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## Additional new species of *Hypselothyrea* de Meijere with description of a new subgenus (Diptera, Drosophilidae)

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A new subgenus of *Hypselothyrea* de Meijere, *Baechlia* subgen. n. is described (type species *Hypselothyrea formosana* Papp, 2004). Other species are *H. (B.) hindu* sp. n. (India), *H. (B.) nitidipleura* sp. n. (Thailand) and *H. (B.) verrucosa* sp. n. (Thailand). A key for the subgenera of *Hypselothyrea* is provided. Two other new species of the subgenus *H. (Deplanothyrea)*: *H. (D.) thaili* sp. n. and *H. (D.) zulu* sp. n. (RSA) are also described. Some corrections to Papp's (2004) revision are given.

Key words: Diptera, Drosophilidae, *Hypselothyrea*, *Baechlia*, taxonomy, Oriental and Afrotropical regions.

### INTRODUCTION

The species in the drosophilid genus *Hypselothyrea* are characteristic with their several long rays on the arista and a distinct, medially flat (in profile nose-like) facial carina. Furthermore, they have no differentiated prescutellar acrostichal setae, their wings are without blackened lappet proximally to vein  $R_1$ , and, in a number of species, the scutellum is apically elongate and upturned. Grimaldi (1990), in his phylogenetic classification, discussed their relationships to *Tambourella* Wheeler, *Jeannelopsis* Séguy, *Liodrosophila* Duda, etc.

*Hypselothyrea* is mainly an Oriental genus, but some species are known from New Guinea (Okada 1980), one species from the Seychelles Islands (Lamb 1914) and one species from western Africa (see below). Okada (1980) published a modern revision with the description of seven new species. There, he described also a subgenus, *Deplanothyrea*, for species without an upright scutellum. Later, Chassagnard *et al.* (1998) reported on three Afrotropical species of *Hypselothyrea* (*Deplanothyrea*) but due to the lack of male specimens, left them undescribed. Papp (2004) made a partial revision and described nine new species, including the first Afrotropical *H. (Hypselothyrea)* species. Among them there was a species with unique wing pattern (Fig. 13, described as *H. (Deplanothyrea) formosana*). Even after repeated examination of the extant literature, I did not manage to find a similar pattern among the known drosophilids, incl. the Australian species (Bock 1982). In addition, three other species with similar wing pattern were found in the collection of the Hungarian Natural History Museum recently. A study on their male and female terminalia revealed several distinct differences to the other species of *Hypselothyrea*. Now I felt competent to describe a new subgenus for them.

As I noted formerly (Papp 2004) there is a tendency in the evolution of the *Hypselothyrea* species to become reduced-winged (not in just one species group,

i.e. this is a form of parallel evolution). This reduction may be a consequence of their terricolous habits. Recently, in 2004, we captured a stenopterous female specimen of *Hypselothyrea* in Thailand. I received another, rather similar *Hypselothyrea* specimen, collected by Dr Michael Mostovski (Natal Museum, Pietermaritzburg) in the RSA in 2006. Both species are described below.

In morphological terminology Bächli's (1998) summary of the drosophilid morphology is the reference. In some cases, Grimaldi (1990) and Okada (1980) were consulted.

The types and other material are deposited in the Department of Zoology, Hungarian Natural History Museum, Budapest, Hungary (HNHM), in the Natal Museum, Pietermaritzburg, Republic of South Africa (NMSA) and in the Zoological Museum, University of Zürich (ZMUZ).

#### TAXONOMY

### *Hypselothyrea* de Meijere, 1906

Type species: *H. dimidiata* de Meijere, 1906; designated by Okada (1956: 38) (subsequent des.).

Okada (1980) described the subgenus *Deplanothyrea* for species without upright scutellum and having a C-index less than 1.0. Of the other two defining characters, «acrostichal hairs present» is valid also for a number of *Hypselothyrea* s.str. species; «wings exceedingly narrowing proximally» is true for the 4 included species, but some *Hypselothyrea* s.str. species also show this character. *H. formosana* was provisionally included by Papp (2004) in *Deplanothyrea* because its scutellum is not upright but in line with the mesonotum.

Below, I describe a third subgenus for the dark bodied species with a large dark central patch on the wing.

#### KEY TO THE SUBGENERA OF HYPSELOTHYREA DE MEIJERE

- 1 (2) Scutellum upright. Females with well-sclerotised spermathecae. Mesonotum microtomentose, granulated, when shiny (*H. guttata* group), wings with a particular pattern ..... sg. *Hypselothyrea* de Meijere
- 1 (2) Scutellum not upright. No sclerotised spermathecae, or sclerotisation of spermathecae weak
- 3 (4) No wings or halteres. Abdomen barrel-shaped. Basal (lateral) scutellar setae absent. 2 pairs of dorsocentral setae ..... *H. aptera* Papp, 1979
- 4 (3) Wings normal, if reduced, abdomen ant-like. Basal scutellar setae present, even if small
- 5 (6) Frons and mesonotum (in some species also scutellum) dull, granulated. Wings with a large dark central spot and light spots around wing margin (Figs 13–16). Costal index very high, 1.84 to 2.75. Clypeus small, low U-shaped. Facial keel large, broad, dorsally mostly trapezoid. 1 or 2 pairs of dc setae. Pleura dull (granulated, microtomentose) or shiny. Base of abdomen narrowed, but slightly so. Female tergite 8 smaller, not high (Fig. 12). Eggs with extremely long, almost straight respiratory filaments (Fig. 9) ..... *Baechlia* subgen. n.



- 6 (5) Frons, mesonotum and scutellum shiny. Wings clear or with a large dark apical spot (Figs 1–2). Costal index less than 1.0. Clypeus large, high, at least as high as length of the 1st flagellomere. 2 pairs of dc setae. Pleura shiny. Proximal part of abdomen ant-like or at least strongly narrowed. Female tergite 8 high, embracing anal structures, incl. cerci (Fig. 11). Eggs with shorter, curved respiratory filaments (Fig. 7) ..... sg. *Deplanothyrea* Okada, 1980

**Subgenus *Hypselothyrea* de Meijere s. str.**

***Hypselothyrea deficiens* Papp, 2004**

Formerly not published specimens: 3 males: Thailand, 2004, leg. L. Papp & M. Földvári (HNHM): Doi Inthanon N. P., Pha Sum Ran Waterfall, forest & along the brook, Oct 30 / Doi Suthep N. P., along a forest brook, Oct 31 / Prov. Nan, Ban Na Lae, nr [= near] Pua, over a rocky forest brook, Nov 5, No. 8/11/19; 1 female (HNHM): ibid., Doi Inthanon N. P., below Haui Sai Nueng Falls, along the brook, Oct 30, No. 7. 1 male (ZMUZ): S VIETNAM, 860 m, Lam Dong Prov. /19., 7 km W Di Linh, 3. IX. 2003, 11.34N/108.01E, Bo Bla Wat. Fall/19, secondary forest, leg. P. Schwendinger.

This peculiar species has been found so far in Thailand only but it does not seem to be rare.

***Hypselothyrea paraguttata* Takada & Momma, 1975**

The female specimen in Papp (2004) was correctly identified and published. 1 male: Thailand, Doi Inthanon N. P., over a small rocky brook, Oct 30, 2004, No. 9, leg. L. Papp & M. Földvári; this specimen was incorrectly published as *H. pseudoguttata* Takada & Momma, 1975 in Papp *et al.* (2006) Actually, its genitalia had not been prepared then.

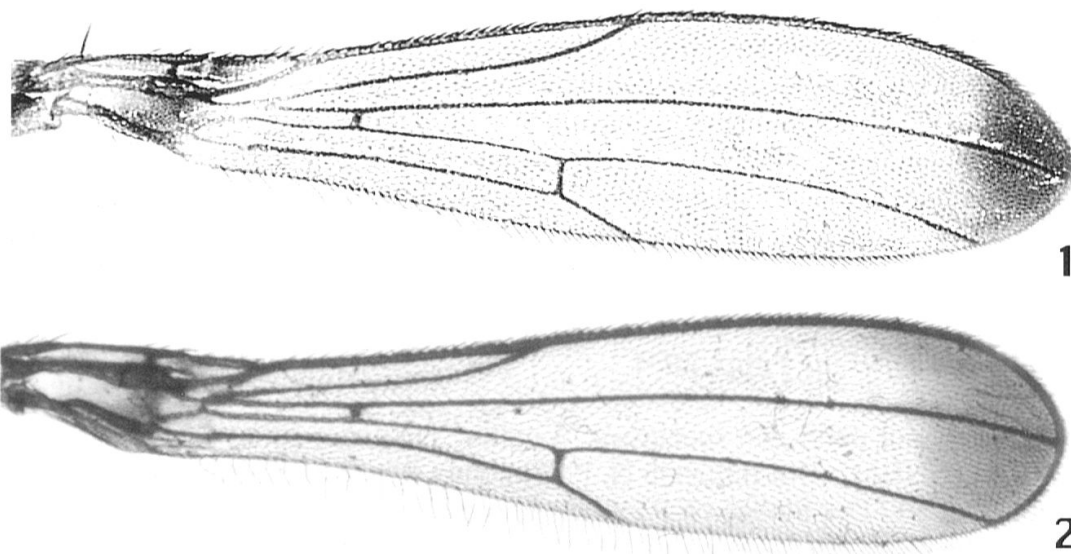
Okada (1980) omitted this species from his revision. This was so unbelievable to me that I assumed he had held it synonymous with *H. pseudoguttata*. My confusion was reflected in the text in the first paragraph on page 280 (Papp 2004). However, my figures for *H. paraguttata* seem correct. Takada & Momma's (1975: fig. 28) figure shows a slightly curved surstylus (in profile) and several long setae on the epandrium ventrally, like my fig. 11. Their figure 29 on «phallic organs» is rather different from my fig. 13, but they probably pressed it down before preparing the illustration.

***Hypselothyrea pseudoguttata* Takada & Momma, 1975**

1 male: THAILAND, Khao Pu – Khao Ya N.P., 21.11.'04, No. 42, forest brook at waterfall, leg. Papp & Földvári. This specimen was published correctly (Papp *et al.* 2006: 208).

This species has two rows of acrostichal microchaetae, only one or two small microchaetae laterally to those rows. The extremely long and thick thorn on the male epandrium ventrally (Takada & Momma 1975: fig. 25; Okada 1980: fig. 25) and its much curved phallus (Takada & Momma 1975: fig. 26; Okada 1980: fig. 26) are most characteristic.





Figs 1–2. *Hypselothyrea (Deplanothyrea)* spp. n., right wings: 1, *H. (D.) thaili* sp. n., holotype. – 2, *H. (D.) zulu* sp. n., holotype.

The key for the *H. guttata* species group (Papp 2004) can be supplemented as follows:

3. Fore femur with a row of black anteroventral peg-like setae. Surstylus with 6 prenisetae only (Papp 2004: fig. 7). Four distinct rows of acrostichal setae ..... *H. guttata* Duda, 1926
- Fore femur without a row of peg-like anteroventral setae. Surstylus with a larger number (11) of prenisetae ..... 4
4. Two rows of acrostichal microchaetae. Male with an extremely long and thick thorn on the epandrium ventrally, phallus strongly curved (Takada & Momma, 1975: figs 25–26) .... *H. pseudoguttata* Takada & Momma, 1975
- Four rows of acrostichal microchaetae. Male without a very long and thick thorn on the epandrium but with several strong setae ventrally (Papp 2004: fig. 11), phallus slightly curved (Papp 2004: fig. 12) ..... *H. paraguttata* Takada & Momma, 1975

### Subgenus *Deplanothyrea* Okada, 1980

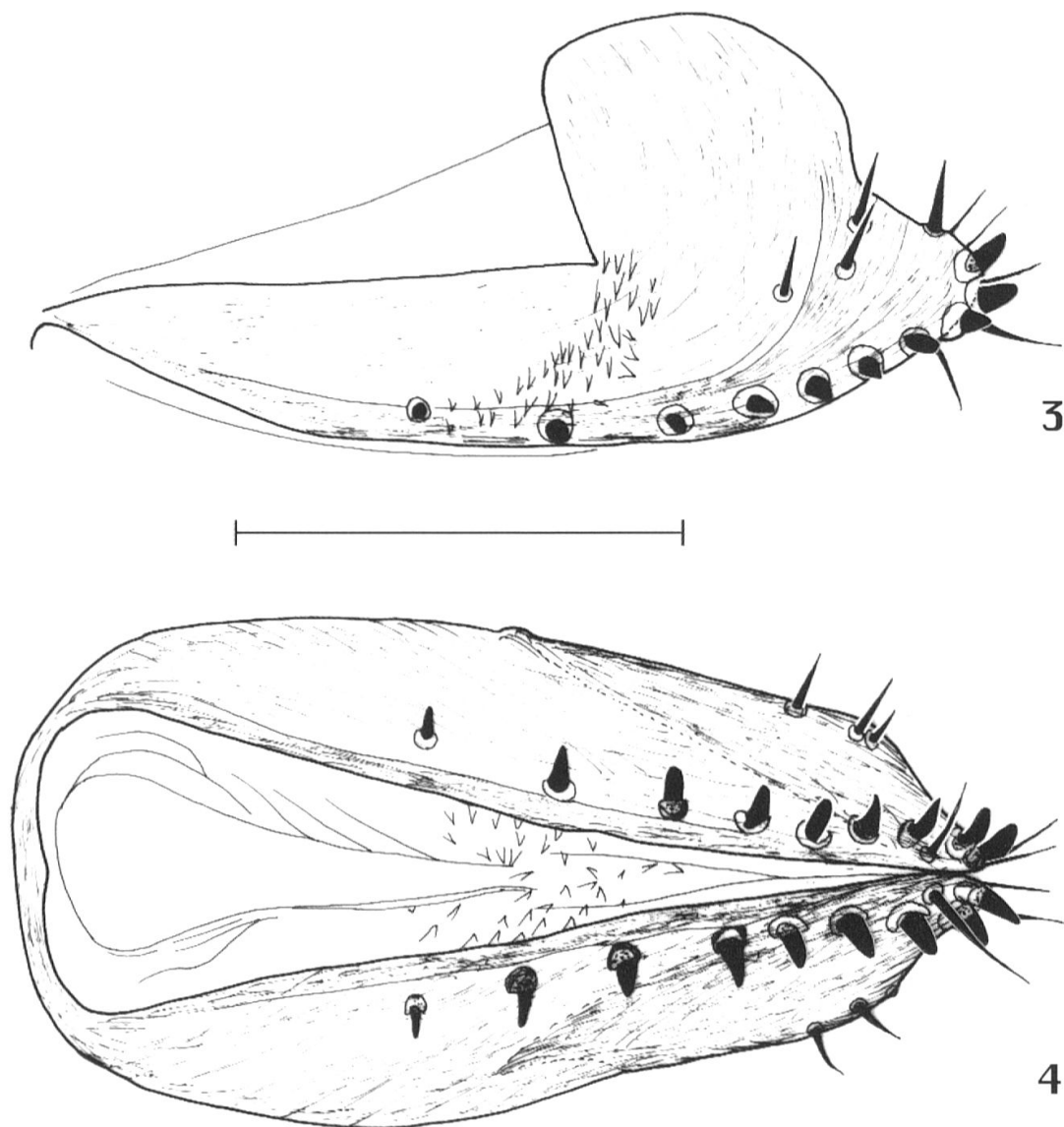
Type species: *Hypselothyrea breviscutellata* Duda, 1928: 82 (orig. des.).

#### *Hypselothyrea (D.) breviscutellata* Duda, 1928

1 female (ZMUZ): Taiwan, Taichung, Chingshui, X/16–17/2002, C.S. Lin & W.T. Yang, UV light trap, NMNS Ent 3941–2004. An important specimen; even a possible neotype (cf. Papp 2004).

#### *Hypselothyrea (D.) thaili* sp. n. (Figs 1, 3–4)

Holotype female (HNHM): Thailand, Trang Prov., Thung Khai Botanic Garden, primary lowland rainforest, along the «Nature Trail», Nov 13, 2004, No. 29,



Figs 3–4. *Hypselothyrea* (*Deplanothyrea*) *thalii* sp. n., holotype female: 3, oviscapt, broadest lateral view – 4, same, caudal view. Scale bar: 0.1 mm.

leg. L. Papp & M. Földvári (cf. Papp *et al.* 2006).

Right wing prepared on a slide (dry, under a cover glass). Abdomen with genitalia preserved in a plastic microvial with glycerol.

Measurements in mm: body length 2.20, wing length 1.66, wing width in broadest area, (i.e. apical 3/5 to 4/5) 0.37, at level of R-M only 0.22.

Body shiny ochre, pleura and abdominal tergites mainly brown.

Frontal shield large, shiny. Facial keel (carina) on dorsal 4/9 of facial plate only. Clypeus high, 0.16 mm. Eyes large, gena only 0.025 mm broad below eye. Head setae as in congeners, anterior orbital pair 0.13 mm long, posterior pair distinctly thicker than anterior pair, 0.19 mm. Vibrissa comparatively short (0.10 mm). Third flagellomere blackish on dorsal half, light yellow on ventral half; dorsal cilia on third flagellomere up to 0.04 mm long. Pedicel and scape yellow. Arista with 6

long dorsal (longest ca. 0.20 mm) and 2 long ventral rays (longest 0.19 mm) behind apical fork, whose ventral branch is 0.09 mm long.

Almost all parts of thorax shiny. Mesonotum ochre except katepisternum and meron which are brown. Scutellum short, not upright, only slightly convex dorsally. Scutellum ochre, base not darker; basal scutellars thin and short (0.06 mm), apical scutellars perpendicular to scutellum, 0.275 mm. In contrast to *H. zulu*, ventral margin of notopleura and a small spot on the anepisternal-anepimeral margin and on wing base also microtomentose. Katepisternum grey microtomentose on its caudal 4/7. Thoracic setae as in *H. zulu* sp. n. (see below), two well-ordered acrostichal rows.

Wing strongly reduced in width; membrane light brownish, a sub-basal and a comparatively small apical spot dark brown (Fig. 1). Veins brown. A small bare area present behind humeral (sub-basal) spot and under radial trunk. Apical spot 0.19 mm measured from wing apex. No anal vein, anal cell or anal region on the wing, and  $Cu_2$  (= Cup of authors) hardly discernible (a thin faint line). First costal section (from H to  $R_1$ ) 0.21 mm, second section 0.50 mm, third section 0.72 mm, C-index 0.69. Inter-crossvein section of M 0.32 mm, terminal section of cubital vein 0.14 mm. Cilia on cubital margin 0.04 mm. Halteres slightly reduced, light yellow, stalk darker basally.

Prosternum with fore coxae whitish yellow. Legs yellow, mid tibia darker, light brown, hind tibia (except base) darker brown. All tarsi yellow. Ventral apical seta of mid tibia reduced, 0.05 mm long.

Abdominal tergites 1 to 3 yellow with some dirty infumation most caudally and laterally, tergites 4 and 5 black, tergites 6 and 7, as well as postabdominal sclerites greyish yellow. Tergal macrosetae very short, 0.06–0.07 mm long only.

Oviscapt (Figs 3–4) sclerotised on larger area of lower half than in *H. zulu*. Marginal pegs are not very different (Fig 4, cf. Fig. 6) but most dorsal one farther from base. Apical setae longer than in *H. zulu*, and subapical-cranial setosity very different (Fig. 3, cf. Fig. 5). Hypoproct forms a half-ring with 4 longer setae. No sclerotised spermatheca.

*Hypselothyrea* (*D.*) *thaii* sp. n. is rather similar to *H. (D.) zulu* sp. n. from South Africa. However, its dark spot on wing apex is much smaller (Fig. 1, cf. Fig. 2), the shape of its oviscapt (Figs 3–4) is slightly, its setosity is distinctly different.

The holotype specimen was captured on fallen fruit. We returned there, but even after sweep netting for a long time, we did not manage to collect more specimens.

### ***Hypselothyrea* (*D.*) *zulu* sp. n. (Figs 2, 5–8, 11)**

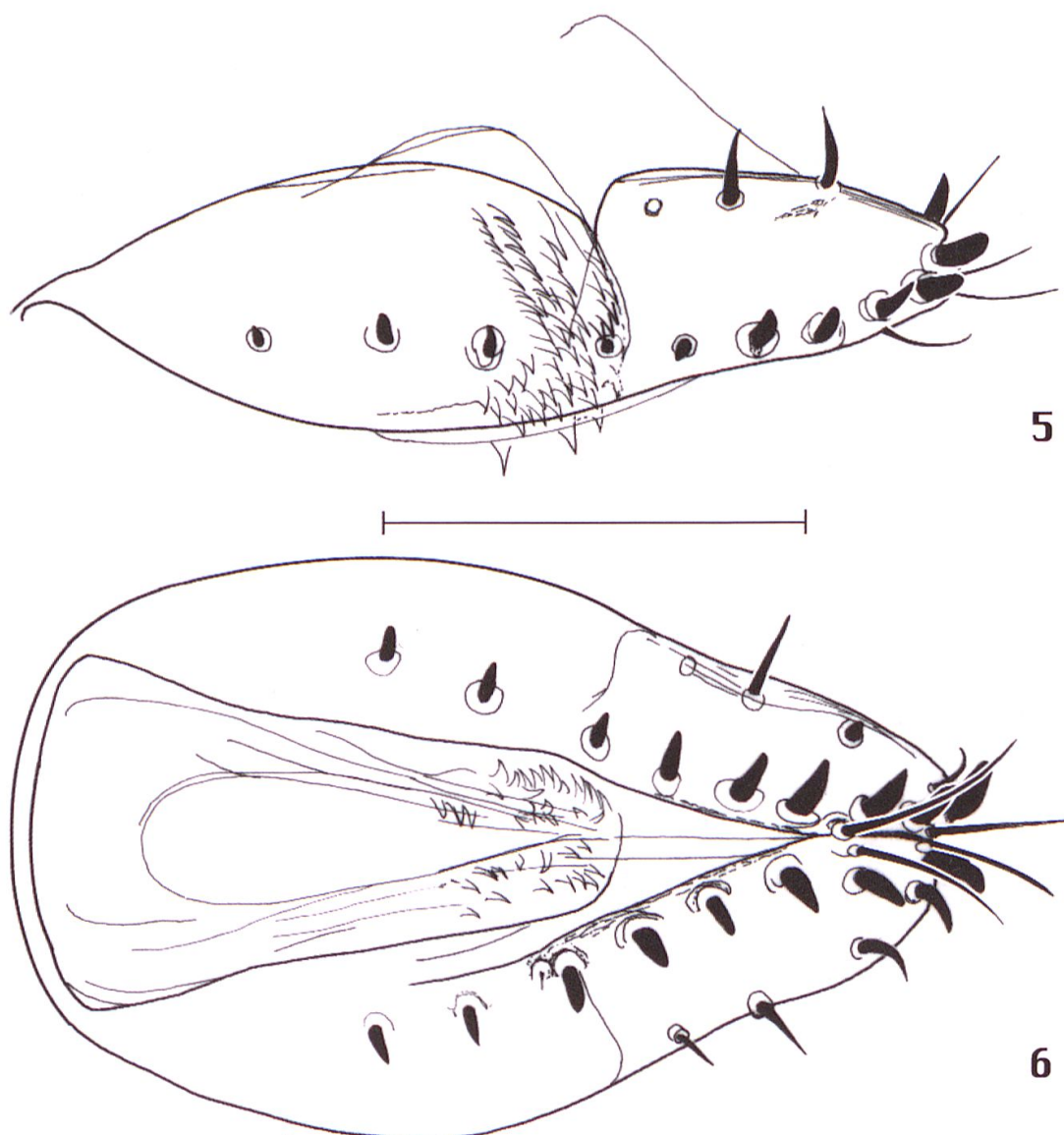
Holotype female (NMSA): SAfr, KZN [KwaZulu Natal], Vernon, Crookes N.R., 250m, 30°17.4'S 30°36.9'E, 24.i. – 10.v. 2006, Malaise tr[ap], Mostovski.

Right wing prepared on a slide (dry, under a cover glass). Abdomen was broken at tergite 5, caudal part of abdomen with genitalia and two ripe eggs preserved in a plastic microvial with glycerol.

Measurements in mm: body length 2.25, wing length 1.65, wing width in broadest area, (i.e. subapically) 0.34, at level of R-M only 0.176.

Body shiny light brown, as for a general impression (but see details below).

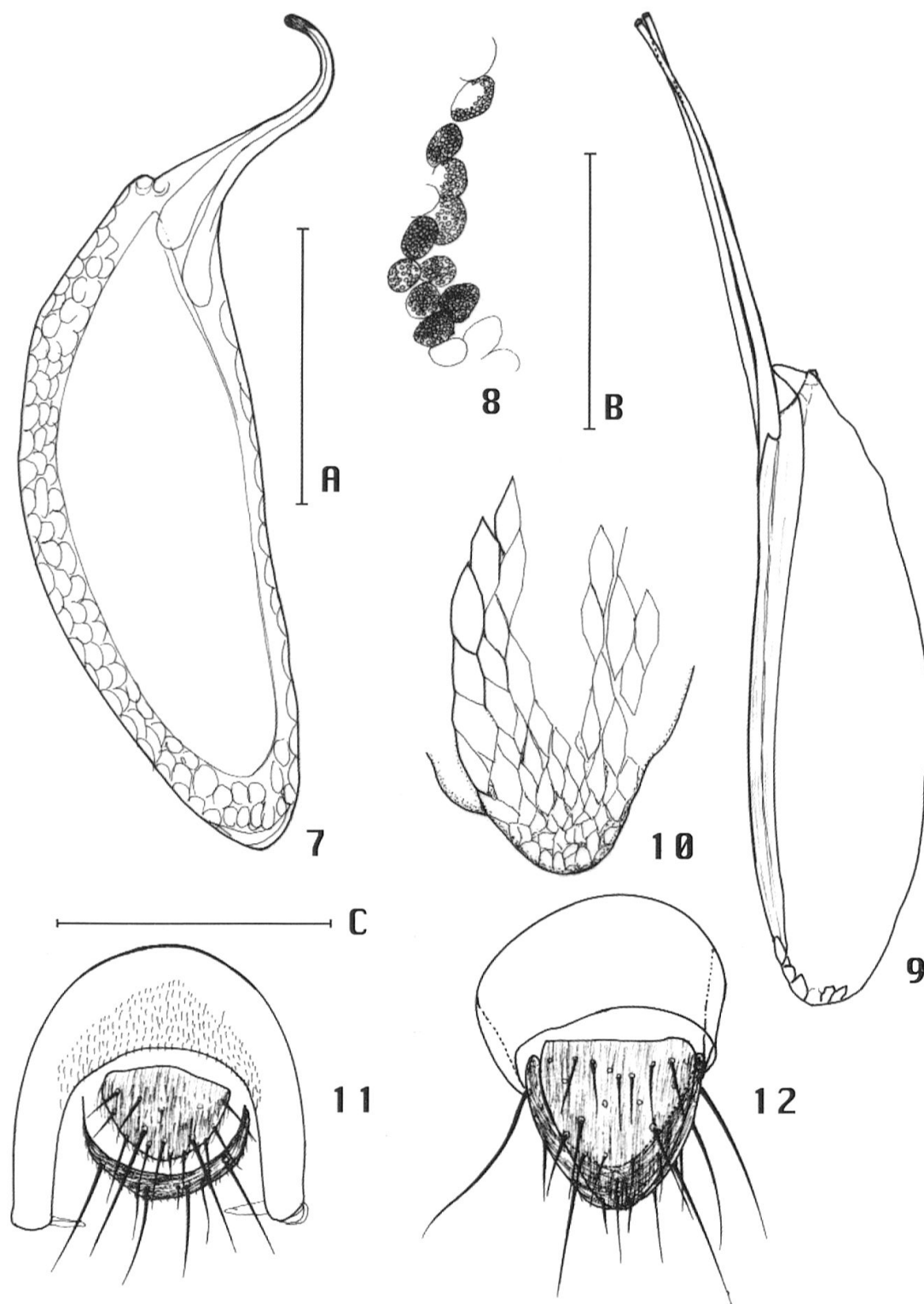




Figs 5–6 *Hypselothyrea* (*Deplanothyrea*) *zulu* sp. n., holotype female: 5, oviscapt, broadest lateral view – 6, same, caudal view. Scale bar: 0.1 mm.

Frontal shield large, shiny. Facial keel only on dorsal half of facial plate. Clypeus high, 0.175 mm. Eyes large, gena only 0.033 mm broad below eye. Head setae as in congeners, anterior orbital pair 0.15 mm long, posterior pair 0.20 mm, but distinctly thicker than anterior pair. Vibrissa comparatively short (0.11 mm). Third flagellomere dark grey on dorsal half, dirty white (!) on ventral half; dorsal cilia on third flagellomere longer than 0.02 mm. Pedicel and scape yellow, pedicel darkened dorsally. Arista with 6 long dorsal and 2 long ventral rays behind apical fork, where ventral branch is 0.10 mm long.

Thorax entirely shiny. Mesonotum dark brown on a large prescutellar spot (to the anterior dc), other parts light brown with a pair of ochre stripes towards head just inside dc lines. Scutellum short, not upright, only slightly convex dorsally. Scutellum ochre with light brown base; basal scutellars thin and short (0.077 mm). Pleura brown. Katepisternum with a large microtomentose spot around and behind



Figs 7–12. *Hypselothyrea* (*Deplanothyrea*) *zulu* sp. n., holotype female: 7, egg, lateral view; 8, structure of chorion. — *Hypselothyrea* (*Baechlia*) *verrucosa* sp. n., holotype female: 9, egg, lateral view; 10, structure of chorion. — Terminalia of females: 11, *Hypselothyrea* (*Deplanothyrea*) *zulu* sp. n., holotype female, caudal view – 12, *Hypselothyrea* (*Baechlia*) *verrucosa* sp. n., holotype female, subdorsal view (perpendicular to cerci). Scale bars: A = 0.4 mm for Figs 7 and 9; B = 0.2 mm for Figs 8 and 10; C = 0.4 mm for Figs 11–12.



katapisternal seta. Thoracic setae: 1 np, 2 sa, 1 pa (in the cavity above and behind wing base), 2 dc pairs, also anterior dc pair well-developed. Two well-ordered acrostichal rows.

Wing strongly reduced; membrane light brownish, a sub-basal and a comparatively broad apical spot dark brown (Fig. 2). Veins brown. A small bare area present behind humeral (sub-basal) spot and under radial trunk. Apical spot 0.26–0.285 mm measured from wing apex. No anal vein, anal cell or anal region on the wing, however,  $Cu_2$  (= Cup of authors) discernible as a thin line. First costal section (from H to  $R_1$ ) 0.17 mm, 2nd section 0.43 mm, 3rd section 0.81 mm, C-index 0.53. Terminal section of cubital vein 0.125 mm. Cilia on cubital margin up to 0.065 mm. Halteres slightly reduced, white, stalk darker basally.

Prosternum with fore coxae yellowish white. Legs yellow, tibiae darker, light brown, basal half of fore basitarsus, apical half of fore tibia and the whole hind tibia darker brown. Ventral apical seta of mid tibia reduced, 0.04 mm long only.

Abdominal tergites 1 to 3 yellow with dirty (yellowish grey) hue most caudally and laterally, tergites 4 and 5 black, tergites 6 and 7, as well as postabdominal sclerites greyish yellow. Tergal macrosetae short, 0.10–0.12 mm.

Oviscapt (Figs 5–6) with distal half sclerotised on a smaller area than in *H. thaili*. Most dorsal pegs in the marginal row closer to base than in *H. thaili*. Cranial part with 3 setae only but these very thick (4 thinner setae in *H. thaili*). Tergite 8 not divided, rather high, cerci (Fig. 11) fused as usual but very short with a pair of long dorsal subapical setae. Hypoproct forms a half-ring with 4 longer setae. No sclerotised spermathecae.

Eggs (Figs 7–8) whitish. Ripe eggs 1.00 mm long plus respiratory filaments (0.28–0.29 mm). Respiratory filaments strongly curved, reticulation of chorion rounded with minor round microsculpture (Fig. 8). The shape of eggs represents a formerly unknown form among drosophilid eggs (cf. Ferrar 1987: figs 29.1–29.59).

With their reduced wings, containing a large, dark, apical spot, *Hypselothyrea thaili* sp. n. and *H. zulu* sp. n. constitute a formerly unknown group within the subgenus *Deplanothyrea*. Other species do not seem to be closely related. *H. (D.) breviscutellata* has only 1 pair of dorsocentrals. The species pair *H. (D.) notabilis* and *H. (D.) vanarasiensis* (cf. Papp 2004) have normal wings which are hyaline and their legs are all yellow.

Chassagnard *et al.* (1998) reported *Hypselothyrea* species from the Afrotropical region but they did not describe them. The first Afrotropical species is *Hypselothyrea africana* Papp, 2004, but being a true *H. (Hypselothyrea)* species, it is not related.

### Subgenus *Baechlia* subgen. n.

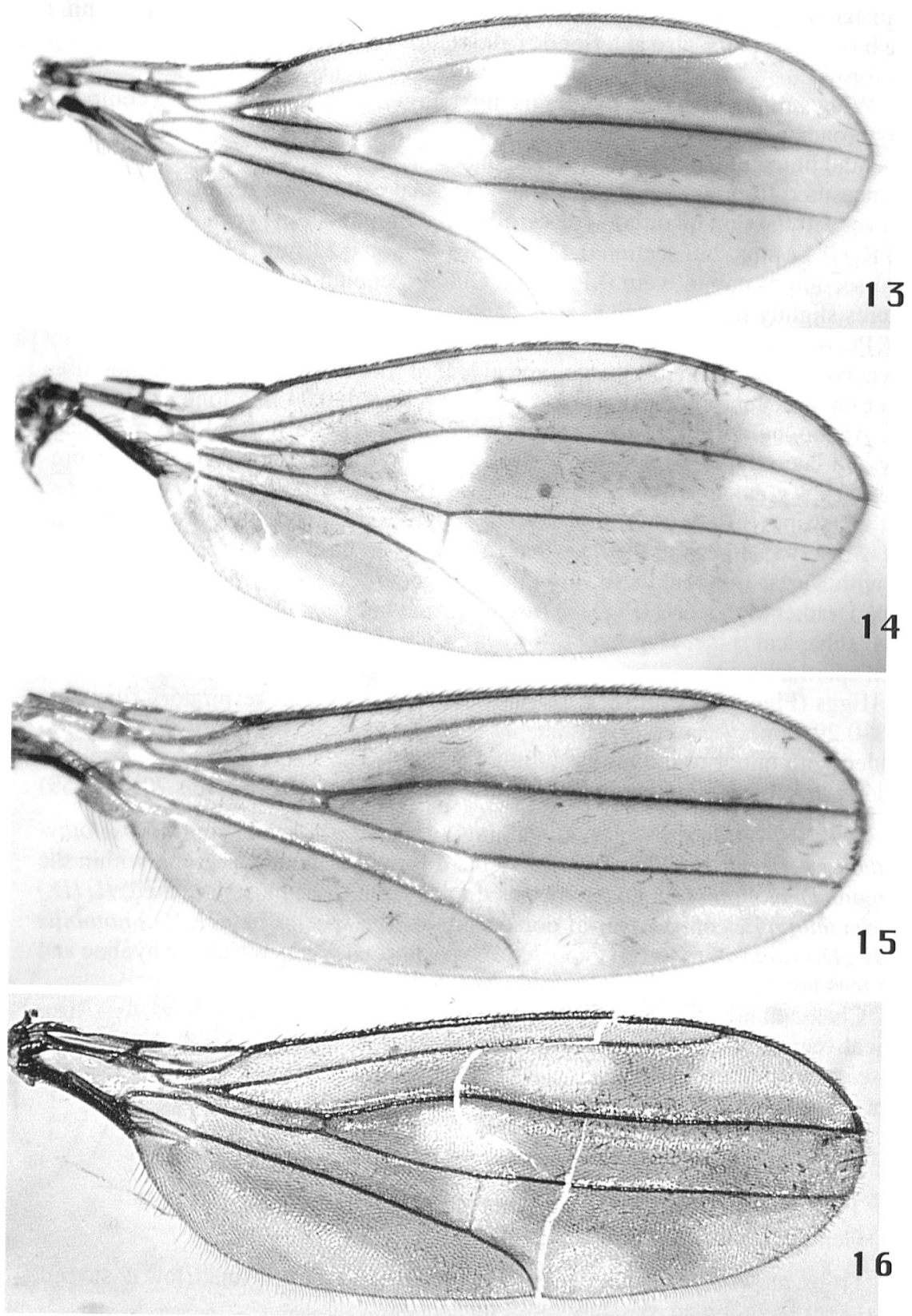
Type species: *Hypselothyrea formosana* Papp, 2004 (orig. des.).

Gender: feminine.

Frons, mesonotum and scutellum dull, granulated. Clypeus small, low U-shaped. Facial keel large, broad, dorsally mostly trapezoid.

One or 2 pairs of dorsocentral setae. Pleura dull (granulated, microtomentose) or shiny. Basal scutellar setae present, even if small. 1 notopleural, 2 supra-alar, 1 posterior katapisternal pairs of setae (1 postalar present or not discernible). Two





Figs 13–16. *Hypselothyrea* (*Baechlia*) species, wings. 13, *H. (B.) formosana* Papp – 14, *H. (B.) hindu* sp. n. – 15, *H. (B.) nitidipleura* sp. n. – 16, *H. (B.) verrucosa* sp. n.

rows of short acrostichal microchaetae, or acrostichal microchaetae discernible caudally to the dorsocentrals only.

Wings with a large, dark, central spot and light spots around wing margin (Figs 13–16). Costal index very high, 1.84 to 2.75.

Fore femur with or without a posteroventral row of stronger setae. Fore femur in its apical  $\frac{3}{5}$  to  $\frac{3}{4}$  with a row of short black spines anteroventrally.

Base of abdomen narrowed, but slightly so.

Male surstyli with dorsal processes meeting in sagittal line (Fig. 22). Surstylus with a row of prensisetae along medial margin and with several thornlike setae on inner surface. Phallus not bulbous apically, phallapodeme rather strong. Ejaculatory apodeme large (Figs 19–20, 24–25, 34–35). Decasternum rather small (at least much smaller than in *Tambourella* and in *Jeannelopsis*, cf. Grimaldi 1990: figs 450–1), connecting hypandrial arms. Hypandrium (Figs 21, 27, 31–32) robust, cranioventral part may widen into a large plate. Cerci always without ventral processes or other sclerotised structures; cerci in various sizes (smaller than anal opening of epanandrium or very large).

Female tergite 7 in two parts, tergite 8 not divided and narrow (compared to cerci), cerci fused, forming a large subtriangular plate (Fig. 12). Oviscapt (Figs 36, 37, 39, 41–43) with a row of black marginal pegs and also some lateral setae.

Eggs with extremely long, almost straight respiratory filaments (Fig. 9). Chorion with longish hexagonal structures (Fig. 10). Shape of eggs similar to some *Microdrosophila* species (cf. Ferrar 1987: figs 29.1–29.59).

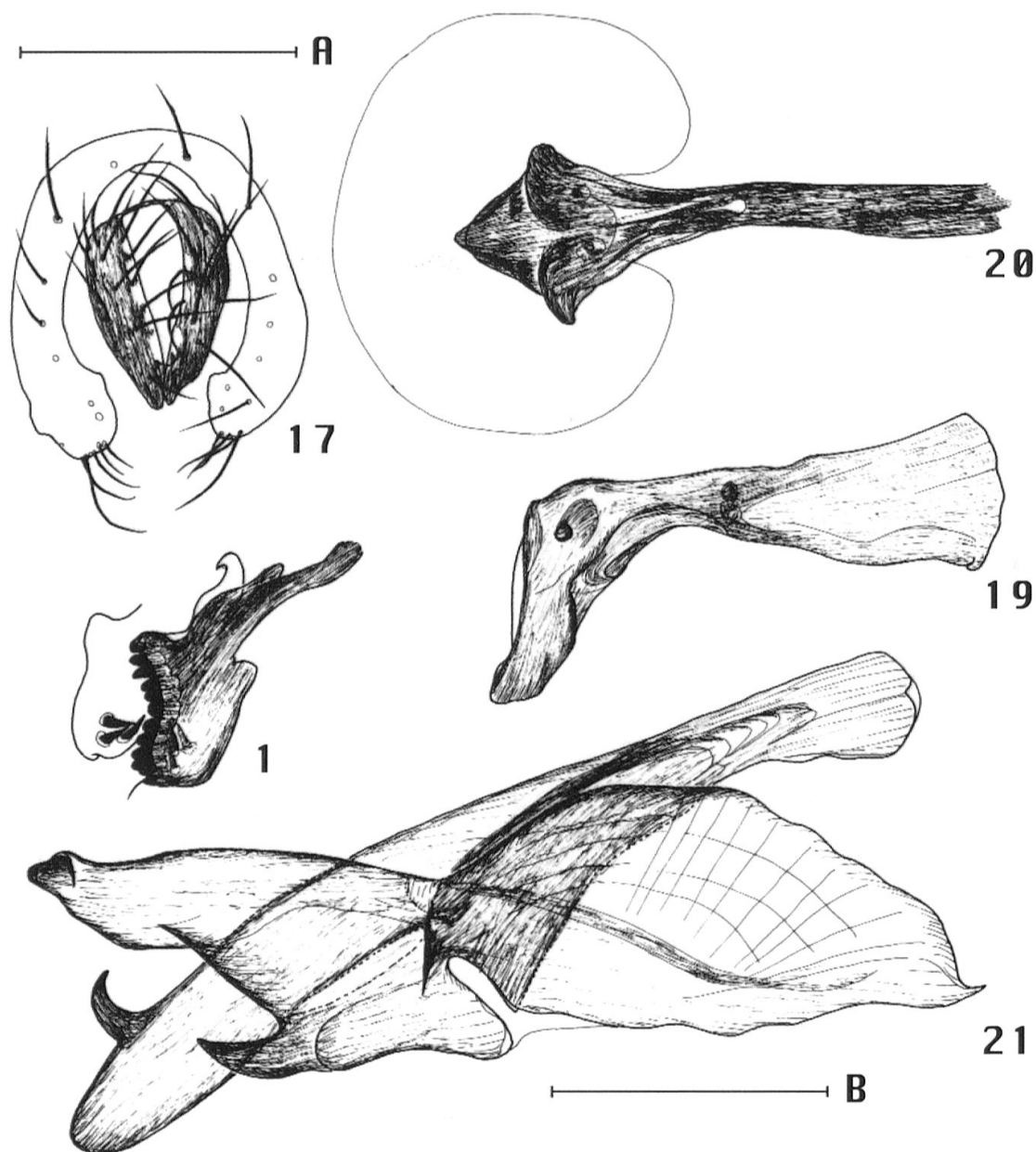
Etymology. I dedicate this new subgenus to Dr. Gerhard Bächli (Zoological Museum of the Universität Zürich, Switzerland), who has published invaluable works on Drosophilidae, and who was my teacher in quantitative sampling and handling of drosophilids.

### *Hypselothyrea (Baechlia) formosana* Papp, 2004

Formerly described from Taiwan but its description was based on three females only. We captured a number of specimens in Thailand, which I consider as conspecific (see Papp *et al.* 2006). Below, I repeat specimens' label data in full (cf. Papp 2004):

Thailand, 2004, L. Papp & M. Földvári (HNHM): 4 males 1 female: Chiang Mai, Doi Suthep N.P., 2 km down to Phuping Palace, groove in forest, Oct 28, No 1; 1 female: *ibid.*, close to and over small waterfalls, No. 3; 1 female: Doi Suthep N. P., along a forest brook, Nov 9, No. 26; 8 males 8 females: Doi Inthanon N. P., Pha Sum Ran Waterfall, forest & along the brook, Oct 30, No. 8; 1 male: *ibid.*, over a small rocky brook, No. 9; 1 male: Doi Pui, over a forest trail, Oct 31, No. 10; 1 male: 8 km E of Doi Anh Kang, over a rocky brook, Nov 2, No. 17; 1 male: Ban Na Lae, nr Pua, over a rocky forest brook, Nov 5, No. 19.

2 males (ZMUZ): THAILAND: Chiang Mai, Chiang Dao Distr., below Phra Prong Cave Temple, 25. XII. 2008, 550M, Schwendinger, TH-08/08; 1 female (ZMUZ): *ibid.*, nr road Mueang Ngai Wiang Haeng, 27. xii. 2008, 950 m, TH-08/13; 2 females: *ibid.*, Chiang Mai Prov. & Distr., Doi Suthep, Huay Khok Ma, 1300 m, 26.xii. 2006, TH-06-20; 3 males 5 females (ZMUZ): Chiang Mai, Doi Suthep N.P., Wat Phrathat, 1050 m, 18.XII.2005, evergreen hill forest, 18.48N/98.55E, leg. P.

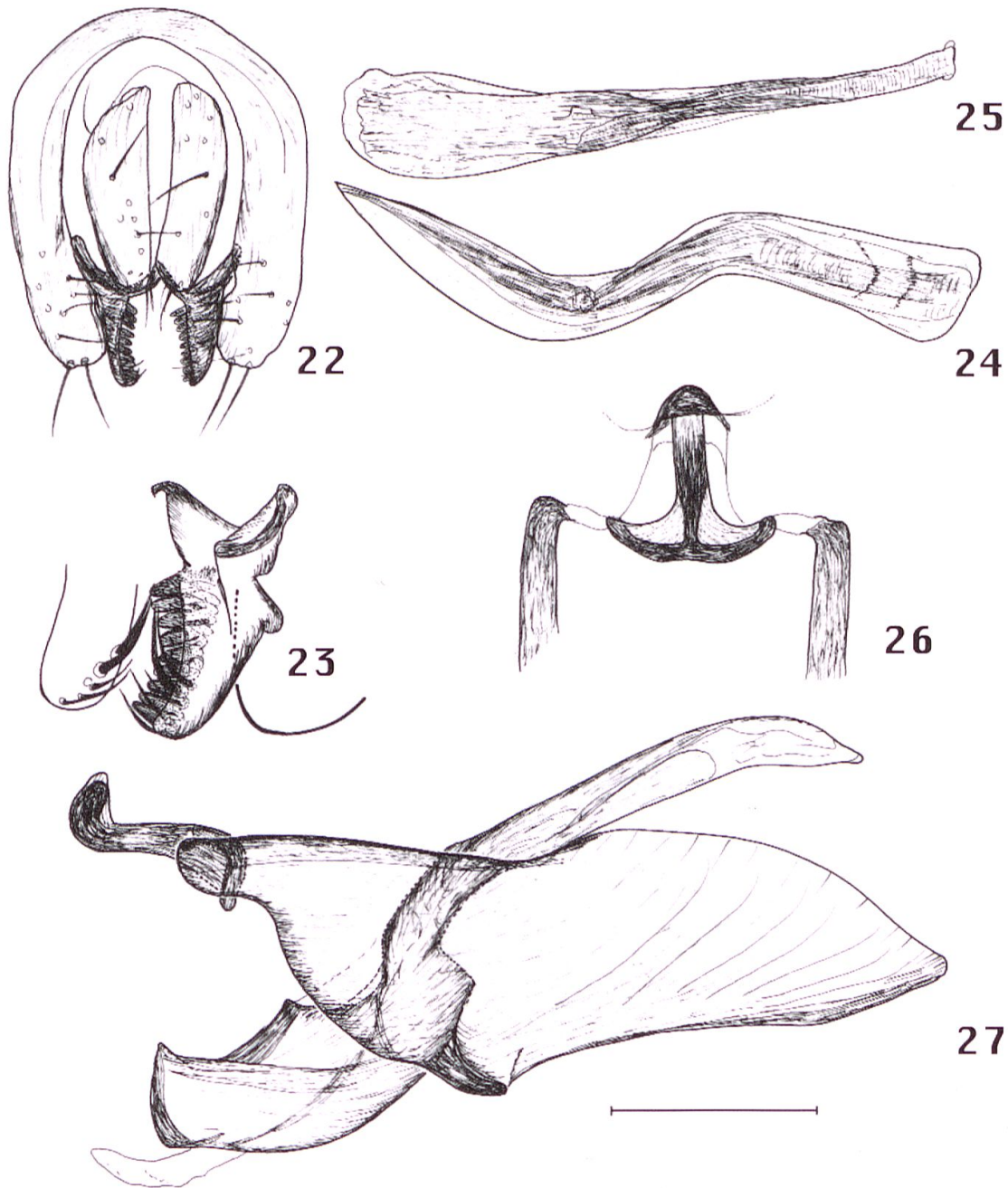


Figs 17–21. *Hypselothyrea (Baechlia) formosana* Papp, male genitalia (Thailand specimens). 17, epandrium and cerci, caudal view; 18, right surstylus at broadest point with inner thorns of left surstylus; 19, ejaculatory apodeme, lateral view; 20, same, dorsal view; 21, inner genital complex, lateral view. Scale bars: A = 0.1 mm for Fig. 17; B = 0.2 mm for Figs 18–21.

Schwendinger; 1 female (ZMUZ): *ibid.*, 30.XII.

Wing measurements were taken of a female from Thailand, Doi Inthanon N. P., Pha Sum Ran Waterfall. First costal section (from H to  $R_1$ ) 0.33 mm. Vein  $R_{2+3}$  rather long, second costal section 1.15 mm, third costal section 0.45 (C-index 2.56, i.e. fits well with the 2.65 value in the original description). Stronger costal fringe on a section of 0.20 mm, i.e. on a 0.45 part of  $Cs_3$  (Fig. 13), practically the same as on the Taiwan specimens. Fourth costal section 0.18 mm, thus third section 2.5 times as long as 4th section. Terminal section of cubital vein 0.125 mm. Anal vein terminates in the closed anal cell, anal region with 2 long brown spots instead of a vein.





Figs 22–27. *Hypselothyrea (Baechlia) hindu* sp. n., male genitalia (holotype). 22, epandrium, surstyli and cerci, caudal view; 23, right surstylus at broadest point with inner thorns of left surstylus; 24, ejaculatory apodeme, lateral view; 25, same, dorsal view; 26, decasternum, dorsal view; 27, inner genital complex, lateral view. Scale bars: A = 0.2 mm for Fig. 22; B = 0.1 mm for Figs 23–27.

Male genitalia of specimens from Thailand are depicted in five figures (Figs 17–21). Epandrium short (Fig. 17), cerci large but comparatively smaller than in *H. (B.) nitidipleura*. Surstylus (Fig. 18) with 11 thick black prenisetae marginally (medially); 3 thick thorns present on medial surface. Dorsolateral processes of surstylus rather strong. Phallus with a large dorsal hook, phallapodeme robust (Fig. 21). Paraphyses elongated caudally. Ejaculatory apodeme (Figs 19–20) large, nearly L-shaped with robust distal part and with narrow but high proximal part.

Female oviscapt (Fig. 37) of the Thailand females rather similar to the oviscapt of the Taiwan type specimens (Papp 2004: fig. 28): with only 3 lateral spinose setae, instead of 5 but that is in all probability within the species variability. Spermathecae (Fig. 38) globular or thimble-shaped, which is a consequence of the thinly sclerotised wall: they may partly collapse even in water. Spermathecae are much smaller than those of *H. (B.) hindu* sp. n. (cf. Fig. 40, but note the different scale). Ducts are shorter but thicker than in *H. (B.) hindu* sp. n.

***Hypselothyrea (Baechlia) hindu* sp. n.** (Figs 14, 22–27, 39–40)

Holotype male (HNHM): INDIA, W. Bengal, Darjeeling Distr., Kurseong, No. 848, 18. X. 1967, Gy. Topál.

Paratypes (HNHM): 2 females: same data as holotype. An additional male, whose abdomen was lost during preparation: India, Daitari, Jajpur-Keonjhar distr., Orissa, 23. X. 1967, leg. Topál (wings 2.53 x 0.92 mm).

The type specimens are damaged, cephalic and thoracic setae broken off, most of the tarsomeres lost. They were preserved in alcohol for nearly three decades, then minuten-pinned.

Measurements in mm: body length 2.42 (holotype), 2.10, 2.75 (paratypes), wing length 2.32 (holotype), 2.14, 2.53 (paratypes), wing breadth 0.88; 0.78, 1.05.

Body brown.

Head structures and setae as in *formosana*. Carina on dorsal  $\frac{3}{5}$  of facial plate. First flagellomere dirty yellow. Arista dorsally with 5, ventrally with 3 long rays behind apical fork. Palpus with strong apical seta.

Mesonotum grey microtomentose as are all the pleura.

Legs yellow, fore tarsi whitish. Setation as in *formosana* (i.e. also with a posteroventral row of stronger setae on fore femur).

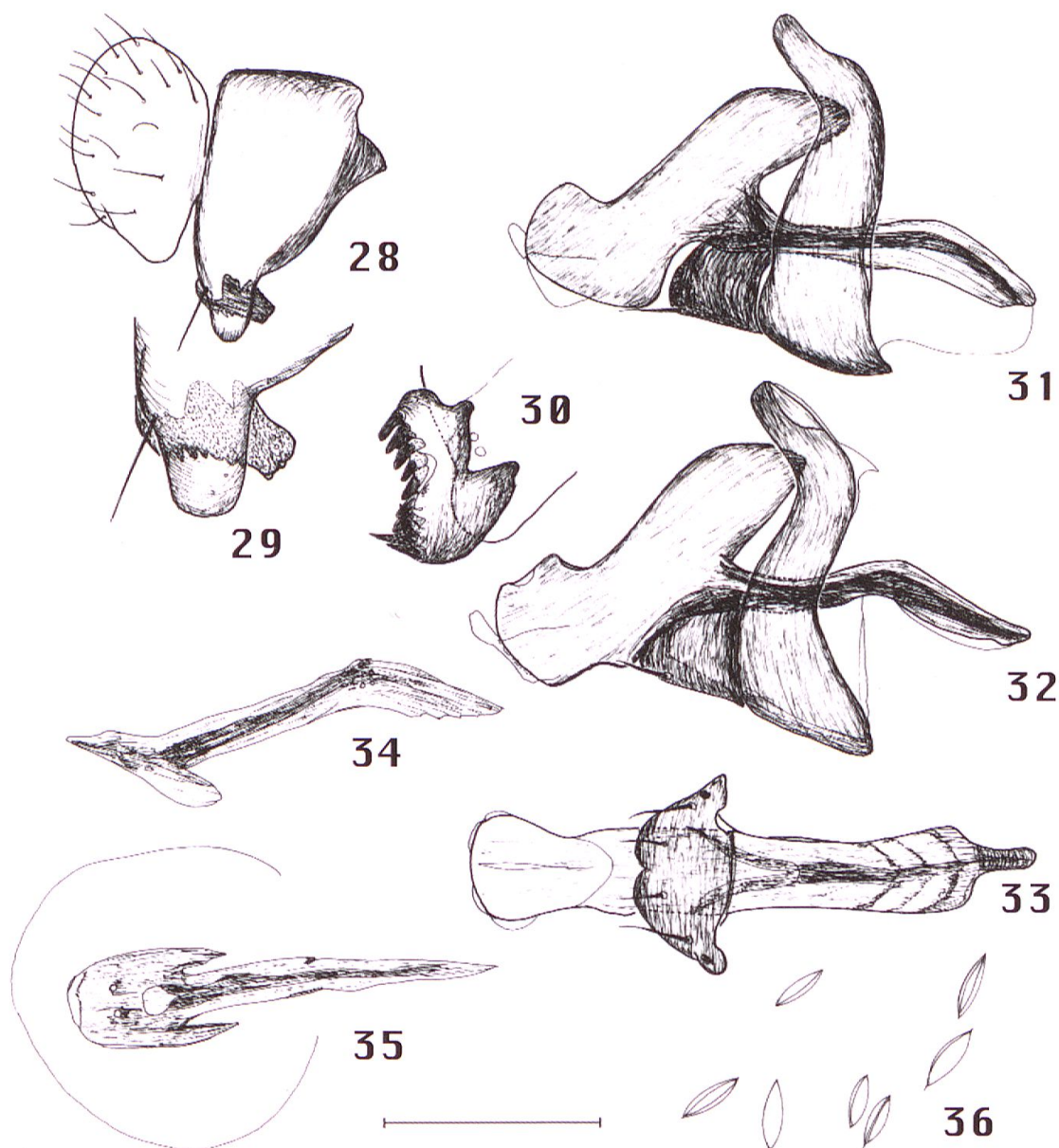
First costal section 0.36 mm, vein  $R_{2+3}$  much shorter than in *H. formosana* (Fig. 14), second costal section 1.23 mm, third costal section 0.67 mm (C-index 1.84 vs. 2.56–2.65), stronger costal fringe on a section of 0.55–0.56 mm, i.e. on 0.82–0.84 part of third section. Fourth costal section 0.175 mm, thus third section 2.5 times as long as fourth section. Cell  $r_1$  not darkened under  $R_1$ . Longest alular cilia 0.09 mm. Inter-crossvein section 0.35 mm, dM-Cu 0.125 mm. Terminal section of Cu downcurved apically, 0.40 mm. Halteres yellow.

Abdomen not much narrowed basally.

Male genitalia (Figs 22–27) structurally similar to those of *formosana*, but different in details. Epandrium short, cerci large but do not occupy the whole space in the arch of the epandrium (Fig. 22). Surstylus (Figs 22–23) with 10 very thick and blunt prenisetae marginally (medially) and with 1 large and 3 thinner thorns on the inner surface. Dorsolateral processes of surstylus somewhat shorter than in *H. (B.) formosana*. Ejaculatory apodeme (Figs 24–25) long, curved twice, distal part much smaller than in *formosana*, proximal part much less high. Decasternum (Figs 26–27) of an intricate form, its connection to hypandrial arms membranous rather than sclerotised. Genital complex (Fig. 27) in general similar to that of *formosana* but phallus shorter and shape completely different, phallapodeme thinner, also processes of paraphyses smaller.

Female oviscapt (Fig. 39) shaped as in *formosana*, however, its armature much stronger: marginal pegs more numerous and thicker, and also lateral setae longer





Figs 28–36. *Hypselothyrea (Baechlia) nitidipleura* sp. n., paratype male. 28, epandrium, right surstylus and cercus, lateral view; 29, right surstylus and ventral lobe of epandrium in higher magnification; 30, right surstylus at broadest point, inner (medial) view; 31, inner genital complex, lateral view; 32, inner genital complex of another male, lateral view; 33, phallus, phallapodeme and paraphyses, ventral view; 34, ejaculatory apodeme, lateral view; 35, same, dorsal view; 36, shells of fungal spores from gut content. Scale bar: 0.2 mm for Fig. 28; 0.1 mm for Figs 29–36.

and thicker. There is an additional row of thinner setae more dorsally. Spermathecae (Fig. 40) much larger than in *H. formosana* (cf. Fig. 38, but note the different scale). Spermathecae semiglobular, ducts thin and asymmetrically placed with bulbous conjointment to spermathecae.

*H. (Baechlia) hindu* sp. n. is related to *H. (B.) formosana*. The easily detectable differences are given in the key below. However, differences found in the armature of the female oviscapt, in the shape of the spermathecae, etc. are so large that



I do not think that these two species are phylogenetically closely related.

Etymology. The specific epithet of this new species refers to its type locality, India.

***Hypselothyrea (Baechlia) nitidipleura* sp. n.** (Figs 15, 28–36, 41–42)

Holotype male (HNHM): Thailand [Trang Prov.], Khao Pu - Khao Ya N. P., along a forest brook below the (Pak Yam) waterfall, Nov 21, 2004, No. 42, leg. L. Papp & M. Földvári.

Paratypes (HNHM): 6 males 2 females: same data as the holotype; 1 male: ibid., Khao Chong Botanic Garden, along stream below waterfall, Nov 14, No. 30; 1 male 2 females: ibid., Khao Chong Botanic Garden, rainforest, Nov 18/22, No. 36/43; 1 male 1 female: ibid., Thung Khai Botanic Garden, primary lowland rainforest, Nov 19, No. 38.

Measurements in mm: body length 2.59 (holotype), 2.08–2.70 (paratypes), wing length 1.87 (holotype), 1.46–1.92 (paratypes), wing width 0.57, 0.48–0.60.

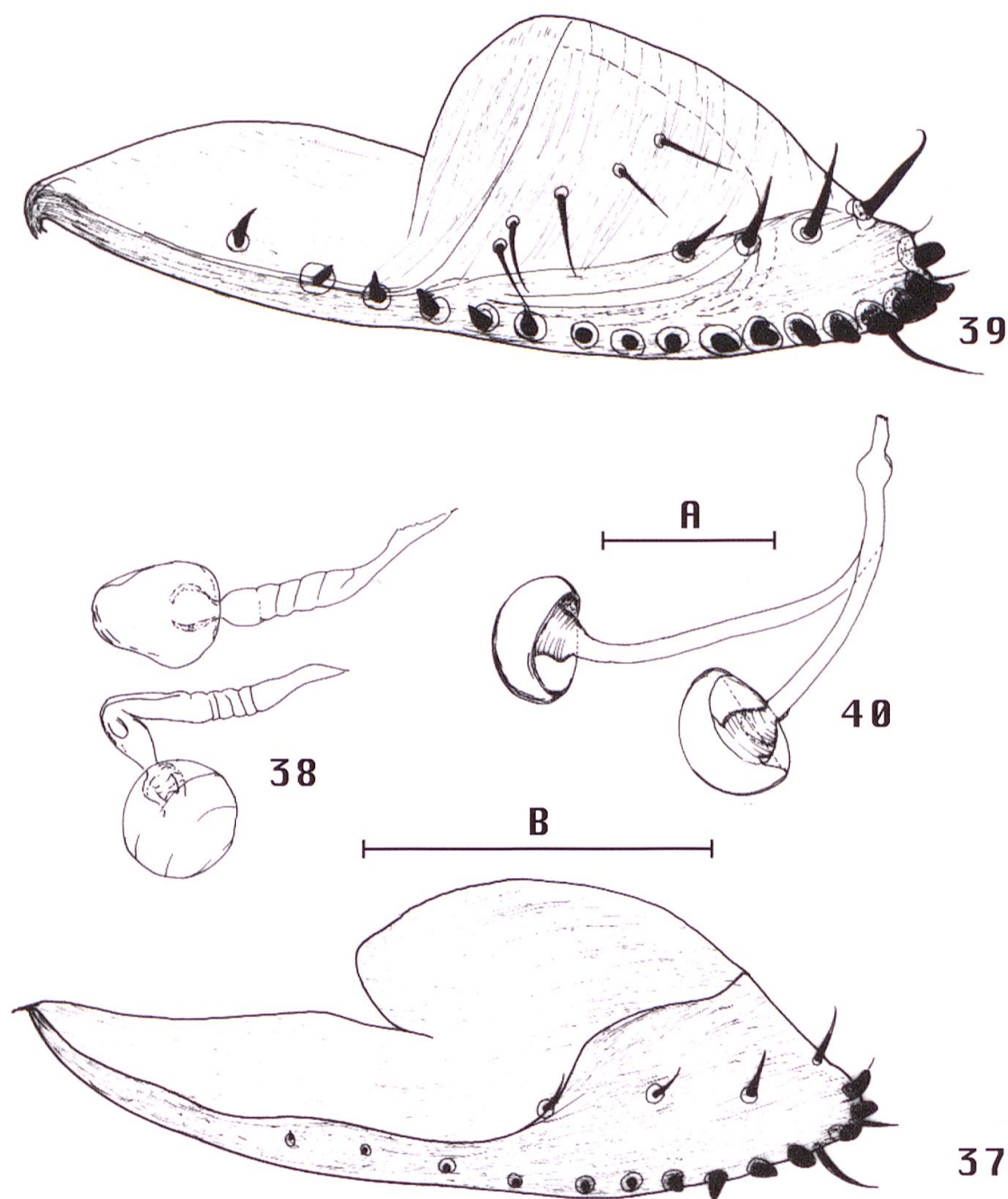
Most of the head, thoracic pleura and abdomen shiny black, mesonotum granulose and microtomentose, frontal shield granulose but still subshiny.

Frons not very broad, 0.34 mm above ptilinum (head 0.70 mm broad, measured on the holotype). Frontal shield trapezoid, frons very similar to that of *H. verrucosa*. Carina on dorsal 3/5 of facial plate. Anterior fronto-orbital pair of setae proclinate and slightly lateroclinate, distinctly shorter than posterior one; ocellar and vertical setae strong. First flagellomere with 0.025 mm long cilia. Eyes with scattered ommatrichia. Palpus with a 0.10 mm long apical seta. Arista with 6 (7) dorsal and 3 ventral long branches (rays) behind apical fork.

Anepisternum and katepisternum shiny, not granulated, but meron, metathoracic parts as well as a narrow dorso-caudal part of both katepisternum and anepimeron grey dusted. Scutellum short, 0.18 mm long, 0.32 mm broad, flat (not upright), but apical scutellars rather perpendicularly upright, 0.31 mm long; basal scutellars present only as 0.055–0.06 mm long setulae. Only 1 pair of strong dorsocentrals. Other thoracic setae: 1 anterior notopleural (posterior one present only as a 0.08 mm long hair), 2 supra-alar (slightly cranial and slightly caudal to wing base), the postalar (in the row of the intra-alars) not discernible; 1 posterior katepisternal pair of setae. Acrostichals discernible only caudally to dorsocentrals (as minute whitish hairs).

Legs yellow, including fore coxae. Fore femur blackish in apical half, brown in basal half, with anteroventral spinules on its apical  $\frac{4}{7}$ , 1 short subbasal posterior seta only. Fore tibia black.

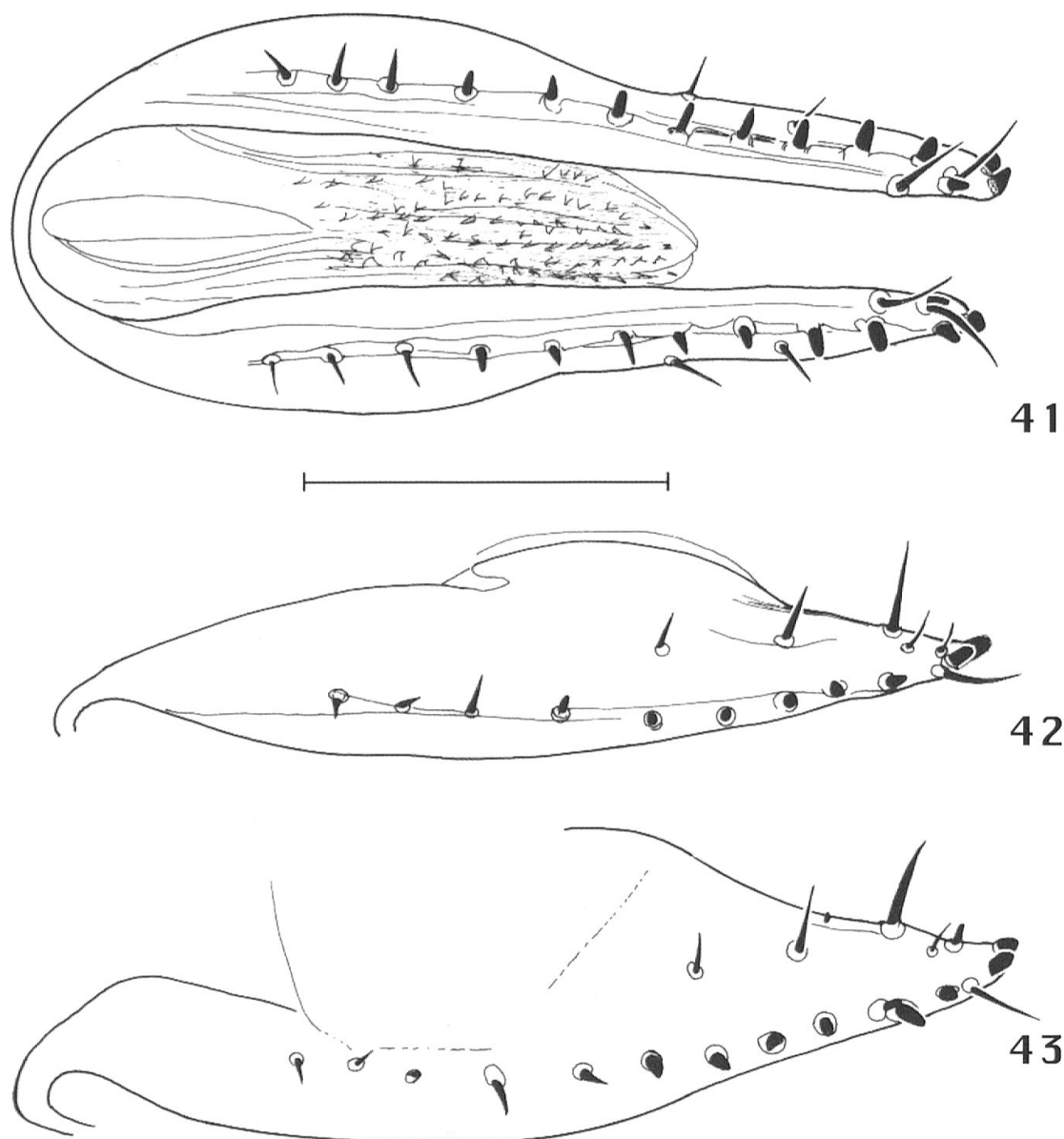
Wing not reduced, but definitely narrower than in *H. (B.) formosana* (Fig. 15 vs. Fig. 13). Veins dark brown. Wing pattern similar to that of *H. (B.) verrucosa*, but the long clear stripe in cell cu narrow, borders diffuse or a lighter spot simply not discernible there. Again, a clear spot around dM-Cu and one in cell  $r_{2+3}$  are separated by a dark margin along vein  $R_{4+5}$ . First costal section (from H to  $R_1$ ) 0.225 mm, 2nd section 0.93 mm, 3rd section 0.35 mm, C-index 2.65. Stronger costal fringe on a 0.165 mm long section, i.e. on a 0.47 part of third section. Inter-crossvein section 0.32 mm, dM-Cu 0.10 mm. Terminal section of cubital vein strongly down-curving, 0.19 mm. Longest cilia on cubital margin 0.055 mm. Alular fringe 0.07



Figs 37–40. *Hypselothyrea* (*Baechlia*) species, female genitalia. *Hypselothyrea* (*Baechlia*) *formosana* Papp: 37, oviscapt, broadest sublateral view; 38, spermathecae in water. — *Hypselothyrea* (*Baechlia*) *hindu* sp. n.: 39, oviscapt, broadest sublateral view; 40, spermathecae in water. Scale bar: 0.1 mm for Figs 38 and 40; 0.2 for Figs 37 and 39.

mm long. Cell  $r_{4+5}$  in broadest area (slightly proximally to dM-Cu) 0.13 mm. Halteres smaller than normal, light brown.

Abdomen with tergites 1 and 2 dusted medially. Male genitalia (Figs 28–35) very distinct. Epandrium long (Fig. 28), if compared to that of *H. formosana* and *H. hindu*, cerci very large but without long setae. Surstylus (Figs 28–30) rather small with 11 strong marginal prensisetae: dorsal ones blunt, shorter and in a marginal



Figs 41–43. *Hypselothyrea* (*Baechlia*) *nitidipleura* sp. n.: 41, oviscapt, caudal view; 42, same, broadest sublateral view — *H. (B.) verrucosa* sp. n.: 43, oviscapt, broadest sublateral view. Scale bar: 0.1 mm.

row, ventral ones longer, more acute and not ordered into that row (Fig. 30). Dorso-lateral processes of surstylus small (short). Phallus short and thick (Figs 31–33), phallapodeme comparatively long but not thick (Figs 31–32, cf. Fig. 33); paraphyses without ventral processes (Figs 32–33). Hypandrium short, ventral part much smaller than in *H. formosana*. Ejaculatory apodeme (Figs 34–35) distinct but less large than in *H. formosana*, distal part with 2 lateral wings, proximal part narrow, curved but not high.

Female abdomen black, not much narrowed basally. Oviscapt (Figs 41–42) short and very high, with 11–13 marginal setae, more dorsal (caudal) ones setose,



ventral ones short, blunt pegs. In addition, 1 longer marginal and several lateral setae present. The oviscapt of *verrucosa* is similar but broader (see Fig. 43).

Distribution. Thailand.

*Hypselothyrea (Baechlia) nitidipleura* sp. n. is a narrow winged species, close to *H. (B.) verrucosa* sp. n. Its distinctive features to *H. (B.) verrucosa* sp. n. are given in the key below. Most probably one will find small differences also in the male genitalia; unfortunately the male of *verrucosa* has not been captured hitherto.

Among the *Baechlia* specimens which were dissected for the preparation of male and female genitalia, I found at least four specimens (*H. formosana*, *H. hindu* and *H. nitidipleura*), whose abdomen contained a black mass of some undigested matter. Under high magnification that matter proved to be shells of fungal spores (Fig. 36).

Etymology. The specific epithet of this new species refers to its smooth shiny pleura.

***Hypselothyrea (Baechlia) verrucosa* sp. n.** (Figs 9–10, 12, 16, 43)

Holotype female (HNHM): Thailand, No. 10, Trang Prov., Khao Chong Reserve, nr [= near] Ton Prew Waterfall – beating and netting, 21.1. 2003, Orosz & Sziráki.

Apical parts of both wings were broken; now both wings are prepared on a slide under two pieces (about a quarter) of cover glass. Its abdomen had been detached but kept on a separate minuten pin on the same card as other parts of the body; postabdomen with genitalia are preserved in a plastic microvial with glycerol.

Measurements in mm: body length 2.70, wing length 2.05, wing breadth 0.65.

Body black, legs mostly yellow (see below).

Frons not very broad, 0.43 mm above ptilinum (head 0.79 mm broad). Frontal shield large, trapezoid, deeply granulose but still subshiny. Orbitalia slightly emerging, a shallow, evenly narrow (ca. 0.01 mm wide) furrow between orbitalia and frontal shield. Face black, shiny, carina on 3/5 of facial height, rounded ventrally, 0.11 mm at widest point. Fronto-orbitals well developed, pro- and reclinate, with a minute reclinate hair between them (partly broken off). No postocellars, minute setulae in that position only 0.04 mm long. Vibrissa broken off on holotype. Eyes with scattered ommatrichia. Palpus narrow. First flagellomere 0.075 mm broad, 0.165 mm long with 0.03 mm long cilia. Arista with 4 (?5) dorsal and 3 very long ventral branches behind apical fork.

Mesonotum mat black, grey microtomentose and granulose. Scutellum not upright, black granulose (not microtomentose), only 0.20 mm long, scutellars broken off from the holotype but based on the size of their base, only apical scutellars are large. One pair of strong dorsocentral setae present. Dorsocentral microchaetae discernible, acrostichal microchaetae hardly so (2 rows as usual, caudally to the level of dorsocentrals). Pleura black, entire anepisternum and part of katapisternum with small, scattered warts, katapisternum with minute setulae and with a 0.18 mm long posterior katapisternal seta. Meron, and metathoracic parts with thick grey microtomentum.

Legs yellow, including fore coxae. Fore femur blackish in apical half, brown in basal half. Fore tibia black, fore tarsi whitish. Fore femur ventrally in its apical

3/5 with a row of small black thornlets (pegs), 1 short thin subbasal posterior seta only. Knees of mid and hind legs brown.

Wing pattern similar to its congeners (Fig. 16). There is a large central brown spot between  $R_{2+3}$  and hind wing margin, apical  $\frac{2}{3}$  of cell  $r_{2+3}$ , incl. wing apex dark. The dM-Cu area and an adjoining area of cell  $r_{2+3}$  are clear. Two larger areas in cell m and a long stripe in cell cu are also clear. First costal section (from H to  $R_1$ ) 0.25 mm, second section 1.09 mm, third section 0.395 mm, C-index 2.75. Stronger costal fringe on a 0.19 mm long section, i.e. on a 0.48 part of third section. Inter-cross-vein section 0.385 mm, dM-Cu 0.125 mm. Terminal section of cubital vein strongly downcurving, 0.22 mm. Longest cilia on cubital margin 0.055 mm. Anal vein short, hardly surpassing the fold. Anal cell not closed by a pigmented vein but by a fold only. Alula very narrow. Alular fringe 0.09 mm long. Cell  $r_{4+5}$  at broadest (slightly proximally to dM-Cu) 0.175 mm. Halteres brown.

Male not known.

Female abdomen black, subshiny, only slightly narrowed basally (in the middle of tergite 2  $\frac{3}{4}$  as broad as abdomen in broadest tergite). Tergites without long setae, i.e. marginal setae only slightly longer than discal ones, 0.05–0.07 mm long. Female tergite 7 in two parts, tergite 8 not divided and narrow (compared to cerci), cerci fused, forming a large subtriangular plate (Fig. 12).

Female genitalia: cerci (Fig. 12) 0.09 mm long, 0.11 mm broad, subtriangular, apex rounded with a pair of medium-long and several short setae, oviscapt (Fig. 43) broader than that of *H. (B.) nitidipleura* (Fig. 42). Armature of oviscapt different from that of *H. (B.) nitidipleura* (Figs 41–42): marginal pegs other than apical ones are more numerous (11 vs. 9); shape and armature of oviscapt is distinctly different from that of *H. (B.) formosana* and *H. (B.) hindu* (Figs 37, 39).

Eggs (Figs 9–10) as described under the subgenus.

Distribution. Thailand.

*Hypselothyrea (Baechlia) verrucosa* sp. n. is closely related to *H. (B.) nitidipleura* (see in the key below).

Etymology. The specific epithet of this new species refers to its granulose pleura.

#### KEY TO THE SPECIES OF THE SUBGENUS *BAECHLIA*

- 1 Two pairs of dorsocentral setae. Wings broader (Fig. 13). Fore femur with a posteroventral row of stronger setae ..... 2
- Only one pair of dorsocentral setae. Wings narrower (Fig. 15). Fore femur without a posteroventral row of strong setae (only a subbasal hair present) ..... 3
- 2 Vein  $R_{2+3}$  long (Fig. 13), C-index 2.56–2.65, third costal section about 2.5 times as long as 4th section. A stronger costal fringe on ca. half of third costal section. Cell  $r_1$  darkened under  $R_1$ . Male genitalia (Figs 17–21). Taiwan, Thailand ..... *H. (B.) formosana* Papp, 2004
- Vein  $R_{2+3}$  much shorter (Fig. 14), C-index 1.84, third costal section nearly 4 times as long as fourth section. A stronger costal fringe on more than  $\frac{4}{5}$  of third costal section. Cell  $r_1$  not darkened under  $R_1$ . Male genitalia (Figs 22–27). India ..... *H. (B.) hindu* sp. n.
- 3 Pleura (anepisternum) granulose black. Wing (Fig. 16) with cell  $r_{4+5}$  0.175



- mm at broadest point. Female oviscapt broader with more marginal setae (Fig. 43). Thailand ..... *H. (B.) verrucosa* sp. n.
- Pleura incl. anepisternum smooth shiny black. Wing (Fig. 15) with cell  $r_{4+5}$  0.13 mm at broadest point. Female oviscapt narrower with less marginal setae (Figs 41–42). Thailand ..... *H. (B.) nitidipleura* sp. n.

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