males for genus or higher-level taxonomy has been demonstrated by various authors (Beirne 1941; Dasch 1964a). The ninth and tenth tergites are fused to form a syntergum in the *Sussaba* and *Diplazon* genus groups, while they are present as separate tergites in the *Syrphoctonus* genus group (Fig. 10). The shape of the ninth sternite provides a good synapomorphy for the *Sussaba* genus group, in which it is convex apically, thus appearing unilobate. In the other two genus groups, it is emarginate, forming two lobes. Because these characters require dissection of the male metasoma, I have not included them in the keys but only refer to the respective states in the genus diagnoses. The value of these structures for species delimitation are not well understood. While considerable variation can be observed, it is unclear how much of it is inter- and how much intra-specific. Furthermore, preparation of the tergites can result in some artifacts because of convexity of the sclerites. I thus only used these character sources for higher-level taxonomy. For those species not already illustrated elsewhere (Beirne 1941; Dasch 1964a), I provide figures of the male terminal sclerites.

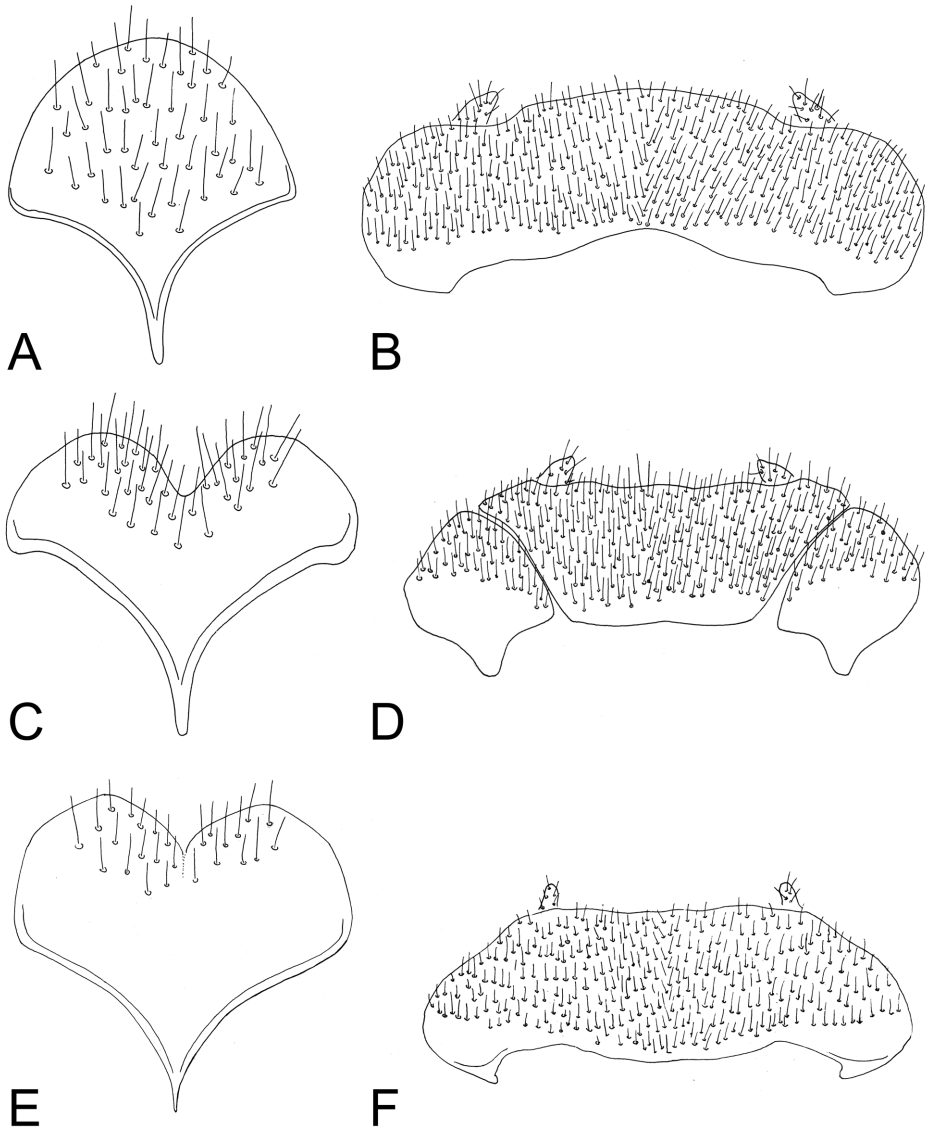

FIGURE 10. Terminal sternites and tergites of male representatives of the three genus groups of Diplazontinae. A, C, E: twelfth sternite. B, D, F: ninth and tenth tergites, which can be fused to form a syntergum (B, F), or present as separate sclerites (D). A, B: *Sussaba aciculata* of the *Sussaba* genus group. C, D: *Homotropus nigritarsus* of the *Syrphoctonus* genus group. E, F: *Diplazon flixi* of the *Diplazon* genus group.

Key to the Western Palaearctic genera of Diplazontinae

1. Metasomal tergite 2 with spiracle on laterotergite, well below lateral fold (Fig. 11A). Hind wing with one basal hamulus (Fig. 11C) 2
- Metasomal tergite 2 with spiracle on dorsal part, above lateral fold (Fig. 11B). Hind wing with one or more basal hamuli (Fig. 11D) 4
2. Female with metasomal tergites 4–6 with hind margins convex, extending at least as far back dorsally as laterally (Fig. 11E). Ovipositor sheaths at most 0.5 times as long as hind tibia. Scutellum with lateral carinae usually extending at least to middle (Fig. 11G). Face usually with large smooth areas; if entirely coriaceous (*S. punctiventris* and *S. placita*), then tyloids of male located around flagellomeres 6 to 8 and more than half as long as respective flagellomeres . . . . . *Sussaba*
- Female with metasomal tergites 4–6 with hind margins concave, extending further back laterally than dorsally (Fig. 11F); if indistinct (sometimes in *Episemura*) then ovipositor sheaths at least 0.6 times as long as hind tibia. Scutellum with carinae distinct only on about basal third (Fig. 11H). Face largely to entirely coriaceous. Tyloids of male either restricted to first three flagellomeres (*Eurytyloides*) or less than half as long as respective flagellomere (*Episemura*) 3
3. Ovipositor sheath more than 0.6 times as long as hind tibia, basal half transversely striate (Fig. 11I). Mesoscutum, scutellum and mesopleuron strongly punctate, distance between punctures less than their diameter . . . . . *Episemura*
- Ovipositor sheath less than 0.5 times as long as hind tibia, smooth and polished (Fig. 11J). Mesoscutum, scutellum and mesopleuron mainly smooth and shining, at most with some weak punctures that are more than their diameter apart . . . . . *Eurytyloides umbrinus* **sp. nov.**
4. Mesoscutum with notauli distinctly impressed, although quite short (Fig. 12A). Fore wing areolet always open (Fig. 12C) . . 5
- Mesoscutum with notauli absent (Fig. 12B). Fore wing areolet open or closed (Fig. 12D) 10
5. Face smooth and shining, sometimes weakly punctate, with two vertical impressions arising from tentorial pits (Fig. 12E). Spiracle of third tergite on laterotergite (Fig. 11B). Hind wing often with only one (Fig. 11C) but sometimes with more basal hamuli . . . . . *Promethes*
- Face not entirely smooth, at least distinctly punctate but usually coriaceous and matt, never with vertical impressions arising from tentorial pits (Fig. 12F). Spiracle of third tergite on dorsal or on lateral part. Hind wing usually with two or more basal hamuli (Fig. 11D) 6
6. Clypeus with apical margin thin and often with a basal elevation, concave or flat in profile; apical margin often bilobed but sometimes truncate or evenly concave (Figs 12G, 12H). Females with face black with yellow along inner orbits and sometimes with a central yellow spot 7
- Clypeus with apical margin thickened, convex and protruding in profile; apical margin convex, truncate or weakly concave, at most weakly bilobed (Figs 12I, 12J, 12K). Female with face usually entirely black but sometimes with yellow along inner orbits 8
7. Hind tibia white with a black apical band, or black-white-black banded (Fig. 12L), or black-white-black-orange banded. Tergites 1–3 and often 4 of metasoma with distinct preapical transverse impressions (Fig. 13A); if impressions not very distinct (*Diplazon neoalpinus* and *Diplazon pectoratorius*), then propodeal carinae reduced, not enclosing basal and petiolar areas (Fig. 13B) . . . . . *Diplazon* (most)
- Hind tibia mainly orange or yellow with apex dark. At most with indistinct transverse impressions on tergite one or one and two. Propodeum always with a full set of carinae defining basal, lateral and petiolar areas (Fig. 13C) . . . . . *Tymmophorus*
8. Scutellum mainly yellow or white. Female metasoma laterally compressed. Mesoscutum centrally impunctate and strongly shining, punctures restricted to front and sides. Yellow shoulder marks often with inner corners extending back over mesoscutum as two parallel lines (Fig. 13D) . . . . . *Xestopelta* (part)
- Scutellum usually black, rarely with a small apical yellow spot. Metasoma dorsoventrally depressed in both sexes. Mesoscutum with obvious punctures over entire surface, shining between punctures or finely coriaceous and matt. Shoulder marks, if present, with inner corner never extending back 9
9. Metasomal tergites 3–5 with hind margins concave even in males, extending conspicuously further back laterally than dorsally (Figs 13E, 13F). Spiracle of third tergite on laterotergite (cf. Fig. 11B). Clypeus with apical margin truncate or weakly concave (Fig. 12J). Metasoma entirely black, or in males sometimes with yellow on posterior part of some tergites . . . . . *Campocraspedon*
- Tergites 3–5 with hind margins at most very weakly concave, extending about as far back dorsally as medially (Fig. 13G). Spiracle of third tergite on dorsal part. Clypeus with apical margin convex (Fig. 12I). Metasoma dark orange at least on apical parts of tergites 2 and 3 . . . . . *Daschia brevitarsis* (Thomson)
10. Fore wing areolet closed, although vein 3rs-m usually unpigmented (Fig. 12D). Male antenna always with tyloids, which can be narrow or broad (Figs 13H, 13I) 11
- Fore wing areolet open (Fig. 12C). Male antenna with or without tyloids 14
11. Female with metasomal tergites 3–5 with hind margins clearly concave, extending conspicuously further back laterally than dorsally (Fig. 14A) (usually indicated also in males). Face shining, finely coriaceous only along inner orbits, distinctly punctate . . . . . *Phthorima*
- Metasomal tergites convex or truncate in both sexes. Face matt, punctures usually almost disappearing among the coriaceous sculpture 12
12. First metasomal tergite with median dorsal carinae strongly converging over basal half and very close to each other on apical half (Figs 14E, 14F). Male with tyloids usually bar-like and broad (Fig. 13I, except for *E. schwarzi*). Female with hind tibia black with a white base (Fig. 14B), male similar or with white part extending over half the tibia, especially on ventral side (Fig. 14C). Clypeus when viewed in profile concave laterally, rather flat centrally, and with apical margin somewhat elevated (Fig. 14I) . . . . . *Enizemum* (most)

- First tergite of metasoma with median dorsal carinae absent or strongly reduced (Fig. 14G), or if strong (*crassicornis* group), then they are almost as far apart from each other as from the lateral margins of the tergite (Fig. 14H). Male with tyloids usually narrowly linear (Fig. 13H, except for the rare *H. venustus* and *H. tauriscorum*). Hind tibia usually orange or white with subbasal and apical dark bands (Fig. 14D). Clypeus usually apically impressed, basal three-quarters convex (Fig. 14J) 13

13. Male with narrow tyloids each with an adjacent dark pit (Fig. 14K). Propodeum with two or more parallel, arcuate carinae around petiolar area (Fig. 14L). Female usually with a yellow line on lower mesopleuron. . . . . *Fossatyloides gracilentus* (Holmgren)
- Male with narrow tyloids without adjacent pits (Fig. 13H). Propodeum various, often lacking transverse carinae (Fig. 14M), or with regular carinae around petiolar area (Fig. 14N). Female with mesopleuron usually entirely black . . . . *Homotropus* (part)

14. Propodeum with a full set of strong carinae delimiting at least basal and petiolar areas (Fig. 13C). 15
- Propodeum with carinae reduced, not delimiting complete set of areas, at least basal or petiolar area not fully enclosed by carinae (Fig. 14M). 17

15. Female with face black with yellow along inner orbits. Male antenna without tyloids. Tergites one and two often with weak subapical transverse impressions (Fig. 15A). Clypeus basally convex, remainder concave (Figs 12G, 12H). . . . . *Syrphophilus*
- Female with face entirely black or with a yellow central spot. Male antenna with tyloids which are usually narrow and linear (Fig. 13H). Metasomal tergites without transverse impressions (Fig. 15B). Clypeus usually apically impressed, basal three-quarters convex (Fig. 14J). 16

16. Propodeal spiracle and spiracle of first tergite with conspicuously enlarged and sometimes pale margins (Fig. 15C). Female with tergites 3–5 with hind margins concave, extending conspicuously further back laterally than dorsally (Fig. 15E). Antenna of female stout, apical flagellomeres wider than long, and with strong setae almost as long as the diameter of the segments (Fig. 15F). . . . . *Bioblapsis*
- Propodeal spiracle not enlarged, with margin inconspicuous (Fig. 15D). Female with metasomal tergites convex or truncate. Antenna slenderer, with setae at most half as long as the diameter of a flagellomere . . . . . *Homotropus* (part)

17. Ovipositor sheaths broadly and transversely truncate, thus apically open; last visible sternite in females large and triangular (Fig. 15G). Hind tibia usually black with a white base (Figs 14B, 14C) but sometimes entirely black or orange with a dark apex. Clypeus usually flat or with a subbasal transverse impression which is often only present on lateral parts, clypeus thus convex or flat centrally but concave in cross section laterally (Fig. 16D). Tyloids on male antenna, if present, usually broad (Fig. 13I) 18
- Ovipositor sheaths either pointed or rounded and closed apically (Fig. 15H), or diagonally truncate (Fig. 15I); last visible sternite, if triangular, then less conspicuous. Hind tibia mainly white, yellow or orange, often with apex dark. Clypeus various but often (genus *Homotropus*) with a preapical impression, rendering basal three-quarters convex (Fig. 16C). Tyloids on male antenna, if present, usually narrow (Fig. 13H) 19

18. First tergite at most with short median dorsal carinae which are broadly separated. Male antenna without tyloids. Face including clypeus, mesosoma, legs and metasoma finely and evenly coriaceous and matt, punctures indistinct . . . . . *Woldstedtius*
- First metasomal tergite with median dorsal carinae reaching at least to middle and very close to each other on apical half (Figs 14E, 14F). Male antenna with tyloids which are most often bar-like (Fig. 13I). Sculpture not entirely fine, mesopleuron with both strong punctures and smooth parts. . . . . *Enizemum* (part)

19. Female with yellow along inner orbits. Male antenna without tyloids. 20
- Female with face black, often with a central yellow spot. Male antenna with narrow tyloids (Fig. 13H) 21

20. Clypeus with apical margin thin and often with a basal elevation, making it concave or flat in profile (Figs 12G). Epicnemial carina complete. Mesoscutum distinctly punctate on a smooth and polished background, yellow shoulder marks with inner corners not extending over most of mesoscutum . . . . . *Diplazon* (part)
- Clypeus with apical margin thickened, convex and protruding in profile; apical margin convex (Fig. 12K). Epicnemial carina broadly interrupted behind fore coxa. Mesoscutum mostly smooth and shining, with punctures very weak or indistinct, yellow shoulder marks usually with inner corners extending over most of mesoscutum (Fig. 13D). . . . . *Xestopelta* (part)

21. Spiracle of third tergite dorsal, above lateral fold. Epicnemial carina complete ventrally (Fig. 16A). Clypeus with a preapical impression, rendering basal three-quarters convex (Fig. 16C) . . . . . *Homotropus* (part)
- Spiracle of third tergite level with or below the fold separating the lateral from the dorsal part. Epicnemial carina usually broadly interrupted ventrally behind fore coxae (Fig. 16B). Clypeus usually flat or with a subbasal transverse impression which is often only present on lateral parts, clypeus thus convex or flat centrally but concave in cross section laterally (Fig. 16D). . . . . *Syrphoctonus*

Species-level taxonomy of Western Palaearctic Diplazontinae

I here provide descriptions of each genus and keys to species, followed by species diagnoses. In contrast to previous work on Diplazontinae, I do not give detailed descriptions of each of the species. Such descriptions often include many characters which are not important for species delimitation and identification and are difficult to adequately communicate. Instead, the species diagnoses are limited to those characters mentioned in the keys to species of the respective genus, complemented by the range of fore wing lengths as a measure of size, the number of flagellomeres and the carination of the propodeum. Notes on the taxonomy or on past identification errors are given where found useful. The diplazontine species reported in the literature from the Western Palaearctic area but which could not be interpreted in the present study, are listed in Appendix 2, together with a discussion of their probable status. Pictures of habiti of a selection of species in each genus are given at the end.

Of the material that I examined, I report complete collection data for type material, for rare species (with less than ten specimens examined) and in cases of first records for specific countries. I added minimum numbers of specimens studied from each country to give an impression of the abundance of a species and of the amount of material the descriptions are based on. These numbers are, however, incomplete, as I have studied much more material than is listed, especially from the United Kingdom (at BMNH) and Germany (at ZSM). Full collection data of about 9'200 specimens are also available as supplementary material (LINK). I do not list all the country records of a certain species from the literature (which can be found in Taxapad, Yu *et al.* 2012), but report the faunistic regions a species has been reported from.

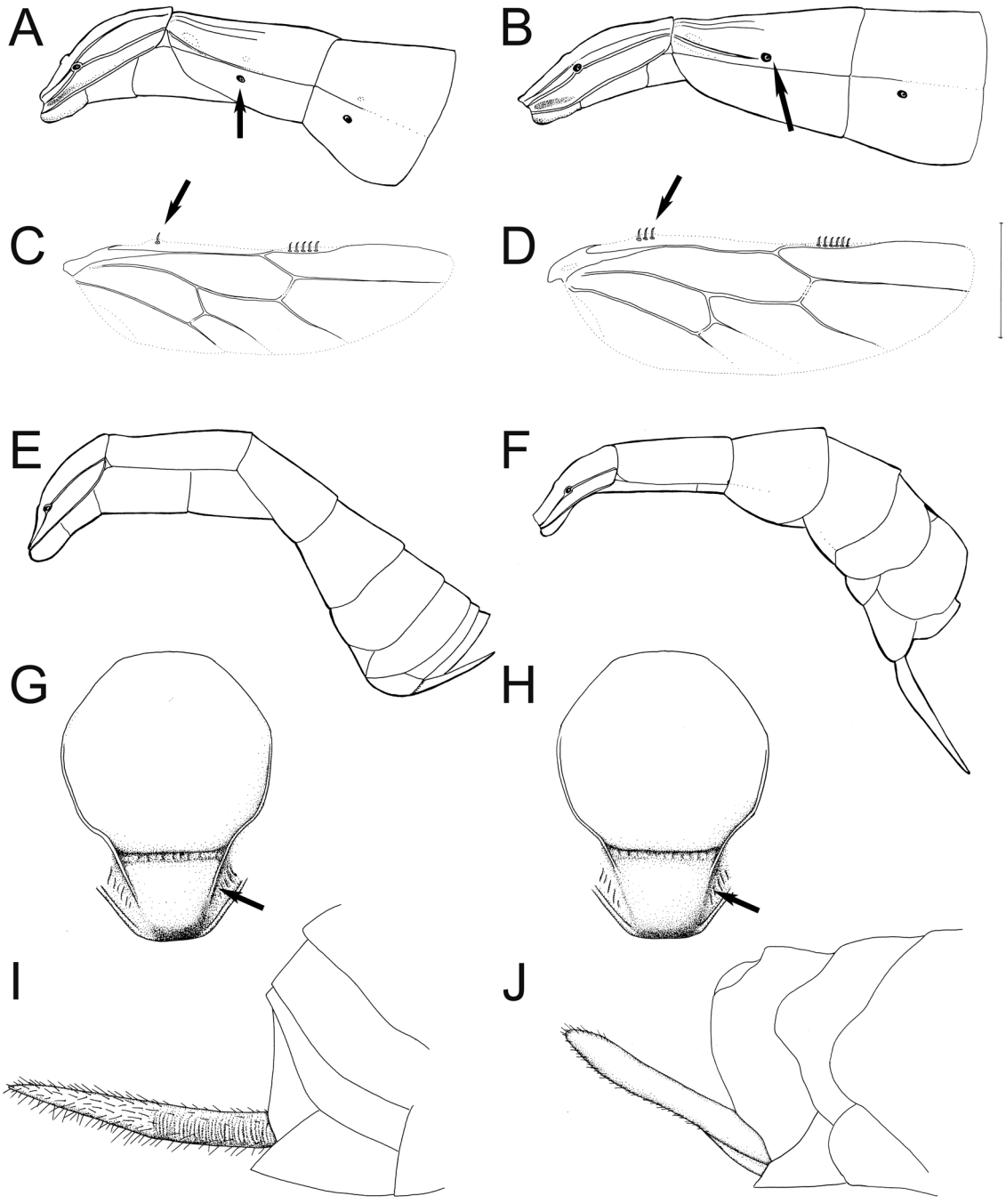

FIGURE 11. A. *Sussaba cognata* ♀, first to third segments of metasoma with laterotergites outflexed. B. *Promethes sulcator* ♀, first to third segments of metasoma with laterotergites outflexed. C. *Sussaba erigator* ♀, hind wing. D. *Diplazon tetragonus* ♀, hind wing. E. *Sussaba cognata* ♀, metasoma. F. *Episemura ensata* ♀, metasoma. G. *Sussaba punctiventris* ♀, scutellum. H. *Episemura diodon* ♀, scutellum. I. *Episemura ensata* ♀, ovipositor sheath. J. *Eurytyloides umbrinus* ♀, ovipositor sheath.

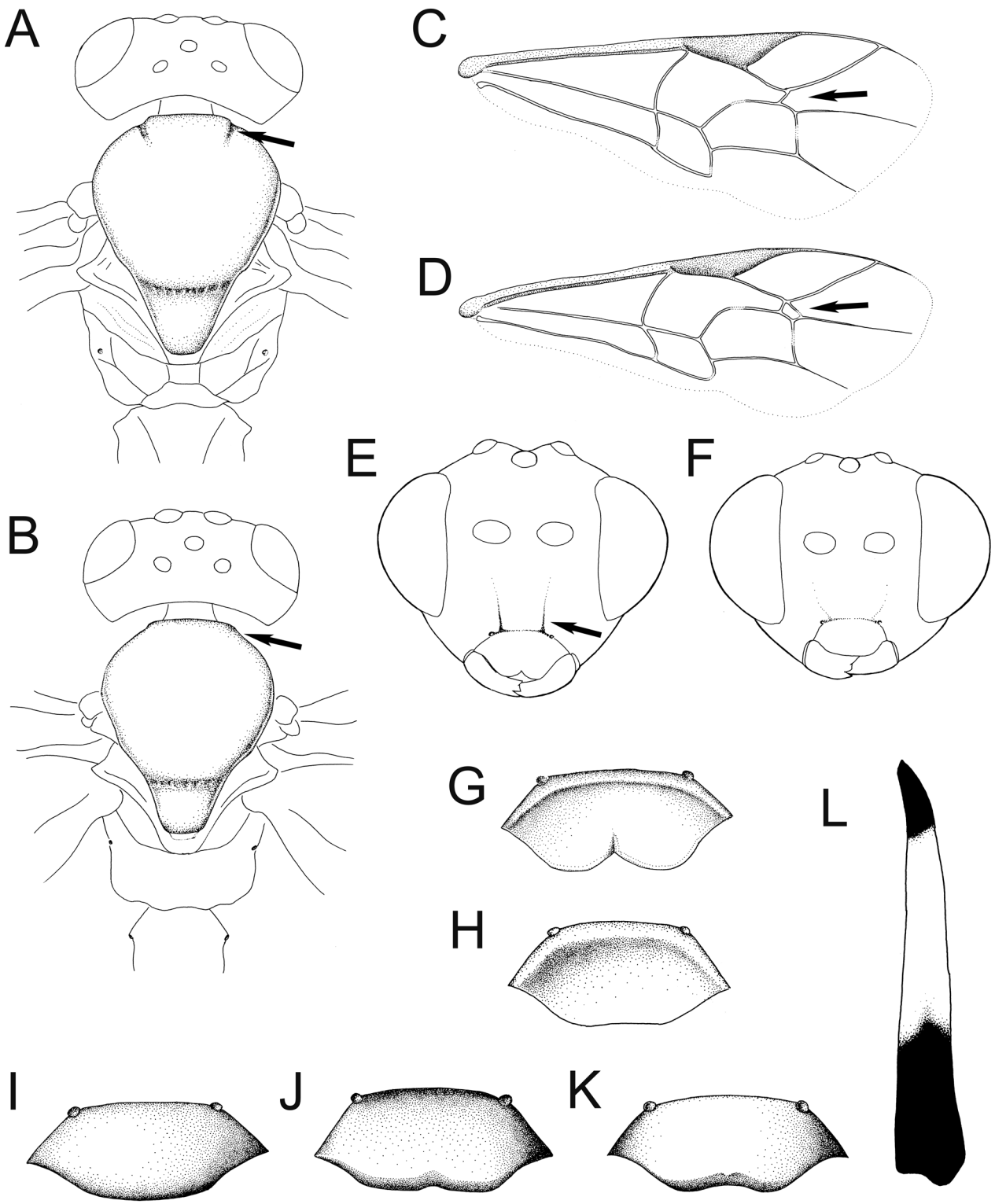

FIGURE 12. A. *Diplazon laetatorius* ♀, mesonotum showing notauli. B. *Syrphoctonus tarsatorius* ♀, mesonotum. C. *Diplazon tetragonus* ♀, fore wing. D. *Enizemum ornatum* ♀, fore wing. E. *Promethes sulcator* ♀, head. F. *Tymmophorus obscuripes* ♀, head. G. *Diplazon tetragonus* ♀, clypeus. H. *Tymmophorus suspiciosus* ♀, clypeus. I. *Daschia brevitarsis* ♀, clypeus. J. *Campocraspedon caudatus* ♀, clypeus. K. *Xestopelta gracillima* ♀, clypeus. L. *Diplazon tetragonus* ♀, hind tibia.

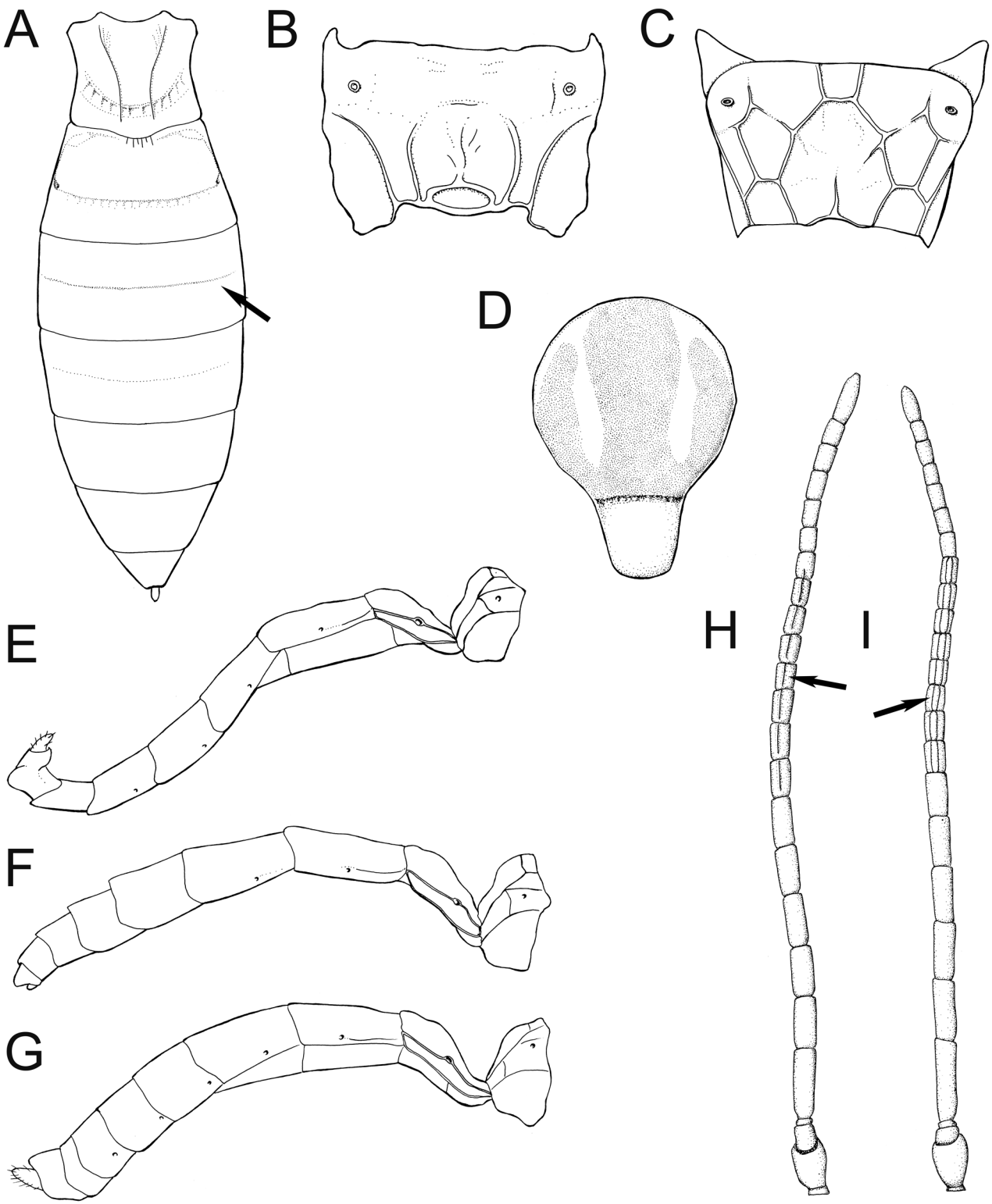

FIGURE 13. A. *Diplazon multicolor* ♀, metasoma. B. *Diplazon pectoratorius* ♀, propodeum. C. *Tymmophorus obscuripes* ♀, propodeum. D. *Xestopelta gracillima* ♀, mesoscutum showing colour pattern. E. *Campocraspedon caudatus* ♀, metasoma. F. *Campocraspedon caudatus* ♂, metasoma. G. *Daschia brevitarsis* ♀, metasoma. H. *Homotropus nigritarsus* ♂, antenna. I. *Enizemum ornatum* ♂, antenna.

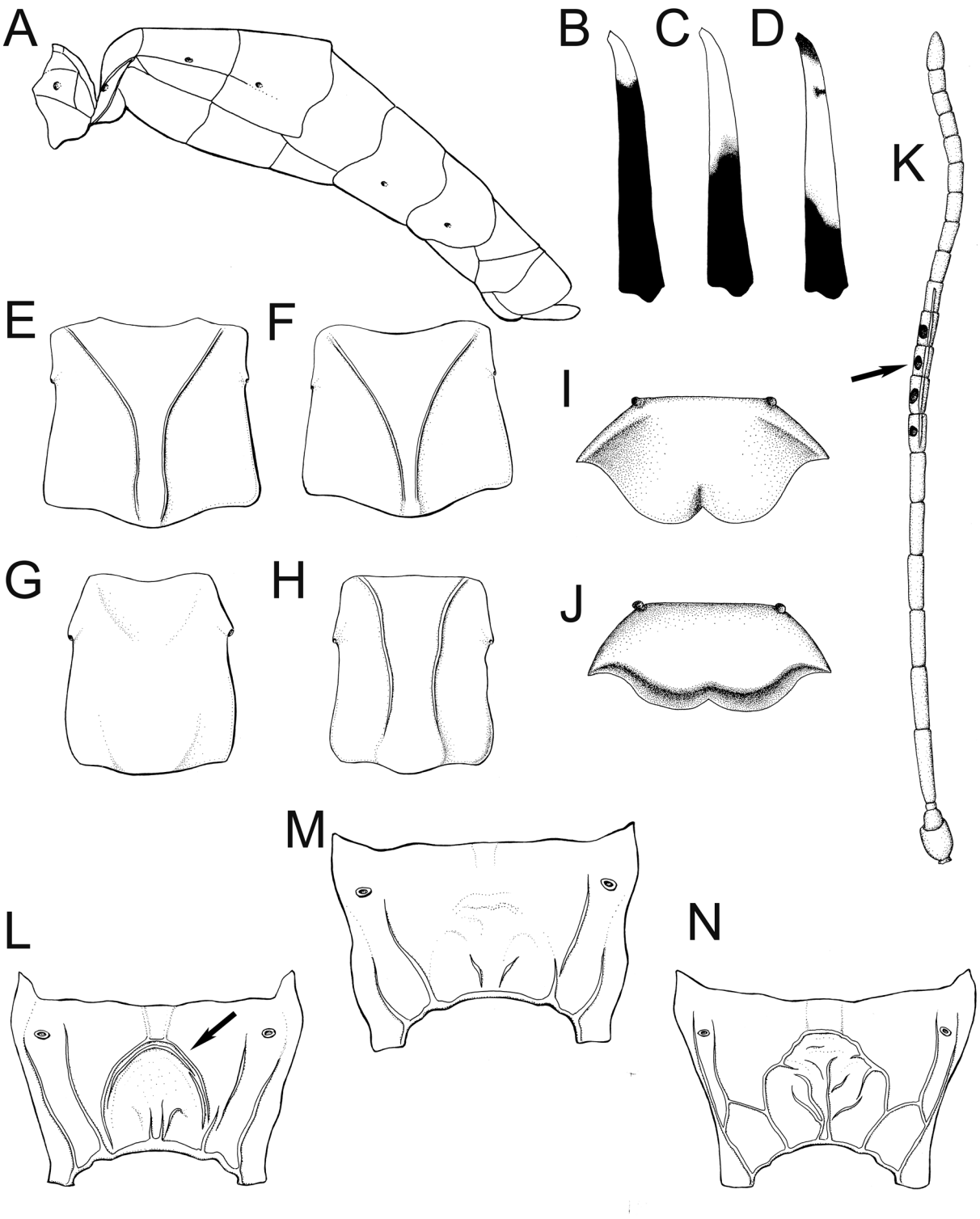

FIGURE 14. A. *Phthorima compressa* ♀, metasoma. B. *Enizemum ornatum* ♀, hind tibia. C. *Enizemum ornatum* ♂, hind tibia. D. *Homotropus frontorius* ♀, hind tibia. E. *Enizemum ornatum* ♀, first tergite. F. *Enizemum nigricorne* ♀, first tergite. G. *Homotropus elegans* ♀, first tergite. H. *Homotropus sundevalli* ♀, first tergite. I. *Enizemum ornatum* ♀, clypeus. J. *Homotropus elegans* ♀, clypeus. K. *Fossatyloides gracilentus* ♂, antenna. L. *Fossatyloides gracilentus* ♀, propodeum. M. *Homotropus pictus* ♀, propodeum. N. *Homotropus crassicornis* ♀, propodeum.

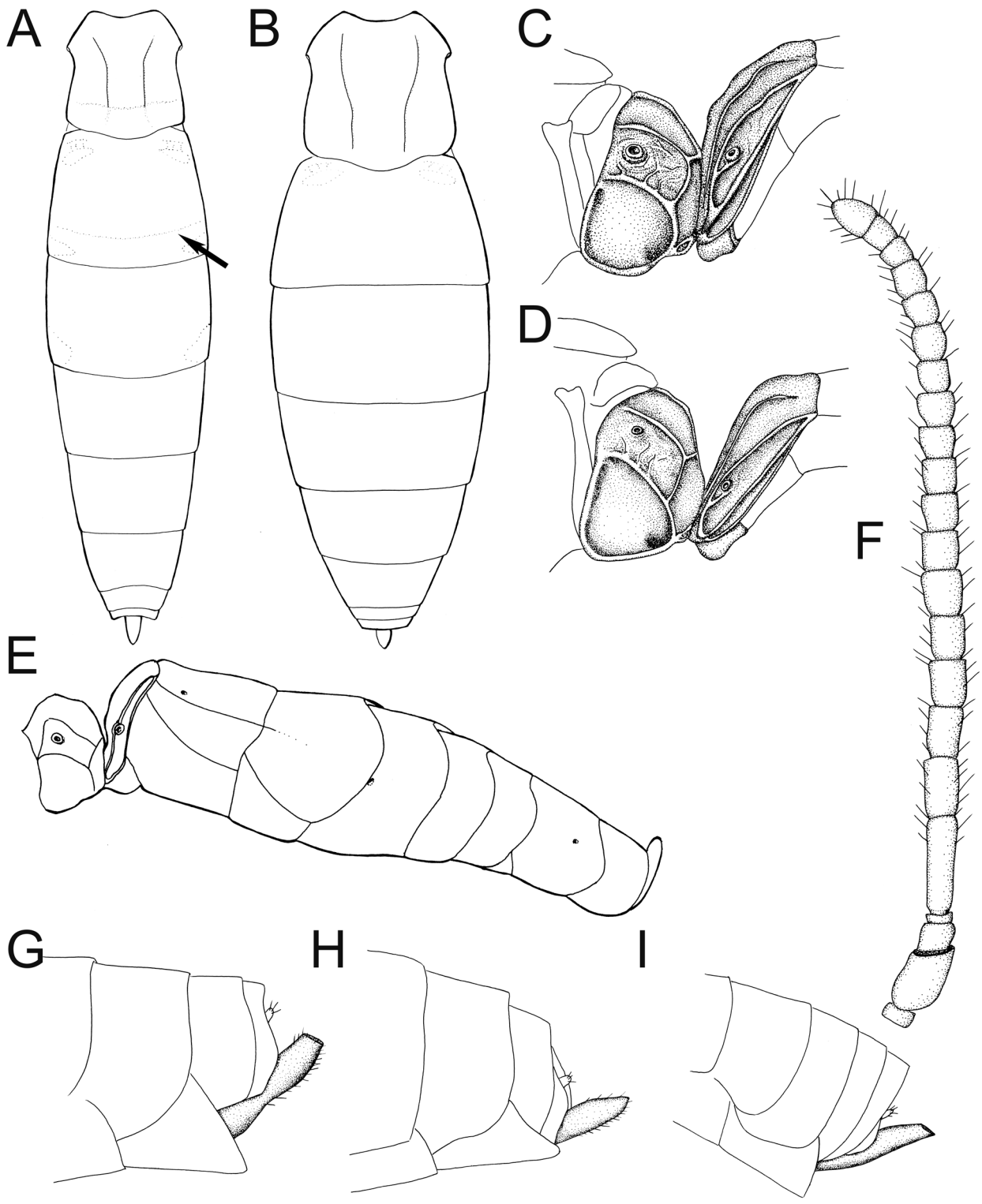

FIGURE 15. A. *Syrphophilus tricinctorius* ♀, metasoma. B. *Homotropus crassicornis* ♀, metasoma. C. *Bioblapsis polita* ♀, propodeum and first tergite. D. *Homotropus crassicornis* ♀, propodeum and first tergite. E. *Bioblapsis polita* ♀, metasoma. F. *Bioblapsis polita* ♀, antenna. G. *Woldstedtius citropectoralis* ♀, apical metasomal segments and ovipositor sheaths. H. *Diplazon neoalpinus* ♀, apical metasomal segments and ovipositor sheaths. I. *Homotropus signatus* ♀, apical metasomal segments and ovipositor sheaths.

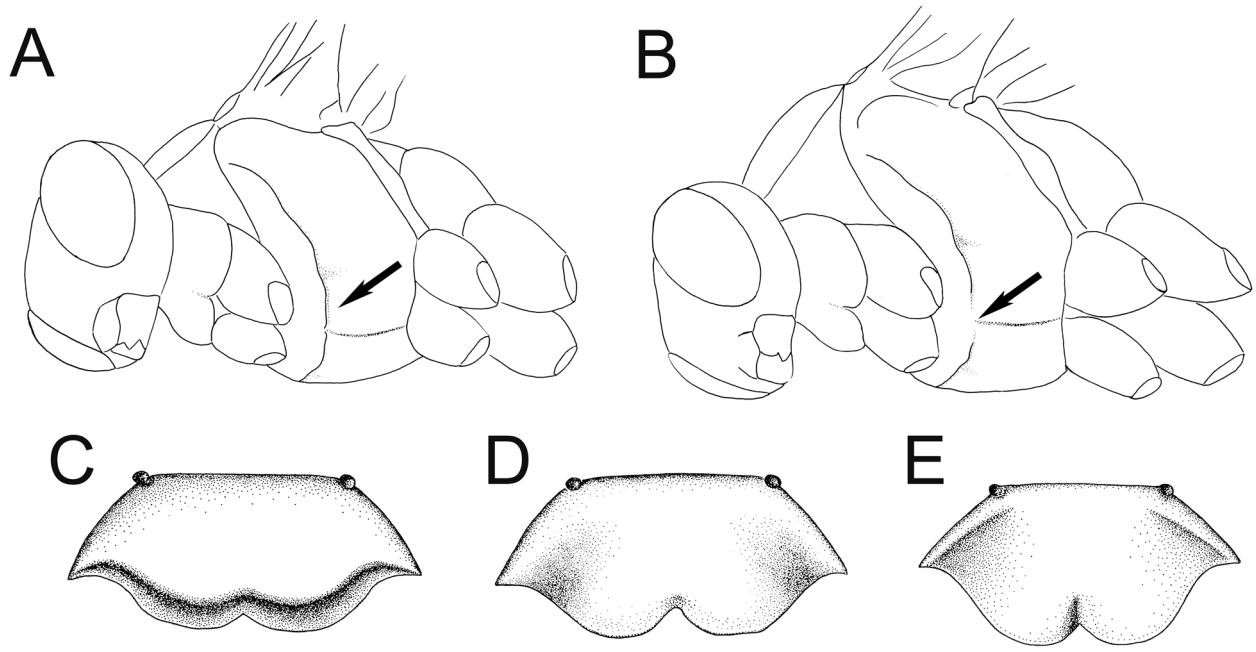

FIGURE 16. A. *Homotropus signatus* ♀, epicnemical carina. B. *Syrphoctonus tarsatorius* ♀, epicnemical carina. C. *Homotropus elegans* ♀, clypeus. D. *Syrphoctonus tarsatorius* ♀, clypeus. E. *Enizemum ornatum* ♀, clypeus.

Bioblapsis Förster 1869

Trichomastix Van Vollenhoven 1878

Type species. *Bassus flavipes* Holmgren 1858

Diagnosis. *Bioblapsis* is a both morphologically and biologically derived genus, and can be distinguished by the enlarged spiracles of the propodeum and first tergite, by the long and thin tarsal claws, the concave hind margins of the tergites and by the long setae present on the female antennas. These characters are much more pronounced in *Bioblapsis polita* than in *B. cultiformis*, and the association of these two species in one genus still needs confirmation.

Face smooth and shining with sparse punctures around seta roots in *Bioblapsis polita*, coriaceous and matt in *Bioblapsis cultiformis*, without vertical impressions arising from tentorial pits, in females entirely black or with a yellow central patch, in males entirely yellow or with yellow inner orbits and a yellow central patch. Clypeus with apical margin thin, with a basal elevation that makes it flat in profile, broad and short. Antenna very stout in females of *B. polita*, less so in males and in *B. cultiformis*, apical flagellomeres wider than long in females, about 1.5 times longer than wide in males; in males of *B. polita* without, in *B. cultiformis* with linear, narrow tyloids; with some conspicuous setae that are almost as long as the diameter of the flagellomeres, especially in females.

Mesoscutum smooth and shining, punctures restricted to along anterior margin, without notauli, yellow shoulder marks usually present; mesopleuron entirely smooth and shining, with punctures on lower half distinct only in male *B. polita*; epicnemial carina complete ventrally. Propodeum with a full set of carinae enclosing basal, petiolar and lateral areas; propodeal spiracle and spiracle of first metasomal tergite with conspicuously enlarged and sometimes pale margins; scutellum only carinate basally. Fore wing areolet absent; hind wing with 1–3 basal hamuli. Hind tibia brownish with an obscurely light base in *B. polita*, orange-brown in *B. cultiformis*. Female metasoma strongly compressed from apex of third segment, tergites 3 or 4 to 6 with hind margins concave, extending further back laterally than dorsally, more so in *B. polita* where it is also distinct in males; tergites without transverse impressions. First tergite with median dorsal carinae arising basally, converging over basal half, parallel and widely separated on apical half, carinae sometimes replaced by strong rugae. Second tergite with spiracle dorsal, above lateral fold, third tergite with spiracle dorsal in *B. cultiformis*, on or below lateral fold in *B. polita*.

Metasoma black or obscurely brown to reddish. Ovipositor sheaths 0.4 times as long as hind tibia, laterally compressed, parallel-sided and fully enclosing ovipositor in *B. polita*, tapered and diagonally truncate in *B. cultiformis*; basally smooth, apically with sparse to dense but inconspicuous setae. Males with tergites 9 and 10 as separate sclerites, sternite 9 about two times wider than long, emarginated apically, thus forming two lobes, their outer corners rounded.

Phylogeny. *Bioblapsis cultiformis* has been shown to be closely related to *Phthorima* in a recent molecular study, and thus belongs to the *Syrphoctonus* genus group. However, the type species of the genus, *B. polita*, was not included in this analysis.

Distribution. Holarctic. *Bioblapsis* currently includes the two Western Palaearctic species and the Nearctic *Bioblapsis henryi* Fitton; the latter is very similar to and might be a synonym of *B. cultiformis*.

Biology. Both *Bioblapsis* species have been reared from hosts that are very unusual for diplazontines in that they are not aphidophagous but instead feed either on fungus (*Cheilosia longula* (Zetterstedt), the host of B. cultiformis, Rotheray 1990) or are associated with tree sap (*Ferdinandea*, the host of *B. polita*). They belong to the syrphid subfamily Eristalinae, while all other known hosts of Diplazontinae belong to the Syrphinae.

Key to species

1. Face smooth and shining. Fore wing more than 5mm long. Spiracle of propodeum with rim pale. Male and sometimes female with scutellum yellow-marked laterally . . . . . *Bioblapsis polita* (Vollenhoven)
- Face coriaceous and matt. Fore wing less than 5mm long. Spiracle of propodeum with rim dark. Scutellum entirely black in both sexes . . . . . *Bioblapsis cultiformis* (Davis)

Bioblapsis cultiformis (Davis 1897, *Otoblastus*), (comb. nov.)

Zootrophes bicoloripes Ashmead 1902 (nomen nudum)
Bioblapsis mallochi Rotheray 1990 (syn. nov.)

Diagnosis. Fore wing length 3.25 to 4.25 mm. Antenna in females with 18–20, in males with 19–20 flagellomeres and with narrow tyloids on flagellomeres 5/6 to 12/13. Face coriaceous and matt. Propodeum with spiracle enlarged, but rim not conspicuously paler than surroundings; with a full set of carinae enclosing basal, lateral and petiolar areas, although transverse carina sometimes almost disappears among the strong rugae.

Colouration of females. Antenna dark brown. Head and mesosoma black or brown, face often with yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, and often a spot on upper mesepimeron; scutellum black. Legs and all coxae orange, coxae sometimes dark, especially basally; hind tibia and tarsus slightly darkended apically. Metasoma black or brown, often paler on tergites 2 and 3, sometimes even orange.

Colouration of males. As in females but with yellow or orange ventrally on scape and pedicel, yellow over entire face. Fore coxa often mostly yellow.

Material examined. Holotype ♀ and paratypes of *Bioblapsis mallochi* Rotheray: United Kingdom, Scotland, Perthshire, Black Wood of Rannoch, leg. G.Rotheray, 28.VIII.1988. 10♂, 2♀, at NMSZ.

New for Sweden: Vaesterbotten, Vindelns kommun, Kulbäckslidens försökspark. 15 yr spruce plantation with blue-berry, N64°09.270', E19°35.591', leg. SMTP, 20.VIII.–03.IX.2004. 1♀, at NRM.

Netherlands (7), Sweden (2), Switzerland (1), USA (1).

Distribution. Holarctic.

Figures. Habitus (Fig. 28A).

Bioblapsis polita (Vollenhoven 1878, *Trichomastix*)

Bassus flavipes Holmgren 1858 (homonym)
Bassus tibialis Bridgman 1883 (homonym)

Diagnosis. Fore wing length 4.4 to 6.4 mm. Antenna in females with 16–18, in males with 17–20 flagellomeres, without tyloids. Face smooth and shining, with central area strongly protruding. Propodeum with spiracle enlarged, with rim pale; with a full set of carinae enclosing basal, lateral and petiolar areas, strongly rugose on petiolar area.

Colouration of females. Antenna black. Head and mesosoma black, face often with yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, usually subtegular ridge and upper mesepimeron; scutellum with two yellow anterolateral spots. Legs and all coxae orange; hind tibia orange or yellow, sometimes more whitish, with apex and dorsal side irregularly dark, hindtarsus dark, first and sometimes also other tarsomeres with a white or yellow base. Metasoma black or brown.

Colouration of males. As in females but with inner orbits broadly yellow and with central face patch large. Mesepimeron usually entirely yellow. Fore and mid coxae mostly yellow, hind tibia often whitish with apex dark and with a subbasal dark spot.

Material examined. Lectotype ♂ of *Bassus flavipes* Holmgren (primary homonym): Sweden, Småland, leg. Boheman. 1♂, at NRM. Lectotype hereby designated, labels: "Sm", "Bhm", "Bioblapsis; flavipes; Holmgr.", "15; 73", "Riksmuseum; Stockholm", "LECTOTYPE; Bassus ♂; flavipes Holmgren, 1858; des. S.Klopfstein 2012".

New for Italy: Sicilia, Nebrodi (ME), Contrada Moglia, faggeta VB 56 96, 1300m, leg. Alicata, 13.VIII.1988. 1♀, at ZSM. New for Switzerland: Vaud, Ecublens, 430m, N46°31.50', W6°33.14', leg. J.de Beaumont, 13.VII.1958. 1♀, at MZL.

France (1), Germany (1), Hungary (1), Netherlands (1), Sweden (5), United Kingdom (1).

Distribution. Palaearctic.

Figures. Propodeum and first tergite (Fig. 15C), metasoma ♀ (Fig. 15E), antenna ♀ (Fig. 15F), habitus (Fig. 28B).

Campocraspedon Uchida 1957

Type species. *Campocraspedon satoi* Uchida 1957

Diagnosis. Females can readily be distinguished by the dorsoventrally depressed metasoma with very strongly concave hind margins of the tergites, a combination unique among the Palaearctic genera. *Campocraspedon* shares with *Daschia* and *Xestopelta* a clypeus with a thick apical margin which is protruding when viewed from the side.

Face coriaceous and matt, without vertical impressions but with central area often clearly elevated; in females entirely black, in males entirely yellow or with a central black stripe. Clypeus with apical margin thick, clypeus thus convex and protruding when viewed in profile. Antenna with apical flagellomeres wider than long, without tyloids and without long setae. Mesoscutum with notauli comparatively long, reaching about one third of length of mesoscutum, sometimes shallow; yellow shoulder marks absent or small; mesoscutum and mesopleuron smooth and with small punctures, sometimes with some coriaceous sculpture; epicnemial carina sometimes indistinct or interrupted behind the fore coxae. Propodeum with carinae partly or fully reduced, enclosing only lateral areas or no areas at all but often rugose; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet absent; hind wing with 2–3 basal hamuli. Hind tibia white with a dark apex and subbasal spot in *Campocraspedon annulitarsis*, orange in *Campocraspedon caudatus*. Female metasoma dorsoventrally depressed and elongated, tergites 3 to 7 with hind margins concave, extending further back laterally than dorsally, more so in females but obvious also in males; tergites with subapical transverse impressions sometimes weakly indicated on first and second tergite. First tergite without median dorsal carinae. Second tergite with spiracle dorsal, above lateral fold, third tergite with spiracle below or behind the fold. Metasoma black. Ovipositor sheaths 0.3 times as long as hind tibia, not compressed, about circular in cross-section, fully enclosing ovipositor; basally smooth, apically with dense and conspicuous setae. Males with tergites 9 and 10 fused as a syntergum, sternite 9 about 1.5 times wider than long, emarginated apically, thus forming two lobes, their outer corner with an acute angle.

Phylogeny. The genus *Campocraspedon* belongs to the *Diplazon* genus group and is probably monophyletic, as retrieved in a recent molecular analysis including the two Western Palaearctic species. Morphologically, it is closest to *Daschia*, for which molecular data are still missing.

Distribution. Holarctic. Besides the two Western Palaearctic species, *Campocraspedon* includes the Eastern Palaearctic *Campocraspedon elongatus* Nakanishi and *Campocraspedon satoid* Uchida, and the Nearctic *Campocraspedon foutsi* (Cushman) and *Campocraspedon truncatus* Dasch.

Biology. Nothing is known about the biology of the species, but the peculiar shape of the female metasoma is probably an adaptation to reach hosts that live inside galls or similar structures.

Key to species

1. Hind tibia and first tarsomere white with apices dark. Female antenna usually with 18 flagellomeres. Male face entirely yellow and metasoma usually entirely black . . . . . *Campocraspedon annulitarsis* (Hedwig)
- Hind tibia orange, apically dark. Female antenna usually with 17 flagellomeres, only rarely with 18. Male face yellow but often with a black median stripe arising from below antennal sockets, and with hind margins of tergites 2 to 4 often yellow-marked. . . . . *Campocraspedon caudatus* (Thomson)

Campocraspedon annulitarsis (Hedwig 1938, *Homocidus*)

Homocidus arcanus Stelfox 1941

Diagnosis. Fore wing length 5.0–6.0 mm. Antenna in females with 18, in males with 18–19 flagellomeres. Female face black, in males yellow. Propodeum with carinae weak, pleural and lateral longitudinal carinae usually present, transverse carina and median longitudinal carinae usually absent, at most indicated by some weak rugae; petiolar area coriaceous and weakly rugose.

Colouration of females. Antenna black, paler below. Head and mesosoma black, face black, yellow on clypeus, mouthparts often more orange, yellow on hind corner of pronotum, tegula, and often upper mesepimeron; scutellum black, at most with a light brown mark on extreme apex. Legs orange, coxae black or orange; femora orange; hind tibia white with a dark subbasal spot and a dark apical band, hindtarsus black, first segment basally white. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, subtegular ridge, at least part of mesosternum and a stripe on lower mesopleuron. Fore and mid coxae often largely yellow.

Material examined. Lectotype ♀ of *Homocidus annulitarsis* Hedwig: Poland, Breslau, Nimkau, Olschebruch, leg. Hedwig, 01.V.1932. 1♀, at NMF. Holotype ♂ of *Homocidus arcanus* Stelfox: Ireland, Ashfort, Devil's Glen, 8.VI.1921, 1♂, at USNM.

New for Germany: Goslar am Harz, Harli, leg. E.Bauer, 21.VI.1941. 1♀, at ZSM. New for Switzerland: Valais, Binn, Binntal, leg. T.Steck, 27.VI.1916. 4♀, at NMBE.

Germany (5), Norway (1), Poland (1), Sweden (20), Switzerland (7), United Kingdom (1).

Distribution. Western Palaearctic.

Campocraspedon caudatus (Thomson 1890, *Homotropus*)

Diagnosis. Fore wing length 4.5–5.5 mm. Antenna in females with 17, rarely with 18, in males with 17–18 flagellomeres. Female face black, male face entirely yellow or with a median vertical black line. Propodeum with carinae weak, pleural and lateral longitudinal carinae usually present, transverse carina and median longitudinal carinae usually absent but indicated by some weak rugae; petiolar area coriaceous and rugose.

Colouration of females. Antenna black, paler below. Head and mesosoma black, face black, yellow on clypeus, mouthparts often more orange, yellow on hind corner of pronotum, tegula, and often upper mesepimeron; scutellum black, at most with a light brown mark on extreme apex. Legs orange, coxae black; femora orange; hind tibia orange with apex and tarsomeres dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, subtegular ridge, often most of mesosternum and a stripe on lower mesopleuron; face entirely yellow but often with a black median stripe which arises below antennal sockets. Fore and mid coxae often largely yellow. Tergites 2 to 4 often with yellow markings along hind margin.

Material examined. Syntypes of *Homotropus caudatus* Thomson: France, Phalempin. 1♂, 5♀, at ZIL.

France (1), Germany (1), Norway (2), Sweden (30), Switzerland (30), United Kingdom (2).

Distribution. Palaearctic.

Figures. Clypeus (Fig. 12J), metasoma ♀ (Fig. 13E), metasoma ♂ (Fig. 13F), habitus (Fig. 28C).

Daschia Diller 1970

Type species. *Homotropus brevitarsis* Thomson 1890

Diagnosis. *Daschia* can readily be identified by its unique clypeus which has a thickened and convex margin when viewed from both the side and from the front. Moreover, males have a black face. Otherwise, this genus can be confused with *Homotropus*, especially in those specimens with both weak notauli and weak transverse impressions on the tergites. But the shape of the clypeus clearly distinguishes it from all other genera.

Face coriaceous and matt, without vertical impressions, entirely black in both sexes. Clypeus with apical margin thick, clypeus thus convex and protruding when viewed in profile. Antenna with apical flagellomeres longer than wide, without tyloids.

Mesoscutum with notauli short, sometimes weak; smooth and shining and distinctly punctate, yellow shoulder marks absent; mesopleuron smooth and shining, with some irregular sculpture and weak punctures on lower half; epicnemial carina complete and strong. Propodeum with carinae weak or partly reduced, often only enclosing lateral areas but often with indications of basal and petiolar areas as well, rugose between the carinae; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet absent; hind wing with 2–3 basal hamuli. Hind tibia orange-brown. Female metasoma strongly dorsoventrally depressed, short, tergites 3 to 6 with hind margins straight to weakly concave; tergites with subapical transverse impressions indicated on tergites 1 and 2, usually indistinct on third tergite. First tergite without median dorsal carinae. Second and third tergites with spiracles dorsal, above lateral folds. Metasoma black, marked with orange at least behind transverse impressions of tergites 2 and 3. Ovipositor sheaths 0.3 times as long as hind tibia, not compressed, about circular in cross-section, fully enclosing ovipositor; basally smooth, apically with dense and conspicuous setae. Males with tergites 9 and 10 fused as a syntergum, sternite 9 about 1.5 times wider than long, emarginated apically, thus forming two lobes, their outer corner with an acute angle.

Phylogeny. Molecular data are to date missing for *Daschia*. Morphologically, it is close to *Campocraspedon*, as deduced from the thick clypeus and the black female face. *Daschia* also has slightly concave hind margins of the tergites, especially in females. The morphology of the male terminal sclerites, especially the acute outer angle of the ninth sternite, supports a close association of *Daschia* with the genera *Campocraspedon*, *Syrphophilus* and some *Tymmophorus* species of the *Diplazon* genus group.

Distribution. *Daschia* is a monotypic genus currently only known from the Western Palaearctic.

Biology. Nothing is known about the biology of the species.

Daschia brevitarsis (Thomson 1890, *Homotropus*)

Homocidus conjungens Schmiedeknecht 1927

Diagnosis. Fore wing length 3.5–4.0 mm. Antenna in females with 16, in males with 16–17 flagellomeres. Propodeum with carinae irregular, mostly replaced by strong rugae, almost disappearing against the strongly rugose background.

Colouration of females. Antenna black, paler below. Head and mesosoma black, face black, orange on clypeus and mouthparts, yellow on tegula, and sometimes upper mesepimeron; scutellum black. Legs orange, coxae and trochanters black; femora orange; hind tibia orange, hind tarsus dark. Metasoma with tergite 2 apically and tergite 3 entirely orange, but this colouration often dark.

Colouration of males. As in female, face and most of mesosoma black. Metasoma often dark.

Material examined. Lectotype ♂ (not a female as previously reported) of *Homotropus brevitarsis* Thomson: Switzerland, Grisons, Chur. 1♂, at ZIL.

Germany (1), Hungary (2), Switzerland (14).

Distribution. Western Palaearctic.

Figures. Clypeus (Fig. 12I), metasoma ♀ (Fig. 13G), habitus (Fig. 28D), male terminal sclerites (Fig. 37A).

Diplazon Nees 1819 (in Gravenhorst 1819)

Type species. *Ichneumon laetatorius* Fabricius 1781

Diagnosis. Most species of *Diplazon* can readily be identified by the distinct transverse impressions on tergites 1 to 3 or 4, which are at most indicated on tergites 1 and sometimes 2 in some other genera of the genus group, and by the black-white-black or black-white-black-orange banded hind tibia. Two species, *D. neoalpinus* and *D. pectoratorius*, which together form the most basal clade in the genus, lack the basal black band and have the transverse impressions often weak. They can be distinguished from *Homotropus* species by the presence of notauli and the yellow inner orbits in females and from *Syrphophilus* and *Tymmophorus* by the reduced carination of the propodeum.

Face coriaceous and matt, often distinctly punctate, without vertical impressions, in females black with yellow inner orbits and sometimes a yellow central patch, in males entirely yellow or black with yellow inner orbits and a yellow central patch. Clypeus with apical margin thin, flat or with a basal elevation that makes it concave or flat in profile. Antenna without tyloids. Mesoscutum with short, deeply impressed notauli on about anterior fifth; smooth and shining and strongly punctate, yellow shoulder marks present or absent; mesopleuron smooth and shining, with weak or strong punctures at least on lower half, rarely with some weakly coriaceous areas; epicnemial carina complete ventrally and strong. Propodeum with a full set of carinae enclosing basal, petiolar and lateral areas, or reduced in *D. pectoratorius* and *D. neoalpinus*; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet absent; hind wing with 2–4 basal hamuli. Hind tibia white with an apical and usually also basal dark band, sometimes also with an orange or orange-brown apical band. Female metasoma dorsoventrally depressed, more tapered towards apex in some species, tergites with hind margins convex, extending at least as far back dorsally as laterally; tergites with distinct subapical transverse impressions on tergites 1 to 3 or 4. First tergite with distinct median dorsal carinae that usually surpass middle, converging over basal half, parallel and widely separated on apical half. Second and third tergites with spiracles dorsal, above lateral folds. Metasoma often black, or with some tergites orange, or with yellow or whitish markings. Ovipositor sheaths 0.3 times as long as hind tibia, laterally compressed and fully enclosing ovipositor at tip; basally smooth, apically with sparse, inconspicuous setae. Males with tergites 9 and 10 fused as a syntergum, sternite 9 about 1.5 times wider than long, emarginated apically, thus forming two lobes, their outer corners rounded to form a right angle.

Phylogeny. The genus *Diplazon* forms a morphologically and molecularly well-defined clade. It belongs to a genus group with the genera *Campocraspedon*, *Daschia*, *Tymmophorus*, *Syrphophilus,* and *Xestopelta*.

Distribution. Worldwide. This is a large genus with 58 species currently recognized. The highest species richness has been recorded for the Eastern and Western Palaearctic and Nearctic regions, but this might well represent a sampling artefact. The most common species, *Diplazon laetatorius*, has a world-wide distribution, which is probably reached at least partly through human-mediated dispersal.

Biology. A number of *Diplazon* species have been reared from various species of the tribe Syrphini. Some show a comparatively broad host range and must be regarded as generalists (Rotheray 1981b; 1981a; Fitton & Rotheray 1982; Rotheray 1984; Greco 1997).

The circumscription of some of the species is still a bit unclear and identification, most of all of males, can require some experience. Broad host ranges might complicate the situation, especially if hosts of different sizes are attacked. In species that exhibit large variation in size, e.g., *D. tetragonus* and *D. varicoxa*, it remains to be demonstrated whether this merely represents host-induced size variation or if there are some additional, potentially more specialized species present. Additional studies including molecular data and extensive sampling in these species and their hosts are needed.

Key to species

1. Coxae and trochanters entirely orange or yellow, at most with some darkening at base of fore coxa in females 2
- Coxae and some of the trochanters usually black, at least basally; if hind coxa all red, then fore and mid coxae dark at bases and hind trochanter marked with black 9
2. Propodeum with carinae partly reduced, longitudinal carinae sometimes present but never with petiolar area fully enclosed by carinae (Fig. 17A). Hind tibia white with a dark apex and sometimes an indistinct subbasal spot but without a basal black band 3
- Propodeum usually with a full set of carinae, petiolar area always fully enclosed (Fig. 17B). Hind tibia black-white-black or

black-white-black-orange banded 4

3. Mesosoma almost always with extensive orange coloration at least on mesopleuron. Transverse impressions distinct on tergites 1 to 3. Metasoma dorsoventrally depressed in both sexes. Often larger species, fore wing length 4.5–7 mm. . . . . *Diplazon pectoratorius* (Gravenhorst)

- Mesosoma black with yellow markings, at most with some orange on scutellum. Transverse impressions distinct only on tergites 1 and 2, present at most as a change in sculpture on tergite 3. Metasoma of female laterally compressed behind third segment. Smaller species, fore wing length 4.1–5.1 mm . . . . . *Diplazon neoalpinus* Zwakhals

4. Hind tibia tri-colored black-white-black-orange, the orange band covering at least the apical quarter of the tibia. Metasoma with orange at least on most of tergites 2 and 3. (Males unknown in Europe) . . . . . *Diplazon laetatorius* (Fabricius)

- Hind tibia black-white-black banded, at most with some orange to orange-brown area in the apical dark band. Metasoma usually entirely black but sometimes with yellow or orange markings behind transverse impressions on some tergites 5

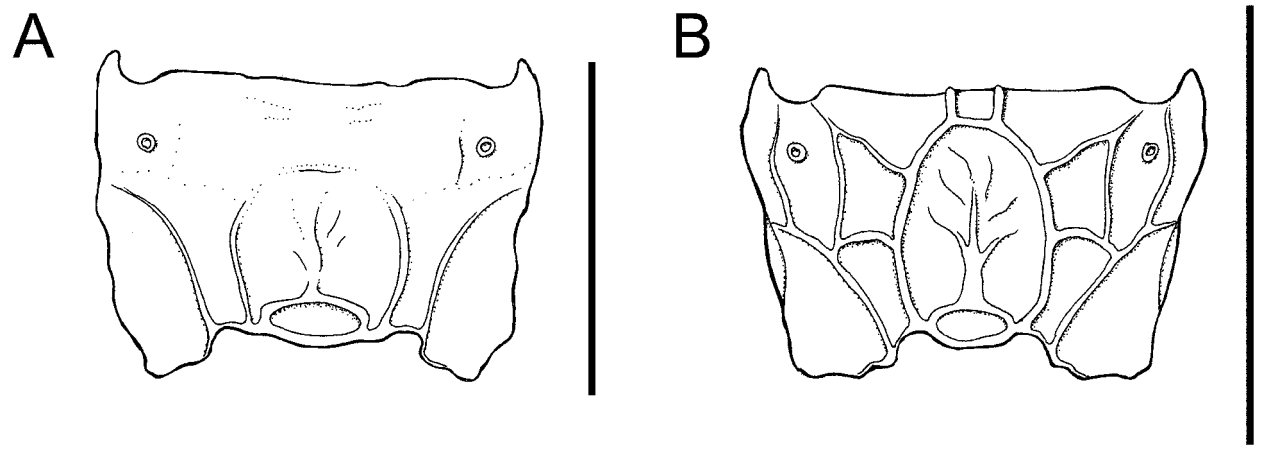

FIGURE 17. Variability of propodeal carination in the genus *Diplazon*. A. *Diplazon pectoratorius* ♀, propodeum. B. *Diplazon pallicoxa* ♀, propodeum. Scale bars represent 500 µm.

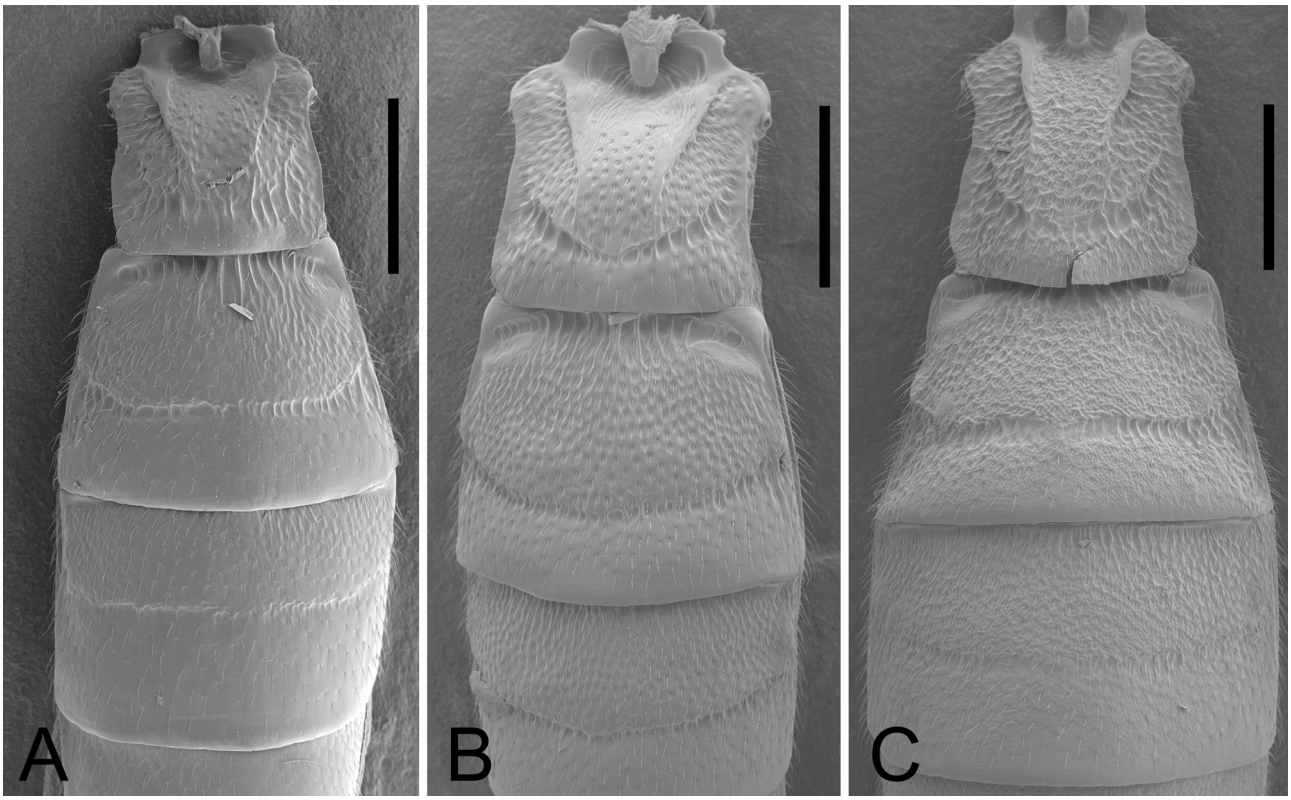

FIGURE 18. Sculpture of the proximal tergites in the genus *Diplazon*. A. *Diplazon tetragonus* ♀, first three tergites showing transverse impressions and a partly rugulous and coriaceous sculpture in front of the impressions. B. *Diplazon scutatorius* ♀, first three tergites with strong transverse impressions and strong punctures. C. *Diplazon zetteli* ♀, strongly coriaceous sculpture extends to hind part of the tergites. Scale bars represent 500 µm.

5. Tergite 2 irregularly sculptured, with punctures often disappearing against the rugose or coriaceous background; tergite 3 often with punctures, but these usually with margins indistinct (Fig. 18A). Bright coloration of scutellum and shoulder marks usually ivory. Females with fore coxa orange and often slightly dark basally, mid coxa entirely orange; in males, at least hind coxa partly orange 6
- Tergites 2 and 3 distinctly punctate on a largely smooth and polished background, margins of punctures well defined (Fig. 18B). Bright coloration of scutellum and shoulder marks yellow. Fore and usually also mid coxae of female entirely yellow, only hind coxa orange; in males, all coxae usually entirely yellow 7
6. Tergites 2 and 3 with punctures disappearing against the strongly coriaceous background sculpture which extends across transverse impressions onto hind part of the tergites. Mesopleuron weakly punctate, coriaceous and matt on about lower half, metapleuron mostly coriaceous and matt. First tergite as long as wide in females, 1.1 times longer than wide in males. . . . . *Diplazon nordicus* **sp. nov.**
- Tergite 2 rugose with some coriaceous areas in front of the transverse impression, smooth and punctate behind transverse impression; at least tergite 3 often with some indication of punctures. First tergite 1.0–1.25 times as long as wide in females, 1.2–1.4 in males . . . . . *Diplazon tetragonus* (Thunberg).
7. Hind margin of tergite 1 yellow, tergite 2 apically and most of tergite 3 orange, following tergites largely yellow. Tergites smooth and shining, sparsely and faintly punctate. (Corsica, female unknown) . . . . . *Diplazon aubertiator* Diller
- Metasoma mainly black, tergites at most with orange or yellow bands or spots behind transverse impressions. Tergites strongly punctate 8
8. Hind coxa orange in females, often entirely yellow in male. Tergite 2 0.55–0.7 times as long as apically wide in females, 0.6–0.8 in males. Female metasoma dorsoventrally depressed, broad, gradually and evenly tapered posterior to third segment. Male and often female with hind margins of tergites 1 to sometimes 3 broadly marked with yellow bands or lateral spots . . . . . *Diplazon scutatorius* Teunissen
- Hind coxa largely yellow in both sexes, sometimes with some orange basally. Tergite 2 0.75–0.9 times as long as apically wide. Female metasoma narrow, parallel-sided, tapered posterior to fourth segment, black or brown . . . . . *Diplazon pallicoxa* Manukyan
9. Tergites 2 and 3 basally without distinct punctures but with a strongly coriaceous or rugose background, without smooth areas, matt. Coriaceous sculpture of tergite 2 often extending across transverse impression onto apical part of tergite (cf. Fig. 18C; this character requires some experience and is often less reliable in males; *D. varicoxa* can be traced through both halves of the couplet) 10
- Tergites 2 and 3 basally distinctly punctate on a more or less smooth or rugose background, at least some punctures with distinct margins, and with some smooth and shining areas between the punctures. Rugose sculpture of tergite 2 not extending across transverse impression, apical part smooth and shining, with or without punctures. (cf. Fig. 18B) 15
10. Metasoma extensively marked with orange, tergites 2 and 3 orange at least behind transverse impressions. Hind tibia often with some orange or orange-brown in the apical dark band . . . . . *Diplazon deletus* (Thomson)
- Metasoma entirely black or with narrow orange or yellow bands along hind margins of the tergites. Hind tibia usually entirely black apically. 11
11. Tergites 2 and 3 with coriaceous or rugose sculpture only in front of transverse impressions, apical part smooth and shining between weak or strong punctures. Female face usually with a yellow central spot 12
- Tergites 2 and 3 with coriaceous sculpture extending across transverse impressions, apical part at least weakly coriaceous between the punctures, at most partly shining. Female face usually without a yellow central spot. 13
12. Female metasoma strongly laterally compressed behind tergite 4. Tergites 2 and 3 without punctures but strongly coriaceous. Tergite 2 0.7–0.85 times as long as wide in females, 0.9 in males. Mesopleuron often with a coriaceous area centrally. Female face without a yellow central spot. . . . . *Diplazon cascadensis* Dasch
- Metasoma at most gradually tapered, dorsoventrally depressed except for the apical segments. Tergites 2 and 3 at least with traces of punctures. Tergite 2 0.55–0.75 times as long as wide in both sexes. Mesopleuron smooth between the weak or strong punctures. Female face almost always with a yellow central spot . . . . . *Diplazon varicoxa* (Thomson)
13. Mesopleuron strongly punctate also on upper half, smooth and shining between the punctures. Face distinctly punctate on a coriaceous background, at least on central, elevated area. Mesoscutum often with large yellow shoulder marks. . . . . *Diplazon angustus* Dasch
- Mesopleuron usually sparsely punctate on lower part but also with irregular coriaceous areas, on upper part at most with a few weak punctures. Face strongly coriaceous, at most indistinctly punctate. Mesoscutum at most with small yellow shoulder marks 14
14. Smaller species, fore wing length 3.9–5 mm. Transverse impression usually absent from tergite 4. Mesoscutum without yellow shoulder marks, male with mesopleuron and mesosternum entirely black. Male face often with two black lines from antennal sockets to clypeus . . . . . *Diplazon hyperboreus* (Marshall)
- Larger species, fore wing length 5.2–6.5 mm. Transverse impression usually present on tergite 4. Mesoscutum often with small yellow shoulder marks, male with a small yellow spot on mesosternum. Male face all whitish-yellow . . . . . *Diplazon zetteli* **sp. nov.**
15. Small species, fore wing length 3.5–4.5 mm. Antenna usually with 15, rarely 16 flagellomeres. Tergite 1 0.8–1.1 times as long as wide, tergite 2 0.5–0.6. Male with face usually black with yellow along inner orbits but sometimes with yellow central face patch. Metasoma often marked with white on hind margin of first tergite and with orange on second and third tergites . . . . . *Diplazon multicolor* (Gravenhorst)
- On average larger species, fore wing length 3.9–7 mm. Antenna with at least 16 flagellomeres, or if with 15, then fore wing length at least 4.8mm. Tergite 1 usually longer than wide, especially in males, tergite 2 often longer. Male with face entirely

yellow or at least with a large yellow central face patch. Metasoma usually entirely black but sometimes with apical bands on some tergites 16

16. Hind coxa mostly orange, sometimes with base dark. Face of both sexes with yellow along inner orbits, in females without, in males with a yellow central spot. Mesopleuron, face and tergites 2 and 3 strongly punctate, at least tergite 3 entirely smooth and shining between the strong punctures. 17

- Hind coxa black, with or without a yellow apex (rarely partly orange). Female face with or without a yellow central spot, often in males and rarely in females entirely yellow. Punctures often less distinct, especially on face, upper half of mesopleuron, and tergite 2 (except for *D. schachti*). 18

17. Larger species, fore wing length 5.0–7.0 mm. Tergites 2 and 3 both very strongly punctate both in front of and behind transverse impressions, smooth and shining between the punctures. Tergite 4 often with a transverse impression. Scutellum marked with white or ivory on most of its surface. Mesopleuron strongly punctate over most of its surface, with impunctate area around mesopleural fovea small, so that most of upper half of mesopleuron is punctate . . . . . *Diplazon tibiatorius* (Thunberg)

- Smaller species, fore wing length 4.0–5.2 mm. Tergites 2 and 3 strongly punctate, but punctures often weak behind transverse impressions; especially tergite 2 often with some rugose to coriaceous sculpture. Transverse impressions absent on tergite 4 but usually with a change in sculpture instead. Scutellum marked with an ivory to yellow spot that usually only covers part of scutellum. Mesopleuron strongly punctate over lower half and along anterior margin, but with a large impunctate area around mesopleural fovea, so that more than half of upper half of mesopleuron is entirely smooth . . . . . *Diplazon parvus* **sp. nov.**

18. Femora with black marks ventro-basally. Female metasoma laterally compressed apically. Hind tibia often with some orange or orange-brown in the apical band. Smaller species, fore wing length at most 3.9–5.1 mm . . . . . *Diplazon flixi* **sp. nov.**

- Femora without black markings. Female metasoma dorsoventrally depressed. Hind tibia usually with apical band uniformly dark. Smaller or larger species 19

19. Hind tibia white with a dark apex, without a dark basal band. Face, mesopleuron, mesoscutum and tergites 1 to 4 very strongly punctate. First and often following tarsomeres white with a dark apex. Both sexes with face all yellow. Metasoma with broad yellow bands behind transverse impressions on tergites 1 to 4 or 5 . . . . . *Diplazon schachti* Diller

- Hind tibia black-white-black banded. Punctures less distinct, on face almost disappearing against the coriaceous background. Hind tarsus all dark. At least female with face usually mostly black. Metasoma with yellow colouration usually less prominent 20

20. Face of female usually with a yellow central patch, and with yellow inner orbits often extending on gena. Coxae in females black with yellow apices, prominent at least on fore and mid coxae, the latter more yellow than black. Tergites 2 and 3 sometimes marked with yellow apically . . . . . *Diplazon varicoxa* (Thomson)

- Face of female without a yellow central face patch. Coxae mostly black, only fore coxa often with a yellow apex, mid coxa at most with a small yellow apical spot. Metasoma entirely black, but sometimes tergite 1 with a white apex 21

21. Tergites 2 and 3 with some punctures but also with more rugose or even coriaceous areas. Mesopleuron with punctures usually restricted to lower half and anterior of upper half. Tergite 4 without a distinct transverse impression. Smaller species, fore wing length 4.2–4.7 mm. . . . . *Diplazon annulatus* (Gravenhorst)

- Tergites 2, 3 and even 4 with strong punctures with distinct margins, area between the punctures largely smooth and shining. Mesopleuron strongly punctate over most of its surface. Tergite 4 with a distinct transverse impression at least centrally. Larger species, fore wing length 5.0–7.0 mm. . . . . *Diplazon cf. tibiatorius* (Thunberg)

Diplazon angustus Dasch 1964a

Diplazon bachmaieri Diller 1986 (syn. nov.)

Diagnosis. Fore wing length 5.2–6.5 mm. Antenna of both sexes with 16–18 flagellomeres. Face with punctures clearly distinct from the background sculpture, at least centrally. Mesopleuron smooth and shining and strongly punctate also on upper half. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 0.95–1.15, tergite 2 0.6–0.7 times as long as wide; tergites 2 and 3 with obvious coriaceous sculpture between the rather indistinct punctures, this sculpture often extending across transverse impressions. Transverse impressions deep on tergites 1 to 2, often still distinct on tergite 3 and sometimes indicated on tergite 4. Metasoma dorsoventrally depressed.

Colouration of females. Antenna dark brown. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, only rarely a spot on subtegular ridge, small shoulder mark, upper mesepimeron; scutellum with a yellow tip. Legs orange, coxae black with a tinge of orange or entirely orange, in which case at least the trochanters are dark; femora orange; hind tibia narrowly white between the dark basal and apical bands, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, entire face, subtegular ridge and some irregular area around epicnemial carina. Fore and mid coxae yellow. Tergites 1 to 3 sometimes with posterior margins dark orange.

Material examined. Holotype and paratype of *Diplazon bachmaieri* Diller: Switzerland, Valais, Sierre, 500m, leg. E.Diller, 1.VIII.1977. 2♀, at ZSM. Paratypes of *Diplazon angustus* Dasch: USA, Alaska, Mt. McKinley, 2500',

leg. David Townes, 6.VIII.1954. 1♀, at AEI. USA, California, Yosemite National Park, Tuolumne Meadows, leg. A.D. Telford, VIII.1959. 1♀, at USNM.

New for Austria: Tirol, Königstal, Obergurgl, 2000m, leg. Fitton & Day, VII.1981. 2♀, at BMNH. New for France: Col du Lautaret, N45.0225, E06.2142, 5.VIII.1982. 1♀, at ZSM. New for Sweden: Uppland, Älvkarleby kommun, Bätfors. Pine forest w. blueberry., N60°27.639', E17°19.069', leg. SMTP, 27.VI.–01.VII.2004. 1♀, at NRM.

Austria (2), France (2), Germany (1), Russia (1), Sweden (1), Switzerland (12).

Distribution. Holarctic.

Figures. Male terminal sclerites (Fig. 37B).

Diplazon annulatus (Gravenhorst 1829, *Bassus*)

Bassus lapponicus Zetterstedt 1838

Diagnosis. Fore wing length 4.2–4.7 mm. Antenna of both sexes with 16–17 flagellomeres. Face with punctures distinct from the background sculpture only on central, elevated part. Mesopleuron smooth and polished, strongly punctate over lower half and along anterior margin. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 1.1–1.3, tergite 2 0.6–0.7 times as long as wide; tergites 2 and 3 mainly rugose, usually with some distinct punctures at least on tergite 3, the rugose sculpture not extending across transverse impressions. Transverse impressions distinct on tergites 1–3. Female metasoma dorsoventrally depressed, laterally compressed only at the tip.

Colouration of females. Antenna dark brown or black. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow centrally on clypeus and mouthparts, hind corner of pronotum, tegula, shoulder mark, upper mesepimeron; scutellum usually only with a yellow tip. Legs orange, coxae black, fore coxa often with a yellow apex, trochanters and part of trochantelli black; femora orange, not marked with black below; hind tibia black-white-black banded, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel or entire antenna, central yellow face patch or entire face. Fore and mid coxae and trochanters often largely yellow. Fore and mid legs often yellow.

Material examined. Lectotype of *Bassus lapponicus* Zetterstedt: Sweden, Södermanland, Björkvik. 1♀, at ZIL.

Finland (1), Germany (1), Sweden (3), Switzerland (25). **Distribution.** Holarctic.

Figures. Habitus (Fig. 28E).

Notes. The type of *Diplazon annulatus* Gravenhorst is unfortunately lost (Townes *et al.* 1965) and the specimens reported under this name by other authors in the past included additional species, such as *D. multicolor*, *D. varicoxa* and the newly described *D. flixi* (see those for diagnostic characters). I here use the most common interpretation of the species (Schmiedeknecht 1926; Beirne 1941). As it also corresponds to the lectotype of the synonym *D. lapponicus*, it is unnecessary to fix a neotype at this point.

Diplazon aubertiator Diller 1986

Diagnosis. (Female unknown). Fore wing length 3.8 mm. Antenna in males with 15 flagellomeres. Face with punctures present but weak against the strongly coriaceous background. Mesopleuron smooth and polished and strongly punctate also on upper half. Propodeum with carinae partly reduced but enclosing pleural and petiolar areas. Tergite 1 1.25, tergite 2 0.7 times as long as wide; tergites 2 and 3 with small but distinct punctures on a very smooth and polished background. Transverse impressions deep on tergites 1 to 3, indicated on tergite 4. Metasoma dorsoventrally depressed (male).

Colouration of males. Antenna dark brown, slightly paler below. Head and mesosoma black, face with yellow along inner orbits, yellow over entire face, clypeus and mouthparts, a line along upper margin of pronotum, tegula, subtegular ridge, very large shoulder marks extending as two parallel lines over most of mesoscutum, upper mesepimeron, entire scutellum. Legs orange, fore and mid coxae yellow, hind coxa orange with apex and

trochanters dark; femora orange, hind femur marked with black apically; hind tibia black-white-black banded, hind tarsus dark. Tergite 1 yellow apically, tergite 2 apically and most of tergite 3 orange, following tergites largely yellow.

Material examined. Holotype of *Diplazon aubertiator* Diller: France, Corse, San-Nicolao, leg. E.Diller, 10.VI.1984. 1♂, at ZSM.

Notes. This species is known only from a single male specimen from Corsica.

Diplazon cascadensis Dasch 1964a

Diplazon fechteri Diller 1969 (syn. nov.)

Diagnosis. Fore wing length 4.5–5.3 mm. Antenna with 16–18 flagellomeres. Face with punctures disappearing against the coriaceous background. Mesopleuron smooth and polished, weakly punctate on lower half, at most with some weak puncture along the anterior margin on upper half, sometimes with a small, coriaceous area centrally. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 0.9–1.3 times as long as wide in females, 1.4 in males, tergite 2 0.7–0.85 in females and 0.9 in males; tergites 2 and 3 finely rugose or coriaceous and matt, punctures indistinct, smooth and shining behind transverse impressions. Transverse impressions deep on tergites 1 and 2, weak or absent on tergite 3. Female metasoma strongly compressed posterior to fourth segment, knife-like towards apex.

Colouration of females. Antenna dark brown. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, small to medium-sized shoulder mark, upper or whole mesepimeron, brown or yellow on subtegular ridge; scutellum yellow. Legs orange, coxae black, fore and mid coxa with a yellow apex; femora orange; hind tibia brown-white-brown banded, hind tarsus dark brown. Metasoma black, second and often third tergite often with orange hind margins.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, entire face, propleuron, mesopleuron and mesosternum in front of epicnemical carina, and a spot low on posterior half of mesopleuron. Fore and mid coxae and trochanters yellow, hind coxa with yellow apex, fore and mid legs often yellow. Metasoma with orange hind margins on tergites 1 to 7.

Material examined. Paratype of *Diplazon cascadensis* Dasch: USA, Alberta, Banff, 7,000–8,000 ft in the Cascade Mts, leg. O.Bryant, 20.VII.1925, 1♀, at USNM. Holotype of *Diplazon fechteri* Diller: Switzerland, Valais, Morteratsch, 1900m, leg. Schacht, VII.1972. 1♀, at ZSM.

Additional material examined. USA, Wyoming, Teton N.For., Snake River, leg. B. and C. Dasch, 9.VII.1978. 1♂, 1♀, at AEI.

Notes. This species is known from only five specimens from the US, the female holotype of *D. fechteri* from Switzerland, and one female collected in Russia (Manukyan 1995). As the latter could not be seen, the description is based on the Swiss specimen and the North American material.

Diplazon deletus (Thomson 1890, *Bassus*)

Diplazon rufigaster Dasch 1964a

Diagnosis. Fore wing length 3.8–4.9 mm. Antenna in females with 16–18, in males with 17–19 flagellomeres. Face with punctures disappearing against the coriaceous background. Mesopleuron smooth and polished weakly punctate largely restricted to lower half and front. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 1.2–1.45 times longer than wide in females, 1.4–1.7 in males, tergite 2 0.65–0.8 in females and 0.8–0.9 in males; tergites 2 and 3 strongly coriaceous and matt, on tergite 2 sometimes more rugose, punctures indistinct, smooth and shining behind transverse impressions. Transverse impressions deep on tergites 1 to 3. Metasoma dorsoventrally depressed or slightly tapered apically.

Colouration of females. Antenna dark brown, sometimes paler below. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, shoulder mark, upper mesepimeron; scutellum at least with yellow tip,

sometimes largely yellow. Legs orange, coxae black with yellow apices, hind coxa entirely black; femora orange, sometimes marked with black basally; hind tibia black-white-black banded, sometimes apical band with an orange or orange-brown area, hind tarsus dark. Metasoma marked with orange at least behind transverse impressions on tergites 2 and 3, often also some orange on tergite 4.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, entire face, front part of mesosternum, and sometimes lower mesopleuron. Fore and mid coxae usually entirely yellow.

Material examined. Lectotype of *Bassus deletus* Thomson: Sweden, Lapland. 1♀, at ZIL.

New for Italy: Süd-Tirol, San Martino di Castrozza, 1444m, leg. E. Bauer, 18.VII.1934. 1♂, at ZSM.

Finland (1), Germany (1), Hungary (1), Italy (1), Netherlands (1), Sweden (20), Switzerland (12), United Kingdom (4).

Distribution. Holarctic.

Diplazon flixi sp. nov.

Etymology. This species is named after it type locality, the Alp Flix in the Swiss Alps. This alp was extensively studied for its biodiversity, and a Malaise trap survey over three years recovered about 40% of the European species of Diplazontinae in an area of less than 1 km^2 (Klopfstein 2007).

Diagnosis. Fore wing length 3.9–5.1 mm. Antenna in females with 16–17, in males with 17 flagellomeres. Face with punctures clearly distinct from the background sculpture at least centrally. Mesopleuron smooth and polished and strongly punctate also along anterior margin on upper half. Propodeum with a full set of carinae enclosing basal and petiolar areas, lateral areas often not fully enclosed. Tergite 1 0.95–1.15, tergite 2 0.55–0.75 times as long as wide; tergites 2 and 3 with large, distinct punctures on a rugose or on tergite 3 smooth and polished background, punctures with distinct margins, rugose sculpture not extending across transverse impressions. Transverse impressions deep on tergites 1 to 3, in males also distinct on tergite 4. Female metasoma progressively laterally compressed posterior to third segment, strongly compressed towards apex.

Description. Antenna with multiporous plate sensilla evenly distributed also on ventral surface of the flagellomeres. Face centrally only weakly elevated, without vertical depressions; strongly coriaceous but also distinctly punctate at least centrally. Clypeus separated from face by a distinct groove, elevated basally, remainder flat to slightly concave, bilobed, coriaceous basally, rather smooth and shining centrally. Head strongly constricted behind compound eyes. Mesoscutum smooth and shining between strong punctures, with short but strongly impressed notauli; scutellum smooth and punctate, with lateral carinae only present basally. Mesopleuron smooth and shining, at most with some coriaceous areas on lower half, strongly punctate over lower half and along anterior margin on upper half, sternaulus weakly impressed, epicnemial carina complete ventrally. Metapleuron mainly smooth and punctate but often coriaceous on lower part. Propodeum with a full set of strong carinae, but lateral longitudinal carinae often weak, especially basally; areas between carinae strongly rugose. Fore wing areolet open, vein 1cu-a opposite to slightly distad of vein M; hind wing with three basal hamuli, vein CU+cu-a broken slightly to clearly below middle. Metasoma laterally compressed behind third segment, apical segments strongly so, hind margins of all tergites straight or convex; tergite 1 with longitudinal carinae distinct on about basal half, with a deep transverse impression, rugose and punctate over entire surface; tergite 2 rugose with some punctures and sometimes some coriaceous areas, tergite 3 smoother between distinct punctures, both tergites smooth and punctate behind the distinct transverse impressions, tergite 4 weakly punctate basally and usually smoother behind the indistinct transverse impression, remaining tergites smooth. Second and third tergites with spiracles dorsal, above lateral folds. Ovipositor sheaths slightly upcurved, tapered, rather stout, with tip closed apically; smooth and shining, with some setae around tip and ventrally.

Colouration of females. Antenna dark brown, sometimes paler below. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow at least centrally on clypeus and mouthparts, hind corner of pronotum, tegula, often subtegular ridge, small shoulder mark, upper mesepimeron; scutellum at least with yellow tip, sometimes largely yellow. Legs orange, coxae black, fore coxa often with a yellow apex, trochanters black with yellow apex; femora orange, marked with black below to largely black; fore and mid tibia sometimes dark on the outside, hind tibia black-white-black banded, apical band often turning to orange or brown apically, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, central yellow face patch or entire face. Fore and mid coxae and trochanters often largely yellow. Fore and mid legs often yellow.

Similar species. This species is most similar to *D. annulatus*, *D. multicolor* and *D. varicoxa* but is unique in terms of the extensive dark colouration of the legs and the laterally compressed female metasoma.

Type material. Holotype ♀, at NMBE: Switzerland, Grisons, Sur, Alp Flix, SE Vauastg, Dafora, 1920m, N46°31.482' E9°38.755', Malaise trap, leg. H.Baur, 16.–23. VI. 2003. Labels: "Malaise-F. 2, FO-Nr. 626; CH/GR Sur, SE Vauastg, Dafora 1920m 769.343/; 154.982 leg. H.Baur; 16.6.–23.6 2003", "Extraction plate 4; 4-H1", "Individual Number; Ichn-0556 ; label S.Klopfstein 2009", "Holotype; Diplazon ♀; flixi n.sp.; det. S.Klopfstein 2012". Paratypes: same as holotype but 23.–30.VI.2003 (1♀) and 9.–16.VI.2003 (1♀); Switzerland, Grisons, Sur, Alp Flix, Clavenia, 1987m, N46°32.005' E8°55.135', Malaise trap, leg. H.Baur: 16.–23. VI. 2003 (2♀), 23.–30. VI. 2003 (1♀); Switzerland, Grisons, Sur, Alp Flix, NE Sur, 1770m, N46°31.451' E9°38.055', Malaise trap, leg. H.Baur and S.Klopfstein, 15.–20.VII. 2006 (2♀, 3♂); all at NMBE.

Additional material. New for France: Col du Lautaret, N45.0225, E06.2142, 5.VIII.1982. 1♂, at ZSM. New for Sweden: Lapland, leg. Boheman.4♀, at NRM.

France (2), Sweden (4), Switzerland (40).

Distribution. Western Palaearctic.

Figures. Male terminal sternite and tergites (Figs 10E, 10F), habitus (Fig. 28F).

Diplazon hyperboreus (Marshall 1877, *Bassus*)

Diplazon algidus Dasch 1964a

Diagnosis. Fore wing length 3.9–5 mm. Antenna of both sexes with 15–17 flagellomeres. Face with punctures disappearing against the coriaceous background. Mesopleuron coriaceous and matt on part of its surface, with some very weak punctures. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 1.0–1.25 times longer than wide in females, 1.1–1.5 in males, tergite 2 0.65–0.9 times as long as wide in both sexes; tergites 2 and 3 strongly coriaceous and matt, punctures indistinct, sculpture extending across transverse impressions. Transverse impressions deep on tergites 1 to 2 and often 3. Metasoma evenly tapered posterior to third segment.

Colouration of females. Antenna black. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow on clypeus and often mouthparts, hind corner of pronotum, remainder of yellow colouration usually reduced; scutellum at most with a yellow tip. Legs orange, coxae black or sometimes red; femora orange, often marked with black below; hind tibia black-white-black banded, sometimes apical band with an orange or orange-brown area, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel and sometimes antenna, central yellow face patch or entire face. Fore and mid coxae yellow apically.

Material examined. Lectotype and paralectotype of *Bassus hyperboreus* Marshall: Norway, 19.VII.1873. 2♂, at BMNH. Paratypes of *Diplazon algidus* Dasch: USA, Alaska, Mt. McKinley, 3500', leg. David Townes, 5. and 7.VIII.1954. 2♀, at AEI. USA, Alberta, Banff, leg. E.H.Strickland, 8.VIII.1949. 1♂, at AEI.

Canada (1), Denmark (Greenland: 1), Norway (3), Sweden (13), USA (4).

Distribution. Holarctic.

Diplazon laetatorius (Fabricius 1781, *Ichneumon*)

Ichneumon dichrous Schrank 1781
Anomalon attractus Say 1835
Bassus albovarius Wollaston 1858
Bassus cinctipes Holmgren 1868
Bassus sycophanta Cresson 1868
Bassus tripicticrus Walsh 1873
Scolobates varipes Smith 1878
Bassus venustulus Saussure 1892

Bassus balearicus Kriechbaumer 1894
Bassus terminalis Davis 1895
Bassus generosus Cameron 1898
Bassus senegalensis Ferrière 1925 (in Vayssière & Mimeur 1925)
Bassus ikiti Cheesman 1936

Diagnosis. (No males found in Europe). Fore wing length 3.5–6 mm. Antenna in females with 16–17 flagellomeres. Face with punctures clearly distinct from the background sculpture. Mesopleuron smooth and polished with weak to strong punctures on lower half, upper half largely smooth but with punctures along anterior margin. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 0.9–1.1, tergite 2 0.55–0.7 times as long as wide; tergites 2 and 3 with large, distinct punctures on a rugose or on tergite 3 rather smooth and polished background, punctures with distinct margins. Transverse impressions deep on tergites 1 to 4. Metasoma dorsoventrally depressed.

Colouration of females. Antenna orange, brown dorsally. Head and mesosoma black, face with yellow along inner orbits, usually without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, shoulder mark, upper mesepimeron; scutellum largely yellow. Legs including coxae orange; hind tibia tricolored, with a dark base, then white band, then black band and a broad, orange apex, hind tarsus dark. Metasoma orange at least on tergites 2 and 3, often also hind margin of tergite 1 and parts of tergite 4 orange.

Material examined. Holotype of *Bassus cinctipes* Holmgren: South Africa. 1♀, at NRM.

New for Kazakhstan: 12 km South from Urda village, bound between Khaki saline and Ryn-Kum, leg. Karalius, Miatleuski, 1.–3.VI.2001. 1♀, at MR.

Argentina (20), Finland (1), France (2), Germany (2), Hungary (>500), Iceland (1), Iran (4), Kazakhstan (1), Norway (1), Portugal (1), Russia (1), Spain (Canary Islands: 1), Sweden (>500), Switzerland (>300), Tadzhikistan (1), Turkey (1), Ukraine (1), United Kingdom (60), USA (4), Zambia (1).

Distribution. Worldwide.

Figures. Mesoscutum (Fig. 12A), habitus (Fig. 29A).

Notes. This species has a cosmopolitan distribution and reproduces parthenogenetically in most of its range. Males are to date only known from North America and India.

Diplazon multicolor (Gravenhorst 1829, *Bassus*)

Diagnosis. Fore wing length 3.5–4.4 mm. Antenna of both sexes with 14–15, rarely 16 flagellomeres. Face with punctures clearly distinct from the background sculpture. Mesopleuron smooth and polished with rather weak but quite frequent punctures. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 0.8–1.1, tergite 2 0.5–0.6 times as long as wide; tergites 2 and 3 with large, distinct punctures on a rugose or on tergite 3 rather smooth and polished background, punctures with distinct margins. Transverse impressions deep on tergites 1 to 4 in females, 1 to 3 or 4 in males. Metasoma dorsoventrally depressed.

Colouration of females. Antenna dark brown, sometimes paler below. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, shoulder mark, upper mesepimeron; scutellum at least with an apical spot, often largely yellow. Legs orange, coxae black, fore and mid coxae with yellow apices; femora orange; hind tibia black-white-black banded, sometimes apical band with an orange or orange-brown area, hind tarsus dark. Metasoma black, tergite 1 often with a white hind margin, tergites 2 and 3 sometimes with apical orange bands.

Colouration of males. As in female, yellow colour largely reduced, usually without central yellow face patch.

Material examined. New for Slovenia: Untersteiermark, Podčetrtek, leg. Dr.Jaeger, 3.IX.1935. 1♀, at ZSM.

France (1), Germany (1), Hungary (13), Russia (1), Sweden (2), Switzerland (14).

Distribution. Palaearctic and Oriental.

Figures. Metasoma (Fig. 13A).

Notes. The delimitation of *D. multicolor* has caused problems with identification in the past and has only been removed from synonymy with *D. annulatus* recently (Klopfstein 2011). But the short antennae, stout metasoma and often characteristic colouration clearly separate *D. multicolor* from the otherwise similar *D. annulatus*.

Diplazon neoalpinus Zwakhals 1979 (new name for primary homonym *Bassus alpinus* Holmgren)

Bassus alpinus Holmgren 1858 (homonym)

Diagnosis. Fore wing length 4.1–5.1 mm. Antenna in females with 16–18, in males with 16–20 flagellomeres. Face with punctures disappearing against the coriaceous background. Mesopleuron smooth and polished weakly punctate largely restricted to lower half. Propodeum with carinae largely reduced, at most with pleural and traces of lateral longitudinal carinae and with a change in sculpture around petiolar area. Tergite 1 1.15–1.3 times as long as wide in females, 1.2–1.8 in males, tergite 2 0.7–1.1 times as long as wide in both sexes; tergites 2 and 3 strongly coriaceous and matt, punctures indistinct, sculpture extending across the weak transverse impressions. Transverse impressions weak but distinct on tergites 1 and 2, at most present as a change in sculpture on tergite 3. Metasoma compressed posterior to third segment.

Colouration of females. Antenna dark brown, sometimes paler below. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, small to large shoulder mark, upper mesepimeron; scutellum at least with yellow tip, sometimes also with yellow sides, sometimes orange centrally. Legs orange, fore coxa yellow, mid coxa yellow or orange, hind coxa orange; femora orange, without black marks; hind tibia white with a dark apex, sometimes with a subbasal dark spot, hind tarsus dark, but first tarsomere basally white. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, epicnemium and a stripe on lower mesopleuron. Coxae and fore and mid legs often largely yellow.

Material examined. Lectotype of *Bassus alpinus* Holmgren: Norway, Dovre, leg. Boheman.1♀, at NRM.

Finland (2), Germany (2), Netherlands (2), Norway (1), Sweden (10), Switzerland (30), United Kingdom (2), USA (2).

Distribution. Holarctic.

Figures. Tip of metasoma and ovipositor sheaths ♀ (Fig. 15H).

Diplazon nordicus sp. nov.

Etymology. This species is named after its northern distribution.

Diagnosis. Fore wing length 5.1–5.8 mm. Antenna in females with 16–17, in males with 17 flagellomeres. Face with punctures disappearing against the coriaceous background. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 0.95–1.0, tergite 2 0.5–0.6 times as long as wide in females, 1.15 and 0.67 in males; tergites 2 and 3 strongly coriaceous and matt, punctures indistinct, sculpture extending across transverse impressions. Transverse impressions deep on tergites 1 to 3. Metasoma dorsoventrally depressed.

Description. Antenna with multiporous plate sensilla evenly distributed also on ventral surface of the flagellomeres. Face centrally only weakly elevated, without vertical depressions; strongly coriaceous, punctures indistinct. Clypeus separated from face by a distinct groove, elevated basally, remainder flat to slightly concave, bilobed, mainly smooth. Head strongly constricted behind compound eyes. Mesoscutum mostly smooth, partly coriaceous between rather sparse, weak punctures, coriaceous sculpture mainly present between the short but strongly impressed notauli; scutellum smooth and sparsely punctate, with lateral carinae only present basally. Mesopleuron smooth and shining on upper half, partly or mainly coriaceous on lower half, and weakly to distinctly punctate, especially along anterior margin and on lower half, sternaulus weakly impressed, epicnemial carina complete ventrally. Metapleuron coriaceous at least on lower part. Propodeum with a full set of strong carinae; areas between carinae strongly rugose. Fore wing areolet open, vein 1cu-a opposite vein M; hind wing with three basal hamuli, vein CU+cu-a broken clearly below middle. Metasoma dorsoventrally depressed, hind margins of all tergites straight or convex; tergite 1 with longitudinal carinae reaching the transverse impression, shape very box-like, quadrate, rugose and coriaceous over entire surface; tergites 2 and 3 finely rugose and very strongly coriaceous in front of and strongly coriaceous and with some weak indications of punctures behind the distinct transverse impressions, tergite 4 strongly coriaceous basally and usually smoother behind middle, remaining tergites weakly coriaceous basally and smooth apically. Second and third tergites with spiracles dorsal, above lateral folds. Ovipositor sheaths slightly upcurved, tapered, rather stout, with tip closed apically; smooth and shining, with setae around tip and ventrally.

Colouration of females. Antenna black. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow or brown on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, and sometimes a small shoulder mark; scutellum with a yellow apical spot. Legs and coxae orange, fore coxa with base dark; femora orange; hind tibia black-white-black banded, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, upper mesepimeron. Fore and mid coxae largely yellow.

Similar species: This species belongs to the group with strongly coriaceous and matt tergites (*D. angustus*, *D. hyperboreus*, *D. zetteli*) but can easily be distinguished from them by the orange and yellow colouration of the coxae. The characters separating it from *D. tetragonus*, a species with similar colouration and very variable but always with partly shining tergites, are given in the key.

Type material. Holotype ♀, at NRM: Sweden, Småland, leg. Boheman. Labels: "Sm", "Bhm", "Holotype; Diplazon ♀; nordicus n.sp.; det. S.Klopfstein 2012". Paratypes: Lapland ("T. Lp."), Juli 1926, leg. Röhl (1♀); Lapland ("T. Lp."), 7.–9.VII.1918, leg. Arn (1♀), both at NRM; Norway, Nord-Trøndelag, Høylandet, stream Skiftesåa, 200m, N64.38°, E12.07°, Malaise trap, leg. Aagaard, Kaare, 1.VII.1986 (1♂), at ZMUO.

Figures. Habitus (Fig. 29B).

Diplazon pallicoxa Manukyan 1987

Diagnosis. Fore wing length 3.8–4.6 mm. Antenna of both sexes with 16–17 flagellomeres. Face with punctures disappearing against the coriaceous background. Mesopleuron smooth and polished weakly punctate largely restricted to lower half. Propodeum with carinae partly reduced, only basal and petiolar areas fully enclosed, lateral and pleural carinae mostly reduced or weak. Tergite 1 1.05–1.2, tergite 2 0.75–0.9 times as long as wide; tergites 2, 3 and usually 4 distinctly punctate on smooth and polished background. Transverse impressions deep on tergites 1 to 3 and usually 4. Metasoma narrow, tapered posterior to fourth segment.

Colouration of females. Antenna black. Head and mesosoma black, face with yellow inner orbits which are usually confluent with yellow on clypeus, without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, small shoulder mark, upper mesepimeron; scutellum yellow. Legs orange, coxae entirely yellow, hind coxa sometimes with an orange tinge; femora orange; hind tibia white with a small dark basal and a dark apical band, hind tarsus dark. Metasoma brown.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, and entire face.

Material examined. New for Germany: Thüringen, Gotha, Galberg, leg. Jänner, 25.VI.1917. 1♀, at NKME. New for Sweden: Småland, Nybro kommun, Bäckebo, Grytsjöns naturreservat, Old aspen forest in boulder terrain, N56°55'53.07", E16°5'7.93", leg. SMTP, 27.VI.–2.VII.2005. 1♀, at NRM.

Finland (1), Germany (1), Russia (1), Sweden (2), Switzerland (4).

Distribution. Palaearctic.

Figures. Propodeum (Fig. 17B).

Diplazon parvus sp. nov.

Etymology. This species is very similar to *D. tibiatorius* but distinctly smaller, which is reflected in the name *parvus*.

Diagnosis. (Male unknown). Fore wing length 4.0–5.2 mm. Antenna with 16 to 17 flagellomeres. Face with punctures strong, clearly distinct from the background sculpture. Mesopleuron smooth and polished and strongly punctate but also with a large impunctate area around mesopleural fovea so that about one quarter of the surface of the mesopleuron is devoid of punctures. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 1.0–1.1 times as long as wide, tergite 2 0.6–0.65 times as long as wide; tergite 2 distinctly punctate on a rugose to even coriaceous background, tergite 3 with punctures very strong on a smooth and polished background, punctures with distinct margins. Transverse impressions distinct on tergites 1–3. Metasoma gradually tapered posterior to third segment.

Description. Antenna with multiporous plate sensilla evenly distributed also on ventral surface of the flagellomeres. Face centrally only weakly elevated, without vertical depressions; strongly coriaceous and distinctly punctate over entire surface. Clypeus separated from face by a distinct groove, elevated basally, remainder flat to slightly concave, bilobed, mainly smooth. Head strongly constricted behind compound eyes. Mesoscutum smooth and shining between strong punctures, with short but strongly impressed notauli; scutellum smooth and sparsely punctate, with lateral carinae only present basally. Mesopleuron smooth and shining between strong punctures which cover lower half and anterior part of upper half, sternaulus weakly impressed, epicnemial carina complete ventrally. Metapleuron smooth and punctate. Propodeum with a full set of strong carinae; areas between carinae strongly rugose or punctate. Fore wing areolet open, vein 1cu-a opposite vein M; hind wing with three basal hamuli, vein Cu+cu-a broken below middle. Metasoma dorsoventrally depressed, hind margins of all tergites straight or convex; tergite 1 with longitudinal carinae distinct, reaching transverse impression, which is deep, rugose and punctate over entire surface; tergite 2 rugose with some strong punctures and sometimes some coriaceous areas, tergite 3 entirely smooth and shining between strong punctures, both tergites smooth and punctate behind the distinct transverse impressions, tergite 4 weakly punctate basally and usually smoother behind the indistinct transverse impression, remaining tergites smooth. Second and third tergites with spiracles dorsal, above lateral folds. Ovipositor sheaths slightly upcurved, tapered, rather stout, with tip closed apically; smooth and shining, with setae around tip and ventrally.

Colouration of females. Antenna dark brown. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow medially on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, shoulder mark, upper mesepimeron; scutellum yellow or ivory at least apically. Legs orange, coxae orange, at least fore and mid coxa with a black base or mainly black; femora orange; hind tibia black-white-black banded, hind tarsus dark. Metasoma black, tergite 1 usually with a white apex.

Similar species. This species is very close to *D. tibiatorius* but differs in size and in details of the sculpture. While *D. tibiatorius* is strongly punctate over most of the mesopleuron and both tergites 2 and 3, *D. parvus* has a larger impunctate area around the mesopleural fovea and more strongly rugose or even coriaceous sculpture on tergite 2. Additional, e.g. molecular, data should be sought to confirm the delimitation of these two species. From *D. varicoxa*, the species can be separated by the lack of a yellow central spot on the face and the mid coxa, which is orange or black, at most with a small yellow spot at the apex.

Type material. Holotype ♀, at NMBE: Switzerland, Bern, Bremgartenwald, 550m, N46°57.58, E7°24.94, Malaise trap, leg. S.Klopfstein, 11.–20. VI. 2008. Labels: "CH/BE Bern, Bremgarten- ; wald, Lichtung, Malaisef A ; 598.250/200.950 550m ; leg. S.Klopfstein ; 11–20 VI. 2008", "Extraction-Nb ; 8_44 ; label S.Klopfstein 2010", "Holotype; Diplazon ♀; parvus n.sp.; det. S.Klopfstein 2012". Paratypes: same as holotype (2♀); Switzerland, Bern, Bremgartenwald, Nägelisbode, 540m, N46°57.96, E7°25.06, Malaise trap, leg. S.Klopfstein : 11.–20. VI., 20.–27. VI., 27. VI.–8. VII., 3.–15. IX. 2008 (1♀ each), all at NMBE. Additional, non-type material as in supplementary material.

Additional material. New for France: Dordogne, St. Marcel du Perigord, leg. R.R.Askew, 1.–19.IX.2006. 1♀, at NMBE. New for Russia: Eastern Siberia, Irkutsk env., leg. Berlov, 30.VIII.2003. 1♀, at MR. New for Spain: Madrid, Casa de Campo, leg. Berlov, 18.VI.1992. 1♀, at MR. New for Sweden: Uppland, Älvkarleby kommun, Bätfors. Pine forest w. blueberry., N60°27.639', E17°19.069', leg. SMTP, 03.VII.–29.VII.2003. 1♀, at NRM.

France (1), Russia (1), Spain (1), Sweden (4), Switzerland (7).

Distribution. Palaearctic.

Figures. Habitus (Fig. 29C).

Diplazon pectoratorius (Thunberg 1824, *Ichneumon*)

Ichneumon angustorius Thunberg 1824
Bassus pectoratorius Gravenhorst 1829 (homonym)
Bassus pulchripes Provancher 1875
Polysphincta pleuralis Provancher 1875
Homotropus pectoratorius nigrithorax Strobl 1902
Homocidus akaashii Uchida 1931

Diagnosis. Fore wing length 4.5–7 mm. Antenna in females with 17–20, in males with 18–21 flagellomeres. Face

with punctures disappearing against the coriaceous background. Mesopleuron smooth and polished, with very weak but dense punctures also on upper half. Propodeum with carinae reduced, only pleural and parts of lateral longitudinal carinae present, petiolar area at most weakly indicated by rugae. Tergite 1 1.0–1.2 times as long as wide in females, 1.2–1.6 in males, tergite 2 0.65–0.8 in females, 0.7–0.9 in males; tergites 2 and 3 strongly coriaceous and matt, punctures indistinct, sculpture extending across transverse impressions. Transverse impressions distinct on tergites 1–3, rarely indicated on tergite 4. Metasoma dorsoventrally depressed.

Colouration of females. Antenna dark brown. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark, upper mesepimeron; scutellum at least with yellow tip, remainder orange. Mesosoma largely orange, at least on mesopleuron and mesosternum, often also on mesoscutum and part of propodeum; the distinctive orange colouration is very rarely reduced to a dark red on mesopleuron. Legs including coxae orange, fore and mid coxae often with yellow apices; femora orange; hind tibia white with an irregular subbasal dark spot and a dark apex, hind tarsus dark, but first tarsomere with white base. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, most of mesosternum and part of mesopleuron. Fore and mid coxae and part of legs yellow.

Material examined. Lectotype ♂ of *Ichneumon pectoratorius* Thunberg: Sweden, no locality data. 1♂, at UU. Lectotype of *Ichneumon angustorius* Thunberg: Sweden, no locality data. 1♀, at UU.

Austria (2), Finland (4), France (1), Germany (1), Hungary (80), Norway (1), Sweden (80), Switzerland (>100), Turkey (1), United Kingdom (20).

Distribution. Holarctic, Neotropical, Oriental.

Figures. Propodeum (Fig. 13B, 17A), habitus (Fig. 29D).

Diplazon schachti Diller 1986

Diagnosis. Fore wing length 3.9–4.7 mm. Antenna with 15–17 flagellomeres. Face with punctures clearly distinct from the background sculpture. Mesopleuron smooth and polished and strongly punctate over entire surface. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 0.85 times as long as wide in females, 1.0–1.15 times in males, tergite 2 0.55 in females, 0.6–0.7 in males; tergites 2 and 3 with large, distinct punctures on a smooth and polished background, on tergite 2 more rugose, but punctures always with distinct margins. Transverse impressions deep on tergites 1 to 4. Metasoma dorsoventrally depressed.

Colouration of females. Antenna dark brown, yellow below on scape and pedicel. Head and mesosoma black, face entirely yellow, yellow or ivory on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark, often two short parallel lines on mesoscutum, small spots on mesosternum in front of epicnemial carina, upper mesepimeron, entire scutellum. Legs orange or yellow, fore and mid coxae mostly yellow with a black base, hind coxa black, trochanters all with a black mark; femora orange; hind tibia white with a black apex, hind tarsus with first and second tarsomeres white with a dark apex, remainder dark. Metasoma black with broad yellow apical bands on tergites 1 to 4.

Colouration of males. As in females but with antenna yellow ventrally and yellow colouration more extended on mesopleuron in front of epicnemical carina. Fore coxa entirely yellow, hind coxa with a yellow apex, trochanters entirely yellow; hind tarsus often also with apical tarsomeres white basally.

Material examined. Holotype of *Diplazon schachti* Diller: Turkey, Pr. Hakkari, Suvari Halil-Pass SE Beytisebap, 2300m, leg. W. Schacht, 2.VIII.1982. 1♂, at ZSM.

New for Iran: Yazd, Sanij, leg. Abbas Mohammadi-Khoramabadi, 14.V.2012. 2♂, 1♀, in the private collection of Abbas Mohammadi-Khoramabadi.

Turkey (1), Iran (3).

Distribution. Palaearctic.

Notes. Only the male holotype of this species from Turkey has previously been reported, but several males and one female have recently been reared from *Scaeva albomaculata* (Macquart) on *Euphorbia heteradena*.

Diplazon scutatorius Teunissen 1943

Diplazon pilosus Uchida 1957

Diagnosis. Fore wing length 3.9–5.2 mm. Antenna of both sexes with 16–17 flagellomeres. Face with punctures clearly distinct from the background sculpture. Mesopleuron smooth and polished weakly punctate largely restricted to lower half. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 0.9–1.1 times as long as wide in females, 1.0–1.4 in males, tergite 2 0.55–0.7 in females and 0.6–0.8 in males; tergites 2 and 3 with large, distinct punctures on a smooth and polished background, on tergite 2 sometimes slightly more rugose, but punctures always with distinct margins. Transverse impressions deep on tergites 1 to 4. Metasoma dorsoventrally depressed.

Colouration of females. Antenna dark brown, sometimes paler below. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, shoulder mark, upper mesepimeron; scutellum largely yellow. Legs orange, fore and mid coxae entirely yellow, hind coxa orange; femora orange; hind tibia black-white-black banded, hind tarsus dark. Metasoma black, often with yellow spots on apical corners of tergites 2 and sometimes 3.

Colouration of males. As in females but with yellow ventrally on scape and pedicel and often entire antenna, entire face, propleuron, epicnemium and part of mesosternum. Hind coxa usually yellow. Metasoma often marked with yellow stripes behind transverse impressions on tergites 2 to 3 or 4.

Material examined. Holotype ♀ of *Diplazon tetragonopsis* Uchida: Japan, Izu-Ôshima, 25.V.1953, leg. S. Momoi, 1♀, at SPRHU.

New for Denmark: Sonderlylland, Stensbaek Plantage, leg. Worn-Hansen, 10.VII.1950. 1♀, at ZMUC. New for Hungary: Gemenci erdő, leg. Bajári, 21.V.1959. 1♀, at TMA. New for North Korea: Prov. North Pyongan, Mt. Myhyang-san, leg. Forro & Topal, 15.IX.1980. 1♀, at TMA. New for South Korea: Prov. Kanwon, Kum-gang san, environs. of Hotel Go-song, leg. S.Mahunka & H.Steinmann, 29.V.1970. 1♀, at TMA.

Denmark (1), Finland (5), France (1), Germany (2), Hungary (7), North Korea (2), Norway (1), Russia (1), Sweden (90), Switzerland (70), United Kingdom (50).

Distribution. Palaearctic.

Figures. Metasoma ♀ (Fig. 7A, 18B), face ♀ (Fig. 7G), propodeum (Figs 9A, 9B), habitus (Fig. 29E), male terminal sclerites (Fig. 37C).

Notes. *Diplazon tetragonopsis* Uchida has variously been synonymized with *D. tetragonus* or *D. scutatorius* in the past. I here confirm Diller's (1982) interpretation of the type of *D. tetragonopsis*.

Diplazon tetragonus (Thunberg 1824, *Ichneumon*)

Ichneumon hortorius Thunberg 1824
Ichneumon ustorius Thunberg 1824
Bassus tricinctus Gravenhorst 1829
Bassus nemoralis Holmgren 1858
Bassus concinnus Cresson 1868
Bassus albicoxus Provancher 1874
Bassus amoenus Provancher 1874

Diagnosis. Fore wing length 3.7–5.2 mm. Antenna in females with 16–17, in males with 16–18 flagellomeres. Face with punctures usually distinct from the background sculpture. Mesopleuron smooth and polished weakly punctate largely restricted to lower half. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 1.0–1.25 times as long as wide in females, 1.2–1.4 in males, tergite 2 0.6–0.75 in both sexes; tergites 2 and 3 mainly rugose and coriaceous, at most with some irregular punctures, especially on tergite 3, the area between the punctures not entirely smooth. Transverse impressions distinct on tergites 1–4. Metasoma dorsoventrally depressed.

Colouration of females. Antenna dark brown. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, shoulder mark, upper mesepimeron; scutellum at least with yellow tip, usually largely yellow. Legs and coxae orange, fore coxa usually dark at extreme base; femora orange; hind tibia black-white-black banded, sometimes apical band with an orange or orange-brown area, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, antenna often orange below, yellow over entire face, spot on propleuron, epicnemium and part of mesosternum. Fore and mid coxae yellow, hind coxa mainly orange. Tergites 2 and 3 sometimes with light posterior margins, the colour of which can be light brown to orange but never entirely yellow or white.

Material examined. Holotype of *Ichneumon tetragonus* Thunberg: Sweden, no locality data. 1♂, at UU. Holotype of *Ichneumon hortorius* Thunberg: Sweden, no locality data. 1♂, at UU. Holotype of *Ichneumon ustorius* Thunberg: Sweden, no locality data. 1♂, at UU. Lectotype of *Bassus nemoralis* Holmgren: Sweden, Småland, leg. Boheman. 1♀, at NRM.

Austria (1), Denmark (1), Finland (7), France (1), Germany (8), Hungary (50), Norway (1), Russia (3), Spain (1), Sweden (>100), Switzerland (>100), Turkey (1), United Kingdom (70), USA (1).

Distribution. Holarctic and Oriental.

Figures. Metasoma ♀ (Fig. 7B, 18A), hind wing (Fig. 11D), fore wing (Fig. 12C), clypeus (Fig. 12G), hind tibia (Fig. 12L).

Notes. This is a rather variable taxon and might not represent a single biological species. Several taxa have already been split from *tetragonus* in the past, e.g. *D. scutatorius* and *D. pallicoxa*, and it is possible that even the remaining taxon still consists of a complex of species.

Diplazon tibiatorius (Thunberg 1824, *Ichneumon*)

Bassus albosignatus Gravenhorst 1829

Diagnosis. Fore wing length 5.0–7.0 mm. Antenna of both sexes with 16 to 18 flagellomeres. Face with punctures strong, clearly distinct from the background sculpture. Mesopleuron smooth and polished and strongly punctate also covering most of upper half. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 0.8–1.0 times as long as wide in females, 1.0–1.2 in males, tergite 2 0.55–0.7 times as long as wide in both sexes; tergites 2, 3 and 4 with large, distinct punctures on a rugose or on tergites 3 and 4 rather smooth and polished background, punctures with distinct margins. Transverse impressions distinct on tergites 1–4. Metasoma dorsoventrally depressed.

Colouration of females. Antenna dark brown. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow medially on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, usually small shoulder mark, upper mesepimeron; scutellum white. Legs orange, coxae black with yellow apices, hind coxa orange (but see Notes); femora orange; hind tibia black-white-black banded, hind tarsus dark. Metasoma black, tergite 1 usually with a white apex.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, central yellow face patch. Fore and mid coxae with yellow apices.

Material examined. The lectotype of this species has been designated by Cresson (Cresson 1916) and is stored at the Academy of Natural Sciences in Philadelphia (Yu *et al.* 2012). This renders the material in Uppsala paralectotypes, despite the labeling of the male as lectotype by Diller (1980): Paralectotypes of *Ichneumon tibiatorius* Thunberg: Sweden. 1♂, 1♀, at UU.

France (3), Hungary (50), Russia (2), Sweden (20), Switzerland (>100), Turkey (1).

Distribution. Holarctic and Neotropical.

Notes. There is a form of *Diplazon tibiatorius* with black hind coxae that appears as "*Diplazon* cf. *tibiatorius*" in the key. In the past, such specimens have usually been identified as *D. varicoxa*, from which they clearly differ by the characters given in the key. Only the colour of the coxae distinguishes these specimens from the typical *D. tibiatorius* with orange coxae; they thus probably do not represent a separate species.

Diplazon varicoxa (Thomson 1890, *Bassus*)

Bassus japonicus Ashmead 1906

Diagnosis. Fore wing length 3.6–6.1 mm. Antenna in females with 15–17, in males with 16–17 flagellomeres. Face with punctures clearly distinct from the background sculpture. Mesopleuron smooth and polished and strongly

punctate, on upper half with a large impunctate area around mesopleural fovea. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 1.0–1.2, tergite 2 0.55–0.7 times as long as wide; tergites 2 and 3 mostly rugose but also with some distinct punctures, tergite 4 with punctures indistinct. Transverse impressions distinct on tergites 1–3, usually indistinct on tergite 4. Metasoma dorsoventrally depressed.

Colouration of females. Antenna black. Head and mesosoma black, face with yellow inner orbits and a yellow central face patch, yellow medially on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, usually large shoulder mark, upper mesepimeron, sometimes irregular yellow markings on epicnemium; scutellum with a yellow or whitish spot. Legs orange, coxae black, fore and mid coxae with yellow apices, mid coxa usually mostly yellow at least on the outside; femora orange; hind tibia white with a dark basal and apical band. Metasoma black, often with first tergite with a white apex, tergites 2 and 3 sometimes with light bands or lateral spots apically.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, entire face, epicnemium and often part of mesosternum. Fore and mid coxae often largely yellow.

Material examined. Holotype of *Bassus varicoxa* Thomson: Sweden, Norrland. 1♀, at ZIL. Two syntypes of *Bassus japonicus* Ashmead examined: Japan. 2♂, at USNM.

Austria (1), Russia (2), Sweden (40), Switzerland (40), United Kingdom (1).

Distribution. Palaearctic and Oriental.

Figures. Habitus (Fig. 29F).

Notes. The status of this species remains somewhat unclear, given that it currently includes a large range of variation in terms of size and extent of the yellow coloration.

Diplazon zetteli sp. nov.

Etymology. This species is dedicated to the zoologist, entomologist and conservation biologist Prof. Jürg Zettel.

Diagnosis. Fore wing length 5.2–6.5 mm. Antenna in females with 16–17, in males with 17–18 flagellomeres. Face with punctures disappearing against the coriaceous background. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Tergite 1 1.05–1.35, tergite 2 0.6–0.8 times as long as wide; tergites 2 and 3 strongly coriaceous and matt, punctures indistinct, sculpture extending across transverse impressions. Transverse impressions deep on tergites 1 to 3, usually still distinct on tergite 4. Metasoma dorsoventrally depressed.

Description. Antenna with multiporous plate sensilla evenly distributed also on ventral surface of the flagellomeres. Face centrally only weakly elevated, without vertical depressions; strongly coriaceous, punctures indistinct. Clypeus separated from face by a distinct groove, elevated basally, remainder flat to slightly concave, bilobed, mainly coriaceous. Head strongly constricted behind compound eyes. Mesoscutum partly smooth, partly coriaceous between dense but fine punctures, coriaceous sculpture mainly present between the short but strongly impressed notauli; scutellum smooth and sparsely punctate, with lateral carinae only present basally. Mesopleuron smooth and shining on upper half, partly or mainly coriaceous on lower half, and with some more or less distinct punctures, especially along anterior margin, sternaulus weakly impressed, epicnemial carina complete ventrally. Metapleuron coriaceous at least on lower part. Propodeum with a full set of strong carinae; areas between carinae strongly rugose. Fore wing areolet open, vein 1cu-a opposite vein M; hind wing with three or four basal hamuli, vein CU+cu-a broken clearly below middle. Metasoma dorsoventrally depressed, hind margins of all tergites straight or convex; tergite 1 with longitudinal carinae distinct on about basal half, then replaced by strong longitudinal rugae, with a deep transverse impression, rugose and coriaceous over entire surface; tergites 2 and 3 finely rugose and very strongly coriaceous in front of and strongly coriaceous and with some weak indications of punctures behind the distinct transverse impressions, tergite 4 strongly coriaceous basally and usually smoother behind the usually distinct transverse impression, remaining tergites weakly coriaceous basally and smooth apically. Second and third tergites with spiracles dorsal, above lateral folds. Ovipositor sheaths slightly upcurved, tapered, rather stout, with tip closed apically; smooth and shining, with setae around tip and ventrally.

Colouration of females. Antenna black. Head and mesosoma black, face with yellow along inner orbits, without yellow central face patch, yellow or brown on clypeus and mouthparts, hind corner of pronotum, tegula, and often small shoulder mark, and sometimes upper mesepimeron; scutellum at most with yellow tip, usually black. Legs orange, coxae black, often with a reddish tinge, hind coxa sometimes orange; femora orange; hind tibia black-white-black banded, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, often subtegular ridge and mesosternum in front of epicnemial carina. Fore and mid coxae often largely yellow.

Similar species: This species can be distinguished from *D. tibiatorius* and *D. varicoxa* by the strongly coriaceous tergites, the punctures absent from the face, the at most very small shoulder marks and the only weakly punctate and partly coriaceous mesopleuron. The latter two characters can also be used to distinguish it from *D. angustus*, which is probably the most similar species. *Diplazon zetteli* has more strongly coriaceous tergites which never show distinct punctures, while *D. angustus* shows at least some punctures on a rugulose background. The subarctic *D. hyperboreus* is distinctly smaller and darker; see key for diagnostic characters.

Type material. Holotype ♀, at NMBE: Switzerland, Grisons, Sur, Alp Flix, SE Vauastg, Dafora, 1920m, N46°31.482 E9°38.755, Malaise trap, leg. H.Baur, 9.–16. VI. 2003. Labels: "Malaise-F. 2, FO-Nr. 626; CH/GR Sur, SE Vauastg, Dafora 1920m 769.343/; 154.982 leg. H.Baur; 9.–16.6.2003", "3-C1", "Holotype; Diplazon ♀; zetteli n.sp.; det. S.Klopfstein 2010". Paratypes: same as holotype (1♀) ; Switzerland, Grisons, Sur, Alp Flix, Clavenia, 1987m, N46°32.005 E8°50.135, Malaise trap, leg. H.Baur, 2.–9. VI. 2003 (4♀, 2♂); 9.–16.VI.2003 (1♀, 1♂) ; Switzerland, Grisons, Sur, Alp Flix, N Gôtet, 1978m, N46°31.945 E9°38.200', leg. H.Baur, 4.VI.2003 (1♂); Switzerland, Grisons, Sur, Alp Flix, W Piz d'Umblei, 1928m, N46°31.655 E9°38.674', leg. H.Baur, 3.VI.2003 (1♂); Switzerland, Glarus, Linthal, Obersand, Melchplatz, 2051m, N46°50.387 E8°55.821', Malaise trap, leg. S.Klopfstein, 19.–28.VI.2008 (1♀), 28.VI–10.VII.2008 (1♀); all at NMBE ; Switzerland, Valais, Col de Bretolet, 1900m, N46°08.6' E6°47.8', 24.–25.VI.1964 (3♀), 11.–15.VIII.1965 (1♀), 14.–15.VII.1964 (2♀), 27.VII.–2.VIII.1963 (1♂), all at MZL.

Additional material. New for Austria: Tirol, Königstal, Obergurgl, 2000m, leg. Fitton & Day, VII.1981. 2♂, 3♀, at BMNH. New for Russia: Siberia, Cape Shartlai, Baikal lake, leg. O.Berlov, 20.VI.2004. 1♀, at MR.

Austria (5), Russia (1), Switzerland (30).

Distribution. Palaearctic.

Figures. Metasomal sculpture (Fig. 18C), habitus (Fig. 30A), male terminal sclerites (Fig. 37D).

Enizemum Förster 1869

Type species. *Bassus tibialis* Cresson 1868

Diagnosis. *Enizemum* species can easily be identified by the strongly converging and then only narrowly separated and parallel median dorsal carinae on the first tergite, a character that can even be discerned when the carinae are apically reduced, by their strong convergence on the basal half of the tergite.

Face coriaceous and matt, without vertical impressions, in females entirely black or with a yellow central patch, in males entirely yellow or black with yellow inner orbits and a yellow central patch. Clypeus with apical margin thin, with a basal elevation and impressed laterally, resulting in the central area being flat or convex and the lateral parts being concave. Antenna with apical flagellomeres longer than wide, in males usually with broad, bar-like tyloids (except for *E. schwarzi* which has narrow tyloids) and without long setae. Mesoscutum without notauli; densely punctate and often background weakly to strongly coriaceous, yellow shoulder marks present or absent; mesopleuron densely punctate and often coriaceous; epicnemial carina strong and complete ventrally. Propodeum with carinae partly reduced, with areas only indicated or absent; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet usually present, but vein 3rs-m often unpigmented, sometimes absent; hind wing with 3–5 basal hamuli. Hind tibia black with a white base, white area usually more extended ventrally in males. Female metasoma strongly dorsoventrally depressed, tergites convex, without transverse impressions. First tergite with a pair of median dorsal carinae arising basally, converging to almost meeting each other on apical half of the tergite, but sometimes the carinae are weak or entirely reduced on apical half. Second and third tergites with spiracles dorsal, above lateral folds. Metasoma black or rarely orange. Ovipositor sheaths 0.3 times as long as hind tibia, often concealed below the apical tergites, parallel-sided and not compressed, about circular in cross-section, transversely truncate and open towards apex. Males with tergites 9 and 10 as separate sclerites, sternite 9 about 2 times wider than long, emarginated apically, thus forming two lobes, their outer corners rounded.

Phylogeny. *Enizemum* is most closely related to *Syrphoctonus* and *Woldstedtius*, with which it shares the shape of the clypeus. Although the monophyly of the genus has been confirmed by molecular methods only for *E. ornatum* and *E. nigricorne*, the distinct morphology suggests that this is indeed a natural group.

Distribution. Worldwide except Australasian. The 24 species currently known in this genus occur mostly in

the Eastern Palaearctic and the Nearctic, but some species are only known from the Afrotropical, Neotropical and Oriengal regions.

Biology. Species of this genus have been reared from a variety of Syrphinae species, and at least the common *Enizemum ornatum* seems to have quite a broad host range (e.g. Rotheray 1984; Thirion 1994, but see notes under *E. scutellare*).

Key to species

1. Antenna with 20 to 22 flagellomeres in both sexes. Female antenna orange to reddish brown at least on basal segments, with multiporous plate sensilla present on entire antenna, although often sparser ventrally. Median dorsal carinae on first tergite very long, almost reaching posterior margin, converging over basal half of first tergite, then more or less parallel, thus forming a quite distinct angle (Fig. 14E). Mesosternum entirely black in females and black with yellow markings in males. Subtegular ridge usually black. Male mesopleuron black and yellow, without orange markings. . . . . *Enizemum ornatum* (Gravenhorst)
- Antenna 23 to 25, rarely with 22 flagellomeres, usually dark brown, very rarely reddish brown. Female antenna apical flagellomeres ventrally often devoid of multiporous plate sensilla, covered with a short velvety pile (cf. Fig. 5). Median dorsal carinae on first tergite various, sometimes as described above, but often weak or even absent on posterior half, often converging over most of the tergite, thus not forming a quite distinct angle (cf. Fig. 14F). Mesosoma sometimes partly orange. Subtegular ridge usually marked with yellow. Male mesopleuron often orange below 2
2. Mesosoma, propodeum and metasoma mainly orange in both sexes. Male antenna with narrow, linear tyloids (cf. Fig. 13H) . . . . . *Enizemum schwarzi* Diller
- At most mesopleuron, mesosternum and metapleuron marked with orange, metasoma black. Male antenna with broad, bar-like to oval tyloids (cf. Fig. 13I). 3
3. Median dorsal carinae on first tergite very long, almost reaching posterior margin, converging over basal half of first tergite, then more or less parallel, thus forming a quite distinct angle (cf. Fig. 14E). Propodeum with carinae around basal area at least indicated, less so in males. In females, ventral area of apical flagellomeres evenly covered with plate sensilla. Male face entirely yellow, mesopleuron orange on at least lower half . . . . . *Enizemum scutellare* (Lange)
- Median dorsal carinae on tergites 1 and 2 often partly reduced, usually converging about three quarters or less of the tergite length, and more evenly and roundedly converging towards each other (cf. Fig. 14F). Propodeum often without any indication of basal area. Female antenna with ventro-apical area devoid of plate sensilla but with a short velvety pile (cf. Fig. 5). Mesopleuron with orange colouration usually absent or more restricted 4
4. Mesoscutum coriaceous between the very dense punctures. Mesosternum entirely black in females. (Male unknown) . . . . . *Enizemum nigricorne* (Thomson)
- Mesoscutum smooth and shining between the punctures. Mesosternum often marked with orange, more so in males. Male face often with two black vertical lines below antennal sockets . . . . . *Enizemum tridentatum* Dasch

Enizemum nigricorne (Thomson 1890, *Homotropus*)

Diagnosis. (Male unknown). Fore wing length 5.1–6.8mm. Antenna in females with 23–24 flagellomeres, dark brown, with ventral surface of apical flagellomeres covered with a velvety pile, devoid of multiporous plate sensilla which are restricted to lateral and dorsal sides. Mesoscutum and mesopleuron with punctures small and very dense, interspaces finely coriaceous. Propodeum with pleural and lateral longitudinal carinae present, median longitudinal and transverse carinae present only as traces. First tergite with median dorsal carinae converging over entire length of the tergite, thus rather evenly curved (Fig. 14F). Second tergite with basal carinae weak.

Colouration of females. Antenna dark brown, sometimes paler below. Head and mesosoma black, face with or without yellow central face patch, often orange on clypeus and mouthparts, often yellow on hind corner of pronotum, tegula, subtegular ridge, small shoulder mark and upper mesepimeron; scutellum sometimes with yellow tip. Legs and coxae orange; femora orange; hind tibia with a white base, remainder dark, hind tarsus dark. Metasoma black.

Material examined. Holotype of *Homotropus nigricornis* Thomson: Sweden, Skåne, Pålsjö. 1♀, at ZIL.

New for Switzerland: Valais, Les Agettes, Les Mayens-de-Sion, N46.201, E7.3778, leg. J.L.Nicod, VIII.1946. 1♀, at MZL.

Additional material examined. Finland: V. Nousiainen, Tepastus, 6735:237, leg. Jussila, 30.VIII.–4.IX.2006. 1♀, at ZMUC; N Espoo, leg. O.Ranin, 11.IX.1982. 1♀, at ZSM. France: Paris, Bois de Vincennes, leg. J.F. Aubert, 12.VI.1962. 1♀, at MZL. Germany: Thüringen, Gotha, Galberg, leg. Jänner, 16.IV.1914. and 15.VIII.1928, 1♀ each, at NKME; Oberharz, Torfhaus, 800m, leg. E.Bauer, 17.VIII.1958. 1♀, at ZSM; Rheinland-Pfalz, Salm bei Gerolstein, leg. F. Ermisch, VII.1963. 1♀, at NMF. Sweden: Dalarna, Säterdalen, Näsakerspussen, N60°22',

E15°43', leg. SMTP, 04.VIII.–26.VIII.2003 and 26.VIII.–16.IX.2003, 1♀ each; Västerbotten, Vindelns kommun, Kulbäckslidens försökspark, Gammnybrãnna, N64°08.688', E19°35.335', leg. SMTP, 01.VIII.–18.VIII.2003. 1♀; Södermansland, 11.IV.1939, 1♀; all at NRM.

Figures. First tergite ♀ (Fig. 14F).

Notes. Manukyan (1995) synonymized *Homocidus rubiginosum* Schmiedeknecht, a species described from a single male from Germany, with *E. nigricorne*. *Homocidus rubiginosum* is, however, conspecific with *E. scutellare* (Lange) (syn. nov.), according to Erich Diller who examined the male type in Berlin (personal communication). Males of *E. nigricorne* thus remain unknown.

Enizemum ornatum (Gravenhorst 1829, *Bassus*)

Bassus deplanatum Gravenhorst 1829
Bassus carinulatum Ruthe 1859
Bassus frenator Desvignes 1862
Enizemum neomexicanum Brues 1908
Homocidus sumptuosum Schmiedeknecht 1926

Diagnosis. Fore wing length 5.3–7.2 mm in females, 4.8–6 mm in males. Antenna in females with 20–22 flagellomeres, light orange, at least ventrally on basal flagellomeres but usually on most of the antenna, with multiporous plate sensilla also present on ventral surface of the apical flagellomeres, although less densely distributed than dorsally; in males with 21–22 flagellomeres and broad tyloids on flagellomeres 7 to 13/14. Mesoscutum and mesopleuron with punctures small and very dense, interspaces finely coriaceous. Propodeum with pleural and lateral longitudinal carinae present, median longitudinal and transverse carinae present only as traces. First tergite with median dorsal carinae converging only over basal half, forming a distinct angle and subparallel on apical half of the tergite (Fig. 14E). Second tergite with basal carinae strong.

Colouration of females. Antenna bright orange, apically often somewhat dark. Head and mesosoma black, face without yellow central face patch, clypeus and mouthparts usually orange, yellow-marked sometimes on hind corner of pronotum and tegula, sometimes with small shoulder mark and upper mesepimeron, subtegular ridge usually black but rarely yellow; scutellum sometimes with yellow tip. Legs and coxae orange; femora orange; hind tibia with a white base, remainder dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, entire face, large part of hind corner of pronotum, subtegular ridge, propleuron, epicnemium, large part of mesosternum and often mesopleuron ventrally. Fore and mid coxae and legs often largely yellow. Hind tibia often with basal white marking extended to about half the length of the tibia.

Material examined. New for Turkey: Bolu, VI.1999. 1♀, at NMBE; Isparta, Atabey, 1250m, leg. F. Gürbüz, 26.VI.2002. 1♀, at SDU.

Germany (4), Hungary (13), Iceland (1), Russia (1), Sweden (3), Switzerland (70), United Kingdom (20), USA (3).

Distribution. Holarctic and Oriental.

Figures. Fore wing (Fig. 12D), antenna ♂ (Fig. 13I), hind tibia ♀ (Fig. 14B), hind tibia ♂ (14C), first tergite (Fig. 14E), clypeus (Fig. 14I), habitus (Fig. 30B), male terminal sclerites (Fig. 37E).

Notes. European female specimens all have bright orange antennae, while North American specimens have brown antennae. The few North American specimens examined are otherwise not different from the European populations, and so probably do not represents a distinct species.

Enizemum schwarzi Diller 1987

Diagnosis. Fore wing length 5.3–5.8 mm in females, 4.7 mm in males. Antenna in females light orange, with 23–24 flagellomeres, with multiporous plate sensilla also present on ventral surface of the apical flagellomeres, although less densely distributed than dorsally; in males with linear, narrow tyloids on flagellomeres 7 to 14. Mesoscutum and mesopleuron with punctures large, separated by less than their diameter, interspaces smooth and shining. Propodeum with pleural and lateral longitudinal carinae present, median longitudinal and transverse

carinae absent or present only as traces. First tergite with median dorsal carinae converging over basal half, forming a blunt angle and subparallel on apical half of the tergite, although this character is somewhat intermediate between *E. ornatum* (Fig. 14E) and *E. nigricorne* (Fig. 14F). Second tergite with basal carinae strong.

Colouration of females. Antenna bright orange, apically often somewhat dark. Head black, face often with a small yellow central face patch, clypeus usually dark orange, mouthparts somewhat paler; mesosoma mostly orange, black along sutures and on most of pronotum, yellow-marked on hind corner of pronotum, tegula, subtegular ridge, small shoulder mark and upper mesepimeron; scutellum orange with yellow margins. Legs and coxae orange; femora orange; hind tibia with a white base, remainder dark, hind tarsus dark. Metasoma orange with varying black parts.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, entire face, large part of hind corner of pronotum, propleuron, entire epicnemium, sometimes part of mesosternum and mesopleuron ventrally. Fore and mid coxae and hind trochanter yellow. Hind tibia with basal white marking extended to about half the length of the tibia.

Material examined. Holotype of *Enizemum schwarzi* Diller: Greece, Creta, Heraklion, leg. M.Schwarz, 26.V.1963. 1♀, at ZSM.

New for Israel and new male: Har Hermon, 1600m, leg. L.Friedman, 4.V.1999. 1♂, at TAU.

Additional material. Italy: Piemonte, Cravanzana, 555m, leg. P.Boffa, 13.VI.1979. 1♀, at ZSM. Spain: Mallorca, Sa Roca, S'Albufera (MV light), leg. M.R. Honey, 24.X.2006. 1♀, at BMNH; Madrid, El Ventorrillo, 1480m, leg. Nieves & Rey, 14.–21.VII.1989. 1♀, at KZ.

Enizemum scutellare (Lange 1911, *Homotropus albopictus* var. *scutellaris*)

Homotropus albopictus Lange 1911 (primary homonym)
Homocidus rubiginosum Schmiedeknecht 1926 (syn. nov.)
Enizemum junctum Dasch 1964a

Diagnosis. Fore wing length 5.8–7.7 mm in females, 4.9–5.6 mm in males. Antenna in females with 23 to 24, rarely 22 flagellomeres, dark brown, at most with some pale brown areas ventrally or on scape, with multiporous plate sensilla also present on ventral surface of the apical flagellomeres, although less densely distributed than dorsally; in males with 22–23 flagellomeres, with broad tyloids on flagellomeres 6/7 to 13/14. Mesoscutum and mesopleuron with punctures small and very dense, interspaces finely coriaceous. Propodeum with pleural and lateral longitudinal carinae present, median longitudinal and transverse carinae absent or present only as traces. First tergite with median dorsal carinae converging only over basal half, forming a distinct angle and subparallel on apical half of the tergite (cf. Fig. 14E). Second tergite with basal carinae strong.

Colouration of females. Antenna black. Head and mesosoma black, face without yellow central face patch, clypeus and mouthparts usually orange, usually yellow-marked on hind corner of pronotum and tegula, subtegular ridge, small shoulder mark and upper mesepimeron; scutellum sometimes with yellow tip. Hind corner of mesopleuron or mesosternum sometimes marked with orange. Legs and coxae orange; femora orange, hind femur often dark apically; hind tibia with a white base, remainder dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, entire face, large part of hind corner of pronotum, subtegular ridge, propleuron, epicnemium; mesosternum and mesopleuron on ventral half orange with yellow markings on mesosternum and lower mesopleuron; scutellum sometimes orange with a yellow margin. Fore and mid coxae and legs often largely yellow. Hind tibia often with basal white marking extended to about half the length of the tibia.

Material examined. Holotypes of *Homotropus albopictus* Lange and *Homotropus albopictus* var. *scutellaris* Lange: Germany, Erzgebirge, leg. Lange. 2♂, at NMF.

New for France: Col-des-Montets, 23.VII.1975. 1♂, at ZSM. New for Italy: Süd-Tirol, San Martino di Castrozza, 1444m, leg. E.Bauer, 18.VII.1934. 1♂, at ZSM. New for Switzerland: Valais, Champéry, Col de Bretolet, 1920m, N46.143, E6.7968, 16.V.1964, 1♀, 14.VII.1964, 1♂, at MZL.

Finland (2), France (1), Germany (2), Italy (1), Switzerland (6).

Distribution. Western Palaearactic.

Notes. This species was formerly only known from the male, as females were usually identified as *E. ornatum*,

with which it shares the strong carination of the basal tergites. The longer and uniformly dark antenna, the generally larger size and more extensive yellow colouration of the mesosoma, however, permit reliable identification of females also. Some of the biological information published under *E. ornatum* might actually relate to *E. scutellare*. For instance, *Scaeva pyrastri* (Linnaeus) was recorded as a host of *E. ornatum* (Rotheray 1984). I could identify a female *Enizemum* reared in Switzerland from *S. pyrastri* as *E. scutellare*; but could not examine Rotheray's material, so it remains unclear whether these two species have overlapping host ranges. The reared specimens of *E. ornatum* should be re-examined to establish sound host ranges.

Manukyan (1995) synonymized *Homocidus rubiginosum* Schmiedeknecht, a species described from a single male from Germany, with *E. nigricorne*. *Homocidus rubiginosum* is, however, conspecific with *E. scutellare* (Lange) (syn. nov.).

Enizemum tridentatum Dasch 1964a

Diagnosis. Fore wing length 4.5.–6.5 mm. Antenna in females dark brown, with 22–24 flagellomeres, with ventral surface of the apical flagellomeres covered with a velvety pile, devoid of multiporous plate sensilla which are restricted to lateral and dorsal sides; in males with 22–23 flagellomeres and broad tyloids on flagellomeres 6/7 to 13/14. Mesoscutum and mesopleuron with punctures dense, interspaces smooth and shining, less so in some specimens on mesopleuron. Propodeum with pleural and lateral longitudinal carinae present as traces, but median longitudinal and transverse carinae usually absent. First tergite with median dorsal carinae converging over basal half, forming a rather blunt angle and subparallel on apical half of the tergite, although this character is somewhat intermediate between *E. ornatum* (Fig. 14E) and *E. nigricorne* (Fig. 14F). Second tergite with basal carinae often weak.

Colouration of females. Antenna black. Head and mesosoma black, face often with a small yellow central face patch, clypeus and mouthparts orange or dark, yellow-marked on hind corner of pronotum, tegula, subtegular ridge, often with shoulder mark and upper mesepimeron; scutellum often with a yellow tip. Legs and coxae orange; femora orange; hind tibia with a white base, remainder dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, antenna paler below; face yellow, often except for two black vertical lines arising from below antennal scrobes, propleuron, epicnemium, large part of mesosternum and often mesopleuron ventrally; mesopleuron sometimes marked with orange below. Fore and mid coxae and legs often largely yellow. Hind tibia often with basal white marking extended to more than half the length of the tibia.

Material examined. New for Tadzhikistan: E. Peter I Mt region, 7 km S Tadshikabad, Mirzaen v. 1800m, leg. Osipov, 22.VII.2004. 1♂, at MR.

Additional material. Russia, Kwak, 35 km from Stalinabad, 2000m, 16.VI.1938. 1♂, at ZSM. USA, Wyoming, Yellowstone NP, 1B 6.8mi N S. Entrance, Malaise trap in heavy burn, 12.VIII.1990. 1♀, at UWL. USA, Maine, Mount Blue, 20.IX.–6.X.1969. 1♀, at ZSM. USA, Alaska, Mt. McKinley, 2700', leg. David Townes, 8.VIII.1954, 1♀, 5.VIII.1954, 1♂, both at AEI.

Distribution. Holarctic.

Notes. This species can sometimes be difficult to distinguish from *E. nigricorne*.

Episemura Kasparyan & Manukyan 1987

Type species. *Episemura diodon* Kasparyan & Manukyan 1987

Diagnosis. The genus *Episemura* is unique in the subfamily with its long and distinctive ovipositor and the bidentate mandibles of *E. diodon*. These characters clearly distinguish it from the genera *Sussaba* and *Eurytyloides* with which it shares the position of the spiracle of the second tergite on the laterotergite.

Face coriaceous and matt, without vertical impressions, in females black with a yellow central patch, entirely yellow in males. Clypeus with apical margin thin, with a basal elevation that makes it flat in profile. Antenna very stout, apical flagellomeres wider than long, in males with short, narrow tyloids, without long setae. Mesoscutum without notauli; densely punctate and background weakly coriaceous, yellow shoulder marks absent or small;

mesopleuron densely punctate, irregularly sculptured with smooth and coriaceous parts; epicnemial carina complete ventrally. Propodeum with a full set of carinae enclosing basal, petiolar and lateral areas; propodeal spiracle inconspicuous; scutellum with carinae not extending behind middle. Fore wing areolet absent; hind wing with 1 basal hamulus. Hind tibia orange to brown. Female metasoma strongly compressed from apex of third or fourth segment, tergites 4 to 6 with hind margins slightly concave, extending further back laterally than dorsally; tergites without transverse impressions. First tergite without median dorsal carinae. Second and third tergites with spiracles on the laterotergite, below lateral fold. Metasoma black or obscurely brown to reddish. Ovipositor sheaths 0.6 times as long as hind tibia, tapered towards apex, with transverse wrinkles on basal half and with conspicuous setae over entire length. Male apical sclerites unknown.

Phylogeny. Molecular data are currently not available for the genus, but the position of the spiracle of the second tergite on the laterotergite suggests a close association with the genera *Sussaba* and *Eurytyloides*. The comparatively long ovipositor, structure of the ovipositor sheaths and the bidentate mandible in *E. diodon* might be indicative of a basal position within the subfamily, but this remains to be confirmed.

Distribution. Palaearctic. The two rare species of this genus have to date only been found in Europe, and *Episemura diodon* also in Eastern Russia. This patchy distribution could well represent a sampling artefact.

Biology. Nothing is known about the hosts utilized by this genus, but both species are probably associated with larch trees, where one female specimen of *E. ensata* has been collected in a trap that was attached to the treetop (Sebald *et al.* 1988; Kasparyan & Manukyan 1989).

Key to species

1. Mandible with upper tooth subdivided, thus apparently with three teeth (Fig. 19A). Female metasoma laterally compressed posterior to third tergite, tergites 4–6 reaching about as far back laterally as medially. Hind tibia orange, as brightly colored as hind femur . . . . . *Episemura ensata* (Bauer)
- Mandible with two teeth, although upper tooth distinctly larger than lower tooth (Fig. 19B). Female metasoma very strongly laterally compressed from apex of third tergite, knife-like, with tergites 4–6 reaching further back laterally than medially. Hind tibia dark brown, distinctly darker than femur . . . . . *Episemura diodon* Kasparyan & Manukyan

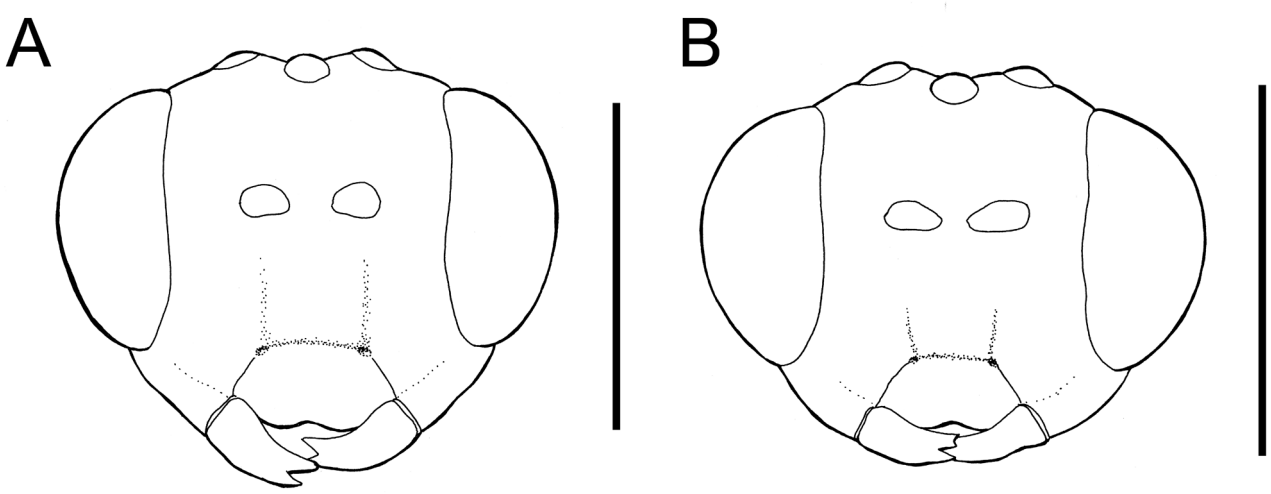

FIGURE 19. Mandibles and faces in *Episemura*. A. *Episemura diodon* ♀, with a relatively high face and bidentate mandibles. B. *Episemura ensata* ♀, with a relatively low face and the tridentate mandibles that are usual in the subfamily. Scale bars represent 500 µm.

Episemura diodon Kasparyan & Manukyan 1987

Diagnosis. Fore wing length 5.0–5.4 mm. Female antenna with 15, male antenna with 18 or 19 flagellomeres, in the latter with short and narrow tyloids on flagellomeres 6 to 9/10. Mandible with upper tooth not subdivided, thus bidentate. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Hind margins of tergites 4 to 6 concave, metasoma very strongly laterally compressed from apex of third tergite. Hind tibia dark brown.

Colouration of females. Antenna black. Head and mesosoma black, face with a small yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, and upper mesepimeron; scutellum black. Legs orange, coxae black, fore coxa with a yellow apex; femora orange; hind tibia brown, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face. Fore coxa often largely yellow, hind tibia more orange than brown, apex dark.

Material examined. Paratype of *Episemura diodon* Kasparyan & Manukyan: Russia, Maritime Territory, Svetovodnaya R., (Biamo) basin of Vikin R., from resin on Larix, leg. Zeriken. 1♀, at ZIP.

New for Austria: St. Ulrich, 25.VIII.1977. 1♂, at ZSM. New for Germany, Nürnberg, 30.VII.1982. 1♀, at ZSM (specimen identified as *E. ensata* by Bauer).

Distribution. Palearactic.

Figures. Scutellum (Fig. 11H), face (Fig. 19A).

Episemura ensata (Bauer 1981, *Sussaba*) (stat. rev.)

Diagnosis. (Male unknown). Fore wing length 4.4–5.1 mm. Antenna of female with 16 flagellomeres. Mandible with upper tooth subdivided, thus appearing tridentate. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas. Hind margins of tergites 4 to 6 only weakly concave to almost straight, metasoma weakly laterally compressed from apex of third tergite. Hind tibia orange, same colour as hind femur.

Colouration of females. Antenna black. Head and mesosoma black, face with a small yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular ridge, and upper mesepimeron; scutellum black. Legs orange, coxae black, fore coxa with a yellow apex; femora orange; hind tibia brown, hind tarsus dark. Metasoma black.

Material examined. Holotype of *Sussaba ensata* Bauer: Germany, Leuzenberg, 2.VII.1952. 1♀, at ZSM. Paratype: Germany, Nürnberg, 29.VI.1976. 1♀, at ZSM.

New for Switzerland: Valais, Les Agettes, Les Mayens-de-Sion, VIII.1961. 1♀, at MZL. Additonal material. Germany, Bayern, Kelheim, Hienheimerforst, Buchberg, trap on larch tree, 25.VII.1996. 1♀, at ZSM.

Distribution. Western Palaearctic.

Figures. Metasoma (Fig. 11F), ovipositor sheaths (Fig. 11I), face (Fig. 19B), habitus (Fig. 30C).

Notes. This species has been synonymized with *E. diodon* (Sebald *et al.* 1988) but represents a distinct species, recognizable by the tridentate instead of bidentate mandible, the less strongly compressed metasoma, and the colouration of the hind tibia. One of the specimens identified as *E. ensata* by Bauer is actually an *E. diodon*, and both species thus occur in central Europe.

Eurytyloides Nakanishi 1978

Type species. *Eurytyloides kusigematii* Nakanishi 1978

Diagnosis. Female *Eurytyloides* can easily be diagnosed by the location of the spiracle of the second tergite on the laterotergite in combination with concave hind margins of tergites 3 to 6, which distinguishes it from *Sussaba*, and short ovipositor sheaths, which distinguish it from *Episemura*. The propodeums of the European and the Russian species are unique in that the lateral longitudinal carinae and the carinae surrounding the petiolar area do not meet as in other diplazontines but are parallel and very close to each other until the apex of the propodeum. The male of the European species is not known, but male *Eurytyloides kusigematii* Nakanishi from Japan have unique, polished and plate-like tyloids on flagellomeres 1 to 2 or 3.

Face coriaceous and matt, more polished below, without vertical impressions, in females entirely black or with a yellow central patch (male of the European species unknown). Clypeus with apical margin thin, with a basal elevation that makes it slightly concave in profile. Female antenna stout, preapical flagellomere quadrate. Mesoscutum with notauli indicated as rugose sculpture; smooth with very small punctures around seta roots, yellow shoulder marks absent; mesopleuron entirely smooth and shining; epicnemial carina complete ventrally. Propodeum with a full set of carinae enclosing basal, petiolar and lateral areas; propodeal spiracle inconspicuous;

scutellum carinate only on basal third. Fore wing areolet absent; hind wing with 1 basal hamulus. Hind tibia orange-brown with apex slightly dark. Female metasoma strongly compressed from third segment, tergites 3 to 6 with hind margins strongly concave, extending much further back laterally than dorsally; tergites without transverse impressions. First tergite without median dorsal carinae. Second and third tergites with spiracles on the laterotergites, below lateral fold. Metasoma black or obscurely brown to reddish. Ovipositor sheaths 0.5 times as long as hind tibia, parallel-sided and fully enclosing ovipositor, smooth, apically and ventrally with setae. Male apical scerites unknown.

Distribution. Palaearctic. The genus *Eurytyloides* was described based on two species from Japan (Nakanishi 1978), and an additional species was later described from the Russian Far East (Manukyan 1995). In Europe, a single female was found in a Malaise trap set up in Savernake forest in South West England.

Biology. Nothing is known about the biology of this genus.

Eurytyloides umbrinus sp. nov.

Etymology. The name *umbrinus* refers to the dark and shaded colouration of the species.

Description. (Male unknown). Fore wing length 3.6 mm. Antenna with 17 flagellomeres, with multiporous plate sensilla evenly distributed also on ventral surface of the flagellomeres. Face broad, centrally elevated and with two shallow depressions on either side as described for the other species of the genus; mainly coriaceous, smoother in the depressions. Clypeus separated from face by a distinct groove, slightly elevated basally, remainder flat, very weakly bilobed, mainly smooth. Head very strongly constricted behind compound eyes. Mesoscutum smooth, very finely punctate, with notauli indicated by rugose sculpture; scutellum smooth and finely punctate, with lateral carinae only present on basal third. Mesopleuron entirely smooth and shining, sternaulus weakly impressed, epicnemial carina complete ventrally. Metapleuron short, smooth and shining. Propodeum with basal and petiolar areas enclosed but with basal transverse carina partly reduced; lateral longitudinal carina reduced on basal half, present and parallel to petiolar carina on apical third; areas between carinae finely rugose. Fore wing areolet open, vein 1cu-a opposite vein M; hind wing with one basal hamulus, vein CU+cu-a broken slightly below middle. Metasoma 1.6 times longer than head and mesosoma combined, strongly compressed, knife-like from about middle of third tergite; hind margins of tergites 3 to 6 strongly concave; tergite 1 without longitudinal carinae but almost completely covered by fine longitudinal striae, 1.45 times longer than apically wide; tergite 2 with numerous longitudinal striae on basal third, tapering towards apex, 1.55 times longer than basally wide, remaining tergites smooth and shining, evenly setose. Second and third tergites with spiracles on the laterotergites, distinctly below lateral folds; lateral fold only present basally on tergite 3. Ovipositor sheaths straight, parallel-sided, rather narrow, with tip closed apically; smooth and shining, with setae over entire length except for extreme base.

Colouration of females. Antenna dark brown. Head and mesosoma dark brown, face with a small yellow central face patch, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, upper mesepimeron; scutellum dark. Legs orange, fore coxa yellow, mid and hind coxae black; femora orange; hind tibia and tarsus orange. Metasoma brown, somewhat darker on tergite 1 (however, the only specimen at hand had been stored in ethanol for almost 20 years, and might originally have been darker).

Similar species: *Eurytyloides umbrinus* can be distinguished from the two species from Japan by the largely coriaceous face, and from the Russian *E. zinovjevi* Manukayn by the stouter first tergite (1.4 times longer than wide compared to more than 1.6 times in *E. zinovjevi*), the shorter and less strongly compressed metasoma (1.6 times longer than head and mesosoma combined, compared to 2.1 times in *E. zinovjevi*), and by the shape of the face.

Type material. Holotype ♀, at NMS in Edinburgh: UK, South West England, Wiltshire, Savernake Forest, 2.–22.V.1990, Malaise trap, leg. Nature Conservancy Council. Labels: "Savernake 2–22.5.90; SU22906558 MalTrap", "Holotype; Eurytyloides ♀; umbrinus n.sp.; det. S.Klopfstein 2010".

Additional material examined of the genus: Holotype of *Eurtyloides zinovjevi* Manukayn (Russia, at ZIP).

Figures. Ovipositor sheaths (Fig. 11J), habitus (Fig. 30D).

Fossatyloides Klopfstein *et al.* 2011

Type species. *Bassus gracilentus* Holmgren 1858

Diagnosis. Males of this genus have unique modifications of the antenna, with a deep pit adjacent to the linear, narrow tyloid which is common in the genus group. Females are more difficult to place, but the petiolar area of the propodeum is enclosed by several parallel carinae, which is a unique feature. Some of the carinae can, however, be partly reduced in some specimens, and I thus include a short-cut in the *Homotropus* key to the present genus.
The diagnostic deep pit adjacent to the narrow, linear tyloid has also been described as a bulbous swelling (Dasch 1964a), but this interpretation of the structure could not be confirmed. Even when antennae of a male caught in alcohol were exposed to increasing pressure (Klopfstein *et al.* 2010b), the pit remained invaginated. It can thus be assumed that this structure is rather a pit than an outward swelling also in the living wasp.

Face coriaceous and matt, without vertical impressions, in females black, in males yellow. Clypeus with apical margin thin, impressed along margin, resulting in the central area being convex. Antenna with 19–21 flagellomeres, apical flagellomeres much longer than wide, in males with linear, narrow tyloids and adjacent pits, without long setae. Mesoscutum without notauli; entirely smooth and shining, yellow shoulder marks large, their inner corners usually extended into two parallel lines on mesoscutum; mesopleuron with some irregular sculpture on lower part; epicnemial carina complete ventrally. Propodeum with longitudinal carinae present, but basal area only indicated by weak carinae, with petiolar enclosed by several concentric, arcuate carinae; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet present, but vein 3rs-m often unpigmented; hind wing with 2 basal hamuli. Hind tibia orange. Female metasoma evenly tapered from fourth segment to apex, hind margins of the tergites convex, tergites without transverse impressions. First tergite without median dorsal carinae. Second and third tergites with spiracles dorsal, above lateral folds. Metasoma black, marked with orange on tergites 2 to 4 or 5. Ovipositor sheaths 0.3 times as long as hind tibia, tapered and diagonally truncate apically, thus with the extreme tip of the ovipositor exposed; with inconspicuous setae ventrally and apically. Male with tergites 9 and 10 as distinct sclerites, sternite 9 about two times wider than long, emarginated apically, thus forming two lobes, their outer corners rounded.

Phylogeny. This genus was erected because *F. gracilentus* clustered together with a species of a tropical genus, *Schachticraspedon*, and outside the genus *Homotropus* as newly circumscribed in a molecular and combined molecular-morphological phylogeny (Klopfstein *et al.* 2011). For a more detailed picture of its origin, additional tropical taxa would need to be sampled, especially from the genera *Schachticraspedon* and *Syrphidepulo*.

Distribution. Holarctic. Besides the Holarctic *Fossatyloides gracilentus*, this genus also includes the Nearctic *Fossatyloides sicarius* Dasch.

Biology. Nothing is known about the biology of this genus.

Fossatyloides gracilentus (Holmgren 1858, *Bassus*)

Bassus pulcher Holmgren 1858
Homotropus fossatus Dasch 1964a
Homotropus fossatus aureopectus Dasch 1964a

Diagnosis. Fore wing length 4.4–4.9 mm. Antenna of both sexes with 20–21 flagellomeres, apical flagellomeres with multiporous plate sensilla also present ventrally. Face strongly coriaceous, punctures disappearing against the background sculpture. Clypeus very weakly excised, with lobes rounded. Mesopleuron with both smooth areas and irregular coriaceous sculpture, especially on lower half, and very weak punctures. Mesoscutum partly smooth and shining with punctures indistinct but with some finely coriaceous areas, often in two parallel lines in place of the notauli. Hind coxa with hind surface entirely coriaceous and matt. Fore wing areolet closed, vein 3rs-m pigmented or unpigmented. Propodeum with pleural carina present, lateral longitudinal carina present but sometimes interrupted, pleural area enclosed by a clear carina which is sometimes interrupted, and with multiple carinulae parallel to it; finely coriaceous, at most with some rugae in petiolar area; with or without enclosed basal area. Female metasoma gradually tapered behind third segment. First tergite without median dorsal carinae but with some longitudinal wrinkles in place, 1.5–1.8 times longer than wide; second tergite basally with some weak longitudinal wrinkles, 0.7–0.8 times as long as wide in females, 0.8–0.95 in males, second tergite 0.6–0.85 times as long as first tergite; spiracle of third tergite on the dorsal part, above lateral fold.

Colouration of females. Antenna dark brown, sometimes paler below. Head and mesosoma black, with or without yellow central face patch, yellow on clypeus and mouthparts, hind corner of pronotum, tegula, subtegular

ridge, large shoulder mark, upper mesepimeron, and sometimes yellow line on lower mesopleuron; scutellum various, ranging from entirely black to only marked laterally or apically to being entirely bordered by yellow. Legs orange, coxae either black basally and hind coxa largely black, or fore and mid coxae yellow and hind coxa orange, femora orange, often marked with black below, hind tibia yellow to orange with a dark apex, hind tarsus dark. Metasoma variously marked with orange, in the extreme from hind part of second tergite to fifth tergite but often less; hind margins of tergites 3 to apex often light.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, and mesosternum and lower half of mesopleuron. Coxae often entirely yellow. Metasoma with orange colour usually reduced to hind parts of tergites 3 and 4 which are marked with yellow basally.

Material examined. Lectotype of *Bassus gracilentus* Holmgren, hereby designated: Sweden, Lapland, leg. Boheman.1♂, at NRM. Lectotype of *Bassus pulcher* Holmgren: hereby designated: Sweden, Lapland, leg. Boheman.1♂, at NRM. Paratype of *Homotropus fossatus fossatus* Dasch: USA, N.H., Randolph, leg. J.Peck & M.Townes, 2.VII.1946. 1♀, at BMNH.

Additional material. Canada, Ontario, Bruce Pen., Tobermory, leg. M.Riedel, 10.VIII.1994. 1♀, at ZSM. Finland, EH Lempäälä, Mäyhäniemi 680:32, leg. O.Sotavalta, 1963. 1♀, at NMBE. Sweden: Västerbotten, Vindelns kommun, Kubäckslidens försökspark, Kulbäcken meadow, birch wood on fine alluvial sediments, N64°11.413', E19°36.342', leg. SMTP, 01.IX.–22.IX.2003. 1♀, at NRM; Lapland, leg. Boheman.8♂, 5♀, at NRM. Switzerland, Grisons, Sur, SE Vauastg Dafora 1920m, N46°31.482, E9°38.755, leg. H.Baur, 21.–28.VII.2003. 1♂, at NMBE.

Distribution. Holarctic.

Figures. Antenna ♂ (Fig. 14K), propodeum (Fig. 14L), habitus (Fig. 30E).

Homotropus Förster 1869

Type species. *Bassus elegans* Gravenhorst 1829

Diagnosis. The genus *Homotropus* currently includes morphologically rather divergent species, which is reflected by the fact that it keys out at several couplets in the genus key. Many species, especially those that lack a fore wing areolet, can be mistaken for *Syrphoctonus* species. *Homotropus* species, however, have a complete epicnemial carina, the spiracle of the third tergite usually distinctly above the lateral fold, and a distinctive clypeus. Males can be confounded with *Phthorima* or *Bioblapsis*; see those generic accounts for diagnostic features. I tried to account in the species keys for specimens of these genera that might be difficult to place.

Face coriaceous and matt, without vertical impressions, in females entirely black or with a yellow central patch, in males entirely yellow or black with yellow inner orbits and a yellow central patch. Clypeus usually with apical margin thin, impressed along margin, resulting in central area being convex. Antenna with apical flagellomeres usually longer than wide, in males always with tyloids which in most species are linear and narrow (Fig. 13H; exceptions: *H. tauriscorium* and *H. venustus*), without long setae. Mesoscutum without notauli; sculpture various, ranging from entirely smooth and shining, with or without punctures, to being strongly coriaceous and matt; yellow shoulder marks present or absent, their inner corners sometimes extended into two parallel lines on mesoscutum; mesopleuron sometimes entirely smooth and shining but often with punctures and / or coriaceous sculpture at least on lower half; epicnemial carina complete ventrally. Propodeum various, sometimes with a full set of carinae enclosing basal, petiolar and lateral areas but usually with carinae partly or fully reduced; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet sometimes absent but usually present, in which case vein 3rs-m often interrupted or unpigmented; hind wing with 2–4 basal hamuli. Hind tibia various, orange, yellow, or white with a dark apex and subbasal spot, very rarely (*H. venustus*) even black-white-black banded. Female metasoma usually evenly tapered to apex, sometimes strongly compressed posterior to third segment but never with hind margins of the tergites concave; tergites without transverse impressions. First tergite usually without median dorsal carinae, but if present, they converge over basal half and are parallel and widely separated on apical half. Second tergite with spiracle dorsal, above lateral fold, third tergite with spiracle usually above but rarely below or behind the fold. Metasoma black, sometimes with yellow markings, or marked with orange. Ovipositor sheaths 0.3 times as long as hind tibia, either parallel-sided and fully enclosing ovipositor or tapered and diagonally truncate; with inconspicuous setae ventrally and apically. Males with tergites 9 and 10 as separate sclerites, sternite 9 about two times wider than long, emarginated apically, thus forming two lobes, their outer corners rounded.

Phylogeny. *Homotropus* is the largest genus of the *Syrphoctonus* genus group and includes most of the species previously included in *Syrphoctonus*, although the non-European species have not been properly placed yet. The name *Homotropus* has recently been re-invoked for these species because phylogenetic studies suggest that the *tarsatorius* and *laevis* species groups (as defined by Dasch 1964) should be removed from this genus in order to restore its monophyly (Klopfstein *et al.* 2011). The exact limits of the genus *Homotropus* remain unclear from the phylogenetic analyses and more extensive species sampling is needed in order to clarify the relationships, especially of the species *crassicornis* and *vitreus* relative to the genera *Bioblapsis* and *Phthormia*. I here adopt a conservative approach and leave them in this genus until further evidence is available.

Distribution. Worldwide. After checking the non-European species currently grouped in *Syrphoctonus*, most of them will probably be transferred to *Homotropus*, which will then probably become the largest genus of the subfamily.

Biology. A number of host records are available for the more common species, and indicate that the genus parasitizes on Syrphinae and that several species are generalists.

Notes. I refrain from splitting the genus into species groups as done by Dasch (1964a) because their circumscription is partly unclear and several species could not be placed. Only a phylogenetic study with a dense taxon sampling is suited for erecting such groupings. When I mention species groups, I thus loosely refer to Dasch's circumscriptions.

Key to species

1. Areolet closed, although vein 3rs-m often unpigmented (Fig. 12D), at least with some indication of vein 3rs-m 2
- Areolet open, without a trace of vein 3rs-m (Fig. 12C) 37
2. Female. Antenna with ventral surface of flagellomeres 10 to apex covered by short, thick bristles, devoid of multiporous plate sensilla which are present only on lateral and dorsal sides of the flagellomeres (Fig. 5) 3
- Female or male. Antenna with ventral surface of all flagellomeres similar to dorsal surface, with multiporous plate sensilla evenly distributed 4
3. Mesopleuron and mesosternum black, coriaceous over entire surface, punctures almost disappearing against the finely rugose background. Scutellum with a small apical spot and sometimes with two yellow lateral stripes. Fore coxa dark, at least basally . . . . . *Homotropus dimidiatus* (Schrank) ♀
- Mesopleuron and mesosternum extensively orange-marked, with dense and distinct punctures over entire surface, background coriaceous only in part. Scutellum with two yellow lateral stripes and a small yellow blotch at hind margin, medially usually orange. Fore coxa usually entirely orange or yellow . . . . . *Homotropus haemorrhoidalis* Szépligeti ♀
4. Hind tibia of female whitish with dark apex and often with a subbasal dark spot (Fig. 14D); in males similar or white ventrally and brown dorsally; AND metasoma black, in males usually with yellow markings, never marked with orange 5
- Hind tibia in both sexes mainly yellow or orange, never white, apex often dark, or entire tibia mainly dark. If hind tibia with some whitish areas, then metasoma broadly marked with orange 24
5. Female (face mainly black, antenna without tyloids) 6
- Male (face mainly yellow, antenna with tyloids) 12
6. Metasoma strongly compressed from fourth segment (Fig. 20A). Scutellum black. Coxae black or orange . . . . . *Homotropus melanogaster* (Holmgren) ♀
- Metasoma less compressed or gradually tapered (Fig. 20B). Scutellum often marked with yellow. Coxae usually orange 7
7. Antenna all bright orange, not much darker than legs. Propodeum with rugae and sometimes an indication of petiolar carina (Fig. 20C). Face medially, pronotum and mesopleuron strongly punctate. Scutellum with a whitish hind margin . . . . . *Homotropus strigator* (Fabricius) ♀
- Antenna brown or black at least on dorsal side, distinctly darker than legs. Propodeum with evenly fine sculpture, without indication of petiolar carinae (Fig. 20D). Punctures of face, pronotum and mesopleuron often faint or almost disappearing against the coriaceous background. Scutellum often with sides and hind margin light marked, light colour often yellow 8
8. Scutellum black, mesoscutum with or without small yellow shoulder marks. Clypeus very strongly excised (Fig. 20E). Larger species, fore wing length 4.5–6.2 mm. Mesopleuron strongly coriaceous in lower half, sometimes strongly punctate, especially along anterior margin . . . . . *Homotropus collinus* (Stelfox) ♀
- Scutellum marked with yellow, mesoscutum with yellow shoulder marks. Clypeus usually less strongly excised (cf. Fig. 20F). Larger or smaller species. Mesopleuron various, often mainly smooth and shining 9
9. Metasoma elongate and middle segments parallel-sided, first tergite short and narrow, second tergite at least 1.2 times length of first tergite (Fig. 20G). Fore and mid coxae yellow. Yellow central face patch confluent with yellow clypeus . . . . . *Homotropus longiventris* Thomson ♀
- Metasoma not elongate, first tergite larger, second tergite usually shorter but at most 1.1 times length of first tergite (Fig. 20H). Mid coxa often orange. Yellow central face patch may or may not be confluent with yellow clypeus 10
10. Mesoscutum and lower half of mesopleuron strongly coriaceous and matt, with punctures less obvious than background sculp-

ture. Often metapleuron and also mesopleuron beneath with dark orange coloration . . . . *Homotropus frontorius* (Thunberg) ♀

- Mesoscutum and mesopleuron with fine sculpture but partially also smooth and shining, with punctures more obvious than background sculpture. Metapleuron and mesopleuron entirely black. 11

11. Larger species, fore wing length 5.5–7 mm. Yellow central face patch often confluent with yellow clypeus. Mid coxa often yellow. Second tergite 0.65–0.7 times as long as wide apically. Pterostigma uniformly brown, of the same colour as the surrounding veins . . . . . *Homotropus megaspis* Thomson ♀

- Smaller species, fore wing length 3.8–5.5 mm. Yellow central face patch separated from yellow or orange clypeus by a dark bar. Mid coxa orange. Second tergite 0.7–0.8 times longer than wide apically (Fig. 20H). Pterostigma light brown medially, with darker margins and surrounding veins . . . . . *Homotropus pictus* (Gravenhorst) ♀

12. Mesopleuron with conspicuous punctures over most of its surface, usually smooth between the punctures, at most with restricted coriaceous areas (*pictus* Holmgren can be traced through both halves of the couplet) 13

- Mesopleuron with a strongly coriaceous background, at least on lower part, with punctures indistinct and restricted to anterior margin or even absent 17

13. Mesopleuron and mesosternum and usually also metapleuron with orange markings . . . . . *Homotropus haemorrhoidalis* Szépligeti ♂

- Mesopleuron and mesosternum black or yellow, without orange markings 14

14. Propodeum with transverse carina present centrally, at least indicated by strong rugae. 15

- Propodeum without indication of transverse carina (cf. Fig. 20D). 16

15. Face often with two black stripes below antennal sockets. First tergite with median dorsal carinae at most present basally. Antenna dark on dorsal half . . . . . *Homotropus nigritarsus* (Gravenhorst) ♂

- Face entirely yellow. First metasomal tergite with median dorsal carinae surpassing middle of the tergite. Antenna orange-brown dorsally. . . . . *Homotropus strigator* (Fabricius) ♂

16. Larger species, fore wing length 4.5–5.5 mm. Shoulder marks often large, with inner hind corners extending over half of the mesoscutum. Metasoma with large yellow markings basally on third and often fourth tergites. Mesopleuron extensively marked with yellow. . . . . *Homotropus megaspis* Thomson ♂

- Smaller species, fore wing length 3.9–4.5 mm. Shoulder marks usually small, inner hind corners at most weakly extended. Yellow markings on metasoma and mesopleuron often reduced, often restricted to fourth tergite and a narrow yellow line on mesopleuron . . . . . *Homotropus pictus* (Gravenhorst) ♂

17. Hind coxa mainly black, fore and mid coxae marked with black basally. Mesopleuron black, yellow markings absent or restricted to epicnemium. Scutellum and clypeus basally usually black 18

- Hind coxa black or orange, fore and mid coxae entirely yellow. Mesopleuron usually with a longitudinal yellow stripe, sometimes mainly yellow. Scutellum often marked with yellow, clypeus usually entirely yellow 19

18. Femora at most with very small dark spots ventrally. Mesopleuron coriaceous on lower half. Hind coxa mostly coriaceous . . . . . *Homotropus melanogaster* (Holmgren) ♂

- Femora mostly black ventrally. Mesopleuron mostly smooth and shining, with some weak punctures on lower half. Hind coxa mostly smooth and shining, only sculptured at the very base. . . . . *Homotropus nigrolineatus* Strobl ♂

19. Mesopleuron entirely black, even in front of epicnemial carina. Scutellum black. Hind tibia with subbasal mark absent. Metasoma rather stout, first tergite at most about 1.3 times longer than broad . . . . . *Homotropus collinus* (Stelfox) ♂

- Mesopleuron marked with yellow at least in front of epicnemial carina, often also with yellow markings on main part. Scutellum usually marked with yellow laterally and apically. Hind tibia often with subbasal mark present. Metasoma stout to more elongate 20

20. Mesoscutum with few punctures on a coriaceous background, punctures often only distinct along anterior margin. Mesopleuron with coriaceous sculpture extending onto upper half. Hind tibia with banding pattern often indistinct, outer surface often brown. 21

- Mesoscutum densely punctate on a mostly smooth background, at most with restricted coriaceous areas. Mesopleuron often mainly smooth on upper half. Hind tibia often with banding pattern distinct, with white band extending also on outer surface 23

21. Mesoscutum with punctures disappearing against the coriaceous background. Metasoma often with background colour of tergites 2 and 3 rather brownish to reddish than black. Most of first tergite and second tergites basally often with longitudinal wrinkles. Scutellum often either entirely yellow or with an apical yellow spot . . . . . *Homotropus pallipes* (Grav.) (part) ♂

- Mesoscutum with punctures distinct against the coriaceous background. Metasoma with background colour black, with yellow markings. Scutellum often yellow laterally and apically. First and second tergites at most with very restricted longitudinal wrinkles. 22

22. Hind tibia with banding pattern distinct, with white band extending to dorsal part. Yellow colouration of mesopleuron and hind coxa often less expanded. . . . . *Homotropus frontorius* (Thunberg) ♂

- Hind tibia brown dorsally, banding pattern thus only distinct ventrally. Mesosternum, lower half of mesopleuron, and most of hind coxa often yellow . . . . . *Homotropus dimidiatus* (Schrank) ♂

23. Metasoma elongate and parallel-sided, first tergite small, narrow, second tergite 1.0–1.2 times longer than apically wide, at least 1.15 times length of first tergite (cf. Fig. 20G). Mesopleuron with both punctures and coriaceous areas restricted to lower half, with large smooth areas. . . . . *Homotropus longiventris* Thomson ♂

- Metasoma less elongate, first tergite larger, second tergite 0.7–0.85 times longer wide, 0.9–1.05 times as long as first tergite (cf. Fig. 20H). Mesopleuron with coriaceous areas and punctures usually extended to upper half . . . . . *Homotropus pictus* (Gravenhorst) ♂

24. Metasoma marked with orange at least medially, in females usually on most of tergites 2 and 3, in males at least with some

orange apically on these tergites 25
- Metasoma entirely black or with yellow markings 31
25. Mesosoma and propodeum mostly orange, dark coloration restricted to sutures and front of tergites 1–3. Face mainly yellow also in females (only known from Madeira) . . . . . *Homotropus coloratus* Hellén
- Mesosoma and propodeum black with yellow markings. Female face entirely black or with a yellow central spot, male face yellow 26
26. Mesopleuron strongly and densely punctate also on upper half, in males at least on lower half. Female with all coxae mainly black 27
- Mesopleuron with punctures indistinct, at most present on lower half. In females, fore and mid coxae mainly yellow, hind coxa black or orange 28
27. Hind tibia orange with apex dark. Mesopleuron extensively coriaceous between the dense punctures. Male with tyloids narrow-linear (cf. Fig. 13H) . . . . . *Homotropus elegans* (Gravenhorst)
- Hind tibia mainly white, with basal and apical dark bands. Mesopleuron mostly smooth and shining between the punctures. Male with tyloids broadly oval (Fig. 20I) . . . . . *Homotropus venustus* Dasch
28. Petiolar area of propodeum higher than broad, enclosed by usually several parallel carinae, although they are sometimes interrupted, areas between carinae coriaceous (Fig. 14L). Male with dark pits beside the narrow tyloids (Fig. 14K). Female mesopleuron usually with a yellow longitudinal stripe. . . . . cf. *Fossatyloides gracilentus* (Holmgren)
- Petiolar area of propodeum, if present, as broad as high but often with carinae largely reduced; if almost fully enclosed by carinae, then area between carinae rugose, with some rugae almost as strong as carinae. Male without pits beside the narrow tyloids (cf. Fig. 13H). Female mesopleuron usually entirely black 29
29. Mesoscutum entirely polished, shining over entire surface, only with some sculpture along anterior margin. Male with tyloids on flagellomeres 8 to 11 . . . . . *Homotropus vitreus* Dasch
- Mesoscutum with sculpture or punctures extending at least to middle, often coriaceous and matt. Male with tyloids on flagellomeres 7 to 14/15 30
30. Scutellum often with a large yellow spot. First tergite 1.3–1.6 times longer than wide in females, 1.4–1.7 in males. Female metasoma gradually tapering, not strongly compressed. Hind coxa of female black or orange, but hind trochanter always with dark marks. Spiracle of third tergite dorsal, above lateral fold. Mesoscutum and mesopleuron extensively coriaceous and matt . . . . . *Homotropus pallipes* (Gravenhorst)
- Scutellum at most with a small yellow spot apically, usually black. First tergite 1.0–1.4 times longer than wide in females, 1.2–1.5 in males. Female metasoma more strongly compressed apically. Hind trochanter the same colour as coxa, or paler. Spiracle of third tergite on or behind lateral fold. Mesoscutum partly with smooth and shining areas, mesopleuron with coriaceous areas restricted to lower half . . . . . *Homotropus signatus* (Gravenhorst)
31. First tergite with median dorsal carinae distinct, clearly surpassing middle of the tergite. Hind coxa smooth and strongly punctate. Mesopleuron smooth and very strongly and densely punctate. Antenna in females usually bright orange 32
- First tergite with median dorsal carinae, if present, not reaching beyond middle of the tergite. Hind coxa smooth or finely coriaceous, at most weakly punctate. Antenna in females usually black or brown but rarely orange 33
32. Antenna stout, with 18–20 orange flagellomeres, male with (rather inconspicuous) tyloids on flagellomeres 2 to 12. Scutellum and mesoscutum usually entirely black, in males often with yellow shoulder marks. First tergite short, at most as long as wide in females . . . . . *Homotropus crassicornis* Thomson
- Antenna slenderer, with 22–24 brown flagellomeres, male with tyloids on flagellomeres 7 to 15. Scutellum marked with yellow, mesoscutum with yellow shoulder marks. First tergite always longer than wide . . . . . *Homotropus sundevalli* (Holmgren)
33. Male. Propodeum carinate, at least with basal area indicated and petiolar area with distinct carina around half its border; areas between carinae rugose. Face with punctures more obvious than background sculpture, which is often weak. Tergites with hind margins extending slightly further back laterally than medially . . . . . cf. *Phthorima* ♂
- Male or female. Propodeum at most carinate on hind side, never with a distinct basal area; rugose at most on petiolar area, remainder finely coriaceous. Face strongly coriaceous and usually impunctate. Tergites with hind margins convex 34
34. Hind coxa orange, in males sometimes with yellow apex. Mesoscutum and mesopleuron finely coriaceous over entire surface 35
- Hind coxa black, in males sometimes with yellow apex. Mesoscutum and mesopleuron various but often smooth and shining between the obvious punctures 36
35. Spiracle of third tergite dorsal, above lateral fold. Epicnemical carina complete (cf. Fig. 16A). Scutellum usually with a small apical yellow blotch . . . . . *Homotropus pectoralis* (Provancher)
- Spiracle of third tergite on or below lateral fold. Epicnemical carina medially interrupted behind fore coxae (Fig. 16B). Scutellum usually mainly yellow . . . . . cf. *Syrphoctonus tarsatorius* (Panzer)
36. Femora ventrally marked with black. Hind tibia with a subbasal dark spot. Mesopleuron with punctures weak and inconspicuous, especially in males. Female with metasoma compressed from tergite 4 posteriorly. Male with face entirely yellow, and usually with two yellow spots basolaterally on tergites 3 and sometimes 4 . . . . . *Homotropus nigrolineatus* Strobl
- Femora orange, without black markings. Hind tibia without a subbasal dark mark. Mesopleuron distinctly punctate also in males. Female with metasoma more gradually tapered. Male with face often with two vertical black stripes but sometimes entirely yellow, metasoma entirely black or dark brown. . . . . *Homotropus nigritarsus* (Gravenhorst
37. Scutellum with two yellow markings at basal corners 38
- Scutellum usually black, rarely with a small apical yellow spot 40

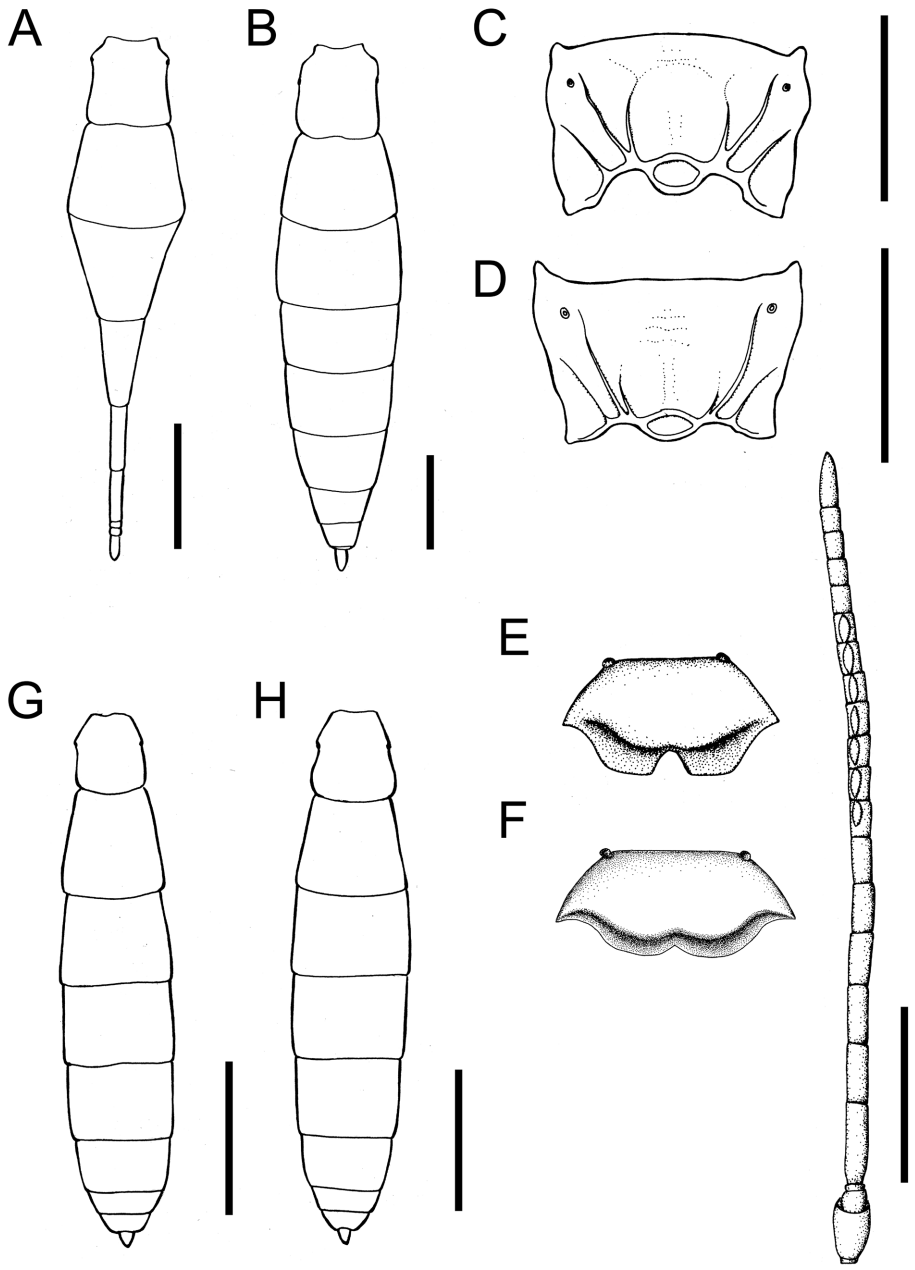

FIGURE 20. *Homotropus* characters mentioned in the species key. A. *Homotropus melanogaster* ♀, metasoma. B. *Homotropus frontorius* ♀, metasoma.C. *Homotropus strigator* ♀, propodeum. D. *Homotropus pictus* ♀, propodeum. E. *Homotropus collinus* ♀, clypeus. F. *Homotropus elegans* ♀, clypeus. G. *Homotropus longiventris* ♀, metasoma. H. *Homotropus pictus* ♀, metasoma. I. *Homotropus venustus* ♂, antenna showing tyloids. Scale bars represent 500 µm.

38. Mesoscutum strongly coriaceous. Male with narrow tyloids (cf. Fig. 13H) on flagellomeres 2 to 10 or 11. Metasoma black, in males often with yellow markings. Femora not marked with black ventrally . . . . . cf. *Syrphoctonus fissorius* (Gravenhorst)
- Mesoscutum with sparse punctures on a smooth and shining background. Male with broad tyloids on flagellomeres 7 to 13 or 14 (Figs 13I and 20I). Metasoma often partly orange on tergites 2–4. Femora usually marked with black ventrally 39
39. Antenna with 21 flagellomeres, in males with broad, barlike tyloids (Figs 13I). First tergite at least 1.2 times longer than wide in females, at least 1.6 times in males. . . . . *Homotropus tauriscorum* Strobl
- Antenna with 17–19 flagellomeres, in males with broad, oval tyloids (Figs 20I). First tergite at most 1.1 times longer than wide in females, at most 1.3 times in males. . . . . *Homotropus venustus* Dasch
40. Mesoscutum centrally entirely smooth and shining, with indistinct punctures restricted to its margins and anterior quarter. Propodeum and first tergite with spiracles enlarged. Female with hind margins of tergites 4 to 6 concave, extending further back laterally than medially. Female antenna with apical segments short and with long setae cf. *Bioblapsis cultiformus* (Davis)
- Mesoscutum coriaceous or distinctly puncate. Propodeum and first tergite with spiracles not enlarged. Female with hind margins of tergites convex, extending at least as far back medially as laterally. Female antenna with apical segments often longer

than wide, without long setae 41

41. Mesopleuron strongly punctate over a smooth and shining background. Metasoma dorsoventrally depressed, black. Spiracle of third tergite distinctly above the strong lateral fold. Male with (rather inconspicuous) tyloids on flagellomeres 2 to 12 . . . . . *Homotropus crassicornis* Thomson

- Mesopleuron with lower half irregularly coriaceous, with sparse and inconspicuous punctures. Metasoma compressed apically, usually orange-marked on tergites 2 and 3. Spiracle of third tergite below or behind lateral fold. Male with tyloids on flagellomeres 7/8 to 14/15. . . . . *Homotropus signatus* (Gravenhorst)

Homotropus collinus (Stelfox 1941, *Homocidus*) (comb. nov.)

Homocidus simulans Stelfox 1941

Diagnosis. Fore wing length 4.5–6.2 mm. Antenna with 20–21 flagellomeres in both sexes; in females, apical flagellomeres with multiporous plate sensilla also present ventrally, in males with narrow, long tyloids 7 to 14/15. Face strongly coriaceous, punctures disappearing against the background sculpture. Clypeus strongly excised, with lobes rounded. Mesopleuron strongly coriaceous on lower half, smooth on upper half, in females often also strongly punctate, especially along anterior margin, which are very distinct on upper half but almost disappearing against the coriaceous background on lower half; in males, punctures usually less pronounced. Mesoscutum coriaceous and finely punctate. Hind coxa with hind surface coriaceous. Fore wing areolet closed, vein 3rs-m usually pigmented. Propodeum with carination reduced to pleural carina, lateral longitudinal carina and apical parts of median longitudinal carinae, mainly coriaceous. Metasoma of both sexes dorsoventrally depressed. First tergite without median dorsal carinae but with numerous longitudinal wrinkles on lateral areas, 1.0–1.2 times as long as wide in females, 1.2–1.5 times in males; second tergite basally with some strong longitudinal wrinkles, 0.55–0.7 times as long as wide in females, 0.7–0.9 times in males, second tergite 0.8–1.0times as long as first tergite; spiracle of third tergite dorsal, above lateral fold.

Colouration of females. Antenna dark brown. Head and mesosoma black, with yellow or brownish central face patch separated from dark yellow on clypeus, yellow on often part of mouthparts, sometimes hind corner of pronotum, tegula, upper mesepimeron; scutellum black. Legs including all coxae orange, fore coxa with yellow apex, hind tibia white to yellow with a dark apex, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, lower half of propleuron, hind corner of pronotum, large shoulder marks, subtegular ridge, and entire mesepimeron.

Material examined. Lectotype ♀ of *Homocidus collinus* Stelfox: United Kingdom, Perthshire, Rannoch., leg. R.B.Benson. 1♀, at BMNH. Paralectotypes ♂ and ♀: United Kingdom, Perthshire, Rannoch, leg. R.B.Benson, 1.–4.VI.1931. 1♂; Invernessshire, Aviemore, G.C.C., leg. Champion, 1910. 1♀, both at BMNH. Holotype ♀ of *Homocidus simulans* Stelfox: Ireland, Dublin, Glenasmole, 31. VIII. 1937, 1♀, at USNM.

New for Sweden: Uppland, leg. Lundblad. 1♀, at NRM. New for Switzerland: Vaud, Bussigny, 410m, N46.543, E6.5521, leg. J.de Beaumont, 3.VI.1961. 1♀, at MZL.

Finland (4), Iceland (4), Sweden (4), Switzerland (2), United Kingdom (3).

Distribution. Western Palaearctic.

Homotropus coloratus (Hellén 1949, *Diplazon*) (comb. nov.)

Diagnosis. (Male unknown). Fore wing length 4.9 mm. Female antenna with 18 flagellomeres, with multiporous plate sensilla also present ventrally. Face strongly coriaceous, with punctures indistinct. Mesopleuron strongly coriaceous, weakly but densely punctate over almost entire surface, smooth only around mesopleural fovea. Mesoscutum finely coriaceous, especially on median part, with weak but dense punctures. Hind coxa with hind surface coriaceous and matt. Fore wing areolet closed, vein 3rs-m at least partly pigmented. Propodeum with carination reduced to hind part of lateral longitudinal carina, transverse and pleural carinae lacking; coriaceous over entire surface. Female metasoma dorsoventrally depressed, more tapered towards apex. First tergite with median dorsal carinae absent and without any wrinkles, 1.2 times as long as wide; second tergite without longitudinal wrinkles, in females 0.8 times as long as wide, second tergite 0.95 times as long as first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna orange. Head black, yellow over entire face, clypeus and mouth parts; mesosoma orange, with dark colouration restricted to sutures between some sclerites, i.e. front and upper part of mesopleuron, metascutum, around wing bases, and apex of propodeum. Yellow on entire propleuron and pronotum, broad line over mesopleuron, tegula, shoulder marks, mesepimeron and lower metapleuron. Fore and mid legs yellow to orange, all coxae yellow, hind trochanter dark, hind femur orange, hind tibia white with apex dark, hind tarsus white. Metasoma orange, with black at the bases of tergites 1 to 3.

Material examined. Holotype of *Diplazon (Homocidus) coloratus* Hellén: Portugal, Madeira, Ribeiro Frio, leg. Frey, 3.V. 1♀, at FMNH.

Notes. I could only examine the female holotype of this species, the male is unknown.

Homotropus crassicornis Thomson 1890

Homotropus brevicornis Thomson 1890 (synonym by homotypy; Thomson used the name *crassicornis* in his key but *brevicornis* in the description)
Homocidus asyntactus Schmiedeknecht 1926

Diagnosis. Fore wing length 5.1–6.5 mm. Antenna in females with 19 flagellomeres, with multiporous plate sensilla also present ventrally; in males with 20 flagellomeres and with narrow, long but usually inconspicuous tyloids on flagellomeres 2/3 to 12/13. Face strongly coriaceous and distinctly punctate, especially centrally. Clypeus weakly excised, lobes rounded. Mesopleuron smooth and shining, strongly punctate over most of its surface. Mesoscutum smooth and shining, strongly punctate. Hind coxa with hind surface smooth and shining between seta roots. Fore wing areolet open or closed. Propodeum with carination complete and strong, although carinae around petiolar area are sometimes only present as rugae; strongly rugose, especially on petiolar area. Metasoma of both sexes dorsoventrally depressed. First tergite with median dorsal carinae clearly surpassing middle of the tergite, usually almost reaching apex, rugose but without longitudinal wrinkles, 0.9–1.1 times as long as wide; second tergite basally irregularly rugose, 0.5–0.65 times as long as wide, second tergite 0.8–0.95 times as long as first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna orange or brown. Head and mesosoma black, with yellow on central face patch separated from yellow on clypeus, yellow on mouthparts, sometimes hind corner of pronotum, tegula, upper mesepimeron; scutellum black. Legs orange, all coxae black, femora orange, hind tibia orange with apex dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow face, yellow on antenna below, epicnemium and spot on lower mesopleuron, subtegular ridge, often small shoulder marks, mesepimeron, coxae apically, sometimes hind tibia yellow with dark apex.

Material examined. Syntype of *Homotropus crassicornis* = *Homotropus brevicornis* Thomson: France, Vendée, Saint-Germain-de-Prinçay. 1♀, at ZIL.

New for Hungary: Szászkézd, leg. Silbernagel. 1♀, at TMA. New for Slovenia: Untersteiermark, Podčetrtek, leg. Dr.Jäger, 2.VII.1933. 1♀, at ZSM.

Germany (6), Hungary (1), Italy (1), Sweden (7).

Distribution. Western Palaearctic.

Figures. Propodeum (Fig. 14N), metasoma (Fig. 15B), propodeum (Fig. 15D), habitus (Fig. 30F).

Notes. *Syrphoctonus robustus* Davis from North America is probably a synonym, but I have not seen any type material.

Homotropus dimidiatus (Schrank 1802, *Ichneumon*) (comb. nov.)

Bassus planus Desvignes 1862
Homotropus crassicrus Thomson 1890 (syn. nov.)
Homotropus nudus Dasch 1964a (syn. nov.)

Diagnosis. Fore wing length 4.3–6.3 mm. Antenna of both sexes with 20 to 21 flagellomeres; in females, apical flagellomeres with ventral surface covered by short, thick bristles and devoid of multiporous plate sensilla, in

males with narrow, long tyloids 7 to 14/15. Face very strongly coriaceous but distinctly punctate centrally. Clypeus weakly excised, with lobes rounded. Mesopleuron strongly coriaceous and matt over entire surface, with some weak punctures along anterior margin. Mesoscutum strongly coriaceous and densely punctate. Hind coxa with hind surface strongly coriaceous and matt. Fore wing areolet closed, vein 3rs-m usually unpigmented. Propodeum with at most pleural carina and lateral longitudinal carinae indicated, coriaceous, smoother on petiolar area. Female metasoma gradually tapered posterior to fourth segment. First tergite without median dorsal carinae, without longitudinal wrinkles, 1.0–1.1 times as long as wide in females, 1.0–1.4 in males; second tergite basally evenly coriaceous, 0.6–0.7 times as long as wide in females, 0.75–0.85 in males, second tergite 0.86–1.1 times as long as first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna brown. Head and mesosoma black, sometimes with yellow on central face patch, separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, shoulder mark, entire mesepimeron, scutellum laterally and apically. Legs orange, coxae usually orange, fore coxa dark, at least basally, sometimes all coxae dark basally, femora orange, hind tibia white with a dark apex and sometimes subbasal marking, often also dark on outer side, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with lower mesopleuron and mesosternum mostly yellow or at least with a broad yellow stripe, hind tibia with outer side almost always brown. Tergite 3 usually with two large yellow basal spots.

Material examined. Lectotype of *Bassus planus* Desvignes: United Kingdom. 1♂, at BMNH (very incomplete specimen, metasoma and hind legs missing; interpretation thus somewhat uncertain). Lectotype of *Homotropus crassicrus* Thomson: Sweden, Öland. 1♀, at ZIL. Holotype of *Homotropus nudus* Dasch, examined by Erich Diller (personal communication).

New for Austria: Tirol, Zillertaler Alpen, Stillupp-Kees, 2700m, leg. E.Jäckh, 16.VIII.1926. 1♀, at ZSM. New for Switzerland: Valais, Champéry, Col de Bretolet, 1920m, N46.143, E6.7968, VIII.1964. 1♀, at MZL.

Austria (1), Finland (2), Germany (4), Hungary (3), Iceland (1), Netherlands (1), Norway (2), Russia (1), Sweden (70), Switzerland (6), United Kingdom (50).

Distribution. Holarctic and Oriental.

Figures. Antenna ♀ (Fig. 5), habitus (Fig. 31A), male terminal sclerites (Fig. 37F).

Notes. The identity of *Ichneumon dimidiatus* Schrank is somewhat uncertain, as the type has been lost (Townes *et al.* 1961). The original description, though not very detailed, points to a male *Homotropus* with a dark outer side of the hind tibia, and later authors described the taxon accordingly (e.g. Morley 1906; Morley 1914; Schmiedeknecht 1926; Beirne 1941). In most collections examined, there are only male specimens under that species, the majority of which correspond to male *Homotropus crassicrus* Thomson. I here follow this interpretation of the name *dimidiatus*, which takes priority over *H. crassicrus*.

Homotropus elegans (Gravenhorst 1829, *Bassus*)

Bassus rufonotatus Holmgren 1858
Homotropus affinis Szépligeti 1898

Diagnosis. Fore wing length 4.1–5 mm. Antenna in females with 18 to 20 flagellomeres, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with 20 to 21 flagellomeres and with narrow, long tyloids on flagellomeres 7 to 14/15. Face strongly coriaceous and distinctly punctate, especially centrally. Clypeus very weakly excised, with lobes somewhat angulate at outer corners. Mesopleuron coriaceous on lower half, strongly punctate over most of its surface. Mesoscutum smooth and shining or at most finely coriaceous, strongly and densely punctate. Hind coxa with hind surface basally coriaceous, apically rather smooth and shining. Fore wing areolet closed, vein 3rs-m usually unpigmented. Propodeum with only metapleural and lateral longitudinal carinae present but sometimes with some rugae on petiolar area which partly indicate the location of the petiolar carinae; coriaceous, rather smooth and rugose on petiolar area. Female metasoma dorsoventrally depressed. First tergite without median dorsal carinae, with few longitudinal wrinkles, as long as wide in females and 1.2–1.3 times longer than broad in males; second tergite basally with few longitudinal wrinkles, 0.55–0.65 times as long as wide in females, 0.7–0.8 in males, second tergite 0.8–0.9 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, with yellow on central face patch separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, often large shoulder mark, mesepimeron, scutellum usually with an apical spot. Legs orange, all coxae black, femora orange, hind tibia orange with apex dark, hind tarsus dark. Metasoma black, tergites 2–4 and sometimes parts of tergites 1 and 5 orange.

Colouration of males. As in females but additionally with yellow over entire face, ventrally on scape, epicnemium, often stripe on lower mesopleuron, coxae apically, sometimes basal spots on tergite 3; metasoma often only partly orange on tergites 2–4.

Material examined. Lectotype of *Bassus rufonotatus* Holmgren: Sweden, Lapland, leg. Boheman. 1♂, at NRM (hereby designated). Holotype of *Homotropus affinis* Szépligeti: Hungary. 1♀, at TMA.

New for Switzerland: Bern, Amselberg, leg. T.Steck, 6.X.1926. 1♀, at NMBE.

Austria (1), Finland (1), Germany (2), Hungary (14), Italy (1), Russia (3), Sweden (40), Switzerland (50), Turkey (1), United Kingdom (2).

Distribution. Holarctic.

Figures. First tergite ♀ (Fig. 14G), clypeus (Fig. 14J), habitus (Fig. 31B).

Homotropus frontorius (Thunberg 1824, *Ichneumon*) (comb. nov.)

Homocidus subopacus Stelfox 1941 (syn. nov.)
Homotropus quadrangularis Dasch 1964a (syn. nov.)

Diagnosis. Fore wing length 4.2–5.6 mm. Antenna in females with 19 to 20 flagellomeres, apical flagellomeres with multiporous plate sensillae also present ventrally; in males with 20 to 21 flagellomeres and with narrow, long tyloids on flagellomeres 7 to 14–16. Face strongly coriaceous, punctures usually disappearing against the background sculpture. Clypeus weakly to strongly excised, with lobes somewhat angulate at outer corners. Mesopleuron coriaceous at least on lower half, punctate on lower half and along anterior margin. Mesoscutum coriaceous, especially on median part, densely punctate. Hind coxa with hind surface coriaceous and matt. Fore wing areolet closed, vein 3rs-m often unpigmented. Propodeum with only pleural carina and apical parts of longitudinal carinae present, coriaceous, rather smooth and rugose on petiolar area. Female metasoma gradually tapered posterior to third segment. First tergite with median dorsal carinae indicated at most basally, never surpassing middle of tergite, without longitudinal wrinkles, 0.85–1.3 times as long as wide; second tergite basally with few longitudinal wrinkles, 0.65–0.8 times as long as wide, second tergite 0.9–1.1 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, with yellow on central face patch usually separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, shoulder mark, at least upper mesepimeron, scutellum laterally and apically; usually marked with orange on hind corner of mesopleuron and on metapleuron. Legs orange, all coxae orange, femora orange, hind tibia white with a dark apex and base and sometimes subbasal marking, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow over entire face, scape and pedicel ventrally, propleuron, mesosternum and a stripe on lower mesopleuron, fore and mid coxae, and often basal spots on tergites 3 and sometimes 4. Meso- and metapleurae usually not marked with orange.

Material examined. Holotype of *Ichneumon frontorius* Thunberg: Sweden, Dalarna, leg. Dr. Blom. 1♂, at UU. Holotype of *Homocidus subopacus* Stelfox: Ireland, Dublin, Gelansmole, 22.V.1938, 1♀, at USNM. Holotype of *Homotropus quadrangularis* Dasch, examined by E. Diller (personal communication).

New for Germany: München, Lochhausen, leg. E.Diller, 8.VI.1963. 1♀, at ZSM. New for Norway: Jotunheimen, Giendesheim, 1000–1500m, leg. J.E.&R.B.Benson, 7.VII.1966. 1♀, at BMNH. New for Sweden: Värmland, Munkfors kommun, Ransäter, Ransbergs herrgard. Old mixed deciduous ofrest in stream ravine, N59°47'25.59", E13°24'54.61", leg. SMTP, 18.VI.–27.VI.2005. 2♀, at NRM. New for Switzerland: Grisons, Sur, Clavenia 1987m, N46°32.005, E8°50.135, leg. S.Klopfstein, 8.VI.2007. 1♀, at NMBE.

Finland (2), Germany (2), Norway (1), Sweden (12), Switzerland (4), United Kingdom (6), USA (1).

Distribution. Holarctic.

Figures. Hind tibia ♀ (Fig. 14D), metasoma ♀ (Fig. 20B), habitus (Fig. 31C).

Homotropus haemorrhoidalis Szépligeti 1898

Homocidus rhenanus Habermehl 1930
Homocidus struvei Hedwig 1936
Homocidus tricolor Stelfox 1941
Homotropus lipothrix Momoi 1973

Diagnosis. Fore wing length 4–5.3 mm. Antenna of both sexes with 19 to 20 flagellomeres, in females apical flagellomeres with ventral surface covered by short, thick bristles and devoid of multiporous plate sensilla, in males with long tyloids on flagellomeres 6 to 9. Face strongly coriaceous but distinctly punctate over most of its surface. Clypeus strongly excised, with lobes rounded. Mesopleuron partly coriaceous, very strongly and densely punctate over most of its surface. Mesoscutum smooth and shining, strongly and densely punctate. Hind coxa with hind surface mainly smooth and shining between seta roots, coriaceous only basally. Fore wing areolet closed, vein 3rs-m usually unpigmented. Propodeum with only pleural carina and lateral longitudinal carinae present, strongly coriaceous, more rugose on petiolar area. Female metasoma dorsoventrally depressed. First tergite with median dorsal carinae present only basally, never surpassing middle of tergite, with few longitudinal wrinkles, 0.8–0.95 times as long as wide in females, 0.95–1.2 in males; second tergite basally with numerous longitudinal wrinkles, 0.5–0.7 times as long as wide in females, 0.7–0.8 in males, second tergite 0.85–1.1 times as long as first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, most of mesopleuron, metapleuron and often also pronotum and first tergite dark orange, with ivory on central face patch separated from ivory on clypeus, ivory on mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark, mesepimeron, scutellum ivory laterally and apically, usually dark orange centrally. Legs orange, all coxae orange, fore coxa dark basally, trochanters and tips of femora often marked with ivory; hind tibia white with base, subbasal spot and apex dark, outer side sometimes dark, hind tarsus dark. Metasoma black, sometimes with some orange markings.

Colouration of males. As in females but additionally with ivory or yellow over entire face, scape and pedicel ventrally, propleuron, mesosternum and a stripe on lower mesopleuron, fore and mid coxae, and often basal spots on tergites 3 and 4.

Material examined. Holotype ♀ of *Homotropus haemorrhoidalis* Szépligeti: Hungary, Budapest. 1♀, at TMA. Holotype ♀ of *Homocidus tricolor* Stelfox: Ireland, Dublin, Harold's Cross, 14.VI.1937, 1♀, at USNM. Lectotype (1♂) and two paralectotypes of *Homotropus lipothrix* Momoi: Mongolia, Bajan-Ölgij aimak, in the valley of the Chavealyn gol river, 25 km East of Somon Cagannuur, 1850 m, leg. Dr.Z.Kaszab, 3.VII.1968. 2♂, 1♀, at TMA.

New for Switzerland: Zürich, Wädenswil environments, leg. K.Schneider.5♂, 6♀, at NMBA.

Germany (3), Hungary (1), Mongolia (3), Switzerland (11), United Kingdom (2).

Distribution. Palaearctic.

Homotropus longiventris Thomson 1890

Diagnosis. Fore wing length 3.6–4.8 mm. Antenna in females with 19 to 20 flagellomeres, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with 20 to 22 flagellomeres and with narrow, long tyloids on flagellomeres 7 to 14/15. Face strongly coriaceous and distinctly punctate, especially centrally. Clypeus weakly excised, with lobes somewhat angulate at outer corners. Mesopleuron weakly coriaceous on lower half, smooth and shining on upper half, with some weak and rather sparse punctures on lower half and along anterior margin. Mesoscutum finely coriaceous, especially on median part, strongly punctate. Hind coxa with hind surface mostly smooth and shining between seta roots, coriaceous only basally. Fore wing areolet closed, vein 3rs-m usually unpigmented. Propodeum with only pleural carina and apical parts of longitudinal carinae present, coriaceous. Female metasoma elongate and parallel-sided. First tergite without median dorsal carinae, with few longitudinal wrinkles, 1.0–1.3 times as long as wide; second tergite basally with numerous longitudinal wrinkles often reaching center of tergite, 0.9–1.2 times as long as wide, second tergite 1.15–1.4 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, with bright yellow on central face patch

confluent with yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark, mesepimeron, scutellum laterally and apically. Legs orange, fore and mid coxae yellow, hind coxa orange, femora yellow or orange, hind tibia white with apex, base and a subbasal spot dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow over entire face, scape and pedicel ventrally, propleuron, hind part of pronotum, mesosternum and at least a stripe on lower mesopleuron, apex of hind coxa, and often basal spots on tergites 3 to 4 or 5.

Material examined. Lectotype of *Homotropus longiventris* Thomson: Sweden, Skåne, Pålsjö. 1♀, at ZIL.

New for Bulgaria: Rila-Kloster, 15.VII.1974. 1♀, at ZSM. New for Italy: Garda, Campi Riva, leg. Haesselbarth, 7.IX.1967. 4♂, at ZSM.

Bulgaria (1), Finland (13), Germany (2), Italy (2), Norway (1), Sweden (70), Switzerland (16), United Kingdom (30).

Distribution. Palaearctic.

Figures. Metasoma ♀ (Fig. 20G), habitus (Fig. 31D), male terminal sclerites (Fig. 37G).

Homotropus megaspis Thomson 1890

Homotropus megalaspis Schulz 1906

Diagnosis. Fore wing length 4.5–6 mm in males and 6–7.8 mm in females. Antenna of both sexes with 19 to 21 flagellomeres, in females, apical flagellomeres with multiporous plate sensilla also present ventrally, in males with narrow, long tyloids on flagellomeres 7 to 14/15. Face strongly coriaceous and distinctly punctate, especially centrally. Clypeus strongly excised, with lobes rounded. Mesopleuron with some coriaceous areas on lower half, otherwise smooth and shining, strongly punctate over more than half of its surface. Mesoscutum smooth and shining but sometimes with some finely coriaceous areas, especially on median part, strongly punctate. Hind coxa with hind surface coriaceous on basal half, apically smooth and shining between seta roots. Fore wing areolet closed, vein 3rs-m sometimes unpigmented. Propodeum at most with metapleural and parts of lateral longitudinal carina present, mostly coriaceous. Female metasoma dorsoventrally depressed. First tergite with median dorsal carinae indicated at least basally, with area between carinae covered with numerous strong longitudinal wrinkles, tergite 0.9–1.1 times as long as wide in females, 1.2–1.5 in males; second tergite basally with some strong longitudinal wrinkles, 0.6–0.7 times as long as wide in females, 0.7–1.0 in males, second tergite 0.9–1.0 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, with yellow on central face patch usually confluent with yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark, mesepimeron, scutellum laterally. Hind part of mesopleuron and metapleuron sometimes marked with orange (cf. form *rufipleuris* Habermehl). Legs orange, fore and mid coxae yellow, hind coxa orange, femora orange, often yellow-marked apically, hind tibia white with apex, base and sometimes a subbasal spot dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow over entire face, scape, pedicel and usually flagellomeres ventrally, propleuron, mesosternum and lower mesopleuron, shoulder marks large and recurved, fore and mid and often basally on hind coxae, and often basal spots on tergites 3 and 4.

Material examined. Holotype of *Homotropus megaspis* Thomson: Germany, Bavaria, leg. A. Kriechbaumer, 11.IX.1873. 1♀, at ZSM.

New for Austria: Oberösterreich, Brunnwald bei Bad Leonfelden, leg. Martin Schwarz, 21.VIII.1985. 1♂, at ZSM.

Austria (1), Germany (3), Hungary (4), Switzerland (2), United Kingdom (2).

Distribution. Palaearctic.

Homotropus melanogaster (Holmgren 1872, *Bassus*)

Diagnosis. Fore wing length 3.8–4.7 mm. Antenna in females with 17 to 19 flagellomeres, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with 19 to 20 flagellomeres and with narrow, long

tyloids on flagellomeres 7 to 14–16. Face strongly coriaceous, punctures disappearing against the background sculpture. Clypeus weakly excised, with lobes rounded. Mesopleuron partly coriaceous on lower half, mainly smooth and shining on upper half, weakly punctate on lower half and along anterior margin. Mesoscutum coriaceous, especially on median part, weakly punctate. Hind coxa with hind surface smooth and shining between seta roots, coriaceous on basal half. Fore wing areolet closed, vein 3rs-m usually unpigmented. Propodeum with only pleural carina and apical parts of longitudinal carinae indicated but sometimes with some rugae on petiolar area which partly indicate the location of the petiolar carinae, coriaceous, smoother on petiolar area. Female metasoma strongly compressed posterior to third segment. First tergite without median dorsal carinae, at most with few longitudinal wrinkles, 1.0–1.1 times as long as wide in females, 1.0–1.4 in males; second tergite basally with few weak longitudinal wrinkles, 0.5–0.9 times as long as wide, second tergite 0.9–1.0 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, sometimes with yellow on central face patch which is sometimes confluent with yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, rarely subtegular ridge, sometimes upper part of mesepimeron; scutellum black. Legs orange, all coxae either black or orange, femora orange, hind tibia white with base, subbasal spot and apex dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow over entire face, scape and pedicel ventrally, epicnemium, coxae apically.

Material examined. Holotype of *Bassus melanogaster* Holmgren: Denmark, Greenland. 1♂, at NRM.

New for Austria: Kaunerberg, 1500m, leg. I.&.E.Diller, 25.IX.1980. 1♀, at ZSM. New for Italy: Bolzano, Sarntal 1250m, leg. K.Zwakhals, 28.VI.1976. 1♀, at KZ. New for United Kingdom: Chippenham Fen., Cambs. Carr at reedbed edge, RMSNH 1986.021, 22.VIII.–5.IX.1985. 1♂, 1♀, at NMSZ.

Austria (1), Iceland (1), Italy (1), Sweden (15), Switzerland (11), United Kingdom (2).

Distribution. Holarctic.

Figures. Metasoma ♀ (Fig. 20A), male terminal sclerites (Fig. 37H).

Notes. While this species normally has entirely black coxae, I found several specimens in Sweden with entirely orange coxae. These were often sampled at the same location as specimens with black coxae. Except for colouration, no reliable characters could be found to distinguish these taxa, and I thus treat them as a single species.

Homotropus nigritarsus (Gravenhorst 1829, *Bassus*)

Bassus picitans Desvignes 1862
Bassus groenlandicus Holmgren 1872

Diagnosis. Fore wing length 3.3–5.1 mm. Antenna of both sexes with 19 to 20 flagellomeres, in females apical flagellomeres with multiporous plate sensilla also present ventrally; in males with narrow, long tyloids on flagellomeres 7 to 14/15. Face strongly coriaceous and punctate over entire area. Clypeus rather weakly excised, with lobes rounded. Mesopleuron smooth and shining, at most with very restricted coriaceous areas on lower half, strongly punctate over at least half the surface. Mesoscutum smooth and shining, strongly punctate. Hind coxa with hind surface smooth and shining between seta roots, coriaceous only basally. Fore wing areolet closed, vein 3rs-m usually unpigmented. Propodeum with only pleural carina and apical parts of longitudinal carinae present but with some rugae on petiolar area which partly indicate the location of the petiolar carinae, coriaceous, rugose on petiolar area. Female metasoma gradually tapered posterior to third segment. First tergite without median dorsal carinae, without longitudinal wrinkles, 1.0–1.4 times as long as wide; second tergite basally with few very short longitudinal wrinkles, 0.5–0.7 times as long as wide in females, 0.6–0.8 in males, second tergite 0.8–1.0 times as long as first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, with yellow usually on small central face patch which is separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, often large shoulder mark, mesepimeron, scutellum at most with small apical spot. Legs orange, all coxae black, fore and mid coxae often with yellow apex; femora orange, hind tibia orange with apex dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow along inner orbits and central face patch,

sometimes over entire face, scape and pedicel ventrally, sometimes parts of epicnemium, fore and mid coxae and sometimes hind coxa apically, and often basal spots on tergites 3 and 4.

Material examined. Lectotype of *Bassus picitans* Desvignes: United Kingdom. 1♂, at BMNH.

New for Ukraine: SE, Lugansk reg, Provalie, leg. Osipov, 19.–21.VII.2004. 1♀, at MR.

Bulgaria (1), Finland (1), France (3), Germany (1), Hungary (2), Netherlands (1), Norway (1), Russia (2), Spain (1), Sweden (90), Switzerland (90), Turkey (1), Ukraine (1), United Kingdom (30).

Distribution. Holarctic and Neotropical.

Figures. Male terminal sternite and tergites (Figs 10C, 10D), antenna ♂ (Fig. 13H), habitus (Fig. 31E).

Homotropus nigrolineatus Strobl 1903

Homocidus nigrilineatus Meyer 1936

Diagnosis. Fore wing length 3.9–5.1 mm. Antenna in females with 19 to 20 flagellomeres, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with 20 to 21 flagellomeres and with narrow, long tyloids on flagellomeres 6/7 to 15/16. Face weakly coriaceous, partly shining, with punctures mainly centrally. Clypeus strongly excised, with lobes somewhat angulate at outer corners. Mesopleuron mainly smooth and shining, often with a small coriaceous patch below speculum, with some punctures on lower half and along anterior margin. Mesoscutum smooth and shining, rather strongly punctate. Hind coxa with hind surface smooth and shining. Fore wing areolet closed, vein 3rs-m usually unpigmented. Propodeum with only pleural carina and apical parts of longitudinal carinae present but sometimes with some rugae on petiolar area which partly indicate the location of the petiolar carinae; evenly coriaceous, rather smooth and rugose on petiolar area. Female metasoma tapered posterior to second or third segment. First tergite without median dorsal carinae, without longitudinal wrinkles but rugose on basal half, 1.2–1.3 times as long as wide in females, 1.4–1.6 in males; second tergite basally with few short longitudinal wrinkles, 0.7–0.9 times as long as wide, second tergite 0.8–0.95 times length of first tergite; spiracle of third tergite usually behind lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, with yellow on central face patch which is separated from yellow on clypeus, mouthparts only partly yellow, palpi often black, yellow on hind corner of pronotum, tegula, small to large shoulder mark, upper part of mesepimeron; scutellum black. Legs yellow or orange, all coxae black, femora yellow or orange with a ventral black stripe, hind tibia yellow or orange with apex dark and with a subbasal dark spot, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow over entire face, scape and pedicel ventrally, part of propleuron, subtegular ridge, often spots on epicnemium, femora except for black markings ventrally and sometimes dorsally, fore and mid coxae and hind coxa apically, and often basal spots on tergites 3 and sometimes 4.

Material examined. New for France: Col du Lautaret, N45.0225, E06.2142, 5.VIII.1982. 2♀, at ZSM. New for Sweden: Västerbotten, Sorsele kommun, Ammarnäs, Vindelfjällens naturreservat, Tjulträsklaspen, N65°58.007', E16°03.630', leg. SMTP, 26.VII.–15.VIII.2004. 1♂, at NRM.

Austria (1), France (3), Hungary (1), Sweden (1), Switzerland (12).

Distribution. Western Palaearctic.

Figures. Male terminal sclerites (Fig. 37I).

Homotropus pallipes (Gravenhorst 1829, *Bassus*)

Lissonota pectoralis Gravenhorst 1829
Bassus pallidipes Marshall 1872
Bassus pallipennis Provancher 1874
Homotropus pallidipennis Dalla Torre 1901
Homotropus pallidipes Dalla Torre 1901
Homocidus impolitus Stelfox 1941 (syn. nov.)

Diagnosis. Fore wing length 3.6–4.5 mm. Antenna of both sexes with 20 to 21 flagellomeres, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with narrow, long tyloids on flagellomeres 7 to 14/

15. Face evenly coriaceous, punctures disappearing against the background sculpture. Clypeus weakly excised, with lobes rounded. Mesopleuron strongly coriaceous on lower half and front part of upper half, with very weak or no punctures. Mesoscutum strongly coriaceous, very weakly punctate. Hind coxa with hind surface coriaceous and matt. Fore wing areolet closed, vein 3rs-m usually unpigmented, rarely areolet open. Propodeum with only pleural carina and apical parts of longitudinal carinae present, evenly coriaceous, smoother on petiolar area. Female metasoma dorsoventrally depressed. First tergite without median dorsal carinae but sometimes with strong longitudinal wrinkles, 1.3–1.7 times as long as wide; second tergite basally with strong longitudinal wrinkles, 0.7–0.8 times as long as wide in females, 0.8–1.1 in males, second tergite 0.9–1.0 times as long as first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, sometimes with a yellow central face patch which is always separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark often with inner corners recurved on mesoscutum, mesepimeron, most of scutellum. Legs yellow or orange, either all coxae orange or black, fore and mid coxae with yellow apices, femora orange, hind tibia orange with apex dark, hind tarsus dark. Metasoma black, tergites 2–4 all or mainly orange.

Colouration of males. As in females but additionally with yellow over entire face, scape and pedicel and usually antenna ventrally, propleuron, epicnemium, mesosternum and a stripe on lower mesopleuron, fore and mid coxae; hind tibia often paler than in female, sometimes mainly yellow or white with apex and usually outer surface dark. Metasoma black, often irregularly orange on tergites 2–4, and often basal yellow spots on tergites 3 and 4.

Material examined. Holotype ♂ of *Homocidus impolitus* Stelfox: Scotland, Dubartonshire, Garelochhead, 9.VII.1938, 1♂, at USNM.

New for Russia: E Siberia, Irkutsk, Lisikha, leg. Berlov, 4.VIII.2005. 1♀, at MR.

Finland (3), Germany (12), Hungary (1), Italy (1), Norway (1), Russia (2), Sweden (>200), Switzerland (60), United Kingdom (80), USA (1).

Distribution. Holarctic and Neotropical.

Figures. Habitus (Fig. 31F).

Homotropus pectoralis (Provancher 1874, *Bassus*) (comb. nov.)

Homotropus incisus Thomson 1890 (syn. nov.)
Homotropus reflexus Morley 1906 (syn. nov.)

Diagnosis. Fore wing length 5.4–7.1 mm. Antenna of both sexes with 20 to 21 flagellomeres, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with narrow, long tyloids on flagellomeres 7 to 14. Face strongly coriaceous and distinctly punctate, especially centrally. Clypeus strongly excised, with lobes rounded. Mesopleuron coriaceous and strongly punctate over almost entire surface. Mesoscutum coriaceous between dense punctures. Hind coxa with hind surface coriaceous and matt, smooth and shining only apically. Fore wing areolet closed, vein 3rs-m often partly unpigmented. Propodeum with only pleural and apical parts of lateral longitudinal carina present, coriaceous, more rugose on petiolar area. Female metasoma gradually tapered posterior to third segment. First tergite with median dorsal carinae present only basally, never surpassing middle of tergite, with numerous longitudinal wrinkles, especially on median part, 0.9–1.2 times as long as wide in females, 1.3 in males; second tergite basally with some short longitudinal wrinkles, 0.55–0.65 times as long as wide in females, 0.8–0.9 in males, second tergite 0.8–0.9 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, sometimes with a yellow central face patch which is separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, sometimes upper part of mesepimeron, scutellum at most with apical spot. Legs orange, all coxae orange, fore coxa dark basally, femora orange, hind tibia orange with apex dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow over entire face, antenna ventrally, propleuron, epicnemium, mesosternum and lower half of mesopleuron, fore and mid coxae, and often basal spots on tergites 3 and 4.

Material examined. Holotype of *Homotropus incisus* Thomson: Sweden, Skåne, Ringsjön. 1♀, at ZIL.
Holotype of *Homotropus reflexus* Morley: United Kingdom, ? Surrey, Shere. 1♀, at BMNH.

New for Ukraine: SE, Lugansk reg, Provalie, leg. Osipov, 1.–9.VII.2004. 1♀, at MR.
Finland (2), Germany (2), Icleand (2), Sweden (9), Ukraine (1), United Kingdom (1).
Distribution. Holarctic.

Homotropus pictus (Gravenhorst 1829, *Bassus*)

Tryphon nigricornis Zetterstedt 1838 (syn. nov.)
Bassus pumilus Holmgren 1858
Bassus thoracicus Desvignes 1862
Homocidus brevis Hedwig 1938 (syn. nov.)

Diagnosis. Fore wing length 3.8–5 mm. Antenna in females with 18 to 19 flagellomeres, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with 19 to 20 flagellomeres and with narrow, long tyloids on flagellomeres 7 to 14/15. Face coriaceous, sometimes weakly punctate, especially centrally. Clypeus weakly to strongly excised, with lobes somewhat angulate at outer corners. Mesopleuron partly coriaceous on lower half, mainly smooth and shining on upper half, with some punctures on lower half and along anterior margin. Mesoscutum partly smooth and shining but also finely coriaceous, especially on median part, densely punctate. Hind coxa with hind surface mostly coriaceous and matt. Fore wing areolet closed, vein 3rs-m usually unpigmented. Propodeum with only pleural carina and lateral longitudinal carinae present, coriaceous, smoother on petiolar area. Female metasoma gradually tapered posterior to third segment. First tergite without median dorsal carinae, with longitudinal wrinkles, 1.1–1.3 times longer than wide in females, 1.2–1.5 in males; second tergite basally with some strong longitudinal wrinkles, 0.7–0.85 times as long as wide, second tergite 0.8–1.1 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, with yellow on central face patch which is usually separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, often large shoulder mark, mesepimeron, scutellum laterally and apically. Legs orange, all coxae orange, fore coxa often dark basally, femora orange, hind tibia white with apex, base and a subbasal spot dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow over entire face, scape, pedicel and usually antenna ventrally, propleuron, epicnemium, part of mesosternum and sometimes a stripe on lower mesopleuron, fore and mid coxae, and often basal spots on tergites 3 and 4. Hind coxa apically yellow, basally orange or black.

Material examined. Holotype of *Tryphon nigricornis* Zetterstedt: Norway, Finnmark fylke, Kautokeino. 1♀, at ZIL. Lectotype of *Bassus pumilus* Holmgren: Sweden, Stockholm, leg. Boheman. 1♀, at NRM (hereby designated). Lectotype of *Homocidus brevis* Hedwig: Poland, Kreis Habelschwerdt, Wustung, leg. Hedwig, 9.VIII.1921. 1♂, at NMF (syn. nov.: The male lectotype as designated from the type series by Oehlke (1963) is a male *H. pictus*, while a female paralectotype that I have studied is *H. melanogaster*).

New for Iceland: Skaftafell, leg. Jens Böcher, 23.VII.1961. 1♀, at ZMUC. New for Turkey: Isparta, Sav, 1100m, leg. O.Poyraz, 30.IV.2003. 1♀, at SDU.

Finland (3), France (2), Germany (3), Hungary (6), Iceland (2) Norway (1), Poland (1), Russia (2), Sweden (40), Switzerland (30), Turkey (1), United Kingdom (50).

Distribution. Palaearctic.

Figures. Propodeum (Fig. 14M, 20C), metasoma (Fig. 20H), habitus (Fig. 32A).

Homotropus signatus (Gravenhorst 1829, *Bassus*)

Tryphon compressiventris Cresson 1868
Homotropus hygrobius Thomson 1890
Homotropus bifoveolatus Kriechbaumer 1894
Zootrephes montanus Davis 1895

Diagnosis. Fore wing length 3.5–5.1 mm. Antenna in females with 19 flagellomeres, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with 19 to 21 flagellomeres and with narrow, long tyloids

on flagellomeres 7/8 to 14/15. Face strongly coriaceous, punctures disappearing against the background sculpture. Clypeus strongly excised at least in females, with lobes somewhat angulate at outer corners. Mesopleuron coriaceous at least on lower half, weakly punctate on lower half and along anterior margin. Mesoscutum finely coriaceous, with weak and sparse punctures. Hind coxa with hind surface coriaceous and matt. Fore wing areolet open or closed, if closed then vein 3rs-m usually unpigmented. Propodeum with pleural and lateral longitudinal carinae present, and usually also petiolar area surrounded by carinae or at least indicated by strong rugae (sometimes almost completely carinate), coriaceous and strongly rugose on hind surface. Female metasoma strongly compressed posterior to third segment. First tergite with median dorsal carinae often surpassing middle of tergite, with some longitudinal wrinkles laterally, 1.0–1.5 times as long as wide; second tergite basally with few short longitudinal wrinkles, 0.65–0.8 times as long as wide in females, 0.8–1.2 in males, second tergite 0.8–1.0 times as long as first tergite; spiracle of third tergite on dorsal or lateral part, above or behind lateral fold.

Colouration of females. Antenna bright orange or brown. Head and mesosoma black, with yellow on central face patch which is separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, small to large shoulder mark, mesepimeron; scutellum black. Legs orange, all coxae either orange or black, fore and mid coxae often largely yellow apically, femora orange, hind tibia usually entirely orange, apex and hind tarsus usually not dark. Metasoma black, tergites 2 to 4 or 5 all or mainly orange.

Colouration of males. As in females but additionally with yellow over entire face, scape and pedicel ventrally, antenna usually orange below; mesosoma usually without additional yellow coloration, fore and mid coxae entirely yellow.

Material examined. 11 syntypes of *Homotropus hygrobius* Thomson: Sweden, Skåne. 5♂, 6♀, at ZIL. Paralectotype of *Homotropus bifoveolatus* Kriechbaumer: Spain, Mallorca,leg. Maragues. 1♂, at ZSM.

New for Greece: Col de Metsovo/Metsovo/Pindos, leg. J.Aubert, 6.V.1955. 2♂, 1♀, at MZL.

Finland (2), Germany (3), Greece (3), Hungary (16), Iceland (14), Netherlands (1), Russia (3), Spain (1), Sweden (>100), Switzerland (30), Turkey (1), United Kingdom (50).

Distribution. Holarctic.

Figures. Face ♀ (Fig. 7H), propodeum (Fig. 9D), tip of metasoma and ovipositor sheaths ♀ (Fig. 15I), epicnemical carina (Fig. 16A), habitus (Fig. 32B).

Homotropus strigator (Fabricius 1793, *Ichneumon*) (comb. nov.)

Bassus ruficornis Holmgren 1858 (homonym)

Diagnosis. Fore wing length 4.3–6 mm. Antenna of both sexes with 19 to 20 flagellomeres; in females, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with narrow, long tyloids on flagellomeres 7 to 14. Face strongly coriaceous and distinctly punctate, especially centrally. Clypeus strongly excised, with lobes somewhat angulate at outer corners. Mesopleuron coriaceous and strongly punctate over almost entire surface. Mesoscutum finely coriaceous, especially on median part, strongly and densely punctate. Hind coxa with hind surface smooth and shining but coriaceous and matt on basal half. Fore wing areolet closed, vein 3rs-m pigmented or unpigmented. Propodeum with only pleural carina and lateral longitudinal carinae complete but with transverse carina and often also petiolar carina partly present or at least indicated by strong rugae; coriaceous, more rugose on petiolar area. Female metasoma gradually tapered posterior to third segment. First tergite with median dorsal carinae usually only present basally but sometimes surpassing middle of tergite, with some longitudinal wrinkles, 1.0–1.2 times longer than wide in females, 1.2–1.5 in males; second tergite basally with few short but strong longitudinal wrinkles, 0.5–0.65 times as long as wide in females, 0.65–0.8 in males, second tergite 0.75–0.95 times as long as first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna bright orange. Head and mesosoma black, with yellow on clypeus, mouthparts, hind corner of pronotum, tegula, subtegular ridge, shoulder mark, mesepimeron, scutellum at most with apical spot. Legs orange, all coxae orange, femora orange, hind tibia white with a dark apex and base, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow over entire face, antenna ventrally, most of propleuron, mesosternum and mesopleuron, fore and mid coxae, and often basal spots on tergites 3 and 4.

Material examined. Lectotype of *Bassus ruficornis* Holmgren: Sweden, Östergötland, leg. Boheman.1♀, at NRM (hereby designated).

Additional material. Germany: Isar, leg. Kriechbaumer, 7.IX.1972. 1♀, at ZSM; Einbeck, 30.VI.1968. 1♀, at ZSM; Thüringen, Blankenburg. 1♂, at ZSM. Poland: Trzcianne at Monki, leg. J.Sawoniewicz, 14.VIII.1982. 1♂, at ZSM. Sweden: Gotland 1♀, Småland 1♂, Stockholm 2♂, all leg. Boheman, all at NRM.

Figures. Propodeum (Fig. 20C).

Homotropus sundevalli (Holmgren 1858, *Bassus*) (comb. nov.)

Bassus scabrosus Desvignes 1862

Diagnosis. Fore wing length 5.7–8.2 mm. Antenna of both sexes with 22 to 24 flagellomeres; in females, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with narrow, long tyloids on flagellomeres 7 to 15/16. Face strongly coriaceous and distinctly punctate, especially centrally. Clypeus strongly excised, with lobes somewhat angulate at outer corners. Mesopleuron smooth and shining, very strongly and densely punctate over entire surface. Mesoscutum smooth and shining, strongly and densely punctate. Hind coxa with hind surface smooth and shining, distinctly punctate. Fore wing areolet closed, vein 3rs-m usually pigmented. Propodeum with carination complete and strong although some of the carinae almost disappearing against the strongly rugose background, especially on petiolar area; rugose and very strongly punctate. Female metasoma dorsoventrally depressed. First tergite with very strong median dorsal carinae which clearly surpass middle of tergite, without longitudinal wrinkles, 1.1–1.4 times as long as wide; second tergite basally with some strong longitudinal wrinkles, 0.65–0.9 times as long as wide, second tergite 0.75–0.9 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna bright orange, darker towards apex. Head and mesosoma black, with yellow on central face patch separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, large shoulder mark, upper mesepimeron, small to large spot apically on scutellum or entire scutellum. Legs orange, all coxae black, fore coxa with yellow apex, femora orange, hind tibia yellow or orange with apex dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but additionally with yellow over entire face, antenna ventrally, most of propleuron, mesosternum and often a spot or stripe on lower mesopleuron, fore and mid coxae.

Material examined. Lectotype of *Bassus sundevalli* Holmgren: Sweden, Småland, leg. Boheman.1♀, at NRM.

New for Austria: Tirol, Trins, 1200m, leg. T.Osten, 3.–12.IX.1991. 1♀, at ZSM; Stallburgalm b. Wayer b. St., leg. Martin Schwarz, 4.VIII.1986. 1♀, at ZSM. New for Switzerland: Valais, Vissoye, leg. T.Steck, 14.VII.1908. 1♀, at NMBE; VS, Sierre, leg. Paul, 4.X.1887. 1♀, at NMBE.

Additional material. Germany: Salzburg, Bad Hofgastein, 900m, leg. Martin Schwarz, S.Schiffkorn, 4.IX.1986. 1♀, at ZSM; Goslar a.H., Grauhöfer Holz, leg. E.Bauer, 1.IX.1929. 1♀, at ZSM; Goslar a.H., Haldenstieg, leg. E.Bauer, 18.VIII.1945. 1♂, at ZSM. Sweden: Småland, leg. Boheman.1♂, 1♀, Uppland, 3♀, at NRM.

Distribution. Palaearctic.

Figures. First tergite ♀ (Fig. 14H), habitus (Fig. 32C).

Homotropus tauriscorum Strobl 1903

Diagnosis. Fore wing length 4–4.5 mm. Antenna of both sexes with 21 flagellomeres; in females, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with broadly oval, smooth and shining tyloids on flagellomeres 7 to 13/14. Face strongly coriaceous, punctures disappearing against the background sculpture. Clypeus weakly excised, with lobes rounded. Mesopleuron coriaceous and weakly punctate on lower half, smooth and shining on upper half. Mesoscutum smooth and shining, punctures restricted to front half and margins, often weak. Hind coxa with hind surface very strongly coriaceous and matt. Fore wing areolet

open. Propodeum with carination complete although sometimes almost disappearing against the very strongly rugose background. Female metasoma dorsoventrally depressed. First tergite with median dorsal carinae present at least basally, often with strong longitudinal wrinkles, 1.3 times as long as wide in females, 1.6–1.9 in males; second tergite basally with few longitudinal wrinkles, more so in males, 0.6 times as long as wide in females, 0.8–0.9 in males, second tergite 0.7–0.9 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, with yellow on central face patch separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark, upper mesepimeron, scutellum laterally. Legs yellow, all coxae black, fore and mid coxae with yellow apices, femora yellow or orange with a ventral black stripe, hind tibia yellow with a dark apex and subbasal spot, hind tarsus dark. Metasoma black, tergites 3–4 and apex of tergite 2 all or mainly orange.

Colouration of males. As in females but additionally with yellow over entire face, scape and pedicel ventrally, propleuron, mesosternum and a spot or stripe on lower mesopleuron, all of fore and mid coxae; metasoma as in female or black with often yellow or orange basal spots and usually with orange hind margins on tergites 3, 4 and 5.

Material examined. New for France: Col du Lautaret, N45.0225, E06.2142, 9.VIII.1982. 1♂, 1♀, at ZSM. New for Italy: Südtirol, Ahrntal, St. Peter, 2200m, leg. Haesselbarth, 26.VIII.1967. 1♂, at ZSM.

Distribution. Western Palaearctic.

Homotropus venustus Dasch 1964a

Diagnosis. Fore wing length 3–4.4 mm. Antenna of both sexes with 17 to 19 flagellomeres; in females, apical flagellomeres with multiporous plate sensilla also present ventrally; in males with broadly oval, matt tyloids on flagellomeres 7 to 13/14. Face coriaceous and distinctly punctate, especially centrally. Clypeus strongly excised, with lobes rounded to somewhat angulate at outer corners. Mesopleuron smooth and shining, strongly punctate over more than half the surface, sometimes less so in males. Mesoscutum smooth and shining, strongly punctate. Hind coxa with hind surface smooth and shining between seta roots, coriaceous only basally. Fore wing areolet open or closed, in which case vein 3rs-m is unpigmented. Propodeum with only trace of pleural carina and most of lateral longitudinal carina present, evenly coriaceous, smoother on petiolar area. Female metasoma gradually tapered posterior to second segment. First tergite without median dorsal carinae, without longitudinal wrinkles, 1.0–1.2 times longer than wide; second tergite basally at most with few weak longitudinal wrinkles, 0.55–0.8 times as long as wide, second tergite 0.75–0.9 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, with yellow often on central face patch which is separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, sometimes subtegular ridge, large shoulder mark, sometimes upper mesepimeron, scutellum laterally. Legs orange, all coxae black, fore and mid coxae often with yellow apex, femora yellow or orange with a ventral black stripe, hind tibia white with a dark apex, hind tarsus dark. Metasoma black, tergites 2–3 or 4 all or mainly orange.

Colouration of males. As in females but additionally with yellow along inner orbits and with large central spot, sometimes entire face, scape and pedicel ventrally, sometimes spots on epicnemium, apex or most of fore and mid coxae. Metasoma often dark.

Material examined. Holotype of *Homotropus venustus* Dasch: USA, Idaho, Hollister, 23.X.1930. 1♀, at USNM. Paratype: USA, Utah, Strbry Daniel Pass, leg. H.M.G. & D. Townes, 19.VI.1948. 1♂, at AEI.

New for Turkey: Hakkari, 10 km NE Oramar, 1700m, leg. Max Schwarz, 29.VI.1985. 1♀, at ZSM.

Additional material. Mongolia: Central aimak; South East of Somon Bajanzogt; 1600 m, leg. Dr.Z.Kaszab, 11.VI.1966. 5♂, at TMA. Russia: East Siberia, 10 km East of Irukutsk, leg. Berlov, 26.VIII.2005. 1♂, at MR.

Distribution. Holarctic.

Figures. Antenna ♂ (Fig. 20I).

Homotropus vitreus Dasch 1964a

Diagnosis. Fore wing length 3.4–4.3 mm. Antenna of both sexes with 20 to 21 flagellomeres; in females, apical

flagellomeres with multiporous plate sensilla also present ventrally, although sparse; in males with narrow, short or long and sometimes hardly visible tyloids on flagellomeres 8 to 10/11. Face strongly coriaceous, punctures disappearing against the background sculpture. Clypeus weakly excised, with lobes somewhat angulate at outer corners. Mesopleuron mainly smooth and shining, with very weak and irregular sculpture and punctures on lower half. Mesoscutum entirely smooth and shining, completely unsculptured except for some punctures along anterior margin. Hind coxa with hind surface strongly coriaceous and matt. Fore wing areolet closed, vein 3rs-m unpigmented, veins of very light colour. Propodeum with pleural carina and apical part of lateral longitudinal carina present and strong, remaining carinae usually at least indicated by strong rugae; rugose, smoother on petiolar area. Female metasoma dorsoventrally depressed. First tergite with median dorsal carinae present only basally or sometimes surpassing middle of tergite, with some longitudinal wrinkles laterally, 1.4–1.75 times longer than wide; second tergite basally and laterally with some strong longitudinal wrinkles, 0.7–0.9 times as long as wide, second tergite 0.8–0.9 times length of first tergite; spiracle of third tergite on dorsal part, above lateral fold.

Colouration of females. Antenna bright orange. Head and mesosoma black, with yellow on central face patch which is broadly separated from yellow on clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark, upper mesepimeron; scutellum black. Legs orange, fore and mid coxae yellow with dark bases, hind coxa black on basal half, yellow apically, femora orange, hind tibia orange, hind tarsus usually not dark. Metasoma black, tergites 2 partly, 3–4 all or mainly orange.

Colouration of males. As in females but additionally with yellow over entire face, antenna ventrally, part of propleuron, epicnemium and a stripe on lower mesopleuron, all of fore and mid coxae, and often basal spots or bars on tergites 3 and 4.

Material examined. Holotype of *Homotropus vitreus* Dasch: USA, Oregon, Cannon Beach, leg. H. & M. Townes, 6.VIII.1940. 1♀, at AEI.

New for Finland: Ks Kuusamo 7353:609, leg. M.Koonen, 3.VII.1979. 1♀, at RJ.

Additional material. Sweden: Västerbotten, Vindelns kommun, Kubäckslidens försökspark, Kulbäcken meadow, birch wood on fine alluvial sediments, N64°11.413', E19°36.342', leg. SMTP, 01.IX.–22.IX.2003. 1♂, 1♀; Västerbotten, Umea kommun, Holmön. Blueberry spruce forest next to pasture, N63°47.379', E20°50.921, leg. SMTP, 03.VIII.–04.IX.2004. 1♀; all at NRM. Kiruna, 16.VII.1969: 2♂, 19.VII.1969. 1♀, 29.VII.1969. 1♂, all at ZSM.

Distribution. Holarctic.

Figures. Habitus (Fig. 32D).

Phthorima Förster 1869

Phthorimus Thomson 1890

Type species. *Bassus compressus* Desvignes 1856

Diagnosis. Females of *Phthorima* can readily be identified by their strongly compressed metasoma and concave hind margins of the tergites in combination with a closed fore wing areolet. Males are more difficult to separate from some species of *Homotropus*, but their face is distinctly less coriaceous and with smooth and shining areas between the distinct punctures.

Face coriaceous and matt but with some shining areas and distinctly punctate, without vertical impressions, in females entirely black or with a yellow central patch, in males entirely yellow. Clypeus with apical margin thin, except in *P. picta* with a preapical impression rendering basal three-quarters concave. Antenna with apical flagellomeres longer than wide, in males with linear, narrow tyloids, without long setae. Mesoscutum without notauli; smooth and shining, strongly punctate, yellow shoulder marks present or absent; mesopleuron smooth and strongly punctate, especially on lower half; epicnemial carina complete ventrally. Propodeum with a full set of carinae enclosing basal, petiolar and lateral areas, or with carinae partly reduced; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet present, but vein 3rs-m often unpigmented; hind wing with 2–4 basal hamuli. Hind tibia orange or brown, or white with subbasal and apical brown bands in *P. picta*. Female metasoma strongly compressed from apex of third segment, knife-like, tergites 3 to 6 with hind margins concave, extending further back laterally than dorsally; tergites without transverse impressions. First tergite with median

dorsal carinae, if present, broadly separated. Second tergite with spiracle dorsal, above lateral fold, third tergite with spiracle usually above but sometimes below the fold. Metasoma black or obscurely brown. Ovipositor sheaths 0.3 times as long as hind tibia, parallel-sided and fully enclosing ovipositor. Males with tergites 9 and 10 as separate sclerites, sternite 9 about 1.5 times wider than long, emarginated apically, thus forming two lobes, their outer corners rounded.

Phylogeny. *Phthorima* clustered with *Bioblapsis* in a molecular phylogenetic analysis, in a clade also including some *Homotropus* species. However, this grouping was not strongly supported. More data and denser taxon sampling are needed to confirm the monophyly and closest relatives of this genus. Morphologically, the genus is rather uniform, with *P. picta* being the most distinctive species.

Distribution. Holarctic. Besides the four Western Palaearctic species, two have been described from the Eastern Palaearctic and five have been recorded from the Nearctic only.

Biology. All reliable host records for this genus are from the syrphine tribe Pipizini (Fitton & Boston 1988).

Key to species

1. Malar space with a deep subocular sulcus (Fig. 21A). Clypeus with a subbasal impression rendering the apical three-quarters concave (Fig. 21A). Male with tyloids on flagellomeres 6 or 7 to 10 or 11. Hind tibia whitish with subbasal and apical light brown bands . . . . . *Phthorima picta* (Habermehl)
- Malar space with subocular sulcus absent or present only as coriaceous sculpture (Fig. 21B). Clypeus with a subapical impression, rendering the basal three-quarters convex (Fig. 21B). Male with tyloids at least on flagellomeres 7–14/15. Hind tibia orange or brown 2
2. Propodeum with carinae incomplete; basal and petiolar areas not enclosed by full set of carinae. Scutellum usually marked with yellow. Fore and mid coxae in females often yellow . . . . . *Phthorima xanthaspis* (Thomson)
- Propodeum with carinae distinct, delimiting basal and petiolar areas. Scutellum often black but sometimes yellow, especially in males. Coxae in females orange or black 3
3. Second metasomal tergite at least 1.5 times longer than basally wide, punctate only to middle, second half smooth or only very sparsely punctate, the punctures separated by several times their diameter. Third tergite with punctures restricted to anterior margin, front half smooth and shining. Coxae usually entirely orange but sometimes black. . . . . *Phthorima compressa* (Desvignes)
- Second metasomal tergite shorter than or as long as wide, punctate almost to apex and with second half finely sculptured and matt. Third tergite coriaceous sculpture and densely punctate over entire length of tergite. Coxae black. . . . . *Phthorima obscuripennis* (Hedwig)

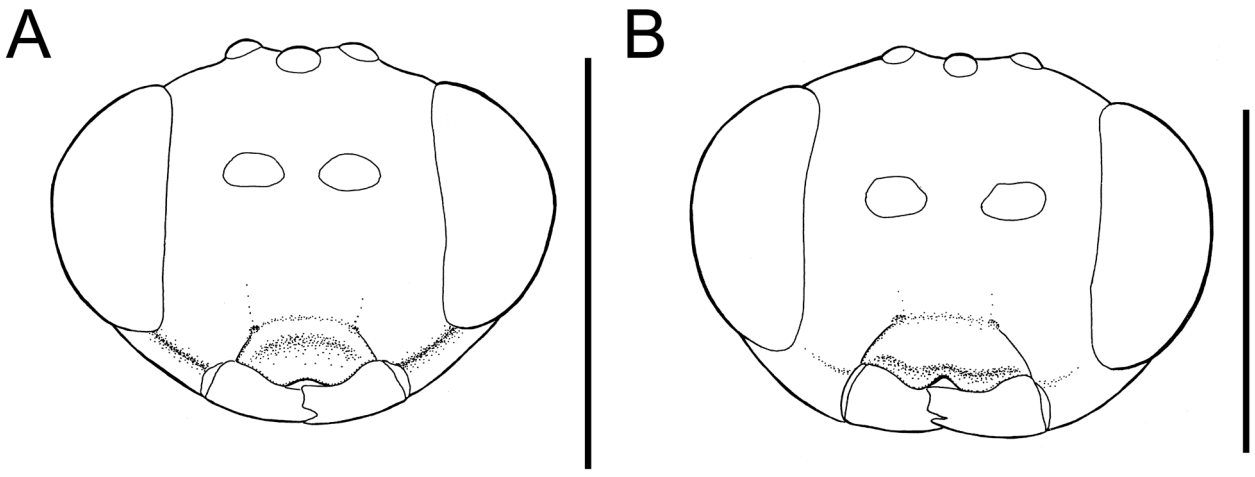

FIGURE 21. Faces of *Phthorima* species showing the grove in the malar space and the shape of the clypeus. A. *Phthorima picta*. B. *Phthorima compressa*. Scale bars represent 500 μm.

Phthorima compressa (Desvignes 1856, *Bassus*)

Bassus ibalioidis Kriechbaumer 1878
Homotropus niger Morley 1906

Diagnosis. Fore wing length 3.5–4.8 mm. Antenna in females with 17 to 18 flagellomeres, in males with 19 to 20 flagellomeres and with narrow, long tyloids on flagellomeres 7 to 14/15. Face without a sulcus between compound eye and base of mandible, at most with a change in sculpture instead. Clypeus with a subapical depression, rendering the basal three-quarters convex. Scutellum usually black but sometimes with varying yellow colouration, especially in males. Propodeum with carination complete and strong. Second metasomal tergite at least 1.5–1.7 times longer than basally wide, densely punctate and coriaceous sculpture restricted to basal third, third tergite mostly smooth and shining, with very sparse punctures basally and weakly coriaceous sculpture close to apex.

Colouration of females. Antenna black. Head and mesosoma black, face with or without a very small yellow central face patch, orange on clypeus and mouthparts, yellow on hind corner of pronotum, tegula, and sometimes upper mesepimeron; scutellum black. Legs orange, coxae usually orange, but hind coxa sometimes black; femora orange; hind tibia orange to brown, often somewhat dark apically, hind tarsus dark orange. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, large shoulder mark, subtegular ridge, variable proportion of epicnemium and mesosternum. Scutellum sometimes marked with yellow. Fore and mid coxae largely yellow.

Material examined. Holotype of *Homotropus niger* Morley: United Kingdom, Norfolk, Wroxham, Wroxham Broad, leg. Morley, 14.VII.1901. 1♂, at BMNH. Holotype of *Bassus ibalioidis* Kriechbaumer: Germany, München, Hochstätt bei Rosenheim, leg. Kriechbaumer, 13.–23.IX.1869. 1♀, at ZSM.

New for Norway: Sarpsborg, Rakil i Tune, 32V PL 1963-7503, leg. T.J.Olsen, 30.VI.2005. 1♂, at MR. New for Turkey: Isparta, Egridir, Kasnakmesesi, 1600m, leg. F. Gürbüz, 9.IX.2004. 1♂, at SDU.

Hungary (2), Norway (1), Sweden (16), Switzerland (40), Turkey (1), United Kingdom (1).

Distribution. Holarctic.

Figures. Metasoma ♀ (Fig. 14A), face (Fig. 21B), habitus (Fig. 32E).

Phthorima obscuripennis (Hedwig 1938, *Homocidus*)

Diagnosis. (Male unknown). Fore wing length 3.8–4.3 mm. Antenna with 17 flagellomeres. Face without a sulcus between compound eye and base of mandible, at most with a change in sculpture instead. Clypeus with a subapical depression, rendering the basal three-quarters convex. Propodeum with carination complete. Second metasomal tergite as long as basally wide, with punctures and coriaceous sculpture surpassing basal half, third tergite punctate and with coriaceous sculpture on its entire length.

Colouration of females. Antenna black. Head and mesosoma black, face with or without a very small yellow central face patch, orange on clypeus and mouthparts, yellow on hind corner of pronotum, tegula, and sometimes upper mesepimeron; scutellum black or marked with yellow. Legs orange, coxae and trochanters mostly black; femora orange; hind tibia orange to brown, often dark apically, hind tarsus dark. Metasoma black.

Material examined. Holotype of *Homocidus obscuripennis* Hedwig: Poland, Kreis Habelschwerdt, Wustung, leg. Hedwig, 30.VII.1921. 1♀, at NMF.

New for Sweden: Stockholm, leg. Malaise, 2.VIII.. 2♀, at NRM. New for Switzerland, Vaud, Le Jorat, 850m, N46.589, E6.7079, leg. J.de Beaumont, 15.IX.1956. 1♀, at MZL; Neuchâtel, Rochefort, La Tourne, 1200m, N46.99, E6.7879, leg. J.de Beaumont, 17.VIII.1955. 1♀, at MZL; Valais, Champéry, Col de Bretolet 1900m, N46°8.541, E6°47.727, leg. H.Baur, 1.VIII.2007. 1♀, at NMBE.

Distribution. Palaearctic.

Phthorima picta (Habermehl 1925, *Phthorimus*)

Phthorima gaullei Seyrig 1928

Diagnosis. Fore wing length 3.8–4.4 mm. Antenna in females with 16 to 17 flagellomeres, in males with 17

flagellomeres and with narrow, long tyloids on flagellomeres 7 to 10/11. Face with a deep sulcus between compound eye and base of mandible. Clypeus with a subbasal impression, rendering the apical three-quarters concave. Propodeum with carination complete, but some carinae often partly replaced by strong rugae. Second metasomal tergite 1.45–1.55 times longer than wide, with irregular sculpture and punctures, third tergite smooth with inconspicuous background sculpture.

Colouration of females. Antenna black. Head and mesosoma black, face with a large yellow central face patch which is often confluent with yellow clypeus, yellow on mouthparts, hind corner of pronotum, tegula, large shoulder mark and supper mesepimeron; scutellum with a yellow margin or entirely yellow. Legs orange, coxae orange, fore and sometimes mid coxae yellow; femora orange; hind tibia whitish with a brown apex and subbasal marking, hind tarsus dark, first tarsomere white basally. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, large shoulder mark with the inner corner extended over part of mesoscutum, subtegular ridge, varying proportion of epicnemium and mesosternum, and a broad stripe on lower mesopleuron. Fore, mid and sometimes hind coxae largely yellow.

Material examined. New for Sweden: Norrbottens Län, Gällivare kommun, Ätnarova försökspark, Pelttovaara, Vaccinium vitis-idaea pine wood, N67°03.103', E20°23.154', leg. SMTP, 30.VI.–08.VII.2004. 1♀, at NRM.

Additonal material: Germany: Salzburg, Flachgau, Hagenau, leg. F.Maierhuber, 2.IX.1978. 1♀, at ZSM. Netherlands: Asperen, leg. K.Zwakhals, 17.VI.1973. 1♀, at KZ; Wageningen, ex. *Cnemodon* sp., leg. Evenhuis, VIII.1958. 1♂, 2♀, at ZSM. Poland: Warszawa, MDM, Tilia cordata, yellow trap, leg. J. Sawoniewicz, 9.–14.VIII.1976. 1♀, at ZSM.

Figures. Face (Fig. 21A), habitus (Fig. 32F).

Phthorima xanthaspis (Thomson 1890, *Homotropus*)

Diagnosis. Fore wing length 4.1–5.6. Antenna in females with 17–18 flagellomeres, in males with 19 flagellomeres and with narrow, long tyloids on flagellomeres 7 to 13/14. Face without a sulcus between compound eye and base of mandible, at most with a change in sculpture instead. Clypeus with a subapical depression, rendering the basal three-quarters convex. Propodeum with carination incomplete. Second metasomal tergite 1.0–1.4 times longer than wide, with punctures and coriaceous sculpture surpassing basal half, third tergite punctate and with coriaceous sculpture on its entire length.

Colouration of females. Antenna black. Head and mesosoma black, face with or without a small yellow central face patch, orange or yellow on clypeus and mouthparts, yellow on hind corner of pronotum, tegula, often subtegular ridge and upper mesepimeron; scutellum entirely yellow or with yellow margins. Legs orange, coxae usually orange, but fore coxa sometimes yellow; femora orange; hind tibia orange to yellow, hind tarsus dark orange. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, large shoulder mark often with the inner corner extended over part of mesoscutum, varying proportion of epicnemium, mesosternum, and a broad stripe on lower mesopleuron. Fore and mid coxae largely yellow. Metasoma often with yellow marks basolaterally on third tergite.

Material examined. New for Finland: V Turku, Pikisaari 671:23, leg. M. Mikkola, 28.VI.–26.VII.2001. 1♀, at RJ. New for Switzerland: Valais, leg. Steck. 1♀, at NMBE.

Finland (1), Germany (6), Sweden (5), Switzerland (1).

Distribution. Western Palaearctic.

Figures. Male terminal sclerites (Fig. 37J).

Promethes Förster 1869

Liopsis Förster 1869
Promethus Thomson 1890

Type species. *Bassus sulcator* Gravenhorst 1829

Diagnosis. *Promethes* species have a very smooth and shining face, punctate or impunctate, with two vertical impressions arising from the tentorial pits, a character that they only share with most *Sussaba* species. *Promethes* species can readily be distinguished from *Sussaba* by having the spiracle of the second tergite above the lateral fold.

Face smooth and shining, sometimes weakly punctate around seta roots, with strong vertical impressions, in females entirely black or with a yellow central patch, in males entirely yellow. Clypeus with apical margin thin, with a basal elevation that makes it flat or concave in profile. Antenna with apical flagellomeres wider than long or longer than wide, in males with linear, narrow tyloids, without long setae. Mesoscutum with notauli comparatively long, reaching one third of length of mesoscutum, sometimes shallow; smooth and shining with very weak punctures in *P. bridgmani* and *P. sulcator*, more densely punctate in remaining species, yellow shoulder marks present or absent; mesopleuron usually entirely smooth and shining, weakly punctate only on lower half but sometimes (*P. nominiguis*) densely punctate and rugose sculpture; epicnemial carina complete ventrally. Propodeum with a full set of carinae enclosing basal, petiolar and lateral areas; propodeal spiracle inconspicuous; scutellum usually carinate to middle. Fore wing areolet absent; hind wing often with 1 (*P. bridgmani* and *P. sulcator*) but sometimes with 2 or 3 (*P. melanaspis*, *P. nigriventris* and *P. nominiguis*) basal hamuli. Hind tibia orange to brown or white with a dark apex. Female metasoma dorsoventrally depressed, or apically weakly compressed in *P. melanaspis* and *P. nigriventris*; tergites without transverse impressions and with hind margins convex. First tergite with median dorsal carinae not reaching apex of tergite but often longitudinally striate. Second tergite with spiracle dorsal, above lateral fold, third tergite with spiracle below or behind the fold. Metasoma orange on tergites 2 to 5 or 6, or entirely black, in males often with yellow markings. Ovipositor sheaths 0.3 times as long as hind tibia, slender, slightly tapered and fully enclosing ovipositor, slightly compressed, with inconspicuous setae ventrally and apically. Males with tergites 9 and 10 fused as a syntergum, sternite 9 longer than wide, as a single lobe, outer corners rounded.

Phylogeny. *Promethes* is part of the *Sussaba* genus group. Many molecular and morphological characters support this placement, for instance the unilobate male ninth sternite. The four Western Palaearctic species were confirmed to be monophyletic by molecular methods; they share a three-base-pair deletion (or lack the corresponding insertion) in the mitochondrial NADH1 gene not found in any other diplazontine genus.

Distribution. Holarctic, Oriental and Neotropical. The fifteen species currently recognized in this genus are mostly Holarctic, but four species have been recorded from the Oriental region, and one from the Neotropics. Further sampling of the Afrotropical and Australasian regions might well expand our current knowledge about the distribution of this genus.

Biology. While nothing is known about the host relations of most species, *P. sulcator* had been reared from a variety of hosts of the tribe Syrphini, thus showing a comparatively broad polyphagy.

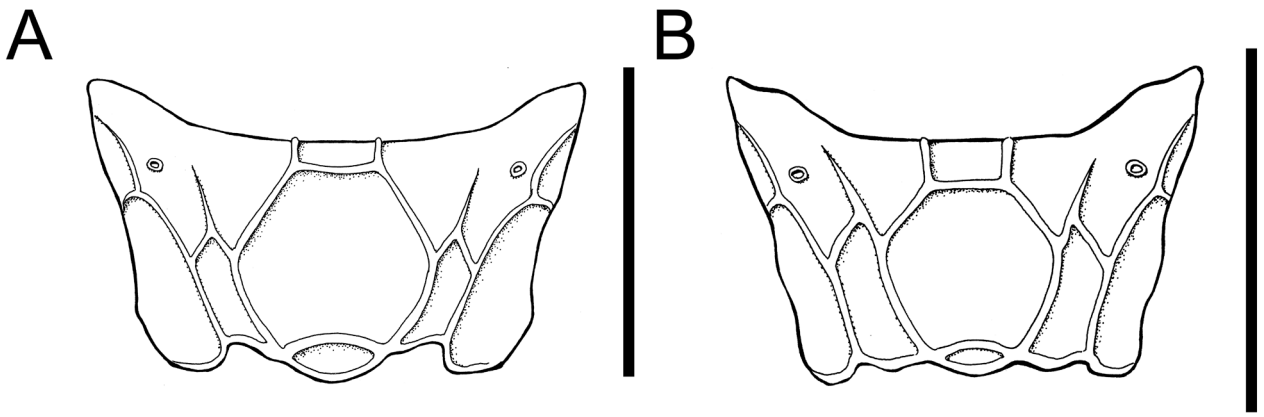

FIGURE 22. Propodea of *Promethes* species showing carination and shape of the different areas. A. *Promethes nigriventris*. B. *Promethes melanaspis*. Scale bars represent 500 µm.

Key to species

1. Antenna orange or brown, long and slender, with 22 or more flagellomeres; first flagellomere more than 5 times as long as wide. Hind tibia orange or yellow, apex sometimes dark. Metasoma in females and often also in males marked with orange on at least some of tergites 2 to 5 2
- Antenna black or sometimes brown, stouter, with 22 or fewer flagellomeres; first flagellomere at most 4.5 times as long as wide. Hind tibia white or yellow with a dark subbasal and apical band. Metasoma in females entirely black, in males often with yellow markings 3
2. Malar space with a deep subocular groove (Fig. 21A). Scutellum yellow-marked . . . . . *Promethes bridgmani* Fitton
- Malar space without subocular groove (Fig. 21B). Scutellum black . . . . . *Promethes sulcator* (Gravenhorst)
3. Second metasomal tergite rugose, matt, wider than long. Mesopleuron distinctly punctate over most of its surface. Petiolar area of propodeum filled with carinulae. Females with metasoma dorsoventrally depressed to apex . . . . . *Promethes nominiguis* Dasch
- Second metasomal tergite smooth and shining at least on apical half, basally with longitudinal wrinkles, longer than wide. Mesopleuron with punctures weak, distinct at most on lower half. Petiolar area of propodeum mostly smooth, with carinulae restricted to its margins. Females with metasoma laterally compressed. 4
4. Scutellum with a large yellow blotch covering most of its surface. Mesoscutum with large yellow shoulder marks which usually expand over notauli. Basal area of propodeum usually more than 2.5 times wider than long, with apical carina often partly reduced (Fig. 22A) . . . . . *Promethes nigriventris* (Thomson)
- Scutellum usually black but sometimes marked with yellow on anterior part, especially in males. Mesoscutum without or at most with small yellow shoulder marks which do not expand over notauli. Basal area of propodeum usually less than 2 times wider than long, with apical carina strong (Fig. 22B). . . . . *Promethes melanaspis* (Thomson)

Promethes bridgmani Fitton 1976

Bassus scutellaris Bridgman 1886

Diagnosis. Fore wing length 4.5–5.5 mm. Antenna with 22–24 flagellomeres in both sexes, first flagellomere 5 to 5.9 times longer than wide; in males with narrow, long tyloids on flagellomeres 7 to 10/11. Face with a deep sulcus between compound eye and base of mandible that continues along hind margin of compound eye. Mesopleuron with punctures weak, distinct at most on lower half. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas; basal area about as long as wide, enclosed by strong carinae; petiolar area mostly smooth, with some irregular wrinkles close to its margins. Tergite 2 with longitudinal wrinkles basally, remainder smooth and shining. Females with metasoma slightly laterally compressed and tapered apically.

Colouration of females. Antenna orange or brown. Head and mesosoma black, face with yellow central face patch often confluent with yellow clypeus, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, and upper mesepimeron; without yellow shoulder marks; scutellum mainly yellow. Legs orange, coxae yellow; femora orange; hind tibia and tarsus orange or brown. Metasoma orange on tergites 2 to 5 or 6, often dark basally on tergite 2 and on median part of following tergites.

Colouration of males. As in females but with yellow ventrally on antenna and entire face. Metasoma as in female, or black with yellow spots basolaterally on tergites 3 to 5.

Material examined. Finland (1), Germany (1), Sweden (5), Switzerland (20), United Kingdom (40).

Distribution. Western Palaearctic.

Figures. Habitus (Fig. 33A).

Promethes melanaspis (Thomson 1890, *Promethus*)

Promethes nigriventris nigroscutellata Habermehl 1925
Promethes gravenhorsti Dasch 1964a

Diagnosis. Fore wing length 4.4–6.2 mm. Antenna with 19–22 flagellomeres in both sexes, first flagellomere 3.7–4.6 times longer than wide; in males with narrow, long tyloids on flagellomeres 6/7 to 10. Face without a sulcus between compound eye and base of mandible, at most with a change in sculpture instead. Mesopleuron with punctures weak, distinct at most on lower half. Propodeum with basal area about 2 times wider than long, apical carina usually complete; petiolar area mostly smooth, with some irregular wrinkles close to its margins. Tergite 2

with longitudinal wrinkles basally, remainder smooth and shining, wrinkles more extended in males. Females with metasoma laterally compressed and tapered from tergite 3 to apex.

Colouration of females. Antenna black. Head and mesosoma black, face sometimes with a small yellow central face patch, yellow on part of clypeus, mouthparts, hind corner of pronotum, tegula, subtegular ridge, and upper mesepimeron; at most with small yellow shoulder marks; scutellum black. Legs orange, coxae orange, fore coxa sometimes yellow; femora orange; hind tibia white with a dark apex and a subbasal dark band, hind tarsus dark, first segement white basally. Metasoma black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, antenna often orange below, yellow over entire face, propleuron, often large shoulder mark, varying portions of epicnemium and mesosternum, often lower mesopleuron; scutellum usually black but rarely with light spots on basolateral corners. Coxae usually yellow, hind coxa sometimes partly orange. Metasoma with yellow anterolateral spots on tergites 3 and sometimes 4.

Material examined. Holotype of *Promethus melanaspis* Thomson: Germany, Bayern, between Ebenhausen and Pullach, leg. Kriechbaumer, 12.VIII.1885. 1♀, at ZSM.

New for France: Col-des-Montets, 24.VII.1975. 1♂, at ZSM. New for Slowakia: Low Tatra, Maluziná, 750m, leg. K.Zwakhals, 11.VII.1982. 1♀, at KZ.

Austria (2), Finland (7), France (1), Germany (1), Hungary (1), Norway (1), Russia (1), Slowakia (1), Sweden (7), Switzerland (13).

Distribution. Holarctic.

Figures. Propodeum (Fig. 22B), habitus (Fig. 33B).

Promethes nigriventris (Thomson 1890, *Promethus*)

Diagnosis. Fore wing length 4.6–5.9 mm. Antenna with 20–21 flagellomeres in both sexes, first flagellomere 3.2–4.4 times longer than wide; in males with narrow, long tyloids on flagellomeres 6/7 to 10. Face without a sulcus between compound eye and base of mandible, at most with a change in sculpture instead. Mesopleuron with punctures weak, distinct at most on lower half. Propodeum with basal area more than 2.5 times wider than long, apical carina partly reduced, much weaker than longitudinal carinae; petiolar area mostly smooth, with some irregular wrinkles close to its margins. Tergite 2 with longitudinal wrinkles basally, remainder smooth and shining, wrinkles more extended in males. Females with metasoma laterally compressed and tapered from tergite 3 to apex.

Colouration of females. Antenna black. Head and mesosoma black, face sometimes with a small yellow central face patch, yellow on part of clypeus, mouthparts, hind corner of pronotum, tegula, subtegular ridge, and upper mesepimeron; usually with very large yellow shoulder marks that stretch across the notauli; scutellum mostly yellow. Legs orange, coxae orange, fore coxa sometimes yellow; femora orange; hind tibia white with a dark apex, usually without a subbasal dark band, hind tarsus dark, first segement white basally. Metasoma black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, antenna often orange below, yellow over entire face, propleuron, often large shoulder mark, varying portions of epicnemium and mesosternum, often lower mesopleuron; scutellum usually black but rarely with light spots on basolateral corners. Coxae usually yellow, hind coxa sometimes partly orange. Metasoma with yellow anterolateral spots on tergites 3 and sometimes 4.

Material examined. Lectotype of *Promethus nigriventris* Thomson: Sweden, Halland, Östra Karup. 1♀, at ZIL.

New for Bulgaria: Sofia, 9.VII.1970. 1♀, at ZSM.

Bulgaria (1), Germany (2), Hungary (1), Sweden (2), Switzerland (9).

Distribution. Palaearctic.

Figures. Propodeum (Fig. 22A).

Promethes nominingui Dasch 1964a

Diagnosis. Fore wing length about 6.5 mm. Antenna in females with 18–19 flagellomeres, first flagellomere about 3.5 times longer than wide; in males with 19 to 20 flagellomeres and with narrow, long tyloids on flagellomeres 5/

6 to 11. Face without a sulcus between compound eye and base of mandible, at most with a change in sculpture instead. Mesopleuron distinctly punctate over most of its surface. Propodeum with basal area more than 2.5 times wider than long, apical carina complete; petiolar area filled with carinulae. Tergite 2 rugose and matt over entire surface. Females with metasoma dorsoventrally depressed to apex.

Colouration of females. Antenna brown. Head and mesosoma black, yellow or orange on part of clypeus, mouthparts, hind corner of pronotum, tegula, and upper mesepimeron; with or without a small shoulder mark; scutellum black or with a yellow apical spot. Legs orange, coxae orange, femora orange; hind tibia white with a dark apex and a subbasal dark band, hind tarsus dark, first tarsomere white basally. Metasoma largely black but with hind margins of anterior tergites sometimes reddish.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, antenna often orange below, yellow over entire face, propleuron, often large shoulder mark, varying portions of epicnemium and mesosternum, often lower mesopleuron; scutellum usually yellow. Fore and mid coxae usually yellow.

Material examined. New for Sweden: Kvikkojokk, 10.VII.1964. 1♀, at ZSM.

Distribution. Canada and Sweden.

Notes. This is a very rare species and was known only from four specimens from Canada (Dasch 1964a). A single female has recently been collected in Sweden. The description of the male follows Dasch (1964a).

Promethes sulcator (Gravenhorst 1829, *Bassus*)

Bassus areolatus Holmgren 1856
Orthopelma anomalum Taschenberg 1865
Bassus longicornis Provancher 1883
Bassus aciculatus Provancher 1888 (homonym)
Bassus auriculatus Provancher 1888
Promethus dodsi Morley 1906
Promethes splendidus Dasch 1964a

Diagnosis. Fore wing length 3.9–5.3 mm. Antenna with 22–24 flagellomeres in both sexes, first flagellomere 5 to 5.9 times longer than wide; in males with narrow, long tyloids on flagellomeres 7 to 10/11. Face without a sulcus between compound eye and base of mandible, at most with a change in sculpture instead. Mesopleuron with punctures weak, distinct at most on lower half. Propodeum with basal area 1.5 times wider than to as wide as long, enclosed by strong carinae; petiolar area mostly smooth, with some irregular wrinkles close to its margins. Tergite 2 with longitudinal wrinkles basally, remainder smooth and shining. Females with metasoma slightly laterally compressed and tapered apically.

Colouration of females. Antenna orange or brown to black. Head and mesosoma black, face with or without yellow central face patch, yellow on mouthparts, hind corner of pronotum, tegula, usually subtegular ridge, and upper mesepimeron; without yellow shoulder marks; scutellum black. Legs orange, coxae yellow; femora orange; hind tibia and tarsus orange or brown. Metasoma orange on tergites 2 to 4, 5 or 6, often dark basally on tergite 2 and on median part of tergites.

Colouration of males. As in females but with yellow ventrally on antenna and entire face. Metasoma as in females, but tergites often dark medially.

Material examined. Lectotype of *Bassus areolatus* Holmgren: Sweden, Småland, leg. Boheman. 1♀, at NRM (hereby designated).

New for Tadzhikistan: Chimbulak, 40 km S from Dushanbe, leg. Osipov, 7.–11.VI.2003. 1♀, at MR.

Finland (12), Germany (2), Norway (2), Russia (3), Sweden (>100), Switzerland (80), Tadzhikistan (1), Ukraine (1), United Kingdom (30).

Distribution. Holarctic and Oriental.

Figures. Metasomal segments 1–3 (Fig. 11B), head (Fig. 12E), habitus (Fig. 33C).

Sussaba Cameron 1909

Type species. *Sussaba bicarinata* Cameron 1909

Diagnosis. *Sussaba* species have the spiracle of the second tergite on the laterotergite, a character they only share with the very rare *Episemura* and *Eurytyloides*, which in contrast both have concave hind margins of the tergites in females. Males of *S. punctiventris* and *S. placita* can be difficult to distinguish from *Episemura* males, but the latter have very short tyloids that extend over less than half of the length of the respective flagellomeres, while *Eurytyloides* males have oval tyloids on the first two or three flagellomeres.

Face in most species largely smooth and shining with some restricted coriaceous areas and sometimes strong punctures around seta roots, with vertical impressions, but sometimes (*S. punctiventris* and *S. placita*), the face is entirely coriaceous and matt and without vertical impressions; female face entirely black or with a yellow central patch, in males usually entirely yellow, sometimes with two black lines between antennal sockets and clypeus. Clypeus with apical margin thin, flat or with a basal elevation that makes it concave in profile. Antenna with apical flagellomeres wider than long or longer than wide, in males with or without tyloids; when present, tyloids linear and narrow, drop-shaped or oval tyloids (this genus shows an unparalleled variation in tyloid morphology); without long setae. Mesoscutum with notauli absent or weakly indicated; sculpture various, smooth and shining with punctures restricted to anterior margin, or smooth with small punctures, or largely coriaceous; yellow shoulder marks present or absent; mesopleuron entirely smooth and shining to strongly punctate or coriaceous on lower half; epicnemial carina complete ventrally. Propodeum with a full set of carinae enclosing basal, petiolar and lateral areas; propodeal spiracle inconspicuous; scutellum with carinae reaching beyond middle. Fore wing areolet absent; hind wing with 1 basal hamulus. Hind tibia orange to brown. Female metasoma continuously tapered to strongly compressed from apex of third segment, tergites in both sexes with hind margins convex or straight, without transverse impressions. First tergite without median dorsal carinae. Second and third tergites with spiracles on laterotergite, below lateral fold. Metasoma entirely black or variously marked with orange and yellow. Ovipositor sheaths 0.3 times as long as hind tibia, slender, slightly tapered and fully enclosing ovipositor at tip, slightly compressed, with inconspicuous setae ventrally and apically. Males with tergites 9 and 10 fused as a syntergum, sternite 9 longer than wide, as a single lobe, outer corners rounded.

Phylogeny. *Sussaba* probably represents a monophyletic entity although the phylogenetic positions of *Episemura* and *Eurytyloides* still require clarification. The genus splits into three clades, the pair *S. punctiventris* and *S. placita* with a strongly coriaceous face, the very stout species *S. erigator* and *S. roberti*, and finally the remaining species. These three clusters are supported by both morphological and molecular evidence, but their inter-relationships remain unresolved. The genus is morphologically most closely related to *Episemura* and *Eurytyloides*, two genera that were not included in a recent molecular phylogenetic analysis of the group. The placement of these three genera together with *Promethes* in a genus-group is supported by the shape of the male ninth sternite.

Distribution. Holarctic, Oriental and Neotropical. The about 35 species currently recognized in this genus are mostly Holarctic and Neotropical, and four species have been recorded from the Oriental region. Further sampling of the Afrotropical and Australasian regions might well expand our current knowledge about the distribution of this genus.

Biology. Some species have been reared from Pipizini, some from Syrphini (Rotheray 1984; Bordera *et al.* 2000).

Key to species

1. Face entirely coriaceous and matt, with punctures indistinct. Metasoma entirely black or with yellow markings 2
- Face mostly smooth and shining, usually punctate, with coriaceous areas restricted to inner orbits and central elevation. Metasoma often extensively marked with orange but sometimes black 3
2. Female with flagellomeres 10 to 20 ventrally with conspicuous areas bearing a short velvety pile and lacking multiparous plate sensilla (cf. Fig. 5). Male with tyloids on flagellomeres 6 to 8. In female, all trochanters marked with black. Male with main part of pronotum and mesosternum black . . . . . *Sussaba placita* Dasch
- Female antenna with multiporous plate sensilla present also ventrally on apical flagellomeres, without conspicuous velvety areas. Males with tyloids on flagellomeres 6 or 7 to 11 or 12. Females with fore and mid trochanters yellow. Males with pronotum and mesosternum mainly yellow . . . . . *Sussaba punctiventris* (Thomson)
3. Female (face mainly black, often with a yellow central spot; antenna without tyloids; slender ovipositor sheaths protruding) . . . 4
- Male (face mainly or entirely yellow; antenna usually with tyloids; stout parameres usually concealed in apex of metasoma) 12
4. Antenna with 16 or fewer flagellomeres. Mesopleuron and face distinctly punctate 5

- Antenna with 17 or more flagellomeres. Mesopleuron and face usually smooth and impunctate, or partly coriaceous 6
5. Mesoscutum centrally entirely smooth and mostly impunctate, at most with some very sparse, irregular punctures, and punctate anteriorly. Antenna with 14/15 flagellomeres. Metasoma compressed from third segment, broadest part is at apex of second tergite (Fig. 23A). Face conspicuously protruding between mandibles and lower margin of the eye. . . . . *Sussaba erigator* ♀ (Fabricius)
- Mesoscutum punctate over entire surface. Antenna with 16 or rarely 15 flagellomeres. Metasoma conspicuously knife-like, compressed behind second segment, broadest part is at front half of second tergite (Fig. 23B). Face less protruding between mandibles and lower margin of the eye. . . . . *Sussaba roberti* ♀ n.sp
6. Fore and mid coxae entirely yellow, hind coxa either orange or black only on basal half, remainder yellow. First metasomal tergite 1.7–2.2 times as long as wide. . . . . *Sussaba cognata* ♀ (Holmgren)
- At least hind coxa mainly black, often all coxae black basally. First tergite of metasoma at most 1.5 times as long as wide . . . 7
7. Metasoma strongly compressed from third segment, knife-like (Fig. 23C); sixth and seventh segments often mostly exposed, not retracted beneath fifth segment 8
- Metasoma less strongly compressed, evenly tapering from fourth segment to apex (Fig. 23D); sixth and seventh segments sometimes mostly retracted beneath fifth segment (although this depends a lot on the way the specimens are mounted) 9
8. Fore and mid coxae mainly or entirely yellow, hind coxa black or black-marked basally. Metasoma with at least some restricted orange markings. Mesopleuron entirely smooth on upper half, impunctate. . . . . *Sussaba dorsalis* ♀ (Holmgren)
- Fore and mid coxae black with yellow apices, hind coxa entirely black. Metasoma black with yellow markings. Mesopleuron distinctly punctate even on upper half. . . . . *Sussaba montana* ♀ Manukyan
9. Antenna with 17, sometimes 18 flagellomeres. Metasoma mainly black, at most with restricted yellow and dark orange markings . . . . . *Sussaba hinzi* ♀ Diller
- Antenna with at least 19 flagellomeres. Metasoma often with at least tergite 2 apically and entire tergite 3 orange but sometimes entirely black 10
10. Fore and mid trochanters and apex of hind trochanter yellow. Hind surface of hind coxa with at least some coriaceous sculpture. Mesoscutum without or at most with small shoulder marks. . . . . *Sussaba flavipes* ♀ (Lucas)
- Fore or at least mid trochanters marked with black, hind trochanter mainly black. Hind coxa often smooth and shining at least centrally, or if coriaceous, then all coxae and trochanters dark. Mesoscutum with or without yellow shoulder marks. 11
11. Outer hind surface of hind coxa mainly coriaceous and matt, with very small smooth areas. All trochanters black-marked, hind trochanter mainly black. Mesoscutum and subtegular ridge usually entirely black. Mesopleuron usually with some coriaceous sculpture on lower part . . . . . *Sussaba aciculata* ♀ (Ruthe)
12. Hind coxa smooth and shining between some faint punctures and irregular sculpture on outer side. Mesoscutum usually with yellow shoulder marks, subtegular ridge yellow. Mesopleuron usually entirely smooth and shining . . . . . *Sussaba pulchella* ♀ (Holmgren)
13. Antenna without tyloids. First tergite more than 1.8 times longer than wide. . . . . *Sussaba cognata* ♂ (Holmgren)
- Antenna with tyloids on segments 6 to 9 or similar. First tergite at most 1.9 times longer than wide, often shorter 13
14. Tyloids two-coloured, yellow on ventral side, dark brown dorsally 14
- Tyloids uni-coloured dark brown 16
15. Hind coxa black at most on basal third, remainder yellow, other coxae and trochanters entirely yellow. Metasoma somewhat elongate, with second tergite at least 1.6 times longer than basally wide. Tergite 3 usually orange with a black diamond-shaped mark in the middle. Femora without black markings . . . . . *Sussaba dorsalis* ♂ (Holmgren)
- Hind coxa mainly black, mid coxa and hind trochanter often black-marked basally. Metasoma not so elongate, second tergite at most 1.5 times longer than wide. Third tergite usually with two yellow basal markings and an orange apical stripe, dark centrally or entirely dark. Femora often marked with black lines ventrally. 15
16. Antenna with 19 to 20 flagellomeres. Metasoma entirely black or marked with dark red. First tergite of metasoma at most 1.4 times as long as wide, second 0.9–1.1 times as long as wide . . . . . *Sussaba hinzi* ♂ Diller
- Antenna with 21–22 flagellomeres. Metasoma marked with yellow and orange. First tergite of metasoma at least 1.5 times as long as wide, second at least 1.1 times as long as wide . . . . . *Sussaba pulchella* ♂ (Holmgren)
17. Mesopleuron distinctly punctate at least on lower half. First tergite at most 1.4 times longer than wide apically 17
- Mesopleuron almost completely smooth and shining, impunctate, at most with some irregular sculpture on lower half. First tergite often more than 1.4 times longer than wide apically 19
18. Antenna with tyloids on flagellomeres 6 to 12. Metasoma black with yellow markings on third and fourth tergites. Larger species, fore wing length 4.5–5.5mm . . . . . *Sussaba montana* ♂ Manukyan
- Antenna with tyloids on flagellomeres 5 to 8 or 9. Metasoma with second to fourth tergites usually orange-marked. Smaller species, fore wing length at most 4.2mm 18
19. Antenna with tyloids on flagellomeres 5 to 8, rarely 5 to 9, first tyloid of about the same size as second tyloid. Face more strongly protruding between clypeus and compound eye . . . . . *Sussaba erigator* ♂ (Fabricius)
- Antenna with tyloids on flagellomeres 5 to 9 or 5 to 10, first tyloid often distinctly smaller than second tyloid. Face less strongly protruding between clypeus and compound eye. ... . *Sussaba roberti* ♂ **sp. nov.**
20. Fore and mid coxae and all trochanters yellow. Mesonotal shoulder marks and subtegular ridge usually yellow. Hind coxa with some smooth and shining and some irregularly sculptured areas. Face entirely yellow . . . . . *Sussaba flavipes* ♂ (Lucas)
- All coxae mostly black, trochanters at least marked with black. Mesoscutum and subtegular ridge black. Hind coxa with strongly coriaceous sculpture rendering it matt over entire surface. Face often black-marked below antennal sockets . . . . . *Sussaba aciculata* ♂ (Ruthe)

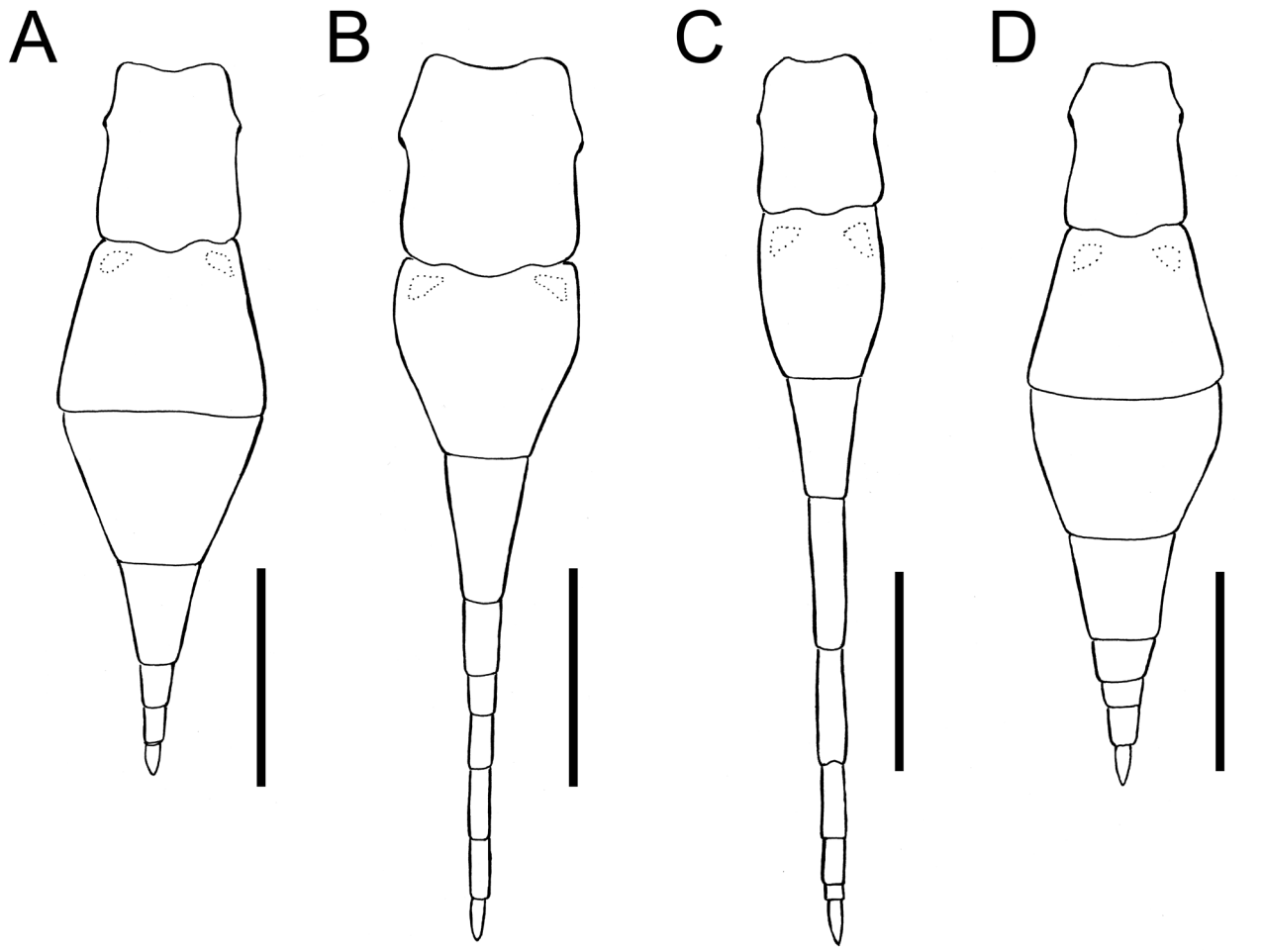

FIGURE 23. Metasoma of *Sussaba* species viewed from above. A. *Sussaba erigator*. B. *Sussaba roberti*. C. *Sussaba dorsalis*. D. *Sussaba pulchella*. Scale bars represent 500 μm.

***Sussaba aciculata* (Ruthe 1859, *Bassus*)**

Sussaba nigrithorax Dasch 1964a

Diagnosis. Fore wing length 3.0–4.4 mm. Antenna in females with 21–22 flagellomeres, with ventral area of median to apical flagellomeres with conspicuous areas bearing a short velvety pile and lacking multiporous plate sensilla; in males with 20–23 flagellomeres, with unicoloured tyloids on flagellomeres 6 to 9. Face mainly smooth and shining, impunctate, with some irregular sculpture centrally and along inner orbits. Mesoscutum mainly coriaceous, at most lateral parts with smooth areas. Mesopleuron entirely smooth and shining, impunctate, at most with some irregular sculpture on lower half. Hind coxa with outer surface coriaceous. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose to coriaceous sculpture. Metasoma evenly tapered towards apex, first tergite 1.3–1.7 times longer than wide in both sexes.

Colouration of females. Antenna dark brown or black. Head and mesosoma black, face without a yellow central face patch, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, sometimes upper mesepimeron; subtegular ridge black, without yellow shoulder marks; scutellum black. Legs orange to brown, coxae black, trochanters all marked with black; femora orange to brown, marked with black below, hind femur often all dark; hind tibia and tarsus brown. Metasoma variously marked with orange or brown on hind margin of tergite 2 and on tergite 3, or often all dark.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, antenna paler below, yellow over entire face but usually with two black vertical lines arising from below antennal sockets. Fore and

sometimes mid coxae often with a yellow apex. Metasoma sometimes as in females but usually with third tergite black centrally with two yellow spots on anterolateral corners, or metasoma entirely black.

Material examined. Finland (6), Iceland (3), Norway (1), Sweden (60), Switzerland (14).

Distribution. Palaearctic.

Figures. Male terminal sclerites (Figs 10A, 10B), habitus (Fig. 33D).

Notes. Males of this species are much more easily identified than females as the tyloid colour clearly associates them with *S. flavipes*. From *flavipes*, *aciculata* can readily be distinguished by the much darker colouration of the coxae and trochanters. Females of *S. aciculata* are often difficult to tell from female *S. pulchella.* Although colouration can provide good indications, it is not always very reliable and one should refer to the sculpture of the hind coxa, a character which requires some experience.

Sussaba cognata (Holmgren 1858, *Bassus*)

Promethus albicoxa Thomson 1890

Diagnosis. Fore wing length 3.5–5.0 mm. Antenna in females with 21–22 flagellomeres, with ventral area of median to apical flagellomeres with conspicuous areas bearing a short velvety pile and lacking multiporous plate sensilla; in males with 21–23 flagellomeres, without tyloids. Face mainly smooth and shining, impunctate, with some irregular sculpture centrally and along inner orbits. Mesoscutum smooth and shining, weakly and irregularly punctate, more densely punctate centrally. Mesopleuron entirely smooth and shining, impunctate. Hind coxa with outer hind surface mostly smooth and shining, without any sculpture apart from around seta roots. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose to coriaceous sculpture. Metasoma evenly tapered towards apex, first tergite 1.7–2.1 times longer than wide in females, 1.8–2.2 in males.

Colouration of females. Antenna brown or orange, paler below. Head and mesosoma black, face usually with a yellow central face patch, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, sometimes a small shoulder mark, upper mesepimeron; scutellum black. Legs orange, fore and mid coxae yellow or orange, hind coxa orange or black with a yellow apex, trochanters yellow, mid and hind trochanters sometimes black-marked; femora orange, sometimes dark ventro-basally; hind tibia and tarsus orange to brown. Metasoma variously marked with orange, usually at least on hind margin of tergite 2 and entire tergite 3, often also tergite 4.

Colouration of males. As in females but with yellow ventrally on entire antenna, entire face, and entire epicnemium. Fore and mid and often also hind coxae entirely yellow. Metasoma sometimes as in females but usually black with yellow spots on anterolateral corners of tergites 3 and 4.

Material examined. Lectotype of *Promethus albicoxa* Thomson: Sweden, Skåne, Pålsjö. 1♂, at ZIL.

New for North Korea: Mt. Pektusan, Explosion-Lake, 2000–2500m, leg. Dely&Draskovits, 18.VII.1977. 1♀, at TMA.

Finland (3), Germany (10), Hungary (15), North Korea (1), Norway (2), Sweden (>200), Switzerland (80), United Kingdom (>300).

Distribution. Holarctic and Oriental.

Figures. Metasomal segments 1–3 (Fig. 11A), tip of metasoma ♀ (Fig. 11E), habitus (Fig. 33E).

Sussaba dorsalis (Holmgren 1858, *Bassus*)

Bassus maculatus Desvignes 1862

Diagnosis. Fore wing length 3.5–4.1 mm. Antenna in females with 18–21 flagellomeres, with ventral area of median to apical flagellomeres with conspicuous areas bearing a short velvety pile and lacking multiporous plate sensilla; in males with 21–22 flagellomeres, with two-coloured tyloids on flagellomeres 5/6 to 10. Face mainly smooth and shining, impunctate, with some irregular sculpture centrally and along inner orbits. Mesoscutum smooth and shining, between somewhat irregular punctures and sculpture. Mesopleuron entirely smooth and shining, impunctate. Hind coxa with outer hind surface mostly smooth and shining, without any sculpture apart

from around seta roots. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose to coriaceous sculpture. Metasoma strongly compressed posterior to second segment, knife-like, first tergite 1.2–1.6 times longer than wide in females and 1.4–1.7 in males.

Colouration of females. Antenna dark brown, paler below. Head and mesosoma black, face usually with a yellow central face patch, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, sometimes a small shoulder mark, upper mesepimeron; scutellum black. Legs orange, fore and mid coxae yellow, sometimes with black at extreme base, hind coxa usually entirely black or with a yellow apex, trochanters yellow, hind trochanter usually marked with black; femora orange, marked with black below at extreme base; hind tibia and tarsus orange to brown. Metasoma variously marked with orange, usually at least on hind margin of tergite 2 and on tergites 3 and 4, there often with a dark, diamond-shaped mark medially.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, entire face, epicnemium, and sometimes a large shoulder mark. Hind trochanter often entirely yellow. Metasoma often as in female, the pattern of orange tergites 3 and 4 with median diamond-shaped marks often even more pronounced but sometimes with yellow spots basally on tergite 3.

Material examined. Lectotype of *Bassus dorsalis* Holmgren: Sweden, Lapland, leg. Boheman. 1♀, at NRM (designated by Townes *et al.* 1965) (a different female with the same data marked as a lectotype by K. Horstmann is also present in the collection; Townes' designation has priority).

Austria (1), Finland (5), Germany (2), Hungary (2), Netherlands (3), Norway (1), Sweden (80), Switzerland (20).

Distribution. Holarctic.

Figures. Metasoma ♀ (Fig. 23C).

Notes. While females of this species can be identified very easily by the strongly compressed metasoma, some males might be confounded with male *S. pulchella*. While colouration and length of the metasoma provide good evidence in most specimens, some males are very difficult to place.

The subspecies *Sussaba cultriformis* (Ashmead 1890, *Trematopygus*), a former subspecies of *S. dorsalis*, is here-in elevated to species rank. Material of this species examined: Holotype, 1♀, USA, Nebraska, leg. L. Brunnel, at USNM. **Additional material.** USA, Alaska, Fairbanks, North Star Borough, leg. D.Fieldling, N.Schiff, 20.–24.6.2006. 3♀, at NMBE.

Sussaba erigator (Fabricius 1793, *Ichneumon*)

Ichneumon festivus Fabricius 1798
Ophion festivator Fabricius 1804 (emendation for *Ichneumon festivus* Fabricius)

Diagnosis. Fore wing length 2.9–4.1 mm. Antenna in females with 14–15, very rarely 16 flagellomeres, with multiparous plate sensilla present also ventrally on apical flagellomeres, although slightly sparser there than dorsally, without conspicuous velvety areas; in males with 17–18 flagellomeres, with uni-coloured tyloids on flagellomeres 5 to 8 or rarely 9, first tyloid as large as or larger than second. Face mainly smooth and shining and strongly punctate over entire surface. Mesoscutum smooth and shining centrally, in females with punctures restricted to front part and sides, only very rarely with some sparse punctures in central area; in males, mesoscutum with punctures evenly distributed over entire surface. Mesopleuron smooth and shining, distinctly punctate over most of its surface. Hind coxa with outer hind surface mostly smooth and shining, without any sculpture apart from around seta roots. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. Metasoma compressed posterior to third segment, usually not knife-like, first tergite 1.1–1.4 times longer than wide in both sexes.

Colouration of females. Antenna dark brown to black. Head and mesosoma black, face sometimes with a small yellow central face patch, clypeus black, yellow or orange on mouthparts, hind corner of pronotum, tegula, sometimes upper mesepimeron; subtegular ridge and scutellum black, without yellow shoulder marks. Legs orange, coxae black and trochanters black; femora orange, marked with black below; hind tibia and tarsus orange to brown. Metasoma variously marked with orange, usually at least on hind margin of tergite 2 and entire tergites 3 and sometimes 4; this colouration can be darkend, especially in high altitude or northern specimens.

Colouration of males. As in females but with yellow ventrally on entire antenna, entire face, often subtegular ridge. Fore and mid coxae with yellow apices, fore and mid trochanters often entirely yellow. Metasoma as in female.

Material examined. Lectotype and Paralectotype of *Ichneumon erigator* (Fabricius 1793, *Ichneumon*): Germany. 2♀, at ZMUC. Lectotype and two paralectotypes of *Ichneumon festivus* Fabricius 1798: Germany. 3♀, at ZMUC.

Austria (5), Denmark (1), Finland (2), France (2), Hungary (>100), Netherlands (5), Sweden (20), Switzerland (>200), United Kingdom (1).

Distribution. Palaearctic.

Figures. Hind wing (Fig. 11C), metasoma ♀ (Fig. 23A), habitus (Fig. 33F), male terminal sclerites (Fig. 38A).

Sussaba flavipes (Lucas 1849, *Bassus*)

Sussaba coriacea neopulchella Diller 1980

Diagnosis. Fore wing length 3.5–4.3 mm. Antenna in females with 19–21 flagellomeres, with ventral area of median to apical flagellomeres with conspicuous areas bearing a short velvety pile and lacking multiporous plate sensilla; in males with 20–22 flagellomeres, with uni-coloured tyloids on flagellomeres 5/6 to 8/9. Face mainly smooth and shining, impunctate, with some irregular sculpture centrally and along inner orbits. Mesoscutum with central area coriaceous, weakly punctate. Mesopleuron entirely smooth and shining, impunctate. Hind coxa with outer surface coriaceous. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose to coriaceous sculpture. Metasoma evenly tapered towards apex, first tergite 1.2–1.5 times longer than wide in females, 1.4–1.9 in males.

Colouration of females. Antenna dark brown, sometimes paler below. Head and mesosoma black, face often with a yellow central face patch, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, usually subtegular ridge, upper mesepimeron; usually without shoulder mark, scutellum black. Legs orange, coxae black with apex yellow at least in fore and mid coxae, trochanters entirely yellow, at most with hind trochanter marked with black; femora orange, sometimes marked with black below basally; hind tibia and tarsus orange to brown. Metasoma variously marked with orange, usually at least on hind margin of tergite 2 and entire tergites 3 and sometimes 4.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, small to large yellow shoulder mark; epicnemium black. Fore and mid coxae entirely yellow or only black at extreme base, hind coxa with a yellow apex, all trochanters yellow. Metasoma usually as in female; if with third tergite black centrally and light basally and apically, then the two spots on anterolateral corners orange rather than yellow.

Material examined. Holotype of *Sussaba coriacea neopulchella* Diller: Germany, Bayern, München, Aubinger-Lohe, leg. E.Diller, 25.Vi.1977. 1♀, at ZSM.

New for Norway: Halden, Vesttorp, EIS 20, leg. T.J.Olsen, 7.VII.2001. 1♂, at MR.

Finland (2), Germany (6), Italy (3), Norway (1), Sweden (>100), Switzerland (>100), United Kingdom (40).

Distribution. Holarctic.

Figures. Face ♀ (Fig. 7E)

Notes. An additional species-level name is in close association with *Sussaba flavipes* and should be discussed here: *Sussaba coriacea* Dasch (1964a). Diller (1980) realised that *Sussaba pulchella auct.* is not the same taxon as the type of *Bassus pulchellus*; the next available name came from a taxon originally described as a subspecies, *Sussaba pulchella coriacea* Dasch. Diller raised *S. coriacea* to species rank and provided a new name for the taxon that Dasch referred to as *S. pulchella pulchella, S. coriacea neopulchella* Diller. Later on, Horstmann (1983) studied the type of *S. flavipes* Lucas and found it to be conspecific with *S. coriacea neopulchella*. Constantineanu & Constantineanu (1971) had previously reported *S. coriacea* from Romania, but I am not certain whether they really found a specimen that corresponds to the subspecies that has been described from North America. Until the types of *S. coriacea* can be studied and a decision made about the status of the taxon, this name thus remains a valid subspecies of *S. flavipes*, potentially with its distribution restricted to North America.

Sussaba hinzi Diller 1982

Diagnosis. Fore wing length 3.5–4.0 mm. Antenna in females with 17 flagellomeres, with ventral area of median to apical flagellomeres with conspicuous areas bearing a short velvety pile and lacking multiporous plate sensilla; in

males with 19–20 flagellomeres, with two-coloured tyloids on flagellomeres 5/6 to 9/10. Face mainly smooth and shining, impunctate, with some irregular sculpture centrally and along inner orbits. Mesoscutum with central area coriaceous and punctate. Mesopleuron entirely smooth and shining, impunctate, at most with some irregular sculpture on lower half. Hind coxa with outer hind surface mostly smooth and shining. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. Metasoma compressed posterior to third segment but not knife-like, first tergite 1.1–1.4 times longer than wide in both sexes.

Colouration of females. Antenna dark brown, sometimes paler below. Head and mesosoma black, face rarely with a yellow central face patch, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, usually at least small shoulder mark, upper mesepimeron; scutellum black. Legs orange, coxae black with yellow apices, hind trochanter marked with black; femora orange, marked with black below; hind tibia and tarsus orange to brown. Metasoma variously marked with orange, usually at least on hind margin of tergite 2 and entire tergite 3, but this colouration usually darkened, often metasoma entirely black.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, entire face, and epicnemium. Fore and mid coxae entirely yellow or only black at extreme base, hind coxa with a yellow apex. Metasoma as in female.

Material examined. Holotype (♀) and paratypes of *Sussaba hinzi* Diller:

Sweden, Norrbotten, Piteå, leg. R. Hinz, 8.VIII.1963. 3♂, 1♀ (holotype), at ZSM. Sweden, Norrbotten, Haparanda, leg. R. Hinz, 27.VII.1963. 1♂, at ZSM.

Additional material. Norway, Oppland; Øystre Slidre, Heimdalen, leg. Sand, 2.–3.VIII.1995. 1♀, at ZMUO.

Distribution. Palaearctic.

Sussaba montana Manukyan 1988

Diagnosis. Fore wing length 4.2–5.3 mm. Antenna in females with 19 flagellomeres, with multiparous plate sensilla present also ventrally on apical flagellomeres, without conspicuous velvety areas; in males with 22 flagellomeres, with uni-coloured tyloids on flagellomeres 6 to 12. Face mainly smooth and shining, with conspicuous punctures around seta roots. Mesoscutum smooth and shining, with distinct and evenly distributed punctures. Mesopleuron distinctly punctate over most of its surface. Hind coxa with outer hind surface mostly smooth and shining, without any sculpture apart from around seta roots. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose to coriaceous sculpture. Metasoma strongly compressed posterior to third segment, knife-like, first tergite 1.3 times longer than wide in both sexes.

Colouration of females. Antenna black. Head and mesosoma black, face with a yellow central face patch, clypeus and mandibles black, yellow on lower mouthparts, hind corner of pronotum, tegula, shoulder mark, sometimes upper mesepimeron; subtegular ridge and scutellum black. Legs yellow, coxae black, fore and mid coxae with yellow apices, trochanters all marked with black; femora yellow, marked with black below, hind femur all dark; hind tibia light brown medially, dark basally and apically, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on entire antenna, entire face, lower propleuron, epicnemium, large shoulder mark with inner corners extended back, subtegular ridge. Fore and mid coxae only black at extreme base, their trochanters yellow, hind coxa with a yellow apex, hind trochanter black-marked; hind femur largely yellow, black only basally. Metasoma black with two yellow spots on anterolateral corners and narrow yellow posterior bands on tergites 3 and 4.

Material examined. Holotype of *Sussaba montana* Manukyan: Tajikistan, 1♀, ZIP. Paratype: Russia, 1♂, ZIP.

Figures. Habitus (Fig. 34A).

Sussaba placita Dasch 1964a

Diagnosis. Fore wing length 4.5–5.3 mm. Antenna in females with 20–22 flagellomeres, with ventral area of median to apical flagellomeres with conspicuous areas bearing a short velvety pile and lacking multiporous plate sensilla; in males with 21 flagellomeres, with uni-coloured tyloids on flagellomeres 6 to 8. Face entirely coriaceous, with punctures indistinct. Mesoscutum entirely smooth and shining, with distinct and evenly distributed punctures. Mesopleuron distinctly punctate and irregularly sculptured over most of its surface. Hind

coxa with outer surface mainly smooth and shining. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose to coriaceous sculpture. Metasoma evenly tapered towards apex, first tergite 1.0–1.3 times longer than wide in both sexes.

Colouration of females. Antenna black or dark brown. Head and mesosoma black, face usually with a yellow central face patch, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, upper mesepimeron; without shoulder marks, scutellum black. Legs orange, coxae and all trochanters black; femora orange; hind tibia orange with dark apex, tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, epicnemium, and large shoulder mark. Fore and mid coxae only black at extreme base, their trochanters yellow, hind coxa with a yellow apex, hind trochanter black-marked. Metasoma black, usually with small yellow spots on anterolateral corners of tergite 3.

Material examined. Paratype of *Sussaba placita* Dasch: USA, California, Marin County, Mill Valley, leg. H. Leech, 8.VI.1950. 1♀, at CAS.

New for Finland: V Houtskan, Hyppeis 669:18, leg. H.Bruun, 15.–30.IX.1990. 1♀, at RJ. New for Germany, Thüringen, Gotha, Galberg, leg. Jänner, 15.IV.1919. 1♂, at NKME. New for Sweden: Stockholm, 11.VII.1936. 1♀, at NRM. New for Switzerland: Valais, Champéry, Col de Bretolet, 1920m, N46.143, E6.7968, leg. J.Aubert, 26.VIII.1961. 1♀, at MZL.

Austria (1), Finland (2), Germany (2), Sweden (1), Switzerland (4), USA (2).

Distribution. Western Palaearctic and Nearctic.

Sussaba pulchella (Holmgren 1858, *Bassus*)

Bassus elongatus Provancher 1874
Bassus monticola Vollenhoven 1880
Promethus laticarpus Thomson 1890
Otoblastus erodens Davis 1897
Promethes unicinctus Ashmead 1902
Promethes albicoxis Ashmead 1906 (nomen nudum)
Promethes ruthei Roman 1931

Diagnosis. Fore wing length 3.7–4.5 mm. Antenna in females with 20–22 flagellomeres, with ventral area of median to apical flagellomeres with conspicuous areas bearing a short velvety pile and lacking multiporous plate sensilla; in males with 21–24 flagellomeres, with two-coloured tyloids on flagellomeres 5/6 to 10/11. Face mainly smooth and shining, impunctate, with some irregular sculpture centrally and along inner orbits. Mesoscutum with central area coriaceous, weakly punctate. Mesopleuron entirely smooth and shining, impunctate, at most with some irregular sculpture on lower half. Hind coxa with outer hind surface mostly smooth and shining, without any sculpture apart from around seta roots. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. Metasoma evenly tapered towards apex, tergite 1 1.3–1.6 times longer than wide in female, 1.4–1.8 times in males.

Colouration of females. Antenna dark brown, sometimes paler below. Head and mesosoma black, face often with a yellow central face patch, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, usually at least small shoulder mark, upper mesepimeron; scutellum black. Legs orange, coxae black, fore coxa with a yellow apex, trochanters all marked with black; femora orange, marked with black below; hind tibia and tarsus orange to brown. Metasoma variously marked with orange, usually at least on hind margin of tergite 2 and entire tergite 3; this colouration can be darkened, especially in high altitude or northern specimens.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, usually entire antenna ventrally, entire face, and epicnemium. Fore and mid coxae only black at extreme base, hind coxa with a yellow apex. Metasoma sometimes as in females but usually with third tergite black centrally with two yellow spots on anterolateral corners and orange hind margin and tergites 4 and 5 similarly coloured or black.

Material examined. Lectotype of *Bassus pulchella* Holmgren: Sweden, Lapland, leg. Boheman. 1♀, at NRM. Lectotype and paralectotype of *Promethus laticarpus* Thomson: Sweden, Skåne, Lund. 1♂, 1♀, at ZIL.

Bulgaria (1), Finland (5), France (1), Germany (1), Hungary (1), Iceland (1), Norway (2), Russia (1), Sweden (>200), Switzerland (>200), United Kingdom (>100).

Distribution. Holarctic and Oriental.

Figures. Metasoma ♀ (Fig. 23D), habitus (Fig. 34B), male terminal sclerites (Fig. 38B).

Sussaba punctiventris (Thomson 1890, *Homotropus*)

Diagnosis. Fore wing length 3.8–5.9 mm. Antenna in females with 20–22 flagellomeres, with multiporous plate sensilla present also ventrally on apical flagellomeres, without conspicuous velvety areas; in males with 20–23 flagellomeres, with uni-coloured tyloids on flagellomeres 6/7 to 11/12. Face entirely coriaceous, with punctures indistinct. Mesoscutum smooth and shining, with distinct and evenly distributed punctures. Mesopleuron smooth and shining on upper half and distinctly punctate on lower half. Hind coxa with outer hind surface mostly smooth and shining, without any sculpture apart from around seta roots. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose to coriaceous sculpture, but petiolar area often with large smooth areas. Metasoma evenly tapered towards apex, first tergite 1.0–1.2 times longer than wide in females, 1.4–1.5 in males.

Colouration of females. Antenna black or dark brown. Head and mesosoma black, face usually with a yellow central face patch, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, upper mesepimeron; without yellow shoulder marks, scutellum black. Legs orange, fore and mid coxae black with yellow apices, their trochanters yellow, hind coxa and trochanter black; femora orange; hind tibia orange with a dark apex, tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, epicnemium, large part of pronotum and mesosternum, and large shoulder mark. Fore and mid coxae and trochanters yellow, hind coxa with a yellow apex, at most hind trochanter black-marked. Metasoma black, with yellow spots on anterolateral corners of tergites 3 and often 4.

Material examined. Finland (4), Germany (2), Sweden (18), Switzerland (40).

Distribution. Western Palaearctic and Nearctic.

Figures. Scutellum (Fig. 11G).

Sussaba roberti sp. nov.

Etymology. This species is dedicated to my grandfather and talented scientist Prof. Robert Schenk, who introduced me to the scientific world.

Diagnosis. Fore wing length 3.5–4.1 mm. Antenna in females with 16, very rarely 15 flagellomeres, with multiporous plate sensilla present also ventrally on apical flagellomeres, although slightly sparser there than dorsally, without conspicuous velvety areas; in males with 18–19 flagellomeres, with uni-coloured tyloids on flagellomeres 5 to 9/10, first tyloid often distinctly smaller than second. Face mainly smooth and shining and strongly punctate over entire surface. Mesoscutum smooth and shining, in both sexes evenly punctate also over entire surface. Mesopleuron smooth and shining, distinctly punctate over most of its surface. Hind coxa with outer hind surface mostly smooth and shining, without any sculpture apart from around seta roots. Propodeum with a full set of carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. Metasoma compressed posterior to second segment, usually knife-like, first tergite 1.3–1.4 times longer than wide in females, 1.2–1.4 in males.

Description. Antenna with multiporous plate sensilla evenly distributed also on ventral surface of flagellomeres. Face centrally elevated, with very short and weak vertical depressions, a little protruding below but less so than *S. erigator*; smooth and shining, with numerous distinct punctures. Clypeus separated from face by a distinct groove, elevated basally, remainder flat, very weakly bilobed, partly smooth, partly coriaceous, with some weak longitudinal striae. Head strongly constricted behind compound eyes. Mesoscutum smooth and shining between strong punctures, often punctures a bit less dense towards sides, without notauli; scutellum smooth and sparsely punctate, with lateral carinae clearly surpassing middle. Mesopleuron smooth and shining and distinctly punctate over entire surface except for a smooth area around mesopleural fovea; sternaulus weakly impressed, epicnemial carina complete ventrally. Metapleuron smooth and sparsely to densely punctate. Propodeum with a full

set of strong carinae; areas between carinae rugose. Fore wing areolet open, vein 1cu-a opposite vein M; hind wing with one basal hamulus, vein CU+cu-a broken slightly below middle. Hind coxa smooth and punctate. Metasoma strongly compressed laterally from tergite 3, tergite 2 strongly tapering, almost triangular; hind margins of tergites 1–3 straight or convex, from tergite 4 concave, extending further back laterally than medially; tergite 1 smooth, with longitudinal carinae distinct on less than basal half, then replaced by some longitudinal rugae and sparse punctures; tergite 2 finely striate basally and punctate on about half the length, remainder entirely smooth, remaining tergites entirely smooth and shining. Second and third tergites with spiracles on laterotergites, distinctly below lateral folds. Ovipositor sheaths upcurved, slender, with tip closed apically; smooth and shining, with setae around tip and ventrally.

Colouration of females. Antenna dark brown, usually paler below. Head and mesosoma black, face sometimes with a yellow central face patch, clypeus black, yellow or orange on mouthparts, hind corner of pronotum, tegula, sometimes upper mesepimeron; subtegular ridge and scutellum black, without yellow shoulder marks. Legs orange, coxae and trochanters black; femora orange, sometimes marked with black below; hind tibia and tarsus orange to brown. Metasoma variously marked with orange, usually at least on hind margin of tergite 2 and entire tergites 3 and sometimes 4; this colouration can be dark.

Colouration of males. As in females but with yellow ventrally on entire antenna, entire face but sometimes with some black markings on face, often subtegular ridge. Fore and mid coxae with yellow apices, fore and mid trochanters often entirely yellow.

Similar species: *Sussaba roberti* is very close to *S. erigator* and has in the past been mistaken for the latter species. Females are easily separable by the longer antennae, the less projecting lower face, the evenly punctate mesoscutum and the more compressed metasoma. Males are more difficult to distinguish and the characters given in the key might not always be reliable, but male *S. roberti* usually have more tyloids, on flagellomeres 5 to 9 instead of 5 to 8 as in most *erigator* males, and the first tyloid is often distinctly smaller than the second.

Type material. Holotype ♀ at NMBE, Switzerland, Grisons, Sur, NE Sur, 1770m, N46°31.451' E9°38.055', Malaise trap, leg. H.Baur & S.Klopfstein, 19.–27. VII. 2006. Labels: "Malaise-F. 3, FO-Nr. 834; CH/GR Sur, NE Sur ; 1770m 768.450/154.500 ; leg. H.Baur; 19.–27.7.2006", "Extraction-Nb ; 1-B9 ", "Holotype; Sussaba ♀; roberti n.sp.; det. S.Klopfstein 2010". Paratypes: CH, Luzern, Allmend and city, 10.VI.2006, leg. G. Bächli (1♂); at NMBE; CH, Schaffhausen, Bargemer Randen, 600–800m, 26.VI.1975, leg. W. Sauter; at ETHZ; UA, Lugansk reg., Provalie, leg. Osipov, 23.V.2002 (1♀), 19.–22.VII.2004 (1♂), 25.VIII.2004 (1♂); RU, Siberia, Irkutsk, Lisikha, leg. O. Berlov, 28.VIII.2003 (1♂), 17.VIII.2004 (1♀), 4.VIII.2005 (1♀), 2.VIII.2007 (1♀); RU, Siberia, 10 km E Irkutsk, leg. O. Berlov, 12.VIII.2004 (1♂), all at MR.

Additional material. Austria: Neusiedler See, Donnerskirchen, leg. Wachmann, 6.VIII.1964. 1♀, at KSch. France: Hautes-Alpes, Briançon, 1400m, leg. K.Zwakhals, 1.VIII.1971. 1♂, at KZ. Germany: Karlstadt i.M., leg. K.Schmidt, 4.VIII.1966. 1♀, at KSch; Rheinland-Pfalz, Büchelberg, Sägewerk, leg. K.Schmidt, 6.VIII.1997. 1♀, at KSch; Karlsruhe, Baden, Durlach, Bergwald, leg. Zmuszinski, 14.VII.1967. 18.VII.1967 1♀ each, at KSch. Italy: Bolzano, Brixen, 1500m, leg. K.Zwakhals, 23.VI.1976. 1♂, at KZ. Macedonia: Gorica, 5 km S. Ohrid, ca. 800m, leg. C.v.Achterberg, 13.IX.1979. 1♂, at KZ. Switzerland: Geneva, Russin, 400m, N46°11.16', E6°00.83', leg. J.de Beaumont, 26.VII.1959. 1♀, at MZL; Vaud, Eclépens, Mormont, 500m, N46°39.06', E6°32.232', leg. J.de Beaumont, 6.VII.1958. 1♀, at MZL; Vaud, Cudrefin, La Sauge, 433m, N46°58.44', E7°03.252', leg. J.de Beaumont, 17.VIII.1957. 1♀, at MZL. Turkey: Isparta, Dere Mahallesi, 1150m, leg. F. Gürbüz, 22.V.2006. 1♂, at SDU; Isparta, Egridir, Kasnakmesesi, 1350m, leg. F. Gürbüz, 7.VI.2004. 3♂, 1♀, at SDU.

Distribution. Palaearctic.

Figures. Metasoma ♀ (Fig. 23B), habitus (Fig. 34C), male terminal sclerites (Fig. 38C).

Syrphoctonus Förster 1869

Type species. *Bassus exsultans* Gravenhorst 1829

Recently, this genus was restricted to include only the *tarsatorius* and *laevis* species groups as defined by Dasch (1964a), based on a large morphological and molecular analysis of the subfamily (Klopfstein *et al.* 2010a; Klopfstein *et al.* 2011). Other species previously included with in *Syrphoctonus* are now referred to the genera *Homotropus* and *Fossatyloides*.

Diagnosis. *Syrphoctonus* species are most similar to some *Homotropus* species and some females might also

be confounded with *Woldstedtius*. From *Homotropus*, most *Syrphoctonus* species can readily be identified by the position of the spiracle of the third tergite on the laterotergite or level with the fold separating it from the dorsal part, the usually interrupted epicnemial carina, the lack of a fore wing areolet, and by the shape of the clypeus. Some of these characters, however, are subject to variation, sometimes even intra-specifically. I tried to account for any such difficulties by providing cross-references in the species keys. From *Woldstedtius*, females of *Syrphoctonus* can be identified by the shape of the ovipositor sheaths and usually the colouration of the hind tibia.

Face coriaceous and matt, without vertical impressions, in females entirely black or with a yellow central patch, in males entirely yellow. Clypeus with apical margin thin, with a basal elevation and impressed only laterally, resulting in the central area being convex and the sides being concave. Antenna with apical flagellomeres longer than wide, in males with linear, narrow tyloids, without long setae. Mesoscutum without notauli; coriaceous and matt with inconspicuous but sometimes dense punctures; yellow shoulder marks usually present; mesopleuron either entirely coriaceous and matt or rather smooth, especially on upper half, never strongly punctate; epicnemial carina interrupted behind fore coxae. Propodeum with carinae reduced, at most with some traces of lateral carinae; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet absent, although very rarely present as an aberration in *S. tarsatorius*; hind wing with 2–3 basal hamuli. Hind tibia white, yellow or orange with apex dark. Female metasoma evenly tapered to apex; tergites without transverse impressions. First tergite without median dorsal carinae. Second tergite with spiracle dorsal, above lateral fold, third tergite with spiracle below or behind the fold. Metasoma black, often with yellow apical bands on most tergites, or orange on median tergites. Ovipositor sheaths 0.3 times as long as hind tibia, rather stout, laterally compressed, slightly tapered and fully enclosing ovipositor or diagonally truncate, with inconspicuous setae ventrally and apically. Males with tergites 9 and 10 as separate sclerites, sternite 9 about two times wider than long, emarginated apically, thus forming two lobes, their outer corners rounded.

Phylogeny. *Syrphoctonus* is placed as the most basal genus of the *Syrphoctonus* genus group, followed by the genera *Woldstedtius*, *Enizemum*, and finally *Homotropus* and related genera. Its monophyly is supported by some rather vague morphological characters such as the reduction of the epicnemial carina, which is very distinct in some but less so in other species (see keys and species descriptions). Molecular characters clearly support the monophyly of this genus, but only five species were included in these analyses (Klopfstein *et al.* 2010a; Klopfstein *et al.* 2011).

Distribution. Probably Holarctic. Most of the non-European species currently known under this genus have not been compared to the new concept of *Syrphoctonus*, and might be transferred to the genus *Homotropus* in the near future.

Biology. Host records of *S. tarsatorius* and *S. fissorius* indicate that these are polyphagous species which attack a variety of host genera. They have been reared most frequently from abundant host species of the genera *Epistrophe, Syrphus* and *Episyrphus* (Schneider 1950; Rotheray 1981b; Fitton & Rotheray 1982; Rotheray 1984).

Notes. The use of the names *Syrphoctonus*, *Homotropus* and *Woldstedtius* differed between authors in the past. While Förster (1869) had already distinguished between the genera *Syrphoctonus* and *Homotropus*, later authors combined the two entities under a single name, which for a long time was *Homocidus* Morley (Morley 1914; Schmiedeknecht 1926; Uchida 1930). Beirne (1941) then even combined the species of these genera with most other diplazontines under *Diplazon.* Dasch (1964a) combined the species of *Syrphoctonus* and *Homotropus* under the latter name, and used the name *Syrphoctonus* for the genus now known as *Woldstedtius*. As the type species of *Syrphoctonus* is *Bassus exsultans* Gravenhorst, a junior synonym of *S. tarsatorius*, the genus combining the *Homotropus* and *Syrphoctonus* species was later referred to under this name. After the genus was split (Klopfstein *et al.* 2011), both *Syrphoctonus* and *Homotropus* became valid again.

Key to species

1. Hind coxa red or yellow 2
- Hind coxa black, at least basally 3
2. Epicnemial carina indistinct on mesosternum, only present laterally. Metasoma black, tergites often with yellow hind margins, first tergite as long as or shorter than wide. In females, metasoma dorsoventrally depressed to gradually tapered. . . . . *Syrphoctonus tarsatorius* (Panzer)
- Epicnemial carina fully developed. Metasoma usually orange on tergites 2 and 3, first tergite longer than wide. In females, metasoma usually laterally compressed posterior to fourth segment . . . . . cf. *Homotropus signatus* (Gravenhorst)

3. Scutellum black 4
- Scutellum marked with yellow 6
4. Clypeus more than 2.5 times broader than high, smooth and polished, with apical lobes very weakly developed. Mesoscutum distinctly punctate, the punctures separated by less than their diameter, on a more or less smooth background, mespleuron weakly punctate at least along anterior margin. Metasoma black with yellow spots on posterior corners of tergite 3 in females and 3 or 4 to 5 in males . . . . *Syrphoctonus borealis* Holmgren
- Clypeus usually about 1.5–2.0 times broader than high, with some coriaceous sculpture and apical lobes well developed. Mesoscutum mostly coriacesous and matt, punctures usually weak and rather sparse. Metasoma either entirely black, marked with orange, or with yellow spots on basal corners of some tergites, or with narrow yellow hind margins 5
5. Epicnemial carina broadly interrupted on mesosternum, only present laterally. Metasoma black. Hind tibia white or yellow with a dark apex. Mesosoma evenly shiny-coriaceous. First tergite as long as or shorter than wide. . *Syrphoctonus idari* Diller
- Epicnemial carina fully developed. Metasoma usually orange on tergites 2 and 3. Hind tibia uniformly orange. Mesosoma with irregular sculpture, often coriaceous only on lower half of mesopleuron. First tergite longer than wide . . . . cf. *Homotropus signatus* (Gravenhorst)
6. Scutellum yellow or with a yellow apical spot. Metasoma usually orange on tergites 2 and 3 and with yellow posterior bands on tergites 2–5, especially in males. Male antenna with tyloids on flagellomeres 7–14 . . . *Syrphoctonus desvignesii* (Marshall)
- Scutellum with a yellow margin, black centrally. Metasoma black, in males with two yellow spots on basal corners of tergite 3. Male antenna with tyloids on flagellomeres 2 to 10 or 11 . . . . *Syrphoctonus fissorius* (Gravenhorst)

Syrphoctonus borealis (Holmgren 1858, *Bassus*)

Syrphoctonus novitus Dasch 1964a

Diagnosis. Fore wing length 4.0–4.5 mm. Antenna in females with 20, in males with 20–21 flagellomeres, with tyloids on flagellomeres 6 to 15. Epicnemial carina only weakly interrupted behind fore coxa. Mesoscutum smooth and shining and distinctly punctate. Propodeum with pleural and lateral longitudinal carinae developed, the latter rather strong, sculpture rugose, especially on petiolar area. Female metasoma gradually tapered to apex, a little elongate, first tergite 1.1 times longer than wide in females, 1.1–1.2 in males; spiracle of third tergite clearly below lateral fold.

Colouration of females. Antenna dark brown. Head and mesosoma black, orange or brown on clypeus, sides and mandibles dark, dark orange on tegula and upper mesepimeron. Legs orange, all coxae and trochanters black; femora orange, not marked with black; hind tibia orange with a dark apex, tarsus dark. Metasoma black with yellow marks on posterior corners of tergite 3.

Colouration of males. As in females but with antennae ligher below, yellow on scape and pedicel below, central face patch and along inner orbits, clypeus, mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark with its inner corners a little extended onto mesoscutum. Fore and mid coxae with yellow apices. Metasoma black with yellow marks on posterior corners of tergites 3 or 4 to 5.

Material examined. Lectotype of *Bassus borealis* Holmgren: Sweden, Lapland, leg. Boheman.1♂, at NRM.

Additional material. Sweden, Lapland, Abisko, 17.IX.1918, 1♂; Lapland, leg. Boheman, 1♂; Lapland, VII.1922, 1♀; Lapland, 27.VII.1908, 1♂; all at NRM.

Distribution. Western Palaearctic and Nearctic.

Notes. This species was placed by Dasch (1964a) in the *elegans* species group of *Homotropus* but clearly belongs in *Syrphoctonus*.

Syrphoctonus desvignesii (Marshall 1870, *Bassus*) (stat. rev.)

(new name for *Bassus pulchellus* Desvignes)

Bassus pulchellus Desvignes 1862 (junior homonym)
Homotropus fraudulentus recurvatus Dasch 1964a (syn. nov.)
Homotropus neopulcher Horstmann 1968 (syn. nov.)

Diagnosis. Fore wing length 4.3–5.2 mm. Antenna in females with 19–21 flagellomeres, in males with 20–21 flagellomeres, with tyloids on flagellomeres 6 to 15/16. Epicnemial carina sometimes only weakly interrupted behind fore coxa. Mesoscutum with weak and sparse punctures on a finely coriaceous background. Propodeum almost devoid of carinae, at most with pleural carina and apex of lateral longitudinal carina weakly indicated, sculpture coriaceous and matt. Female metasoma compressed posterior to fourth tergite or rather gradually tapered to apex, first tergite 1.3–1.4 times longer than wide in females, 1.4–1.7 in males; spiracle of third tergite on or below lateral fold.

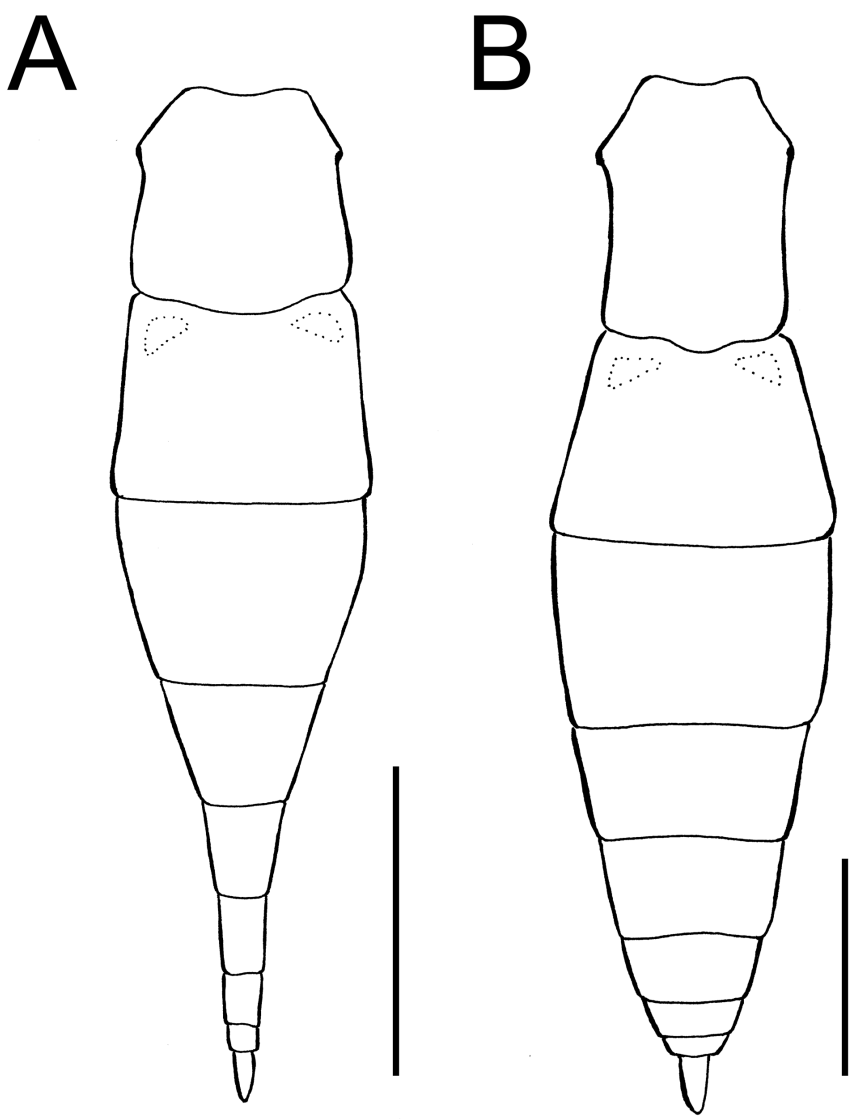

FIGURE 24. Metasomas of *Syrphoctonus* species viewed from above. A. *Syrphoctonus idari*. B. *Syrphoctonus tarsatorius*. Scale bars represent 500 µm.

Colouration of females. Antenna dark brown, paler below. Head and mesosoma black, face with a yellow central face patch, yellow on clypeus, mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark, upper mesepimeron, and most of scutellum. Legs orange, fore and mid coxae black basally with a yellow apex, hind coxa black, trochanters yellow; femora orange, often marked with black ventro-basally; hind tibia orange with a dark apex, tarsus dark. Metasoma usually orange on hind margin of tergite 2 and entire tergites 3 and sometimes 4, this colouration sometimes dark, and usually with posterior margins of tergites 3 to 5 yellow.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, lower propleuron, epicnemium, and a stripe on lower mesopleuron. Fore and mid coxae entirely yellow, hind coxa black with a yellow apex. Metasoma sometimes as in females but often with orange colouration reduced, yellow posterior margins of tergites 3 to 5 often broadened.

Material examined. Holotype of *Bassus pulchellus* Desvignes: United Kingdom, 1♂, at BMNH. Paratypes of *Homotropus fraudulentus recurvatus* Dasch: USA, California, Crane Flat, Yosemite park, leg. H.M.G., D. & J. Townes, 22.VII.1948, 1♂ at BMNH; 25.VII.1948, 1♀, at AEI. USA, California, Cisco, leg. H.M.G. & D. Townes, 31.VII.1948. 1♂, at AEI. Paratype of *Homotropus neopulcher* Horstmann: Sweden. 1♀, at ZIL.

New for Italy: Südtirol, Antholzer-Obertal, 1800m, leg. E.Diller, 19.VIII.1967. 1♀, at ZSM.

Finland (1), Germany (2), Ireland (1), Italy (1), Norway (1), Sweden (10), Switzerland (20), United Kingdom (1), USA (4).

Distribution. Western Palaearctic and Nearctic.

Figures. Habitus (Fig. 34D).

Notes. This species had been synonymized with *S. tarsatorius* (Morley 1911), but is actually conspecific with the taxon referred to as *Homotropus neopulcher* Horstmann, which becomes a junior synonym. As I have only seen the paratypes of *Homotropus fraudulentus recurvatus* Dasch and not of the subspecies *fraudulentus*, only the former is synonymized with *desvignesii* here. Whether *H. fraudulentus* should be treated as a distinct species, as a subspecies of *desvignesii*, or even as its synonym thus remains unclear at the current state.

Syrphoctonus fissorius (Gravenhorst 1829, *Bassus*)

Bassus punctatus Bridgman 1887
Homotropus similis Lange 1911

Diagnosis. Fore wing length 4.6–6.6 mm. Antenna in females with 17–19 flagellomeres, in males with 18–19 flagellomeres, with tyloids on flagellomeres 2 to 10/12. Epicnemial carina often only weakly interrupted behind fore coxa. Mesoscutum strongly coriaceous and distinctly punctate. Propodeum almost devoid of carinae, at most with pleural carina and apex of lateral longitudinal carina weakly indicated, sculpture coriaceous and matt. Female metasoma gradually tapered to apex, first tergite 1.0–1.2 times longer than wide in females, 1.2–1.3 in males; spiracle of third tergite either on or above lateral fold.

Colouration of females. Antenna dark brown. Head and mesosoma black, face with a yellow central face patch, yellow on clypeus, mouthparts, tegula, large shoulder mark, upper mesepimeron, and often hind corner of pronotum and subtegular ridge; scutellum yellow along sides and apex. Legs orange, all coxae and trochanters black or brown; femora orange, often marked with black ventro-basally; hind tibia yellow or orange with a dark apex, tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, usually entire propleuron, epicnemium, mesosternum and lower mesopleuron. All coxae yellow, hind coxa sometimes marked with black basally. Metasoma black with large yellow spots on anterolateral corners of tergites 3 and sometimes 4.

Material examined. Lectotype of *Homotropus similis* Lange: Germany, Erzgebirge, leg. Lange. 1♀, at NMF.

New for Sweden: Öland, Mörbylånga kommun, Gamla Skogsby (Kalkstad), "diversitets-ängen". Meadow with bushes, N56°37.002', E16°30.457', leg. SMTP, 1.VI.–15.VI.2005. 1♀, at NRM.

Germany (3), Sweden (1), Switzerland (11), United Kingdom (5).

Distribution. Palaearctic.

Figures. Habitus (Fig. 34E).

Syrphoctonus idari Diller 1985

Diagnosis. (Male unknown). Fore wing length 4.1–5.3 mm. Antenna with 18–19 flagellomeres. Epicnemial carina very broadly interrupted behind fore coxa. Mesoscutum with punctures disappearing against the strongly coriaceous background. Propodeum almost devoid of carinae, at most with pleural carina and apex of lateral longitudinal carina weakly indicated, sculpture coriaceous and matt, smoother on petiolar area. Female metasoma compressed posterior to fourth tergite, although this character may vary depending on the preparation of the specimen, first tergite 0.85–1.1 times longer than wide; spiracle of third tergite always distinctly below lateral fold.

Colouration of females. Antenna black. Head and mesosoma black, face without a yellow central face patch, yellow on clypeus, mouthparts, hind corner of pronotum, tegula, shoulder mark, and upper mesepimeron; scutellum black. Legs orange, all coxae black, trochanters usually yellow; femora orange; hind tibia white to light yellow with a dark apex, tarsus dark. Metasoma black.

Material examined. Holotype of *Syrphoctonus idari* Diller: Germany, Harz, 23.VII.1964, leg. R.Hinz. 1♀, at ZSM. Paratypes examined: Germany, Harz, 17.VI.1964, 1♀; 7.VIII.1964. 1♀; Solling, 9.VIII.1967, 1♀; all at ZSM. Switzerland, Valais, Brig, 684m, leg. E.Bauer, 25.–30.VI.1959. 1♀, at ZSM.

Additional material. Sweden: Västerbotten, Vindelns kommun, Kulbäckslidens försökspark. 15 yr spruce plantation with blue-berry, N64°09.270', E19°35.591', leg. SMTP, 01.IX.–22.IX.2003. 1♀; Värmland, Munkfors

kommun, Ransäter, Ransbergs herrgard. Old mixed deciduous ofrest in stream ravine, N59°47'25.59", E13°24'54.61", leg. SMTP, 10.VII.–24.VII.2005. 1♀; Norrbotten, Gällivare kommun, Ätnarova försökspark, Pelttovaara, Vaccinium vitis-idaea pine wood, N67°03.103', E20°23.154', leg. SMTP, 30.VI.–08.VII.2004. 1♀; Västerbotten, Skelleftea kommun, Brännbergets naturreservat. Mixed boreal forest, N64°54.768', E20°29.984', leg. SMTP, 21.VII.–12.VIII.2004. 1♀; Uppland, 27.VII.1909. 1♀; all at NRM.

Figures. Metasoma ♀ (Fig. 24A).

Syrphoctonus tarsatorius (Panzer 1809, *Bassus*)

Bassus exsultans Gravenhorst 1829
Bassus insignis Gravenhorst 1829
Bassus flavus Desvignes 1862
Bassus indicus Cameron 1909
Homotropus eximius Habermehl 1922 (syn. nov.)
Homotropus flavitrochanterus Uchida 1957

Diagnosis. Fore wing length 3.9–6.4 mm. Antenna in females with 19–21 flagellomeres, in males with 19–23 flagellomeres, with tyloids on flagellomeres 6–7 to 14–16. Epicnemial carina sometimes only weakly interrupted behind fore coxa. Mesoscutum strongly coriaceous and distinctly punctate. Propodeum almost devoid of carinae, at most with pleural carina and apex of lateral longitudinal carina weakly indicated, sculpture coriaceous and matt. Female metasoma gradually tapered to apex, first tergite 1.0–1.4 times longer than wide in females, 1.2–1.5 in males; spiracle of third tergite slightly to distinctly below lateral fold.

Colouration of females. Antenna dark brown or black. Head and mesosoma black, face with a yellow central face patch, yellow on clypeus, mouthparts, hind corner of pronotum, tegula, sometimes subtegular ridge, large shoulder mark, upper mesepimeron, and most of scutellum. Legs orange, fore coxa dark, mid and hind coxae orange; femora orange; hind tibia dark orange with a dark apex, tarsus dark. Metasoma black, usually with hind margins of tergites 2 or 3 to 5 or 6 yellow.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, entire propleuron, most of pronotum, epicnemium, a varying portion of mesosternum, and a stripe on lower mesopleuron. Fore and mid and often also hind coxae entirely yellow. Metasoma as in females but often with yellow posterior margins broader and yellow spots on basolateral corners of tergite 3.

Material examined. Holotype of *Bassus indicus* Cameron: India, Simla. 1♂, at BMNH. Holotype ♀ of *Homotropus eximius* Habermehl examined by Erich Diller (personal communication).

Finland (3), France (2), Germany (1), Hungary (30), Sweden (40), Switzerland (>100), Turkey (1), United Kingdom (30).

Distribution. Holarctic and Oriental.

Figures. Mesoscutum (Fig. 12B), epicnemical carina (Fig. 16B), clypeus (Fig. 16D), metasoma ♀ (Fig. 24B), habitus (Fig. 34F).

Notes. This is a species with a large range of variation in size and also colouration. Two specimens of a colour variant which might or might not represent a distinct species were found in the Swiss Alps and in Finland. They have a mostly black hind tibia with a whitish base and yellow posterior bands on tergites 2 to 7 instead of the usual 2 to 5 in females. No distinction from specimens with the typical orange hind tibia was found in the CO1, ND1 and 28S markers. It remains to be shown if this variant represents a distinct species.

Syrphophilus Dasch 1964a

Type species. *Bassus bizonarius* Gravenhorst 1829

Diagnosis. The genus *Syrphophilus* can be recognized by the combination of the following characters: fully carinate propodeum, yellow inner orbits of females and often males, weak indications of transverse impressions at least on the first tergite, and the lack of a fore wing areolet or of notauli. Some males of *S. scabriculus* and *S. tricinctorius* might show some indications of notauli; I thus also included a cross-reference for the genus *Syrphophilus* in the *Tymmophorus* species key.

Face coriaceous and matt, without vertical impressions, in females black with yellow inner orbits and sometimes a central spot yellow, in males similar or often entirely yellow. Clypeus with apical margin thin, with a basal elevation that makes it covex in profile, broad and short. Antenna with apical flagellomeres wider than long in females but longer than wide in males, without tyloids and without long setae. Mesoscutum without notauli (rarely indicated in male *S. tricinctorius*); usually smooth and shining and weakly to strongly punctate but sometimes entirely coriaceous and impunctate; yellow shoulder marks usually present; mesopleuron variously sculptured, ranging from entirely smooth and shining and punctate on lower half to coriaceous and matt; epicnemial carina complete ventrally. Propodeum with a full set of carinae enclosing basal, petiolar and lateral areas; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet absent; hind wing with 2–4 basal hamuli. Hind tibia orange or brown with apex often dark. Metasoma dorsoventrally depressed with hind margins of tergites convex; tergites with subapical transverse impressions usually weakly indicated on first and sometimes second tergite. First tergite with broadly separated or without median dorsal carinae. Second and third tergites with spiracles dorsal, above lateral folds. Metasoma black, often with yellow or orange markings, or orange on tergites 2–5. Ovipositor sheaths 0.3 times as long as hind tibia, laterally compressed, tapered and fully enclosing ovipositor; basally smooth, apically with dense and conspicuous setae. Males with tergites 9 and 10 fused as a syntergum, sternite 9 about 1.5 times wider than long, weakly emarginated to form two lobes, their outer corners with an acute angle.

Phylogeny. Monophyly of *Syrphophilus* is well supported by both morphological and molecular data. The relationships between the remaining genera of the *Diplazon* genus group, however, are not well resolved, especially concerning the genus *Tymmophorus*. It thus remains to be shown what the sister genus is of *Syrphophilus*.

Distribution. Holarctic and Oriental. This genus only includes six species, the Nearctic *Syrphophilus ichneumonoides* (Provancher) and the five Holarctic species discussed here. Two of the latter have even been reported from the Oriental region, and this genus thus has a very high proportion of species with multi-regional distributions.

Biology. *Syrphophilus bizonarius* and *S. tricinctorius* have been reared from a range of Syrphinae, mostly of the tribe Syrphini (e.g. Thirion 1994).

Key to species

1. Sternaulus very strongly impressed on anterior half of mesopleuron (Fig. 25A), usually with transverse carinulae in the impression. Metasoma marked with orange at least on hind margins of tergites 2 and 3. Tergites 1–3 usually distinctly punctate on a smooth and shining background, more rugose in males . . . . . *Syrphophilus bizonarius* (Gravenhorst)
- Sternaulus visible but never as strongly impressed, without transverse carinulae (Fig. 25B). Metasoma black with yellow or sometimes with orange markings.Tergites usually more rugose and coriaceous and matt, only rarely smooth and strongly punctate (only in *Syrphophilus stibarus* Momoi) 2
2. Antenna with at least 19 flagellomeres in both sexes. Metasoma in females entirely black or with yellow spots apico-laterally on tergites 2 to 3 or 4, in males black with yellow apical bands on tergites 1 or 2 to 4 or 5. Femora usually entirely orange, male face usually entirely yellow, and scutellum at least marked with a yellow apical spot . . *Syrphophilus tricinctorius* (Thunberg)
- Antenna with 16–19 flagellomeres. Metasoma in both sexes entirely black or with orange or yellow hind margins. Femora often marked with black below, male face often with yellow inner orbits and a central yellow spot, scutellum with or without yellow markings 3
3. Mesopleuron, mesosternum and scutellum mainly orange, metasoma black or with diffuse dark red coloration. Coxae, trochanters and legs entirely orange . . . . . *Syrphophilus asperatus* Dasch
- Mesosoma black, scutellum black or yellow-marked. Coxae black or yellow, trochanters yellow 4
4. Mesopleuron, mesoscutum and tergites 1 to 3 smooth and shining and strongly punctate . . . . . *Syrphophilus stibarus* Momoi
- Mesopleuron impunctate but with weakly coriaceous areas; mesoscutum with smooth and indistinctly punctate areas laterally but coriaceous towards middle and along the lines extending the notauli; tergites strongly coriaceous and matt . . . . . *Syrphophilus scabriculus* (Holmgren)

Diagnosis. Fore wing length 4.5–5.3 mm. Antenna of both sexes with 16–18, usually 17 flagellomeres. Mesoscutum smooth and shining between weak but very dense punctures. Mesopleuron coriaceous and punctate over most of its surface. Sternaulus weakly impressed. Propodeum with a full set of strong carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. First tergite with median dorsal carinae strongly developed at least on basal half. Second and third tergites with punctures indistinct against the strongly rugulose or coriaceous background.

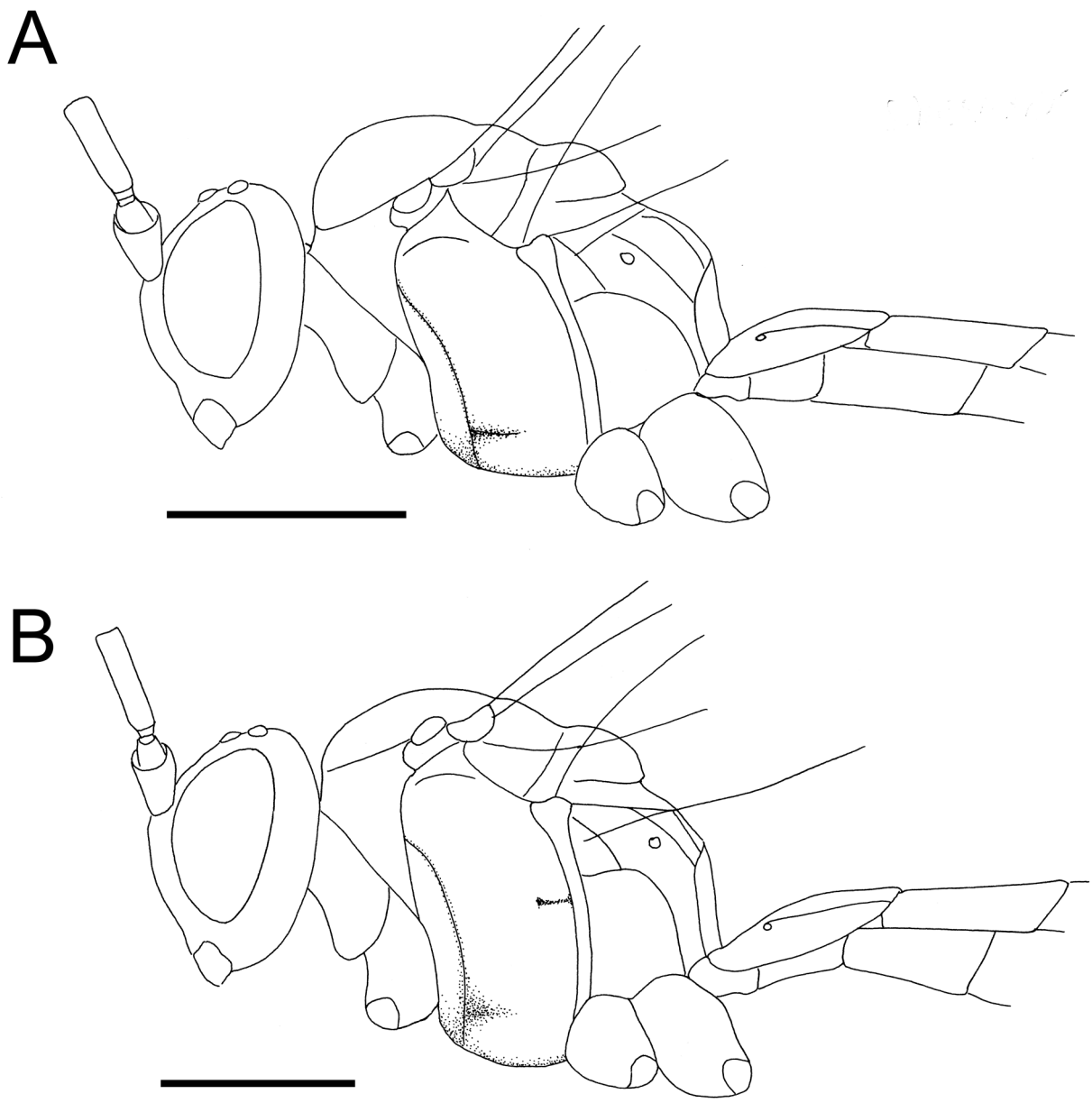

FIGURE 25. Sternaulus in *Syrphophilus*. A. *Syrphophilus bizonarius* with a very deeply impressed sternaulus. B. *Syrphophilus tricinctorius* with the sternaulus distinct but less deeply impressed. Scale bars represent 500 µm.

***Syrphophilus asperatus* Dasch 1964a**

Colouration of females. Antenna black. Head and mesosoma black, face with yellow inner orbits, yellow on clypeus, mouthparts, hind corner of pronotum, tegula, sometimes subtegular ridge, at least a small shoulder mark, and upper mesepimeron; scutellum orange, often with apex yellow. Mesopleuron, mesosternum and often metapleuron dark orange. Legs including all coxae orange; femora orange; hind tibia orange to whitish basally, remainder and hind tarsus dark. Metasoma black, often with some dark orange colour on hind margins of tergites 2 to 5.

Colouration of males. As in females but with yellow ventrally on scape and sometimes antenna, large central face patch or entire face, lower propleuron, epicnemium, sometimes a stripe on lower mesopleuron, and sometimes part of mesosternum; scutellum with an apical spot or largely yellow. Fore coxa entirely yellow, mid coxa orange with a yellow apex, hind coxa orange. Metasoma black but sometimes with yellow spots apically on third segment.

Material examined. New for Finland: EnL Enontekiö, Jokasjärvi 7686:280, leg. Jussila, 11.–15.VII.2007. 2♂, 1♀, at ZMUC.

Additional material. Sweden: Norrbotten, Kiruna kommun, Abisko, leg. J.E. & R.B. Benson, 13.VII.1954. 1♀; Stockkholms län, Dalarö Malmen, leg. J.Q.&T.H., 15.–26.VIII.1976. 1♀, both at BMNH. Värmland, Munkfors kommun, Ransäter, Ransbergs herrgard. Old mixed deciduous ofrest in stream ravine, N59°47'25.59", E13°24'54.61", leg. SMTP, 10.VII.–24.VII.2005. 1♂, and 18.VI.–27.VI.2005. 1♀; Västerbotten, Sorsele kommun, Ammarnäs, Vindelfjällens naturreservat, Tjulträsklaspen, Alpine birch wood., N65°58.007', E16°03.630', leg. SMTP, 27.VI.–17.VII.2005. 2♀; Norrbotten, Kiruna kommun, Abisko NP, Bare mountain above tree limit, 900m.a.s.l., N68°21.648', E18°43.245', leg. SMTP, 26.VI.–15.VII.2006. 5♀; Norrbotten, Pajala kommun, Vasikkavuoma, mowable bog, N67°13.778', E23°11.200', leg. SMTP, 25.VI.–30.VI.2004. 1♀; Abisko, leg. Krogerus, 6.VII.1939. 1♀; Torne Tr., leg. Malaise, 7.VII.1917. 1♀; all at NRM; Kiruna, 22.VII.1964, 1♀, at ZSM.

Distribution. Holarctic.

Figures. Habitus (Fig. 35A), male terminal sclerites (Fig. 38D).

Syrphophilus bizonarius (Gravenhorst 1829, *Bassus*)

Bassus cingulatus Holmgren 1858
Bassus frontalis Brischke 1878 (homonym)
Zootrephes inconstans Davis 1895
Bassus saginatus Provancher 1879
Homocidus iwatensis Uchida 1930
Homocidus satoi Uchida 1930

Diagnosis. Fore wing length 3.5–4.5 mm. Antenna of both sexes with 17–21 flagellomeres. Mesoscutum smooth and shining between weak punctures. Mesopleuron smooth and shining between weak punctures which are more than their diameter apart. Sternaulus strongly impressed. Propodeum with a full set of strong carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. First tergite with median dorsal carinae strongly developed at least on basal half. Second and third metasomal tergites strongly punctate against a smooth and polished or sometimes more coriaceous background.

Colouration of females. Antenna brown to orange, often paler below. Head and mesosoma black, face with yellow inner orbits, yellow on clypeus, mouthparts, hind corner of pronotum, tegula, sometimes subtegular ridge, small to large shoulder mark, and upper mesepimeron; scutellum usually yellow, at least with yellow apex. Legs orange, coxae and often mid and hind trochanters black; femora orange, marked with black below, sometimes hind femur all dark; hind tibia orange with apex and sometimes base dark, hind tarsus dark. Metasoma orange on tergites 2 to 3 or 4 but sometimes dark and only with orange or yellow apical bands on tergites 2 to 3.

Colouration of males. As in females but with yellow ventrally on scape, pedicel and sometimes basal flagellomeres, face with yellow inner orbits and a central yellow spot. Fore and mid coxae sometimes entirely yellow, hind coxa black with a yellow apex. Metasoma as in females but often tergites 2 and 3 black basally.

Material examined. Lectotype of *Bassus cingulatus* Holmgren: Sweden, Lapland, leg. Boheman. 1♂, at NRM.

New for North Korea: Prov. Ryang-Gang, Hyesan, Mt. Ze-dong, 1150m, leg. J.Papp & J.Vojnits, 26.VII.1975. 2♂, at TMA. New for Ukraine: SE, Lugansk reg, Provalie, leg. Osipov, 23.V.2003. 1♀, at MR. New for Vietnam: Tonkin, Hoang Lien N.R., 10 km SW Sa Pa, c. 1550m, leg. C.v.Achterberg, 23.X.1999. 1♀, 26.–28.X.1999. 1♀, 24.X.1999, 1♀, all at RMNH.

Finland (6), Germany (2), Hungary (12), Italy (1), North Korea (2), Norway (3), Russia (6), Spain (1), Sweden (>100), Switzerland (50), Turkey (2), Ukraine (1), United Kingdom (1), Vietnam (3).

Distribution. Holarctic and Oriental.

Figures. Sternaulus (Fig. 25A), habitus (Fig. 35B).

Syrphophilus scabriculus (Holmgren 1858, *Bassus*)

Bioblapsis tricincta Ashmead 1902 (syn. nov.)

Diagnosis. Fore wing length 3.5–4.8 mm. Antenna of both sexes with 16–18 flagellomeres. Mesoscutum smooth with some fine sculpture centrally, punctures with margins indistinct and restricted to anterior margin.

Mesopleuron smooth with some fine sculpture on lower half. Sternaulus weakly impressed. Propodeum with a full set of strong carinae enclosing basal, lateral and petiolar areas, the areas with rugose to coriaceous sculpture. First tergite with median dorsal carinae usually only present on basal third. Second and third metasomal tergites with punctures indistinct against the rugulose or coriaceous background.

Colouration of females. Antenna black. Head and mesosoma black, yellow inner orbits often restricted to above the antennae, yellow or orange on clypeus and mouthparts, yellow on hind corner of pronotum, tegula, and sometimes upper mesepimeron; without yellow shoulder marks, scutellum black. Legs orange, coxae and trochanters black; femora orange, marked with black ventrally; hind tibia orange with apex dark, hind tarsus dark. Metasoma black with orange or yellow apical bands on tergites 2 to 3 or 4.

Colouration of males. As in females but with yellow ventrally on scape and pedicel, face with yellow inner orbits and a central yellow spot, mesosoma black. Fore and mid coxae with yellow apices, trochanters sometimes yellow. Metasoma as in female.

Material examined. Lectotype of *Bassus scabriculus* Holmgren: Sweden, Dalarna, leg. Boheman. 1♀, at NRM (hereby designated). Holotype ♂ of *Bioblapsis tricincta* Ashmead: USA, Alaska, Berg Bay, 10.VII.1899, 1♂ (damaged), at USNM.

New for Finland: InL Utsajoki, Kevo, leg. Jussila, 13.VII.1959. 1♂, 1♀, at NMBE; EnL, Enontekiö, Toskaljärvi 7689:280, leg. Jussila, 15.VII.2007. 1♀, at RJ; InL Utsajoki, Kevo, leg. Jussila, 13.VII.1959. 1♂, at RJ; Utsjoki Li, leg. Karvonen, 2.VII.1967. 1♀, at RJ. New for Norway: Dovrefjell, Kongsvoll, 1000–1500m, leg. J.E. & R.B. Benson, 25.VI.–3.VII.1966. 1♀, 8.–27.VI.1967. 3♂, 4♀; Buskerund Fylke, Geijo, 1000–1100m, leg. J.E. & R.B. Benson, 16.–24.VI.1965. 1♀; all at BMNH; Telemark, 3 km E Kalhovd, 900–1000m, N60°04', E8°23', leg. Munk, 27.VII.1987. 2♀, at MR.

Canada (1), Finland (4), Norway (11), Sweden (30).

Distribution. Holarctic.

Figures. Habitus (Fig. 35C).

Notes. This species was formerly known as *Syrphophilus tricinctus* (Ashmead), but examination of the type of *Bassus scabriculus* Holmgren showed that this is not a synonym of *S. tricinctorius* but instead identical with the former species.

Syrphophilus stibarus Momoi 1973

Syrphophilus dilleriator Aubert 1976

Diagnosis. Fore wing length 4.2–5.5 mm. Antenna in females with 16–17 flagellomeres, in males with 17–19 flagellomeres. Mesoscutum smooth and shining between weak to strong punctures. Mesopleuron smooth and shining between strong punctures which are separated by less than their diameter. Sternaulus weakly to strongly impressed. Propodeum with a full set of strong carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. First tergite with median dorsal carinae at most weakly indicated on part of tergite. Second and third metasomal tergites very strongly punctate against a smooth and polished background.

Colouration of females. Antenna black or brown. Head and mesosoma black, face with yellow inner orbits and often yellow central face patch, yellow on clypeus, mouthparts, hind corner of pronotum, tegula, sometimes subtegular ridge, small to large shoulder mark, and often upper mesepimeron; scutellum partly yellow, at least with yellow apex. Legs orange, coxae and all trochanters black, fore and sometimes mid coxae often with yellow apex; femora orange, marked with black below, sometimes hind femur all dark; hind tibia orange with apex or dorsal side dark, hind tarsus dark. Metasoma orange on tergites 2 to 3 or 4 but sometimes dark and only with orange or yellow posterior bands on tergites 2 to 3.

Colouration of males. As in females but with yellow ventrally on scape, pedicel and sometimes entire antenna, face entirely yellow or with yellow inner orbits and a central yellow spot, and yellow on parts of epicnemium. Fore and mid coxae and their trochanters usually entirely yellow, hind coxa black with a yellow apex. Metasoma as in females but often tergites 2 and 3 black basally.

Material examined. Lectotype ♀ and paralectotypes of *Syrphophilus stibarus* Momoi (lectotype examined, TMA): Mongolia, Bajan-Ölgij aimak, in the valley of the Chavealyn gol river, 25 km East of Somon, Cagannuur, 1850 m, leg. Dr. Z. Kaszab, 3.VII.1968. 2♂, 2♀, at TMA. Holotype of *Syrphophilus dilleriator* Aubert: France, Alpes-Maritimes, Col de la Lombarde, 2400m, 7.VIII.1969. 1♀, at MZL.

New for Turkey: Pr. Hakkari, Suvari Halil-Pass, SE Beytisebap, 2300m, leg. W.Schacht, 2.VIII.1982. 1♂; Hakkari, Mt. Sat, südlicher Sat-Gölü, 2800m, leg. Warncke, 7.VIII.1983. 1♂; both at ZSM.

Additi onal material. France: Col du Lautaret, N45.0225, E06.2142, 6.VIII.1982. 1♀, 9.VIII.1982. 1♂, both at ZSM. Switzerland: Valais, Champéry, Col de Bretolet, 1920m, N46.143, E6.7968, 23.VII.1964. 1♀, at MZL.

Distribution. Palaearctic.

Syrphophilus tricinctorius (Thunberg 1824, *Ichneumon*)

Bassus cinctus Gravenhorst 1829
Bassus lateralis Gravenhorst 1829
Bassus albicinctus Desvignes 1862
Bassus scapulatus Provancher 1883
Homocidus takaozanus Uchida 1930
Syrphophilus niveus Dasch 1964a

Diagnosis. Fore wing length 4.6–5.9 mm. Antenna of both sexes with 19–21 flagellomeres. Mesoscutum smooth and shining between weak punctures. Mesopleuron smooth and shining between weak punctures which are more than their diameter apart. Sternaulus weakly to strongly impressed. Propodeum with a full set of strong carinae enclosing basal, lateral and petiolar areas, the areas with rugose to coriaceous sculpture. First tergite with median dorsal carinae strongly developed at least on basal half. Second and third tergites with punctures indistinct against the rugulose or coriaceous background.

Colouration of females. Antenna black or brown. Head and mesosoma black, face with yellow along inner orbits, yellow on clypeus, mouthparts, hind corner of pronotum, tegula, usually subtegular ridge, small to large shoulder mark, and often upper mesepimeron; scutellum partly yellow, at least with yellow apex. Legs orange, coxae black, fore and mid coxae with yellow apices, trochanters yellow; femora orange; hind tibia orange with apex dark, hind tarsus dark. Metasoma black, often with small spots on posterolateral corners of tergites 2 to 3 or 4.

Colouration of males. As in females but with yellow ventrally on scape, pedicel and sometimes basal flagellomeres, face entirely yellow, yellow on propleuron, epicnemium, front part of mesosternum, and often a stripe or dot on lower mesopleuron. Fore and mid coxae entirely yellow, hind coxa black with a yellow apex. Metasoma black, usually with yellow apical bands on tergites 1 or 2 to 4 or 5.

Material examined. Holotype of *Ichneumon tricinctorius* Thunberg: Sweden, Uppsala. 1♂, at UU.

Finland (3), Germany (2), Hungary (10), Norway (4), Russia (5), Sweden (60), Switzerland (>100), United Kingdom (30).

Distribution. Holarctic and Oriental.

Figures. Metasoma (Fig. 14A)**,** sternaulus (Fig. 25B), habitus (Fig. 33F).

Tymmophorus Schmiedeknecht 1913

Type species. *Tymmophorus lacustris* Schmiedeknecht 1913

Diagnosis. *Tymmophorus* species can readily be identified by the following combination of characters: spiracles of the second and third tergites on the dorsal parts, notauli strongly impressed, usually only tergite 1 with a distinct transverse impression. Some *Syrphophilus* species with indications of notauli can be mistaken for *Tymmophorus* species. However, the notauli of *Tymmophorus* are very strongly impressed while being indistinct in *Syrphophilus*.

Face coriaceous and matt, without vertical impressions, in females black with yellow along inner orbits, these sometimes restricted to frons or completely absent, in males black with yellow inner orbits or entirely yellow. Clypeus with apical margin thin, flat or with a basal elevation that makes it concave in profile. Antenna with apical flagellomeres longer than wide, without tyloids and without long setae. Mesoscutum with notauli comparatively long, reaching one third of length of mesoscutum, always deeply impressed; smooth and shining with some weakly to strongly coriaceous areas, or evenly punctate; yellow shoulder marks usually present; mesopleuron entirely smooth and shining or weakly punctate on lower and front half, rarely mostly coriaceous (in *T. gelidus* Dasch);

epicnemial carina complete ventrally. Propodeum with a full set of carinae enclosing basal, petiolar and lateral areas; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet absent; hind wing with 2–4 basal hamuli. Hind tibia orange to brown. Female metasoma dorsoventrally depressed to strongly compressed from apex of fourth segment, tergites with hind margins convex, with subapical transverse impressions sometimes weakly indicated on tergites 1 and 2. First tergite with or without median dorsal carinae, if present, they are widely separated. Second and third tergites with spiracles dorsal, above lateral folds. Metasoma black, tergites 2–5 usually with orange or yellow hind margins, or mainly orange. Ovipositor sheaths 0.3 times as long as hind tibia, parallel-sided and fully enclosing ovipositor, basally smooth, apically with dense and conspicuous setae. Males with tergites 9 and 10 fused as a syntergum, sternite 9 about 1.5 times wider than long, emarginated apically, thus forming two lobes, their outer corners rounded.

Phylogeny. The genus *Tymmophorus* was not recovered as monophyletic by molecular data as *T. obscuripes* clustered either with *Campocraspedon* or basal to a clade including the genera *Campocraspedon*, *Syrphophilus* and the two other *Tymmophorus* species. The position of *T. obscuripes*, however, was unstable, and additional data are needed to clarify the status of this morphologically rather well-defined genus.

Distribution. Holarctic. This is a small genus including the four Holarctic species discussed here, plus three Nearctic and one Eastern Palaearcthic species.

Biology. The only reliable host records come from the genus *Platycheirus* (Syrphinae, Bacchini, Townes 1945; Maibach & Goeldlin de Tiefenau 1991).

Key to species

1. Notauli only weakly impressed, without transverse carinulae . . . . . cf. *Syrphophilus* sp.
- Notauli very strongly impressed, often with fine transverse carinulae in the impressions and sometimes interrupting yellow shoulder marks, if present 2
2. All coxae and at least most of hind trochanter black. Femora usually extensively marked with black. Metasoma black, at most with orange hind margins of tergites 2 to 4 or 5.. 3
- Fore and mid coxae mostly yellow, hind coxa black with a yellow tip, trochanters yellow. Femora orange, very rarely with some ventral black marks. Metasoma with at least most of tergite 3 orange 4
3. Mesoscutum smooth and shining between rather sparse punctures. Antenna with 18 to 20 flagellomeres. Mesopleuron mostly smooth but sometimes with some restricted coriaceous sections and weak punctures, especially along epicnemical carina . . . . . *Tymmophorus obscuripes* (Holmgren)
- Mesoscutum with notauli continued as strongly coriaceous bands towards scutellum. Antenna with 15 to 16 flagellomeres. Mesopleuron shiny coriaceous over most of its surface . . . . . *Tymmophorus gelidus* Dasch
4. Female metasoma dorsoventrally depressed, gradually tapered (Fig. 26A). Tergite 2 in females as long as basally wide, or at most 1.2 times longer. Orange on metasoma usually covering all of tergites 3, 4 and often 2, and at least part of tergite 5. Antenna usually all orange, often a bit darker dorsally (males can be difficult to identify). . . . . *Tymmophorus suspiciosus* (Britschke)
- Female metasoma dorsoventrally depressed basally but strongly compressed laterally posterior to segment 4 (Fig. 26B). Tergite 2 at least 1.3 times as long as basally wide in females. Metasoma darker, with most of tergite 2 and all of tergite 5 dark. Antenna brown dorsally, orange or brown ventrally (males can be difficult to identify) . . . . . *Tymmophorus erythrozonus* (Förster)

Tymmophorus erythrozonus (Förster 1850, *Tryphon*)

Bassus rufiventris Gravenhorst 1829 (homonym)
Bassus holmgreni Bridgman 1882
Zootrephes antennatus Davis 1895
Tymmophorus lacustris Schmiedeknecht 1913

Diagnosis. Fore wing length 3.5–4.3 mm. Antenna of both sexes with 18–19 flagellomeres. Mesoscutum and mesopleuron entirely smooth and shining, mostly unsculptured, sometimes with some weak punctures along anterior margin. Propodeum with a full set of strong carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. Tergite 2 1.3–1.6 times as long as wide. Metasoma in females laterally compressed posterior to fourth segment, widest part of metasoma is thus at base or middle of third segment.

Colouration of females. Antenna brown, usually paler below but very rarely bright orange. Head and

mesosoma black, face with yellow along inner orbits, yellow or brown on clypeus and mouthparts, yellow on hind corner of pronotum, tegula, and sometimes upper mesepimeron; without yellow shoulder marks, scutellum black. Legs orange, coxae basally black with a yellow apex, fore coxa sometimes entirely yellow, trochanters yellow; femora orange, often dark basally; hind tibia and tarsus orange. Metasoma with orange markings on tergites 2 to 3 or 4, usually with tergite 2 black basally and tergite 4 partly dark.

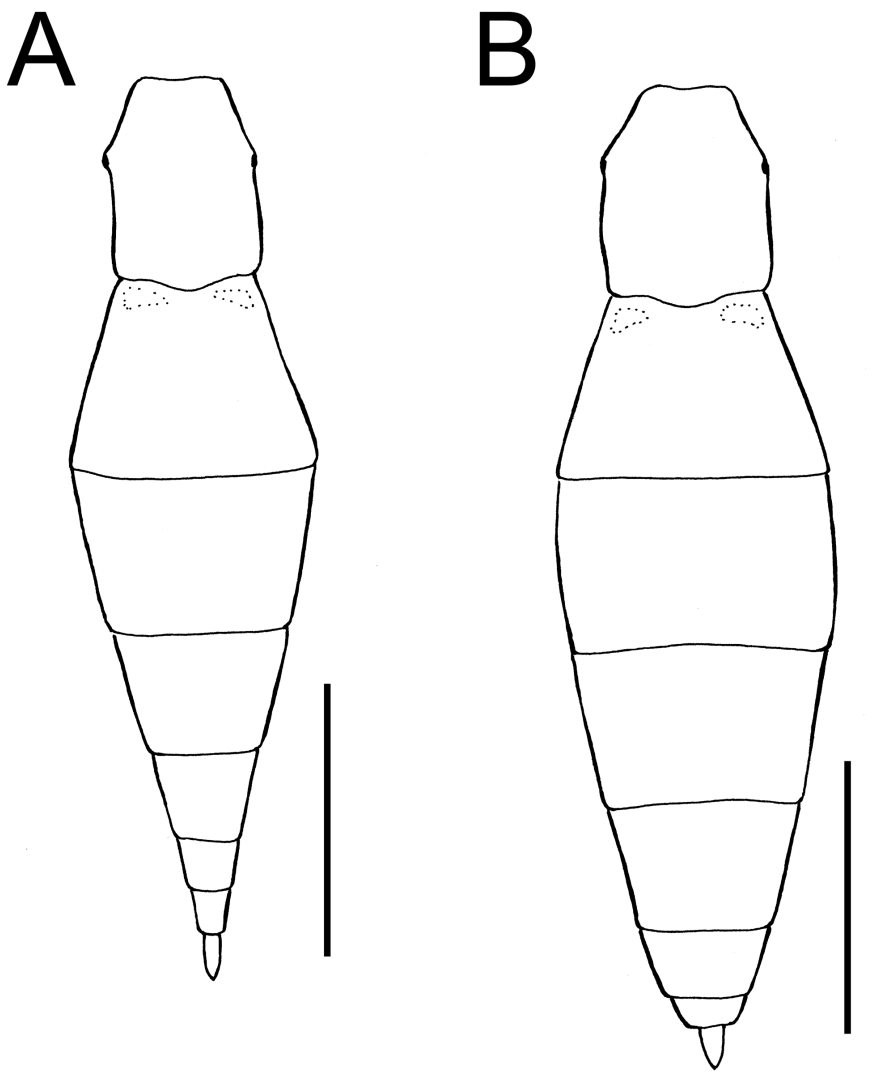

FIGURE 26. Metasomas of *Tymmophorus* species viewed from above. A. *Tymmophorus erythrozonus*. B. *Tymmophorus suspiciosus*. Scale bars represent 500 μm.

Colouration of males. As in females but with yellow ventrally on antenna, face entirely yellow or with black marks arising below antennal sockets, yellow marks often on lower propleuron and sometimes anteriorly on mesosternum. Fore and mid coxae all and hind coxa mainly yellow. Metasoma as in females but with orange colouration on metasoma often extending further back.

Material examined. New for North Korea: Mt. Pektusan, Explosion-Lake, 2000–2500m, leg. Dely&Draskovits, 18.VII.1977. 1♀, at TMA.

Finland (7), Germany (2), Netherlands (4), North Korea (1), Sweden (12), Switzerland (3).

Distribution. Palaearctic.

Figures. Metasoma ♀ (Fig. 26A), habitus (Fig. 35D), male terminal sclerites (Fig. 38E).

Notes. *Tymmophorus suspiciosus* Brischke has been removed from synonymy with *T. erythrozonus* here, but it remains unclear to which of the two taxa the other junior synonyms belong. Until the types can be studied, we thus do not change their status.

Tymmophorus gelidus Dasch 1964a

Diagnosis. Fore wing length about 3.5 mm. Antenna of both sexes with 15–16 flagellomeres. Mesoscutum with strongly coriaceous bands starting at notauli and extending back to scutellum, smooth and punctate in-between and laterally. Mesopleuron strongly coriaceous over most of its surface. Propodeum with a full set of strong carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. Tergite 2 about 0.8 times as long as wide in females. Metasoma in females dorsoventrally depressed, tapered towards apex.

Colouration of females. Antenna black or dark brown. Head and mesosoma black, face usually without yellow along inner orbits, dark brown on clypeus and mouthparts, yellow on tegula, usually without a shoulder mark; scutellum black. Legs mainly dark brown, coxae and trochanters black; femora extensively dark basally and dorsally, hind and usually also mid femur all dark; hind tibia and tarsus yellow to light brown, tibia with dark apex and a quite well-defined subbasal mark. Metasoma black.

Colouration of males. As in female.

Material examined. New for Europe / Sweden: Norrbotten, Kiruna kommun, Abisko NP, Bare mountain above tree limit, 900m.a.s.l., N68°21.648', E18°43.245', leg. SMTP, 26.VI.–15.VII.2006. 1♀, at NRM.

Additional material examined: Canada, Manitoba, Churchill, on tundra, leg. J.E. & R.B. Benson, 7.VII.1956, 1♂, at BMNH.

Notes. This species was described from the Arctic zone in the Northwest Territories and Greenland (Dasch 1964a) and only a single female has up to now been found in northern Sweden. The description is thus based partly on Dasch's original description.

Tymmophorus obscuripes (Holmgren 1858, *Bassus*)

Bassus rufocinctus Desvignes 1862
Bassus arcticus Holmgren 1869
Promethes luctuosus Schmiedeknecht 1926
Tymmophorus nigrofemoratus Dasch 1964a

Diagnosis. Fore wing length 3.4–4.1 mm. Antenna of both sexes with 17–19 flagellomeres. Mesoscutum smooth between irregular, rather weak punctures which are often denser towards anterior margin. Mesopleuron smooth and shining, at most with some weak punctures along anterior margin and very restricted coriaceous areas. Propodeum with a full set of strong carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. Tergite 2 0.8–1.1 times as long as wide. Metasoma in females dorsoventrally depressed, tapered towards apex.

Colouration of females. Antenna black or dark brown. Head and mesosoma black, face with yellow inner orbits which are sometimes restricted to frons, yellow or brown on clypeus and mouthparts, yellow on hind corner of pronotum, tegula, shoulder mark, and sometimes upper mesepimeron; scutellum black. Legs mainly orange or brown, coxae and trochanters black; femora extensively dark basally, hind femur often all dark; hind tibia and tarsus yellow or light brown, tibia sometimes with dark apex and a weak subbasal mark. Metasoma black, often with orange apical bands on tergites 2 to 4 or 5.

Colouration of males. As in female, including black face with yellow along inner orbits.

Material examined. Lectotype of *Bassus obscuripes* Holmgren: Sweden, Västra Götalands län, leg. Boheman. 1♀, at NRM (hereby designated).

New for North Korea: Mt. Pektusan, Explosion-Lake, 2000–2500m, leg. Dely&Draskovits 18.VII.1977. 1♀, at TMA.

Austria (1), Finland (4), Germany (7), Hungary (6), Netherlands (1), North Korea (1), Norway (2), Sweden (>100), Switzerland (>100), United Kingdom (70).

Distribution. Holarctic.

Figures. Metasoma ♀ (Fig. 7C), propodeum (Fig. 9C, 13C), head (Fig. 12F), habitus (Fig. 35E), male terminal sclerites (Fig. 38F).

Tymmophorus suspiciosus (Brischke 1871, *Bassus*) (stat. rev.)

Diagnosis. Fore wing length 3.5–4.5 mm. Antenna of both sexes with 18–19 flagellomeres. Mesoscutum and mesopleuron entirely smooth and shining, mostly unsculptured, sometimes with some weak punctures along anterior margins. Propodeum with a full set of strong carinae enclosing basal, lateral and petiolar areas, the areas with rugose sculpture. Tergite 2 0.9–1.2 times as long as wide. Metasoma in females dorsoventrally depressed and gradually tapered, widest part of metasoma at apex of third or base of fourth segment.

Colouration of females. Antenna usually bright orange, at least ventrally. Head and mesosoma black, face with yellow along inner orbits, yellow or brown on clypeus and mouthparts, yellow on hind corner of pronotum, tegula, and sometimes upper mesepimeron; without yellow shoulder marks, scutellum black. Legs orange, coxae basally black with a yellow apex, fore coxa sometimes entirely yellow, trochanters yellow; femora orange, often dark basally; hind tibia and tarsus orange. Metasoma with orange markings on all of or apex of tergite 2, usually all of tergites 3 and 4, and usually part of 5.

Colouration of males. As in females but with yellow ventrally on antenna, face entirely yellow, yellow marks often on lower propleuron and sometimes anteriorly on mesosternum. Fore and mid coxae all and hind coxa mainly yellow. Metasoma as in female, or with orange colouration extending further back.

Material examined. New for Austria: Salpburg, Pass Thurn, 1200m, leg. Haesselbarth, 8.IX.1968. 1♂, at ZSM. New for Belgium: Liège, Büllingen, leg. K.Zwakhals, 25.VI.1983. 1♀, at KZ. New for Norway, Oslo, Kvarner, EIS 28, leg. Morten Falck, 12.–26.VI.1990. 1♂, at MR.

Austria (1), Belgium (1), Finland (4), Germany (1), Hungary (6), Netherlands (5), Norway (1), Sweden (60), Switzerland (30), United Kingdom (2).

Distribution. Palaearctic, and probably also Nearctic (Dasch 1964a).

Figures. Clypeus (Fig. 12H), metasoma ♀ (Fig. 26B), habitus (Fig. 35F).

Woldstedtius Carlson 1979

Type species. *Bassus biguttatus* Gravenhorst 1829

Diagnosis. The Western Palaearctic species of *Woldstedtius* are quite uniform in morphology, whereas the Neotropical species show a larger variation. In the Western Palaearctic, the genus can be recognized by the transversely truncate ovipositor sheaths which leave the tip of the ovipositor exposed, by the lack of notauli, areolet or tyloids in males, and the very even, weakly coriaceous microsculpture. Except for three very rare species, the hind tibia is black with a white base, a character only shared by *Enizemum* species. From *Enizemum*, *Woldstedtius* species can readily be identified by the lack of or short median dorsal carinae on the first two tergites which reach at most over half the tergite and are about as far apart as they are distant from the sides of the tergite.

Face coriaceous and matt, without vertical impressions, in females entirely black or with a yellow central patch, in males entirely yellow. Clypeus with apical margin thin, with a basal elevation that makes it flat or even convex in profile, relatively broad and short. Antenna with apical flagellomeres longer than wide, without tyloids and without long setae. Mesoscutum without notauli; weakly punctate on a strongly coriaceous background, yellow shoulder marks present or absent; mesopleuron mostly coriaceous, often rather smooth and shining on upper half, with or without punctures; epicnemial carina complete ventrally. Propodeum with carinae partly or more often fully reduced, enclosing only lateral areas or no areas at all; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet absent; hind wing with 2–3 basal hamuli. Hind tibia usually black with a white base, in males with light colouration often extending to half the length of the tibia, rarely hind tibia all dark (*W. melanocnemis*) or yellow or orange with a dark apex (in *W. nigrolineatops*). Female metasoma dorsoventrally depressed, tergites convex, without transverse impressions, with median dorsal carinae absent or weakly indicated basally. Second and third tergites with spiracles dorsal, above lateral folds. Metasoma black, in males often with yellow markings on tergites 3 and 4. Ovipositor sheaths 0.3 times as long as hind tibia, parallel-sided and not compressed, about circular in cross-section, transversely truncate and open towards apex, with dense setae apically. Males with tergites 9 and 10 as separate sclerites, sternite 9 about two times wider than long, emarginated apically, thus forming two lobes, their outer corners rounded (in *W. citropectoralis*, sternite 9 with a median weakly sclerotized area, making it superficially unilobate).

Phylogeny. The monophyly of the five common Western Palaearctic *Woldstedtius* species is supported by numerous morphological and molecular characters (Klopfstein *et al.* 2010a; Klopfstein *et al.* 2011). The rare *W. melanocnemis* and *W. nigrolineatops* are more divergent morphologically, and have not been analyzed by molecular methods. However, they fit well into the circumscription of the genus when also considering the tropical representatives.

Distribution. Worldwide, except Afrotropics. This is the only genus discussed here with a predominantly tropical disbtribution; of the 36 currently recognized species, 17 have been reported from the Neotropics and five from Australasia. The distribution gap in the Afrotropics might only represent the lack of sampling in this region.

Biology. *Woldstedtius* species have been reared from a wide range of Syrphinae, including some Pipizini and Bacchini (Thirion 1994).

Notes. There is rather little morphological variation found in the Western Palaearctic species and one often has to rely on colour characters. Males of most species are often difficult to identify because of large intra-specific variation, especially in the colour of the coxae. The key given below thus only partly works for male specimens.

Key to species

1. Hind tibia black with a white base (Fig. 13B), or entirely black. Propodeum usually with carinae completely reduced 2
- Hind tibia mostly orange or yellow with a dark apex. Propodeum with petiolar area at least partly enclosed or indicated by carinae, its surface rugose 7
2. Mid coxa mainly black, either with a yellow or reddish apex, hind coxa at least basally black (males may have to be traced through both halves of the couplet). 3
- Mid and hind coxae entirely orange 4
3. Antenna with 24 to 25 flagellomeres. Mid coxa black with a yellow stripe or spot on outer surface. Central face patch in females large, covering almost entire elevated central part. Larger species, fore wing length 4.1–5.5 mm. . . . . *Woldstedtius holarcticus* (Diller)
- Antenna with 21 to 23 flagellomeres. Mid coxa black basally, irregularly yellow apically, or with some reddish parts. Central face patch in females smaller, distinctly narrower than elevated central part. Smaller species, fore wing length 3.5–4.9 mm . . . . . *Woldstedtius bauri* **sp. nov.**
4. Hind tibia entirely black or dark brown. Propodeum with carinae mostly reduced but with apical parts of median longitudinal carinae present, often with transverse carina indicated by rugae and with some rugae centrally on petiolar area. . . . . *Woldstedtius melanocnemis* (Bauer)
- Hind tibia black with more or less extended white base. Propodeum with carinae reduced, at most with very short posterior parts of longitudinal carinae, coriaceous and matt also on petiolar area. 5
5. Antenna with 21 or fewer flagellomeres, very rarely with 22. In males, face conspicuously widened ventrally, inner orbits much further apart from each other below than above (Fig. 27A), less so in females (Fig. 27B). Propodeum sometimes with orange markings which can extend to mesopleuron and/or to first metasomal tergite . . . . . *Woldstedtius citropectoralis* (Schmiedeknecht)
- Antenna with 22 or more flagellomeres. Face not conspicuously widened ventrally (Fig. 27C, D). Propodeum black, but metasoma sometimes marked with orange 6
6. Yellow coloration reduced, females without central face patch and shoulder marks, males with mesopleuron yellow only in front of epicnemial carina, at most with small shoulder marks. Smaller species, fore wing 3.5–4.5 mm. Face broad and not very high (Fig. 27C) . . . . . *Woldstedtius biguttatus* (Gravenhorst)
- Yellow coloration well developed, females with yellow face patch, males with mesopleuron yellow on more than half of its surface, both sexes usually with yellow shoulder marks. Large species, fore wing length 4.3–6.3 mm. Face not conspicuously broad (Fig. 27D) . . . . . *Woldstedtius flavolineatus* (Gravenhorst)
7. Fore and mid coxae black with yellow apices, hind coxa orange with a black base and yellow apex. Femora usually with a black line on ventral surface, hind femur with base and apex often yellow. Mesopleuron irregularly wrinkled. Metapleuron black. Larger species, fore wing length 4.9–5.2 mm . . . . . *Woldstedtius nigrolineatops* (Bauer)
- Coxae red, only base of fore coxa dark, but trochanters marked with black. Femora all red. Mesopleuron evenly coriaceous and with inconspicuous punctures. Metapleuron marked with red below. Smaller species, fore wing length 4.6–4.8 mm . . . . . *Woldstedtius patei* Dasch

Etymology. This species is gratefully dedicated to the entomologist and chalcidologist Hannes Baur who introduced me to the varied and inspiring work with Hymenoptera.

Diagnosis. Fore wing length 3.4–4.9 mm. Antenna of both sexes with 20–23 flagellomeres. Face not broadened, not conspicuously widened ventrally. Mesopleuron finely and evenly coriaceous. Propodeum devoid of carinae, evenly coriaceous also on petiolar area.

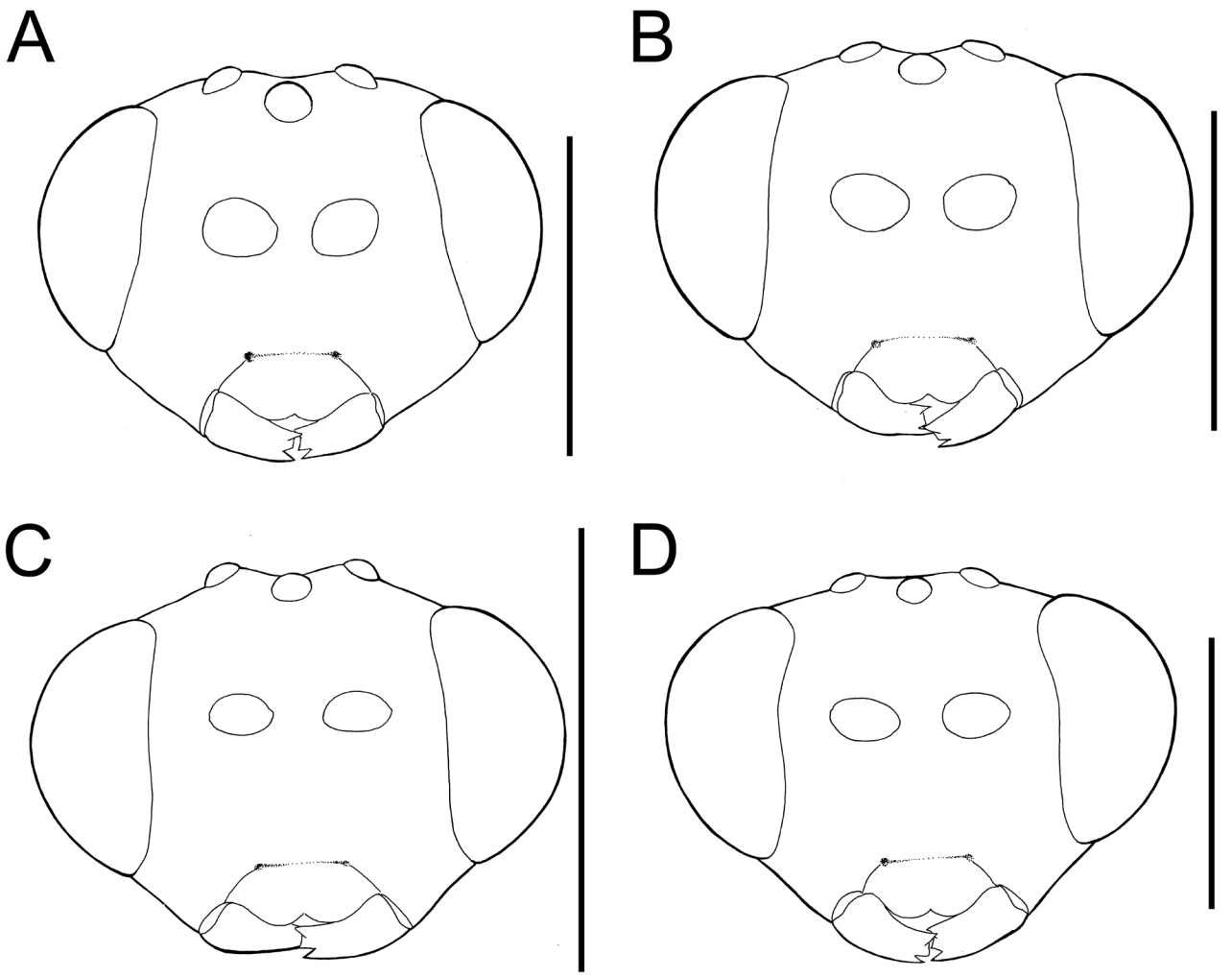

FIGURE 27. Faces of the more common *Woldstedtius* species. A. *Woldstedtius citropectoralis* ♂. B. *Woldstedtius citropectoralis* ♀. C. *Woldstedtius biguttatus* ♀. D. *Woldstedtius flavolineatus* ♀. Scale bars represent 500 µm.

***Woldstedtius bauri* sp. nov.**

Description. Antenna with multiporous plate sensilla present also on ventral surface of flagellomeres but often sparser than dorsally. Face very weakly elevated centrally, without vertical depressions; strongly and evenly coriaceous, at most centrally with some very indistinct punctures. Clypeus separated from face by a shallow groove, elevated basally, remainder flat or weakly concave, bilobed; coriaceous over entire surface, with some weak longitudinal striae apically. Head strongly constricted behind compound eyes. Mesoscutum strongly and evenly coriaceous and matt, with some indistinct punctures, without notauli; scutellum entirely coriaceous and matt, with lateral carinae only present basally. Mesopleuron strongly coriaceous and matt over entire surface except for a smooth area around mesopleural fovea, often more roughly coriaceous or rugose on lower than upper mesopleuron; sternaulus very weakly impressed, epicnemial carina complete also ventrally. Metapleuron coriaceous and matt. Propodeum with carinae almost completely reduced but often with front part of pleural carina and sometimes very short traces of apical part of lateral longitudinal carina present; evenly coriaceous and matt. Fore wing areolet open, vein 1cu-a usually apical of vein M; hind wing with two or three basal hamuli, vein CU+cu-a broken slightly below middle. Hind coxa coriaceous and matt. Metasoma dorsoventrally depressed; hind margins of all tergites straight or convex; tergites entirely coriaceous and matt, tergite 1 with weak longitudinal carinae on about basal half, with some longitudinal striae parallel to them; tergite 2 finely striate basally. Second and third tergites with spiracles dorsal, above lateral folds. Ovipositor sheaths straight, stout, with tip transversely truncate apically so that ovipositor tip is often protruding from it; coriaceous and with dense but rather short setae over entire surface but very concentrated around tip.

Colouration of females. Antenna black. Head and mesosoma black, face usually with a small yellow face patch which is smaller than central elevated area, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, usually subtegular ridge, and upper mesepimeron; without yellow shoulder marks, scutellum at most with a small yellow apical spot. Legs orange, fore coxa mainly yellow with black base, mid and hind coxae mainly black with a yellow apex, often with traces of reddish colour; femora orange; hind tibia black with a white base, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, and small yellow shoulder marks; yellow on epicnemium; mesosternum and lower mesopleuron variously marked with yellow, often mainly yellow. Coxae mainly yellow, hind coxa usually marked with orange and black. Metasoma black with yellow spots basally on tergites 3 and often 4

Similar species. *W. bauri* is similar to *W. biguttatus*, from which it can be distinguished by the more extensive yellow colouration and the dark coxae. It might also be confused with *W. citropectoralis*, the species with which it clusters in the molecular studies (Fig. 6); *W. bauri,* however, has longer antennae, the inner orbits close to parallel and the coxae dark.

Type material. Holotype ♀ at NRM: Sweden, Småland, Nybro kommun, Bäckebo, Grytsjöns naturreservat, N56°55'17.96", E16°6'4.42", Malaise trap, leg. Swedish Malaise Trap Project, 2.–12.VII.2005. Labels: "SWEDEN Sm, Nybro; komun, Bäckebo,; Grytsjöns naturreservat,; N6310596 E1518027 (=Trap ID 1000)" [coordinates on label incorrect], "Old aspen forest in boulder terrain CollID; 1323. 2.VII.–12.VII.2005 ; Leg.Swedish MT Project", "Extraction plate 4; 4-D7; label: SKlopfstein 2008", "Holotype; Woldstedtius ♀; bauri n.sp.; det. S.Klopfstein 2010". Paratypes: As holotype, 1♀, at NRM. Sweden, Småland, Gränna kommun, Lönnemalen, next to old cellar in Norway spruce forest with big harvested ashes, N58°02.935', E14°34.382', leg. SMTP, 01.VII.–17.VII.2005. 1♀, at NRM. Sweden, Östergottland, Ödeshögs kommun, Omberg, Storpissan, N58°20.095', E14°39.300, 28.V.–5.VII.2005, 3♀, at NRM. Sweden, Småland, Nybro kommun, Alsterbro/Alsteran. Mixed forest, N56°56'11.53", E15°55'12.60", leg. SMTP, 01.VI.–10.VI.2006, 1♀, 05.VII.–10.VII.2005, 1♀, both at NRM.

Additional material. Sweden (13), Switzerland (2), United Kingdom (14).

Distribution. Western Palaearctic.

Figures. Habitus (Fig. 36A), male terminal sclerites (Fig. 38G).

Woldstedtius biguttatus (Gravenhorst 1829, *Bassus*)

Bassus rufipes Gravenhorst 1829 (homonym)
Bassus confusus Woldstedt 1874

Diagnosis. Fore wing length 3.7–4.5 mm. Antenna of both sexes with 22–23 flagellomeres. Face broadened, not conspicuously widened ventrally. Mesopleuron finely and evenly coriaceous. Propodeum devoid of carinae, evenly coriaceous also on petiolar area.

Colouration of females. Antenna black or brown. Head and mesosoma black, face including clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, sometimes subtegular ridge, and upper mesepimeron; without yellow shoulder marks, scutellum at most with a small yellow apical spot. Legs including all coxae orange, fore coxa often dark, at least basally; femora orange, hind femur often with a dark apex; hind tibia black with a white base, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, and small yellow shoulder mark; yellow colouration on mesopleuron restricted to area in front of epicnemial carina and sometimes a yellow spot in front of hind coxa. Fore and mid coxa often entirely yellow, hind coxa black or orange with a yellow apex. Metasoma black with yellow spots basally on tergites 3 and often 4.

Material examined. Austria (1), Finland (2), Germany (1), Hungary (30), Netherlands (1), Russia (2), Sweden (90), Switzerland (20), United Kingdom (2).

Distribution. Palaearctic.

Figures. Face ♀ (Fig. 27C), habitus (Fig. 36B).

Woldstedtius citropectoralis (Schmiedeknecht 1926, *Homocidus*)

Bassus abdominator Bridgman 1886 (homonym)

Diagnosis. Fore wing length 3.5–4.8 mm. Antenna of both sexes with 19–21, very rarely 22 flagellomeres. Face broadened and conspicuously widened ventrally, especially in males. Mesopleuron finely and evenly coriaceous. Propodeum devoid of carinae, evenly coriaceous also on petiolar area.

Colouration of females. Antenna black. Head and mesosoma black, face usually with a small yellow face patch which is smaller than central elevated area, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, sometimes subtegular ridge, with or without small shoulder marks, and upper mesepimeron; scutellum at most with a small yellow apical spot. Mesopleuron sometimes marked with orange below which can extend onto propodeum and first tergite. Legs including coxae orange, fore coxa often dark basally; femora orange; hind tibia black with a white base, hind tarsus dark. Metasoma black, sometimes with some orange markings.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, and small yellow shoulder marks; epicnemium, mesosternum and lower mesopleuron usually mostly yellow. Coxae mainly yellow, hind coxa usually marked with orange or black. Metasoma black with yellow spots or bands basally on tergites 3 to 4 or 5.

Material examined. New for Norway: Rygge, Ekeby, Gunnarsbekken, EIS 19 (Malaise trap), leg. L.O.Hansen & G.Walberg, 19.V.–17.VI.1992. 2♀, at MR.

Finland (7), Germany (2), Hungary (2), Norway (3), Russia (1), Sweden (60), Switzerland (20), United Kingdom (12).

Distribution. Holarctic.

Figures. Tip of metasoma with ovipositor sheaths ♀ (Fig. 15G), face ♂ (Fig. 27A), face ♀ (Fig. 27B), habitus (Fig. 36C), male terminal sclerites (Fig. 38H).

Woldstedtius flavolineatus (Gravenhorst 1829, *Bassus*)

Bassus bimaculatus Holmgren 1858
Bassus interruptus Holmgren 1858
Bassus agilis Cresson 1868
Bassus frontalis Cresson 1868 (homonym)
Mesoleius junctus Provancher 1883

Diagnosis. Fore wing length 4.3–6.3 mm. Antenna in females with 22–24, in males with 23–25 flagellomeres. Face not broadened, not conspicuously widened ventrally. Mesopleuron finely and evenly coriaceous. Propodeum mostly devoid of carinae but often with vestiges of petiolar carinae present apically, evenly coriaceous also on petiolar area.

Colouration of females. Antenna black. Head and mesosoma black, face usually with a large yellow face patch which often covers a large part of or entire central elevated area, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, sometimes subtegular ridge, with small to large shoulder marks, and upper mesepimeron; scutellum at most with a small yellow apical spot. Legs including coxae orange, fore coxa often dark basally; femora orange, hind femur sometimes with a dark apex; hind tibia black with a white base, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow ventrally on antenna, entire face, propleuron, epicnemium, mesosternum and most of lower mesopleuron. Coxae mainly yellow, hind coxa usually marked with orange or black. Metasoma black with yellow spots or bands basally on tergites 3 and sometimes 4.

Material examined. Lectotype of *Bassus bimaculatus* Holmgren: Sweden, Småland, leg. Boheman. 1♂, at NRM (hereby designated). Lectotype of *Bassus interruptus* Holmgren: Sweden, Småland, leg. Boheman. 1♂, at NRM (hereby designated).

Finland (2), Hungary (15), Russia (2), Sweden (24), Switzerland (7), United Kingdom (5).

Distribution. Holarctic, Oriental, Oceanic, and Neotropical.

***Woldstedtius holarcticus* (Diller 1969, *Syrphoctonus*)**

Diagnosis. Fore wing length 4.3–5.5 mm. Antenna of both sexes with 23–25 flagellomeres. Face broadened, not conspicuously widened ventrally. Mesopleuron finely and evenly coriaceous. Propodeum devoid of carinae, evenly coriaceous also on petiolar area.

Colouration of females. Antenna black. Head and mesosoma black, face with a large yellow central patch which almost covers elevated central area, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder mark, and upper mesepimeron; scutellum often with a small yellow apical spot. Legs orange, fore coxa black with a yellow apex, mid coxa black with apex and a stripe on dorsal side yellow, hind coxa black; femora orange, hind femur often with a dark apex; hind tibia black with a white base, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow on ventral surface of antenna, entire face, propleuron, epicnemium, mesosternum and most of lower mesopleuron. Coxae mainly yellow, hind coxa usually marked with black. Metasoma black with yellow spots or bands basally on tergites 3, 4 and 5, sometimes also on tergite 2.

Material examined. New for Sweden: Västernorrland, Ömsköldsviks kommun, Skuleskogen, Langra, Brook ravine in mixed forest, N63°05.323', E18°29.903', leg. SMTP, 25.VII.–9.VIII.2004. 1♀, at NRM. New for United Kingdom: Hants. Romsey, Awbridge, leg. C.Vardy, VIII.1981. 1♀, at BMNH.

Finland (6), Hungary (1), Sweden (30), Switzerland (40), United Kingdom (1).

Distribution. Holarctic and Oriental.

Figures. Metasoma ♀ (Fig. 7D), face ♀ (Fig. 7F), habitus (Fig. 36D), male terminal sclerites (Fig. 38I).

***Woldstedtius melanocnemis* (Bauer 1981, *Syrphoctonus*)**

Diagnosis. (Male unknown). Fore wing length 5.0–5.2 mm. Antenna in females with 23–24 flagellomeres. Face not broadened, not conspicuously widened ventrally. Mesopleuron finely and evenly coriaceous. Propodeum largely reduced, coriaceous only in part, petiolar area smooth and polished with lateral and median carinae or carinulae.

Colouration of females. Antenna black. Head and mesosoma black, face usually with a yellow or brown central face patch, clypeus black, yellow on mouthparts, hind corner of pronotum, tegula, sometimes subtegular ridge, with small to large shoulder marks, and often upper mesepimeron; scutellum at most with a small yellow apical spot. Legs including coxae orange, fore coxa often dark basally; femora orange, hind femur sometimes with a dark apex; hind tibia entirely black or dark brown, slightly paler basally, hind tarsus dark. Metasoma black.

Material examined. Holotype and paratypes of *Syrphoctonus melanocnemis* Bauer: Germany, Nürnberg, 30.VI.1967. 1♀, at ZSM; paratypes: Germany, Nürnberg, 14.VI.1957, 1♀, 4.VII.1976. 1♀, both at ZSM.

Notes. This species is to date only known from the type series and one female from Finland. The differences from *W. flavolineatus* are rather small, and it remains to be demonstrated that it represents a distinct species.

***Woldstedtius nigrolineatops* (Bauer 1981, *Syrphoctonus*)**

Diagnosis. Fore wing length 4.9–5.2 mm. Antenna of both sexes with 24–25 flagellomeres. Face not broadened, not conspicuously widened ventrally. Mesopleuron irregularly wrinkled. Propodeum strongly rugose, with petiolar area at least partly enclosed by carinae.

Colouration of females. Antenna black. Head and mesosoma black, face without a central patch, clypeus black, yellow or orange on mouthparts and sometimes hind corner of pronotum; scutellum black. Legs orange, fore and mid coxae black with yellow apices, hind coxa with a black base, remainder orange and yellow, all trochanters black-marked; femora orange, black-marked ventrally; hind tibia dark orange with apex dark, hind tarsus dark. Metasoma black.

Colouration of males. As in females but with yellow on ventral surface of antenna, entire face, hind corner of pronotum, large shoulder marks, tegula, subtegular ridge, upper mesepimeron, epicnemium, often along front of mesosternum. Coxae mainly yellow with a black base, hind coxa largely black with a yellow apex; hind femur orange with yellow marks basally and apically, hind tibia yellow or light brown with a dark apex. Metasoma black.

Material examined. Holotype of *Syrphoctonus nigrolineatops* Bauer: Austria, Vent, 15.VIII.1971. 1♂, at ZSM. Paratypes: Austria, Vent, 7.VIII.1971, 1♂, Austria, Allgäu, 7.VIII.1965, 1♂; both at ZSM.

New for Switzerland: Glarus, Linthal, Obersand, Melchplatz. 2051m, N46°50.387, E8°55.821, leg. S.Klopfstein, H.Baur & F.Marti, 17.–27.VIII.2008, 1♀, 28.VIII.–17.IX.2008. 1♀, both at NMBE. Valais, Col de Cou et Col de Bretolet, 1900m, 4.–10.IX.1966. 1♀, at ZSM.

Additional material. Austria, Tirol, Sölden, 1800m, leg. K.Zwakhals, 17.VIII.1975. 1♂, at KZ.

Distribution. Western Palaearctic (Alps).

Woldstedtius patei (Dasch 1964a, *Syrphoctonus*)

Diagnosis. (Male unknown). Fore wing length 4.6–4.8 mm. Antenna in females with 22 flagellomeres. Face not broadened, not conspicuously widened ventrally. Mesopleuron finely coriaceous and weakly punctate. Propodeum with posterior third of petiolar median longitudinal carinae present and with indication of petiolar carina and basal transverse carina, rugose on petiolar and lateral areas, more evenly coriaceous on metapleuron.

Colouration of females. Antenna black. Head and mesosoma black, face without a central patch, clypeus dark brown; orange on mouthparts, hind corner of pronotum, mesopleuron below and metapleuron; scutellum black. Legs and all coxae orange, fore coxa dark basally, trochanters marked with black; femora orange; hind tibia dark orange with apex dark, hind tarsus dark. Metasoma dark brown.

Material examined. Paratype of *Syrphoctonus patei* Dasch: USA, Alaska, Independence Mine, leg. W. C. Frohne, 6.VIII.1956, 1♀, at AEI.

New for Western Palaearctic, new for Sweden: Lapland, leg. Boheman, 10. VIII. New for Norway: Oppland, Dovre, leg. Boheman.

Distribution. Western Palaearctic, Nearctic.

Figures. Habitus (Fig. 36E).

Notes. This species is known only from the holotype and paratype from Alaska and Colorado, respectively, and now from two females from northern Scandinavia.

Xestopelta Dasch 1964a

Type species. *Syrphoctonus vertebratus* Cushman 1922

Diagnosis. *Xestopelta* species can readily be identified by the shape of the clypeus which has its margin thickened and protruding as a bilobed elevation (Fig. 12K), and by the yellow shoulder marks with the inner corners extending back as two parallel lines over most of the mesoscutum (Fig. 13D).

Face very finely coriaceous, thus shining in part, without vertical impressions, in females black with yellow inner eye margins, in males entirely yellow. Clypeus with apical margin thick, clypeus thus convex and protruding when viewed in profile. Antenna with apical flagellomeres wider than long in female but longer than wide in males, without tyloids and without long setae. Mesoscutum with notauli present or absent; smooth and shining, sometimes with some irregular and very weak punctures, yellow shoulder marks large, their inner corners usually extended as two parallel lines over most of mesoscutum (Fig. 13D); mesopleuron entirely smooth and shining, impunctate; epicnemial carina interrupted behind fore coxae. Propodeum with carinae partly (*X. sexcincta*) or fully reduced (*X. gracillima*), enclosing only lateral areas or no areas at all; propodeal spiracle inconspicuous; scutellum only carinate basally. Fore wing areolet absent; hind wing with 2–3 basal hamuli. Hind tibia orange (*X. gracillima*) or white with a dark apex (*X. sexcincta*). Female metasoma strongly compressed from apex of third segment, tergites 3 or 4 to 6 with hind margins usually concave, extending further back laterally than dorsally; tergites without transverse impressions. First tergite without median dorsal carinae. Second tergite with spiracle dorsal, above lateral fold, third tergite with spiracle below or behind the fold. Metasoma black with yellow markings on hind margins of some tergites. Ovipositor sheaths 0.3 times as long as hind tibia, parallel-sided and fully enclosing ovipositor, basally smooth, apically with sparse to dense but inconspicuous setae. Males with tergites 9 and 10 fused as a syntergum, sternite 9 about 1.5 times wider than long, emarginated apically, thus forming two lobes, their outer corners rounded.

Phylogeny. In the past, *Xestopelta* species have been associated mainly with the genus *Promethes* because of the smooth and shining mesosoma, or with *Homotropus*, which in general was often used as a taxonomic waste

basket. Results from a molecular phylogeny (Klopfstein *et al.* 2011), however, placed this genus with high support in the *Diplazon* genus group. Morphological examination, especially of the colouration of the female face and the morphology of the male apical sclerites, further support this placement. The position of *Xestopelta* within this genus group is unstable between different genes, and its resolution requires additional data.

Distribution. Holarctic and Afrotropical. Only five species belong to this genus, the Palaearcic *Xestopelta gracillima* and *X. sexcincta* treated here, the Nearctic *X. vertebrata* (Cushman), and the Afrotropical *X. alutacea* (Bennoit) and *X. lugens* (Seyrig).

Biology. Nothing is known about the host relations of this genus.

Notes. This genus was erected by Dasch (1964a) to include *X. vertebrata* (Cushman) from the Nearctic and *X. lugens* (Seyrig) from Madagascar. The circumscription of the genus had to be expanded here to account for the morphology of the Western Palaearctic species. Especially, the epicnemial carina is interrupted in both *Xestopelta gracillima* and *X. sexcincta*, and the carination of the propodeum is only partly reduced in *X. sexcincta*.

Key to species

1. Propodeum with carinae mostly reduced, at most with pleural and traces of lateral longitudinal carinae. Hind tibia orange, apex slightly dark. . . . . *Xestopelta gracillima* (Schmiedeknecht)
- Propodeum with pleural and lateral carinae usually complete, apical transverse carina partly present or at least indicated by carinulae. Hind tibia white with dark subbasal and apical bands. (Female unknown) . . . . . *Xestopelta sexcincta* (Brauns)

Xestopelta gracillima (Schmiedeknecht 1926, *Promethes*)

Homocidus amabilis Habermehl 1935

Diagnosis. Fore wing length 3.8–4.6 mm. Antenna of both sexes with 16–20 flagellomeres. Propodeum with carinae mostly reduced, sometimes with pleural and traces of lateral carinae, never with apical transverse carina.

Colouration of females. Antenna black or dark brown. Head and mesosoma black, face with yellow along inner orbits, yellow on clypeus, mouthparts, hind corner of pronotum, tegula, subtegular ridge, large shoulder marks with their inner corners elongated over most of mesoscutum (Fig. 13D), and upper mesepimeron; scutellum yellow. Legs orange, fore and mid coxae yellow, sometimes with black at extreme base, hind coxa black with a yellow apex, hind and sometimes mid trochanters black-marked; femora orange, black-marked basally; hind tibia and tarsus orange or brown, apex sometimes dark. Metasoma black with yellow triangular marks medially on apex of tergites 3 to 5 or 6.

Colouration of males. As in females but with yellow on ventral surface of antenna, entire face, epicnemium, and a stripe on lower mesosternum. Coxae with yellow colouration often more extensive than in female. Metasoma as in female.

Material examined. Holotype of *Homocidus amabilis* Habermehl: Italy, Südtirol, Graun im Vinschgau, St. Valentin auf der Heide, 1470m, leg. E. Bauer, 10.VII.1931. 1♀, at ZSM.

Additonal material: Italy: Bolzano, Sarntal 1250m, leg. K.Zwakhals, 26.VI.1976. 1♀, at KZ. Sweden: Södermanland, Tyresö kommun, Ava, Spirudden, mixed coastal oak forest, N59°10.313', E18°22.197', leg. SMTP, 12.V.–28.V.2004, 1♂, 28.V.–16.VI.2004, 1♂, both at NRM. United Kingdom: Hilbre Island, on blackthorn, leg. G.Broad, 21.VII.2001. 1♀, at BMNH. Switzerland: Vaud, L'Abergement, Le Suchet 1350m, 1350m, N46.773, E6.4776, leg. J.de Beaumont, 19.VII.1959. 1♀, at MZL; Fribourg, Prévondavaux, 690m, N46.729, E6.7911, leg. J.Aubert, 2.VI.1957. 1♀, at MZL; Vaud, Blonay, Les Pléiades, 1360m, N46.482, E6.9047, leg. D.Petitpierre, 20.VI.1960. 1♀, at MZL; Vaud, Blonay, Les Pléiades, 1360m, N46.482, E6.9047, leg. J.de Beaumont, 5.VII.1956, 1♀, 13.VI.1960, 1♀, both at MZL. Grisons, S-chanf, 1673m, N46.612, E9.9855, leg. J.de Beaumont, 8.VII.1955. 4♀, at MZL.

Distribution. Palaearctic.

Figures. Clypeus (Fig. 12K), mesoscutum (Fig. 13D), habitus (Fig. 36F), male terminal sclerites (Fig. 38J).

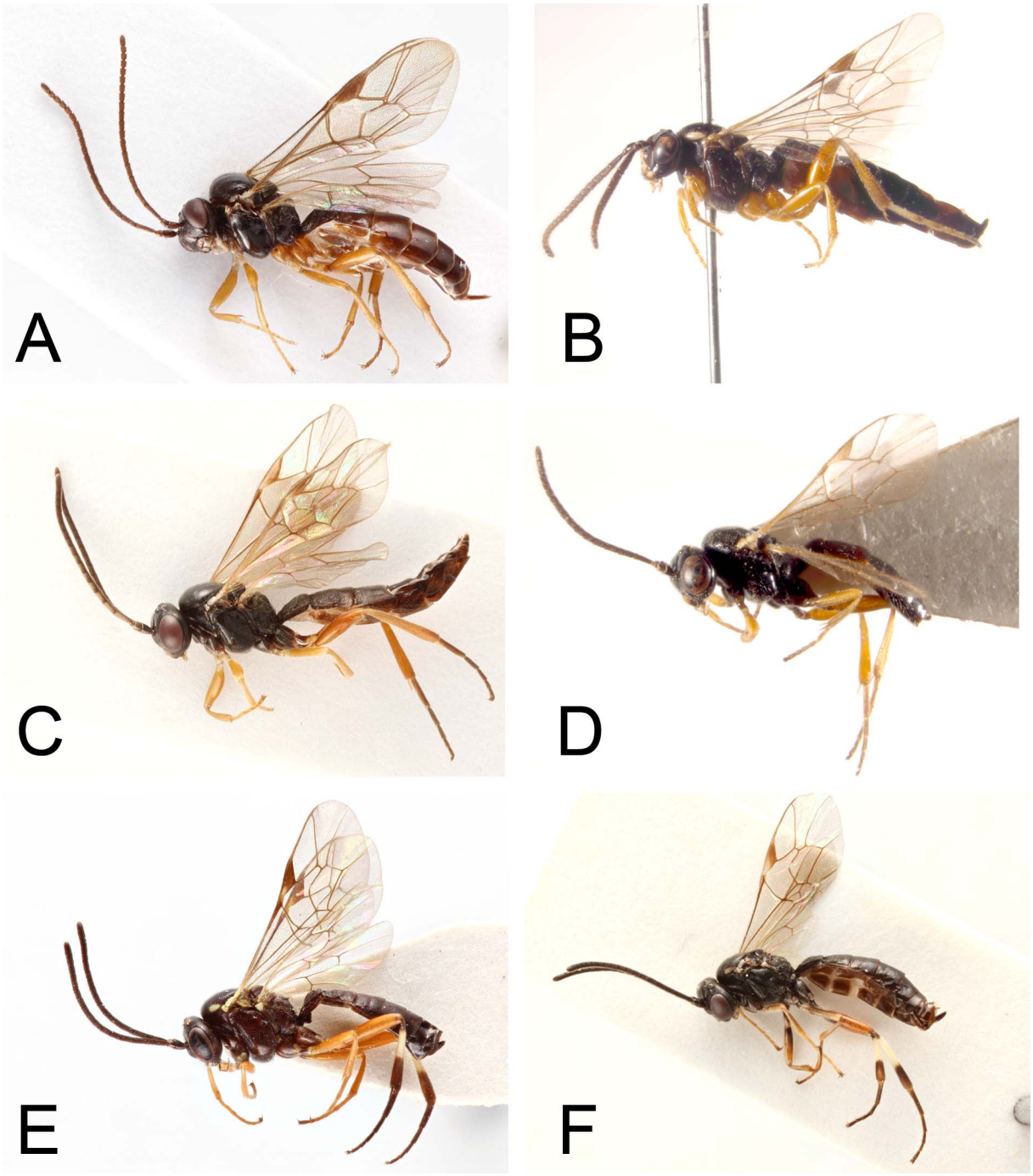

FIGURE 28. Habitus of Diplazontinae species. A. *Bioblapsis cultiformis*. B. *Bioblapsis polita*. C. *Campocraspedon caudatus*. D. *Daschia brevitarsis*. E. *Diplazon annulatus*. E. *Diplazon flixi* **sp. nov.**.

Xestopelta sexcincta (Brauns 1896, *Bassus*)

Zootrephes fasciatus Szépligeti 1899
Promethes pretiosa Schmiedeknecht 1926

Diagnosis. (Female unknown). Fore wing length 4.8 mm. Antenna with 19 flagellomeres. Propodeum with carinae only partly reduced, pleural and lateral carinae strong over most of its length, apical transverse carina indicated at least medially, partly replaced by strong rugae.

Colouration of males. Antenna black dorsally, yellow ventrally. Head and mesosoma black, face and orbits yellow, yellow on clypeus, mouthparts, propleuron, most of pronotum, tegula, subtegular ridge, large shoulder

marks with their inner corners elongated over most of mesoscutum (cf. Fig. 13D), and upper mesepimeron; scutellum yellow. Propodeum often marked with irregular yellow spots. Legs yellow to orange, coxae and trochanters yellow, hind coxa partly orange; femora yellow or orange; hind tibia and first tarsomere white with apex dark, remainder of hind tarsus dark. Metasoma black with broad yellow bands on apex of tergites 1 to 6 or 7.

Material examined. Lectotype of *Bassus sexcinctus* Brauns: Hungary, Budapest, Svábhegy, 2.V.1895. 1♂, at TMA.

Additional material. Germany, 1♂, at ZSM.

Notes. Only males of this species are known and I could only find two specimens in all the collections examined. It is morphologically very distinct.

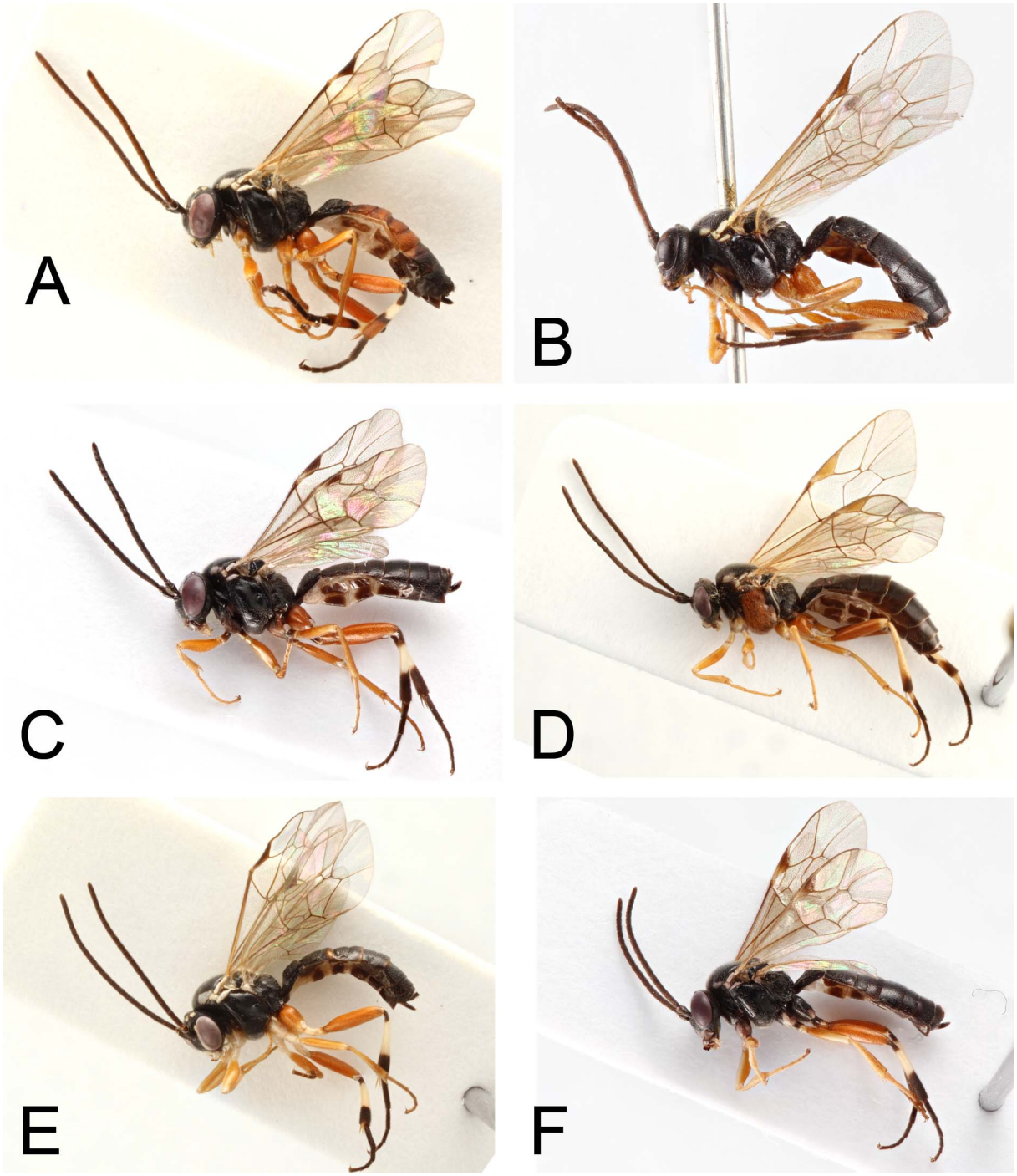

FIGURE 29. Habitus of *Diplazon* species. A. *Diplazon laetatorius*. B. *Diplazon nordicus* **sp. nov.** C. *Diplazon parvus* **sp. nov.** D. *Diplazon pectoratorius*. E. *Diplazon scutatorius*. E. *Diplazon varicoxa*.

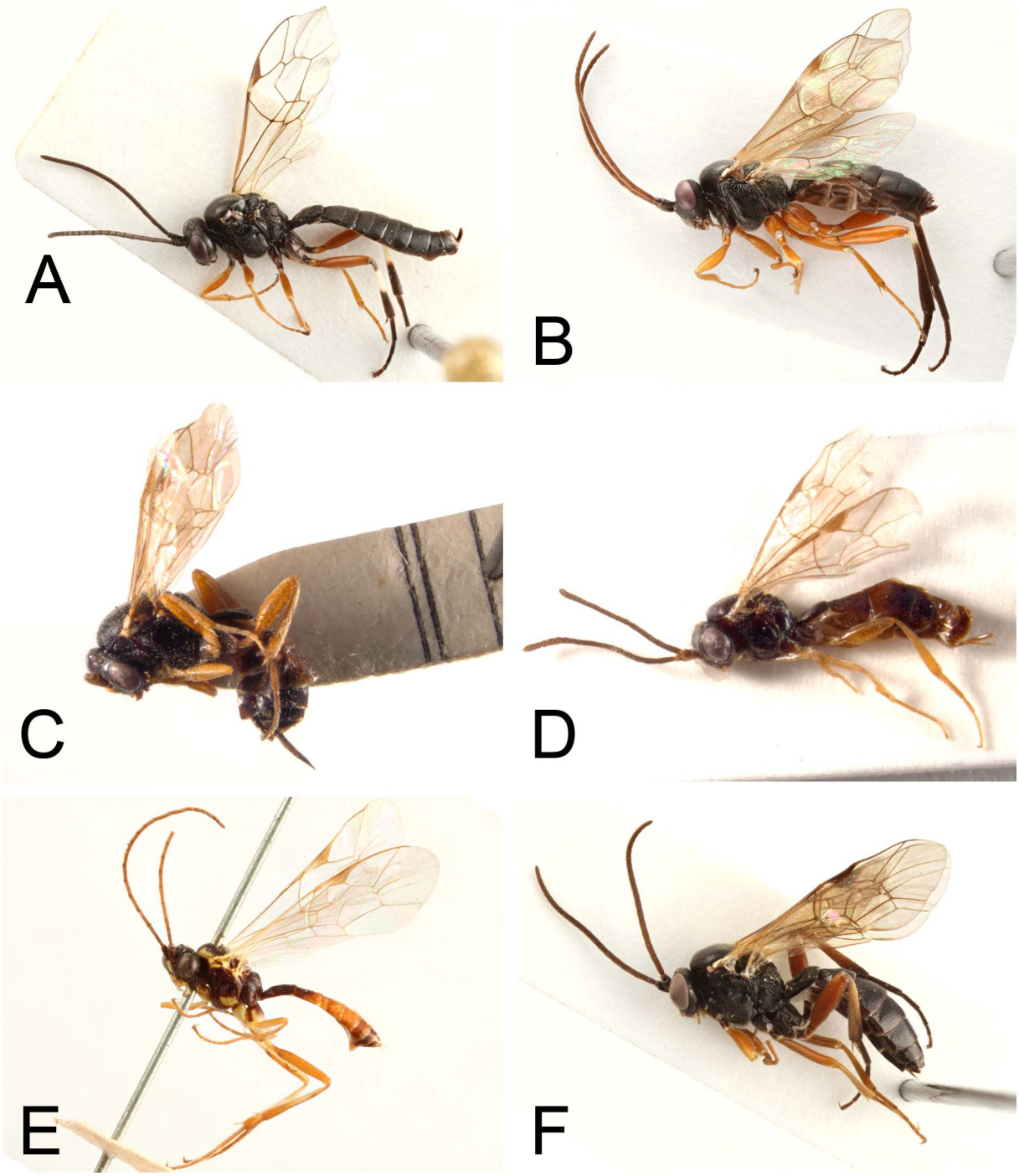

FIGURE 30. Habitus of Diplazontinae species. A. *Diplazon zetteli* **sp. nov.** B. *Enizemum ornatum*. C. *Episemura ensata*. D. *Eurytyloides umbrinus* **sp. nov.** E. *Fossatyloides gracilentus*. F. *Homotropus crassicornis*.

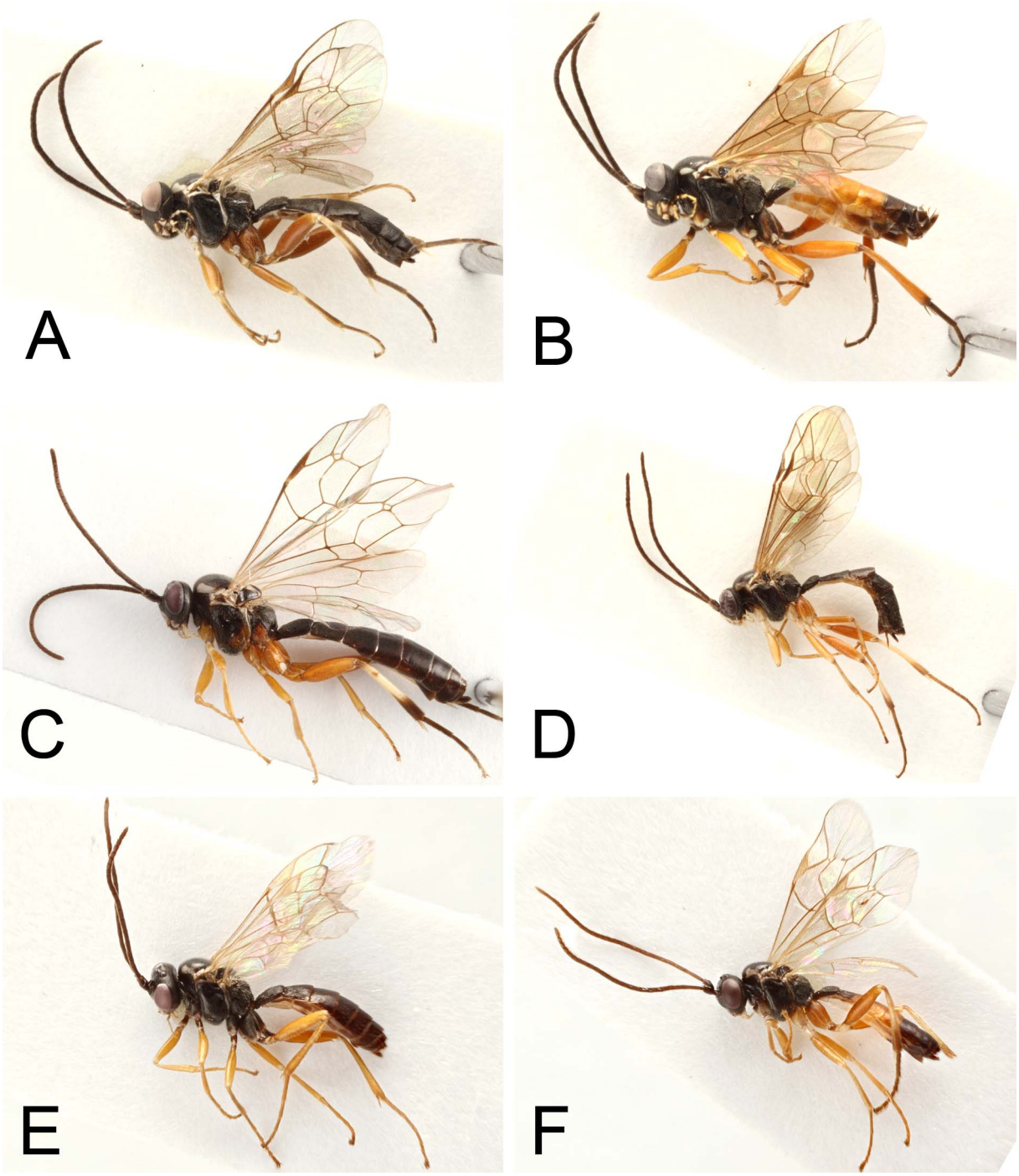

FIGURE 31. Habitus of *Homotropus* species. A. *Homotropus dimidiatus*. B. *Homotropus elegans*. C. *Homotropus frontorius*. D. *Homotropus longiventris*. E. *Homotropus nigritarsus.* F. *Homotropus pallipes.*

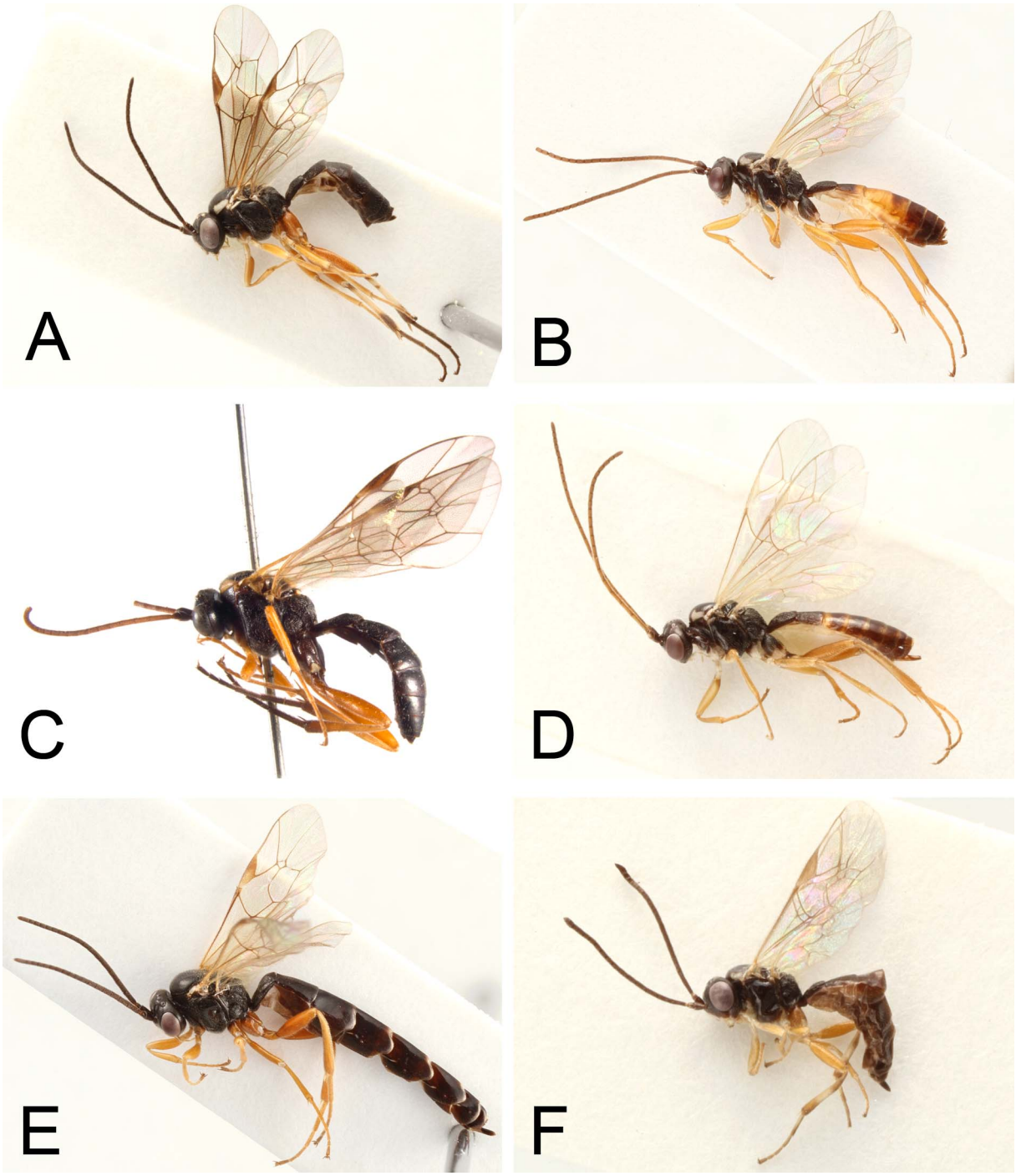

FIGURE 32. Habitus of Diplazontinae species. A. *Homotropus pictus*. B. *Homotropus signatus.* C. *Homotropus sundevalli*. D. *Homotropus vitreus*. E. *Phthorima compressa*. F. *Phthorima picta*.

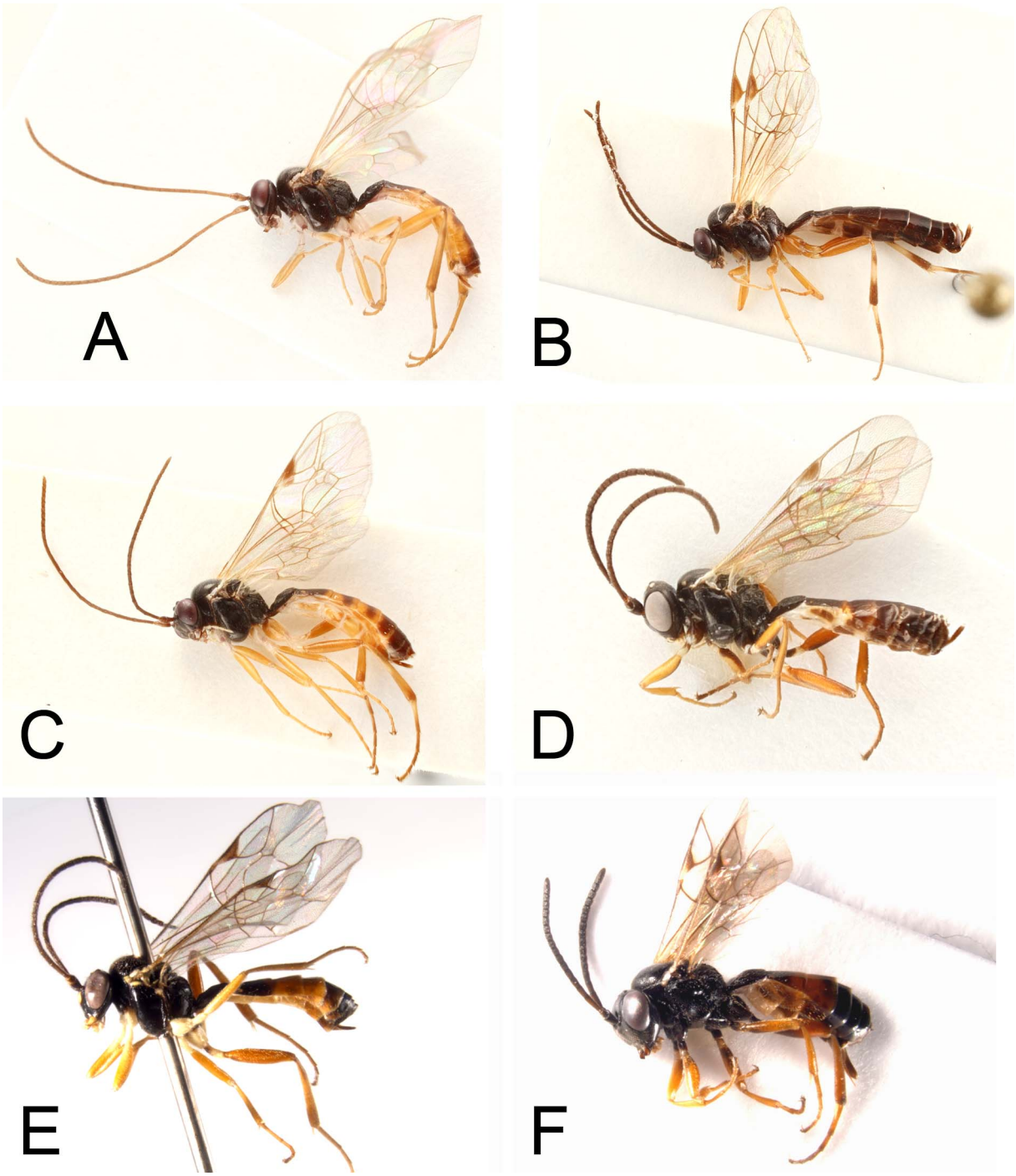

FIGURE 33. Habitus of Diplazontinae species. A. *Promethes bridgmani.* B. *Promethes melanaspis.* C. *Promethes sulcator.* D. *Sussaba aciculata.* E. *Sussaba cognata*. F. *Sussaba erigator.*

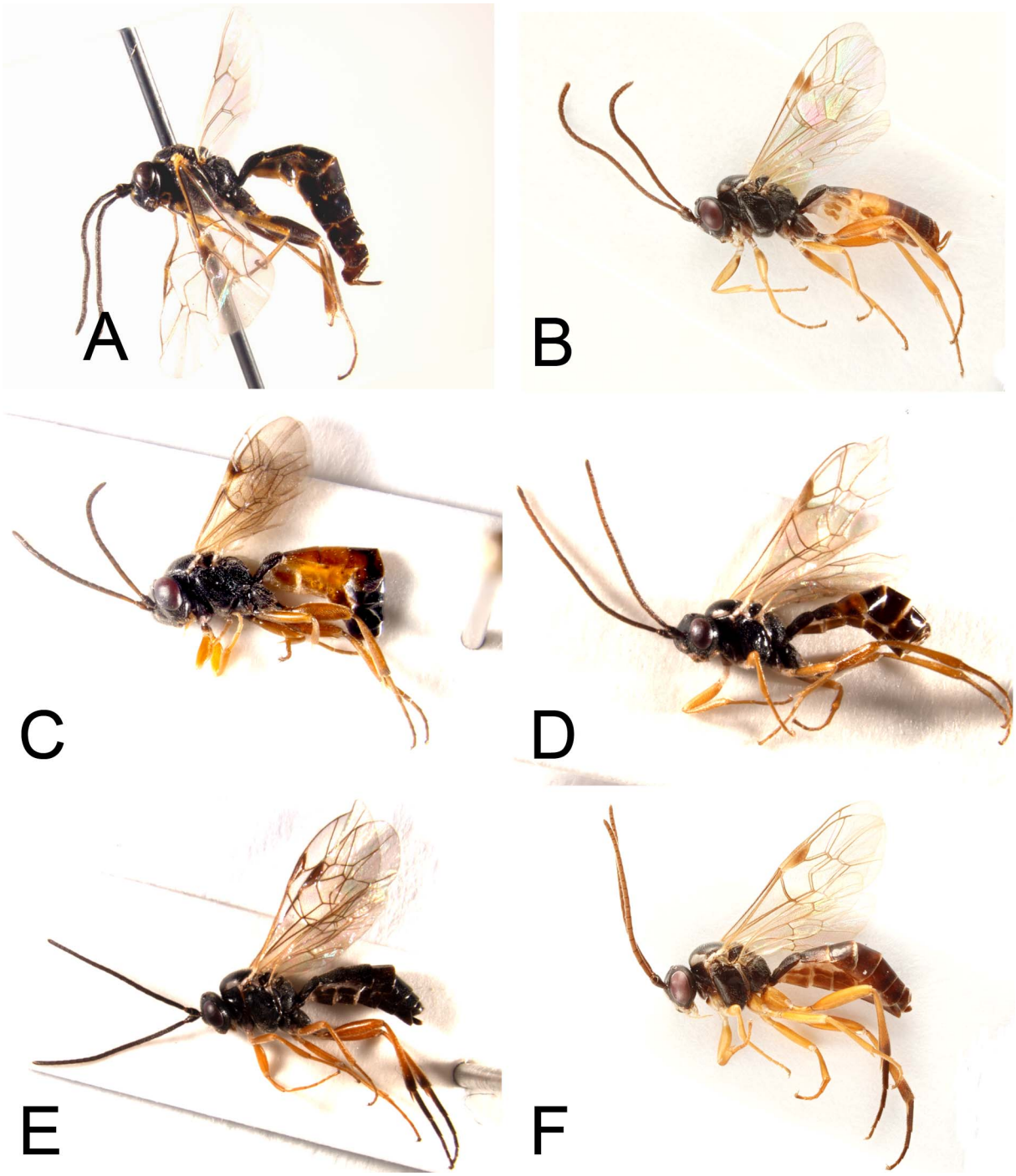

FIGURE 34. Habitus of Diplazontinae species. A. *Sussaba montana*. B. *Sussaba pulchella*. C. *Sussaba roberti* **sp. nov.** D. *Syrphoctonus desvignesii*. E. *Syrphoctonus fissorius*. F. *Syrphoctonus tarsatorius*.

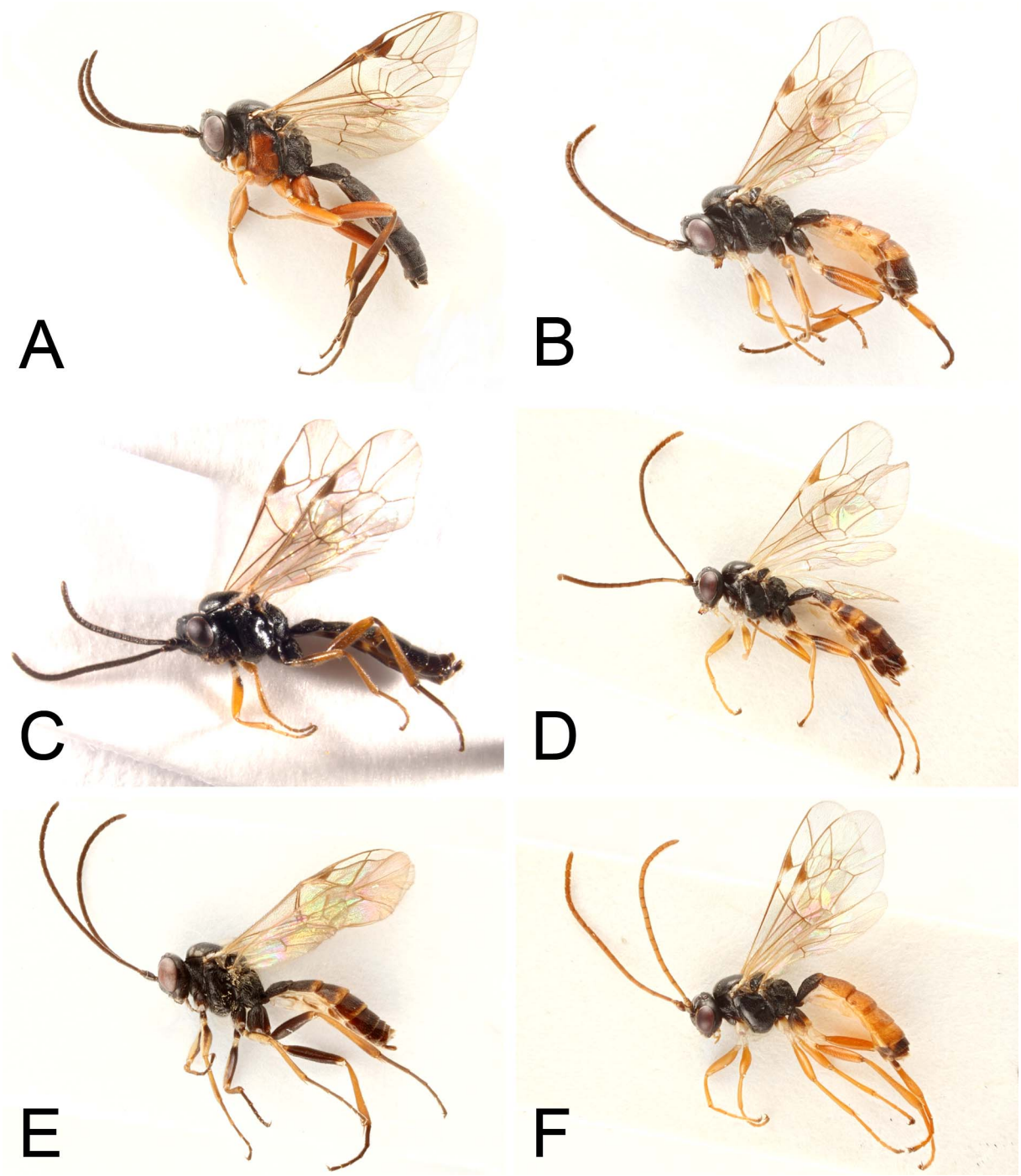

FIGURE 35. Habitus of Diplazontinae species. A. *Syrphophilus asperatus*. B. *Syrphophilus bizonarius*. C. *Syrphophilus scabriculus.* D. *Tymmophorus erythrozonus*. E. *Tymmophorus obscuripes*. F. *Tymmophorus suspiciosus*.

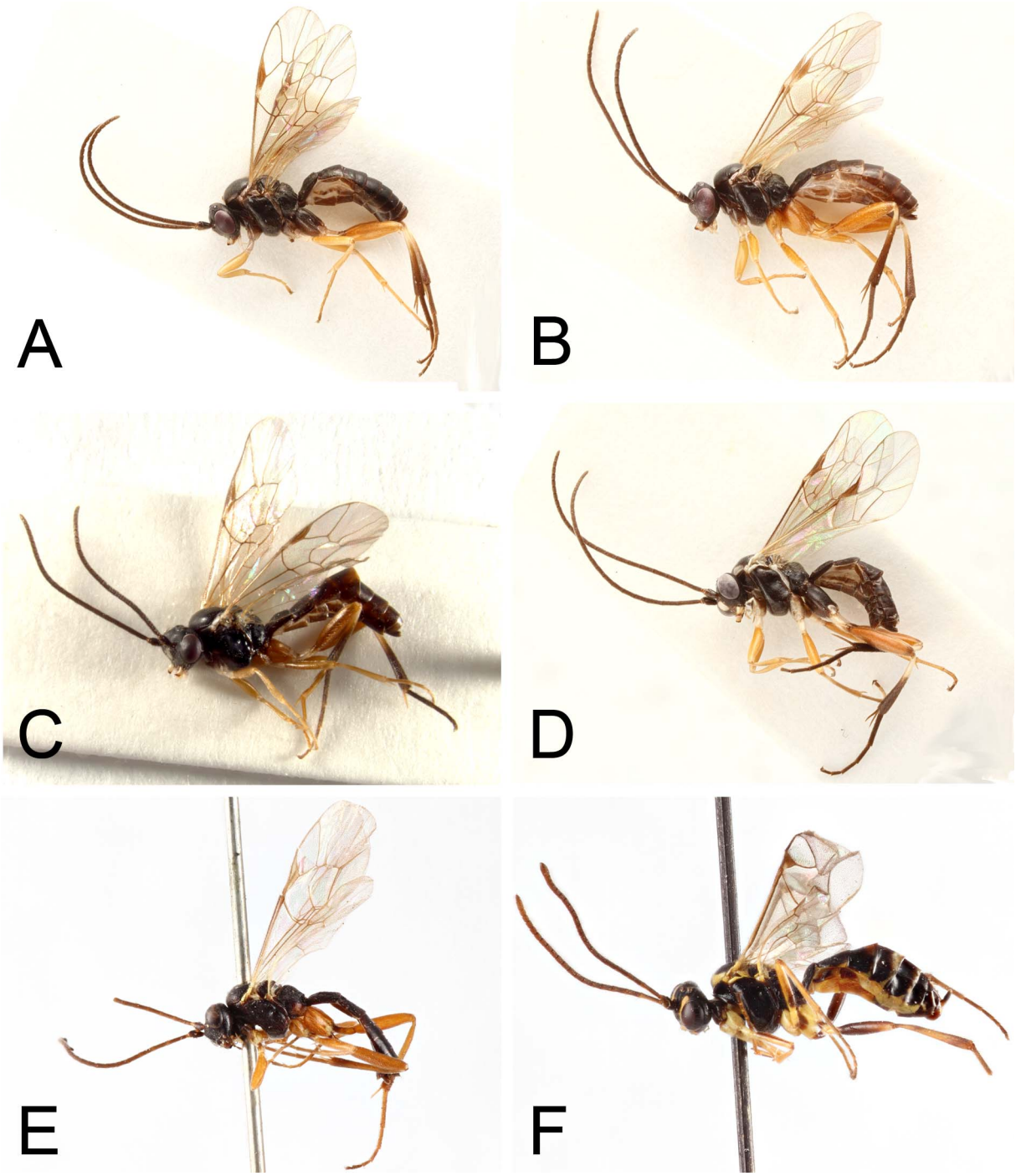

FIGURE 36. Habitus of Diplazontinae species. A. *Woldstedtius bauri* **sp. nov.** B. *Woldstedtius biguttatus*. C. *Woldstedtius citropectoralis.* D. *Woldstedtius holarcticus.* E. *Woldstedtius patei*. F. *Xestopelta gracillima.*

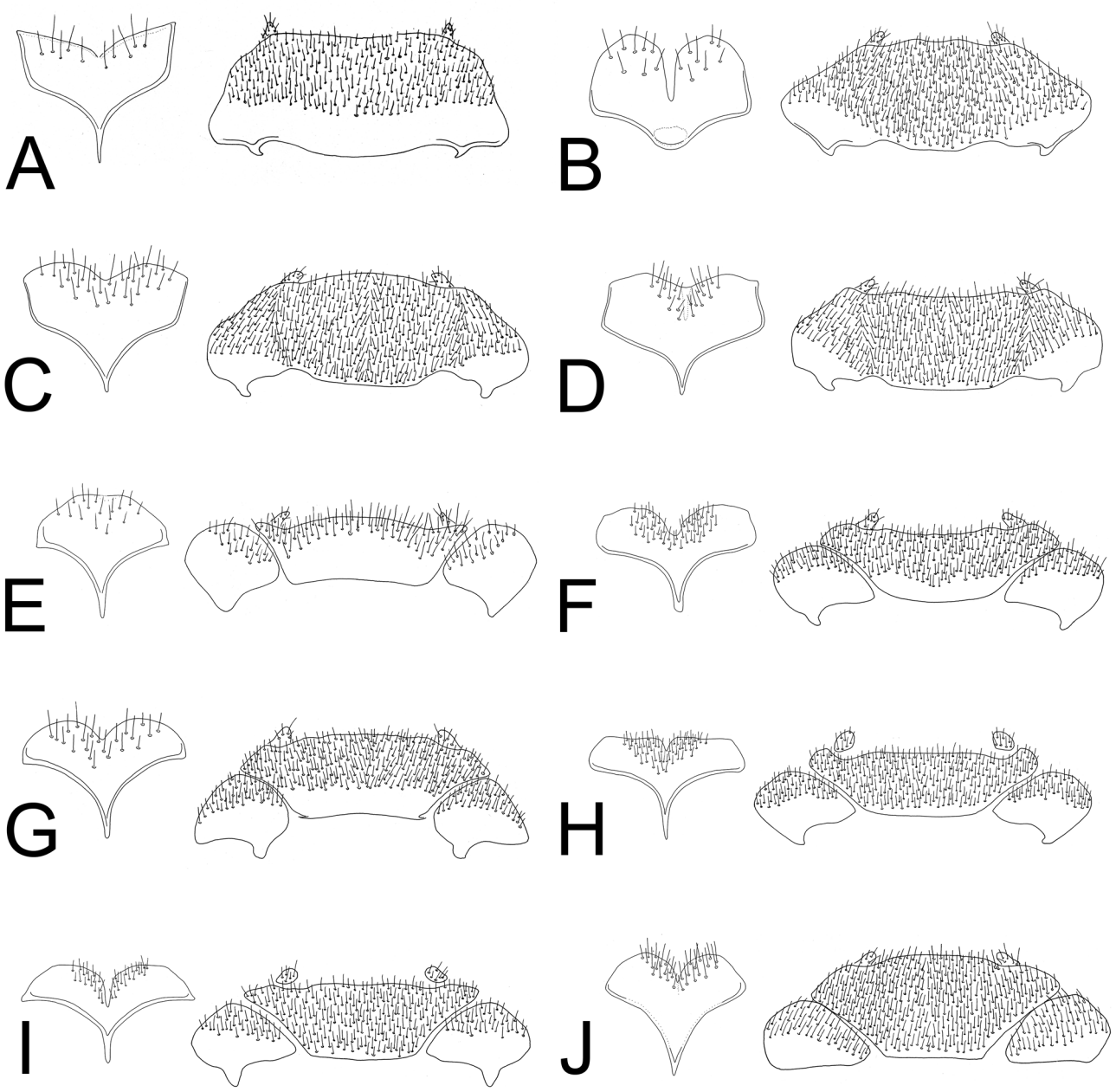

FIGURE 37. Ninth sternite and ninth and tenth tergites of male Diplazontinae species. A. *Daschia brevitarsis*. B. *Diplazon angustus*. C. *Diplazon scutatorius.* D. *Diplazon zetteli*. E. *Enizemum ornatum*. F. *Homotropus dimidiatus.* G. *Homotropus longiventris.* H. *Homotropus melanogaster*. I. *Homotropus nigrolineatus*. J. *Phthorima xanthaspis*.

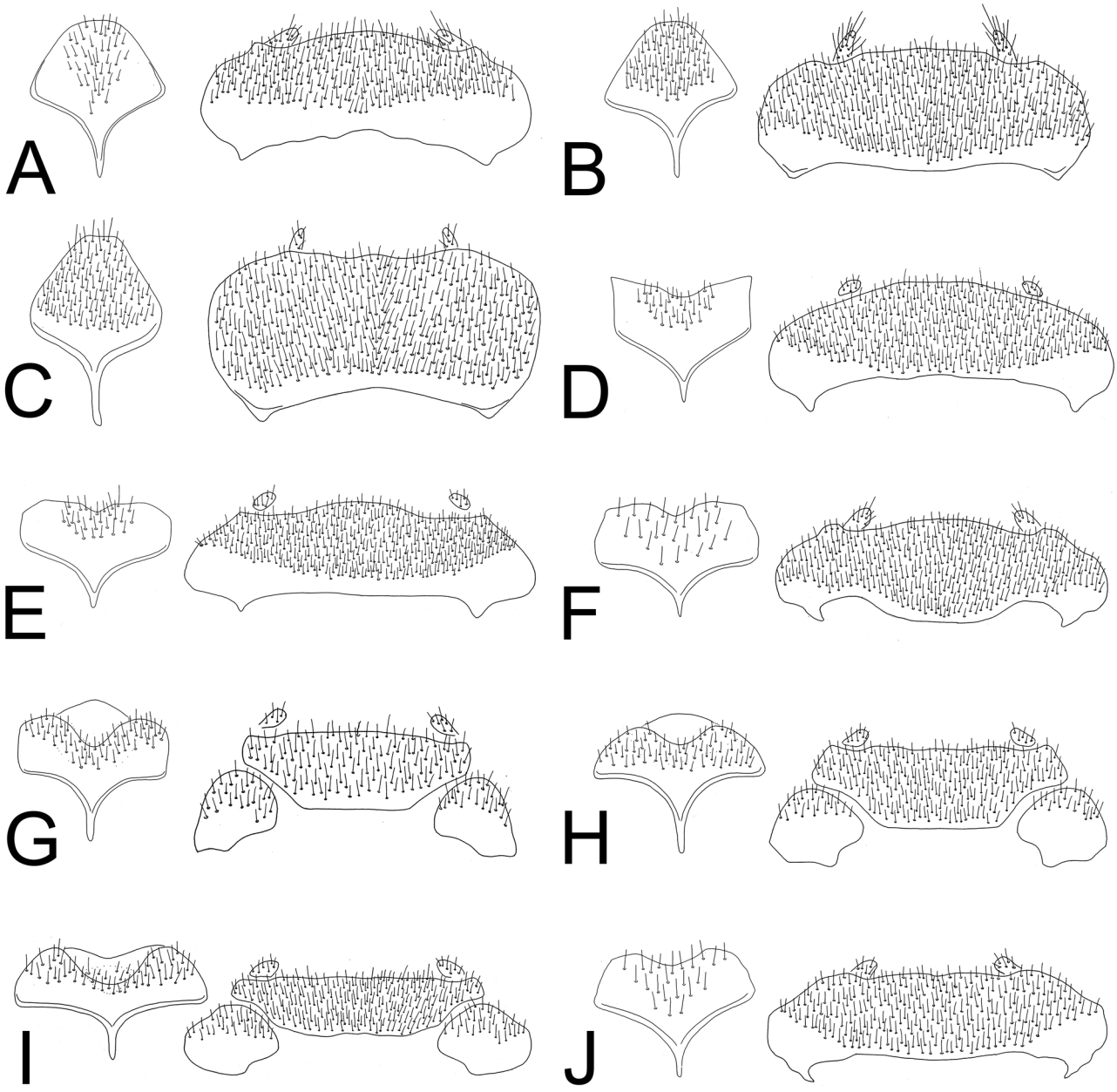

FIGURE 38. Ninth sternite and ninth and tenth tergites of male Diplazontinae species. A. *Sussaba erigator*. B. *Sussaba pulchella*. C. *Sussaba roberti.* D. *Syrphophilus asperatus*. E. *Tymmophorus erythrozonus*. F. *Tymmophorus obscuripes.* G. *Woldstedtius bauri.* H. *Woldstedtius citropectoralis*. I. *Woldstedtius holarcticus*. J. *Xestopelta gracillima*.

Discussion

To revise an entire subfamily of Ichneumonidae for a faunistic region as large as the Western Palaearctic poses a considerable challenge. The present study solves many of the taxonomic problems and attempts to propose unequivocal morphological characters for species identification. It provides the first reliable keys for identification of the species of this subfamily in the Western Palaearctic, and thus facilitates and will hopefully stimulate more research on the distribution, ecology, behaviour and evolution of this group. However, several taxonomic problems, e.g. the identification of certain males, remain unresolved and will require further study. The major areas of uncertainty include the genera *Homotropus* and *Diplazon*, where species delimitation proved especially difficult. In both genera, the limit between intra-specific and inter-specific variation both in morphology and in the molecular markers studied was found to overlap at least in part.

Nevertheless, it can be said that the morphological and molecular data complemented each other quite well in this revision of the subfamily Diplazontinae, and both data partitions provided valuable information for proposing sound species hypotheses and testing previously proposed species and genera. The ITS2 sequences examined did not only reveal some nucleotide substitutions that could be used to distinguish between closely related species but also some species-specific indels which probably represent molecular synapomorphies. However, using reciprocal monophyly as a criterion, both ITS2 and, even more, CO1 failed in multiple cases where morphology provided good evidence for the existence of multiple species. Molecular taxonomy without morphology, let alone automated procedures for species discovery (e.g., Pons *et al.* 2006; Vogler & Monaghan 2007), would have severely underestimated species numbers in many cases because of extensive non-monophyly and overlapping intra- and interspecific distances in several species. This was often even the case when the molecular data, adequately interpreted, added to the evidence for the existence of multiple species, e.g. in cases where monophyly was only reached in one of the two putative species, as in the genus *Tymmophorus*. But the limited performance of both markers cannot be viewed as being the rule in Diplazontinae, as molecular methods were only invoked in cases where morphology was somewhat unclear, at least in one sex. The groups of species examined in more detail might thus represent especially young speciation events.

Non-monophyly in single-gene trees by good biological species has been shown to be very common in several groups, e.g. concerning 36% of species in diving beetles (Bergsten *et al.* 2012). A similar number has previously been reported in other studies with broader taxonomic sampling (Funk & Omland 2003). However, reciprocal monophyly might not be necessary for molecular species delimitation. Recently developed methods are instead based on coalescent approaches and multiple markers (Yang & Rannala 2010), and can provide estimates of likely species delimitation which do not require reciprocal monophyly of the taxa. For the current study, however, the limited sampling did not seem to justify the application of such methods, and both marker and specimen sampling should be expanded in the future. In any case, a careful evaluation of multiple sources of evidence, including morphology, appears to be the only way to arrive at sound species hypotheses in parasitoid wasps and other organisms (Schlick-Steiner *et al.* 2010).

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APPENDIX 2. Diplazontinae reported in the literature from the Western Palaearctic which could not be interpreted in the present study. They are sorted alphabetically according to the species epithet.

Promethes albipes (Szépligeti 1898) (Hungary): The type of this species could not be found at the museum in Budapest. The taxon was redescribed by Morley (1914), but neither the original description nor this redescription allows any judgement on the status of this taxon (although it is reminiscent of a male *Promethes melanaspis*).

Bassus pulchellus alpigena (Strobl 1904) (Austria): This subspecies was originally described as a variety and is only an available name because this was done before 1961 (ICZN 1999). No types could be obtained and the taxon could thus not be interpreted.

Homocidus canaliculatus (Hedwig 1939) (Poland): This species is only known from the original description and cannot be interpreted just based on the restricted information therein. The type is lost (Horstmann 1981).

Bassus clypearis (Brischke 1892) (Poland): This species is only known from the original description and cannot be interpreted just based on the information therein. The whereabouts of the type could not be determined.

Bassus coccinatus (Tosquinet 1896) (Algeria): This species is only known from the original description. It cannot be interpreted just based on the information therein and the whereabouts of the type could not be determined.

Bassus contiguus (Schiødte 1839) (Denmark): This species is only known from the original description and cannot be interpreted just based on the information therein. I have searched in vain for the type in the collection of the Natural History Museum of Denmark in Copenhagen.

Bassus festatorius (Costa 1888) (Italy): This species is only known from the original description. The type was reported from the Dipartimento di Zoologia, Università degli Studi di Napoli in Italy but could not be obtained from this institution.

Bassus hispanicus (Spinola 1843) (Spain): The type is lost according to Horstmann (1991). The taxon was redescribed by Morley (1906) and, judging from that description, it is probably not a diplazontine.

Homocidus insignis (Hedwig 1939) (Poland): This species is only known from the original description and cannot be interpreted just based on the restricted information therein, but it is probably not a diplazontine. The type is lost (Horstmann 1981).

Syrphoctonus irinae (Manukyan 1995) (Russia): The type material of this species could not be obtained and the species is accordingly not interpreted. It seems very close to *S. fissorius*.

Diplazon tibiatorius lapponicus (Hellén 1937) (homonym) (Finland): This subspecies was originally described as a variety and is only an available name because this was done before 1961 (ICZN 1999). No types were found at the museum in Helsinki where the Hellén collection is stored and the taxon could thus not be interpreted.

Sussaba lativentris (Manukyan 1988) (Russia): Types of this species could not be obtained and the species thus not interpreted.

Bassus longipes (Holmgren 1858) (Sweden): No types could be found in any of the Swedish collections. Two specimens found in the NRM collection under this name turned out to be *Sussaba placita* and *Phthorima obscuripennis* and were probably both collected after the species was described.

Syrphoctonus pictus nigriscuta (Hellén 1957) (Finland): This subspecies was originally described as a form and is only an available name because this was done before 1961 (ICZN 1999). No types were found at the museum in Helsinki where the Hellén collection is stored and the taxon could thus not be interpreted.

Homotropus flavolineatus nigroscutellatus (Habermehl 1925) (Germany): This subspecies was originally described as a form and is only an available name because this was done before 1961 (ICZN 1999). No types could be obtained and the taxon could thus not be interpreted.

Ichneumon quadricinctus (Schrank 1785) (Germany): This species is only known from the original description and cannot be interpreted just based on the information therein. The whereabouts of the type could not be determined.

Phthorima rossica Szépligeti 1901 (in: Mocsáry & Szépligeti 1901) (Russia): The type of this species is probably lost according to Townes *et al.* (1965) and my own research at the museum in Budapest. According to the description, this taxon is probably not a diplazontine (Fitton & Boston 1988).

Syrphoctonus pictus rufipleura (Hellén 1957) (Finland): This subspecies was originally described as a form and is only an available name because this was done before 1961 (ICZN 1999). No types were found at the museum in Helsinki where the Hellén collection is stored and the taxon could thus not be interpreted.

Homotropus megaspis rufipleuris (Habermehl 1925) (Germany): This taxon was originally described as a form of *Homotropus megaspis* and is only an available name because this was done before 1961 (ICZN 1999). No types could be obtained and the taxon could thus not be interpreted, but red marks on the meso- or metapleuron occur regularly in *H. megaspis*.

Promethes rugulosus (Constantineanu & Constantineanu 1971) (Romania): The type of this taxon could not be obtained. According to Diller (1984), it is probably a synonym of *P. sulcator* (Gravenhorst).

Zootrephes tricolor (Szépligeti 1898) (Hungary): This species was not found in the collection in Budapest and has thus not been interpreted in the current study. It might not even be a diplazontine, as indicated by the elongate metathorax mentioned in the description (as referenced in Morley 1914).

APPENDIX 1. Specimens used for the molecular analysis, including locality data and Genbank accession numbers.

Taxon	Code	Coll.	Locality data	leg.	sex	CO1	ITS2
Bioblapsis cultiformis	2-D12	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 27.VII.–14.VIII.2006	H.Baur & S.Klopfstein	m	FJ556422	
Campocraspedon annulitarsis	3-H1	NMBE	United Kingdom, 2002	D.Quicke	f	JN626288	
Campocraspedon annulitarsis	5_1	NRM	Sweden/Up, Häbo kommun, Biskops-Arnö, northern beach. Elm grove, N59°40.328'/ E17°30.051', 19.VIII.–07.IX.2003	SMTP	f	GU597778	
Campocraspedon caudatus	1-C2	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 16.–23.VI.2003	H.Baur	f	GU597779	
Campocraspedon caudatus	1-C3	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 16.–23.VI.2003	H.Baur	f	JN626289	
Campocraspedon caudatus	4-H9	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 23.–30.VI.2003	H.Baur	f	JN626290	
Diplazon bradleyi	2-A5	NMBE	USA/Alaska, Fairbanks, North Star Borough, 20.–24.VI.2006	D.Fieldling, N.Schiff	f	FJ556426	
Diplazon deletus	1-A8	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 23.–30.VI.2003	H.Baur	f	FJ556428	
Diplazon flixi	1-A2	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–20.VII.2006	H.Baur & S.Klopfstein	m	FJ556425	
Diplazon laetatorius	1-C4	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 1.–25.IX.2006	H.Baur & S.Klopfstein	f	FJ556429	
Diplazon neoalpinus	5_2	NMBE	Switzerland/GL, Linthal, Obersand, Melchplatz. 2051m, N46°50.387/ E8°55.821, 19.–28.VI.2008	S.Klopfstein, H.Baur & F.Marti	f	GU597781	
Diplazon orientalis	7_01	NMBE	Thailand/Buri Prov., Kanchara, Thongpapoom, Chemical Farm, 13.VI.2009	D.Quicke	f	GU597782	
Diplazon pallicoxa	5_03	NMBE	Switzerland/BE, Bern, Bremgartenwald, Nägelisbode, Malaise trap B, 540m, N46°57.955/ E7°25.057, 27.VI.–8.VII.2008	S.Klopfstein	f	GU597783	
Diplazon pectoratorius	1-C6	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 14.–21.VII.2003	H.Baur	f	FJ556433	
Diplazon scutatorius	1-A11	NMBE	Finland/Sipoonkorpi, 16.–21.VI.2006	N.Laurenne	f	FJ556435	
Diplazon tetragonus	1-B1	NMBE	Finland/Sipoonkorpi, 2.–12.VII.2006	N.Laurenne	f	FJ556437	
Diplazon tibiatorius	1-B2	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 19.–27.VII.2006	H.Baur & S.Klopfstein	f	FJ556440	
Diplazon cf. *tibiatorius*	1-B4	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 1.–25.IX.2006	H.Baur & S.Klopfstein	f	FJ556442	
Enizemum cf. *ornatum*	1-C8	NMBE	USA/Alaska, Fairbanks, North Star Borough, 17.–20.VI.2006	D.Fieldling, N.Schiff	m	JN626292	

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APPENDIX 1. (Continued)

Taxon	Code	Coll.	Locality data	leg.	sex	CO1	ITS2
Enizemum cf. *ornatum*	2-F2	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 1.–25.IX.2006	H.Baur & S.Klopfstein	f	JN626291	
Enizemum nigricorne	5_5	NRM	Sweden/VB, Vindelns kommun, Kulbäckslidens försökspark, N64°08.688'/ E19°35.335', 01.–18.VIII.2003	SMTP	f	GU597792	
Enizemum ornatum	1-B5	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 30.VI.–7.VII.2003	H.Baur	f	FJ556444	
Enizemum ornatum	1-B6	NMBE	Turkey/Bolu, VI.1999	D.Quicke	f	JN626293	
Enizemum ornatum	2-A11	NMBE	United Kingdom/London, Merton Park, VII.2002	Galsworthy	f	JN626294	
Fossatyloides gracilentus	1-E12	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 21.–28.VII.2003	H.Baur	m	FJ556459	
Homotropus cf. *lissosoma*	5_22	UWL	Ecuador/Napo Province/Yanayacu biological Station, S0°35.9'/ W77°53.4', 21.–25.VII.2008	S.Shaw	m	GU597790	
Homotropus cf. melanogaster	5_9	NRM	Sweden/Up, Uppsala kommun, Ekdalens naturreservat, N59°58.291'/ E18°21.299', 12.X.–27.X.2003	SMTP	f	GU597812	
Homotropus cf. *pictus*	1-E7	NMBE	Finland/Sipoonkorpi, 21.VI.–2.VII.2006	N.Laurenne	m	JN626340	
Homotropus crassicornis	5_10	NRM	Sweden/Sö, Huddinge kommun, Sofielunds atervinnings-anläggning, N59°10.592/ E17°59.631, 30.VI.–13.VII.2004	SMTP	f	GU597805	
Homotropus dimidiatus	2-B4	NMBE	Finland/Hindsby, 13.–29.VI.2006	N.Laurenne	m	JN626328	
Homotropus dimidiatus	4-C8	NRM	Sweden/Sm, Nybro kommun, Alsterbro/Alsteran, NN56°56'11.53"/E15°55'12.60", 4.VII.–10.VII.2006	SMTP	f	GU597806	
Homotropus dimidiatus	4-F7	NRM	Sweden/Dr, Säterdalen, Näsakerspussen, N60°22'/ W15°43', 8.VII.–21.VII.2003	SMTP	f	JN626326	
Homotropus elegans	4-A11	NMSZ	United Kingdom/Chippenham Fen., Cambs. Carr at reedbed edge, RMSNH 1986.021, 22.VIII.–5.IX.1985	M.Shaw	f	JN626329	
Homotropus elegans	5_11	NRM	Sweden/Vb, Vindelns kommun, Kulbäcken meadow, N64°11.413'/ E19°36.342', 01.VIII.–18.VIII.2003	SMTP	f	GU597807	
Homotropus frontorius	1-E8	NMBE	Finland/Sipoonkorpi, 21.VI.–2.VII.2006	N.Laurenne	f	JN626341	
Homotropus frontorius	2-B9	NMBE	Finland/Sipoonkorpi, 21.VI.–2.VII.2006	N.Laurenne	f	FJ556469	
Homotropus longiventris	1-G5	NMBE	Switzerland/SO, Trimbach MF1 Miesernbach, 563m, N47°21.899/ E7°52.159, 6.–13.VI.2002	H.Baur, G.Artmann	f	GU597810	
Homotropus longiventris	2-B7	NMBE	Finland/Muhos, 19.VIII.–3.IX.2005	N.Laurenne	f	JN626343	
Homotropus longiventris	2-B8	NMBE	Finland/Sipoon, Hindsby, 18.–25.VI.2005	N.Laurenne	f	JN626344	
Homotropus longiventris	4-C12	NRM	Sweden/Ög, Ödeshögs kommun, Omberg, Storpissan. N58°20.095'/ E14°39.300', 28.V.–5.VII.2005	SMTP	f	JN626330	
Homotropus longiventris	4-D6	NRM	Sweden/Sm, Nybro kommun, Bäckebo, Grytsjöns naturreservat, N56°55'17.96"/ E16°6'4.42", 2.VII.–12.VII.2005	SMTP	f	JN626332	
Homotropus longiventris	4-F4	NRM	Sweden/Sm, Nybro kommun, Bäckebo, Grytsjöns naturreservat, N56°55'17.96"/ E16°6'4.42", 24.VIII.–12.IX.2005	SMTP	f	JN626333	

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APPENDIX 1. (Continued)

Taxon	Code	Coll.	Locality data	leg.	sex	CO1	ITS2
Homotropus longiventris	4-F9	NRM	Sweden/Sm, Nybro kommun, Bäckebo, Grytsjöns naturreservat, N56°55'17.96"/ E16°6'4.42", 12.VII.–18.VII.2005	SMTP	f	JN626331	
Homotropus melanogaster	1-F5	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 9.–16.VI.2003	H.Baur	f	JN626336	
Homotropus melanogaster	4-E6	NRM	Sweden/BD, Gallivare kommun, Atnarova försökspark, Pelttovaara, N67°03.103'/ E20°23.154', 8.VII.–29.VII.2004	SMTP	f	GU597811	
Homotropus nigritarsus	1-F2	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 23.–30.VI.2003	H.Baur	f	JN626334	
Homotropus nigritarsus	1-F3	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 21.–28.VII.2003	H.Baur	f	FJ556462	
Homotropus nigritarsus	1-F4	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 9.–16.VI.2003	H.Baur	f	JN626335	
Homotropus nigrolineatus	1-F6	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 7.–14.VII.2003	H.Baur	f	JN626337	
Homotropus nigrolineatus	1-G1	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 14.–21.VII.2003	H.Baur	f	FJ556465	
Homotropus pacificus	1-G7	NMBE	USA/Alaska, Fairbanks, North Star Borough, 20.–24.VI.2006	D.Fieldling, N.Schiff	f	JN626346	
Homotropus pallipes	1-G2	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 14.–21.VII.2003	H.Baur	f	JN626338	
Homotropus pallipes	1-G3	NMBE	Finland/Muhos, 5.–19.VIII.2005	N.Laurenne	f	FJ556466	
Homotropus pallipes	4-D11	NRM	Sweden/Hr, Härejdalens kommun, Sanfjället, Nyvallens fäbod, Alpine birch and spruce wood, N62°19.001'/ E13°34.113', 16.VII.–25.VII.2003	SMTP	f	JN626339	
Homotropus pictus	1-F1	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 16.–23.VI.2003	H.Baur	f	JN626342	
Homotropus pictus	1-G4	NMBE	Finland/Sipoonkorpi, 2.–12.VII.2006	N.Laurenne	f	GU597813	
Homotropus pictus	2-B3	NMBE	Finland/Muhos, 15.–19.VIII.2006	N.Laurenne	m	JN626325	
Homotropus signatus	1-G6	NMBE	United Kingdom	D.Quicke	f	JN626345	
Homotropus sp.	5_13	NRM	Sweden/Sö, Trosa kommun, Hunga Södergard nr 1. N58°55.244'/ E17°31.274', 11.IX.–02.X.2004	SMTP	f	GU597815	
Homotropus sp. (Malaysia)	2-C10	NMBE	Malaysia/Pahang/Cameron Highlands, Tanah Rata, V.2001	D.Quicke	m	GU597818	
Homotropus vitreus	6_11	NRM	Sweden/Vb, Vindelns kommun, Kubäckslidens försökspark, N64°11.413'/ E19°36.342', 01.IX.–22.IX.2003	SMTP	f	GU597817	
Phthorima compressa	1-C10	NMBE	Switzerland/SO, Trimbach MF1 Miesernbach, 563m, N47°21.899/ E7°52.159, 6.–13.VI.2002	H.Baur, G.Artmann	f	JN626295	
Phthorima compressa	1-C9	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 25.VI.–6.VII.2008	H.Baur	f	FJ556447	

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APPENDIX 1. (Continued)

Taxon	Code	Coll.	Locality data	leg.	sex	CO1	ITS2
Phthorima xanthaspis	5_6	NRM	Sweden/Sö, Tyresö kommun, Ava, Spirudden, N59°10.313'/ E18°22.197', 17.VI.–02.VII.2003	SMTP	f	GU597793	
Promethes bridgmani	1-C11	NMBE	Finland/Sipoonkorpi, 2.–12.VII.2006	N.Laurenne	m	FJ556448	
Promethes melanaspis	4-C2	NRM	Sweden/An, Ömsköldsviks kommun, Skuleskogen, Langra, N63°05.323'/ E18°29.903', 17.VII.–29.VII.2003	SMTP	f	GU597794	
Promethes nigriventris	5_7	NMBE	Switzerland/BE, Bern, Bremgartenwald, Clearing, Malaise trap A, 550m, N46°57.577/ E7°24.939, 11.–20.VI.2008	S.Klopfstein	f	GU597795	
Promethes sulcator	1-C12	NMBE	Finland/Sipoon, Hindsby, 5.–12.VI.2005	N.Laurenne	f	GU597796	
Promethes sulcator	1-D1	NMBE	Switzerland/SO, Trimbach MF1 Miesernbach, 563m, N47°21.899/W7°52.159, 6.–13.VI.2002	H.Baur, G.Artmann	f	JN626296	
Promethes sulcator	4-F11	NRM	Sweden/Go, Gotlands kommun, Roleks, N57°32.207'/ E18°20.273, 17.VII.–9.VIII.2005	SMTP	f	JN626297	
Schachticraspedon sp.	6_05	UWL	Ecuador/Napo Province/Yanayacu biological Station, Macucoloma trail, S0°35.9'/ E77°53.4', 1.–10.V.2008	S.Shaw	f	GU597788	
Sussaba aciculata	1-D2	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 9.–16.VI.2003	H.Baur	m	JN626298	JN626396
Sussaba aciculata	1-D3	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 16.–23.VI.2003	H.Baur	f	GU597797	
Sussaba aciculata	4-H7	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 16.–23.VI.2003	H.Baur	f	JN626299	JN626397
Sussaba cognata	1-D4	NMBE	Switzerland/BE, Bern, Bremgartenwald, Clearing, Malaise trap A, 550m, N46°57.577/ E7°24.939, 4.–15.VIII.2006	S.Klopfstein	f	GU597798	JN626398
Sussaba cognata	1-D5	NMBE	Finland/Sipoonkorpi, 2.–12.VII.2006	N.Laurenne	f	JN626300	JN626399
Sussaba cultriformis	1-D8	NMBE	USA/Alaska, Fairbanks, North Star Borough, 20.–24.VI.2006	D.Fieldling, N.Schiff	f	JN626302	JN626401
Sussaba cultriformis	2-B1	NMBE	USA/Alaska, Fairbanks, North Star Borough, 20.–24.VI.2006	D.Fieldling, N.Schiff	f	JN626303	JN626402
Sussaba cultriformis	2-B2	NMBE	USA/Alaska, Fairbanks, North Star Borough, 20.–24.VI.2006	D.Fieldling, N.Schiff	f	JN626304	JN626403
Sussaba dorsalis	1-D6	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 16.–23.VI.2003	H.Baur	f	JN626301	
Sussaba dorsalis	1-D7	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 1.–25.IX.2006	H.Baur & S.Klopfstein	f	GU597799	JN626400
Sussaba dorsalis	2-F5	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–19.VII.2006	H.Baur & S.Klopfstein	f	JN626305	JN626404
Sussaba erigator	1-B7	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–27.VII.2006	H.Baur & S.Klopfstein	f	GU597800	JN626410
Sussaba erigator	1-B8	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–27.VII.2006	H.Baur & S.Klopfstein	f	JN626311	

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APPENDIX 1. (Continued)

Taxon	Code	Coll.	Locality data	leg.	sex	CO1	ITS2
Sussaba erigator	2-D10	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–20.VII.2006	H.Baur & S.Klopfstein	m	JN626314	JN626412
Sussaba erigator	2-D8	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 25.IX.–20.X.2006	H.Baur & S.Klopfstein	f	JN626312	JN626411
Sussaba erigator	2-D9	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–20.VII.2006	H.Baur & S.Klopfstein	f	JN626313	
Sussaba erigator	2-F10	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–27.VII.2006	H.Baur & S.Klopfstein	f	JN626315	
Sussaba erigator	2-F3	NMBE	Switzerland/SO, Trimbach MF1 Miesernbach, 563m, N47°21.899/ E7°52.159, 6.–13.VI.2002	G.Artmann	m	JN626306	JN626405
Sussaba erigator	2-F4	NMBE	Switzerland/LU, Luzern, 10.VI.2006	G.Bächli	m	JN626307	JN626406
Sussaba erigator	2-F6	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–27.VII.2006	H.Baur & S.Klopfstein	m	JN626308	JN626407
Sussaba erigator	2-F8	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–27.VII.2006	H.Baur & S.Klopfstein	m	JN626309	JN626408
Sussaba erigator	2-F9	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–27.VII.2006	H.Baur & S.Klopfstein	m	JN626310	JN626409
Sussaba flavipes	1-D10	NMBE	Switzerland/SO, Trimbach MF1 Miesernbach, 563m, N47°21.899/ E7°52.159, 6.–13.VI.2002	H.Baur, G.Artmann	m	JN626316	JN626414
Sussaba flavipes	1-D9	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 14.VII.–1.VIII.2006	H.Baur & S.Klopfstein	f	GU597801	
Sussaba flavipes	4-E4	NRM	Sweden/Go, Gotlands kommun, Rembs, N56°56.036/ E18°16.127, 11.VII.–30.VII.2004	SMTP	f	JN626317	
Sussaba flavipes	4-F10	NRM	Sweden/Go, Gotlands kommun, Roleks, N57°32.207'/ E18°20.273, 17.VII.–9.VIII.2005	SMTP	f	JN626318	JN626415
Sussaba placita	7_15	UWL	USA/Wyoming, Yellowstone national park, 1B, 6.8km N S Entrance. Malaise trap at heavy burn, 12.VIII.1990	S.Shaw	f	GU597802	
Sussaba pulchella	1-D11	NMBE	Finland/Sipoon, Hindsby, 18.–25.VI.2005	N.Laurenne	f	FJ556453	
Sussaba pulchella	1-D12	NMBE	Switzerland/SO, Trimbach MF1 Miesernbach, 563m, N47°21.899/ E7°52.159, 6.–13.VI.2002	H.Baur, G.Artmann	m	JN626320	JN626416
Sussaba pulchella	2-B10	NMBE	Finland/Muhos, 5.–19.VIII.2005	N.Laurenne	f	JN626319	
Sussaba pulchella	4-E2	NRM	Sweden/Up, Knivsta kommun, Rickebasta alsumpskog. N59°44.061'/ E17°43.225, 24.VI.–16.VII.2005	SMTP	f	JN626321	JN626417
Sussaba punctiventris	1-E1	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 25.VII.–1.VIII.2003	H.Baur	f	FJ556454	
Sussaba punctiventris	1-E2	NMBE	Finland/Sipoon, Hindsby, 5.–12.VI.2005	N.Laurenne	f	JN626322	
Sussaba punctiventris	4-D10	NRM	Sweden/Hr, Härejdalens kommun, Sanfjället, Nyvallens fäbod, N62°19.001'/ E13°34.113', 16.VII.–25.VII.2003	SMTP	m	JN626323	JN626418

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APPENDIX 1. (Continued)

Taxon	Code	Coll.	Locality data	leg.	sex	CO1	ITS2
Sussaba roberti	1-B9	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–27.VII.2006	H.Baur & S.Klopfstein	f	GU597803	JN626413
Sussaba sugiharai	1-E3	NMBE	Taiwan/Nanton Ren-ai, Ruligenghih wildlife reserve, VII.2005	D.Quicke	f		JN626419
Sussaba sugiharai	7_16	RMNH	Vietnam/Tonkin, Hoang Lien N.R., 15km W Sa Pa, c. 1900m, Malaise trap, 15.–21.X.1999	C.v.Achterberg	m	JN626324	
Sussaba tertia	6_03	UWL	Ecuador/Napo Province/Yanayacu biological Station, S0°35.9'/ W77°53.4', 21.–25.VII.2008	S.Shaw	m	GU597789	
Syrphoctonus cf. *tarsatorius*	1-E9	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 1.–25.IX.2006	H.Baur & S.Klopfstein	m	JN626347	
Syrphoctonus desvignesii	1-E10	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 15.–20.VII.2006	H.Baur & S.Klopfstein	f	FJ556457	
Syrphoctonus desvignesii	4-H6	NMBE	Switzerland/VS, Champéry, Col de Bretolet 1922m, N46°8.568/ E6°47.742, 2.–9.VIII.2007	S.Klopfstein	f	JN626327	
Syrphoctonus fissorius	1-E11	NMBE	Switzerland/BE, Bern, Bremgartenwald, Clearing, Malaise trap A, 550m, N46°57.577/ E7°24.939, 21.–28.VII.2006	S.Klopfstein	f	GU597808	
Syrphoctonus idari	5_12	NRM	Sweden/Vr, Munkfors kommun, Ransäter, Ransbergs herrgard. N59°47'25.59"/ E13°24'54.61", 10.VII.–24.VII.2005	SMTP	f	GU597809	
Syrphoctonus sp.	1-E4	NMBE	USA/Alaska, Fairbanks, North Star Borough, 20.–24.VI.2006	D.Fieldling, N.Schiff	m	GU597804	
Syrphoctonus tarsatorius	1-G8	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 18.–25.VIII.2003	H.Baur	f	FJ556470	
Syrphoctonus tarsatorius	1-G9	NMBE	Finland/Sipoonkorpi, 21.VI.–2.VII.2006	N.Laurenne	f	JN626348	
Syrphoctonus tarsatorius	1-H9	NMBE	United Kingdom/Silwood park, 2002	D.Quicke	f	JN626349	
Syrphoctonus tarsatorius	6_12	NMBE	Switzerland/GL, Linthal, Obersand, Melchplatz. 2051m, N46°50.387/ E8°55.821, 28.VI.–10.VII.2008	S.Klopfstein, H.Baur & F.Marti	f	GU597816	
Syrphophilus asperatus	5_14	NRM	Sweden/Vr, Munkfors kommun, Ransäter, Ransbergs herrgard. N59°47'25.59"/ E13°24'54.61", 18.VI.–27.VI.2005	SMTP	f	GU597819	
Syrphophilus bizonarius	1-G10	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 9.–16.VI.2003	H.Baur	f	JN626350	
Syrphophilus bizonarius	1-G11	NMBE	Turkey/Bolu, VI.1999	D.Quicke	f	GU597820	
Syrphophilus bizonarius	4-E5	NRM	Sweden/Ög, Ödeshögs kommun, Omberg, Stocklycke äng., N58°18.452'/ E14°37.859', 23.VIII.–16.IX.2005	SMTP	f	JN626351	
Syrphophilus scabriculus	5_15	NRM	Sweden/Hr, Härejdalens kommun, Sanfjället, Nyvallens fäbod, N62°19.001'/ E13°34.113', 04.VII.–04.VIII.2004	SMTP	f	GU597823	
Syrphophilus tricinctorius	1-G12	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 2.–9.VI.2003	H.Baur	f	GU597821	
Syrphophilus tricinctorius	1-H1	NMBE	Finland/Sipoonkorpi, 16.–21.VI.2006	N.Laurenne	f	GU597822	

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APPENDIX 1. (Continued)

Taxon	Code	Coll.	Locality data	leg.	sex	CO1	ITS2
Syrphophilus tricinctorius	4-H11	NMBE	Switzerland/VS, Champéry, Col de Bretolet 1900m, N46°8.541/ E6°47.727, 1.VIII.2007	H.Baur	f	JN626352	
Tymmophorus erythrozonus	1-B10	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 30.VI.–7.VII.2003	H.Baur	f	FJ556474	JN626422
Tymmophorus erythrozonus	1-B11	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 14.VII.–1.VIII.2006	H.Baur & S.Klopfstein	f	FJ556475	JN626423
Tymmophorus erythrozonus	2-F12	NMBE	Switzerland/GR, Sur, SE Vauastg Dafora 1920m, N46°31.482/ E9°38.755, 23.–30.VI.2003	H.Baur	m	JN626353	JN626424
Tymmophorus erythrozonus	7_02	NRM	Sweden/Vr, Munkfors kommun, Ransäter, Rudstorp, N59°46'22.64"/ E13°28'25.37", 23.VII.–12.VIII.2005	SMTP	f	JN626357	JN626425
Tymmophorus erythrozonus	7_10	NRM	Sweden/Vb, Vindelns kommun, Kulbäcken meadow. N64°11.413'/ E19°36.342', 01.VIII.–18.VIII.2003	SMTP	f	JN626354	JN626426
Tymmophorus erythrozonus	7_13	NRM	Sweden/Vb, Vindelns kommun, Kulbäcken meadow. N64°11.413'/ E19°36.342', 01.VIII.–18.VIII.2003	SMTP	f	JN626355	JN626427
Tymmophorus erythrozonus	7_17	NRM	Sweden/Sm, Torsas kommun, Paboda. N56.43472°/ E16.07084°, 15.VI.–01.VII.2008	SMTP	f	JN626356	JN626428
Tymmophorus obscuripes	1-H2	NMBE	United Kingdom	G.Broad	f	FJ556476	JN626420
Tymmophorus obscuripes	1-H3	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 28.VII.–4.VIII.2003	H.Baur	m	JN626358	JN626421
Tymmophorus suspiciosus	1-B12	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 23.–30.VI.2003	H.Baur	f	JN626359	JN626429
Tymmophorus suspiciosus	2-B11	NMBE	Finland/Muhos, 5.–19.VIII.2005	N.Laurenne	f	FJ556478	JN626430
Tymmophorus suspiciosus	2-E4	NMBE	Switzerland/LU, Luzern, 10.VI.2006	G.Bächli	m	JN626360	JN626431
Tymmophorus suspiciosus	2-G6	NMBE	Switzerland/SO, Trimbach MF1 Miesernbach, 563m, N47°21.899/ E7°52.159, 6.–13.VI.2002	H.Baur, G.Artmann	f	JN626361	JN626433
Tymmophorus suspiciosus	3-F3	NMBE	Switzerland/SO, Trimbach MF1 Miesernbach, 563m, N47°21.899/ E7°52.159, 6.–13.VI.2002	H.Baur, G.Artmann	f	JN626362	JN626432
Tymmophorus suspiciosus	7_05	NRM	Sweden/Sm, Almhults kommun, Stenbrohult, Djäknabygds bokbacke, N56°36.548'/ E14°11.583', 31.V.–20.VII.2005	SMTP	f	JN626363	JN626434
Tymmophorus suspiciosus	7_08	NRM	Sweden/Sö, Haninge kommun, Tyresta, Ungfars mosse, N59°10.698'/ E18°13.766', 20.VII.–11.VIII.2004	SMTP	f	JN626364	JN626435
Woldstedtius bauri	4-C4	NRM	Sweden/Ög, Ödeshögs kommun, Omberg, Storpissan, N58°20.095'/ E14°39.300', 28.V.–05.VII.2005	SMTP	f	JN626386	JN626457
Woldstedtius bauri	4-D1	NRM	Sweden/Ög, Ödeshögs kommun, Omberg, Storpissan, N58°20.095'/ E14°39.300', 28.V.–05.VII.2005	SMTP	f	JN626387	
Woldstedtius bauri	4-D7	NRM	Sweden/Sm, Nybro kommun, Bäckebo, Grytsjöns naturreservat, N56°55'53.07"/ E16°5'7.93", 02.VII.–12.VII.2005	SMTP	f	JN626378	JN626456
Woldstedtius bauri	4-F12	NRM	Sweden/Ög, Ödeshögs kommun, Omberg, Storpissan, N58°20.095'/ E14°39.300', 05.VII.–19.VII.2005	SMTP	f	GU597827	JN626458

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APPENDIX 1. (Continued)

Taxon	Code	Coll.	Locality data	leg.	sex	CO1	ITS2
Woldstedtius biguttatus	1-H4	NMBE	United Kingdom	G.Broad	f	GU597824	JN626436
Woldstedtius biguttatus	1-H5	NMBE	Switzerland/GR, Sur, NE Sur, 1770m, N46°31.451/ E9°38.055, 1.–25.IX.2006	H.Baur & S.Klopfstein	m	JN626365	JN626437
Woldstedtius biguttatus	4-F1	NRM	Sweden/Sö, Tyresö kommun, Ava, Spirudden, N59°10.313'/ E18°22.197', 12.V.–28.V.2004	SMTP	m	JN626388	JN626453
Woldstedtius biguttatus	4-G8	NMBE	Switzerland/SO, Trimbach, Miesernbach, 28.IX.–16.X.2002	G.Artmann, H.Baur	f	JN626365	JN626438
Woldstedtius cf. *biguttatus*	2-B12	NMBE	South Korea/Gangwondo, Goseong Ganseong Heulri (Shinseonbong), 2.8.–19.X.2002	D.Quicke	f	GU597826	JN626459
Woldstedtius cf. *biguttatus*	4-G10	NMBE	Switzerland/VS, Champéry, Col de Bretolet 1965m, N46°8.768/ E6°47.678, 6.–13.VI.2002	S.Klopfstein	m	JN626390	JN626454
Woldstedtius cf. *biguttatus*	4-G5	NMBE	Switzerland/VS, Champéry, Col de Bretolet 1947m, N46°8.590/ E6°47.726, 20.–27.IX.2007	S.Klopfstein	m	JN626389	JN626451
Woldstedtius cf. *biguttatus*	4-H2	NMBE	Switzerland/VS, Champéry, Col de Bretolet 1922m, N46°8.568/ E6°47.742, 2.–9.VIII.2007	S.Klopfstein	m	JN626376	JN626455
Woldstedtius citropectoralis	1-H7	NMBE	Finland/Sipoonkorpi, 2.–12.VII.2006	N.Laurenne	f	JN626367	JN626439
Woldstedtius citropectoralis	2-C1	NMBE	United Kingdom/Silwood park	D.Quicke	f		JN626440
Woldstedtius citropectoralis	2-C4	NMBE	Finland/Muhos, 5.–19.VIII.2005	N.Laurenne	f	FJ556481	
Woldstedtius citropectoralis	2-G2	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 16.–23.VI.2003	H.Baur	f	JN626368	JN626441
Woldstedtius citropectoralis	4-C7	NRM	Sweden/Ög, Ödeshögs kommun, Omberg, Bokskogsreservatet. N58°17.831'/ E14°38.089', 28.V.–5.VII.2005	SMTP	f	JN626369	
Woldstedtius citropectoralis	4-C9	NRM	Sweden/Sm, Nybro kommun, Alsterbro/Alsteran. N56°56'11.53"/ E15°55'12.60", 4.VII.–10.VII.2006	SMTP	f	JN626370	
Woldstedtius citropectoralis	4-D5	NRM	Sweden/Sm, Nybro kommun, Bäckebo, Grytsjöns naturreservat, N56°55'17.96"/ E16°6'4.42", 2.VII.–12.VII.2005	SMTP	f	JN626371	JN626442
Woldstedtius citropectoralis	4-F8	NRM	Sweden/Sm, Nybro kommun, Bäckebo, Grytsjöns naturreservat, N56°55'17.96"/ E16°6'4.42", 12.VII.–18.VII.2005	SMTP	f	JN626372	
Woldstedtius flavicauda	1-H12	NMBE	Chile, XI.2001	A.Daran	f	GU597828	
Woldstedtius flavolineatus	1-H8	NMBE	Switzerland/GR, Sur, Clavenia 1987m, N46°32.005/ E8°50.135, 23.–30.VI.2003	H.Baur	f	GU597825	
Woldstedtius flavolineatus	2-C3	NMBE	United Kingdom/Silwood park	D.Quicke	f	JN626373	
Woldstedtius flavolineatus	4-C1	NMSZ	United Kingdom/Rannoch, Native Pinewood, VII.1990	I.MacGowan	f	JN626374	
Woldstedtius flavolineatus	4-F5	NRM	Sweden/Sm, Nybro kommun, Bäckebo, Grytsjöns naturreservat, N56°55'17.96"/ E16°6'4.42", 24.VIII.–12.IX.2005	SMTP	f	JN626375	JN626452

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APPENDIX 1. (Continued)

Taxon	Code	Coll.	Locality data	leg.	sex	CO1	ITS2
Woldstedtius holarcticus	1-H10	NMBE	Switzerland/BE, Bern, Bremgartenwald, Clearing, Malaise trap A, 550m, N46°57.577/ E7°24.939, 2006	S.Klopfstein	f	FJ556483	JN626443
Woldstedtius holarcticus	1-H11	NMBE	Finland/Sipoonkorpi, 21.VI.–2.VII.2006	N.Laurenne	f	FJ556484	JN626444
Woldstedtius holarcticus	2-C5	NMBE	Finland/Sipoonkorpi, 21.VI.–2.VII.2006	N.Laurenne	f	JN626379	JN626445
Woldstedtius holarcticus	2-C6	NMBE	Finland/Sipoonkorpi, 21.VI.–2.VII.2006	N.Laurenne	f	JN626380	
Woldstedtius holarcticus	2-C9	NMBE	Finland/Sipoonkorpi, 21.VI.–2.VII.2006	N.Laurenne	f	JN626381	JN626446
Woldstedtius holarcticus	4-C6	NRM	Sweden/An, Ömsköldsviks kommun, Skuleskogen, Langra, N63°05.323'/ E18°29.903', 25.VII.–9.VIII.2004	SMTP	f	JN626377	JN626447
Woldstedtius holarcticus	4-D9	NRM	Sweden/Hr, Härejdalens kommun, Sanfjället, Nyvallens fäbod, N62°19.001'/ E13°34.113', 16.VII.–25.VII.2003	SMTP	f	JN626382	JN626448
Woldstedtius holarcticus	4-E1	NRM	Sweden/An, Ömsköldsviks kommun, Skuleskogen, Langra, N63°05.323'/ E18°29.903', 17.VII.–29.VII.2003	SMTP	f	JN626383	
Woldstedtius holarcticus	4-G4	NRM	Sweden/Sm, Nybro kommun, Alsterbro/Alsteran, N56°56'11.53"/ E15°55'12.60", 22.VI.–28.VI.2006	SMTP	f	JN626385	JN626450
Woldstedtius cf. *holarcticus*	4-G2	NRM	Sweden/Ög, Ödeshögs kommun, Omberg, Storpissan, N58°20.095'/ E14°39.300', 28.V.–5.VII.2005	SMTP	m	JN626384	JN626449
Woldstedtius isidroi	6_04	UWL	Ecuador/Napo Province/Yanayacu biological Station, Malaise trap in *Munnozia* patch, S0°35.9'/ E77°53.4', 21.–25.VII.2008	S.Shaw	f	GU597791	
Xestopelta gracillima	3-C3	NMBE	United Kingdom/Hilbre Island, on blackthorn, 21.VII.2001	G.Broad	f	GU597829	
Xestopelta gracillima	4-E12	NRM	Sweden/Sö, Tyresö kommun, Ava, Spirudden, N59°10.313'/ E18°22.197', 12.V.–28.V.2004	SMTP	m	JN626391	
Outgroups							
Coelichneumon cyaniventris	at_35	NMBE	Switzerland/Bern/Bern, Bremgartenwald, 20.VI.2008	S.Klopfstein	f	JX453374	
Ichneumon deliratorius	at_41	NRM	Sweden/Stockholms län/Södertälje, Tullgarn, 17.VII.2005	SMTP	f	JX453375	
Collyria trichophthalma	5_16	NMBE	Switzerland/Stadt Luzern, Allmend, N47°03'/ E8°18', 10.VI.2006	G.Bächli	f	GU597832	
Cylloceria cf. melancholica	1-F7	NMBE	Finland/Nordösterbotten, Muhos, 5.–19.VIII.2005	N.Laurenne	f	GU597833	
Diacritus aciculatus	3-D3	NMBE	United Kingdom	D.Quicke	f	JN626394	
Ichneumon sp. 1	6_08	NMBE	France/Hautes-Alpes/Col du Lautaret, N45°20'/ E6°24', 2008	Sébastien	f	GU597830	
Ichneumon terminatorius	at_29	NRM	Sweden/Kronobergs län/ Älmhult, Stenbrohult, 01.VIII.2003	SMTP	f	JX453356	
Entypoma sp.	1-F11	NMBE	Finland/Nordösterbotten, Muhos, 5.–19.VIII.2005	N.Laurenne	f	GU597835	
Picrostigeus cf. obscurus	1-F10	NMBE	Finland/Nordösterbotten, Muhos, 5.–19.VIII.2005	N.Laurenne	m	GU597834	
Apechthis quadridentata	1-F8	NMBE	Finland/Nordösterbotten, Muhos, 5.–19.VIII.2005	N.Laurenne	f	GU597831	
Scambus sp.	1-F9	NMBE	Finland/Nordösterbotten, Muhos, 5.–19.VIII.2005	N.Laurenne	f	JN626395	
Deuteroxorides elevator	2-A1	NMBE	Germany/Albrechtschachten, 20.VI.–6.VII.2001	M.Kuhlmann	f	JN626392	
Deuteroxorides elevator	3-H3	NMBE	Finland/Sipoonkorpi, 21.VI.–3.VII.2006	N.Laurenne	f	JN626393	
Rhyssa amoena	2-A2	NMBE	Finland/Sipoonkorpi, 21.VI.–3.VII.2006	N.Laurenne	m	GU597836	