

Research article

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Illustrated key to the genera and a checklist of Italian Vespidae (Hymenoptera)

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Abstract

An illustrated key for the identification of genera and subgenera, and a checklist of Italian Vespidae (Hymenoptera) are presented.

Key words: Vespidae, genera, subgenera, key, catalog, Italy.

Introduction

Vespidae is a family of cosmopolitan Aculeate Hymenoptera, with more than 5000 described species (Carpenter 1982; Brothers & Carpenter 1993; Pickett & Carpenter 2010). Most of them are solitary with a predatory lifestyle, supplying the pedotrophic nests with larvae of other insects, mainly moths, but also Chrysomelidae and Curculionidae beetles and sawflies (Hymenoptera: Tenthredinidae) (Iwata 1976; Krombein 1979; Carpenter & Cumming 1985; Budriene 2003). Exceptions are the members of the subfamily Masarinae, which use nectar and pollen as a source of nourishment for the larvae, showing particular morphological adaptations suitable for this purpose (Gess 1996). In addition to the aforementioned strictly solitary forms, in the vespids there are also obligatory or facultative social species, presocial species and social parasites (Crespi & Yanega 1995; Hunt 2007; Archer 2012).

The supra-generic classification is currently debated and the subject of studies that attempt to delineate the relationships between the various evolutionary lines of the family, as recent studies based on molecular data (Schmitz & Moritz 1998; Hines et al. 2007; Bank et al. 2017; Peters et al. 2017; Piekarski et al. 2018) are largely incongruent with those based on morphological and behavioral traits (e.g., Carpenter 1982, 1987, 1988a, 1988b, 1991, 1993, 1996; Carpenter & Cumming 1985; Carpenter & Rasnitsyn 1990; Vernier 1997; Gess 1998; Krenn et al. 2002; Carpenter & Perera 2006; Hermes et al. 2013; Perrard et

al. 2017). In particular, some authors separate two groups from the subfamily Eumeninae, the so-called “Zethini” and “Raphiglossini”, sometimes as a single subfamily (Zethinae) and others as two separate lineages (Zethinae and Raphiglossinae) (Bank et al. 2017; Piekarski et al. 2018). The species of Vespidae currently known for Italy are 153 (128 Eumeninae, two Masarinae, 10 Polistinae, 13 Vespinae), of which six species are of dubious occurrence or identity. Moreover, an unspecified number of subspecies, which vary according to the opinions of the authors, should be added. For completeness, all the subspecies considered valid in the most recent catalogs will be listed, while bearing in mind that some of them may not be actually well founded.

Although widespread from sea level up to over 2000m of altitude, very well represented in the collections, and the subject of numerous publications, the study of Italian vespids turns out to be more complicated than expected, mainly due to the lack of recent dichotomous keys and checklists. There is no single publication including keys for all the genera of Italian Vespidae, rather we have a series of papers limited to individual subfamilies, which are outdated and not devoid of inaccuracies or errors. Speaking of the subfamily Eumeninae, the most neglected and complicated from this point of view, we have on the one hand the key by Giordani Soika (1978) for the European genera, with a taxonomy now partly outdated, while on the other we have that by Gusenleitner (2000, 2013), without images to help interpret the most difficult characters. The most recent checklist was published in

the “Fauna d’Italia” project by Giordani Soika & Borsato (1995), and is still mostly valid for the subfamily Eumeninae, which has seen only a few new additions (Borsato & Turrisi 2004; Borsato 2006), but needs substantial modification for the genus *Polistes* Latreille, 1802, which

in recent years has undergone a profound reclassification (Schmid-Egger et al. 2017).

To overcome these problems and provide a starting point for anyone wishing to study Italian Vespidae, I thought it appropriate to develop a dichotomous key that

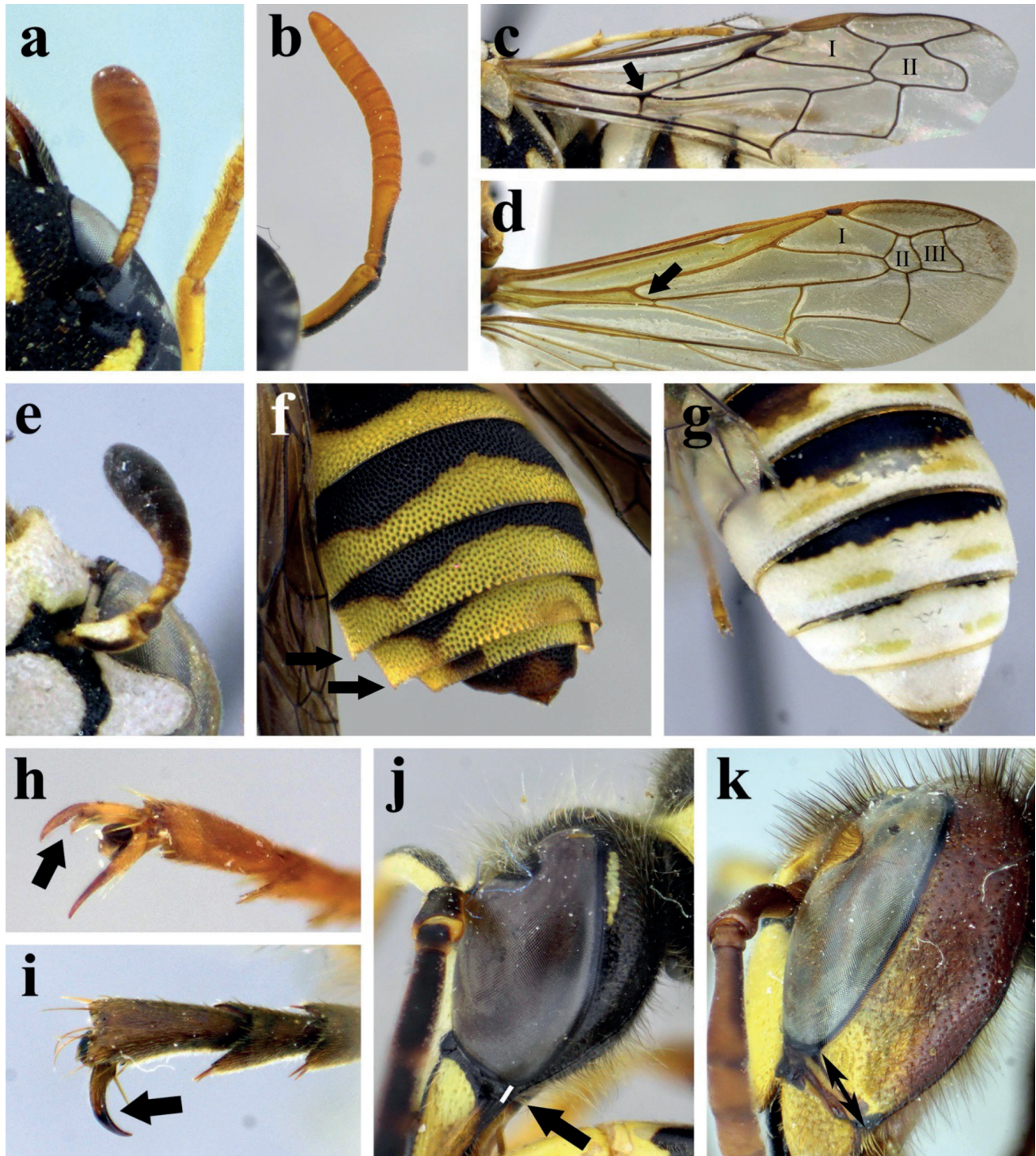


Fig. 1 – a, *Celonites abbreviatus* ♀, antenna. b, *Polistes dominula* ♀, antenna. c, *Jugurtia* sp. ♀, fore wing. d, *Polistes dominula* ♀, fore wing. e, *Jugurtia* sp. ♀, antenna. f, *Celonites abbreviatus* ♀, metasoma. g, *Jugurtia* sp. ♀, metasoma. h, *Paragynmomerus spiricornis* ♀, tarsal claws. i, *Vespa crabro* ♀, tarsal claws. j, *Katamenes arbustorum* ♂, head. k, *Vespa crabro* ♀, head.

allows the identification of the genera and subgenera of all Italian Vespidae, accompanied by an updated catalog of all currently recorded species and subspecies. Keys to the species are currently under preparation and will be published in the coming years, but for the time being the readers can refer to the following papers for a species-level identification: the series “Bestimmungstabellen mittel- und südeuropäischer Eumeniden” by Gusenleitner (1993, 1994, 1995a, 1995b, 1996, 1997a, 1997b, 1998a, 1998b, 1999a, 1999b, 1999c, 2000a, 2000b, 2003, 2007, 2011) for the Eumeninae; Mauss (2013) for the Masarinae; Schmid-Egger et al. (2017) for the Polistinae; Archer (1989, 2012) and Dvořák & Roberts (2006) for the Vespinae.

Material and methods

The key and catalog include all the genera of Vespidae recorded from Italy, including some doubtful records based on probable labeling errors or erroneous identifications. For convenience, the traditional division of the Italian fauna into four subfamilies (Eumeninae, Masarinae, Polistinae and Vespinae) is followed.

Specimens designed for the implementation of this identification key are housed in the author’s collection and were examined through a Leica MZ6 stereoscopic microscope. Morphological terminology follows Carpenter & Cumming (1985), Yamane (1990), and Carpenter & Garcete-Barrett (2003). Metasomal terga, metasomal sterna and antennal flagellomeres are abbreviated as T, S and F respectively. Images were acquired using a Canon EOS 1300D equipped with an inverted Canon EF-S 18-55mm lens and extension tubes, stacked with CombineZP, processed and assembled with Photoshop CC 2018.

The taxonomy of the catalog is based on the checklist published by Giordani Soika & Borsato (1995), complemented with Schmid-Egger et al. (2017) and Carpenter’s catalogs (unpublished work). A summary distribution in Italy is provided for each species following the model already used in the “Fauna d’Italia” project, dividing Italy in four areas: **North** (Aosta Valley, Emilia-Romagna, Friuli-Venezia Giulia, Liguria, Lombardy, Piedmont, Trentino-South Tyrol, Veneto), **South** (Abruzzo, Apulia, Basilicata, Calabria, Campania, Lazio, Marche, Molise, Tuscany, Umbria), **Sardinia** and **Sicily**.

KEY TO THE GENERA AND SUBGENERA OF ITALIAN VESPIDAE

1. Apical antennomeres forming a club (Fig. 1 a, e). Fore wing with two submarginal cells, first discoidal cell touching medial cell (Fig. 1 c).....2, Masarinae
- Apical antennomeres normal, not forming a club (Fig. 1 b). Fore wings with three submarginal cells, first dis-

- coidal cell not touching medial cell (Fig. 1 d).....3
2. Sides of tergites pointed, forming more or less triangular projections (Fig. 1 f); metasoma flattened on ventral side. Scape short and spherical (Fig. 1 a). Occipital carina complete.....*Celonites* Latreille, 1802
- Sides of tergites regularly rounded (Fig. 1 g); metasoma cylindrical. Scape more or less cylindrical, longer than following segment (Fig. 1 e). Occipital carina incomplete.....*Jugurtia* de Saussure, 1854
3. Tarsal claws bifid (Fig. 1 h). Gena strongly tapering below, posterobasal corner of mandible nearly touching ocular margin (Fig. 1 j).....4, Eumeninae
- Tarsal claws simple (Fig. 1 i). Gena not tapering below, posterobasal corner of mandible widely separated from ocular margin (Fig. 1 k).....43
4. Second recurrent vein received by third submarginal cell (Fig. 2 a). Very long mouthparts, reaching hind coxae (Fig. 2c). Clypeus laterally expanded by subtriangular expansions.....5
- Both recurrent vein received by second submarginal cell (Fig. 2 b). Mouthparts short and barely exceeding mandibles, if long then not reaching hind coxae (Fig. 2 d). Clypeus not expanded.....6
5. Metasoma sessile (Fig. 2 e).....
-*Psiliglossa* Saunders, 1852
- Metasoma petiolate (Fig. 2 f).....
-*Raphiglossa* Saunders, 1850
6. Mid tibia with two apical spurs (Fig. 2 g).....
-*Discoelius* Latreille, 1809
- Mid tibia with one apical spur (Fig. 2 h).....7
7. 7. Metasoma petiolate, T1 several times longer than wide and narrower than half of T2 (Fig. 3 a).....8
- Metasoma sessile, T1 at most slightly narrower than T2 (Fig. 3 b-d).....11
8. T2 with an apical black or translucent lamella, sharply separated from the rest of the tergite by a step (Fig. 3 e).....
-*Eumenes* Latreille, 1802
- T2 without an apical lamella, at most with a narrow decolorate margin not separated by a step (Fig. 3 f).....9
9. Apical margin of clypeus convex (Fig. 3 g). In male, fore tarsomeres shortened and with lateral spine (Fig. 3 i), mid basitarsus with usually convex lateral margin
-*Katamenes* Meade-Waldo, 1910
- Apical margin of clypeus truncated or concave (Fig. 3 h). In male, tarsi not modified.....10
10. T1 very long and narrow, parallel-sided in the posterior two thirds and dorsally flattened (Fig. 4 a).....
-*Ischnogasteroides* Magretti, 1884
- T1 pyriform, widened in the apical half and dorsally convex (Fig. 4 b).....*Delta* de Saussure, 1855
11. Second submarginal cell petiolate (Fig. 4 c). Tegulae large, covering parategulae (Fig. 4 d).....
-*Alastor* Lepeletier, 1841
- Second submarginal cell not petiolate. Tegulae different, parategulae well visible (Fig. 4 e-f).....12

12. Tegulae elliptical, posteriorly rounded (Fig. 4 e). Antenna of male apically spiraled (Fig. 4 g).....13
- Tegulae with a pointed posterior lobe, more or less developed but always evident (Fig. 4 f). Antenna of male apically simple or hooked (Fig. 8 g-h).....21
13. Labial palpi 3-segmented, elongated and with long fringes of setae at least in the female (Fig. 5 a-c). Elongate mouthparts.....14
- Labial palpi with 4-segmented, short and with very sparse short setae in both sexes (Fig. 5 d). Short mouthparts.....16
14. Maxillary palpi 5-segmented. Third segment of labial palpi narrow and parallel-sided, with long fringes of setae in both sexes (Fig. 5 a). Apical margin of clypeus widely truncate (Fig. 5 e).....*Pterocheilus* Klug, 1805
- Maxillary palpi 6-segmented. Labial palpi different15
15. Third segment of labial palpi narrower than preceding one, ending in a long narrow point (Fig. 5 b). Male lacking apical fringes of setae on sternites*Hemipterochilus* Ferton, 1909
- Third segment of labial palpi wider than preceding one, flattened and with curved margins, apically rounded (Fig. 5 c). Male with apical fringes of dense setae on sternites.....*Onychopterocheilus* Blüthgen, 1955
16. Head and mesosoma with short pubescence (Fig. 5 f). Vertex with a fine longitudinal carina in the middle, in the female without cephalic foveae (Fig. 6 a). S4-7 of male with short and dense, woolly vestiture (Fig. 6 e)*Tropidodynerus* Blüthgen, 1939
- Head and mesosoma with long setae (Fig. 6 f). Vertex without longitudinal carina, in female with cephalic foveae (Fig. 6 b-d). Male sternites without wool-like vestiture17
17. In female, clypeus deeply incised apically and mandible with a deep incision between third and fourth teeth (Fig. 6 g). Cephalic foveae punctiform, close to each other in the middle of vertex (Fig. 6 b). Male without modifications on legs and gena*Gymnomerus* Blüthgen, 1938
- In female, clypeus more or less apically truncate and mandible normal (Fig. 6 h, 7 a). Cephalic foveae widely separated and placed behind posterior ocelli (Fig. 6 c-d). Male usually with modified legs18
18. Large-sized species (13-17mm). Parapsidal furrows deep in the posterior half of mesoscutum (Fig. 7 b). Cephalic foveae about as large as an ocellus and densely pubescent (Fig. 6 c). Mid femur of male apically expanded (Fig. 7 d)*Paragymnomerus* Blüthgen, 1938
- Smaller species (8-13mm). Mesoscutum without parapsidal furrows (Fig. 7 c). Cephalic foveae much smaller than an ocellus and bare (Fig. 6 d). Mid leg of male differently modified (Fig. 7 e, g)19, *Odynerus* Latreille, 1802
19. Mid femur of male with two deep incisions, forming a median tooth (Fig. 7 e). In female, metanotum black (Fig. 7 f)*O. (Odynerus)* Latreille, 1802
- Mid femur of male normal, not incised20
20. Mid coxa of male with a thorn at posteromedial corner (Fig. 7 g). Gena of male with a long thorn behind mandible articulation in some species (Fig. 8 a). Metanotum of female with yellow or white wide band (Fig. 8 b)*O. (Spinicoxa)* Blüthgen, 1938
- Mid coxa and gena of male without thorns. Metanotum of female black (Fig. 7 f).....*O. (Monoplomerus)* Blüthgen, 1941
21. Scutellum, metanotum and propodeum forming an even curve in lateral view. Propodeum with a median basal fovea, posteriorly continuing in a median longitudinal carina. Corners of propodeum prolonged in two lamellar triangular teeth (Fig. 8 c). T1 bell-shaped, longer than wide and narrower than T2 (Fig. 8 d)*Pareumenes* de Saussure, 1855
- Scutellum, metanotum and propodeum not forming an even curve. Propodeum without basal fovea, corners different. T1 different, at most as long as wide (Fig. 3 b-d).....22
22. T1 with a basal transverse carina (Fig. 8 e).....23
- T1 without carina.....27
23. T1 with a median longitudinal furrow behind carina (Fig. 8 f). Apical flagellomeres of male simple (Fig. 8 g)*Symmorphus* Wesmael, 1836
- T1 without longitudinal furrow. Apical flagellomeres of male hooked (Fig. 8 h)24
24. Pronotum lacking pretegular carina (Fig. 9 a)25, *Eustenancistrocerus* Blüthgen, 1938
- Pronotum with pretegular carina (Fig. 9 b).....26
25. Tegulae not punctured but with two translucent spots (Fig. 9 c). S2 truncated basally, forming a step. Clypeus of male apically truncate.....*E. (Parastenancistrocerus)* Blüthgen, 1938
- Tegulae with many deep punctures (Fig. 9 d). S2 evenly convex. Clypeus of male deeply incised apically*E. (Eustenancistrocerus)* Blüthgen, 1938
26. Head and mesosoma with long and dense setae (Fig. 9 g). Epicnemial carina absent. Tegulae narrow, longer than wide (Fig. 9 e). T1 evenly punctured behind transverse carina (Fig. 9 h). Female with cephalic foveae*Ancistrocerus* Wesmael, 1836
- Head and mesosoma with short and sparse pubescence (Fig. 9 i). Epicnemial carina present. Tegulae wider, about as long as wide (Fig. 9 f). T1 with a smooth unpunctured area behind transverse carina (Fig. 9 j). Female without cephalic foveae*Tachyancistrocerus* Giordani Soika, 1952
27. T1 with an apical translucent lamella (Fig. 3 b).....28
- T1 without apical lamella (Fig. 3 c-d).....31
28. Pronotum with pronotal carina present only on humeri, dorsal face smoothly passing into anterior face (Fig. 10 a). Epicnemial carina barely visible, confused with

- sculpture of mesepisternum. Metasoma with long bristles pointing behind. In male, mid femur flattened below and hind tibia apically expanded (Fig. 10 c)
 *Chlorodynerus* Blüthgen, 1951
- Pronotum with complete pronotal carina, dorsal face sharply separated from anterior face (Fig. 10 b). Epicnemial carina sharp and well visible. Metasoma with very short and barely visible bristles. Male with unmodified legs.....29
29. Metanotum evenly rounded. Dorsal carinae of propodeum forming long and sharp teeth, their distance narrower than the width of metanotum (Fig. 10 d).....
 *Syneudynerus* Blüthgen, 1951
- Metanotum sharply angled, with a fine toothed carina separating a short dorsal face and a longer posterior face. Dorsal carinae of propodeum absent or, if present, forming shorter teeth as far apart as the width of metanotum (Fig. 10 e-f).....
30, *Euodynerus* Dalla Torre, 1904
30. Dorsal carinae of propodeum forming sharp teeth reaching half height of metanotum, separated from it by a narrow incision (Fig. 10 e). If carinae less developed, then upper side of mesosoma with brush-like vestiture. Vertex of female with subtriangular hairy depression, wider than ocellar triangle (Fig. 10 g). In male, mid and hind apical tarsomeres widened and black (Fig. 10

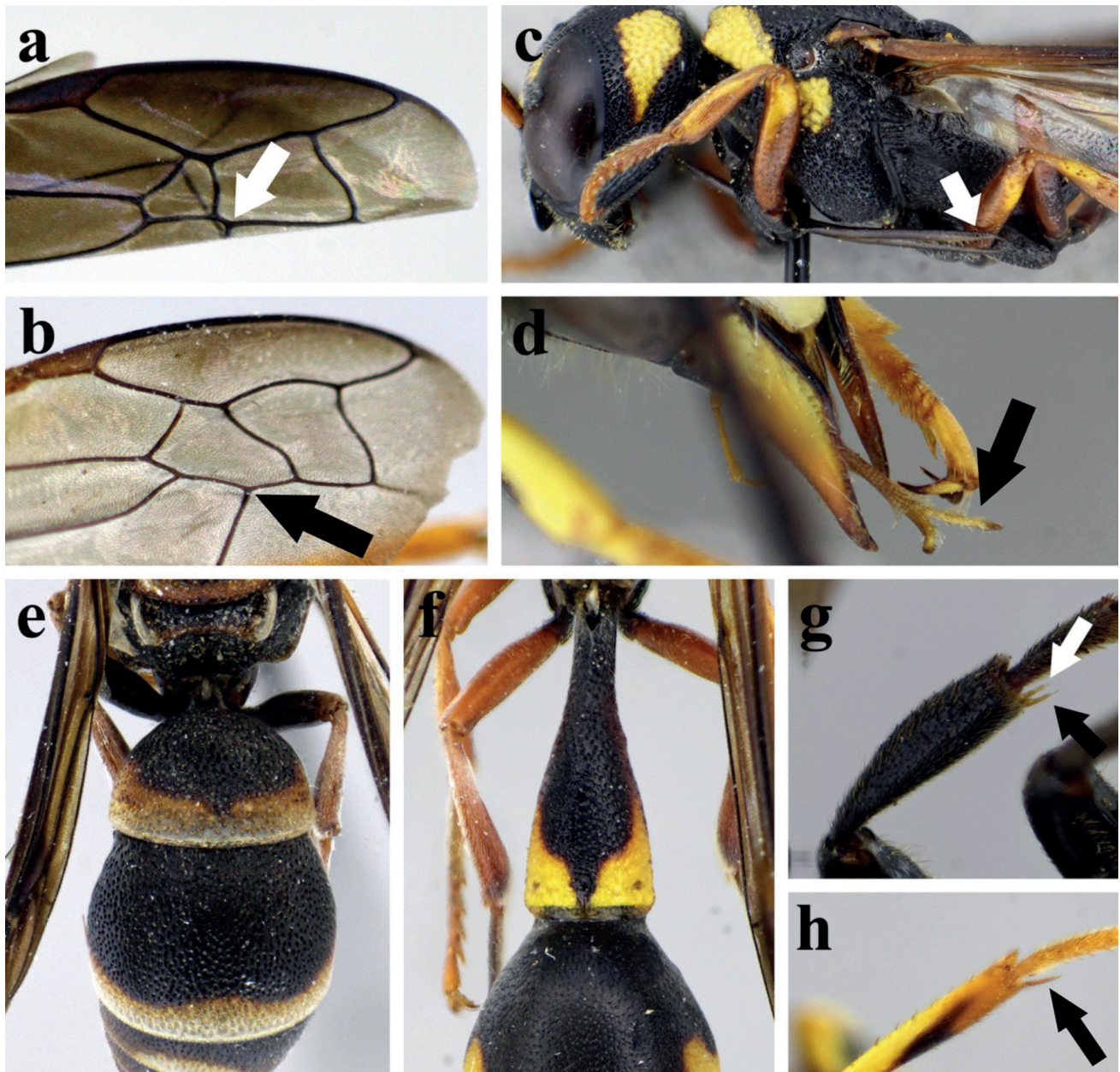


Fig. 2 – a, *Raphiglossa spinosa* ♀, fore wing. b, *Katamenes arbustorum* ♂, fore wing. c, *Raphiglossa spinosa* ♀, mouthparts. d, *Katamenes arbustorum* ♂, mouthparts. e, *Psiliglossa zeppelini* ♀, metasoma. f, *Raphiglossa spinosa* ♀, metasoma. g, *Discoelius dufourii* ♀, mid tibia. h, *Eumenes coarctatus* ♂, mid tibia.

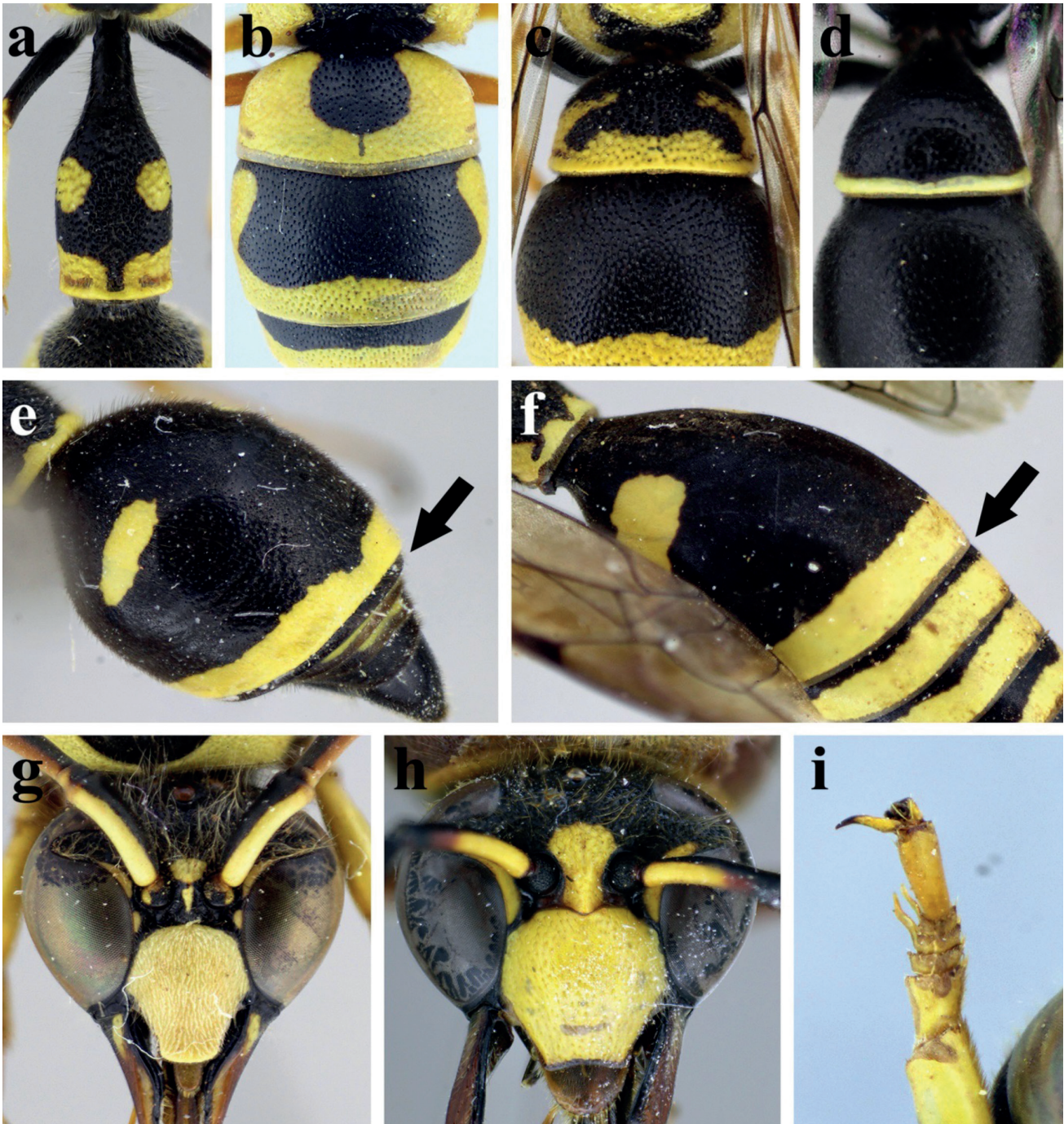


Fig. 3 – a, *Eumenes mediterraneus* ♀, T1. b, *Euodynerus dantici* ♀, metasoma. c, *Allodynerus delphinalis* ♂, metasoma. d, *Microdynerus longicollis* ♂, metasoma. e, *Eumenes papillarius* ♀, T2. f, *Katamenes arbustorum* ♂, T2. g, *Katamenes arbustorum* ♂, head. h, *Delta unguiculatum* ♀, head. i, *Katamenes arbustorum* ♂, fore tarsi.

- h).....*E. (Pareuodynerus)* Blüthgen, 1938
- Dorsal carinae of propodeum not exceeding base of metanotum and not forming teeth (Fig. 10 f). Vertex of female with rounded bare depression, narrower than ocellar triangle (Fig. 10 i). Tarsi of male not modified (Fig. 10 j).....*E. (Euodynerus)* Dalla Torre, 1904
- 31. T2 with an apical lamella (Fig. 11 a). Second submarginal cell basally right-angled to obtuse (Fig. 11 c)....32
- T2 without lamella (Fig. 11 b). Second submarginal cell basally acute (Fig. 11 d).....37
- 32. T1 much narrower than T2 (Fig. 11 e). Mesosoma short, mesoscutum about as long as wide (Fig. 11 g) 33, *Leptochilus* de Saussure, 1853
- T1 barely narrower than T2 (Fig. 11 f). Mesosoma elongate, mesoscutum longer than wide (Fig. 11 h) 35, *Microdynerus* Thomson, 1874

33. Tegulae widened posteriorly, larger than half scutellum (Fig. 12 a).....**L. (*Euleptochilus*)** Blüthgen, 1943
 - Tegulae pointed posteriorly, smaller than half scutellum (Fig. 12 b)34
34. Apical lamella of T2 with fine sculpture and sharply separated from rest of tergites (Fig. 11 a).....
**L. (*Lionotulus*)** Blüthgen, 1938
 - Apical lamella of T2 with coarse punctures and connected with preapical margin of tergite by pigmented digitations (Fig. 12 c).....
**L. (*Neoleptochilus*)** Blüthgen, 1961
35. Mandibles of female wide and angled on outer margin (Fig. 12 d). F11 of male wide and flattened (Fig. 12 f)**M. (*Pseudomicrodynerus*)** Blüthgen, 1938
 - Mandibles of female normal, evenly curved (Fig. 12 e)36
36. Apical margin of female clypeus bidentate (Fig. 12 g). S2 without a longitudinal furrow. F11 of male pointed ..
**M. (*Microdynerus*)** Thomson, 1874
 - Apical margin of female clypeus tridentate, median tooth prolonged in a sharp carina (Fig. 12 h). S2 with a longitudinal furrow. F11 of male flattened and not pointed.....**M. (*Alastorynerus*)** Blüthgen, 1938
37. Pronotum lacking pretegular carina (Fig. 13 a). Tegulae as wide as long. Metanotum with two small teeth at extreme sides (Fig. 13 c).....
**Parodontodynerus** Blüthgen, 1938
 - Pronotum with pretegular carina (Fig. 13 b). Metanotum without teeth, if teeth present then larger and close to middle.....38
38. Propodeum with a sharp and continuous dorsal carina (Fig. 13 d). Tegulae wide and expanded on outer margin (Fig. 13 f).....39, **Pseudepipona** de Saussure, 1856
 - Propodeum without dorsal carinae, or with a widely interrupted one. Tegulae narrower40
39. Sides of propodeum with a triangular expansion (Fig. 13 e). Male mandible with a deep incision between second and third teeth (Fig. 13 g)
**P. (*Pseudepipona*)** de Saussure, 1856
 - Sides of propodeum without triangular expansion. Male mandible without incision.....
**P. (*Deuterepipona*)** Blüthgen, 1951
40. Metanotum with two triangular teeth (Fig. 13 h)
**Antepipona** de Saussure, 1855
 - Metanotum without teeth.....41
41. Large sized species, red and black with yellow markings on metasoma. Posterior half of metanotum and whole scutellum flattened, smooth and shiny with extremely fine sculpture (Fig. 14 a). Male clypeus apically pointed (Fig. 14 b). Mid femur of male basally depressed (Fig. 14 c).....**Rhynchium** Spinola, 1806
 - Smaller species, black with yellow or white markings, some species with red legs. Mesoscutum and scutellum convex, entirely covered by dense and deep punctures. Mid femur of male normal. Male clypeus apically emarginate42
42. Head and mesosoma with short setae (Fig. 14 d). Tegulae wide, campanulate and not exceeding parategulae, and axillary fossa large and rounded (Fig. 14 e). Anterior face of pronotum with a pair of pits in the middle and punctures in the lateral thirds (Fig. 14 f).....
**Stenodynerus** de Saussure, 1863
 - Head and mesosoma with long setae (Fig. 14 g). Tegulae narrow, exceeding parategulae, and axillary fossa small and punctiform (Fig. 14 h). Anterior face of pronotum entirely smooth (Fig. 14 i).....
**Allodynerus** Blüthgen, 1938
43. Clypeus apically pointed (Fig. 15 a). Vestiture very short on whole body. T1 weakly arched in lateral view, sub-petiolate and with diverging sides in dorsal view (Fig. 15 b).....Polistinae, **Polistes** Latreille, 1802
 - Clypeus apically truncate or emarginate (Fig. 15 c). Vestiture long on whole body. T1 angled in lateral view, with a long anterior vertical face and a shorter horizontal one, parallel-sided in dorsal view (Fig. 15 d)44, Vespinae
44. Distance between posterior ocelli and occipital margin much longer than two ocellar diameters (Fig. 15 e). Pronotal carina complete (Fig. 16 a). Male flagellum with strong tyloids (Fig. 15 g).....**Vespa** Linnaeus, 1758
 - Distance between posterior ocelli and occipital margin as long as two ocellar diameters at most (Fig. 15 f). Pronotal carina absent or medially interrupted (Fig. 16 b-c). Male flagellum without or with poorly defined tyloids (Fig. 15 h).....45
45. Malar space long (Fig. 16 d). Pronotal carina present but widely interrupted in the middle (Fig. 16 b).....
**Dolichovespula** Rohwer, 1916
 - Malar space short, almost linear (Fig. 16 e). Pronotal carina absent (Fig. 16 c).....**Vespa** Thomson, 1869

CATALOG OF ITALIAN VESPIDAE

Subfamily Eumeninae

Genus *Alastor* Lepeletier, 1841

Alastor (Alastor) atropos Lepeletier, 1841 (N, S, Sa, Si)

Alastor (Alastor) mocsaryi (André, 1884) (N)

Genus *Allodynerus* Blüthgen, 1938

Allodynerus delphinalis delphinalis (Giraud, 1866) (N, S, Si)

Allodynerus delphinalis sardous Blüthgen, 1953 (Sa)

Allodynerus floricola floricola (de Saussure, 1853)

(N, S, Sa?, Si)

Allodynerus rossii (Lepeletier, 1841) (N, S, Si)

Genus *Ancistrocerus* Wesmael, 1836

Ancistrocerus abditus Gusenleitner, 1977 (Sa)

Ancistrocerus antilope antilope (Panzer, 1798) (N, S)

Ancistrocerus auctus (Fabricius, 1793) (N, S, Si)

Ancistrocerus biphaleratus triphaleratus (de Saussure, 1855) (S, Sa, Si)
Ancistrocerus claripennis claripennis Thomson, 1874 (N, S)
Ancistrocerus gazella (Panzer, 1798) (N, S, Sa, Si)
Ancistrocerus ichneumonideus ichneumonideus (Ratzeburg, 1844) (N)
Ancistrocerus longispinosus gazelloides Guiglia, 1943 (S, Sa)
Ancistrocerus longispinosus longispinosus (de Saussure, 1855) (N, S, Si)
Ancistrocerus nigricornis (Curtis, 1826) (N, S, Sa, Si)
Ancistrocerus oviventris oviventris (Wesmael, 1836) (N, S, Si)
Ancistrocerus oviventris siculus Blüthgen, 1955 (S, Si)
Ancistrocerus parietinus (Linnaeus, 1761) (N, S)
Ancistrocerus parietum (Linnaeus, 1758) (N, S, Sa?, Si?)
Ancistrocerus renimacula (Lepelletier, 1841) (Sa)
Ancistrocerus scoticus scoticus (Curtis, 1826) (N, S, Si)
Ancistrocerus trifasciatus trifasciatus (Müller, 1776) (N, S, Sa?)
Ancistrocerus tussaci Gusenleitner, 1987 (Sa)

Genus *Antepipona* de Saussure, 1855

Antepipona caelebs (Dalla Torre, 1894) (Si)
 [apparently a Sicilian endemic, probably synonym of *Antepipona orbitalis*]
Antepipona deflenda (Saunders, 1853) (N, S, Sa, Si)
Antepipona doursii (de Saussure, 1855) (S, Sa)
Antepipona orbitalis (Herrich-Schäffer, 1839) (N, S, Si)

Genus *Chlorodynerus* Blüthgen, 1951

Chlorodynerus ypsilon ypsilon (Kostylev, 1929) (S?)
 [species occurring in Eastern Mediterranean, there is one specimen labelled "Is. del Giglio" [Giglio Island, Tuscany] in the Natural History Museum of Genova, probably mislabeled]

Genus *Delta* de Saussure, 1855

Delta unguiculatum (Villers, 1789) (N, S, Si)

Genus *Discoelius* Latreille, 1809

Discoelius dufourii dufourii Lepelletier, 1841 (N)
Discoelius zonalis (Panzer, 1801) (N, S)

Genus *Eumenes* Latreille, 1802

Eumenes (Eumenes) aemilianus Guiglia, 1951 (N)
Eumenes (Eumenes) coarctatus coarctatus (Linnaeus, 1758) (N, S, Sa, Si)
Eumenes (Eumenes) coarctatus maroccanus Gusenleitner, 1972 (Sa, Si)
Eumenes (Eumenes) coarctatus nuragicus Giordani Soika, 1972 (Sa)
Eumenes (Eumenes) coronatus coronatus (Panzer, 1799) (N, S, Sa, Si)

Eumenes (Eumenes) cyrenaicus pseudogermanicus Blüthgen, 1938 (Sa, Si)
Eumenes (Eumenes) dubius dubius de Saussure, 1852 (N, S, Sa?, Si)
Eumenes (Eumenes) mediterraneus filitosa Gereys, 2011 (Sa)
Eumenes (Eumenes) mediterraneus mediterraneus Kriechbaumer, 1879 (N, S, Sa, Si)
Eumenes (Eumenes) papillarius papillarius (Christ, 1791) (N, S, Sa, Si)
Eumenes (Eumenes) pedunculatus pedunculatus (Panzer, 1799) (N, S)
Eumenes (Eumenes) pomiformis (Fabricius, 1781) (N, S, Sa, Si)
Eumenes (Eumenes) punctaticlypeus Giordani Soika, 1943 (S)
Eumenes (Eumenes) sardous Guiglia, 1951 (Sa)
Eumenes (Eumenes) sareptanus André, 1884 (N, S, Si)
Eumenes (Eumenes) subpomiformis Blüthgen, 1938 (N, S, Si)

Genus *Euodynerus* Dalla Torre, 1904

Euodynerus (Euodynerus) curictensis curictensis Blüthgen, 1940 (N, S, Si)
Euodynerus (Euodynerus) curictensis sardous Borsato, 2006 (Sa)
Euodynerus (Euodynerus) dantici dantici (Rossi, 1790) (N, S, Sa, Si)
Euodynerus (Euodynerus) dantici poggii Giordani Soika, 1986 (S)
Euodynerus (Euodynerus) disconotatus (Lichtenstein, 1884) (N, S, Sa?, Si)
Euodynerus (Euodynerus) fastidiosus (de Saussure, 1853) (S, Si)
Euodynerus (Euodynerus) variegatus variegatus (Fabricius, 1793) (S, Sa, Si)
Euodynerus (Pareuodynerus) bidentiformis (Giordani Soika, 1942) (Sa)
Euodynerus (Pareuodynerus) notatus notatus (Jurine, 1807) (N, Sa)
Euodynerus (Pareuodynerus) posticus (Herrich-Schäffer, 1841) (N, S, Sa, Si)
Euodynerus (Pareuodynerus) quadrifasciatus quadrifasciatus (Fabricius, 1793) (N, S, Si)

Genus *Eustenancistrocerus* Blüthgen, 1938

Eustenancistrocerus (Eustenancistrocerus) blanchardianus (de Saussure, 1855) (N, Sa, Si)
Eustenancistrocerus (Parastenancistrocerus) amadanensis amadanensis (de Saussure, 1855) (S, Si)

Genus *Gymnomerus* Blüthgen, 1938

Gymnomerus laevipes laevipes (Shuckard, 1837) (N, S, Sa, Si)

Genus *Hemipterochilus* Ferton, 1909

Hemipterochilus bembeciformis terricola (Mocsáry, 1883)
(N, S, Sa)

Genus *Ischnogasteroides* Magretti, 1884

Ischnogasteroides picteti (de Saussure, 1852) (N?)
[species known from France and Spain, recorded from
Piedmont based on a specimen in Sichel collection, its
presence in Italy is doubtful]

Genus *Katamenes* Meade-Waldo, 1910

Katamenes algirus (Schulz, 1905) (S, Si)
Katamenes arbustorum arbustorum (Panzer, 1799)
(N, S, Si)
Katamenes arbustorum burlinii (Giordani Soika, 1949) (N)
Katamenes arbustorum soikai Borsato, 1993 (Sa)
Katamenes sichelii sichelii (de Saussure, 1852) (S)

Genus *Leptochilus* de Saussure, 1853

Leptochilus (Euleptochilus) duplicatus duplicatus (Klug,
1835) (N, S)
Leptochilus (Euleptochilus) duplicatus xanthochromus
Giordani Soika, 1986 (Sa)
Leptochilus (Euleptochilus) limbiferus (Morawitz, 1867)
(N, S)
Leptochilus (Lionotulus) alpestris alpestris (de Saussure,
1855) (N, S)
Leptochilus (Lionotulus) alpestris trinacriae
(André, 1883) (Si)
Leptochilus (Lionotulus) crassipunctatus
(Maidl, 1922) (N)
Leptochilus (Lionotulus) josephi Giordani Soika, 1947
(N, S)
Leptochilus (Lionotulus) membranaceus membranaceus
(Morawitz, 1867) (S)
Leptochilus (Lionotulus) tarsatus (de Saussure, 1855)
(N, S, Si)
Leptochilus (Lionotulus) torretassoi venerensis Blüthgen,
1964 (Si)
Leptochilus (Neoleptochilus) medanae medanae
(Gribodo, 1886) (Sa, Si)
Leptochilus (Neoleptochilus) regulus (de Saussure, 1855)
(N, S, Sa, Si)

Genus *Microdynerus* Thomson, 1874

Microdynerus (Alastorynerus) perezii (Berland, 1927) (N, S)
Microdynerus (Microdynerus) appenninicus Giordani
Soika, 1960 (S, Si)
Microdynerus (Microdynerus) exilis (Herrich-Schäffer,
1839) (N, S, Sa?)
Microdynerus (Microdynerus) habitus Gusenleitner, 1991 (Si)
Microdynerus (Microdynerus) longicollis longicollis
Morawitz, 1895 (N, S)
Microdynerus (Microdynerus) longicollis sicanius
Blüthgen, 1964 (Si)

Microdynerus (Microdynerus) mirandus (Giordani Soika,
1947) (S, Sa, Si)

Microdynerus (Microdynerus) nugdunensis nugdunensis
(de Saussure, 1855) (N, S, Sa)

Microdynerus (Microdynerus) nugdunensis sicelis
Blüthgen, 1964 (Si)

Microdynerus (Microdynerus) tauromenitanus Blüthgen,
1955 (S, Si)

Microdynerus (Microdynerus) timidus timidus
(de Saussure, 1856) (N, S, Sa, Si)

Microdynerus (Pseudomicrodynerus) parvulus
(Herrich-Schäffer, 1838) (N, S)

Genus *Odynerus* Latreille, 1802

Odynerus (Monoplomerus) consobrinus consobrinus
Dufour, 1839 (N?) [species known from Iberian
Peninsula, North Africa and Middle East, the record
from Italy is doubtful]
Odynerus (Odynerus) alpinus von Schulthess, 1897
(N, Si)
Odynerus (Odynerus) femoratus de Saussure, 1856 (S,
Sa, Si)
Odynerus (Odynerus) melanocephalus melanocephalus
(Gmelin, 1790) (N, S, Sa, Si)
Odynerus (Odynerus) poecilus de Saussure, 1856
(N, S)
Odynerus (Odynerus) rotundigaster burlinii Giordani
Soika, 1977 (Si)
Odynerus (Odynerus) rotundigaster rotundigaster de
Saussure, 1853 (S, Si)
Odynerus (Odynerus) spinipes spinipes (Linnaeus, 1758)
(N, S, Si)
Odynerus (Spinicoxa) albopictus de Saussure, 1856
(S, Si)
Odynerus (Spinicoxa) reniformis (Gmelin, 1790)
(N, S, Sa, Si)
Odynerus (Spinicoxa) wilhelmi Dusmet, 1917 (Sa)

Genus *Onychopterocheilus* Blüthgen, 1955

Onychopterocheilus (Onychopterocheilus) albopictus
(Kriechbaumer, 1869) (S)
Onychopterocheilus (Onychopterocheilus) hellenicus
hellenicus (Morawitz, 1885) (S, Si)

Genus *Paragymnomerus* Blüthgen, 1938

Paragymnomerus spiricornis spiricornis (Spinola, 1808)
(N, S)

Genus *Pareumenes* de Saussure, 1855

Pareumenes (Nortonia) laminatus laminatus
(Kriechbaumer, 1879) (S)

Genus *Parodontodynerus* Blüthgen, 1938

Parodontodynerus ephippium ephippium (Klug, 1817)
(N, S, Sa, Si)

Genus *Pseudepipona* de Saussure, 1856

Pseudepipona (Deuterepipona) inexpectata (Blüthgen, 1955) (Si)

Pseudepipona (Pseudepipona) herrichii (de Saussure, 1856) (N, S)

Pseudepipona (Pseudepipona) lativentris lativentris (de Saussure, 1855) (N, S, Sa, Si)

Pseudepipona (Pseudepipona) tripunctata (Fabricius, 1787) (Si)

Genus *Psiliglossa* Saunders, 1872

Psiliglossa odyneroides odyneroides (Saunders, 1850) (Si)

Genus *Pterocheilus* Klug, 1805

Pterocheilus (Pterocheilus) phaleratus chevrieranus de Saussure, 1856 (N, S)

Pterocheilus (Pterocheilus) phaleratus phaleratus (Panzer, 1797) (N, S)

Genus *Raphiglossa* Saunders, 1850

Raphiglossa eumenoides eumenoides Saunders, 1850 (S?)

[species known from Balkans and Eastern Mediterranean, doubtfully recorded from Southern Italy by Giordani Soika & Borsato (1995)]

Genus *Rhynchium* Spinola, 1806

Rhynchium oculatum lefebvrei Lepelletier, 1841 (Si)

Rhynchium oculatum oculatum (Fabricius, 1781) (N, S, Sa, Si)

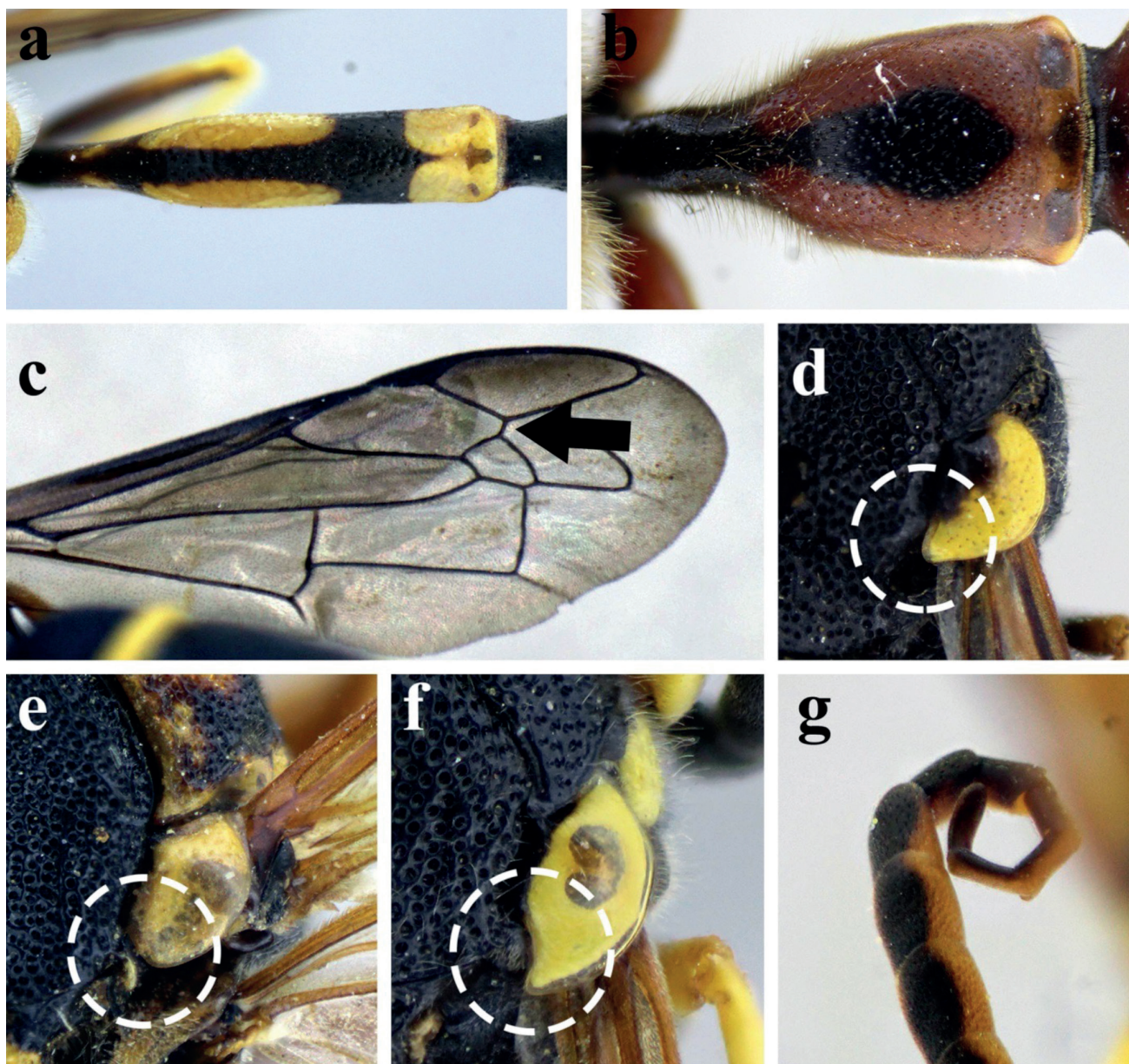


Fig. 4 – a, *Ischnogasteroides picteti tenuis* ♀, T1. b, *Delta unguiculatum* ♀, T1. c, *Alastor atropos* ♀, fore wing. d, *Alastor atropos* ♀, tegula. e, *Tropidodynerus flavus* ♂, tegula. f, *Allodynerus delphinalis* ♂, tegula. g, *Tropidodynerus flavus* ♂, antenna.

Genus *Stenodynerus* de Saussure, 1863

- Stenodynerus aequisculptus aequisculptus* (Kostylev, 1940) (Sa)
Stenodynerus bluethgeni van der Vecht, 1971 (N, S, Sa, Si)
Stenodynerus chevrieranus (de Saussure, 1855) (N, S, Sa, Si)
Stenodynerus clypeopictus (Kostylev, 1940) (N)
Stenodynerus fastidiosissimus difficilis (Morawitz, 1867) (S, Si)
Stenodynerus fastidiosissimus fastidiosissimus (de Saussure, 1855) (N, S, Si)
Stenodynerus fastidiosissimus laborans (Costa, 1882) (Sa)
Stenodynerus jurinei jurinei de Saussure, 1855 (N, Sa)
Stenodynerus orenburgensis (André, 1884) (N)
Stenodynerus picticrus (Thomson, 1874) (N)
Stenodynerus punctifrons (Thomson, 1874) (N)
Stenodynerus steckianus (von Schulthess, 1897) (N, S)
Stenodynerus xanthomelas (Herrich-Schäffer, 1839) (N)

Genus *Symmorphus* Wesmael, 1836

- Symmorphus (Symmorphus) allobrogus* (de Saussure, 1855) (N)
Symmorphus (Symmorphus) angustatus (Zetterstedt, 1838) (N)
Symmorphus (Symmorphus) bifasciatus (Linnaeus, 1761) (N, S, Si)
Symmorphus (Symmorphus) connexus (Curtis, 1826) (N)
Symmorphus (Symmorphus) crassicornis (Panzer, 1798) (N, S, Sa)
Symmorphus (Symmorphus) debilitatus (de Saussure, 1855) (N)
Symmorphus (Symmorphus) declivis Harttig, 1932 (S)
Symmorphus (Symmorphus) fuscipes (Herrich-Schäffer, 1838) (N)
Symmorphus (Symmorphus) gracilis (Brullé, 1832) (N, S, Si)
Symmorphus (Symmorphus) murarius (Linnaeus, 1758) (N, S)

Genus *Syneuodynerus* Blüthgen, 1951

- Syneuodynerus egregius egregius* (Herrich-Schäffer, 1839) (N, S, Sa, Si)

Genus *Tachyancistrocerus* Giordani Soika, 1952

- Tachyancistrocerus rhodensis* (de Saussure, 1855) (N, S, Si)

Genus *Tropidodynerus* Blüthgen, 1939

- Tropidodynerus (Tropidodynerus) fertoni* (Dusmet, 1925) (Sa)
Tropidodynerus (Tropidodynerus) flavus flavus (Lepelletier, 1841) (Si)
Tropidodynerus (Tropidodynerus) interruptus tricolor Blüthgen, 1956 (S)

Subfamily Masarinae**Genus *Celonites* Latreille, 1802**

- Celonites (Celonites) abbreviatus* (Villers, 1789) (N, S)

Genus *Jugurtia* de Saussure, 1854

- Jugurtia dispar* (Dufour, 1854) (S?) [endemic of Iberian Peninsula, recorded by Erlandsson (1974) from Pesaro province, its presence in Italy is improbable]

Subfamily Polistinae**Genus *Polistes* Latreille, 1802**

- Polistes (Polistes) associus* Kohl, 1898 (N, S, Si)
Polistes (Polistes) atrimandibularis Zimmermann, 1930 (N, S, Si)
Polistes (Polistes) austroccidentalis van Achterberg & Neumeyer, 2017 (N, S)
Polistes (Polistes) biglumis (Linnaeus, 1758) (N, S, Si)
Polistes (Polistes) bischoffi Weyrauch, 1937 (N, S, Sa)
Polistes (Polistes) dominula (Christ, 1791) (N, S, Sa, Si)
Polistes (Polistes) foederatus Kohl, 1898 (N)
Polistes (Polistes) gallicus (Linnaeus, 1767) (N, S, Sa, Si)
Polistes (Polistes) opinabilis Kohl, 1898 (N, S, Sa, Si) [traditionally known as *Polistes nimpha* (Christ, 1791), Gereys (2022) considers *Vespa nimpha* Christ, 1791 a nomen dubium, with *Polistes opinabilis* being the valid name]
Polistes (Polistes) semenowi Morawitz, 1889 (N, S, Si)

Subfamily Vespinae**Genus *Dolichovespula* Rohwer, 1916**

- Dolichovespula adulterina* (du Buysson, 1905) (N)
Dolichovespula media (Retzius, 1783) (N, S)
Dolichovespula norwegica (Fabricius, 1781) (N)
Dolichovespula omissa (Bischoff, 1931) (N, S)
Dolichovespula saxonica (Fabricius, 1793) (N)
Dolichovespula sylvestris (Scopoli, 1763) (N, S)
Genus *Vespa* Linnaeus, 1758
Vespa crabro Linnaeus, 1758 (N, S, Sa, Si)
Vespa orientalis Linnaeus, 1771 (N, S, Sa, Si)
Vespa velutina Lepelletier, 1836 (N, S)

Genus *Vespula* Thomson, 1869

- Vespula austriaca* (Panzer, 1799) (N)
Vespula germanica (Fabricius, 1793) (N, S, Sa, Si)
Vespula rufa (Linnaeus, 1758) (N, S)
Vespula vulgaris (Linnaeus, 1758) (N, S, Si?)

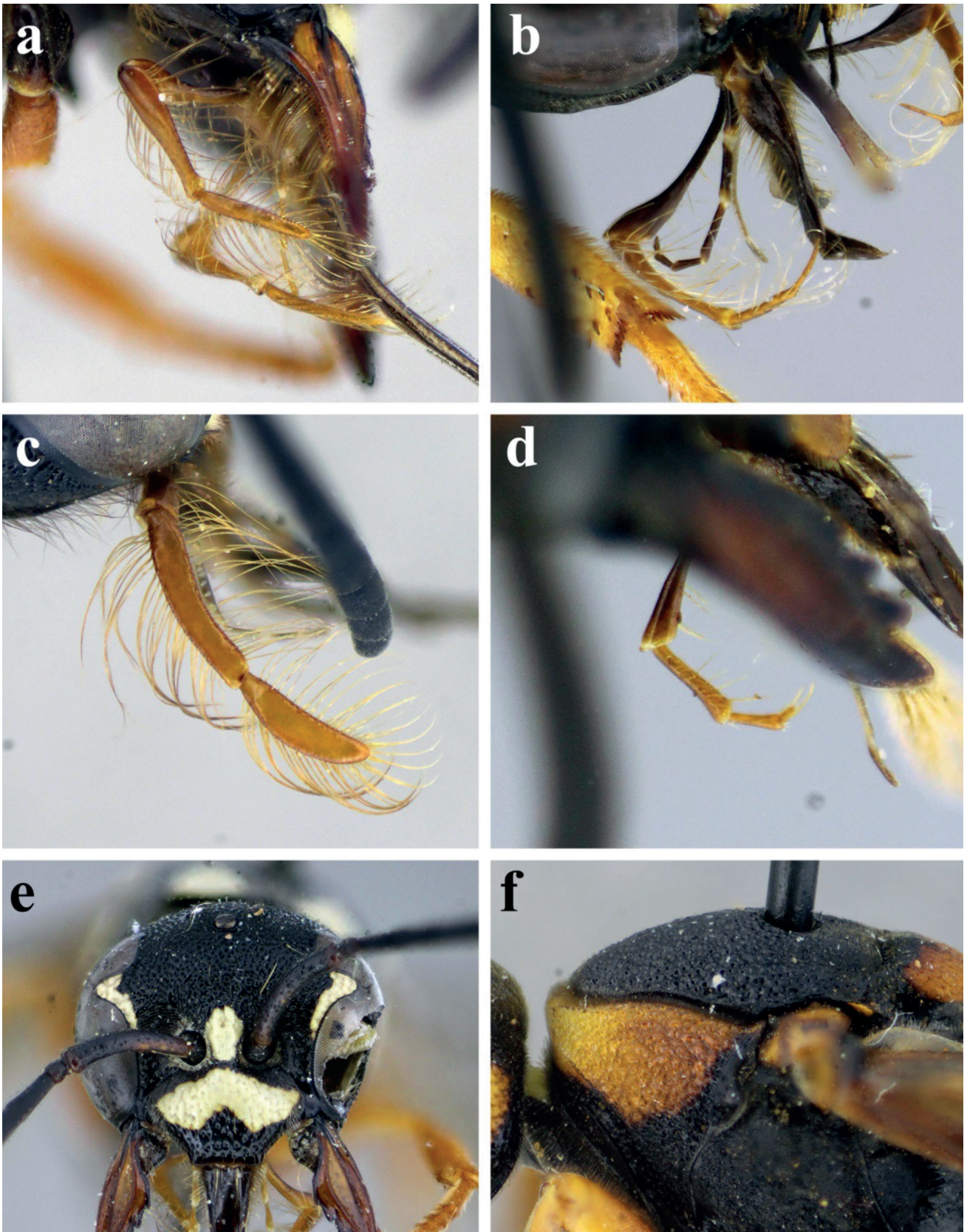


Fig. 5 – a, *Pterocheilus phaleratus* ♀, labial palpus. b, *Hemipterochilus bembeciformis* ♀, labial palpus. c, *Onychopterocheilus* sp. ♀, labial palpus. d, *Tropidodynerus flavus* ♀, labial palpus. e, *Pterocheilus phaleratus* ♀, head. f, *Tropidodynerus flavus* ♀, mesosoma.

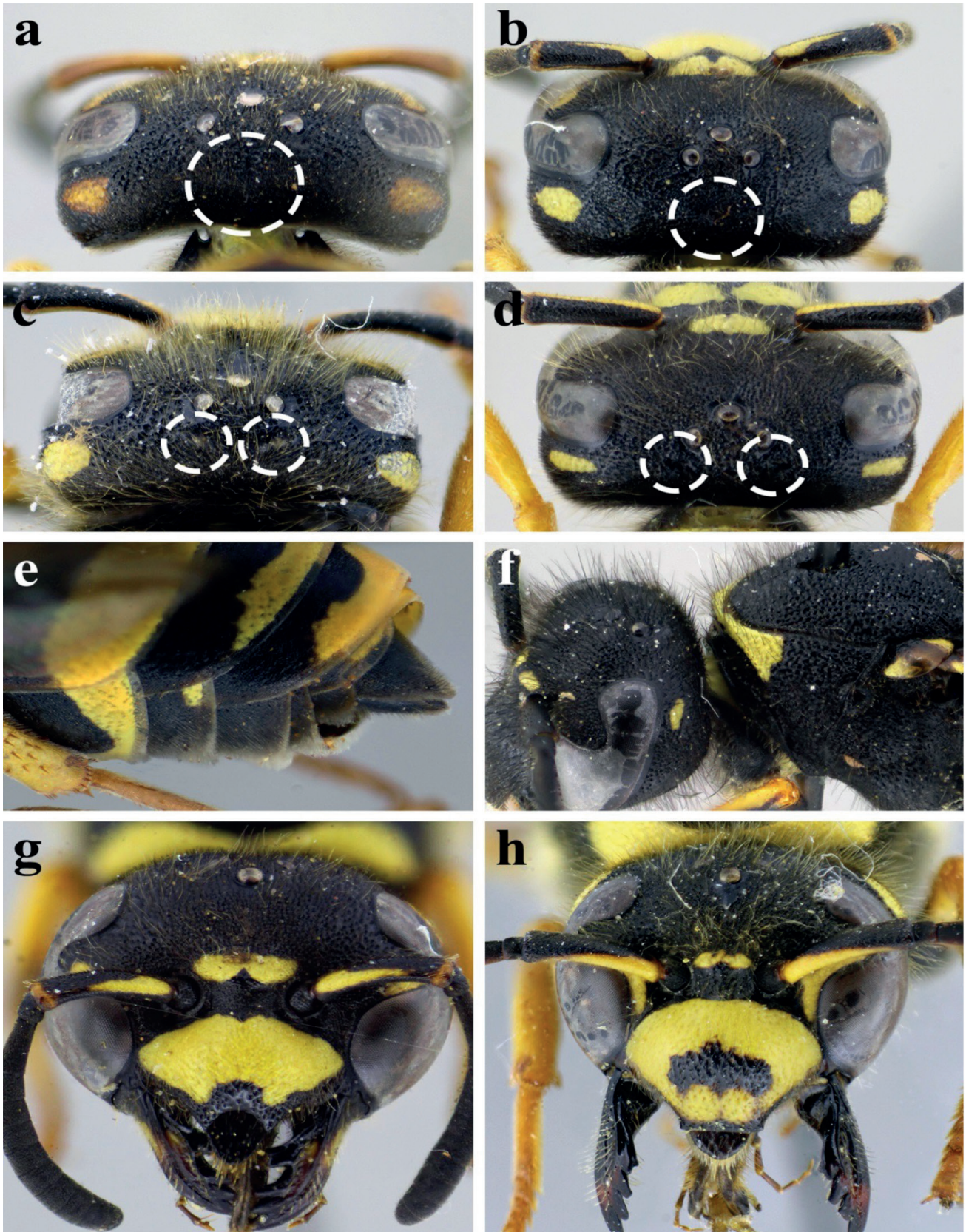


Fig. 6 – a, *Tropidodynerus flavus* ♀, head. b, *Gymnomerus laevipes* ♀, head in dorsal view. c, *Paragymnomerus spiricornis* ♀, head in dorsal view. d, *Odynerus poecilus* ♀, head. e, *Tropidodynerus flavus* ♂, metasoma. f, *Odynerus spinipes* ♀, mesosoma. g, *Gymnomerus laevipes* ♀, head in frontal view. h, *Paragymnomerus spiricornis* ♀, head in frontal view.

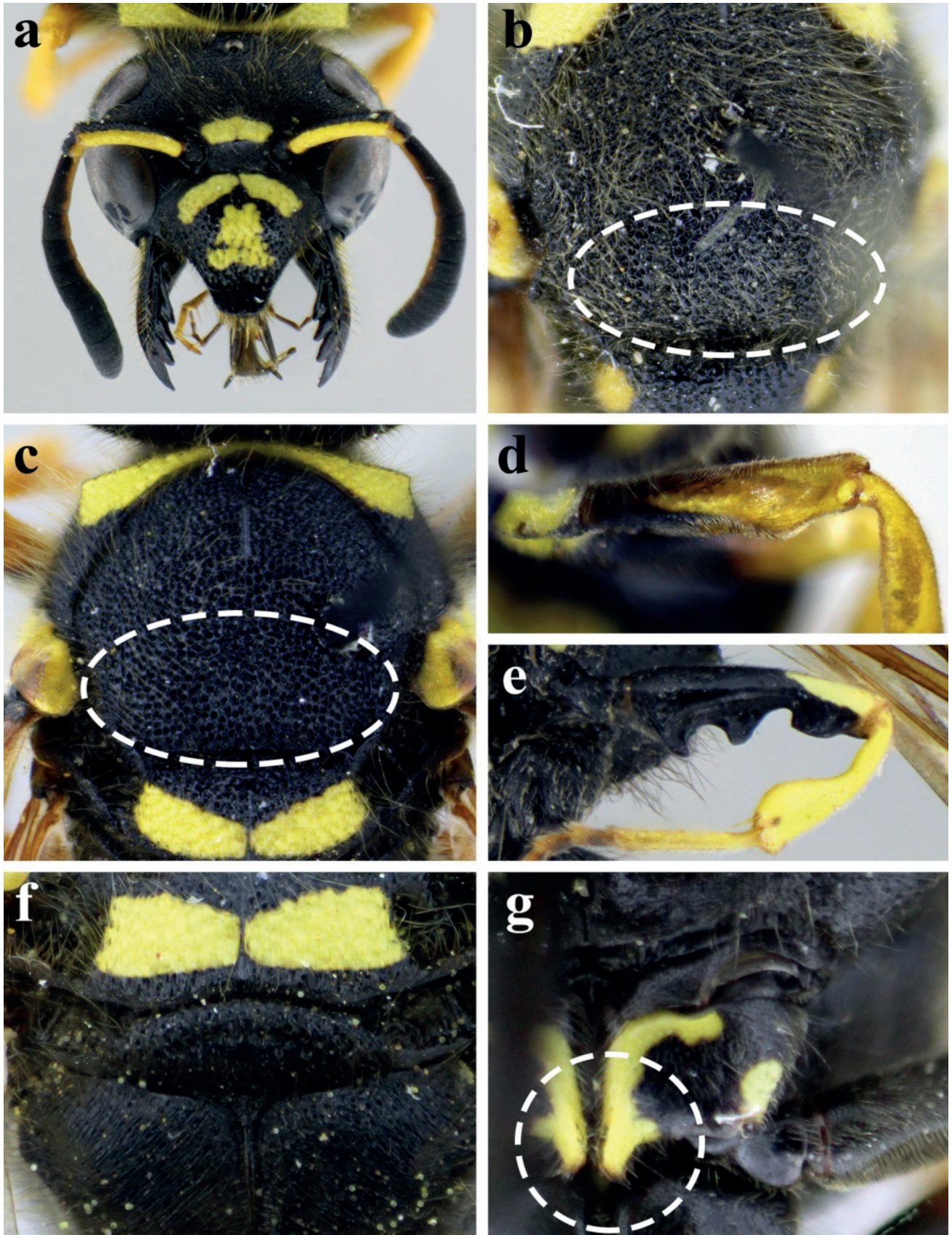


Fig. 7 – **a**, *Odynerus poecilus* ♀, head. **b**, *Paragymnomerus spiricornis* ♀, mesoscutum. **c**, *Odynerus poecilus* ♀, mesoscutum. **d**, *Paragymnomerus spiricornis* ♂, mid femur. **e**, *Odynerus melanocephalus* ♂, mid femur. **f**, *Odynerus poecilus* ♀, metanotum. **g**, *Odynerus albopictus* ♂, mid coxa.

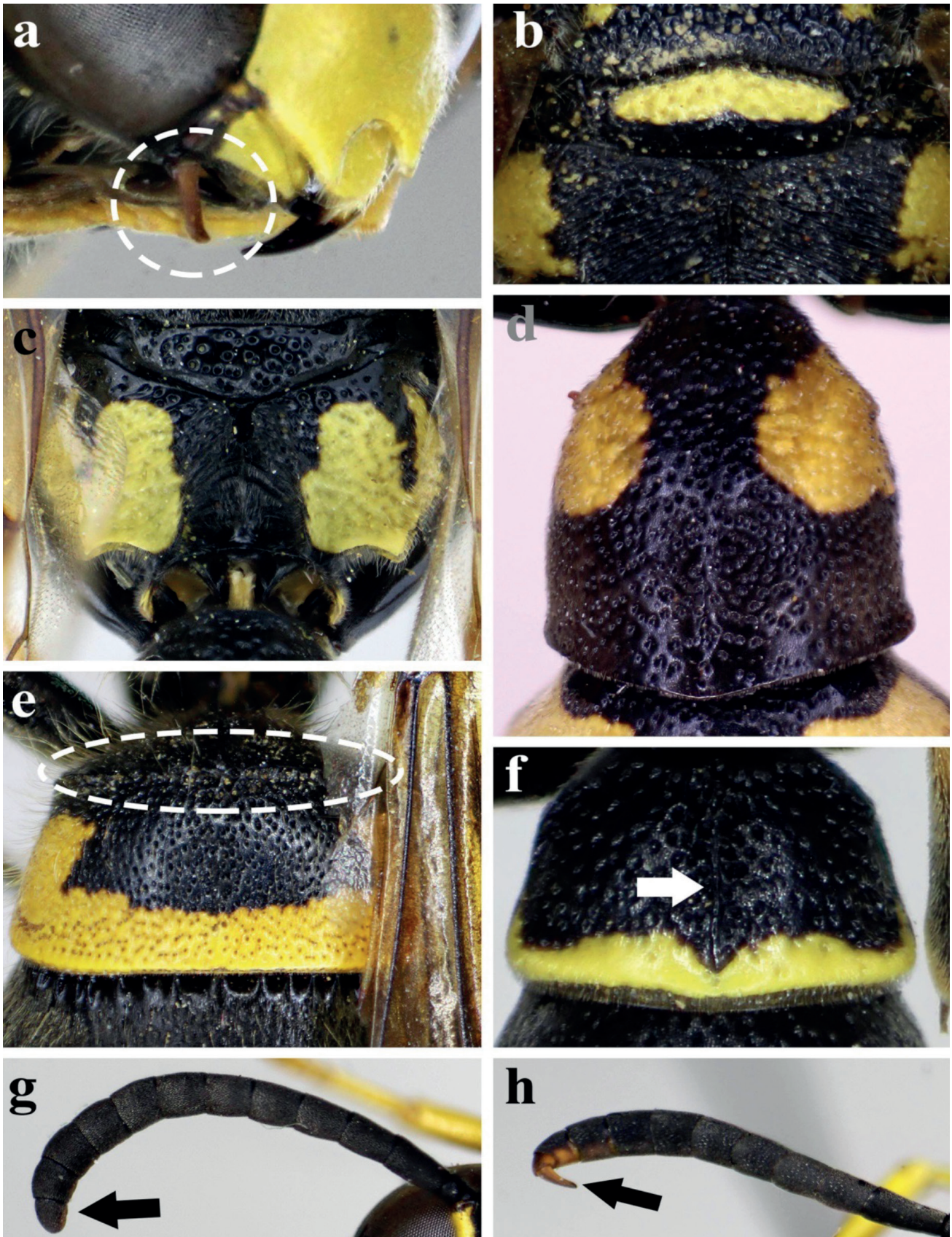


Fig. 8 – **a**, *Odynerus albopictus* ♂, **gena**. **b**, *Odynerus albopictus* ♀, **metanotum**. **c**, *Pareumenes laminatus* ♂, **propodeum**. **d**, *Pareumenes laminatus* ♂, **T1**. **e**, *Ancistrocerus parietinus* ♀, **T1**. **f**, *Symmorphus debilitatus* ♂, **T1**. **g**, *Symmorphus crassicornis* ♂, **flagellum**. **h**, *Ancistrocerus maroccanus* ♂, **flagellum**.

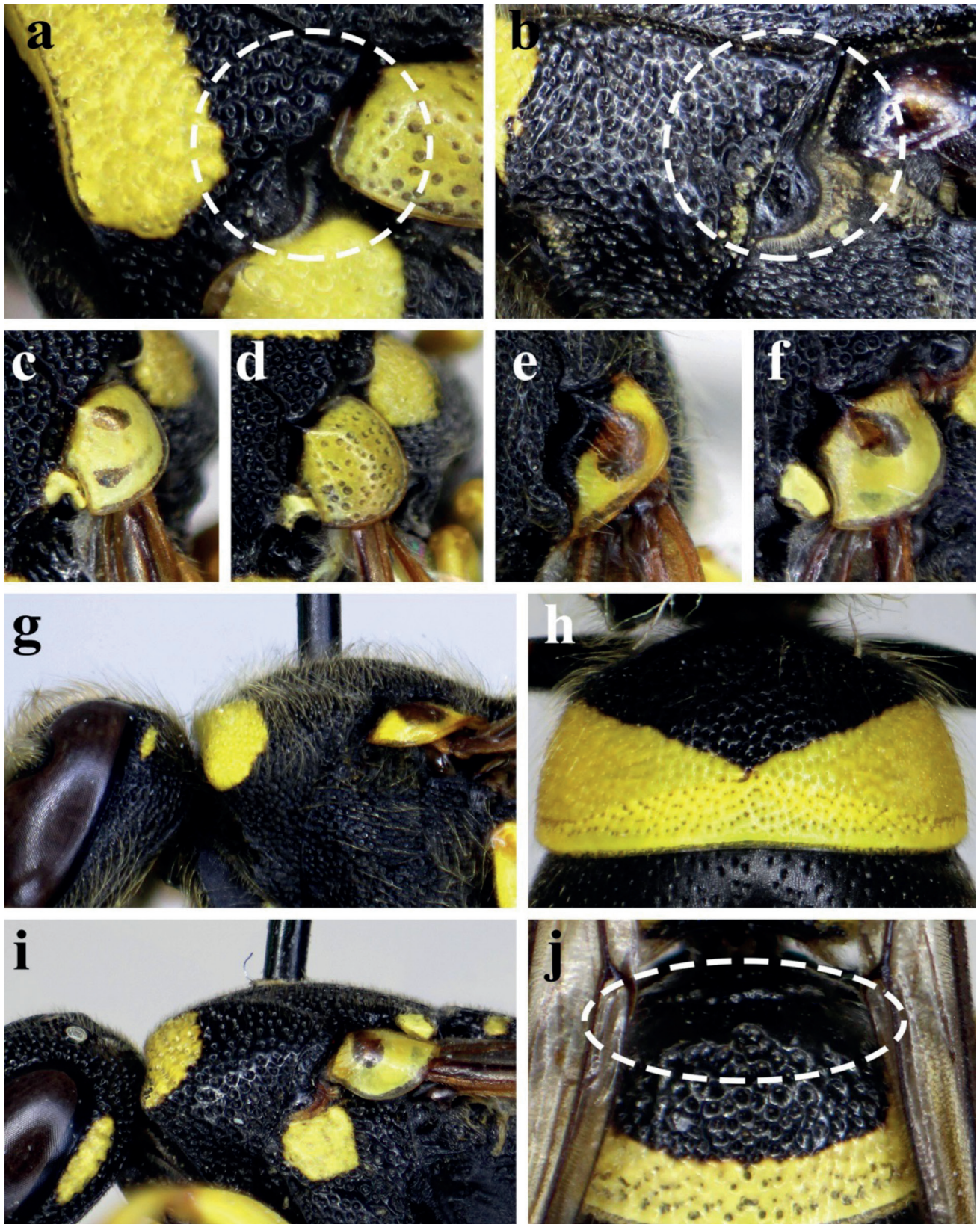


Fig. 9 – a, *Eustenancistrocerus blanchardianus* ♀, pronotum. b, *Ancistrocerus antilope* ♀, pronotum. c, *Eustenancistrocerus amadanensis* ♀, tegula. d, *Eustenancistrocerus blanchardianus* ♀, tegula. e, *Ancistrocerus biphaleratus triphaleratus* ♀, tegula. f, *Tachyancistrocerus rhodensis* ♀, tegula. g, *Ancistrocerus biphaleratus triphaleratus* ♀, mesosoma. h, *Ancistrocerus biphaleratus triphaleratus* ♀, T1. i, *Tachyancistrocerus rhodensis* ♀, mesosoma. j, *Tachyancistrocerus rhodensis* ♀, T1.

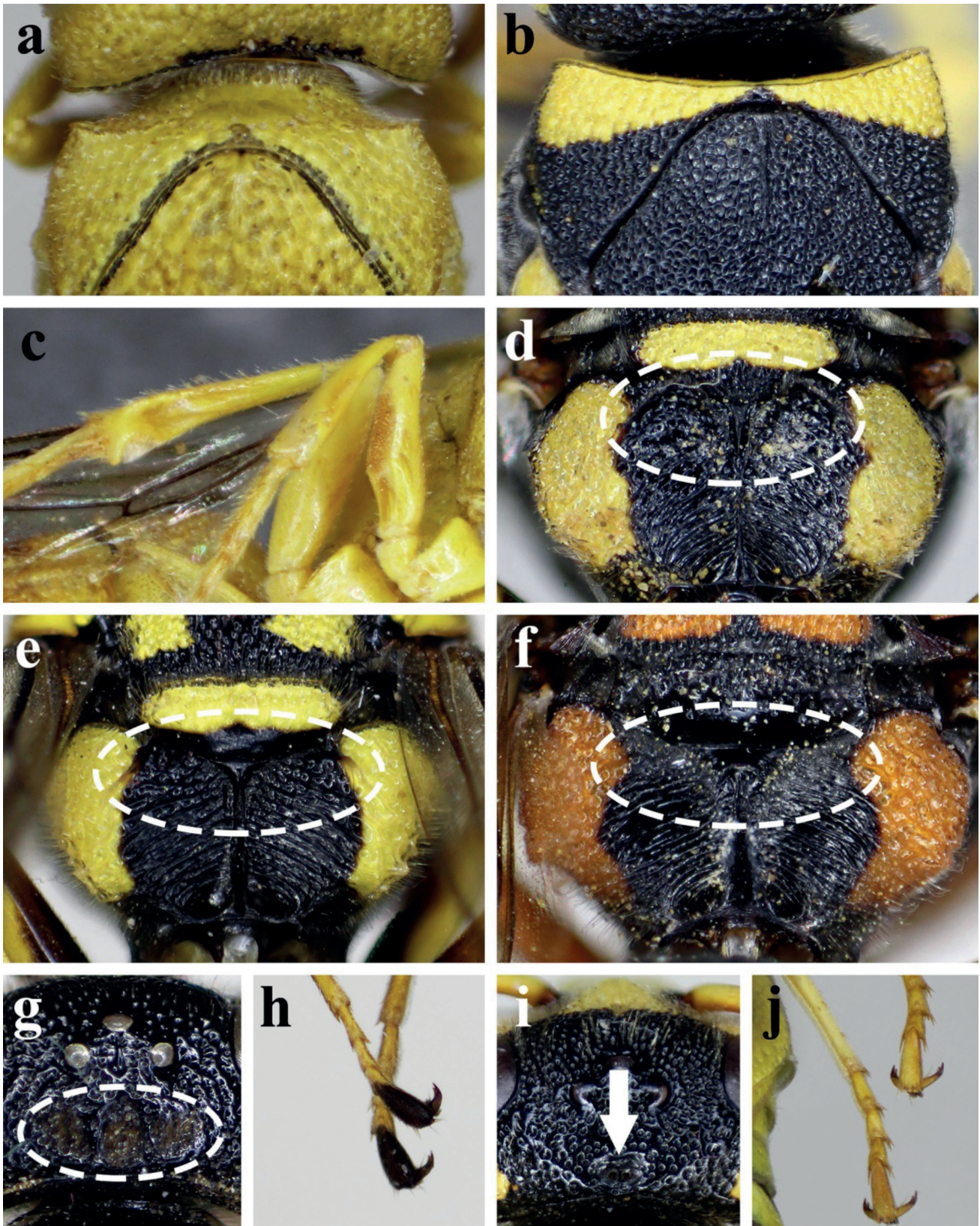


Fig. 10 – a, *Chlorodynerus kelidopteris* ♂, pronotum. b, *Syneuodynerus egregius* ♀, pronotum. c, *Chlorodynerus kelidopteris* ♂, mid and hind legs. d, *Syneuodynerus egregius* ♀, propodeum. e, *Euodynerus posticus* ♀, propodeum. f, *Euodynerus dantici* ♀, propodeum. g, *Euodynerus posticus* ♀, vertex. h, *Euodynerus notatus* ♂, mid and hind tarsi. i, *Euodynerus semisaecularis* ♀, vertex. j, *Euodynerus semisaecularis* ♂, mid and hind tarsi.

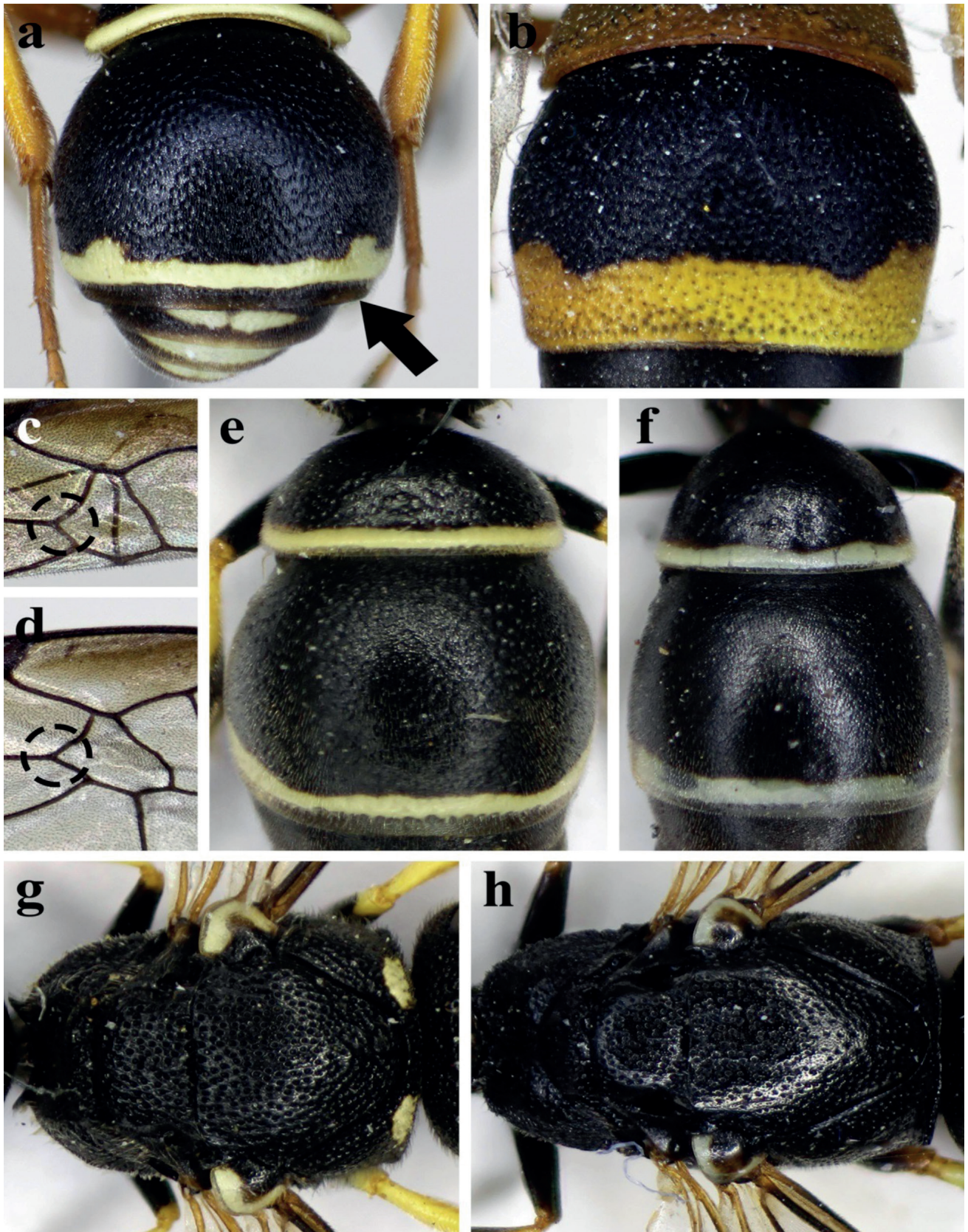


Fig. 11 – a, *Leptochilus limbiferus* ♀, T2. b, *Stenodynerus fastidiosissimus* ♀, T2. c, *Leptochilus limbiferus* ♀, fore wing. d, *Stenodynerus fastidiosissimus* ♀, fore wing. e, *Leptochilus tarsatus* ♂, metasoma. f, *Microdynerus nugdunensis* ♂, metasoma. g, *Leptochilus tarsatus* ♂, mesosoma. h, *Microdynerus nugdunensis* ♂, mesosoma.

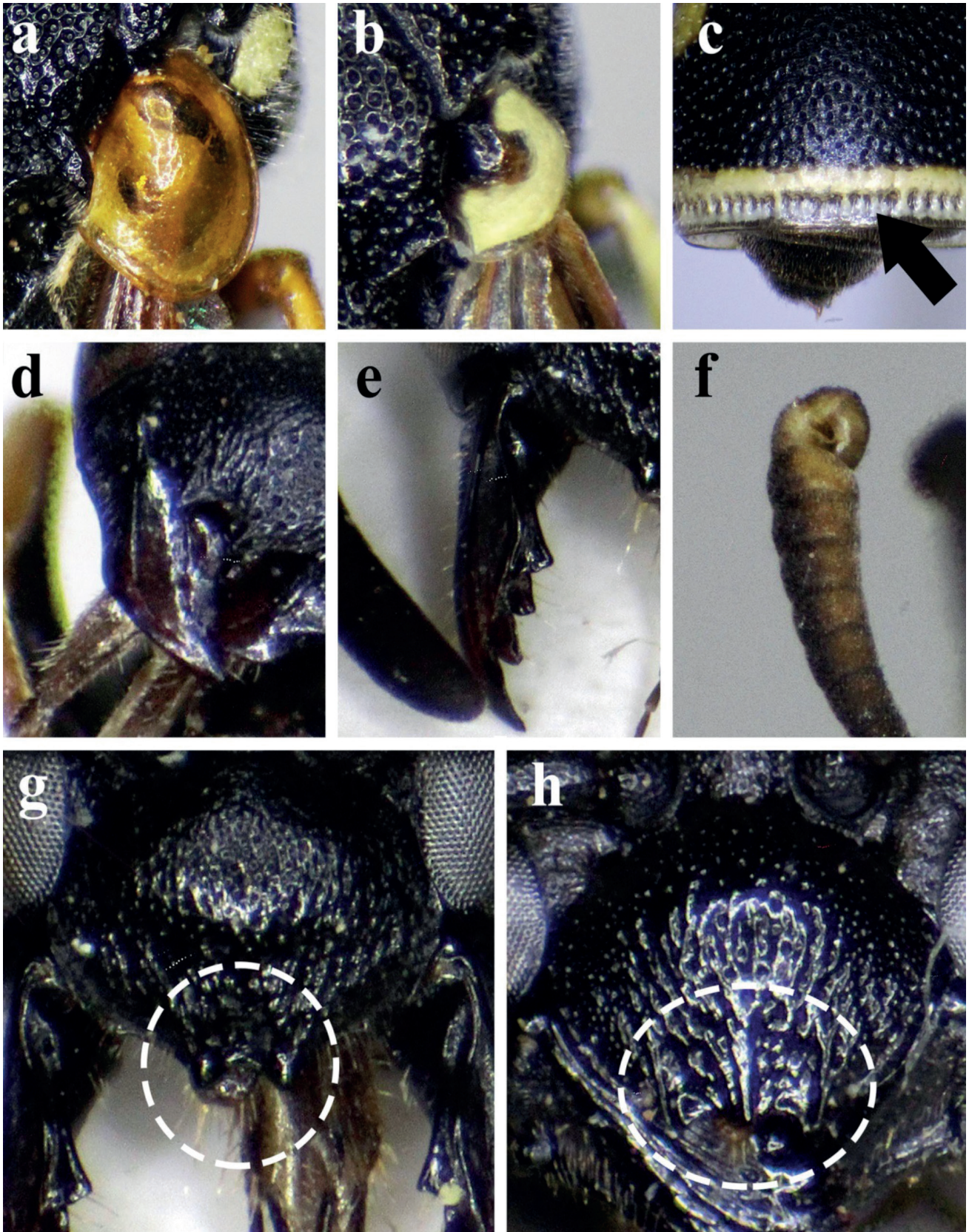


Fig. 12 – a, *Leptochilus limbiferus* ♀, tegula. b, *Leptochilus tarsatus* ♀, tegula. c, *Leptochilus regulus* ♀, T2. d, *Microdynerus parvulus* ♀, mandible. e, *Microdynerus nugdunensis* ♀, mandible. f, *Microdynerus parvulus* ♂, flagellum. g, *Microdynerus nugdunensis* ♀, clypeus. h, *Microdynerus microdynerus* ♀, clypeus.

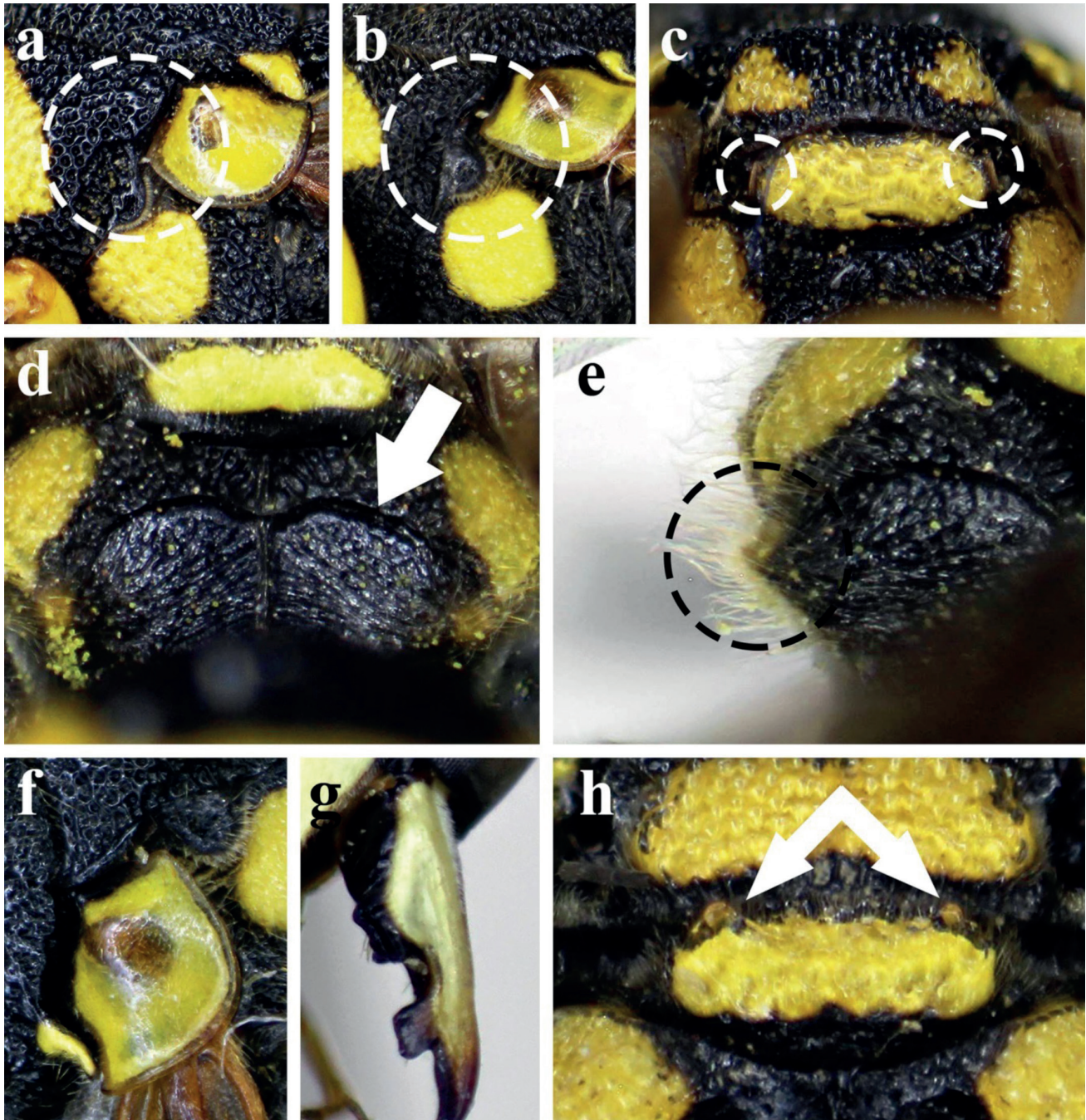


Fig. 13 – a, *Parodontodynerus ephippium* ♀, pronotum. b, *Pseudepipona lativentris* ♀, pronotum. c, *Parodontodynerus ephippium* ♀, metanotum. d-e, *Pseudepipona lativentris* ♀, propodeum. f, *Pseudepipona lativentris* ♀, tegula. g, *Pseudepipona herrichii* ♂, mandible. h, *Antepipona deflenda* ♀, metanotum.

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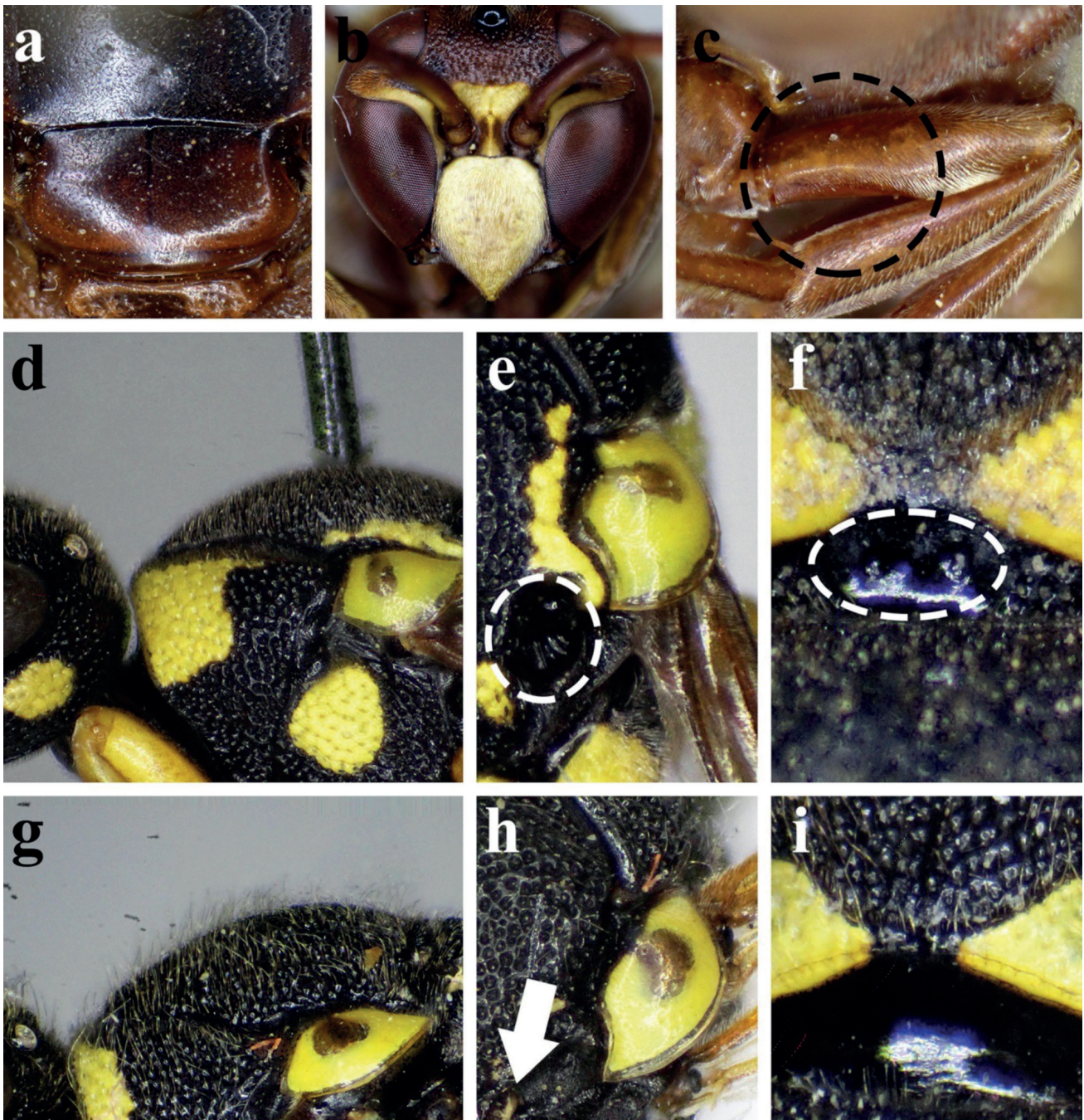


Fig. 14 – **a**, *Rhynchium oculatum* ♂, mesoscutum and scutellum. **b**, *Rhynchium oculatum* ♂, head. **c**, *Rhynchium oculatum* ♂, mid femur. **d**, *Stenodynerus fastidiosissimus* ♀, mesosoma. **e**, *Stenodynerus fastidiosissimus* ♀, tegula and axillary fossa. **f**, *Stenodynerus fastidiosissimus* ♀, pronotum. **g**, *Allodynerus delphinalis* ♂, mesosoma. **h**, *Allodynerus delphinalis* ♂, tegula and axillary fossa. **i**, *Allodynerus rossii* ♀, pronotum.

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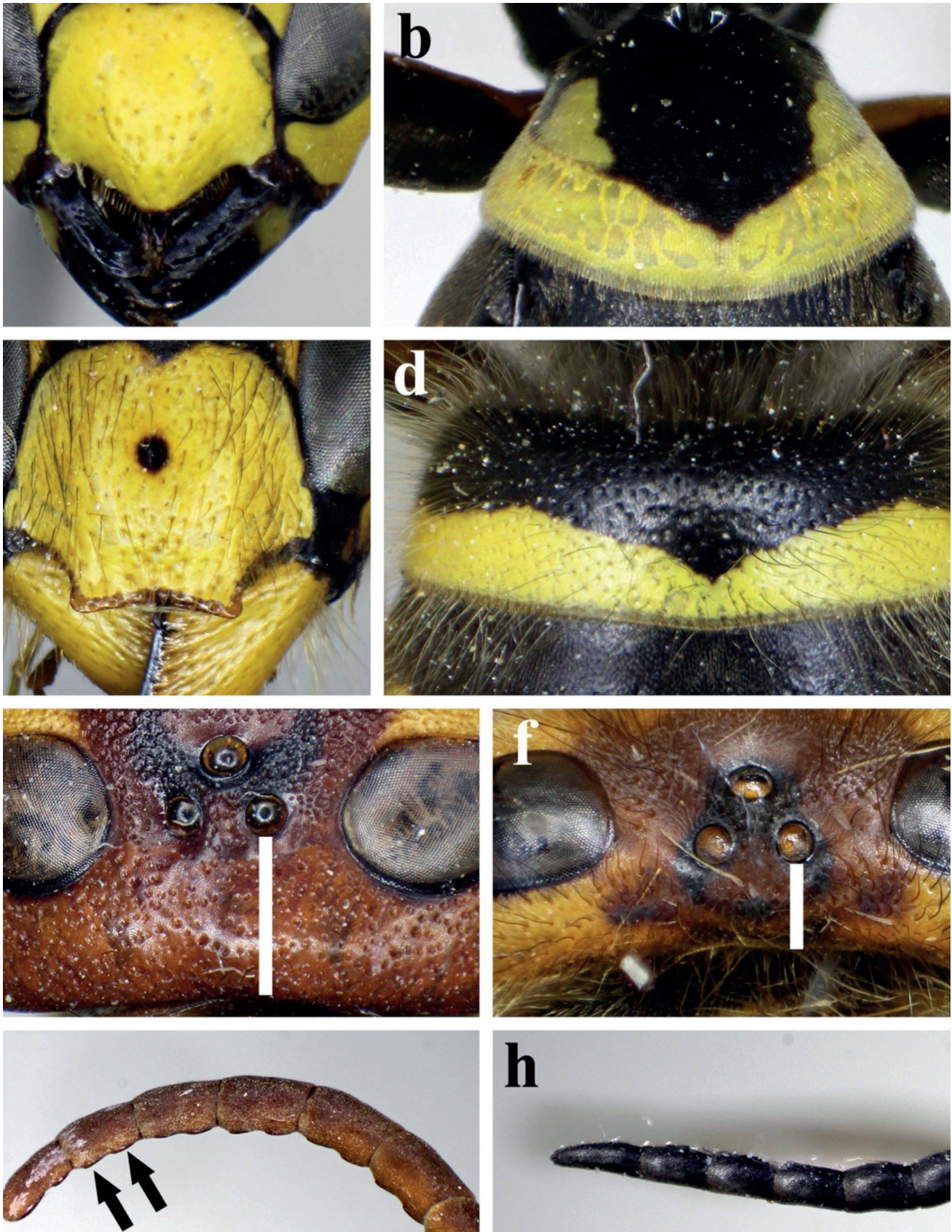


Fig. 15 – a, *Polistes dominula* ♀, clypeus. b, *Polistes dominula* ♀, T1. c, *Dolichovespula media* ♀, clypeus. d, *Dolichovespula media* ♀, T1. e, *Vespa crabro* ♀, vertex. f, *Dolichovespula media* ♀, vertex. g, *Vespa crabro* ♂, flagellum. h, *Dolichovespula norvegica* ♂, flagellum.

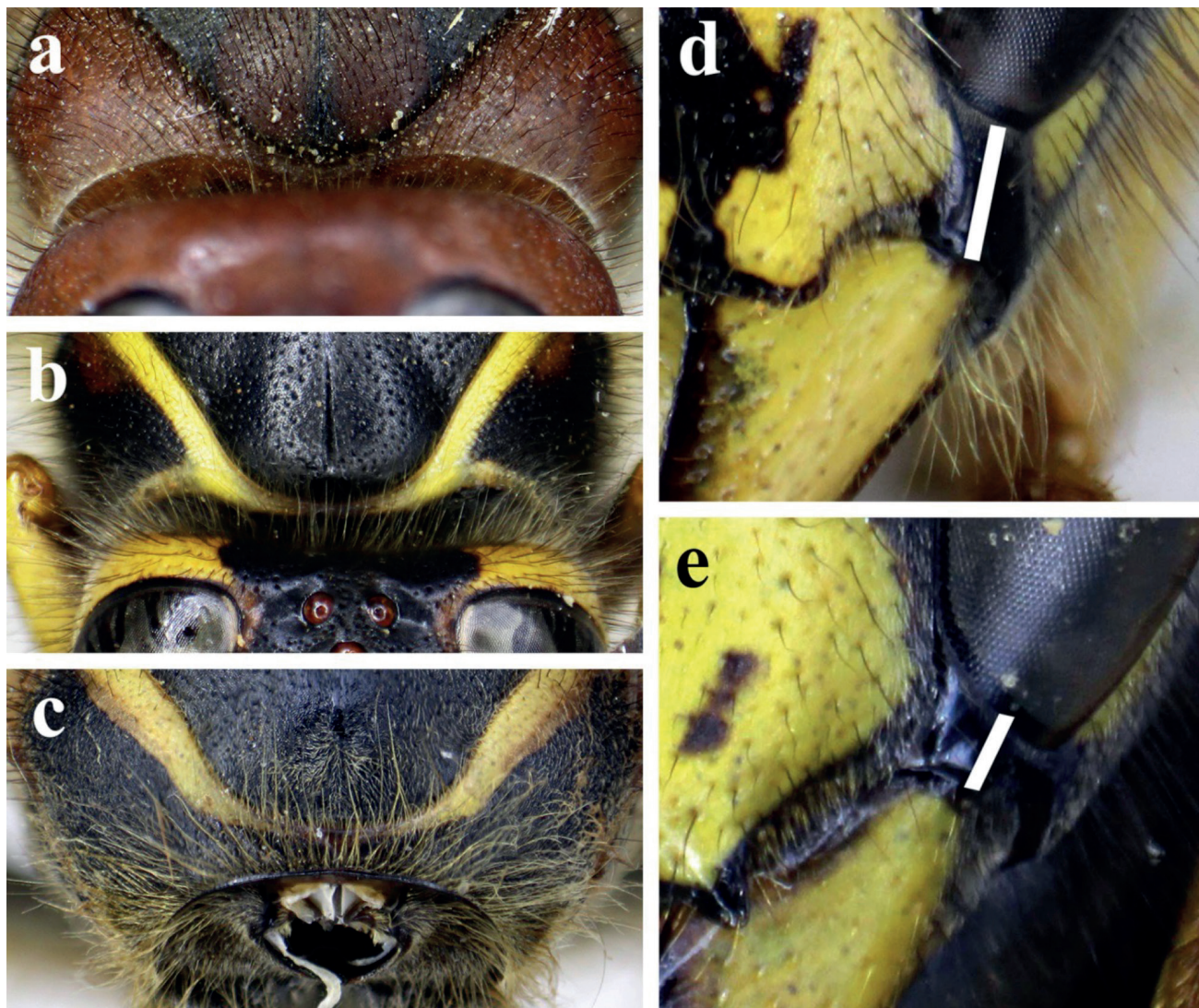


Fig. 16 – a, *Vespa crabro* ♀, pronotum. b, *Dolichovespula media* ♀, pronotum. c, *Vespa vulgaris* ♀, pronotum. d, *Dolichovespula saxonica* ♀, malar space. e, *Vespa austriaca* ♀, malar space.

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