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## **New species of *Leptacis* FÖRSTER, 1856 from Malaysia (Hymenoptera, Platygasteridae)**

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### **Abstract**

14 new species of *Leptacis* from Borneo are described, viz. *L. adebratti*, *L. laeviusculus*, *L. latispina*, *L. lineatifrons*, *L. longiclava*, *L. mendolongensis*, *L. microgaster*, *L. microspina*, *L. microtrichiata*, *L. nigricorpa*, *L. pteridis*, *L. pulla*, *L. synopeana*, and *L. terebrans*. The work is illustrated by 17 text-figures.

### **Zusammenfassung**

14 neue Arten von *Leptacis* aus Borneo werden beschrieben: *L. adebratti*, *L. laeviusculus*, *L. latispina*, *L. lineatifrons*, *L. longiclava*, *L. mendolongensis*, *L. microgaster*, *L. microspina*, *L. microtrichiata*, *L. nigricorpa*, *L. pteridis*, *L. pulla*, *L. synopeana*, and *L. terebrans*. Die Arbeit ist mit 17 Abbildungen versehen.

### **Introduction**

All the 14 new species (types and paratypes) described below are preserved in the Museum of Zoology, Lund University (Sweden). They were part of a loan of platygasterids by courtesy of curator Roy DANIELSSON. With this paper, 119 species of *Leptacis* are known worldwide. The range of morphological diversity is much widened with the present paper. Some of the new species described below also share certain characters with the genus *Synopeas* FÖRSTER, 1856, from which *Leptacis* is now harder to separate at first glance; great care should be taken with the key characters pointed out by JACKSON (1969), which are always used.

*Leptacis adebratti* sp. nov. (fig. 1)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 31.III.1989 (S. ADEBRATT). Paratypes: 2 females same data as holotype but 13.V.1988 and 14.III.1989.

Description. Female: Length 1.6-2.1 mm (holotype 2.1 mm). Colour black; mandibles, A1-A7 and legs reddish yellow; scutellar spine yellowish; T1 reddish brown. Head from above 1.8 x as wide as long, hardly as wide as thorax (18:19), finely reticulate-coriaceous, strongest on occiput. Occipital carina complete and rather high; lateral ocelli separated from eyes by 0.6 their diameter; OOL:POL:LOL = 1:10:4. Head from front 1.3 x as wide as high. A1 1.2 x as long as height of head, 5.5 x as long as wide. A2-A4 of about equal length, A3-A4 each hardly 4.0 x as long as wide, A2 slightly wider; A5 fully 0.6 x as long as A4; club 3-segmented, A7 pale and only half as long and 0.75 x as wide as A8 which is about as long as wide; A8 1.3 x as long as A9 which is 1.3 x as wide as long; A9 0.6 x as long as A10. Mesosoma 1.7 x as long as wide, hardly higher than wide. Pronotum in dorsal view rather long and broad, sides with a few hairs and finely reticulate-coriaceous, sculpture strongest in upper anterior corner, fading out in lower third. Mesoscutum flattened with rather dense pale hairs where notauli should have been (these entirely absent), disc antero-medially and laterally with few hairs, hind margin distinctly swollen and semitransparent brown; scuto-scutellar grooves with dense hairs. Mesopleura finely and densely reticulate-coriaceous in upper third, rest smooth and shiny. Scutellum (fig. 1) below level of mesoscutum, spine reaching base of T1, in lateral view remarkable flat, fully 3.5 x as long as anterior part of scutellum; scutellum in dorsal view 2.3 x as long as wide, evenly narrowed toward apex (almost triangular), with black anterior part and yellowish spine, smooth and with few hairs. Metapleura smooth, hardly hairy except along posterior margin; propodeal carinae semitransparent brownish, long, slightly curved, not high. Fore wing brownish, 2.9 x as long as wide, fully 0.9 x as long as body, disc densely hairy; marginal cilia hardly 0.1 the width of wing. Hind wing 6.9 x as long as wide, marginal cilia hardly 0.4 the width of wing. Metasoma as wide as thorax, slightly longer than head and mesosoma combined (45:42). T1 longer than wide (8:7), smooth medially, with two weak longitudinal carinae, laterally with dense and moderately long hairs; T2 with two short, shallow and finely hairy foveae; T3-T6 combined half as long as T2; T3-T4 almost smooth, T5-T6 partly densely covered by fine punctures, with few hairs; T6 0.7 as long as its basal width.

Comments: Named after the collector. Differs much from all *Leptacis*-species (from India) keyed by MUKERJEE (1981); runs to *brachycerus* MUKERJEE, 1981, but this species has antennae, scutellum and wings much different from *adebratti*. *L. indicus* MUKERJEE, 1981, *konkanensis* MUKERJEE, 1981 and *thanensis* MUKERJEE, 1981 all have notauli, cf. MANI & SHARMA (1982). All Oriental *Leptacis*-species described by BUHL (1997) differ widely from *L. adebratti*.

*Leptacis laeviusculus* sp. nov. (figs 2-3)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 13.V.1988 (S. ADEBRATT).

Description. Female: Length 2.7 mm. Colour black; A1 and legs reddish, coxae and apical half of hind femora almost black; A2-A3 yellowish, A4-A10 brownish. Head from above 1.9 x as wide as long, very slightly wider than thorax; occiput smooth, with complete carina; vertex with weak transverse reticulation; frons smooth, with remote punctures, transversely wrinkled above antennal insertions. Lateral ocelli separated from eye by about half their diameter; OOL:POL:LOL = 2:16:7. Head from front only slightly more than 1.1 x as wide as high. Antenna (fig. 2) with A1 about 4.5 x as long as wide, 0.8 x as long as height of head. Mesosoma 1.7 x as long as wide, 1.1 x as high as wide. Sides of pronotum smooth, with sparse hairs in upper half. Mesoscutum smooth except for faint reticulation anteriorly, sparsely hairy, with complete notauli, mid lobe prolonged as a tongue over base of scutellum, hind margin with a few very long hairs over wide scuto-scutellar grooves. Mesopleura smooth. Scutellum (fig. 3) with dense brownish hairs especially posteriorly, spine reaching to slightly behind middle of propodeum, without lamella below. Metapleura with long and rather sparse pilosity posteriorly and in lower third, rest smooth and bare. Propodeal carinae not semitransparent, low, straight, parallel, close together, area in between smooth and shiny. Fore wing reaching middle of T6, 3.0 x as long as wide, with dense hairs and brownish tint; marginal cilia hardly 0.1 width of wing. Hind wing fully 5.7 x as long as wide; marginal cilia hardly 0.3 width of wing. Metasoma 1.25 x as long as head and mesosoma combined, hardly 0.9 x as wide as thorax. T1 1.3 x as long as wide, with two longitudinal keels, area in between smooth, lateral areas pubescent. T2 with sparse hairs laterally, almost smooth, with three shallow but long basal foveae. T3-T6 combined almost two-thirds as long as T2, with fine and dense punctation over most of surface and with some long hairs; T6 as long as its own basal width.

Comments: Runs to *L. thanensis* MUKERJEE, 1978 in MUKERJEE's (1981) key to Indian *Leptacis*, but *L. laeviusculus* is e.g. larger and smoother than *L. thanensis*, and it has A1 less elongate, cf. MANI & SHARMA (1982).

*Leptacis latispina* sp. nov. (fig. 4)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 6.V.1988 (S. ADEBRATT). Paratypes: 2 females same data as holotype but 1.V.1988 and 13.V.1988.

Description. Female: Length 1.2-1.3 mm. Colour black; antennae and legs dirty yellow; A7-A10 light brown. Head from above 1.6 x as wide as long, as wide as thorax. Occiput without carina, distinctly transversely reticulate; vertex and frons faintly reticulate with smaller meshes. Lateral ocelli separated from eye by about half their diameter; OOL:POL:LOL = 1:8:4. Head from front 1.2 x as wide as high. A1 shorter than height of head (10:11); A2 hardly 0.3 x as long as A1, fully twice as long as wide; A3 0.7 x as long as A2, 2.5 x as long as wide; A4 as long as A2, 3.5 x as long as wide; A5 hardly half as long as A4. A7-A10 of equal width, 2.5 x as wide as A3; A7 slightly longer than wide, A8-A9 each as wide as long, A10 1.5 x as long as A9. Mesosoma fully 1.5 x as long as wide, 1.1 x as high as wide. Sides of pronotum distinctly reticulate except along broad hind margin. Mesoscutum finely reticulate anteriorly and laterally, medially smooth, with a few hairs, notauli fine but complete, mid lobe posteriorly broad but hardly prolonged. Mesopleura smooth, with a few wrinkles below tegulae. Scutellum (fig. 4) reticulate-coriaceous,

reaching base of T1, hairy laterally, with a strong parallel-sided spine which is triangular (and semitransparent) at apex only; spine in lateral view with a narrow semitransparent lamella below. Metapleura smooth, with pubescence in posterior third. Propodeal carinae low, dark, straight, well separated. Fore wing 0.8 x as long as body, 2.9 x as long as wide, almost clear, with fine dense hairs; marginal cilia 0.2 width of wing. Hind wing 6.9 x as long as wide; marginal cilia two-thirds the width of wing. Metasoma 1.1 x as long as head and mesosoma combined, slightly narrower than thorax (12:13). T1 slightly wider than long (5:4), with two longitudinal carinae medially, almost smooth on area between them, laterally with fine pubescence. T2 1.3 x as long as wide, smooth, with two small pubescent basal foveae. T3-T6 combined hardly half as long as T2 (8:17), hardly hairy; T3-T5 each with a narrow stripe of reticulation; T6 reticulate over most of surface, 1.5 x as wide as long.

Comments: In shape of antennae and scutellum somewhat similar to *L. pulla* sp. nov. described below from which *L. latispina* most readily differs in having much shorter marginal cilia of wings which are broader than in *pulla*, cf. below.

*Leptacis lineatifrons* sp. nov. (fig. 5)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 13.V.1988 (S. ADEBRATT). Paratype: 1 female same data but 29.IV.1988.

Description. Female: Length 0.8 mm. Colour brownish black; metasoma dark brown; antennae and legs dirty yellow; A7-A10 light brownish. Head shiny, from above 1.6 x as wide as long, 1.2 x as wide as thorax. Occiput and vertex distinctly reticulate, without carina; frons with sharp transverse striation (or very transverse reticulation) all over. Head from front wider than high (9:8). A1 shorter than height of head (7:8), almost 4.4 x as long as wide. A2 0.3 x as long as A1, about twice as long as A3 which is hardly twice as long as wide. A4 about 1.8 x as long as A3, fully 3 x as long as wide. A5 about as long as A3. A7-A10 of about equal width, fully 2.5 x as wide as A3, A8-A9 each about 1.1 x as wide as long, A10 fully 1.5 x as long as A9. Mesosoma 1.6 x as long as wide; almost 1.2 x as high as wide. Sides of pronotum reticulate-coriaceous, in posterior half smooth in upper 0.5. Mesoscutum with rather sparse fine hairs, finely reticulate-coriaceous laterally and anteriorly, almost smooth medially in posterior half; notauli absent; hind margin straight, with a few strong hairs above scuto-scutellar grooves. Mesopleura smooth, with fine longitudinal striations in upper half. Scutellum (fig. 5) finely reticulate-coriaceous, with sparse hairs, reaching base of T1; spine semitransparent, with a distinct semitransparent lamella below. Metapleura smooth, with pubescence along posterior margin. Propodeal carinae low, dark, parallel, close together. Fore wing 0.85 x as long as body, 2.7 x as long as wide, clear, rather densely hairy; marginal cilia 0.4 width of wing. Hind wing fully 10 x as long as wide; marginal cilia 1.3 width of wing. Metasoma shorter than head and mesosoma combined (15:17), fully as wide as thorax. T1 1.1 x as wide as long, with two longitudinal carinae rather close together, area in between smooth, laterally with fine pubescence. T2 smooth, with small pubescent basal foveae. T3-T6 smooth, hardly hairy, combined about one-third as long as T2.

Comments. A distinct Oriental *Leptacis*-species on account of sculpture of head.

*Leptacis longiclava* sp. nov. (fig. 6)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 31.III.1989 (S. ADEBRATT). Paratypes: 20 females same data as holotype but 28.IV.1988 (1 female), 1.V.1988 (3 females), 3.V.1988 (1 female), 4.V.1988 (5 females), 13.V.1988 (9 females) and 2.III.1989 (1 female).

Description. Female: Length 1.3-2.0 mm. Colour brownish yellow; head, antennae and legs pale yellowish; T2 darkened medially. Head from above 1.8 x as wide as long, slightly wider than thorax (18:17), without occipital carina, finely reticulate-coriaceous, faintly and transversely so on frons. Lateral ocelli separated from eye margin by slightly less than their diameter, OOL:POL:LOL = 2:11:4. Head from front 1.2 x as wide as high. A1 as long as width of head, 8.1 x as long as wide. A2 hardly 0.3 x as long as A1, 3.3 x as long as wide. A3 as long as A2, 4.2 x as long as wide. A4 0.9 x as long as A3, as wide as this. A5 slightly dilated, 0.7 x as long as A4. A7-A9 hardly twice as wide as A3, each about 3.0 x as long as wide. A10 1.2 x as long as A9. Mesosoma 2.0 x as long as wide, 1.3 x as high as wide. Sides of pronotum faintly longitudinally reticulate all over. Mesoscutum finely reticulate, without notauli but with two parallel stripes of hairs; hind margin slightly prolonged over whole width of scutellum, slightly concave medially. Mesopleura smooth. Scutellum (fig. 6) at level of mesoscutum, sculptured almost as this but evenly and rather densely hairy; spine straight, slightly longer than anterior part, hardly reaching hind margin of propodeum. Metapleura with very sparse and long pilosity in upper half, with shorter and denser pilosity along hind margin. Propodeal carinae long, rounded, fused, moderately high. Fore wing very slightly shorter than body, 2.9 x as long as wide, with faint brownish tint, densely hairy; marginal cilia fully 0.1 width of wing. Hind wing 6.9 x as long as wide; marginal cilia one-third the width of wing. Metasoma 1.1 x as long as head and mesosoma combined, 1.5 x as wide as thorax. T1 about as long as wide, without carinae, finely sculptured except along anterior and posterior margins, hairy especially laterally, anterior part raised. T2 without foveae, hairy anteriorly. T3-T6 short, smooth and bare, with reticulate hind margins.

Comments: Among Oriental species of the genus most similar to *L. flava* BUHL, 1997 from the Philippines (only male known), but this species differs from *longiclava* e.g. in being smaller, paler colored, in having more slender wings and differently sculptured T1-T2, cf. BUHL (1997).

*Leptacis mendolongensis* sp. nov. (fig. 7)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 13.V.1988 (S. ADEBRATT).

Description. Female: Length 1.3 mm. Colour black; antennae, mandibles and legs yellowish, A7-A10 light brown. Head from above 1.9 x as wide as long, 1.1 x as wide as thorax. Occiput distinctly reticulate-coriaceous, vertex and frons finely so, occipital carina distinct but not high. Lateral ocelli separated from eye by half their diameter. Head from front hardly 1.2 x as wide as high. A1 longer than height of head (26:25). A2 hardly 0.3 x as long as A1, about 3 x as long as wide. A3 0.8 x as long as A2, hardly 3 x as long as wide. A4 1.4 x as long as A3, about 4 x as long as wide. A5 fully 0.4 x as long as A4,

slightly longer than wide; A6 smaller, hardly longer than wide. A7-A10 forming club, A7 1.5 x as long as wide; A8-A9 each 1.2 x as long as wide; A10 1.6 x as long as A9. Flagellar pubescence distinct. Mesosoma 1.75 x as long as wide; 1.25 x as high as wide. Sides of pronotum with faint reticulation, smooth in posterior half. Mesoscutum finely reticulate-coriaceous, uniformly and rather densely hairy, without notauli, hind margin straight. Mesopleura smooth, with fine longitudinal striation in upper 0.3. Scutellum (fig. 7) sculptured and hairy as mesoscutum, with a rather narrow yellowish spine which reaches posterior third of T1 and which has a distinct semitransparent lamella below. Metapleura smooth, with whitish pilosity along upper and hind margins. Propodeal carinae low, dark, slightly curved. Fore wing fully 0.9 x as long as body, 3.0 x as long as wide, almost clear, disc with fine dense hairs; marginal cilia slightly less than 0.25 width of wing. Hind wing 8.1 x as long as wide; marginal cilia 0.75 width of wing. Metasoma hardly 1.1 x as long as mesosoma, as wide as this. T1 about as long as wide, sides almost parallel, with two longitudinal carinae, smooth medially, laterally with short and dense white hairs. T2 longer than wide (15:13), hardly with foveae but with two spots of pubescence at base, rest smooth except for reticulation along hind margin. T3-T6 combined one-third as long as T2, with some reticulation, hardly hairy.

Comments. Among Oriental *Leptacis* this species seems to be most similar to *L. orientalis* BUHL, 1997 which however has antennae and scutellum slightly different from *L. mendolongensis*, cf. BUHL (1997).

#### *Leptacis microgaster* sp. nov. (fig. 8)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 26.IV.1988 (S. ADEBRATT).

Description. Female: Length 1.0 mm. Colour blackish; A1-A2 and legs dirty yellow; A3-A10 light brown; scutellar spine semitransparent yellowish. Head from above 1.9 x as wide as long, slightly wider than thorax (13:12), finely reticulate; occiput without carina. Head from front wider than high (13:12). A1 shorter than height of head (21:24). A2 hardly 0.25 x as long as A1. A3 0.8 x as long as A2, 2.9 x as long as wide. A4 almost 1.8 x as long as A3, about 5 x as long as wide. A5 0.4 x as long as A4. A7 2.3 x as long as wide. A8-A9 each about 1.3 x as long as wide. A10 1.6 x as long as A9. Mesosoma 1.6 x as long as wide, fully 1.1 x as high as wide. Sides of pronotum smooth except for faint reticulation in upper anterior corner. Mesoscutum with a few hairs, anteriorly and laterally weakly reticulate-coriaceous, medially almost smooth, notauli faintly indicated over most of length; mid lobe broad posteriorly, not prolonged. Mesopleura smooth, with some wrinkles below tegulae. Scutellum (fig. 8) reticulate-coriaceous, almost bare except along margins, sides converging towards apex of a semitransparent spine which reaches middle of T1. Metapleura smooth, with pubescence posteriorly. Propodeal carinae moderately high, slightly semitransparent, very close together. Fore wing hardly 0.9 x as long as body, 3.0 x as long as wide, clear, with sparse hairs; marginal cilia very short. Hind wing 7.1 x as long as wide; marginal cilia 0.6 width of wing. Metasoma shorter than mesosoma (17:19) and 0.8 x as wide as this. T1 1.3 x as wide as long, rather dull and with two weak longitudinal carinae, laterally with short pubescence. T2 smooth, strongly pubescent in shallow basal foveae. T3-T6 smooth, combined hardly 0.4 x as long as T2.

Comments: Of the species described in the present paper most similar to *L. latispina* sp. nov. and *L. pulla* sp. nov., but both species have e.g. less slender antennae and longer marginal cilia on fore wings than *L. microgaster*.

*Leptacis microspina* sp. nov. (fig. 9)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 3.V.1988 (S. ADEBRATT). Paratype: 1 female same data but 6.V.1988.

Description. Female: Length 1.0 mm. Colour brownish black; A1-A6 and legs yellowish, A7-A10 brown. Head from above 1.8 x as wide as long, wider than thorax (10:9). Occiput almost smooth, with some transverse wrinkles just behind the very high occipital carina. Vertex weakly reticulate, frons transversely so. Lateral ocelli separated from eye by about half their diameter. Head from front hardly 1.1 x as wide as high. A1 0.75 x as long as height of head. A2 0.3 x as long as A1, fully twice as long as wide. A3 0.5 x as long as A2, 1.6 x as long as wide. A4 hardly longer than A3, as wide as this. A5 about as long as A4, slightly wider than this. A9 1.3 x as wide as long, almost 3 x as wide as A3. A10 1.5 x as long as A9. Mesosoma 1.5 x as long as wide, 1.2 x as high as wide. Sides of pronotum smooth. Mesoscutum with a few hairs, smooth, mid lobe reticulate in anterior half; entire mid lobe slightly raised so that notauli appear to be complete, mid lobe slightly prolonged posteriorly. Mesopleura smooth. Scutellum (fig. 9) almost smooth, sparsely hairy, disc fully 1.1 x as long as wide, posteriorly with a small pale tooth. Metapleura smooth, with fine pilosity along broad hind margin. Propodeal carinae straight, slightly semitransparent, very close together, slightly diverging posteriorly. Fore wing hardly 0.9 x as long as body, 2.7 x as long as wide, with faint brownish tint, disc with moderately dense but unusually strong hairs; marginal cilia almost 0.25 width of wing. Hind wing 10.0 x as long as wide; marginal cilia 1.3 width of wing. Metasoma 1.1 x as long as head and mesosoma combined, fully 1.1 x as wide as thorax. T1 1.3 x as wide as long, uniformly dull, with raised anterior margin, behind this with two blunt short carinae, laterally with short dense hairs. T2 basally with dense pubescence, without foveae. T3-T6 combined 0.8 x as long as T2, with faint microsculpture, hardly hairy; T6 pointed, about as long as wide.

Comments: Runs to *L. brachycerus* MUKERJEE, 1981 in MUKERJEE's (1981) key to Indian *Leptacis*, but this species differs from *L. microspina* e.g. in structure of mesoscutum, in having longer scutellar spine, and in having longer marginal cilia of fore wings, cf. MUKERJEE (1981).

*Leptacis microtrichiata* sp. nov. (figs 10-11)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 13.V.1988 (S. ADEBRATT). Paratype: 1 female same data but 2.III.1989.

Description. Female: Length 1.2-1.4 mm. Colour brownish yellow; legs and T3-T6 paler yellowish. Head from above 1.75 x as wide as long, as wide as thorax, smooth; occiput without carina; vertex with four long erect hairs (fig. 10). Lateral ocelli separated from eye by about half their diameter. Head from front 1.1 x as wide as high. A1 hardly as long as height of head (18:19). A2 shorter than A1 (5:18), fully twice as long as wide

and about twice as long as A3 which is 1.2 x as long as wide. A3-A4 about equal, A5 slightly shorter. Club about 2.5 x as wide as A2; A7 rather small, A8 hardly wider than long, A9 1.7 x as wide as long, A10 1.7 x as long as A9. Mesosoma almost 1.9 x as long as wide, fully 1.2 x as high as wide. Sides of pronotum smooth but anteriorly densely pubescent. Mesoscutum remarkably smooth and bare except for two broad stripes of hairs where notauli should have been; hind margin straight; scuto-scutellar grooves covered by some long pale hairs. Mesopleura smooth. Scutellum (fig. 11) smooth and bare medially, rest with dense hairs, posteriorly with a short triangular tooth which is semitransparent below. Metapleura smooth, pubescent posteriorly. Propodeal carinae low and fused, not semitransparent. Fore wing just surpassing tip of metasoma, distinctly brownish and with dense and strong hairs (microtrichia) on disc, nearly 3 x as long as wide; marginal cilia fully 0.2 width of wing. Hind wing 9.1 x as long as wide; marginal cilia as long as width of wing. Metasoma fully 1.3 x as long as head and mesosoma combined, as wide as thorax. T1 wider than long (4:3), smooth, laterally with white pubescence. T2 smooth, with pubescence at base. T3-T6 combined as long as T1-T2 combined, T6 1.75 x as long as wide.

Comments: A distinct species on account of short basal flagellar segments, brown wings with strong hairs, and pointed T6.

*Leptacis nigricorpa* sp. nov. (fig. 12)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 6.V.1988 (S. ADEBRATT).

Description. Female: Length 1.1 mm. Colour black; antennae and legs brownish yellow; A7-A10 and scutellar spine light brownish. Head from above 1.7 x as wide as long, 1.2 x as wide as thorax, unevenly reticulate-coriaceous, with traces of an occipital carina. Lateral ocelli separated from eye margin by about half their diameter. Head from front 1.25 x as wide as high. A1 about 0.9 x as long as height of head; A2 one-third as long as A1; A3 0.7 x as long as A2, fully twice as long as wide; A4 1.1 x as long as A3, about 2.4 x as long as wide; A5 hardly half as long as A4. A7-A10 2.2 x as wide as A3; A7 1.1 x as long as wide; A8-A9 each as long as wide; A10 1.5 x as long as A9. Mesosoma 1.5 x as long as wide; fully 1.3 x as high as wide. Sides of pronotum smooth, reticulate-coriaceous in upper anterior corner. Mesoscutum finely reticulate-coriaceous, uniformly and moderately hairy, without notauli; hind margin slightly convex medially, with some long hairs above scuto-scutellar grooves. Mesopleura smooth, with about 4 longitudinal striae below tegulae. Scutellum (fig. 12) sculptured and hairy almost as mesoscutum; spine semitransparent, reaching posterior margin of propodeum, with a narrow semitransparent lamella below. Metapleura smooth, pubescent posteriorly. Propodeal carinae low, dark, close together. Fore wing 0.75 x as long as body, 3.1 x as long as wide, with yellowish tint, rather densely hairy; marginal cilia 0.3 width of wing. Hind wing 7.5 x as long as wide; marginal cilia 0.75 width of wing. Metasoma as long as head and mesosoma combined, 2.4 x as long as wide, slightly narrower than thorax. T1 as long as wide, with almost parallel sides, with two longitudinal carinae and with a medial one fading out posteriorly; sides finely pubescent; anterior margin smooth and brownish. T2 almost smooth, with small pubescent basal foveae. T3-T6 combined two-thirds as long as T2, almost smooth, with some



fine superficially implanted hairs; T6 1.2 x as wide as long.

Comments. In general features rather similar to *L. latispina* sp. nov. described above, but this species has e.g. more slender basal flagellar segments, scutellar spine in dorsal view wider, and shorter marginal cilia of wings than in *L. nigricorpa*.

*Leptacis pteridis* sp. nov. (fig. 13)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 31.III.1989 (S. ADEBRATT). Paratype: 1 female same data but 8.III.1989.

Description. Female: Length 1.00-1.05 mm. Colour almost uniformly light brown, only eyes and ocelli darker. Head from above 1.8 x as wide as long, almost 1.2 x as wide as thorax. Occiput distinctly reticulate, with a high and sharp carina; vertex and frons faintly reticulate (frons transversely so). Lateral ocelli separated from eye by their diameter; OOL:POL:LOL = 2:12:5. Head from front (fig. 13) as high as wide. Antenna with A1 shorter than height of head (10:11). A2 one-third as long as A1, 2.7 x as long as wide. A3 hardly half as long as A2, 1.5 x as long as wide. A4 hardly 1.5 x as long as A3, twice as long as wide. A5 0.7 x as long as A4. A7 as long as wide, 1.2 x as long as A5. A8-A9 each fully 1.1 x as wide as long, 2.5 x as wide as A3. A10 1.75 x as long as A9. Mesosoma 1.75 x as long as wide, 1.4 x as high as wide. Pronotum broad in dorsal view, faintly reticulate in upper half, rest almost smooth. Mesoscutum finely reticulate, sparsely hairy, without notauli, hind margin prolonged over base of scutellum. Mesopleura smooth. Scutellum at level of mesoscutum, sculptured as this, with a fine straight spine which does not reach hind margin of propodeum. Metapleura smooth and bare except for white pubescence posteriorly. Propodeal carinae in the form of two high, diverging foamy structures. Fore wing fully as long as body, 2.5 x as long as wide, clear, with dense and strong hairs; marginal cilia one-third to two-fifths the width of wing. Hind wing almost 14 times as long as wide, marginal cilia 2.0 the width of wing. Metasoma 1.1 x as long as head and mesosoma combined, as wide as head. T1 about 1.3 x as wide as long, almost smooth, with white pubescence. T2 with white pubescence at front margin, without foveae. T3-T6 short, smooth, hardly hairy.

Comments: A most characteristic Oriental species because of shape of head. The highly elevated vertex is also found in some Afrotropical species mentioned by HUGGERT (1976). With *L. miratus* HUGGERT, 1976 *L. pteridis* shares the strong hairs on wing disc and the modification of propodeal carinae; the two species differ only slightly, e.g. in antennal and wing measurements and shape of T1, cf. HUGGERT (1976).

*Leptacis pulla* sp. nov. (fig. 14)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 31.III.1989 (S. ADEBRATT). Paratype: 1 female same data as holotype.

Description. Female: Length 0.9 mm. Colour blackish; antennae, legs and scutellar spine yellowish; antennal club brown. Head from above 1.8 x as wide as long, as wide as thorax. Occiput strongly transversely reticulate, without carina; vertex faintly reticulate; frons weakly transversely reticulate, smooth medially. Lateral ocelli separated from eye by less than their diameter, OOL:POL:LOL = 1:9:4. Head from in front 1.2 x as wide as

high. A1 as long as height of head. A2 hardly 0.3 x as long as A1, 2.5 x as long as wide. A3 0.6 x as long as A2, 1.9 x as long as wide. A4 as long as A2, about 3.0 times as long as wide. A8-A9 each about as long as wide; A10 1.5 x as long as A9. Mesosoma 1.7 x as long as wide, higher than wide (12:11). Pronotum in dorsal view broad, with sides finely reticulate-coriaceous in upper third, smooth below. Mesoscutum finely reticulate-coriaceous, rather densely hairy, without notauli, hind margin slightly rounded, with dense hairs covering scuto-scutellar grooves. Mesopleura smooth, with about four longitudinal furrows below tegulae. Scutellum (fig. 14) sculptured and hairy as mesoscutum, at level with this, with a strong spine reaching base of T1. Metapleura smooth and bare except along posterior margin. Propodeal carinae low and straight. Fore wing hardly as long as body (37:38), 3.1 x as long as wide, with brownish tint; marginal cilia 0.4 the width of wing. Hind wing fully 10 times as long as wide, marginal cilia 1.3 width of wing. Metasoma 0.9 x as long as mesosoma, hardly 0.9 x as wide as this. T1 about 1.25 x as wide as long, with a couple of weak carinae, laterally densely pubescent. T2 with pubescence at base, without foveae; T3-T6 short, smooth, with a few hairs.

Comments: Runs to *L. yercaudensis* MUKERJEE, 1981 in MUKERJEE'S (1981) key to (Indian) *Leptacis*-species, but *yercaudensis* has notauli present. *L. pulla* sp. nov. has marginal cilia of wings longer than any of the *Leptacis*-species described by BUHL (1997) except for *L. bismarckensis* BUHL, 1997, but this species has an antennal structure very different from that of *L. pulla* sp. nov., cf. BUHL (1997).

#### *Leptacis synopeana* sp. nov. (fig. 15)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 31.III.1989 (S. ADEBRATT). Paratypes (3 females): 1 female same data as holotype, and 2 females same data but 13.V.1988.

Description. Female: Length 1.1-1.2 mm. Colour rather uniformly pale brownish yellow. Head from above 1.4 x as wide as long, 1.1 x as wide as thorax, without occipital carina, weakly reticulate, faintly and transversely so on frons which is almost smooth medially. Lateral ocelli separated from eye by hardly half their diameter; OOL:POL:LOL = 1:12:5. Head from front 1.2 x as wide as high. A1 1.1 x as long as height of head. A2 hardly one-third as long as A1, 3.2 x as long as wide. A3-A4 equal, each 0.75 x as long as A2, narrower than this, each 3.2 x as long as wide. A5 0.75 x as long as A4, slightly wider than this. A8-A9 each 1.2 x as long as wide, almost 2.4 x as wide as A3. A10 1.7 x as long as A9. Mesosoma 1.8 x as long as wide, 1.3 x as high as wide. Sides of pronotum smooth except for some sparse sculpture in upper anterior corner. Mesoscutum finely reticulate-coriaceous, without notauli but with two broad stripes of white hairs; hind margin almost straight, with long hairs covering scuto-scutellar grooves. Mesopleura smooth. Scutellum (fig. 15) at level with mesoscutum, sculptured as this, with numerous hairs and a with straight spine which reaches end of propodeum. Metapleura with dense pilosity in posterior half and with very sparse long pilosity in front of this. Propodeal carinae long and rather high. Fore wing fully as long as body, 3.1 x as long as wide, with dense hairs and brownish tint; marginal cilia 0.2 width of wing. Hind wing about 10.0 x as long as wide; marginal cilia 0.8 width of wing. Metasoma hardly as long as head and mesosoma combined (11:12), as wide as head. T1 1.4 x as wide as long, smooth, with

dense pubescence laterally. T2 with pubescence anteriorly, without foveae. T3-T6 combined half as long as T2, smooth, hardly hairy.

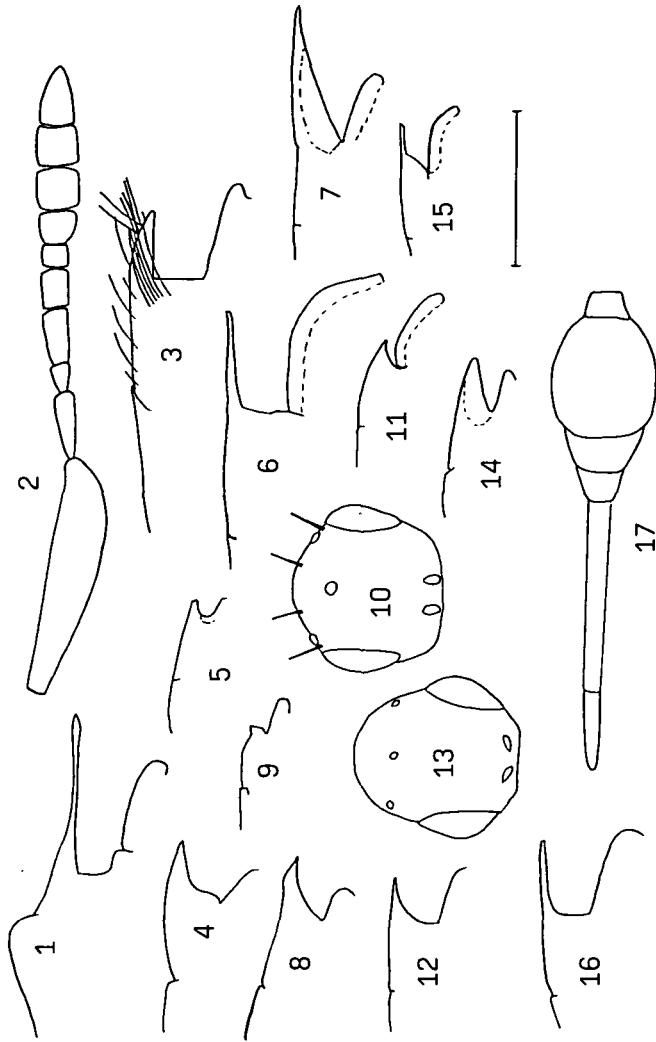
Comments: Rather similar, especially regarding shape of metasoma, to the Neotropical *L. brevipetiolata* BUHL, 2002 and *L. peruviana* BUHL, 2002, but these species e.g. have more slender antennal club than *synopeana*, cf. BUHL (2002).

*Leptacis terebrans* sp. nov. (figs 16-17)

Material examined: Holotype female: Malaysia, Borneo, Sabah, Sipitang, Mendolong 14.III.1989 (S. ADEBRATT). Paratypes: 2 females same data but 1.V.1988 and 2.III.1989.

Description. Female: Length 1.9-2.2 mm. Colour rather uniformly yellowish brown, head slightly darkened, A7-A10 and metasoma somewhat darkened, especially T5-T6. Head from above 1.6 x as wide as long, very slightly wider than thorax. Occiput weakly reticulate, without carinae but slightly angled; vertex faintly reticulate, frons even fainter and transversely so. Lateral ocelli separated from eye but about half their diameter; OOL:POL:LOL = 1:10:4. Head from front 1.2 x as wide as high. A1 as long as height of head. A2 0.3 x as long as A1, 2.7 x as long as wide. A3-A4 about equal, each 0.75 as long as A2, hardly 2.5 x as long as wide. A5 hardly 0.6 x as long as A4. A7 1.4 x as long as wide; A8-A9 each about as long as wide; A10 1.5 x as long as A9. Mesosoma 1.8 x as long as wide, hardly 1.3 x as high as wide. Sides of pronotum with faint longitudinal microsculpture in upper third, rest smooth. Mesoscutum faintly reticulate-coriaceous, sparsely hairy, without notauli; hind margin almost straight, prolonged over scuto-scutellar grooves. Mesopleura smooth. Scutellum (fig. 16) at level of mesoscutum, sculptured and hairy as this; spine 1.2 x as long as anterior part, straight, reaching hind margin of propodeum. Metapleura with dense white pilosity in posterior half and with a few setae in front of this. Propodeal carinae semitransparent, high and fused. Fore wing fully 3.0 x as long as wide, reaching hind margin of T5, with brownish tint and dense hairs; marginal cilia 0.2 width of wing. Hind wing 11.0 x as long as wide; marginal cilia 0.75 width of wing. Metasoma (fig. 17) almost 1.9 x as long as head and mesosoma combined, as wide as thorax, at its widest 1.3 x as wide as high. T1 slightly transverse, without distinct carinae but with conspicuous pubescence. T2 with pubescence anteriorly, without foveae. T3-T6 smooth and bare; T3-T4 short; T5 very long, fully as long as T2-T4 combined, 6.7-8.3 x as long as wide; T6 about 0.4 x as long as T5, about 4.0 x as long as wide.

Comments. A very distinct *Leptacis*-species on account of the unusually long T5-T6.



Figs 1-17 *Leptacis* spp. nov.: 1) *adebratti* ♀ scutellum; 2-3) *laeviusculus* ♀: 2) antenna, 3) scutellum; 4) *latispina* ♀ scutellum; 5) *lineatifrons* ♀ scutellum; 6) *longiclava* ♀ scutellum; 7) *mendolongensis* ♀ scutellum; 8) *microgaster* ♀ scutellum; 9) *microspina* ♀ scutellum; 10-11) *microtrichiata* ♀: 10) head front view, 11) scutellum; 12) *nigricorpa* scutellum; 13) *pteridis* ♀ head front view; 14) *pulla* ♀ scutellum; 15) *synopeana* ♀ scutellum; 16-17) *terebrans* ♀: 16) scutellum, 17) metasoma. Scale bar = 0.25 mm except for figs. 2 and 17 for which it is 0.50 mm.~

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## Literaturbesprechung

**PAUL, R.J. 2001: Physiologie der Tiere. System und Stoffwechsel.** - Georg Thieme Verlag, Stuttgart. 207 S.

Die vorliegende Einführung in die System- und Stoffwechselfysiologie der Tiere liefert in kompakter Form das Basiswissen über die für den Lebenserhalt des Tierkörpers essentiellen Prozesse und Systeme, z.B. Homöostase, Hormone, Gastransport, Gasaustauschorgane, extrazelluläre Körperflüssigkeiten, Perfusion, Wasserhaushalt, Osmoregulation, Säure-Basen-Haushalt, Temperaturregulation, Ernährung und Verdauung, Bioenergetik der Zelle sowie Leben unter Extrembedingungen (Tauchen, Leben in großen Höhen, Leben im Watt).

Ein kompaktes, gut illustriertes Lern- und Nachschlagewerk für Studenten im Grund- und Hauptstudium.

R. GERSTMEIER

**PLATIA, G. & SCHIMMEL, R. 2001: Revisione delle specie orientali (Giappone e Taiwan esclusi) del genere *Melanotus* Eschscholtz, 1829 (Coleoptera, Elateridae, Melanotinae).** - Museo Regionale di Scienze Naturali Torino, Monografia XXVII, Torino, 638 Seiten.

Diese umfangreiche monografische Bearbeitung analysiert die Schnellkäfer-Gattung *Melanotus* in der Orientalis (von Pakistan bis zu den Solomonen, exkl. Japan und Taiwan). Während in Mitteleuropa die Gattung mit knapp 10 Arten vertreten ist, konnten die beiden Autoren immerhin 410 Arten in ihrem Untersuchungsgebiet nachweisen, 296 Taxa werden neu beschrieben, zudem werden zahlreiche Synonyme und neue systematische Kombinationen vorgestellt. Der kurze, einführende allgemeine Teil beschäftigt sich i. W. mit den morphologischen Merkmalen der Imagines und Larven, aber auch der Biologie und geografischen Gesamtverbreitung. Der systematische Teil enthält die Beschreibungen und Bestimmungstabellen. In einem relativ umfangreichen Abstract werden die wichtigsten Ergebnisse sowie die Bestimmungstabellen in Englisch zusammengefaßt.

Eine hervorragende taxonomische Arbeit.

R. GERSTMEIER

**HANSEN, A. 2001: Bioinformatik. Ein Leitfaden für Naturwissenschaftler.** - Birkhäuser Verlag, Basel, 2001. 112 S.

Dieser Leitfaden entstand in Begleitung zu einem Praktikum über "Angewandte Bioinformatik" und ist als Einstieg in die Sequenzanalyse gedacht. Es soll all denen, die zum ersten Mal mit biologischen Sequenzen arbeiten, helfen, in der Bioinformatik als Anwender Fuß zu fassen. Nach einer Einführung in primäre Datenbanken (Genbank, EMBL, DDBJ) und die einfachsten Methoden des paarweisen Sequenzvergleichs im globalen und lokalen Alignment geht es über die gängigsten heuristischen Verfahren (FASTA, BLAST), multiple Alignments (CLUSTAL W), phylogenetische Analysen zu abgeleiteten Datenbanken. Trotz zahlreicher Abbildungen und Tipps zu Beispielprogrammen und Webadressen, bleiben viele Themen oberflächlich (u.a. Bootstrapping, was versteht denn man denn nun tatsächlich unter "Ziehen und Zurücklegen"?), andere (wie z.B. PAUP) werden garnicht angesprochen. Nichtsdestotrotz bietet es den Nicht-Molekularbiologen einen ersten Einstieg.

R. GERSTMEIER

**HOFER, U., MONNEY, J.-C. & DUŠEJ, G. (Hrsg.) 2001: Die Reptilien der Schweiz. Verbreitung, Lebensräume, Schutz.** - Birkhäuser Verlag, Basel, 202 S.

Dieser dreisprachige (Deutsch, Französisch, Italienisch) Atlas basiert auf über 43.000 Einzelbeobachtungen von Schlangen und Echsen aus sieben Jahrzehnten. Sechs Echsen-, acht Schlangenarten und eine Schildkrötenspezies werden ausführlich charakterisiert. Das Kernstück des Buches bilden die vielen einzigartigen Farbaufnahmen der Reptilien in ihren Lebensräumen sowie die Verbreitungskarten aus kantonalen Bestandsaufnahmen. Ebenfalls großen Raum nehmen die Kapitel "Artübergreifende Betrachtungen" und "Reptilienschutz" ein.

Eine fantastische Monographie für alle Naturliebhaber und ein unschätzbares Nachschlagewerk für Herpetologen und Faunisten.  
R. GERSTMEIER

**GORB, S. 2001: Attachment Devices of Insect Cuticle.** - Kluwer Academic Publishers, Dordrecht. 305 S.

Throughout their evolution, living creatures have developed systems to attach themselves to a variety of substrate textures. As is the case in many technical systems, animals use friction and adhesion to generate an attachment force for overcoming drag. In recent decades, our knowledge of such systems has greatly increased, not only by establishing scanning electron microscopy (SEM). A large proportion of works have been devoted to attachment systems occurring in arthropods. This book gives an excellent overview of a wide variety of devices of the insect integument, adapted for attachment. The focus lies on so-called frictional systems, which are kind of attachment device containing tiny outgrowths on the contact surfaces. The presence of fields of such protuberances on the insect body increases frictional forces in the region of contact, and may result in fixation between these surfaces. To show different principles of morphology and ultrastructure of frictional systems, this book describes some examples, and outlines general rules of interrelationships between the construction and function of such devices. Several examples are described in detail which allows discussion of the combination of morphological, ultrastructural, and physiological data.

This is an excellent introduction to biological attachment and will be of interest to biologists, especially entomologists, materials scientists and engineers.

R. GERSTMEIER

**HALLÉ, F. 2001: Mit dem Luftschiff über den Wipfeln des Regenwaldes. Ein Expeditionsbericht.** - Frederking & Thaler, München. 253 S.

Seit 15 Jahren erforschen die französischen Forscher Francis HALLÉ, Dany CLEYET-MARREL und Gilles EBERSHOLT (Botaniker und Techniker) mit einem von einem Luftschiff transportierten "Baumfloß" (eine aufblasbare Arbeitsplattform) das Kronendach des tropischen Regenwaldes. Stationen dieses Abenteuers waren Guayana, Brasilien, Französisch-Guayana, Kamerun, Brunei, Venezuela, Gabun und Madagaskar. Im Blätterdach der Regenwälder erforschen die Wissenschaftler die faszinierende Flora und Fauna, in über 50 m Höhe ein nicht ganz ungefährliches Unternehmen. "Forschung mit Fantasie" lautete dabei das Motto der drei Wissenschaftler und so präsentiert dieses Buch einen packenden Erlebnisbericht aus der "Apotheke Regenwald".  
R. GERSTMEIER

**POLK, M. & TIEGREEN, M. 2001: Frauen erkunden die Welt. Entdecken, Forschen, Berichten.** - Frederking & Thaler, München. 256 S.

Seit vielen Jahrhunderten und in vielen Ländern haben sich immer wieder Frauen auf den Weg gemacht, die Welt zu erkunden: Abenteuerinnen, Künstlerinnen, Sammlerinnen, Wissenschaftlerinnen und Visionärinnen. Es galt die physischen und sozialen Grenzen ihrer Zeit zu überwinden, um grundlegende Beiträge zur Wissenserweiterung über unsere Erde zu liefern. Trotz enormer Leistungen blieb vielen dieser mutigen Frauen die Anerkennung versagt. In diesem Bildband werden stellvertretend 84 außergewöhnliche Frauen und ihr Lebenswerk dargestellt; aufgeteilt in die Großkapitel "Die Erzählungen der frühen Reisenden" (u.a. Wen-Chi, EGERIA, Jeanne BARET), "Kühne Entdeckerinnen" (z.B. Lady Anne BLUNT, Alexandra DAVID-NÉEL, Gertrude M.L. BELL), "Unterwegs mit Wissenschaftlerinnen" (u.a. Naomi PIERCE, Lucy Evelyn CHEESMAN, Dian FOSSEY, Jane GOODALL, Cynthia MOSS), "Künstlerische Visionen" (Anna Maria Sibylla MERIAN, Leni RIEFENSTAHL, Emily HAHN, Ida PFEIFFER) und "Entdeckerinnen in Grenzbereichen" (Maria MITCHELL, Annie SMITH PECK, Marie THARP). Die einzelnen Porträts sind spannend und ergreifend erzählt, garniert mit dokumentarischen Aufnahmen und Illustrationen aus älteren Werken. Die abschließenden Literaturhinweise beinhalten eigene Werke dieser Frauen oder Literatur über sie.

Eine überaus lebendige Darstellung mit hohem dokumentarischen Wert.

R. GERSTMEIER

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