DiVA
http://www.diva-portal.org

This is the published version of a paper published in *Entomologisk Tidskrift*.

Citation for the original published paper (version of record):

Stigenberg, J., van Achterberg, K. (2016)
Heads up on Swedish Leiophron (Braconidae, Euphorinae) - a key to species and three new species records.
Entomologisk Tidskrift

Access to the published version may require subscription.

N.B. When citing this work, cite the original published paper.

Permanent link to this version:
http://urn.kb.se/resolve?urn=urn:nbn:se:nrm:diva-1702

Heads up on Swedish *Leiophron* (Braconidae, Euphorinae) - a key to species and three new species records

JULIA STIGENBERG & KEES VAN ACHTERBERG

Stigenberg, J. & van Achterberg, C.: Heads up on Swedish *Leiophron* (Braconidae, Euphorinae) – a key to species and three new species records. **[Se upp för svenska *Leiophron* (Braconidae, Euphorinae) – en nyckel till art och tre nya landsfynd.]** – Entomologisk Tidskrift 136 (4): 175-184. Uppsala, Sweden 2015. ISSN 0013-886x.

The Swedish species of *Leiophron* Nees are reviewed. The species *Leiophron reclinator* (Ruthe, 1856), *L. fulvipes* (Curtis, 1833) and *L. duploclaviventris* (Shenefelt, 1969) are reported for the first time from Sweden. *Leiophron similis* (Curtis, 1833) is introduced as a new synonym of *L. basalis* (Curtis, 1833). A key and diagnoses for the identification of the Swedish species are also provided. There are currently nine species known in Sweden, most parasitize on Miridae (Hemiptera) and Psochidae (Psocoptera).

Julia Stigenberg, Naturhistoriska Riksmuseet, Box 50007, 104 05 Stockholm. E-mail: julia.stigenberg@nrm.se
Kees van Achterberg, Department of Terrestreal Zoology, Naturalis Biodiversity Center, Leiden, P.O. 9517, 2300 RA Leiden, Netherlands / College of Life Sciences, Northwest University 229 North Taibai Road, Xi'an, Shaanxi, 710069, China. E-mail: c.vanachterberg@xs4all.nl

The subfamily Euphorinae Förster, 1862 (in Braconidae), is very diverse distributionally, morphologically and biologically. The euphorine genera of the world were reviewed by Shaw (1985), and their biology and phylogeny was discussed later (Shaw 1988). The subfamily was recently divided up into 14 tribes and 52 genera (Stigenberg et al. 2015). In Sweden the tribe Euphorini only includes the genera *Leiophron* and *Peristenus*. The subgenera of *Leiophron* found in Sweden are *Leiophron*, *Euphorus* and *Euphoriana*. We have here chosen to lump rather than to split *Leiophron*, although preliminary unpublished molecular analyses seem to show that at least *Euphorus* is a valid genus. Fauna Europaea (de Jong 2013) lists 6 species of *Leiophron* in Sweden, whereas Taxapad (Yu et al 2012) lists only four species. The taxonomic database of Swedish species, lists 6 *Leiophron* species (Dyntaxa 2013). Examining hundreds of mounted specimens has increased both the collection at NHRS extensively (adding 380 mounted specimens), and the Swedish species list to include nine species.

The most general morphological character of Euphorinae is the often, but not always, bent wing vein 3RSb samt (SR1) (Fig. 1). Otherwise the species vary greatly both in size, shape and colour. A good key to the different subfamilies of braconidae is van Achterberg's (1993). A striking feature of the Euphorinae is the large variation of the shape of the first metasomal tergite (i.e. the petiole) and the ovipositor. This variation is probably the result of extreme requirements on speed, agility and precision during oviposition as they attack adult hosts that can run away or fight back. This have lead to a diversifying selection on female morphologies when combined with the different habits of the attacked hosts. It is also easy to find correlations between female morphologies and attacked hosts. For instance, Muesebeck (1936) noted that the ovipositor of nymphal parasitoids (*Leiophron* and *Aridelus*) were very short (subexserted), while the ovipositor of coleoptera parasitoids were longer. The

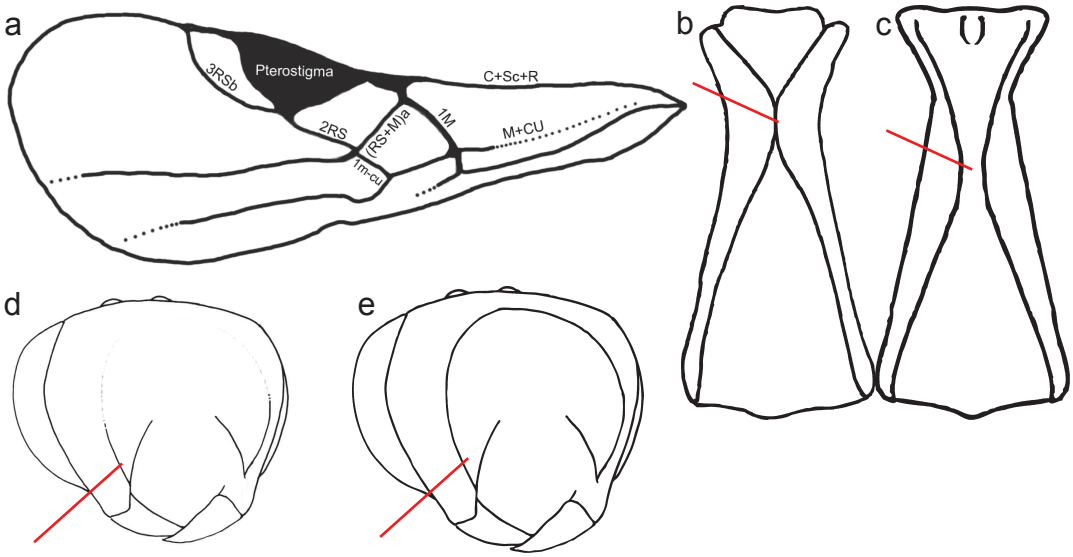

Figure 1. Important characters to discern between *Perilitus* and *Leiophron*. – a) Fore wing of a generalized *Leiophron*. – b) the ventral sides of the first metasomal tergite (i.e. the petiole) of *Peristenus*, fused at the base. – c) the ventral sides of the first metasomal tergite (i.e. the petiole) of *Leiophron*, separated. – d) the complete occipital carinae of *Peristenus*. – e) the interrupted occipital carinae on *Leiophron*.

Illustrationer av viktiga karaktärer för att skilja mellan *Peristenus* och *Leiophron*. – a) Generaliserad framvinge av *Leiophron*. – b) undersidan av den första metasomala tergiten (petiole) på *Peristenus*, sidorna i basen ihopsittande. – c) undersidan av den första metasomala tergiten (petiole) på *Leiophron*, sidorna åtskilda. – d) en komplett tinningsfåra hos *Peristenus*. – e) en bruten occipital carinae hos *Leiophron*.

species *Meteorus corax* has one of the longest ovipositors within the subfamily and it parasitizes hidden coleopteran larvae, such as larvae of Scolytidae.

The Euphorinae are generally solitary parasitoids (one parasitoid larva per host) except for some gregarious species (several parasitoid larvae per host) of the genera *Meteorus* (Haliday), *Perilitus* Nees, *Microctonus* (Wesmael) and *Syntretus* Förster (Loan 1967, Stigenberg & Ronquist 2011). They are koinobiont endoparasitoids (internal parasitoids that allow their host being active after oviposition), and predominantly attack adult insects. However, they also include lineages that parasitize larvae (*Meteorini*) (Stigenberg & Ronquist 2011) or nymphs (*Euphorini*) (Loan 1974). Most of the Euphorinae genera are parasitoids of Coleoptera, although other insect orders, including Hymenoptera, Lepidoptera, Orthoptera, Hemiptera, Psocoptera, and Neuroptera, act as hosts for some euphorines.

The genus *Leiophron*, and the very similar genus *Peristenus*, are easy to recognize from all other braconids by the small size, 2–5 mm in body length, and the very small marginal cell in the forewing (Fig. 1). The females of *Leiophron* and *Peristenus* have a short petiole and a short and strongly curved ovipositor. They chase the host nymph, lift it up and insert the ovipositor ventrally in the abdomen of the host. Members of the genus *Leiophron* are parasitoids of nymphal Miridae, Lygaeidae (Hemiptera) and Psocoptera. One, rarely two eggs (New 1970) are laid in the early instar nymph and the mature parasitoid larva emerges from the nearly full grown nymph (sixth instar) or more rarely from the adult (New 1970, Loan 1980, 1983). The parasitoid larvae exits the host toward the anterior of the abdomen, drops to the ground and actively move into a space where it spins a cocoon. They overwinter as adults in the cocoon on the ground and the adult emerges in Britain, in late spring (New 1970). From collection data

Figure 2. Habitus of *Leiophron* species – a) *L. apicalis.* – b) *L. deficiens.* – c) *L. basalis*, – d) *L. fascipennis,* – e) *L. oblitus,* – f) *L. duploclaviventris,* – g) *L. pallidistigma*, – h) *L. fulvipes*, – i) *L. reclinator.* Scale bars = 1 mm.

we can conclude that there is only one generation per year.

Here we present the species of *Leiophron* currently found in Sweden.

Material and methods

This research is mainly based on material from the Swedish Malaise Trap Project (SMTP) (Karlsson et al. 2005). The *Leiophron* material from SMTP was stored in ethanol, now most is dry-mounted and stored in the collection at the Swedish Museum of Natural History (NHRS). Additionally, some very interesting material from the entomological collections at the Lund Zoological Museum (ZMLU) was studied. Bo W. Svensson and others collected this material mainly at the Limhamn limestone quarry but also at other localities in Skåne, the southernmost province in Sweden.

In total more than 300 specimens have been

studied. We have morphologically identified all the Swedish material. Some of the material has also been used for molecular identification using DNA (gene markers COI and 28S). Additionally material from the Natural History Museum in London (BMNH), as well as the material housed in the Zoological Institute in St. Petersburg (ZIN) was studied . In the effort to determine the material to species four different keys were initially consulted (Loan 1974, Tobias et al. 2002, van Achterberg *manuscript*), with varying success. The key presented here is based upon these keys as well as our own conclusions about important characters, so hopefully it is a well functioning key for the Swedish species of *Leiophron*. Under the section diagnosis we have indicated in brackets the number of specimens found in Swedish provinces. The studied material is from NHRS and Lund Zoological Museum (ZMLU) (also indicated in brackets). Data on flight periods are collected from the label data of specimens. Morphological terminology follows Wharton et al. (1997). Images were taken using Canon EOS D50 with a MP-E 65 mm lens and for detail photos we used Dino-Lite AM423, a microscope eye-piece camera. The images were stacked using Zerene Stacker software. The scale bar equals 1 mm.

Nine species recorded from Sweden are presented with a key and species diagnoses. The new species records are indicated with an asterisk (*) in the diagnoses section.

Distinguishing characters between Swedish *Peristenus* and *Leiophron*

– Sides of first metasomal tergite (i.e. the petiole) fused or touching at base (Fig. 1b), usually the petiole is much wider apically than at the base, occipital carina complete dorsally (Fig. 1e).....***Peristenus***
– Sides of first metasomal tergite (i.e. the petiole) not touching at all (Fig. 1c), usually the petiole is parallel sided or only slightly divergent apically, occipital carina not complete dorsally (Fig. 1d).....***Leiophron***

Key to Swedish species of *Leiophron*

1. Body colour yellow (Fig. 2a), or at least with head yellow-brown (Fig. 2b)….....**2**
– Body colour brown or blackish brown (Fig. 2c)...**5**

2. Wings infuscated (Fig. 3a).....3
– Wings subhyaline (Fig. 3b).....4

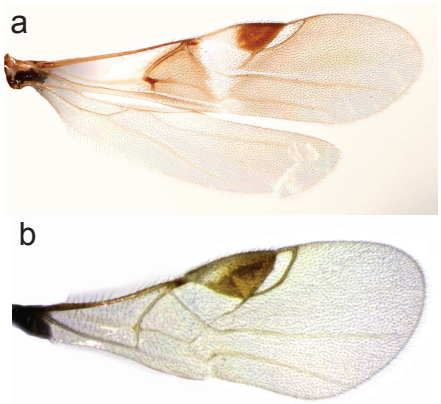

Figure 3. Fore wings of two species of *Leiophron*: – a) *L. fascipennis,* – b) *L. oblitus*.

Framvingar på två arter av *Leiophron*: – a) *L. fascipennis,* – b) *L. oblitus*.

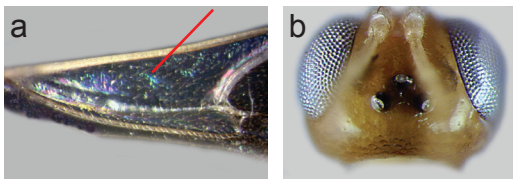

Figure 4. Detail characters of *L. apicalis*. – a) the setate basal cell of fore wing, – b) ocellar area.

Detaljkaraktärer av *L. apicalis*. – a) den håriga basala cellen på framvingen, – b) området kring ocellerna.

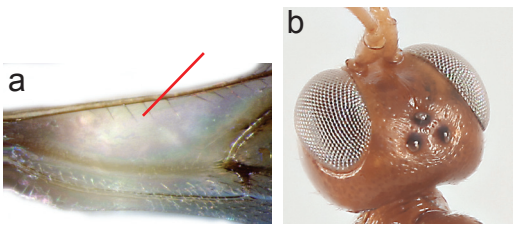

Figure 5. Detail characters of *L. fascipennis*: – a) the glabrous basal cell of fore wing, – b) ocellar area.

Detaljkaraktärer av *L. fascipennis*: – a) den hårlösa basala cellen på framvingen, – b) området kring ocellerna.

3. Forewing with basal cell setose (Fig. 4a), head dorsally behind ocelli not or very weakly striated (Fig. 4b), body colour light yellow (Fig. 2a). .....***L. apicalis***

– Forewing with basal cell glabrous (Fig. 5a), head dorsally behind ocelli striated (Fig. 5b), body colour dark yellow (Fig. 2d).....***L. fascipennis***

4. Wing veins reduced, fore wing veins (RS+M)a, 2RS, 1m-cu, 1CU etc. missing (Fig. 6a), scapus short (Fig. 6b) at most two times as long as broad .....***L. deficiens***

– Wing veins mentioned above present (Fig. 2i, 7a), scapus long (Fig. 7b) at least two times as long as broad.....***L. reclinator***

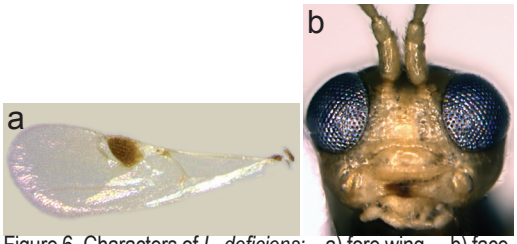

Figure 6. Characters of *L. deficiens:* – a) fore wing, – b) face.

Karaktärer på *L. deficiens*: – a) framvinge. – b) ansikte.

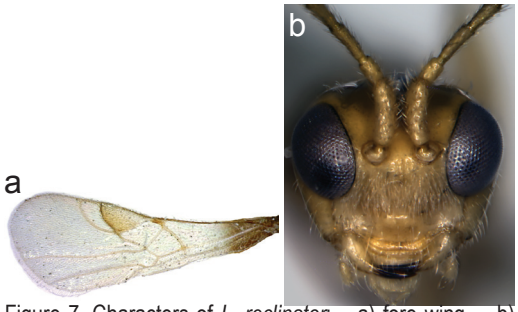

Figure 7. Characters of *L. reclinator*: – a) fore wing, – b) face.

Karaktärer på *L. reclinator*: – a) framvinge, – b) ansikte.

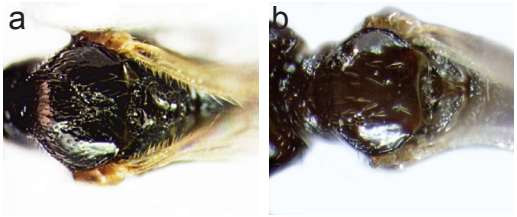

Figure 8. Mesoscutum showing area with or without notauli: – a) *L. duploclaviventris*, – b) *L. fulvipes.*

Mesoscutum som visar området med eller utan notauli: – a) *L. duploclaviventris*, – b) *L. fulvipes.*

5. Notauli clearly indicated (Fig. 8a).....**6**

– Notauli absent or rarely weakly indicated (Fig. 8b).....**8**

6. Face and clypeus in profile convex (Fig. 9a), clypeus wide, not truncate (Fig. 9b) postpectal carina distinctly developed (Fig. 9c)..... ***L. basalis***

– Face and clypeus in profile flat (Fig. 10a), clypeus wide and truncate (10b), postpectal carina not developed, though there might be rugose area (Fig. 10c).....7

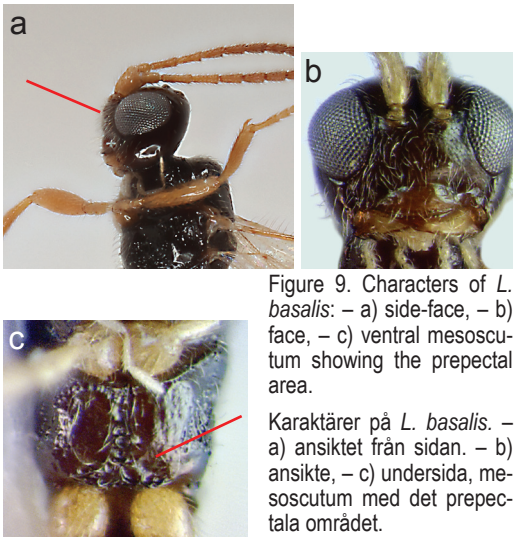

Figure 9. Characters of *L. basalis*: – a) side-face, – b) face, – c) ventral mesoscutum showing the prepectal area.

Karaktärer på *L. basalis.* – a) ansiktet från sidan. – b) ansikte, – c) undersida, mesoscutum med det prepectala området.

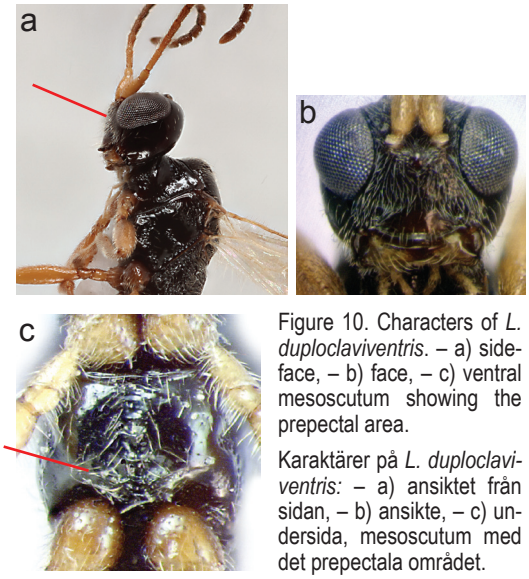

Figure 10. Characters of *L. duploclaviventris*. – a) side-face, – b) face, – c) ventral mesoscutum showing the prepectal area.

Karaktärer på *L. duploclaviventris:* – a) ansiktet från sidan, – b) ansikte, – c) undersida, mesoscutum med det prepectala området.

7. Marginal cell narrow, about 4-6 times the width of pterostigma (Fig. 11a), postpectal area rugose (Fig. 11b), lateral image showing size and habitus (Fig. 2e).....***L. oblitus***

– Marginal cell wider, about 2.5-3 times the width of pterostigma (Fig. 12a), postpectal area not or slightly rugose (Fig. 12b), lateral image showing size and habitus (Fig. 2f)..... .....***L. duploclaviventris***

8. Pterostigma pale (Fig. 13a), antennal segments slender subapically, longer than wide (Fig. 13b), legs and antennae pale yellow to yellow (Fig. 2g), gena not broad and distinctly convex, clypeus not distinctly truncate.....***L. pallidistigma***

– Pterostigma brown with basal corner pale (Fig. 14a), female antennal segments subquadrate subapically, as wide as long (Fig. 14b), male antennae paler and longer than wide but gena broad and distinctly convex (Fig. 14c), clypeus distinctly truncate (Fig. 14d), a few specimens have punctures indicating notauli, legs and antennae yellowish-brown (Fig. 2h).....***L. fulvipes***

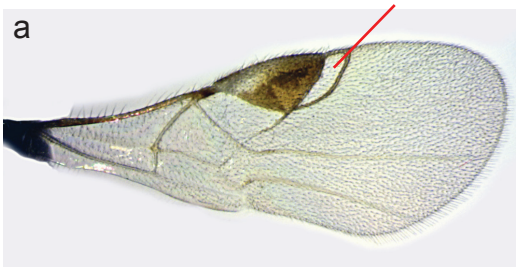

Figure 11. Characters of *L. oblitus*. – a) fore wing. – b) ventral mesoscutum showing the prepectal area.

Karaktärer på *L. oblitus:* – a) framvinge, – b) undersida, mesoscutum med det prepectala området.

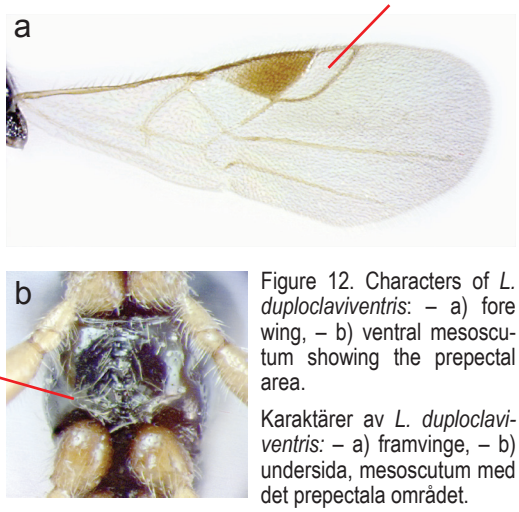

Figure 12. Characters of *L. duploclaviventris*: – a) fore wing, – b) ventral mesoscutum showing the prepectal area.

Karaktärer av *L. duploclaviventris:* – a) framvinge, – b) undersida, mesoscutum med det prepectala området.

Figure 13. Characters of *L. pallidistigma*: – a) fore wing, – b) antennal segments.

Karaktärer på *L. pallidistigma*: – a) framvinge, – b) antennsegmenten.

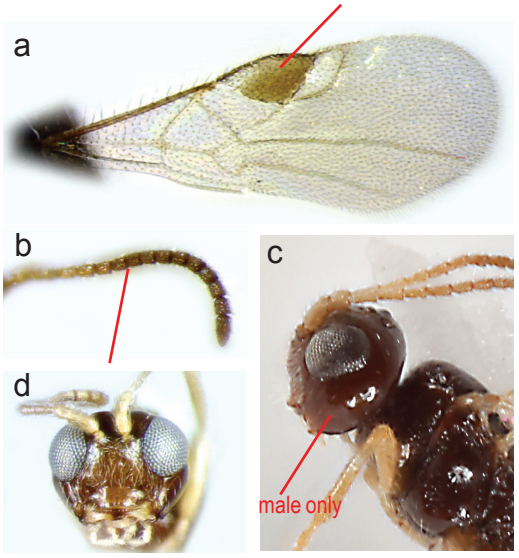

Figure 14. Characters of *L. fulvipes*: – a) fore wing, – b) antennal segments, – c) male side-face, – d) face.

Karaktärer på *L. fulvipes*: – a) framvinge, – b) antennsegmenten, – c) hanens ansikte från sidan, – d) ansikte.

Genus *Leiophron*

Antennal segments 14-22; maxillary palpi with five segments; labial palpi with 2-3 segments; occipital carina usually interrupted dorsally; mesonotum and scutellum usually smooth; notauli usually, but not always, absent; propodeum without postero-median depression; marginal cell of fore wing small; vein RS ending far before wing apex; vein RS+M of fore wing present, but sometimes absent; vein 2M of fore wing present; vein M+CU of fore wing largely unsclerotized; vein 1M usually thickened; veins 2CUa and 3CU absent; tarsal claws simple; first metasomal tergite parallel or slightly widened apically, ventrally variable but mostly open, ovipositor hardly visible, slender and either curved downwards or straight.

Diagnosis of *Leiophron* species

L. (Leiophron) apicalis Haliday, 1833
(Figs. 2a, 4a, 4b)
This species can only be confused with *L. fascipennis*. The easiest way to differentiate these two species is to look at the basal cell, whether it is setose (*L. apicalis*) or not (*L. fascipennis*). Generally a yellowish, long legged species with infuscate wings.

Flight period: June-July.

Host: Bred from fifth stage nymphs of the Miridae species: *Orthotylus adenocarpi* (Perris), *O. virescens* (Douglas & Scott), *O. concolor* (Kirschb.) and on *Platycranus bicolor* (Douglas & Scott) (Richards, 1967)

Studied specimens: 5 (5 Sk) (ZMLU)

L. (Euphorus) basalis (Curtis, 1833)
(Figs. 2c, 9a, 9b, 9c)
The second author has examined the lectotypes of *L. similis* (Curtis, 1833) and of *L. basalis* and considers them conspecific, thus we regard *L. similis* as a new synonym of *L. basalis* . *Leiophron basalis* has a pterostigma with a very large pale basal part, sometimes more than 1/3 of the pterostigma is pale. The face and clypeus is very convex and the clypeus is not truncate. Postpectal carina and notauli are well developed. Generally a brown small species (up to 2 mm) that might be confused with *L. fulvipes* that has traces of notauli. See key characters for separating them.

Flight period: May-September.

Host: This species has host records of two insect orders. We believe that the host record noting the chrysomelid species Psylliodes. *Longitarsus longipennis*, *L. pellucidus*, *Phyllotreta undulata*, *P. nigripes*, *Psylliodes attenuata* (Jolivet 1950, Jolivet & Théodoridès 1951) are doubtful and that the true host is *Caecilius flavidus* (Stephens) (New 1970).

Studied specimens: 43 (18 Sk , 6 Sm, 3 Dlr, 4 Öl, 1 Gtl, 5 Upl, 3 Sdm, 2 Vs, 1 Ög) (ZMLU and NHRS)

L. (Euphoriella) deficiens (Ruthe, 1856)
(Figs. 2b, 6a, 6b)
A bicoloured small (2 mm) species with yellow head and brown mesosoma. It is the only species with incomplete wing venation in the fore wing (Fig. 6a), which makes it unmistakable.

Flight period: August-October.

Host: Hemiptera, Miridae. *Campylomma diversicornis* (Reuter), *Creontiades pallidus* (Rambur), *Polymerus cognatus* (Fieber) (Efil et al. 2009, Efil & Bayram 2009). The female oviposit on young nymphs and the parasitoid larva emerges from older nymph stages. The parasitoid overwinters as pupa.

Studied specimens: 5 (1 Gtl, 1 Vs, 1 Sdm, 2 Öl) (NHRS)

****L. (Euphorus) duploclaviventris*** (Shenefelt, 1969)
(Figs. 2f, 8a, 10a, b, c, 12a, b)
A blackish larger (3 mm) species that most resembles *L. oblitus*. But the 'large' marginal cell in the fore wing easily separates it from *L. oblitus*.

Flight period: May-July

Host: Psocoptera, Mesopsocidae. *Mesopsocus immunis* (Stephens) *M. unipunctatus* (Müller) (New 1970).

Studied specimens: 14 (11 Sö, 2 Sm, 1 Öl) (NHRS)

L. (Leiophron) fascipennis (Ruthe, 1856)
(Figs. 2h, 3a, 5a, b)
This species can only be confused with *L. apicalis*. The easiest way to differentiate these two species is to look at the basal cell, whether it is setose or not. Generally a yellowish, long legged

species with infuscate wings. The colours of *L. fascipennis* is stronger/more intense than the colours of *L. apicalis*.

Flight period: May-July

Host: No data.

Studied specimens: 22 (1 Sk, 1 Bl, 1 Bo, 19 Öl) (ZMLU and NHRS)

L. (Euphorus) fulvipes (Curtis, 1833)
(Figs. 2h, 8b, 14a, b, c, d)
A smaller (2 mm) brownish species that can occur with great variation. Most specimens do not have notauli but some (2 out of 60) have slight punctures indicating notauli and then some have what seem to be real notauli. Specimens with notauli are easily confused with *L. basalis*, but *L. fulvipes* does not have a postpectal carina and the area surrounding is rather rugose-free. The specimens without notauli can be confused with *L. pallidistigma* since some specimens can have pale appendages as *L. pallidistigma*. The shape of antennae is the best character to separate these two species. Though male *L. fulvipes* can have longer antennal segments similar to the antennae of *L. pallidistigma* the male *L. fulvipes* has a very convex face with bulging temples and thus should be possible to separate from *L. pallidistigma*. Also, *L. fulvipes* has a much darker pterostigma than *L. pallidistigma*.

Flight period: May-September.

Host: Psocoptera, Elipsocidae, Stenopsocidae. *Elipsocus pumilis* (Hagen), *E. hyalinus* (Stephens), *Amphigerontia bifasciata* (Latreille) (Richards, 1967). Emerges from nymph.

Studied specimens: 62 (39 Sk, 9 Sm, 3 Upl, 6 Sdm, 1 Gtl, 2 Dlr, 2 Ha) (ZMLU and NHRS)

L. (Euphorus) oblitus (Ruthe, 1856)
(Figs. 2e, 3b, 11a, b)
A blackish larger (2.5 mm) species that most resembles *L. duploclaviventris*. But *L. oblitus* has a very narrow marginal cell that easily separates it from *L. duploclaviventris*.

Flight period: May-September.

Host: No data.

Studied specimens: 11 (4 Sk, 2 Bl, 1 Sm, 1 Sd, 1 Öl, 2 Up) (NHRS)

L. (Euphorus) pallidistigma (Curtis, 1833)
(Figs. 2g, 8b, 13a, b)
A smaller (2 mm), very common species. This species can be confused with those *L. fulvipes* that do not have notauli. The shape of the antennae is the best character to separate *L. pallidistigma* and *L. fulvipes*. See diagnose of *L. fulvipes*. *L. pallidistigma* varies morphologically, some specimens have pale appendages whilst some are not pale but yellow, some have vein "r" in the fore wing and some do not. Molecular data indicate that there is a cryptic species involved but further study is needed for conclusive evidence.

Flight period: May-August (one specimen caught Oct.-Dec.).

Host: Psocoptera, Caeciliusidae, Peripsocidae, *Caecilius flavidus* (Stephens), *Peripsocus phaeopterus* (Stephens) (Tobias 1986)

Studied specimens: 161 (69 Sk, 30 Sm, 8 Sö, 14 Dlr, 4 Vs, 1 Ång, 6 Up, 18 Öl, 1 Ha, 5 Vr, 2 Gtl, 3 Vb) (ZMLU and NHRS)

L. (Leiophron) reclinator (Ruthe, 1856)
(Fig. 2i, 7a, 7b)
A fairly large (3.5 mm), yellow coloured *Leiophron*, with a cubic-shaped head, protruding eyes, and long and slender antennae. Ovipositor short and straight. These diagnostic characters separates it from all other species. This species is also found new for Great Britain. 2 specimens of *L. reclinator* collected in UK were found in the collections in Munich (Zoologische Staatssammlung München): Cambridgeshire, Chippenham Fen, TL650693, 25.vi-9.vii, 1985 and 4.vi-20.vii, 1985 (J. Field).

Flight period: June-July.

Host: No data.

Studied specimens: 5 (2 Sk, 1 Sm) (ZMLU, NHRS and ZSM in Munich).

S: Sk. Malmö, Limhamns Kalkbrott, Malaise trap 1-"graffiti" 26.IV-10V.2009. leg. B.W. Svensson & Co.; Öved, Frualid, 55°41'05.8N 13°40'36.7E, 11.vii.2015, 1 male, C.Hansson. Voucher_ID: Euph_102; Sm, Nybro kommun, Bäckebo, Grytsjöns naturreservat, Trap ID 1001, Coll event ID 1332, 02.vii – 12.vii.2005. Leg. Swedish Malaise Trap Project, NHRS; Voucher_ID: JS10_00578.

Discussion

Nine species of *Leiophron* are presented here but within the collections in ZMLU and NHRS there are at least five additional undescribed species. The problem is that there is only one specimen each of these species. To describe them on only one specimen seems unjustified. The amplitude of the intraspecific variation of morphological as well as molecular characters is unknown. For some of these species we have either the COI or 28S gene sequence, or both, but to us it does not feel right to base a species description on such characters alone. Even with unique sequences connected to unique specimens, a problem is that not everyone has access to a molecular lab and thus cannot identify these species. Large amounts of insect material at museums are still unsorted and unmounted. Therefore, there is a good chance that there are more undetected specimens of these species in museum collections. More funding and effort should be put into making such material more accessible.

Acknowledgements

We would like to thank the following for the loan of material: Christer Hansson, Roy Danielsson and Rune Bygebjerg at ZMLU, Gavin Broad at the BMNH, Sergey Belokobylskij at ZIN. For helpful comments on the manuscript we would like to thank Mattias Forshage, Hege Vårdal, Mats Jonsell, Christer Hansson and Helmut Aguirre. This work was funded by the Swedish Taxonomy Initiative (Dha 2013–145).

Reference list

Dyntaxa 2013. Svensk taxonomisk databas. – Visited at www.dyntaxa.se the 6th of February 2015.

de Jong, Y.S.D.M. (ed.) 2013. Fauna Europaea version 2.6. – Web Service available online at www.faunaeur.org. Visited the 6th of February 2015.

Efil, L. Güclü, C. & Belokobylskij, S.A. 2009. *Leiophron* (*Euphorus*) *deficiens* Ruthe (Hymenoptera, Braconidae, Euphorinae), A Parasitoid of *Campylomma diversicornis* (Reuter) (Heteroptera, Miridae). – Turkey Journal of the Entomological Research Society. 11:65-73.

Efil, L. & Bayram, A. 2009 (Hemiptera: Miridae) and notes on the parasitoid *Leiophron decifiens* Ruthe (Hymenoptera: Braconidae). – Entomologica Fennica 20: 9-17.

Jolivet, P. 1950. Les parasites, prédateurs et phorétiques des Chrysomeloidea (Coleoptera) de la faune Franco-belge. – Bulletin de l'Institute Royal des Sciences Naturelles de Belgique. 26: 1-39.

Jovilet, P., Théodoridès, J. 1951. Les parasites, prédateurs et phorétiques des Chrysomeloidea (Coleoptera) de la faune Franco-belge. – Bulletin de l'Institute Royal des Sciences Naturelles de Belgique. 27: 1-55

Karlsson, D., Pape, T., Johanson, K.A., Liljeblad, J. & Ronquist, F. 2005. Svenska Malaisefälleprojektet, eller hur många arter steklar, flugor och myggor finns i Sverige? – Entomologisk Tidskrift 126: 43-53.

Loan, C.C. 1967. Studies on the taxonomy and biology of the Euphorinae (Hymenoptera: Braconidae). II. Host relations of six *Microctonus* species. –Annals of the Entomological Society of America 60: 236-240.

Loan, C.C. 1974. The European species of *Leiophron* Nees and *Peristenus* Foerster (Hymenoptera: Braconidae, Euphorinae). – Transactions of the Royal Entomological Society of London 126: 207-238.

Loan, C.C. 1980. Plant bug hosts (Heteroptera: Miridae) of some euphorine parasites (Hymenopera: Braconidae) near Belleville, Ontario, Canada. – Nat. Canad. 107: 87-93.

Loan, C.C. 1983. Hosts and generic relations of the Euphorini (Hymenopera: Braconidae). – Contrib. Amer. Entomol. Inst. 20: 388-397.

Muesebeck, C.F.W. 1936. The genera of parasitic wasps of the braconid subfamily Euphorinae, with a review of the Nearctic species. –United States Department of Agriculture. Miscellaneous Publication 241: 1-38.

New, T.R. 1970. The life histories of two species of *Leiophron* Nees (Hymenoptera, Braconidae) parasitic on Psocoptera in southern England. – Entomologist's Gazette 21:39-48.

Richards, O.W. 1967. Some British species of *Leiophron* Nees (Hymenoptera: Braconidae) with the description of two new species. – Transactions of the Royal Entomological Society of London 119:171-189.

Shaw, S.R. 1985. A phylogenetic study of the subfamilies Meteorinae and Euphorinae (Hymenoptera: Braconidae). – Entomography 3: 277-370.

Shaw, S.R. 1988. Euphorine phylogeny: the evolution of diversity in host-utilization by parasitoid wasps (Hymenoptera: Braconidae). – Systematic Entomology 12: 103-109.

Simbolotti, G., Villemant, C. & Andrei-Ruiz, M.C. 2002. *Leiophron* Nees (Hymenoptera, Braconidae: Euphorinae): a debated genus. Provisional key for West Palaearctic species, additional data on related genera and newly collected material from Corsica. – Annales de la Sociètè Entomologique de France 38: 339-350.

Stigenberg, J. & Ronquist, F. 2011. Revision of the Western Palearctic Meteorini (Hymenoptera, Braconidae), with a molecular characterization of hidden Fennoscandian species diversity. – Zootaxa 3084: 1-95.

Stigenberg, J., Boring, C.A. & Ronquist, F. 2015. Phylogeny of the parasitic wasp subfamily Euphorinae (Braconidae) and evolution of its host preferences. – Systematic Entomology 40: 570-591.

Tobias, V.I. 1986. Euphorinae. – In: Medvedev, G.S. (ed.). Opredelitel nasekomych Evropeiskoi tchasti SSSR 3, Perepontchatokrylye 4. Opredelitel Faune SSSR: 181-250.

Wharton, R.A., Marsh, P.M., & Sharkey, M.J. 1997. Manual of the New World Genera of the Family Braconidae (Hymenoptera). – Special Publication of the International Society of Hymenopterists No. 1. International Society of Hymenopterists, Washington DC.

Yu, D.S., van Achterberg, C. & Horstmann, K. 2012. World Ichneumonoidea 2011 – Taxonomy, Biology, Morphology and Distribution. DVD/CD. – Taxapad. Vancouver, Canada. www.taxapad.com.

van Achterberg, C. 1993. Illustrated key to the subfamilies of the Braconidae (Hymenoptera: Ichneumonoidea). – Zoologische Verhandelingen 283: 1-189

Sammanfattning

De svenska arterna av brackstekelsläktet (Braconidae) *Leiophron* Nees presenteras. Arterna *Leiophron reclinator* (Ruthe, 1856), *L. fulvipes* (Curtis, 1833) och *L. duploclaviventris* (Shenefelt, 1969) rapporteras för första gången från Sverige. *Leiophron similis* (Curtis, 1833) etableras som en ny synonym till *L. basalis* (Curtis, 1833). En nyckel och diagnoser för identifieringen av de svenska arterna finns också med. Det finns idag nio arter kända för Sverige, de flesta parasiterar på Miridae (Hemiptera) och Psochidae (Psocoptera). Äggen läggs helst i nymfer av yngre stadier och den fullväxta larven kläcks ur en nästan fullvuxen nymf eller mer sällan från en adult (Richards, 1967).