

## The velvet ants (Hymenoptera, Mutillidae) of Central Europe

A.S. LELEJ & Ch. SCHMID-EGGER

**Abstract:** The species of *Mutillidae* from Central Europe are keyed, briefly diagnosed, their distribution and host relationships summarized. New synonymy is proposed: *Ronisia brutia* (PETAGNA 1787) = *Mutilla crimeae* STRAND 1917, **syn.n.**; *Smicromyrme triangularis* (RADOSZKOWSKI 1865) = *S. pouzdranensis* HOFFER 1936, **syn.n.** The key in German language is given also. 34 species in 15 genera are treated.

**Key words:** Hymenoptera, Mutillidae, key, Central Europe.

### Introduction

The species of Mutillidae in Central Europe are poorly known, compared with the remaining Aculeate groups as Apidae, Sphecidae, Crabronidae, Pompilidae or others. Until now, there is no complete key or monograph for the species of Central Europe. The basic work with keys for most European species is still the fauna of Italy by INVREA (1964), but obsolete in taxonomy and nomenclature. Lelej (1985) published a key to the former USSR species of Mutillidae in Russian language, comprising most species of Central Europe. PETERSEN (1988) revised the type species of FABRICIUS, and SUÁREZ (1988) revised the Myrmosinae of Spain and added keys for the species of the Western Palearctic region. The German species were keyed by OEHLKE (1974) and the species of *Smicromyrme* and *Physetopoda* of Germany revised and keyed by SCHMID-EGGER & PETERSEN (1993). The Mutillidae of former Czechoslovakia were studied by HOFFER (1938) and keyed by BOUČEK & ŠNOFLÁK (1957). An important step to stability in nomenclature and taxonomy was done by the catalogue of the Palearctic region by LELEJ (2002) with keys to all Mutillidae genera.

The aim of the present paper is to present an updated key for the Mutillidae species of Central Europe. We treat all species known from Austria, Czech Republic, Slovakia, Hungary, Switzerland, and Germany. Also we include some species from North Italy, which may occur also in southern Switzerland or in southern Austria (Tab. 1). Total 34 species in 15 genera are included in this review. However we did not revise the fauna of these countries, so information about distribution comes from literature only (summarized in LELEJ 2002). Changes in fauna or additional species are therefore to expect. The only faunistic revision of a country in Central Europe within the last 40 was done by SCHMID-EGGER & BURGER (1998) for Germany.

Also, the knowledge about taxonomy is not completed at all. So, the males of *Physetopoda pusilla*, *Ph. sericeiceps* and *Smicromyrme triangularis* and the females of

*Ph. cingulata* and *Ph. daghestanica* are unknown for science. With the present keys, we want to encourage scientists in Central Europe to include Mutillidae in their faunistic work and to increase knowledge about this interesting family.

**Tab. 1.** Taxa of Mutillidae distributed in Austria (A), Czech Republic (CZ), Slovakia (SL), Hungary (H), Switzerland (CH), Germany (D), North Italy (I)

No.	species/subspecies	A	CZ	SL	H	CH	D	I
	<b>M y r m o s i n a e</b>							
1.	<i>Krombeinella longicollis</i> (TOURNIER 1889)	-	-	+	-	-	-	-
2.	<i>Krombeinella thoracica</i> (FABRICIUS 1793)	-	-	-	-	-	-	+
3.	<i>Myrmosa a. atra</i> PANZER 1801	+	+	+	+	+	+	+
4.	<i>Paramyrmosa brunnipes</i> (LEPELETIER 1845)	+	+	+	+	-		+
	<b>M y r m i l l i n a e</b>							
5.	<i>Myrmilla</i> (s.str.) <i>calva</i> (VILLERS 1789)	+	-	+	+	+	+	+
6.	<i>Myrmilla</i> (s.str.) <i>erythrocephala</i> (LATREILLE 1792)	+	+	+	+	-	-	+
7.	<i>Myrmilla</i> ( <i>Pseudomutilla</i> ) <i>capitata</i> (LUCAS 1849)	+	-	-	+	-	-	-
8.	<i>Myrmilla</i> ( <i>Pseudomutilla</i> ) <i>glabrata</i> (FABRICIUS 1775)	+	-	-	+	-	-	-
9.	<i>Myrmilla</i> ( <i>Pseudomutilla</i> ) <i>vutshetitschi</i> (SKORIKOV 1927)	+	-	-	-	-	-	-
10.	<i>Platymyrmilla quinquefasciata</i> (OLIVIER 1811)	-	-	-	+	-	-	-
	<b>M u t i l l i n a e - M u t i l l i n i</b>							
11.	<i>Mutilla europaea</i> LINNAEUS 1758	+	+	+	+	+	+	+
12.	<i>Mutilla marginata</i> BAER 1848	+	+	+	+	+	+	+
13.	<i>Ronisia brutia</i> (PETAGNA 1787)	+	+	+	-	-	+	+
14.	<i>Tropidotilla litoralis</i> (PETAGNA 1787)	+	+	-	+	+	-	+
	<b>M u t i l l i n a e - S m i c r o m y r m i n i</b>							
15.	<i>Nemka v. viduata</i> (PALLAS 1773)	+	+	+	+	-	-	+
16.	<i>Physetopoda cingulata</i> (COSTA 1858)	-	-	-	+	-	-	-
17.	<i>Physetopoda daghestanica</i> (RADOSZKOWSKI 1885)	+	+	+	+	+	+	+
18.	<i>Physetopoda halensis</i> (FABRICIUS 1787)	+	+	+	+	+	+	+
19.	<i>Physetopoda lucasii</i> (SMITH 1855)	-	-	-	-	-	-	+
20.	<i>Physetopoda punctata</i> (LATREILLE 1792)	-	-	-	+	-	-	-
21.	<i>Physetopoda pusilla</i> (KLUG 1835)	-	-	-	-	-	-	+
22.	<i>Physetopoda scutellaris</i> (LATREILLE 1792)	+	+	+	+	+	+	+
23.	<i>Physetopoda sericeiceps</i> (ANDRÉ 1901)	-	-	-	+	-	-	-
24.	<i>Smicromyrme</i> ( <i>Astomyrme</i> ) <i>ausonia</i> INVREA 1950	-	-	-	-	-	-	+
25.	<i>Smicromyrme</i> ( <i>Eremotilla</i> ) <i>ingauna</i> INVREA 1958	-	-	-	-	-	-	+
26.	<i>Smicromyrme</i> ( <i>Eremotilla</i> ) <i>triangularis</i> (RAD. 1865)	-	+	-	-	-	-	-
27.	<i>Smicromyrme</i> ( <i>Erinyrme</i> ) <i>sicana</i> (DE STEFANI 1887)	+	+	+	+	-	-	+
28.	<i>Smicromyrme</i> (s.str.) <i>r. ruficollis</i> (FABRICIUS 1793)	+	-	-	-	-	-	+
29.	<i>Smicromyrme</i> (s.str.) <i>rufipes</i> (FABRICIUS 1787)	+	+	+	+	+	+	+

No.	species/subspecies	A	CZ	SL	H	CH	D	I
	<b>Mutillinae - Peterseniini</b>							
30.	<i>Artiotilla biguttata</i> (COSTA 1858)	-	-	-	-	-	-	+
	<b>Mutillinae - Trogaspidiini</b>							
31.	<i>Trogaspidia catanensis</i> (ROSSI 1794)	-	-	-	+	-	-	-
	<b>Sphaerophthalminae</b>							
32.	<i>Cystomutilla ruficeps</i> (SMITH 1855)	+	-	+	+	+	-	+
	<b>Dasylabrinae</b>							
33a.	<i>Dasylabris</i> (s.str.) <i>maura clausa</i> (LEPELETIER 1845)	-	-	-	-	+	-	-
33b.	<i>Dasylabris</i> (s.str.) <i>m. maura</i> (LINNAEUS 1758)	+	+	+	+	+	+	+
34.	<i>Dasylabris</i> ( <i>Inbalilla</i> ) <i>regalis</i> (FABRICIUS 1793)	+	+	+	+	-	-	-
	<b>t o t a l</b>	<b>21</b>	<b>16</b>	<b>17</b>	<b>23</b>	<b>13</b>	<b>10</b>	<b>23</b>

### Identification of Mutillidae

For identification, open mandibles, a clear clypeus of male and female, a visible pygidial area of female, lateral felt line on metasomal segment II of male (especially for *Smicromyrme* and *Physetopoda*) and male genitalia are very important. The identification of *Physetopoda* and *Smicromyrme* males requires the study of genitalia. Pinning specimens is the standard method for preparation. When gluing specimens (e.g. small females of *Smicromyrme*, *Physetopoda* or *Myrmosinae*), it is recommended to glue them laterally on a triangular card, to make examination of venter and sterna possible.

The morphologic terminology used in this paper follows subsequent authors (cf. LELEJ 2002). The term 'mesosoma' is the united thorax and propodeum. The metasomal segments (metasomal sternum, metasomal tergum) are denoted with tergum and sternum only. Felt lines are marked and easily visible furrows or a line with a fringe along lateral margin of terga or sterna.

The first key includes subfamilies and genera. The full species name is given, when the genus is represented with one species only in Central Europe. The following keys (A - F) treat the genera with two or more species in Central Europe. To facilitate the finding of a species in the text, species are numbered continuously without consideration of subfamilies or genera. The numeration is similar to this of tab. 1. For further information about genera and subfamilies relationships and phylogeny of Mutillidae, see LELEJ & NEMKOV (1997).

For each species, a brief description of the most typical characters is given. Characters, given in the key, are not repeated in the description. For better recognition of some species, additional characters are given in the key, separated by a dash (-). The body length is mentioned for each species in the key only. Because the basic color of all species is black, only red or pale colored body parts are described.

### Life history

Velvet ants are parasitoids and their larvae feed other larva of various species of Aculeate Hymenoptera, Diptera or even Coleoptera. Females dig in the ground or enter host

nest to deposit eggs. LELEJ (1985) summarizes the knowledge about the host relationships and listed references. We add this information in the description part. The host relationships are not reviewed or verified, but only listed here.

Mutillidae in general are xerothermophil species and occur in dry habitats, often on sandy ground. Females walk over the ground and avoid large heat, so often (especially in southern parts of Central Europe), they can be observed in the morning and late afternoon. Exceptions are the species of *Mutilla*, which occur also in the higher mountains. Males visit flowers, especially these of umbrella plants (Apiaceae) and can be caught in flight in the lower vegetation. Some males are nocturnal (e.g. *Physetopoda halensis*) and can be attract by light. Malaise traps are suited to collect Mutillidae males.

### Key to subfamilies and genera

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- 1 Apterous or subapterous forms. (Subfamily Myrmillinae) ..... *Myrmilla* B
- Fully winged forms..... 2
- 2 Metasomal segment II without felt lines on tergum or sternum. Eyes with setae, sometimes very short, and visible under large magnification only. Veins of forewing touch wing apex. (Subfamily Myrmosinae)..... 3
- Metasomal segment II with felt lines on tergum or sternum (Fig. 1). Eyes without setae. Veins of forewing do not touch wing apex ..... 5
- 3 Tergum VII laterally with preapical tooth (Fig. 2). Mesosoma partly red ..... *Krombeinella* A
- Tergum VII laterally without preapical tooth (Fig. 3). Mesosoma all black ..... 4
- 4 Tergum VII with longitudinal rounded fovea, more or less emarginated apically (Fig. 4). Inner border of mandible with three preapical teeth, basal tooth enlarged. Sternum II basally with medial tubercle. 5.0-11.5 mm ..... 3 *Myrmosa atra* PANZER
- Tergum VII without longitudinal rounded fovea and rounded apically (Fig. 5). Inner border of mandible with two preapical teeth, basal tooth not enlarged. Sternum II basally without medial tubercle. 4.5-10.0 mm ..... 4 *Paramyrmosa brunnipis* (LEPELETIER)
- 5 Inner eye margin with deep notch (Fig. 6), if sometimes notch not so deep (some Mutillini), than tegula shortened. (Subfamily Mutillinae) ..... 6
- Inner eye margin without any notch (Fig. 7)..... 13
- 6 Tegula long, protruded beyond the scuto-scutellar suture (Fig. 20), if much shorter, than eye notch is weak. Mandible without basal tooth or with rounded lobe beneath (Fig. 15). Metasomal segment I more or less transversal. (Tribe Mutillini) ..... 7
- Tegula usually not protruded beyond scuto-scutellar suture (Fig. 19). Usually mandible with basal tooth or basal lobe beneath (Fig. 16). Metasomal segment I different shape, but not transversal..... 9
- 7 Terga II and III without band or spots of pale pubescence, at most with fringe of pale setae on posterior margin. 9.0-18.0 mm ..... 14 *Tropidotilla litoralis* (PETAGNA)
- Terga II and III with band or spots of pale pubescence ..... 8
- 8 Band of pale pubescence on tergum II with medial emargination or divided medially into two spots. Terga with blue or violet lustre. Mandible tridentate (Fig. 17) ... *Mutilla* C
- Band of pale pubescence on tergum II with two emargination or divided into three spots. Terga without blue or violet lustre. Mandible bidentate. 8.0-16.0 mm..... 13 *Ronisia brutia* (PETAGNA)

- 9 Forewing: distance between origin of RS on vein SC and base of stigmatic cell almost  $2 \times$  stigmatic cell length or more than  $2 \times$  first abscissa RS length (Fig. 21). Flagellomere I 1.5-2.0  $\times$  shorter than flagellomere II (Fig. 23). (Tribe Smicromyrmini) ..... 10
- Forewing: distance between origin of RS on vein SC and base of stigmatic cell more or less equal to stigmatic cell length or first abscissa RS length (Fig. 22). Usually flagellomere I more or less equals to flagellomere II or longer than it (Fig. 24)..... 12
- 10 Sternum II without any trace of lateral felt lines (Fig. 9)..... *Physetopoda* D
- Sternum II with short lateral felt lines, sometimes reduced to a few small punctures (Fig. 1)..... 11
- 11 Mesosternum with precoxal pointed tubercle. Genital volsella with basal external lobe and long narrow cusps, basivolsella with very long setae (Fig. 30). - Mandible apically larger than medially, tridentate, medial tooth is the shortest (Fig. 16). 5.0-19.0 mm ..... 15 *Nemka viduata* (PALLAS)
- Mesosternum without precoxal tubercle. Genital volsella without basal external lobe and long narrow cusps, basivolsella with short setae or without setae (Fig. 29). - Mandible apically narrow in Central European species, bi- or tridentate (Figs 34, 37)..... *Smicromyrme* E
- 12 Penial valvae of genitalia symmetrical. Mesoscutellum not gibbous, usually without median carina. Sternum VIII (hypopygium) usually without a pair of strong lateral carinae. (Tribe Peterseniini). 7.0-12.0 mm ..... 30 *Artiotilla biguttata* (COSTA)
- Penial valvae of genitalia more or less asymmetrical. Mesoscutellum gibbous, usually with median longitudinal carina or narrow smooth line. Sternum VIII usually with a pair of strong lateral carinae. (Tribe Trogaspidiini). 11.5-15.0 mm..... 31 *Trogaspidia catanensis* (ROSSI)
- 13 Metasomal segment I not constricted posterad. Gonostyli curved down. (Subfamily Myrmillinae)..... 14
- Metasomal segment I usually constricted posterad (Figs 27, 28). Gonostyli straight or curved up ..... 15
- 14 Tergum II laterally longitudinally swollen. Sternum II with extremely long carina protruding of posterior sternal border. 10.0-15.0 mm ..... 10 *Platymyrmylla quinquefaciata* (OLIVIER)
- Tergum II laterally not swollen. Sternum II at most with short longitudinal medial carina ..... 4 *Myrmilla* B
- 15 Eyes hemispherical (as Fig. 8). Gonostyli strongly curved up. (Subfamily Sphaerophthalminae). 6.0-12.0 mm..... 32 *Cystomutilla ruficeps* (SMITH)
- Eyes weakly convex, oval (Fig. 7). Gonostyli straight or slightly curved up apically. (Subfamily Dasylabrinae) ..... *Dasylabris* F

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- 1 Eye with setae, sometimes setae rare and only visible under large magnification. (Subfamily Myrmosinae)..... 2
- Eye without setae ..... 4
- 2 Flagellomere III angulate anterad (Fig. 10). - Head behind eyes elongated. Pronotum wider than propodeum. 5.0-9.0 mm..... 4 *Paramyrmosa brunnipes* (LEPELETIER)
- Flagellomere III cylindrical ..... 3
- 3 Head behind eye not elongated, convergented (Fig. 12). Flagellomere I equal in length to flagellomere II or shorter. Tergum I with brownish-red cuticular band. 3.0-8.0 mm ..... 3 *Myrmosa atra* PANZER
- Head behind eye elongated (Fig. 11). Flagellomere I slightly longer than flagellomere II. Tergum I usually with ivory cuticular band ..... *Krombeinella* A
- 4 Mesopleuron concave. (Fig. 39). Mesosoma not wider than head..... 5
- Mesopleuron convex. (Fig. 38). Mesosoma wider than head..... 14

- 5 Usually head shape modified; head elongated behind eyes and remarkably wider than pronotum. Mesopleural suture ends at mid spiracle tubercle. (Subfamily Myrmillinae) ... 6  
 - Usually head shape not modified or head weakly wider than pronotum. Mesopleural suture ends at anterior spiracle (Fig. 40). (Subfamily Mutillinae) ..... 7
- 6 Tergum II laterally longitudinally swollen. Head width less than head length; head beneath concave with lateral longitudinal carina. Forecoxa apically with obtuse tubercle. 10.0-16.0 mm ..... 10 *Platymyrilla quinquefaciata* (OLIVIER)  
 - Tergum II laterally not swollen. Head width more than head length; head beneath weakly convex without lateral longitudinal carina. Forecoxa apically without tubercle ..... 4 *Myrmilla* B
- 7 Tergum II without basal spots of pale pubescence. (Tribe Mutillini) ..... 8  
 - Tergum II usually with one, two or three basal pale spots disposed transversally ..... 10
- 8 Metasomal segment I extremely short, without dorsal surface (Fig. 50). 7.5-15.0 mm ..... 14 *Tropidotilla lioralis* (PETAGNA)  
 - Metasomal segment with dorsal surface as long as 2/3 scape length, right-angled at anterior surface (Fig. 49) ..... 9
- 9 Mandible tridentate. Tergum VI without pygidial area. Band of pale pubescence on Tergum II with medial emargination or divided into two spots ..... *Mutilla* C  
 - Mandible bidentate. Tergum VI with pygidial area. Band of pale pubescence on Tergum II with two emarginations or divided into three spots. 9.0-16.0 mm ..... 13 *Ronisiasia brutia* (PETAGNA)
- 10 Tergum II with one or three basal spots of pale pubescence disposed transversally. (Tribe Smicromyrmini) ..... 11  
 - Tergum II with two basal spots of pale pubescence disposed transversally ..... 13
- 11 Pygidial area narrowed basally and closed laterally, with long setae (Fig. 41). Scutellar scale well developed, nail-like ..... *Physetopoda* D  
 - Pygidial area with more or less parallel lateral sides or widened basally (Figs 42, 43). Scutellar scale less developed ..... 12
- 12 Pygidial area short-oval (Fig. 44). 5.0-15.0 mm ..... 15 *Nemka viduata* (PALLAS)  
 - Pygidial area elongated, with parallel sides, or widened basally (Figs 42, 43) ..... *Smicromyrme* E
- 13 Mesosoma broadest in pronotum or pronotal and propodeal width equal. Pygidial area usually weakly developed. (Tribe Peterseniini). 6.0-11.0 mm ..... 30 *Artioilla biguttata* (COSTA)  
 - Mesosoma definitely broadest in propodeum. Pygidial area usually well developed. (Tribe Trogaspidiini). 7.0-12.0 mm ..... 31 *Trogaspidia catanensis* (ROSSI)
- 14 Eye hemispherical (Fig. 8). (Subfamily Sphaerophthalminae). 4.0-7.0 mm ..... 32 *Cystomutilla ruficeps* (SMITH)  
 - Eye flattened, oval (Fig. 51). (Subfamily Dasylabrinae) ..... *Dasylabris* F

### A. Key to species of *Krombeinella*

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- 1 Fore coxa with spur. 6.0-6.2 mm ..... 1 *Krombeinella longicollis* (TOURNIER)  
 - Fore coxa without spur. 5.0-8.0 mm ..... 2 *Krombeinella thoracica* (FABRICIUS)

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- 1 Humeral pronotal corner without denticle. Head sparsely punctured, shiny. 4.5-6.0 mm ..... 2 *Krombeinella thoracica* (FABRICIUS)

- ....Humeral pronotal corner with denticle. Head densely punctured, less shiny. 5.0-5.5 mm ..... 1 *Krombeinella longicollis* (TOURNIER)

### B. Key to species of *Myrmilla*

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- 1 Fully winged. (Subgenus *Myrmilla* WESMAEL 1852)..... 2  
 - Apterous or subapterous. (Subgenus *Pseudomutilla* COSTA 1885)..... 3  
 2 Inner border of mandible without subbasal denticle. – Sternum II without medial carina, hypopygium with lateral longitudinal carina. Clypeus concave, anterior border with two denticles. 9.0-12.0 mm..... 6 *Myrmilla* (*M.*) *erythrocephala* (LATREILLE)  
 - Inner border of mandible with subbasal denticle. – Sternum II and hypopygium with medial longitudinal carina. Anterior border of clypeus with medial acuminated process. 5.0-7.5 mm..... 5 *Myrmilla* (*M.*) *calva* (VILLERS)  
 3 Terga IV-VI with black setae. 5.0-10.0 mm ..... 7 *Myrmilla* (*P.*) *capitata* (LUCAS)  
 - Terga IV-VI with pale setae..... 4  
 4 Hypostomal carina with two long narrow processes (often lacking in dry specimens). Inner border of mandible without subbasal denticle. 4.0-7.0 mm..... 8 *Myrmilla* (*P.*) *glabrata* (FABRICIUS)  
 - Hypostomal carina without processes. Inner border of mandible with subbasal denticle. 4.5-7.0 mm..... 9 *Myrmilla* (*P.*) *vutshetiishi* SKORIKOV

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- 1 Sternum I with process or high carina. Mandible widened apically. (Subgenus *Myrmilla* WESMAEL 1852)..... 2  
 - Sternum I without process or carina. Mandible acuminated or slightly widened apically. –Antennal tubercle usually without acuminated denticles. Terga IV and V usually with sparse pale setae. (Subgenus *Pseudomutilla* COSTA 1885)..... 3  
 2 Lateral process of tergum I long wing-like, curved posterad. Tubercles between antennal socket small, rounded ferruginous-red. 4.0-10.0 mm ..... 5 *Myrmilla* (*M.*) *calva* (VILLERS)  
 - Lateral process of tergum I short, pointed, not curved posterad. Tubercles between antennal socket large, triangular black. 5.0-15.0 mm ..... 6 *Myrmilla* (*M.*) *erythrocephala* (LATREILLE)  
 3 Inner border of mandible without subbasal denticle. 5.0-8.0 mm..... 8 *Myrmilla* (*P.*) *glabrata* (FABRICIUS)  
 - Inner border of mandible with subbasal denticle ..... 4  
 4 Terga IV and V with black setae. 5.0-10.0 mm ..... 7 *Myrmilla* (*P.*) *capitata* (LUCAS)  
 - Terga IV and V with pale setae. 4.0-7.0 mm ..... 9 *Myrmilla* (*P.*) *vutshetiishi* SKORIKOV

### C. Key to species of *Mutilla*

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- 1 Body setae short and straight (not wool-like). Legs with black setae. 11.0-17.0 mm..... 11 *Mutilla europaea* LINNAEUS

- Body setae long wool-like. Legs with pale setae. 11.0-15.0 mm..... 12 *Mutilla marginata* BAER

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- 1 Body setae short straight (not wool-like). Mesosoma 1.2-1.3 × distance between medial spiracles. – Head 1.0-1.2 × mesosomal width. Tergum VI with pale lateral setae. 10.0-26.0 mm..... 11 *Mutilla europaea* LINNAEUS
- Body setae long wool-like. Mesosoma 1.7-1.8 times distance between medial spiracles. 11.0-14.0 mm..... 12 *Mutilla marginata* BAER

**D. Key to species of *Physetopoda*****♂ ♂** (unknown for *Physetopoda pusilla* and *Ph. sericeiceps*)

- 1 Ocelli large, diameter of anterior ocellus equal or larger than distance between them and posterior one ..... 2
- Ocelli small, diameter of anterior ocellus much less than distance between them and posterior one ..... 3
- 2 Clypeus with medial carina 0.5 × clypeal length and two preapical well developed denticles (Fig. 48). 7.0-13.5 mm..... 19 *Physetopoda lucasii* (SMITH)
- Clypeus with medial carina 0.3 × clypeal length and two preapical tubercles (Fig. 47). 5.5-10.0 mm..... 18 *Physetopoda halensis* (FABRICIUS)
- 3 Basivolsella of genitalia with setae length more or less equal to volsella length (Fig. 31)..... 4
- Basivolsella of genitalia with setae length much longer than volsella length (Fig. 32, 33)..... 5
- 4 Clypeus without medial basal carina and transverse shiny band (Fig. 36). – Mesosoma black with ferruginous-red mesoscutellum, tegulae and metanotum. 5.5-10.0 mm..... 22 *Physetopoda scutellaris* (LATREILLE)
- Clypeus with medial basal carina and transverse shiny band (Fig. 35). – Head height somewhat less than head width. Postocellar line 0.6 × ocellular line. Colour of mesosoma varies from black all over (except red tegulae) to ferruginous-red all over (except black mesopleurae). 7.0-9.0 mm..... 16 *Physetopoda cingulata* (COSTA)
- 5 Pronotum and apical metasomal fringe with black setae. 9.0-14.0 mm..... 20 *Physetopoda punctata* (LATREILLE)
- Pronotum and apical metasomal fringe with pale setae. 5.0-10.0 mm..... 17 *Physetopoda daghestanica* (RADOSZKOWSKI)

Females (unknown for *Physetopoda cingulata* and *Ph. daghestanica*)

- 1 Tergum II with apical medial pale spot and 3 basal pale spots ..... 2
- Tergum II with apical more or less wide pale band and 1 or 3 basal pale spots ..... 4
- 2 Lateral basal spots of tergum II very large, distance between them and medial one less than diameter of medial spot. Mesosoma ferruginous-red to black (f. *melanothorax*). Larger: 8.0-10.0 mm..... 20 *Physetopoda punctata* (LATREILLE)
- Lateral basal spots of tergum II small, distance between them and medial one more than diameter of medial spot. Mesosoma ferruginous-red. Smaller: 4.0-9.5 mm ..... 3
- 3 Basal half of pygidial area with irregular longitudinal rugae (Fig. 41). Frons without pale spot. 4.0-6.5 mm ..... 18 *Physetopoda halensis* (FABRICIUS)



- Basal half of pygidial area with irregular transverse rugae. Frons with small spot of greyish setae. 4.0-9.5 mm ..... 19 *Physetopoda lucasii* (SMITH)
- 4 Tergum II longer, length more or less equals with its width. Tergum II with weak basal lateral pale spots. 4.5-6.0 mm ..... 21 *Physetopoda pusilla* (KLUG)
- Tergum II shorter, length 0.85-0.9 its width. Tergum II without lateral pale spots ..... 5
- 5 Frons and vertex with black setae sometimes mixed with sparse pale setae on vertex. Medial length of band on gastral tergum 2 0.5-0.7 length of band on tergum III. 4.0-7.0 mm ..... 22 *Physetopoda scutellaris* (LATREILLE)
- Frons and vertex with dense pale setae. Medial length of band on gastral tergum II equal length of band on tergum III. 3.5-6.5 mm ..... 23 *Physetopoda sericeiceps* ANDRÉ

### E. Key to species of *Smicromyrme*

#### ♂♂ (unknown for *Smicromyrme triangularis*)

- 1 Mandible beneath without subbasal tooth. (Subgenus *Astomyrme* SCHWARTZ 1984). 6.0-10.0 mm ..... 24 *Smicromyrme* (*A.*) *ausonia* INVREA
- Mandible beneath with well-developed subbasal tooth (Fig. 18) ..... 2
- 2 Mandible tridentate (Fig. 37). Clypeus concave. (Subgenus *Erimyrme* LELEJ 1985). 4.5-10.0 mm ..... 27 *Smicromyrme* (*E.*) *sicana* (DE STEFANI)
- Mandible bidentate (Fig. 34). Clypeus more or less flatten ..... 3
- 3 Clypeus without preapical denticles (Fig. 52). (Subgenus *Eremotilla* LELEJ 1985). – Metasoma with fringe of dense pale setae on tergum II and pale band on terga III and IV. Ocelli small, postocellar line less than ocellocular line. Mesosoma ferruginous-red with black tegulae, lower part of mesopleuron and coxae. 7.0-10.0 mm ..... 25 *Smicromyrme* (*E.*) *ingauna* INVREA
- Clypeus with two preapical teeth or denticles (Fig. 34). (Subgenus *Smicromyrme* THOMSON 1870) ..... 4
- 4 Length of tergum I less than its maximum width. Mesosoma black with ferruginous-red mesoscutum, tegulae and propodeum, often pronotum, mesoscutellum and upper part of mesopleuron ferruginous-red. 3.5-8.5 mm ..... 28 *Smicromyrme* (*S.*) *ruficollis* (FABRICIUS)
- Length of tergum I more than its maximum width. Mesosoma black with ferruginous-red pronotum, mesoscutum, tegulae and mesoscutellum, sometimes mesosoma all black (f. *nigra*). 3.0-10.0 mm ..... 29 *Smicromyrme* (*S.*) *rufipes* (FABRICIUS)

#### ♀♀

- 1 Pygidial area triangular, widened basally (Fig. 42). (Subgenus *Eremotilla* LELEJ 1985). – Tergum II with three basal pale spots ..... 2
- Pygidial area elongated, very often with more or less parallel sides (Fig. 43) ..... 3
- 2 Pronotum weakly wider than propodeum. Head black. Antennae brown, basal flagellomeres brownish-red beneath. Legs castaneous with fulvous tarsi. 5.0-8.0 mm ..... 26 *Smicromyrme* (*E.*) *triangularis* (RADOSZKOWSKI)
- Pronotum evidently wider than propodeum. Head castaneous ferruginous-red beneath, with indistinct brownish-red spot on vertex. Antenna and legs ferruginous-red. – Scutellar scale well developed elevated. Posterior propodeal face with dense black setae oriented to scutellar scale. 6.0-9.0 mm ..... 25 *Smicromyrme* (*E.*) *ingauna* INVREA
- 3 Pygidial area sculptured throughout including apical part. (Subgenus *Smicromyrme* THOMSON) ..... 4
- Pygidial area with apical fourth or fifth not sculptured, shiny. (Subgenera *Astomyrme* SCHWARTZ 1984 and *Erimyrme* LELEJ 1985). – Tergum II with three basal pale spots ..... 5

- 4 Scutellar scale narrow. Prescutellar row of tubercles scarcely visible. Striae of pygidial area divergent especially apically. 2.25-4.8 mm ..... 28 *Smicromyrme* (*S.*) *ruficollis* (FABRICIUS)
- Scutellar scale wide. Prescutellar row of tubercles well developed. Striae of pygidial area parallel. 3.0-7.0 mm ..... 29 *Smicromyrme* (*S.*) *rufipes* (FABRICIUS)
- 5 Tergum II with arcuate lateral sides. Mesosoma with arcuate anterior border and rounded anterior and posterior angles, dorsum weakly convex with sparse black setae and pale lateral spots on mesoscutum and propodeum. 3.0-5.0 mm ..... 27 *Smicromyrme* (*E.*) *sicana* (DE STEFANI)
- Tergum II with weakly rounded lateral sides. Mesosoma rectangle, dorsum plane with sparse golden setae. 3.0-6.0 mm ..... 24 *Smicromyrme* (*A.*) *ausonia* INVREA

### F. Key to species of *Dasylabris*

#### ♂♂

- 1 Mandible beneath with strong subbasal tooth (Fig. 13). (Subgenus *Inbaltilla* LELEJ 1976). Body black without any pale setae (Fig. 28). 5.5-9.0 mm ..... 34 *Dasylabris* (*I.*) *regalis* (FABRICIUS)
- Mandible beneath with weak subbasal lobe (Fig. 14). (Subgenus *Dasylabris* RADOSZKOWSKI 1985). Metasoma with pale spots and bands (Fig. 27) ..... 2
- 2 Pronotum all red. Frons and vertex with some short inconspicuous white setae. 10.0-15.0 mm ..... 33b *Dasylabris* (*D.*) *maura maura* (LINNAEUS)
- Pronotum partly or all black. Frons and vertex without short white setae ..... 33a *Dasylabris* (*D.*) *maura clausa* (LEPELETIER)

#### ♀♀

- 1 Lateral carina of pygidial area widened posterad likes wide triangle (Fig. 45). (Subgenus *Inbaltilla* LELEJ 1976). – Tergum II with apical pale band (Fig. 26). 6.0-9.0 mm ..... 34 *Dasylabris* (*I.*) *regalis* (FABRICIUS)
- Lateral carina of pygidial area not widened posterad (Fig. 46). (Subgenus *Dasylabris* RADOSZKOWSKI 1985). – Tergum II with 2 apical pale spots disposed transversally (Fig. 25) ..... 2
- 2 Frons with transverse band of white pubescence which usually touch eyes. 7.0-13.0 mm ..... 33b *Dasylabris* (*D.*) *maura maura* (LINNAEUS)
- Frons with subcircular spot of white pubescence which not touch eyes ..... 33a *Dasylabris* (*D.*) *maura clausa* (LEPELETIER)

### Deutscher Bestimmungsschlüssel

Für die Determination sollten die Tiere so präpariert werden, dass die folgenden Körperteile gut sichtbar sind: geöffnete Mandibeln und eine freier Clypeus bei den Männchen und Weibchen, ein gut sichtbares Pygidialfeld bei den Weibchen, die Seitenfurchen der Männchen an Tergum II und Sternum II (besonders bei *Smicromyrme* und *Physetopoda*). Für die Determination der Männchen von *Smicromyrme* und *Physetopoda* muss auch das Genital untersucht werden.

Mutilliden werden standardmäßig durch den Thorax genadelt. Sehr kleine Weibchen (z.B. *Smicromyrme*, *Physetopoda* oder *Myrmosinae*) können auch auf dreieckige Kar-

tonplättchen aufgeklebt werden. Hierbei ist zu empfehlen, die Tiere seitlich auf eine Thoraxseite zu kleben, damit auch die Thoraxunterseite und die Bauchsegmente untersucht werden können.

Die hier verwendete Terminologie folgt LELEJ (2002) und anderen Autoren. Für die meisten Bezeichnungen der Körperteile werden die wissenschaftlichen Bezeichnungen belassen, also keine deutschen Begriffe gewählt. Die ‚felt lines‘ an den Seiten der Sterna und Terga der Männchen werden mit ‚Seitenfurchen‘ übersetzt. Es handelt sich um leistenförmige Längsstrukturen unbekannter Funktion, die zum Teil mit kleine Borsten bestanden sind. Der Begriff ‚Mesosoma‘ bezeichnet das Brustteil (Thorax und Propodeum).

Der erste Schlüssel führt zu den Unterfamilien und Gattungen. Gattungen mit nur einer Art in Mitteleuropa sind bereits in diesem Schlüssel aufgeführt. Die folgenden Schlüssel (A-F) behandeln die Gattungen mit zwei oder mehr Arten in Mitteleuropa. Um die Orientierung zu erleichtern, sind alle Arten ohne Berücksichtigung ihrer verwandtschaftlichen Verhältnisse durchnummeriert. Die Nummerierung stimmt mit der in Tab. 1 überein. Weitere Informationen über die verwandtschaftlichen Beziehungen der Mutillidengattungen und -unterfamilien finden sich bei LELEJ & NEMKOV (1997).

Jede Art ist nachfolgend im speziellen Teil (nur in englischer Sprache) kurz beschrieben. Dabei werden Merkmale, die bereits im Schlüssel erwähnt sind, nicht mehr aufgeführt. Merkmale im Schlüssel, die nach dem Gedankenstrich genannt werden, sind ergänzend und dienen nicht als Schlüsselalternativen.

### Schlüssel zu den Unterfamilien und Gattungen

#### ♂♂

- |   |   |   |
|---|---|---|
| 1 | Flügellos oder stummelflügelig (Unterfamilie Myrmillinae).....  | <i>Myrmilla</i> B                           |
| - | Flügel vollständig entwickelt.....  | 2   |
| 2 | Hinterleibssegment II ohne Seitenfurchen auf dem Tergum oder Sternum. Augen behaart, Haare manchmal nur unter großer Vergrößerung sichtbar. Adern des Vorderflügels berühren den äußeren Flügelrand (Unterfamilie Myrmosinae).....  | 3   |
| - | Hinterleibssegment II mit Seitenfurchen auf dem Tergum oder Sternum (Fig. 1). Augen unbehaart. Adern des Vorderflügels berühren nicht den äußeren Flügelrand.....   | 5   |
| 3 | Tergum VII seitlich mit Zahn (Fig. 2). Mesosoma teilweise rot.....  | <i>Krombeinella</i> A                       |
| - | Tergum VII seitlich ohne Zahn (Fig. 3). Mesosoma schwarz.....   | 4   |
| 4 | Tergum VII mit Längsfurche, am Ende ausgerandet (Fig. 4). Innenrand der Mandibel mit drei Zähnen, basaler Zahn vergrößert. Sternum II an der Basis in der Mitte mit Tuberkel. 5.0-11.5 mm.....  | 3 <i>Myrmosa atra</i> PANZER                |
| - | Tergum VII ohne Längsfurche, am Ende gerundet (Fig. 5). Innenrand der Mandibel mit zwei Zähnen, basaler Zahn nicht vergrößert. Sternum II ohne Tuberkel. 4.5-10.0 mm.....   | 4 <i>Paramyrmosa brunnipes</i> (LEPELETIER) |
| 5 | Innerer Augenrand tief ausgerandet (Fig. 6), falls Ausrandung weniger tief (einige Mutillini), dann Tegula verkürzt. (Unterfamilie Mutillinae).....   | 6   |
| - | Innerer Augenrand gerade (Fig. 7).....  | 13  |
| 6 | Tegula lang, über die scuto-scutellare Furche hinaus nach hinten verlängert (Fig. 20), falls kürzer, ist die Augenausrandung schwach. Mandibel ohne Basalzahn oder mit gerundetem Lobus auf der Unterseite (Fig. 15). Metasomalsegment I mehr oder weniger quer. (Tribus Mutillini) ..... | 7   |

- Tegula normalerweise nicht über die scuto-scutellare Furche hinaus verlängert (Fig. 19). Normalerweise Mandibel auf der Unterseite mit Basalzahn oder Basallobus (Fig. 16). Metasomalsegment I anders, nie quer..... 9
- 7 Terga II und III ohne helles Band oder helle Flecke, höchstens mit hellen Fransen am Endrand. 9.0-18.0 mm..... 14 *Tropidotilla litoralis* (PETAGNA)
- Terga II und III mit hellem Band oder hellen Flecken..... 8
- 8 Helles Band auf Tergum II in der Mitte ausgerandet oder vollständig unterbrochen. Terga mit blauem oder violetter Schimmer. Mandibel am Ende dreizählig (Fig. 17) ..... *Mutilla* C
- Helles Band auf Tergum II zweimal ausgerandet oder in drei Flecke geteilt. Terga schwarz, ohne metallischen Schimmer. Mandibel am Ende zweizählig. 8.0-16.0 mm..... 13 *Ronisia brutia* (PETAGNA)
- 9 Costalader (ST) zwischen Einmündung der Radialader I (RS) und dem Pterostigma (ST) etwa 2 x so lang wie der Durchmesser des Pterostigmas (Fig. 21). Fühlergeißelglied I 1.5-2.0 x kürzer als Fühlergeißelglied II (Fig. 23). (Tribus Smicromyrmini)..... 10
- Costalader (ST) zwischen Einmündung der Radialader I (RS) und dem Pterostigma (ST) etwa so lang wie der Durchmesser des Pterostigmas (Fig. 22). Fühlergeißelglied I etwa so lang wie Fühlergeißelglied II (Fig. 24)..... 12
- 10 Sternum II seitlich ohne Seitenfurchen (Fig. 9)..... *Physetopoda* D
- Sternum II seitlich mit kurzen Seitenfurchen, manchmal reduziert zu einigen Punkten. (Fig. 1)..... 11
- 11 Mesosternum mit spitzem Höcker vor den Coxen II. Volsella basal mit externem Lobus und langen, schmalen Cuspis, Basivolsella mit sehr langen Haaren (Fig. 30). – Mandibel an der Spitze breiter als in der Mitte, dreizählig, der mittlere Zahn ist der kürzeste (Fig. 16). 5.0-19.0 mm ..... 15 *Nemka viduata* (PALLAS)
- Mesosternum dort ohne Höcker. Volsella ohne Lobus und langem Cuspis, Basivolsella mit kurzen oder ohne Haare. (Fig. 29). – Mandibel an der Spitze schmal, zwei oder dreizählig. (Figs 34, 37)..... *Smicromyrme* E
- 12 Penisvalve symmetrisch. Mesoscutellum gewölbt, normalerweise ohne Mittelkiel Sternum VIII normalerweise ohne seitliche Kiele (Tribus Peterseniini). 7.0-12.0 mm ..... 30 *Artiotilla biguttata* (COSTA)
- Penisvalve mehr oder weniger asymmetrisch. Mesoscutellum flach, normalerweise mit Mittelkiel oder schmaler, glatter Linie. Sternum VIII normalerweise mit zwei seitlichen Kielen (Tribus Trogaspidiini). 11.5-15.0 mm..... 31 *Trogaspidia catanensis* (ROSSI)
- 13 Metasomalsegment I nach hinten nicht verengt. Gonostyli nach unten gebogen. (Unterfamilie Myrmillinae)..... 14
- Metasomalsegment I nach hinten verengt. (Figs 27, 28). Gonostyli gerade oder nach oben gebogen..... 15
- 14 Tergum II seitlich längs verdickt. Sternum II mit extrem langem Mittelkiel, überragt den hinteren Rand des Sternum. 10.0-15.0 mm.... 10 *Platymyrmilla quinquefaciata* (OLIVIER)
- Tergum II seitlich normal. Sternum II höchstens mit einem kurzen Mittelkiel..... *Myrmilla* B
- 15 Augen halbrund (hemisphärisch) (Fig. 8). Gonostyli stark nach oben gebogen. (Unterfamilie Sphaerophthalminae). 6.0-12.0 mm ..... 32 *Cystomutilla ruficeps* (SMITH)
- Augen schwach convex, oval (Fig. 7). Gonostyli gerade oder an der Spitze schwach nach oben gebogen (Unterfamilie Dasylabrinae) ..... *Dasylabris* F

## ♀ ♀

- 1 Augen behaart, Haare manchmal sehr zerstreut und nur unter hoher Vergrößerung sichtbar. (Unterfamilie Myrmosinae)..... 2
- Augen unbehaart..... 4

- 2 Fühlergeißelglied III deutlich ausgerandet (Fig. 10). – Kopf hinter den Augen verlängert. Pronotum breiter als Propodeum. 5.0-9.0 mm ..... 4 *Paramyrmosa brunripes* (LEPELETIER)
- Fühlergeißelglied III im Querschnitt kreisrund, ohne Ausrandung ..... 3
- 3 Kopf hinter den Augen sofort verschmälert (Fig. 12). Fühlergeißelglied I so lang wie Fühlergeißelglied II oder kürzer. Tergum I mit rotbraunem Cuticularband. 3.0-8.0 mm ....
- ..... 3 *Myrmosa atra* PANZER
- Kopf hinter den Augen verlängert (Fig. 11). Fühlergeißelglied I etwas länger als Fühlergeißelglied II. Tergum I normalerweise mit elfenbeinfarbenem Band .....
- ..... *Krombeinella* A.
- 4 Mesopleuron konkav (ausgehöhlt). (Fig. 39). Mesosoma nicht breiter als der Kopf..... 5
- Mesopleuron konvex. (Fig. 38). Mesosoma breiter als der Kopf..... 14
- 5 Kopfform normalerweise modifiziert: Kopf hinter den Augen verlängert, deutlich breiter als das Pronotum. Mesopleuralfurche endet am mittleren Spirakel (m.sp, fig. 40) (Unterfamilie Myrmillinae)..... 6
- Kopfform nicht modifiziert, oder Kopf nur wenig breiter als das Pronotum. Mesopleuralfurche endet am vorderen Spirakel (a.sp. Fig. 40). (Unterfamilie Mutillinae) 7
- 6 Tergum II seitlich mit Längsschwellung. Kopf schmaler als lang; Kopfunterseite konkav mit seitlicher Längsfurche. Forecoxa hinten mit Höcker. 10.0-16.0 mm.....
- ..... 10 *Platymyrmylla quinquefaciata* (OLIVIER)
- Tergum II seitlich flach. Kopf breiter als lang; Kopfunterseite nur schwach konkav ohne Längsfurche. Forecoxa ohne Höcker .....
- ..... 4 *Myrmilla* B
- 7 Tergum II ohne helle Flecke. (Tribus Mutillini) .....
- ..... 8
- Tergum II mit einem bis drei hellen Flecken, die in einer Querreihe liegen..... 10
- 8 Metasomalsegment I extrem kurz, ohne horizontale Fläche (Fig. 50). 7.5-15.0 mm.....
- ..... 14 *Tropidotilla litoralis* (PETAGNA)
- Metasomalsegment I mit horizontaler Fläche, die 2/3 so lang wie der Scapus ist, rechtwinklig zur vorderen Fläche abgeknickt (Fig. 49)..... 9
- 9 Mandibel dreizählig. Tergum VI ohne Pygidialfeld. Helles Band auf Tergum II in der Mitte eingebuchtet oder in zwei Flecke geteilt .....
- ..... *Mutilla* C
- Mandibel zweizählig. Tergum VI mit Pygidialfeld. Helles Band auf Tergum II zweimal eingebuchtet oder in drei Flecke geteilt. 9.0-16.0 mm..... 13 *Ronisia brutia* (PETAGNA)
- 10 Tergum II mit einem oder drei queren Flecken (Tribus Smicromyrmini)..... 11
- Tergum II mit zwei queren Flecken .....
- ..... 13
- 11 Pygidialfeld an der Basis verschmälert, seitlich geschlossen, mit langen Haaren (Fig. 41). Scutellarschuppe deutlich entwickelt, nagel-artig..... *Physetopoda* D
- Pygidialfeld mit mehr oder weniger parallelen Seiten oder basal verbreitet. (Figs 42, 43). Scutellarschuppe schwach entwickelt..... 12
- 12 Pygidialfeld kurz-oval (Fig. 44). 5.0-15.0 mm ..... 15 *Nemka viduata* (PALLAS)
- Pygidialfeld verlängert, mit parallelen Seiten oder basal verbreitet (Figs 42, 43) .....
- ..... *Smicromyrme* E
- 13 Mesosoma am breitesten auf Höhe des Pronotum oder Pronotum und Propodeum gleich breit. Pygidialfeld schwach entwickelt (Tribus Peterseniini). 6.0-11.0 mm.....
- ..... 30 *Artiotilla biguttata* (COSTA)
- Mesosoma am breitesten auf Höhe des Propodeum. Pygidialfeld deutlich entwickelt. (Tribus Trogaspidiini). 7.0-12.0 mm..... 31 *Trogaspidia catanensis* (ROSSI)
- 14 Auge halbrund (hemisphärisch) (Fig. 8). (Unterfamilie Sphaerophthalminae). 4.0-7.0 mm...
- ..... 32 *Cystomutilla ruficeps* (SMITH)
- Auge abgeflacht, oval (Fig. 51). (Unterfamilie Dasylabrinae)..... *Dasylabris* F

**A. Schlüssel für die Arten von *Krombeinella***

♂♂

- 1 Vordercoxa mit langem Sporn. 6.0-6.2 mm..... 1 *Krombeinella longicollis* (TOURNIER)  
 - Vordercoxa ohne Sporn. 5.0-8.0 mm..... 2 *Krombeinella thoracica* (FABRICIUS)

♀♀

- 1 Ecke des Humeraltuberkel am Pronotum ohne Zähnnchen. Kopf zerstreut punktiert, glänzend. 4.5-6.0 mm ..... 2 *Krombeinella thoracica* (FABRICIUS)  
 - Ecke des Humeraltuberkel am Pronotum mit Zähnnchen. Kopf dicht punktiert, etwas matt. 5.0-5.5 mm..... 1 *Krombeinella longicollis* (TOURNIER)

**B. Schlüssel für die Arten von *Myrmilla***

♂♂

- 1 Flügel vollständig. (Untergattung *Myrmilla* WESMAEL 1852) ..... 2  
 - Flügellos oder stummelflügelig. (Untergattung *Pseudomutilla* COSTA 1885) ..... 3  
 2 Innenrand der Mandibel ohne Zahn nahe der Basis. – Sternum II ohne Mittelkiel, Hypopygium mit seitlichem Längskiel. Clypeus konkav, Vorderrand mit zwei Zähnnchen. 9.0-12.0 mm..... 6 *Myrmilla* (*M.*) *erythrocephala* (LATREILLE)  
 - Innenrand der Mandibel mit Zahn nahe der Basis. – Sternum II und Hypopygium mit seitlichem Längskiel. Vorderrand des Clypeus mit zugespitztem Fortsatz. 5.0-7.5 mm..... 5 *Myrmilla* (*M.*) *calva* (VILLERS)  
 3 Terga IV-VI mit schwarzen Haaren. 5.0-10.0 mm..... 7 *Myrmilla* (*P.*) *capitata* (LUCAS)  
 - Terga IV-VI mit hellen Haaren..... 4  
 4 Hypostomalkante mit zwei langen, schmalen Fortsätzen. (fehlen oft bei getrockneten Tieren). Innenrand der Mandibel ohne Zahn nahe der Basis. 4.0-7.0 mm..... 8 *Myrmilla* (*P.*) *glabrata* (FABRICIUS)  
 - Hypostomalkante ohne Fortsätze. Innenrand der Mandibel mit Zahn nahe der Basis. 4.5-7.0 mm..... 9 *Myrmilla* (*P.*) *vutsheitshi* SKORIKOV

♀♀

- 1 Sternum I mit Fortsatz oder hohem Kiel. Mandibel am Ende verbreitert. (Untergattung *Myrmilla* WESMAEL 1852) ..... 2  
 - Sternum I flach. Mandibel am Ende zugespitzt oder höchstens schwach verbreitert. – Antennenhöcker normalerweise ohne zugespitzte Zähnnchen. Terga IV und V normalerweise mit spärlichen hellen Haaren. (Untergattung *Pseudomutilla* COSTA 1885)... 3  
 2 Seitlicher Fortsatz des Tergum I lang, flügelartig, seitlich gebogen. Höcker zwischen den Fühlerbasen klein, abgerundet und rot. 4.0-10.0 mm ..... 5 *Myrmilla* (*M.*) *calva* (VILLERS)  
 - Seitlicher Fortsatz des Tergum I kurz, zugesitzt, nicht gebogen. Höcker zwischen den Fühlerbasen groß, dreieckig und schwarz. 5.0-15.0 mm..... 6 *Myrmilla* (*M.*) *erythrocephala* (LATREILLE)  
 3 Innerer Rand der Mandibel ohne Zahn nahe der Basis. 5.0-8.0 mm..... 8 *Myrmilla* (*P.*) *glabrata* (FABRICIUS)  
 - Innerer Rand der Mandibel mit Zahn nahe der Basis ..... 4

- 4 Terga IV und V mit schwarzen Haaren. 5.0-10.0 mm ..... 7 *Myrmilla (P.) capitata* (LUCAS)  
 - Terga IV und V mit hellen Haaren. 4.0-7.0 mm ..... 9 *Myrmilla (P.) vutshetitschi* SKORIKOV

### C. Schlüssel für die Arten von *Mutilla*

#### ♂♂

- 1 Körperhaare kurz und gerade. Beine mit schwarzen Haaren. 11.0-17.0 mm ..... 11 *Mutilla europaea* LINNAEUS  
 - Körperhaare lang und gebogen, erinnern an Wolle. Beine mit hellen Haaren. 11.0-15.0 mm ..... 12 *Mutilla marginata* BAER

#### ♀♀

- 1 Körperhaare kurz und gerade. Mesosoma 1.2-1.3 × so lang wie zwischen den mittleren Spirakeln breit. – Kopf 1.0-1.2 × breit wie Mesosoma. Tergum VI seitlich mit hellen Haaren. 10.0-26.0 mm ..... 11 *Mutilla europaea* LINNAEUS  
 - Körperhaare lang und gebogen, erinnern an Wolle. Mesosoma 1.7-1.8 × so lang wie zwischen den mittleren Spirakeln breit. 11.0-14.0 mm ..... 12 *Mutilla marginata* BAER

### D. Schlüssel für die Arten von *Physetopoda*

♂♂ (die Männchen von *Physetopoda pusilla* und *Ph. sericeiceps* sind unbekannt)

- 1 Ocellen groß, der Durchmesser des vorderen Ocellus ist gleichlang oder größer als die Entfernung zwischen ihm und dem Seitenocellus ..... 2  
 - Ocellen klein, der Durchmesser des vorderen Ocellus ist sehr viel kleiner als die Entfernung zwischen ihm und dem Seitenocellus ..... 3  
 2 Clypeus mit Mittelkiel auf 0.5 × seiner Länge und mit zwei deutlich entwickelten Zähnen im vorderen Bereich (Fig. 48). 7.0-13.5 mm ..... 19 *Physetopoda lucasii* (SMITH)  
 - Clypeus mit Mittelkiel auf 0.5 × seiner Länge und mit zwei kleineren Zähnen (Fig. 47). 5.5-10.0 mm ..... 18 *Physetopoda halensis* (FABRICIUS)  
 3 Basivolsella des Genitals mit Haaren, die etwa so lang wie die Volsella sind (Fig. 31) ..... 4  
 - Basivolsella des Genitals mit Haaren, die deutlich länger als die Volsella sind (Fig. 32, 33) ..... 5  
 4 Clypeus ohne Mittelkiel und ohne glänzendes Querband (Fig. 36). – Mesosoma schwarz, rot sind Mesoscutellum, Tegula und Metanotum. 5.5-10.0 mm ..... 22 *Physetopoda scutellaris* (LATREILLE)  
 - Clypeus mit basalem Mittelkiel und mit glänzendem Querband (Fig. 35). – Kopf etwas weniger hoch als breit. Farbe des Mesosoma variiert von schwarz mit roter Tegula bis hin zu vollständig rot mit schwarzem Mesopleuron. 7.0-9.0 mm ..... 16 *Physetopoda cingulata* (COSTA)  
 5 Pronotum und hintere Franse des Metasoma mit schwarzen Haaren ..... 20 *Physetopoda punctata* (LATREILLE)  
 - Pronotum und hintere Franse des Metasoma mit hellen Haaren. 5.0-10.0 mm ..... 17 *Physetopoda daghestanica* (RADOSZKOWSKI)

♀ ♀ (die Weibchen von *Physetopoda cingulata* und *Ph. daghestanica* sind unbekannt)

- |   |  |   |
|---|--|---|
| 1 | Tergum II hinten mit hellem Mittelfleck und an der Basis mit drei hellen Flecken.....  | 2   |
| - | Tergum II hinten mit einem breitem hellen Band und an der Basis mit einem oder drei hellen Flecken.....  | 4   |
| 2 | Seitliche Flecke des Tergum II sehr groß, Entfernung zwischen ihnen und dem Mittelfleck geringer als Durchmesser des Mittelflecks. Mesosoma rot bis schwarz (f. <i>melanothorax</i> ). Größer: 8.0-10.0 mm ..... | 20 <i>Physetopoda punctata</i> (LATREILLE)    |
| - | Seitliche Flecke des Tergum II klein, Entfernung zwischen ihnen und dem Mittelfleck größer als Durchmesser des Mittelflecks. Mesosoma rot. Kleiner: 4.0-9.5 mm.....  | 3   |
| 3 | Basale Hälfte des Pygidialfeldes mit unregelmäßigen längsgerichteten Runzeln. (Fig. 41). Stirn ohne helle Flecke. 4.0-6.5 mm.....  | 18 <i>Physetopoda halensis</i> (FABRICIUS)    |
| - | Basale Hälfte des Pygidialfeldes mit unregelmäßigen quergerichteten Runzeln. Stirn mit kleinen Flecken aus grauen Haaren. 4.0-9.5 mm.....  | 19 <i>Physetopoda lucasii</i> (SMITH)         |
| 4 | Tergum II so lang wie breit. Tergum II mit schwachen seitlichen hellen Basalflecken. 4.5-6.0 mm.....   | 21 <i>Physetopoda pusilla</i> (KLUG)          |
| - | Tergum II kürzer, 0.85-0.9 mal so lange wie breit. Tergum II ohne Seitenflecke.....  | 5   |
| 5 | Gesicht und Scheitel mit schwarzen Haaren, manchmal durchmischt mit einzelnen hellen Haaren auf der Stirn. Band auf Tergum II in der Mitte 2 0.5-0.7 mal so lang wie Band auf Tergum III. 4.0-7.0 mm .....       | 22 <i>Physetopoda scutellaris</i> (LATREILLE) |
| - | Gesicht und Scheitel mit dichten hellen Haaren. Band auf Tergum II in der Mitte so lang wie Band auf Tergum III. 3.5-6.5 mm .....  | 23 <i>Physetopoda sericeiceps</i> ANDRÉ       |

### E. Schlüssel für die Arten von *Smicromyrme*

♂ ♂ (*Smicromyrme triangularis* ist unbekannt)

- |   |  |   |
|---|--|---|
| 1 | Mandibel auf der Unterseite ohne Zahn nahe der Basis (Untergattung <i>Astomyrme</i> SCHWARTZ 1984). 6.0-10.0 mm .....  | 24 <i>Smicromyrme</i> ( <i>A.</i> ) <i>ausonia</i> INVREA         |
| - | Mandibel auf der Unterseite mit gut entwickeltem Zahn nahe der Basis (Fig. 18).....  | 2   |
| 2 | Mandibel dreizähmig (Fig. 37). Clypeus konkav. (Untergattung <i>Erimyrme</i> LELEJ 1985). 4.5-10.0 mm.....   | 27 <i>Smicromyrme</i> ( <i>E.</i> ) <i>sicana</i> (DE STEFANI)    |
| - | Mandibel zweizähmig (Fig. 34). Clypeus abgeflacht.....   | 3   |
| 3 | Clypeus ohne Zähnchen nahe dem Vorderrand (Fig. 52). (Untergattung <i>Eremotilla</i> LELEJ 1985). – Metasoma mit heller Fransenreihe auf Tergum II und einem hellen Band auf den Terga III und IV. Ocellen klein. Mesosoma rot, schwarz sind: Tegula, der untere Teil des Mesopleuron und die Coxen. 7.0-10.0 mm ..... | 25 <i>Smicromyrme</i> ( <i>E.</i> ) <i>ingauna</i> INVREA         |
| - | Clypeus mit zwei Zähnchen nahe dem Vorderrand (Fig. 34). (Untergattung <i>Smicromyrme</i> THOMSON 1870).....   | 4   |
| 4 | Tergum I kürzer als seine maximale Breite. Mesosoma schwarz, rot sind: Mesoscutum, Tegula, Propodeum, oft das Pronotum, Mesoscutellum und der untere Teil des Mesopleuron. 3.5-8.5 mm.....   | 28 <i>Smicromyrme</i> ( <i>S.</i> ) <i>ruficollis</i> (FABRICIUS) |
| - | Tergum I länger als seine maximale Breite Mesosoma schwarz, rot sind: Pronotum, Mesoscutum, Tegula und Mesoscutellum, manchmal ist das Mesosoma vollständig schwarz (f. <i>nigra</i> ). 3.0-10.0 mm.....   | 29 <i>Smicromyrme</i> ( <i>S.</i> ) <i>rufipes</i> (FABRICIUS)    |

♀ ♀

- |   |   |   |
|---|---|---|
| 1 | Pygidialfeld dreieckig, basal verbreitert (Fig. 42). (Untergattung <i>Eremotilla</i> LELEJ 1985). – Tergum II mit drei hellen Basalflecken..... | 2 |
| - | Pygidialfeld verlängert, oft mit parallelen Seiten Fig. 43).....  | 3 |



- 2 Pronotum etwas breiter als das Propodeum. Kopf schwarz. Antenne braun, basale Fühlergeisselglieder auf der Unterseite rotbraun. Beine kastanienbraun mit gelblichen Tarsen. 5.0-8.0 mm ..... 26 *Smicromyrme (E.) triangularis* (RADOSZKOWSKI)
- Pronotum deutlich breiter als das Propodeum. Kopf auf der Unterseite kastanienbraun-rot, mit undeutlichen braunen Flecken auf der Stirn. Antenne und Beine rot. – Scutellumschuppe deutlich ausgeprägt. Hintere Fläche des Propodeum mit dichten schwarzen Haaren, die zur Scutellumschuppe gerichtet sind. 6.0-9.0 mm ..... 25 *Smicromyrme (E.) ingauna* INVREA
- 3 Pygidialfeld vollständig skulpturiert einschliesslich des hinteren Teils. (Untergattung *Smicromyrme* THOMSON) ..... 4
- Pygidialfeld im hinteren Viertel oder Fünftel ohne Skulptur, glänzend. (Untergattungen *Astomyrme* SCHWARTZ 1984 und *Erimyrme* LELEJ 1985). – Tergum II mit drei basalen hellen Flecken ..... 5
- 4 Scutellumschuppe schmal. Zähnenreihe auf dem vorderen Scutellum kaum sichtbar. Feine Runzeln auf dem Pygidialfeld divergieren besonders im hinteren Teil. 2.25-4.8 mm ..... 28 *Smicromyrme (S.) ruficollis* (FABRICIUS)
- Scutellumschuppe breit. Zähnenreihe auf dem vorderen Scutellum gut sichtbar. Feine Runzeln auf dem Pygidialfeld parallel 3.0-7.0 mm ..... 29 *Smicromyrme (S.) rufipes* (FABRICIUS)
- 5 Seiten von Tergum II gewinkelt. Mesosoma mit gewinkelt Vorderrand und gerundetem vorderen und hinteren Ecken, Rückenfläche schwach konvex mit zerstreuten schwarzen Haaren und hellem Seitenflecken auf dem Mesoscutum und Propodeum. 3.0-5.0 mm ..... 27 ..... *Smicromyrme (E.) sicana* (DE STEFANI)
- Seiten von Tergum II schwach gerundet. Mesosoma rechteckig, Rückenfläche mit zerstreuten goldenen Haaren. 3.0-6.0 mm ..... 24 *Smicromyrme (A.) ausonia* INVREA

### F. Schlüssel für die Arten von *Dasylabris*

#### ♂♂

- 1 Mandibel auf der Unterseite mit deutlichem Zahn nahe der Basis (Fig. 13). (Untergattung *Inbalitilla* LELEJ 1976). Körper vollständig schwarz ohne helle Haare (Fig. 28). 5.5-9.0 mm ..... 34 *Dasylabris (I.) regalis* (FABRICIUS)
- Mandibel auf der Unterseite mit kleinem Lobus (Fig. 14). (Untergattung *Dasylabris* RADOSZKOWSKI 1985). Metasoma mit hellen Flecken und Bändern (Fig. 27) ..... 2
- 2 Pronotum rot. Gesicht und Stirn mit einigen hellen Haaren. 10.0-15.0 mm ..... 33b *Dasylabris (D.) maura maura* (LINNAEUS)
- Pronotum teilweise oder ganz schwarz. Gesicht und Stirn ohne hellen Haare ..... 33a *Dasylabris (D.) maura clausa* (LEPELETIER)

#### ♀♀

- 1 Seitliche Kante des Pygidialfeldes im unteren Teil dreieckig verbreitert. (Fig. 45). (Untergattung *Inbalitilla* LELEJ 1976). – Tergum II hinten mit einem hellen Band (Fig. 26). 6.0-9.0 mm ..... 34 *Dasylabris (I.) regalis* (FABRICIUS)
- Seitliche Kante des Pygidialfeldes nicht verbreitert (Fig. 46). (Untergattung *Dasylabris* RADOSZKOWSKI 1985). – Tergum II mit zwei quer liegenden hellen Flecken (Fig. 25) ..... 2
- 2 Stirn mit weissem Querband, welches normalerweise die Augen berührt. 7.0-13.0 mm ..... 33b *Dasylabris (D.) maura maura* (LINNAEUS)
- Stirn mit einem halbrunden Fleck weisser Haare, welcher nicht die Augen berührt ..... 33a *Dasylabris (D.) maura clausa* (LEPELETIER)

**List of the species (female - ♀, male - ♂)**

**Subfamily Myrmosinae FOX 1894**

**Genus *Krombeinella* PATE 1947**

10 species in Europe.

**1. *Krombeinella longicollis* (TOURNIER 1889)**

*Myrmosa longicollis* TOURNIER 1889 - l'Entom. Genevois 1: 17, ♀ non ♂, type locality: "Sarepta" (Russia, environs of Volgograd), syntypes in Mus. d'Hist. Natur. Geneve.

**Male:** Black, red are: pronotum, tegulae, often mesoscutum and mesoscutellum. Terga II-VI with sparse pale fringe. First abscissa of R vein and second radio-medial vein forming straight line.

**Female:** Ferruginous-red are: mesosoma and legs. Tergum I dark-brown, brownish-red laterally with apical ivory band. Head dorsally and terga I-V with sparse brown setae, mesosoma dorsally with reddish ones, posterior border of tergum I with yellowish setae. Head behind eye angulate. Distance between anterior clypeal tubercles less than between tubercle and basal clypeal process.

**Distribution:** Slovakia, Romania, Bulgaria, Croatia, Serbia-Montenegro, Macedonia, Greece, Turkey, Ukraine, Russia (South European territory).

**2. *Krombeinella thoracica* (FABRICIUS 1793)**

*Hyleus thoracica* FABRICIUS 1793 - Entomologia systematica 2: 304, ♂, type locality: "in Italia", lectotype in Copenhagen Univ. Zool. Mus. (designated by PETERSEN 1988: 195).

Synonymy: *Myrmosa dubia* COSTA 1858.

**Male:** Black, red are: pronotum, mesoscutum, mesoscutellum, upper part of mesopleuron. Terga II-V laterally with sparse pale fringe. Sternum VI slightly emarginated. Sternum II with basal medial tubercle. Apex of interlobular process of hypopygium bifurcate.

**Female:** Black with ferruginous-red mandibles, clypeus and mesosoma; antennae and legs reddish-brown, tarsi more or less reddish. Tergum I with wide apical ivory band covered by dense yellowish pubescence.

**Distribution:** Italy, France, Spain, Croatia (2 males 10 km SE Pula, 12 Aug 1994 leg. Schmid-Egger).

**Genus *Myrmosa* LATREILLE 1796**

2 species in Europe.

**3. *Myrmosa atra atra* PANZER 1801**

*Myrmosa atra* PANZER 1801 - Faune Insectorum Germanicae oder Deutschlands insecten 85: 14, ♂, type locality: "Germania", types unknown.

**Synonymy:** *Mutilla melanocephala* FABRICIUS 1793; *Myrmosa nigra* LATREILLE 1809; *Myrmosa atra* LEPELETIER 1845; *Myrmosa nigra* LEPELETIER 1845; *Myrmosa bicolor* BAER 1848; *Mutilla melanaria* BLANCHARD 1849; *Myrmosa melanocephala* f. *rufomaculata* HOFFER 1938.

**M a l e.** Sternum I without lateral deep fovea. Ratio postocellar line to ocellocular line 0.65-0.7. Lateral process of hypopygium without outside basal tubercle.

**F e m a l e.** Ferruginous-red are: medial part of mandible, clypeus, scape, basal half of flagellum, clypeus, mesosoma, tergum I, sternum I, basal part of tergum and sternum II, legs, in some specimens also last terga. Ratio postocellar line to ocellocular line 0.8.

**H o s t :** *Oxybelus uniglumis* (LINNAEUS) (Crabronidae) (LELEJ 1985).

**D i s t r i b u t i o n :** Sweden, Finland, United Kingdom, Belgium, Netherlands, Germany, Poland, Estonia, Belarus, Ukraine, Austria, Czechia, Slovakia, Hungary, Switzerland, France, Spain, Portugal, Italy, Slovenia, Croatia, Bosnia-Herzegovina, Serbia-Montenegro, Romania, Russia (European part, West Siberia, Yakutsk); Turkey, Kazakhstan, Kyrgyzstan, ? Iran.

### **Genus *Paramyrmosa* SAUSSURE 1880**

3 species in Europe.

#### **4. *Paramyrmosa brunripes* (LEPELETIER 1845)**

*Myrmosa brunripes* LEPELETIER 1845 - Hist. nat. ins. Hymen. 3: 590, ♀, type locality: "Environns de Paris et Midi de la France", lectotype in Torino Mus. Reg. Sci. Natur. (designated by SUÁREZ 1988: 91).

**Synonymy:** *Myrmosa cognata* COSTA 1858.

**M a l e.** Head 1.2 × wider than height. Sternum I with cylindrical process. Apex of medial lobe of hypopygium rounded. Second abscissa of R vein 2.0 times shorter than first abscissa.

**F e m a l e.** Light red are: lower third of face, mesosoma, metasomal segment I, segment II partly (tergum II baso-laterally), legs. Erect body setae all pale. Head densely sculptured, space between punctures microsculptured, less than puncture diameter. Pronotum laterally right-angled with small point. Sternum I with conical process. Scutellar scale lacking. The female is characterized by the laterally emarginated flagellum III and the prolonged head.

**D i s t r i b u t i o n :** Poland, Belarus, Ukraine, Czechia, Slovakia, Austria, Hungary, Romania, Bulgaria, Greece, Albania, Slovenia, Croatia, Bosnia-Herzegovina, Serbia-Montenegro, Macedonia, Italy, France, Spain, Portugal, Russia (Central and South European territory), Armenia, Turkey.

### **Subfamily *Myrmillinae* BISCHOFF 1920**

#### **Genus *Myrmilla* WESMAEL 1852**

16 species in Europe.

#### **5. *Myrmilla (Myrmilla) calva* (VILLERS 1789)**

*Mutilla calva* VILLERS 1789 - Caroli Linnaei Entomologica: 343, fig. 33, ♀, type locality: Marseilles (France), syntypes not found.

Synonymy: *Mutilla calva* FABRICIUS 1798, *M. triareolata* SPINOLA 1841, *M. distincta* LEPELETIER 1845, *M. agrestis* LEPELETIER 1845, *M. incompleta* LEPELETIER 1845, *Rudia hastata* COSTA 1858, *Myrmilla calva* var. *andalusiana* SKORIKOV 1927, *M. calva* f. *seminigra* HOFFER 1938, *M. calva* f. *perparvula* INVREA 1958, *M. calva* f. *semirubra* NONVEILLER 1972.

**M a l e :** Ferruginous-red are: apex of mandible, mesosoma except mesosternum, terga II and III with few fringe-like setae apically. Sternum II and VIII each pyrramid-formed pointed.

**F e m a l e :** Ferruginous-red are lower part of face, mesosoma, tibiae medially, tarsi. Terga I-II with an indistinct fringe of grey setae.

**H o s t :** *Halictus* sp. (Halictidae) (LELEJ 1985).

**D i s t r i b u t i o n :** Austria, Czechia, Slovakia, Hungary, Germany, Switzerland, Romania, Albania, Slovenia, Croatia, Bosnia-Herzegovina, Serbia-Montenegro, Macedonia, Bulgaria, Greece, Italy, France, Spain, Portugal, Turkey, Morocco, Tunisia, Libya, Egypt.

### 6. *Myrmilla (Myrmilla) erythrocephala* (LATREILLE 1792)

*Mutilla erythrocephala* LATREILLE 1792 - Act. Soc. Hist. Nat. Paris 1: 8, ♀, type locality: Provence, France, syntypes in Mus. Nat. d'Hist. Natur. Paris.

Synonymy: *Mutilla latreillei* MEYER 1794, *M. cornuta* OLIVIER 1811, *Rudia megacephala* COSTA 1858, *M. bison* COSTA 1887.

**M a l e :** Ferruginous-red are: most part of head, mesosoma except black sternum and lower part of mesopleuron and brown metanotum. Sternum II without medial longitudinal carina, sternum VIII with longitudinal lateral carinae.

**F e m a l e :** Ferruginous-red are: head (lower parts somewhat darkened), mesosoma, tibiae medially. Horizontal part of tergum I and tergum III all covered with silver appressed setae, tergum II with apical band, medially enlarged to a round patch. Tergum IV with sparse apical fringe. Clypeus separated from face by a large triangular edge, deeply hollowed out below.

**D i s t r i b u t i o n :** Czechia, Slovakia, Austria, Hungary, Croatia, Serbia-Montenegro, Macedonia, Bulgaria, Greece, Italy, France (south), Spain, Portugal, Cyprus, Lebanon, Palestine, Tunisia, Egypt.

### 7. *Myrmilla (Pseudomutilla) capitata* (LUCAS 1849)

*Mutilla capitata* LUCAS 1849 - Explor. sci. de l'Alg. 3: 290, ♂, type locality: "Lacalle" (Algeria), syntypes in Mus. Nat. d'Hist. Natur. Paris.

Synonymy: *Mutilla parvicollis* COSTA 1860, *Pseudomutilla sardiniensis* COSTA 1885, *M. olceseii* TOURNIER 1895.

**M a l e :** The head black rarely with small red spot on vertex; mesosoma ferruginous-red. Terga I-III with apical fringe of yellowish pubescence. Hypostomal carina without two long processes.

**F e m a l e :** Ferruginous-red are: lower part of face, mesosoma, most parts of legs. Tergum I and III with apical silver band (band of tergum III sometimes covering the whole tergum), tergum II with apical band, medially enlarged to a round patch. Clypeus medially divided by a transversal edge, above a triangular plane surface, below hollowed out and shiny. Antennal socket and eye connected by a sharp edge.

**H o s t :** *Lasioglossum malachurum* (KIRBY) (Halictidae) (LELEJ 1985).

**D i s t r i b u t i o n :** Hungary, Austria, Serbia-Montenegro, Bulgaria, Greece, Italy, France (south), Spain, Portugal, Syria, Morocco, Algeria, Tunisia, Libya, Egypt.

**8. *Myrmilla (Pseudomutilla) glabrata* (FABRICIUS 1775)**

*Mutilla glabrata* FABRICIUS 1775 - Systema entomologicae: 398, ♂, type locality: "Habitat in Oriente" (? Egypt), holotype in Copenhagen Univ. Zool. Mus.

Synonymy: *Mutilla ciliata* FABRICIUS 1793, *M. fraterna* BAER 1848, *M. cephalica* SICHEL & RADOSZKOWSKI 1869, *Myrmilla sarmatica* SKORIKOV 1927, *M. sarmatica* var. *beljgovskii* SKORIKOV 1927.

**M a l e :** Ferruginous-red are: mesosoma, mandibles. Head dorsally with sparse black setae. Mesosoma dorsally with sparse brown setae. Terga I-VI with apical pale band widened medially on terga II-VI.

**F e m a l e :** Ferruginous-red are: clypeus, mandible and mesosoma. Head and mesosoma dorsally with sparse brown setae. Terga I-V with apical yellowish band widened medially on terga II-V.

**D i s t r i b u t i o n :** Austria, Hungary, Romania, Bulgaria, Serbia-Montenegro, Macedonia, Greece, Ukraine, Russia (South European territory), Kazakhstan, Uzbekistan, Turkey, Syria.

**9. *Myrmilla (Pseudomutilla) vutshetitshi* SKORIKOV 1927**

*Myrmilla vutshetitshi* SKORIKOV 1927 - Ezhegodnik Zool. Mus. AN SSSR 28(1): 41, ♀, type locality: Cape Menganam near Tokluk, Crimea (Ukraine), lectotype in St. Petersburg Zool. Inst. (designated by LELEJ 1985: 107).

Synonymy: *Myrmilla capitata kusdasi* INVREA 1965.

**M a l e :** Ferruginous-red are: head beneath, mesosoma, mandibles. Legs castaneous with paler tarsi. Head, mesosoma, legs and metasoma ventrally with sparse pale setae. Tergum II with apical pale band weakly widened medially. Tergum III with apical band of sparse pale setae, sometimes band interrupted medially.

**F e m a l e :** Head black or brown with indistinct brownish-red spot on vertex and ferruginous-red beneath. Mesosoma ferruginous-red. Legs castaneous with paler tarsi. Terga I-V with apical whitish band.

**D i s t r i b u t i o n :** Austria, Romania, Bulgaria, Greece, Ukraine, Turkey, Syria.

**Genus *Platymyrmilla* ANDRE 1900**

Monotypic (1 species in genus).

**10. *Platymyrmilla quinquefasciata* (OLIVIER 1811)**

*Mutilla quinquefasciata* OLIVIER 1811 - Encyclopédie methodique 8: 60, ♀, type locality: "en Arabie en Perse" (Iran), syntypes in Mus. Nat. d'Hist. Natur. Paris.

**M a l e.** Ferruginous-red are: metasomal segments I-II. The long process of sternum II in large specimens with lateral processes. Lateral felt lines located on tergum II and sternum II. Hypopygium with basal medial tubercle.

**F e m a l e.** Head behind eyes with parallel sides or slightly narrowed posterad. Scutellar scale lacking. Posterior border of terga I-V with pale band.

**D i s t r i b u t i o n :** Hungary, Romania, Bulgaria, Macedonia, Greece, Moldova, Georgia, Armenia, Azerbaijan, Palestine, Syria, Turkey, Iran, Iraq.

**Subfamily Mutillinae LATREILLE 1802**

**Tribe Mutillini LATREILLE 1802**

**Genus *Mutilla* LINNAEUS 1758**

4 species in Europe.

**11. *Mutilla europaea* LINNAEUS 1758**

*Mutilla europaea* LINNAEUS 1758 - Systema naturae: 583, ♀, type locality: "in Suecia" (Sweden), syntypes probably lost.

Synonymy: *Apis aptera* UDDMAN 1753; *Mutilla similis* HARRIS 1782; *M. schaefferi* SCHRANK 1802; *M. coerulans* LEPELETIER 1845; *M. cyanea* LEPELETIER 1845; *M. panzeri* LEPELETIER 1845; *M. obscura* NYLANDER 1847; *M. kaschiriensis* BAER 1848; *M. laevigata* SICHEL & RADOSZKOWSKI 1870; *M. notomelas* ANDRÉ 1902; *M. europaea* f. *rufula* HOFFER 1938; *M. europaea* f. *nigrescens* HOFFER 1938; *M. europaea* f. *ruficeps* HOFFER 1938.

**Male:** Dark red are: apex of mandible, mesoscutum, mesoscutellum, metanotum. Terga I and II with band of long silver setae; band on tergum II medially emarginated or interrupted. Tergum II laterally all covered with long silver setae, terga IV-VII apically and remaining body with long black setae, setae straight. Legs mainly with black setae, and some silver setae in between. In some specimens, hindleg with more silver setae than black setae. Body puncture coarser and denser than in *M. marginata*.

**Variation:** Some specimens are all black colored.

**Female:** Mesonotum red, sometimes also parts of pronotum. Tergum I with band of long silver setae, terga II, III and VI with lateral spots of silver setae, sometimes space between small. Legs with some short, adjecting black and silver setae. Body setae straight, most setae more or less adjecting.

**Host:** Various species of *Bombus* (Apidae) (LELEJ 1985).

**Distribution:** Europe: from Sweden and Finland to Spain; Russia (European part, South Ural, Western Siberia); Asia: Kazakhstan, Turkey; North Africa.

**12. *Mutilla marginata* BAER 1848**

*Mutilla marginata* BAER 1848: Bull. Soc. Imp. Natur. Moscou 21(1): 230, ♀, type locality: "Elisabetgrad" (Ukraine), syntypes not found.

Synonymy: *Mutilla trifasciata* RADOSZKOWSKI 1865; *M. marginata* f. *insueta* INVREA 1964.

**Male:** Body black with reddish-brown tegulae. Tergal bands similar and body setae as in *europaea*, but setae thinner and wool-like, apically winded. Legs with silver setae only. Body puncture finer and sparser than in *M. europaea*.

**Female:** Mesonotum red. Tergum I with band of long silver setae, terga II, III and VI with lateral spots of silver setae, sometimes space between small. Legs with sense erect silver setae. Body setae wool-like, most setae erect. The whole body seems to be woolly.

**Distribution:** Czechia, Slovakia, Germany, Austria, Switzerland, Hungary, Romania, Ukraine, Bulgaria, Italy, Spain, Russia (European part, South Ural), Georgia, Turkey, Syria.

**Genus *Ronisia* COSTA 1858**

5 species in Europe.

**13. *Ronisia brutia* (PETAGNA 1787)**

*Mutilla brutia* PETAGNA 1787 - Specimen insectorum: 33, fig. 37, ♀, type locality: "in planis Silvae nobilis vulgo Aspromonte" (Italy), syntypes unknown.

Synonymy: *Mutilla sexmaculata* CYRILLO 1787, *M. hungarica* FABRICIUS 1793, *M. confusa* LEPELETIER 1845, *M. monspeliensis* LEPELETIER 1845, *M. sexmaculata* BAER 1848, *M. robusta* SMITH 1855, *Ronisia torosa* COSTA 1858, *M. sericeiventris* COSTA 1864, *M. taurica* RADOSZKOWSKI 1865, *M. discoidalis* RADOSZKOWSKI 1865, *M. morawitzii* DALLA TORRE 1897, *M. crimeae* STRAND 1917, **syn.n.**

**M a l e.** Mesosoma surface ferruginous-red (in eastern specimens partly black). Tergum I and II apically with band of silver setae (band of tergum II: apically with emargination), tergum II all covered with silver setae. Sterna II-V with apical fringe of pale setae.

**F e m a l e.** Large patch on frons and mesosoma ferruginous-red. Terga I and II each with three silver spots, located transversally on posterior border of terga, and band on tergum III, tergum VI laterally with black setae.

**H o s t :** *Anthophora crinipes* SMITH (Apidae), *Megachile albisecta* KLUG, *Megachile parietina* GEOFFROY IN FABRICIUS (Megachilidae) (LELEJ 1985).

**D i s t r i b u t i o n :** Austria, Czechia, Slovakia, Germany (east), France, Italy, Malta, Croatia, Serbia-Montenegro, Macedonia, Greece, Bulgaria, Turkey, Ukraine, Russia (South European territory, South Ural), Turkey, Kazakhstan (west).

**Genus *Tropidotilla* BISCHOFF 1920**

3 species in Europe.

**14. *Tropidotilla litoralis* (PETAGNA 1787)**

*Mutilla litoralis* PETAGNA 1787 - Specimen insectorum: 33, ♀, type locality: Calabria, Brancaleone (Italy); syntypes unknown.

Synonymy: *Mutilla italica* FABRICIUS 1793, *M. indigena* ILLIGER 1807, *M. graeca* LEPELETIER 1845, *M. iberica* KOLENATI 1846, *M. salentina* COSTA 1858, *M. simplicia* RADOSZKOWSKI 1865, *M. pauperata* SICHEL & RADOSZKOWSKI 1870, *Tropidotilla litoralis* f. *bimaculata* INVREA 1965, *T. litoralis* f. *verticichroma* INVREA 1965.

**M a l e.** Parts of or all tergum II ferruginous-red. Tegulae dark ferruginous-red. Mandible without inner teeth, only apically pointed. Clypeus all concave and shiny. Mesosternum with large medial biapical process on the anterior border and two well developed precoxal tubercles.

**F e m a l e.** Mandible basally and mesosoma ferruginous-red. Tergum II with posterior silver band which arcuate anterad, terga III-V with silver fringe. Mandible with small inner tooth. Propodeum dorsally with small tubercles. Mesosoma length slightly more than its width.

**D i s t r i b u t i o n :** Spain, Portugal, France, Belgium, Switzerland, Austria, Hungary, Czechia, Romania, Bulgaria, Croatia, Serbia-Montenegro, Macedonia, Albania, Greece, Italy, Ukraine, Russia (South European territory), Georgia, Armenia, Azerbaijan, Turkmenistan (Kopet-Dag), Iran (north), Turkey, Syria, Palestine, Morocco, Algeria, Egypt.

**Tribe *Smicromyrmini* BISCHOFF 1920**

**Genus *Nemka* LELEJ 1985**

1 species in Europe.

**15. *Nemka viduata viduata* (PALLAS 1773)**

*Mutilla viduata* PALLAS 1773 - Reisen ... Russischen Reiches 2: 730, ♂, type locality: "Lecta cun praecedenti (ad Irтин locis australioribus)" (Shulba river near Semipalatinsk, Kazakhstan), syntypes probably in Zool. Mus. Berlin.

Synonymy: *Tiphia stridula* ROSSI 1790, *Mutilla coronata* ROSSI 1792, *M. coronata* FABRICIUS 1793, *M. paedemontana* FABRICIUS 1794, *M. togata* AHRENS 1812.

**M a l e:** Metasomal segment II ferruginous-red with black or brown apical band. Pronotum and mesoscutellum apically with dense whitish setal band. Terga I-II with long erect silver setae, tergum II apically with long black setae, terga III and IV with dense appressed silver setae, remaining terga with black erect setae. Mandible apically larger than medially, tridentate, medial tooth is the shortest. Clypeus concave and shiny. Spine between antennal base. Mesosternum with pointed tubercle. Genital volsella with basal external lobe and long narrow cuspis, basivolsella with very long setae.

**F e m a l e:** Head in lower part, antenna and mesosoma ferruginous-red. Frons between eyes with large patch of golden appressed setae, mesosoma dorsally with sparse golden setae. Tergum I with apical silver band, tergum II with basal rounded silver patch and apical silver band, medially enlarged, tergum III with large silver band. Sterna I-IV with silver setae. Foretarsal spines dark. Pygidial area large, oval, laterally and apically with marked edge, its surface completely diagonally wrinkled.

**H o s t:** *Gorytes* sp., *Bembecinus tridens* (FABRICIUS), *Bembix olivacea* (FABRICIUS) (Crabronidae) (LELEJ 1985).

**D i s t r i b u t i o n:** Ukraine, Spain, France, Italy, Malta, Greece, Slovenia, Croatia, Bosnia-Herzegovina, Serbia-Montenegro, Macedonia, Albania, Austria, Bulgaria, Hungary, Romania, Czechia, Slovakia, Russia (South European territory, South Ural, Altai), Turkey, Syria, Georgia, Azerbaijan, Armenia, Kazakhstan, Mongolia (north-west).

**Genus *Physetopoda* SCHUSTER 1949**

18 species in Europe.

**16. *Physetopoda cingulata* (COSTA 1858)**

*Mutilla cingulata* COSTA 1858 - Fauna regno Napoli: 15, tab. 21, fig. 4, ♂, type locality: "Terra d'Otranto" (Italy), holotype in Mus. Zool. Univ. Napoli.

Synonymy: *Smicromyrme rudolfae* LELEJ 1984.

**M a l e:** Ferruginous-red are: mesoscutellum, tegulae, metanotum medially and sometimes pronotum. Rarely mesosoma black all over with ferruginous-red tegulae.

**F e m a l e:** Unknown.

**D i s t r i b u t i o n:** Italy, Greece, Hungary, Russia (south-east of South European territory), Kazakhstan.



**17. *Physetopoda daghestanica* (RADOSZKOWSKI 1885)**

*Mutilla daghestanica* RADOSZKOWSKI 1885 - Horae Soc. Ent. Ross. **19** (1-2): 24, fig. 22, ♂, type locality: "Banat" (Hungary), lectotype in Krakow Inst. Syst. Exper. Zool. (designated by PETERSEN 1988: 169).

Synonymy: *Smicromyrme montata* f. *moravica* HOFFER 1936, *S. variabilis* HOFFER 1938, *S. variabilis* f. *maculata* HOFFER 1938, *S. variabilis* f. *lineata* HOFFER 1938, *S. variabilis* f. *obenbergeri* HOFFER 1938, *S. variabilis* f. *conversa* HOFFER 1938.

**Male**: Ferruginous-red are: pronotum, mesoscutum, tegulae and often mesoscutellum. Volsellar cuspis short, touch gonostylus intum. Disc of tergum II densely punctured, interspaces less than puncture width.

**Female**: Unknown.

**Distribution**: France, Italy, Germany, Czechia, Slovakia, Austria, Switzerland, Hungary, Romania, Croatia, Greece, Ukraine, Russia (South European territory, Altai), Kazakhstan.

**18. *Physetopoda halensis* (FABRICIUS 1787)**

*Mutilla halensis* FABRICIUS 1787 - Mantissa Insectorum **1**: 312, ♀, type locality: "Halae Saxonum" (Germany), syntypes lost, neotype in Mus. Nat. d'Hist. Natur. Paris. (designated by PETERSEN 1988: 163).

Synonymy: *Mutilla ephippium* FABRICIUS 1793, *M. montana* PANZER 1805, *M. schencki* SCHMIEDEKNECHT 1907, *Smicromyrme punctata pseudomontana* HOFFER 1936, *S. montana* f. *susterai* HOFFER 1936, *S. compacta* f. *melaclena* INVREA 1958, *S. subalpina* RESSL 1960.

**Remarks**: The male occurs in two color forms: an all black form and a partly red form (red are: pronotum, mesoscutum, sometimes mesoscutellum). PETERSEN (1988) treated both forms as conspecific, writing that "the two color forms...do not occur distinctly geographically separate, but in some areas one form may dominate over the other (Switzerland, parts of Czechoslovakia)". A more detailed view to the material list of PETERSEN (1988) and new records show that all recent findings from southern Germany (Baden-Württemberg, Rheinland-Pfalz, Bayern, Thüringen) and all records from Switzerland belongs to the black form only, whereas findings from France, North Italy, Austria and countries eastwards of these, belong to the red form. In eastern Germany a recent record from Brandenburg (Burger in litt.) and two old records from South Germany belong to the red form. In Czech Republic, Austria, Croatia and other countries occur both forms.

This distribution pattern gives an impression of a Central European range for the black form and a Southern to Southeast European and temperate Asian range for the red form with a large overlapping zone. Transition forms are unknown. Supposing, that both taxa represent forms only, an evenly mixed distribution pattern or an even change of the forms from the South to the North (when temperature depending) may be expected. But the present distribution pattern of both forms is more or less typical for subspecies or species behaviour.

The case needs further examination, and also a detailed geographical analysis of the distribution pattern of both forms. Provisionally, we remain with the opinion of PETERSEN (1988) and treat both as conspecific. But we recommend to mention the membership of the form in further publications. The black form is *Physetopoda halensis* s.str. (= f. *halensis*), whereas the red form was described as *Mutilla ephippium* FABRICIUS 1793 (= f. *ephippium*). There is no replacement name for preoccupied *M. ephippium*, so we remain with the provisional 'red form'.

**M a l e :** Mesosoma black with ferruginous-red pronotum, mesoscutum, mesoscutellum, metanotum, sometimes upper part of mesopleuron ferruginous-red also; or mesosoma black all over. Mesoscutum, tegulae and disc of tergum II with sparse black or brown setae, other body and legs with sparse pale setae forming apical fringe on metasomal segments.

**F e m a l e :** Ferruginous-red are: mesosoma with dark scutellar scale. The legs almost castaneous. Head and mesosoma dorsally with sparse black setae, very often appressed setae on head and mesoscutum are reddish. Tergum III with band of dense pale setae.

**H o s t :** *Clytra quadripunctata* (LINNAEUS) (Coleoptera), a chrysomelid beetle living in ants' nests. This very special host relationship was observed twice, in Würzburg/Germany and in Genève/Switzerland (PETERSEN 1988). The males often are found on light traps.

**D i s t r i b u t i o n :** Germany, Czechia, Slovakia, Austria, Switzerland, Hungary, Italy, Romania, Slovenia, Croatia, Bosnia-Herzegovina, Serbia-Montenegro, Macedonia, Bulgaria, Greece, Ukraine, Russia (South European territory, South Ural, Altai), Kazakhstan.

### 19. *Physetopoda lucasii* (SMITH 1855)

*Mutilla lucasii* SMITH 1855 - Cat. Hymen. 3: 14. New name for *Mutilla bicolor* LUCAS 1849.  
Synonymy: *Mutilla bicolor* LUCAS 1849; *Smicromyrme montana* f. *cerruuii* INVREA 1956.

**M a l e :** Mesosoma black with ferruginous-red pronotum, mesoscutellum, often mesoscutum and tegulae ferruginous-red also; sometimes mesosoma black all over or with ferruginous-red mesoscutellum and tegulae (f. *pseudobimaculata*) or ferruginous-red all over and black beneath (f. *bicolor*).

**F e m a l e :** Very similar with female of *Ph. halensis*, the differences see in the key above.

**D i s t r i b u t i o n :** Serbia-Montenegro, Albania, Greece, Italy, France, Spain, Portugal, Algeria.

### 20. *Physetopoda punctata* (LATREILLE 1792)

*Mutilla punctata* LATREILLE 1792 - Act. Soc. Hist. Nat. Paris 1: 11, ♀, type locality: "Gallo-provincia" (France), syntypes unknown.  
Synonymy: *Mutilla quadripunctata* OLIVIER 1811; *M. quadrimaculata* LUCAS 1849.

**M a l e :** Mesosoma ferruginous-red with black pronotum, tegulae and metanotum.

**F e m a l e :** Mesosoma ferruginous-red with black pronotum to black over (f. *melanothorax* ANDRÉ). Head and mesosoma dorsally with dense pale setae, pronotum with black ones. Tergum III with band of dense pale pubescence. Tergum VI laterally with pale setae.

**H o s t :** *Tituboea* sp. (Coleoptera), a chrysomelid beetle (LELEJ 1985).

**D i s t r i b u t i o n :** Spain, Portugal, France (south), Italy, Malta, Hungary, Romania, Croatia, Egypt, Tunisia, Algeria, Morocco.

### 21. *Physetopoda pusilla* (KLUG 1835)

*Mutilla pusilla* KLUG 1835 - Reise d. Tirol 2: 91, ♀, type locality: "Andalousie Puertoreal" (Spain), syntypes in Zool. Mus. Berlin.

**M a l e :** Unknown.

**F e m a l e :** Head black, dorsally with black setae only. Mesosoma ferruginous-red, at least with black sparse setae on pronotum and propodeum; legs somewhat darker than mesosoma.

Tergum III with band of dense pale pubescence. Tergum VI laterally with pale setae. Pygidial area with divergent wrinkles, shiny apically.

**D i s t r i b u t i o n :** Italy (north), Croatia, Albania, Greece, Spain, Cyprus, Algeria, Morocco.

### **22. *Physetopoda scutellaris* (LATREILLE 1792)**

*Mutilla scutellaris* LATREILLE 1792: Act. Soc. Hist. Nat. Paris 1: 10, ♂, type locality: "Habitat in provincia Inculismensi" (France), neotype in Copenhagen Univ. Zool. Mus. (designated by PETERSEN 1988: 192).

Synonymy: *Mutilla bimaculata* JURINE 1807, *M. subcomata* WESMAËL 1852, *Smicromyrme subcomata* f. *nigricollis* HOFFER 1936, *S. bimaculata* f. *castellaneta* PAGLIANO 1983.

**M a l e :** Mandible medially, mesoscutellum, metanotum and tegula red. Tergum II with fringe of pale setae. Clypeus with triangular flat surface and two tubercles near apical margin.

**F e m a l e :** Red are: mandible in basal half, face in lower third, antenna in basal half, mesosoma, legs and tergum I. Margin of terga II and III yellowish-red. Terga II with basal silver patch and apical band. Tergum III covered with silver setae. Pygidial area with some indistinct wrinkles in basal half, without sculpture and shiny in apical half.

**D i s t r i b u t i o n :** Spain, France, Italy, Germany, Czechia, Slovakia, Austria, Switzerland, Romania, Hungary, Slovenia, Croatia, Serbia-Montenegro, Greece, Armenia, Turkey, ?Algeria, ?Tunisia.

### **23. *Physetopoda sericeiceps* (ANDRÉ 1901)**

*Mutilla subcomata* var. *sericeiceps* ANDRÉ 1901 - Spec. Hymen. d'Eur. et d'Alg. 8: 265, ♀, type locality: "Corse" (France), lectotype in Mus. d'Hist. Natur. Paris (designated by PETERSEN 1988: 167).

Synonymy: *Smicromyrme moltonii* INVREA 1955.

**M a l e :** Unknown.

**F e m a l e :** Mesosoma and legs ferruginous-red. Mesosoma dorsally with sparse pale setae, except black ones on pronotum. Tergum VI laterally with pale setae. Apical fifth of pygidial area shiny.

**D i s t r i b u t i o n :** Hungary, Serbia-Montenegro, Greece, Italy, France, Portugal, Spain.

## **Genus *Smicromyrme* THOMSON 1870**

43 species in Europe.

### **24. *Smicromyrme (Astomyrme) ausonia* INVREA 1950**

*Smicromyrme ausonia* INVREA 1950 - Mem. Soc. entom. Ital. 29: 23, ♂, type locality: "Liguria, Varazze" (Italy), holotype in Genova Mus. Civ. Stor. Natur.

Synonymy: *Smicromyrme sabatia* INVREA 1953.

**M a l e :** Ferruginous-red are: pronotum, mesoscutum, tegulae, mesoscutellum and metanotum medially; rarely mesosoma black all over with brownish-red tegulae only. Antenna black, sometimes ferruginous-red beneath. Mandible tridentate. Ocelli small, diameter of anterior ocellus much smaller than distance between it and posterior one. Clypeus concave with three preapical tubercles.

**F e m a l e :** Mesosoma ferruginous-red. Antennae brownish-red darkened apically. Legs

castaneous with ferruginous tibiae and tarsi. Frons and vertex with sparse black setae sometimes with reddish lustre. Tergum II with large medial basal pale spot, lateral sub-circular pale spot and apical pale band which triangle widened medially. Tergum III with pale band. Apical third-fourth of pygidial area shiny.

**H o s t :** *Zeuxia cinerea* MEIGEN (Tachinidae, Diptera), *Eumerus strigatus* FALLÉN (Syrphidae, Diptera) (LELEJ 1985).

**D i s t r i b u t i o n :** France, Italy, Greece, Ukraine (Crimea), Moldova, Russia (South European territory, South Ural), Kazakhstan, Turkmenistan (Kopet-Dag), Cyprus.

### 25. *Smicromyrme (Eremotilla) ingauna* INVREA 1958

*Smicromyrme ingauna* INVREA 1958 - Boll. Soc. entom. Ital. **88** (9-10): 145, E, type locality: Liguria, Albenga" (Italy), holotype in Genova Mus. Civ. Stor. Natur.

Synonymy: *Smicromyrme varinella* INVREA 1960.

**M a l e :** Mesosoma red except tegula, upper part of mesopleuron and mesosternum. Mandible with red in apical third. Terga I and II with apical fringe of silver pale setae, terga III and IV with large silver band. Sterna I-IV with silver apical setae. Clypeus triangular, flat and shiny.

**F e m a l e :** Red are: mandible in basal half, antenna, mesosoma except a dark zone at its basal border, and legs. Face between eyes with large golden band. Tergum II basally with rounded silver spot and some silver setae laterally, apically with silver band, medially enlarged. Tergum II with large silver band. Pygidial area with more or less longitudinal wrinkles, somewhat divergent in apical part.

**D i s t r i b u t i o n :** Italy (also in the Alps in Valle d'Aosta, leg. Schmid-Egger June 1996), Romania.

### 26. *Smicromyrme (Eremotilla) triangularis* (RADOSZKOWSKI 1865)

*Mutilla triangularis* RADOSZKOWSKI 1865 - Bull. Soc. Imper. Natur. Moscou **38** (2): 448, tab. 7, fig. 16, E, type locality: "Saratov, Kasan, Spask" (Russia), syntypes probably in Krakow Inst. Syst. Exper. Zool.

Synonymy: *Smicromyrme pouzdranensis* HOFFER 1936, **syn.n.**

**R e m a r k s :** The characters of *Smicromyrme pouzdranensis*, which was described by an unique specimen from South Moravia, including pale design of tergum II (with three basal pale spots), wide pygidial area and well developed comb of fore tarsus, are similar to ones of *S. triangularis*, which is distributed in the steppes of Ukraine, European part of Russia and South Ural. Czechia is the western point of this species. The male is still unknown.

**M a l e :** Unknown.

**F e m a l e :** Mesosoma ferruginous-red with darker scutellar scale. Frons and vertex with appressed yellowish pubescence which not form spot and sparse erect black setae. Mesosoma dorsally with sparse appressed golden setae and black ones on pronotum and around scutellar scale.

**D i s t r i b u t i o n :** Czechia, Ukraine, Russia (South European territory, Kasan, South Ural).

### 27. *Smicromyrme (Erimyrme) sicana* (DE STEFANI 1887)

*Mutilla ephippium* var. *sicana* DE STEFANI 1887 - Natural. Sicil. **6**: 62, ♂, type locality: Sicily (Italy), lectotype in Mus. Nat. d'Hist. Natur., Paris. (designated by PETERSEN 1988: 194).

Synonymy: *Smicromyrme pusilla septentrionalis* HOFFER 1936, *S. pusilla septentrionalis* f. *gregory* HOFFER 1936, *S. rufipes* var. *lutescens* INVREA 1954.

**Male** : Ferruginous-red are: pronotum, tegulae, mesoscutellum, metanotum, upper part of mesopleuron. Mesoscutum black. Frons, vertex, mesoscutum and tegulae with black or brown setae. Distance between teeth on anterior clypeal border less than their length.

**Female** : Mesosoma ferruginous-red with black anterior pronotal border, rarely black all over with two brownish-red spots on mesoscutum laterally. Legs castaneous with reddish tibiae and tarsi. Frons and vertex with indistinct small spot of appressed pale setae; head beneath, metasoma ventrally and legs with sparser pale setae. Tergum III with pale band.

**Host** : Various ground nesting Crabronidae: *Cerceris arenaria* (LINNAEUS), *Miscophus bicolor* JURINE, *Tachyspex pompiliiformis* (PANZER), *Diodontus minutus* (FABRICIUS) and wood-nesting Crabronidae: *Nitela spinolae* LATREILLE (LELEJ 1985)

**Distribution** : France, Italy, Serbia-Montenegro, Croatia, Albania, Greece, Hungary, Austria, Ukraine, Czechia, Slovakia, Romania, Turkey, Russia (South European territory, South Ural, Altai), Turkey, Syria.

## 28. *Smicromyrme (Smicromyrme) ruficollis ruficollis* (FABRICIUS 1793)

*Mutilla ruficollis* FABRICIUS 1793 - Entomologia systematica 2: 371, ♂, type locality: "In Italia" (Italy), lectotype in Copenhagen Univ. Zool. Mus. (designated by PETERSEN 1988: 188).

Synonymy: *Smicromyrme kiritshenkoae* SKORIKOV 1935.

**Male** : Ferruginous-red are: mesoscutum, tegulae, propodeum, often pronotum, mesoscutellum and upper part of mesopleuron. Mesoscutum and tegulae with sparse brown setae other body with sparse pale setae. Postocellar line 0.6-0.7 × ocellular line.

**Female** : Red are: mandible in basal half, antenna, mesosoma and legs. Face between eyes with some golden setae. Tergum II basally with longitudinal silver spot, apically with silver band. Tergum III with large silver band. Pygidial area with more or less longitudinal wrinkles, markedly divergent in apical part.

**Distribution** : Austria, Croatia, Bosnia-Herzegovina, Serbia-Montenegro, Macedonia, Greece, Bulgaria Italy, Spain, France, Malta, Ukraine, Russia (Altai), Kazakhstan, Turkey.

## 29. *Smicromyrme (Smicromyrme) rufipes* (FABRICIUS 1787)

*Mutilla rufipes* FABRICIUS 1787 - Mantissa Insectorum 1: 312, ♀, type locality: "Halae Saxonum" (Germany), syntypes probably lost.

Synonymy: *Mutilla nigra* ROSSI 1792; *M. ephippium* ROSSI 1792; *M. sellata* PANZER 1797; *M. nigrita* PANZER 1801; *M. petiolaris* FABRICIUS 1804; *M. gibba* BAER 1848; *M. nemoralis* BAER 1848; *M. rufipes* var. *fulvogastra* ANDRÉ 1901; *Smicromyrme rufipes* var. *nigricollaris* SKORIKOV 1935; *S. rufipes* f. *zavadili* HOFFER 1938; *S. rufipes* f. *lidmilae* HOFFER 1938; *S. kuehlhorni* INVREA 1963; *S. globosa* FRANZ 1982.

**Male** : Red are: Pronotum, mesoscutum, tegula, mesoscutellum. Terga I-III with apical fringe of silver setae. Body below with silver setae except sterna VI and VII. Clypeus triangular, surface rounded, with two preapical tubercles.

**Variation** : The male occurs in an all black form, which is more abundant in northern parts of Central Europe than in the southern parts (f. *nigra* ROSSI).

**Female** : Red are: mandible in basal half, face in lower third, antenna in basal half, mesosoma, legs and tergum I. Margin of terga II and III yellowish-red. Terga II with basal silver patch and indistinct apical band, sometime only with a medial patch. Tergum

III covered with less dense silver setae. Pygidial area with longitudinal wrinkles, in apical part somewhat divergent.

**Host:** Various ground nesting Crabronidae: *Tachysphex* sp., *Oxybelus* spp., *Miscophus spurius* DAHLBOM, *Palarus variegatus* F., *Astata boops* SCHRANK, *Cerceris arenaria* LINNAEUS, *Crossocerus wesmaeli* VANDER LINDEN, *Tracheliodes quinquenotatus* (JURINE) also *Evagetes* sp. (Pompilidae) is mentioned (LELEJ 1985).

**Distribution:** Spain (north), France, Italy (north), Slovenia, Croatia, Bosnia-Herzegovina, Serbia-Montenegro, Switzerland, Austria, Germany, Hungary, Czechia, Slovakia, Ukraine, Belarus, Sweden, Finland, Russia (European part, South Ural, Altai, Yakutsk), Kazakhstan.

### Tribe *Peterseniini* LELEJ 1996

#### Genus *Artiotilla* INVREA 1950

1 species in Europe.

#### 30. *Artiotilla biguttata* (COSTA 1858)

*Mutilla biguttata* COSTA 1858 - Fauna regno Napoli: 23, tab. 23, fig. 3, ♀, type locality: "Calabria, Sicilia" (Italy), syntypes in Mus. Zool. Univ. Napoli.

Synonymy: *Mutilla dalmatica* ANDRÉ 1893, *M. mervensis* RADOSZKOWSKI 1893, *Smicromyrme fertoni* INVREA 1953, *Artiotilla biguttata f. palestinensis* INVREA 1965.

**Male:** Body black with ferruginous-red metasomal segments I and II and apical brown-red band on segment II. Pronotum and terga II and IV with pale band. Postocellar line equal or somewhat less than ocellocular line. Weak lateral carina of hypopygium straight.

**Female:** Head and metasoma black, mesosoma ferruginous-red darker laterally. Femora reddish-brown or the same color as mesosoma laterally. Metasoma with two large pale spots disposed transversally on tergum II and pale band on tergum III. Sternum II with lateral longitudinal carina ending posterad by denticle and weak medial longitudinal carina. Inner border of mandible with obtuse subbasal denticle. Scutellar scale lacking.

**Distribution:** Italy, Croatia, Serbia-Montenegro, Macedonia, Greece, Albania, Azerbaijan, Turkmenistan, Iran, Turkey, Cyprus, Palestine.

### Tribe *Trogaspidiini* BISCHOFF 1920

#### Genus *Trogaspidia* ASHMEAD 1903

1 species in Europe.

#### 31. *Trogaspidia catanensis* (ROSSI 1794)

*Mutilla catanensis* ROSSI 1794 - Mantissa Insectorum 2: 126, tab. 3, fig. B, ♀, type locality: "Catania" (Italy), syntypes unknown.

Synonymy: *Mutilla ballioni* RADOSZKOWSKI 1866, *M. paripunctata* SICHEL & RADOSZKOWSKI 1870.

**Male:** Terga I and II ferruginous-red. Medially interrupted band on terga III and IV.

Propodeum dorsally with dense recumbent pale setae. Frons with black, pronotal laterad with dense pale setae.

**F e m a l e:** Head, antennae, legs and metasoma black, mesosoma ferruginous-red. Mesosoma dorsally with sparse erect black setae and appressed yellowish ones. Metasoma with medially interrupted band on terga III and IV. Pronotum anterad weakly arcuate. Scutellar scale narrow.

**D i s t r i b u t i o n:** Hungary, Romania, Croatia, Serbia-Montenegro, Macedonia, Greece, Italy, Ukraine (Crimea), Russia (South European territory), Armenia, Kazakhstan (west), Algeria.

### **Subfamily S p h a e r o p t h a l m i n a e ASHMEAD 1903**

#### **Genus *Cystomutilla* ANDRE 1896**

1 species in Europe.

#### **32. *Cystomutilla ruficeps* (SMITH 1855)**

*Mutilla ruficeps* SMITH 1855 - Cat. Hymen. 3: 15. New name for *Mutilla erythrocephala* LUCAS 1849.

Synonymy: *Mutilla erythrocephala* LUCAS 1849, *M. parvula* KRIECHBAUMER 1896

**M a l e:** Head and metasoma black. Mesosoma ferruginous-red with brownish-red sternum and anterior pronotal border. Tergum III with sparse pale setae. Ocelli small. Mandible bidentate, beneath without large tooth near the base. Long lateral felt lines disposed on tergum II and short one on sternum II.

**F e m a l e:** Head and metasoma black. Mesosoma ferruginous-red, antennae and legs brownish-red. Head ferruginous-red. Terga I and II with apical pale band, tergum II with pale band. Scutellar scale lacking. Long lateral felt lines disposed on tergum 2. Pygidial area developed.

**H o s t:** *Ectemnius rubicola* (DUFOUR & PEREZ), *Pemphredon rugifer* (DAHLBOM), (Crabronidae) (LELEJ 1985).

**D i s t r i b u t i o n:** United Kingdom, France, Spain, Italy, Switzerland, Slovakia, Austria, Hungary, Romania, Croatia, Albania, Greece, Ukraine, Russia (South European territory), Georgia, Algeria.

### **Subfamily D a s y l a b r i n a e INVREA 1964**

#### **Genus *Dasylabris* RADOSZKOWSKI 1885**

11 species in Europe.

#### **33a. *Dasylabris (Dasylabris) maura maura* (LINNAEUS 1758)**

*Mutilla maura* LINNAEUS 1758 - Systema Nature 1: 583, ♀, type locality: "Germania" (Germany), neotype in London Linnean Society (designated by PETERSEN 1988: 182).

Synonymy: *Mutilla austriaca* PANZER 1799, *M. rubricans* LEPELETIER 1845, *M. argenteofasciata* COSTA 1858, *M. trisinuosa* COSTA 1886, *Dasylabris maura* f. *nigrociliata* HOFFER 1938.

**M a l e:** Pronotum, mesoscutum, tegula, scutellum and propodeum red. Tergum II with

basal triangular silver patch and apical silver band, deeply emarginated medially. Tergum III completely covered with silver setae. Sterna II and III with silver fringe, remaining sterna with black fringe. Apical border of clypeus with two triangular teeth. Tergum I small, 1/3 as wide as tergum II.

**F e m a l e :** Mesosoma all red. Frons between eyes with large silver band, touching eyes, with some golden-brownish setae in between. Tergum I with silver setae. Tergum II with small basal and two large latero-apical silver patches. Tergum III black, tergum IV and V each with medial silver patch, patch V double as large as patch IV. Tergum VI with large pygidial area, covered with irregular longitudinal wrinkles. Mandible straight, with two small inner teeth.

**H o s t :** *Palmodes occitanicus* LEPELETIER & SERVILLE, *Ammophila heydeni* DAHLBOM, (Sphecidae), *Katamenes arbustorum* (PANZER) (Vespidae) (LELEJ 1985).

**D i s t r i b u t i o n :** France, Switzerland, Italy, Malta, Croatia, Bosnia-Herzegovina, Serbia-Montenegro, Macedonia, Albania, Greece, Bulgaria, Hungary, Turkey, Austria, Czechia, Slovakia, Germany, Poland, Ukraine (Crimea), Georgia, Armenia, Azerbaijan.

### 33b. *Dasylabris (Dasylabris) maura clausa* (LEPELETIER 1845)

*Mutilla clausa* LEPELETIER 1845 - Hist. nat. ins. Hymen. 3: 601, ♂, type locality: "Environs de Paris" (France), lectotype in Torino Mus. Reg. Sci. Natur. (designated by PETERSEN 1988: 183).

**R e m a r k s :** The subspecies *D. m. clausa* is based on a partly or all black pronotum in male (red in *maura* s.str.) and different setal pattern on head in females. In our material we could find transition forms to *D. maura* s.str. from southern France (males with a partly black pronotum). So the status of *D. m. clausa* as a subspecies of *D. maura* s.str. is questionable, because these minor changes in character states also may be caused by climatic or other influences. Its status as a forma rather than a subspecies is more probable. Detail examinations will confirm this assumption. The host is probably the same as in *D. maura* s.str.

**M a l e :** *D. m. clausa* has a partly black pronotum. Otherwise it agree with *D. m. maura*.

**F e m a l e :** The female of *D. m. clausa* has a smaller and rounded patch on frons. The space between the patch and the eye is covered with golden-brownish setae (or: the setae change color from silver to golden). Otherwise it agree with *D. m. maura*.

**D i s t r i b u t i o n :** Switzerland, France (south), Spain, Portugal.

### 34. *Dasylabris (Inbaltilla) regalis* (FABRICIUS 1793)

*Mutilla regalis* FABRICIUS 1793 - Entomologia systematica 2: 371, ♀, type locality: "Habitat in Hungaria" (Hungary), neotype ♂ in Copenhagen Univ. Zool. Mus. (designated by PETERSEN 1988: 186).

Synonymy: *Mutilla petiolata* BAER 1848; *M. petiolaris* RADOSZKOWSKI 1865; *M. concolora* RADOSZKOWSKI 1865; *M. unipetiolearis* RADOSZKOWSKI 1866; *Dasylabris italica* var. *triangulomaculata* SKORIKOV 1935; *D. italica* f. *slovaca* HOFFER 1938; *D. italica* f. *batai* HOFFER 1938.

**M a l e :** Body, antennae and legs black. Pubescence of the body and legs black. Apical fringe of metasomal segments with black setae.

**F e m a l e :** Ferruginous-red are: mesosoma, antennae reddish-brown paler beneath, mandible brownish-red with black apexes. Legs black or brown with reddish tarsi. Frons,



vertex and occiput with dense appressed yellowish pubescence. Mesosoma dorsally with sparse short appressed golden and long erect black setae. Medial pale spots on terga III-V equal in width. Mesosoma length 1.15-1.2 × its maximum width. Basal pale spot of tergum II transversally oval, wider than tergum I, distance between spot and medial projection of pale band of the same tergum less spot diameter.

**D i s t r i b u t i o n :** Czechia, Slovakia, Austria, Hungary, Serbia-Montenegro, Bulgaria, Ukraine, Russia (South European territory, South Ural, Altai), Kazakhstan.

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### Zusammenfassung

Die vorliegende Arbeit behandelt alle mitteleuropäischen Arten der Spinnenameisen (Mutillidae). Ein Bestimmungsschlüssel in deutscher und englischer Sprache wird vorgestellt, die Arten werden kurz beschrieben, ihre Verbreitung und ihre Wirte werden dargestellt. Insgesamt werden 34 Arten in 15 Gattungen besprochen. Neue Synonyme sind: *Ronisia brutia* (PETAGNA 1787) = *Mutilla crimeae* STRAND 1917, **syn.n.**; *Smicromyrme triangularis* (RADOSZKOWSKI 1865) = *S. pouzdranensis* HOFFER 1936, **syn.n.**

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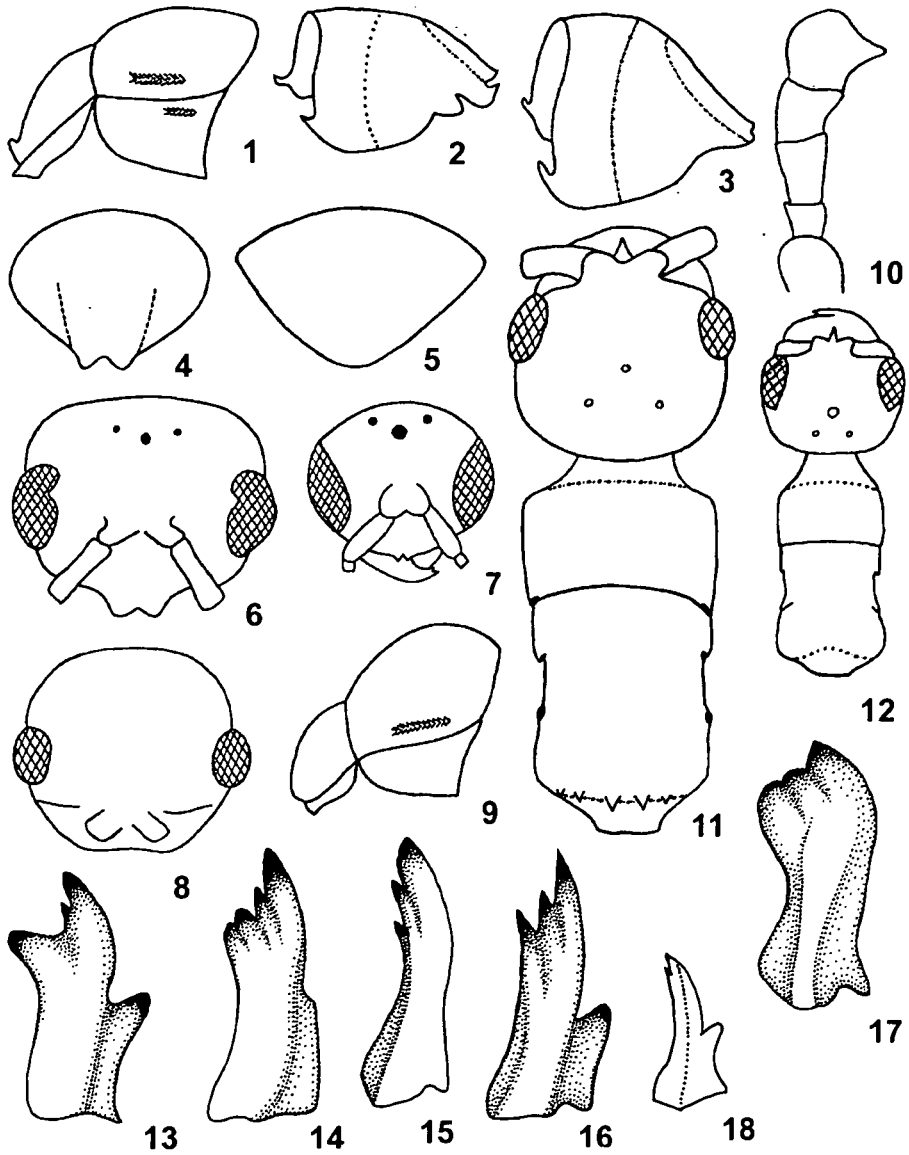
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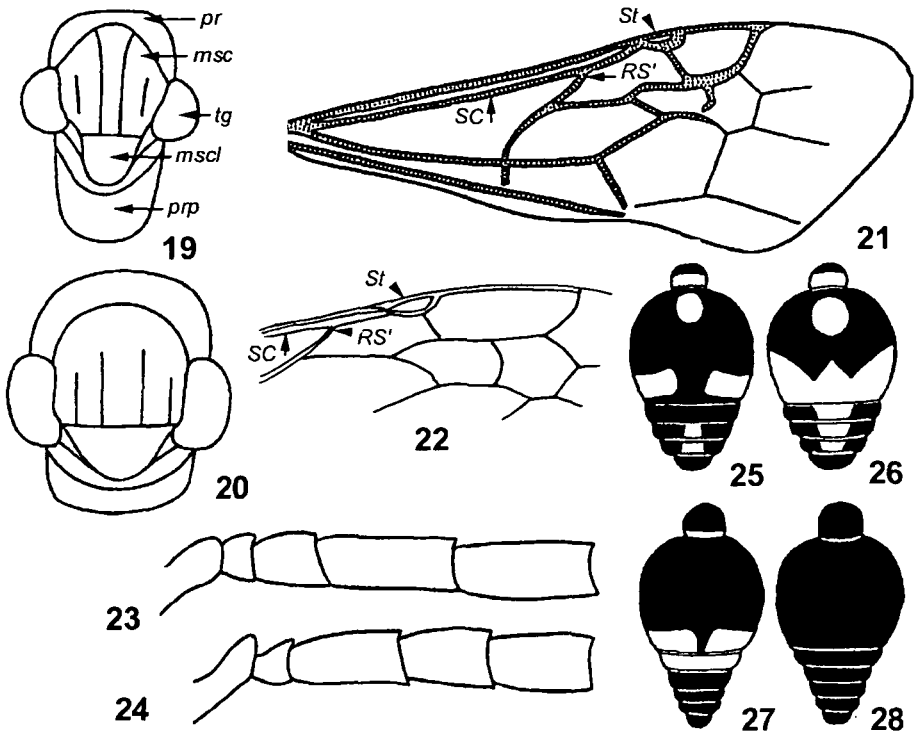
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Addresses of the authors: Arkady LELEJ  
Institute of Biology and Soil Science,  
Vladivostok-22, 690022, Russia  
E-Mail: [lelej@ibss.dvo.ru](mailto:lelej@ibss.dvo.ru)

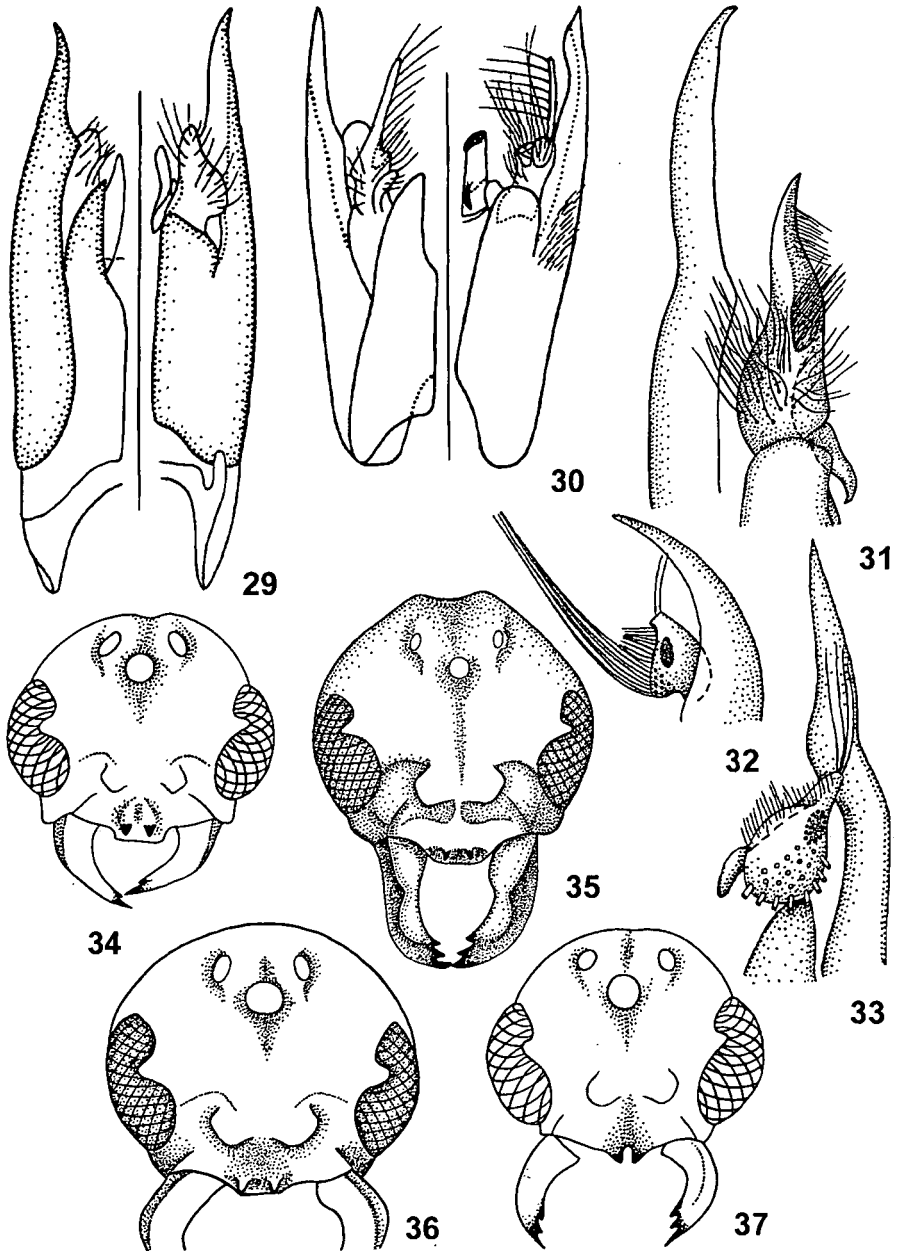
Dr. Christian SCHMID-EGGER  
Kirchstr. 1,  
82211 Herrsching, Germany  
E-Mail: [christian@bembix.de](mailto:christian@bembix.de)



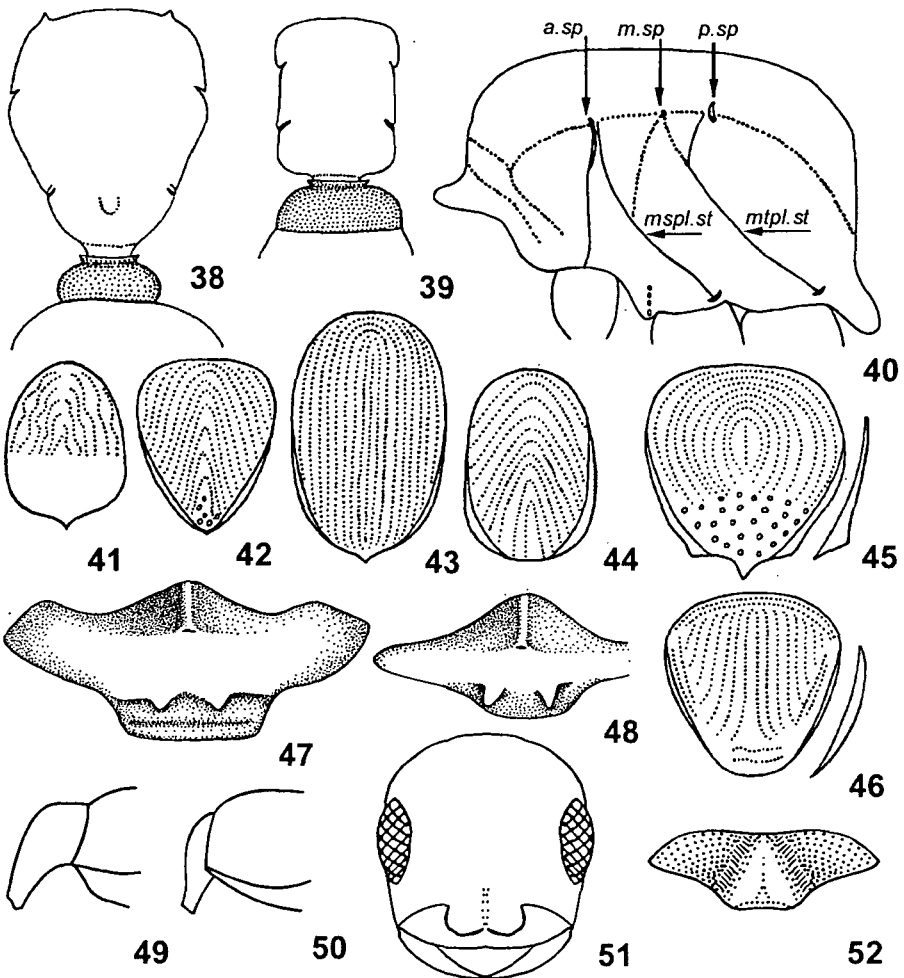
Figs 1-18: (1) *Smicromyrme rustipes*, ♂, segment I-II lateral view; (2) *Krombeinella wolffi*, ♂, tergum VII lateral view; (3) *Myrmosa atra*, ♂, tergum VII lateral view; (4) *M. atra*, ♂, tergum VII posterior view; (5) *Paramyrmosa brunnipipes*, ♂, tergum VII posterior view; (6) *Mutilla europaea*, ♂, head; (7) *Dasylabris maura*, ♂, head; (8) *Cystomutilla ruficeps*, ♀, head; (9) *Physetopoda halensis*, ♂, segment I-II lateral view; (10) *P. brunnipipes*, ♀, pedicel and flagellomeres I-III; (11) *Krombeinella longicollis*, ♀, head and mesosoma dorsal view; (12) *M. atra*, ♀, head and mesosoma dorsal view; (13) *D. regalis*, ♂, mandible, lateral view; (14) *D. maura*, mandible, lateral view; (15) *Tropidotilla litoralis*, ♂, mandible lateral view; (16) *Nemka viduata*, ♂, mandible lateral view; (17) *Mutilla mikado*, ♂, mandible lateral view; (18) *S. rustipes*, ♂, mandible, lateral view.



**Figs 19-28:** (19) *Nemka viduata*, ♂, mesosoma dorsal view (msc - mesoscutum, mscl - mesoscutellum, pr - pronotum, prp - propodeum, tg - tegula); (20) *Tropidotilla litoralis*, ♂, mesosoma dorsal view; (21) *Physetopoda halensis*, ♂, forewing (RS' - first abscissa of RS, SC - subcosta, st - stigmatic cell); (22) *Trogaspidia catanensis*, ♂, forewing (RS' - first abscissa of RS, SC - subcosta, st - stigmatic cell); (23) *Nemka viduata*, ♂, pedicel and flagellomeres I-III; (24) *Trogaspidia jedtschenkoi*, ♂, pedicel and flagellomeres I-III; (25) *Dasylabris maura*, ♀, metasoma; (26) *D. regalis*, ♀, metasoma; (27) *D. maura*, ♂, metasoma; (28) *D. regalis*, ♂, metasoma.



Figs 29-37: (29) *Smicromyrme sicana*, ♂, genitalia, dorsal view at left, ventral view at right; (30) *Nemka viduata*, ♂, genitalia, dorsal view at left, ventral view at right; (31) *Physetopoda scutellaris*, ♂, volsella, ventral view; (32, 33) *Ph. daghestanica*, ♂, volsella, lateral (32) and ventral (33) view; (34) *Smicromyrme ruficollis*, ♂, head; (35) *Ph. cingulata*, ♂, head; (36) *Ph. scutellaris*, ♂, head; (37) *Smicromyrme sicana*, ♂, head.



**Figs 38-52:** (38) *Dasylabris mongolica*, ♀, mesosoma and base of metasoma, dorsal view; (39) *Mutilla saltensis*, ♀, mesosoma and base of metasoma, dorsal view; (40) *Trogaspidia fedtschenkoi*, ♀, mesosoma lateral view (a.sp - anterior spiracle, m.sp - mid spiracle tubercle, mspl.st - mesopleural suture, mtpl.st - metapleural suture, p.sp - propodeal spiracle); (41) *Physetopoda halensis*, ♀, pygidial area; (42) *Smicromyrme triangularis*, ♀, pygidial area; (43) *S. rufipes*, ♀, pygidial area; (44) *Nemka viduata*, ♀, pygidial area; (45) *D. regalis*, ♀, pygidial area; (46) *D. maura*, ♀, pygidial area; (47) *Ph. halensis*, ♂, clypeus; (48) *Ph. lucasii*, ♂, clypeus; (49) *M. europaea*, ♀, segment I-II lateral view; (50) *Tropidotilla litoralis*, ♀, segment I-II lateral view; (51) *D. maura*, ♀, head; (52) *S. ingauna*, ♂, clypeus.

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