

## A REVIEW OF THE GENUS *STILPON* LOEW, 1859 (EMPIDOIDEA: HYBOTIDAE) FROM THE ORIENTAL REGION

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**ABSTRACT.** – The first comprehensive study of the genus *Stilpon* Loew in the Oriental region is presented. Seventeen species are known nowadays from the region, including sixteen new ones. Fifteen species are separated into three groups: *S. graminum* group: *S. monospinatus*, new species (Thailand), *S. spinicercus*, new species (Thailand); *S. seeluang* group (newly recognised): *S. crassinervis*, new species (Thailand), *S. isaanensis*, new species (Thailand), *S. laawae*, new species (Thailand), *S. nhomyaaw*, new species (Thailand), *S. seeluang*, new species (Thailand), *S. taksin*, new species (Thailand); *S. divergens* group: *S. khorngkeun*, new species (Thailand), *S. lek*, new species (Thailand), *S. lekkwar*, new species (Thailand), *S. malayensis*, new species (Singapore), *S. nhamdam*, new species (Thailand), *S. trilobatus*, new species (Thailand); two species have an uncertain group position: *S. paradoxus*, new species (Thailand), *S. yai*, new species (Thailand). A key to all species from the Oriental region is provided. The gland-like structures on the male abdomen are described for the first time in *Stilpon*. Phylogenetic relationships within the genus are shortly discussed.

**KEY WORDS.** – Empidoidea, Hybotidae, Tachydromiinae, *Stilpon*, new species, Oriental, phylogeny, gland-like abdominal structures, Thailand, Singapore.

### INTRODUCTION

The genus *Stilpon* Loew, 1859, includes very small predacious flies inhabiting different biotopes but usually occurring in the low-lying vegetation zones (Collin, 1961; Chvála, 1975; Cumming & Cooper, 1992). *Stilpon* belongs to the subfamily Tachydromiinae and is a member of an assemblage of the genera known nowadays as a tribe Drapetini (Chvála, 1975). Cumming & Cooper (1992) have defined this genus as having linear to sublinear frons, large antennal pedicel, small postpedicel with dorsoapical arista and large asymmetrical male terminalia with a single ejaculatory apodeme. The group is almost worldwide in the distribution (except Australia), with about 25 described recent species. However, this number is attributed mainly to the Palaearctic and Nearctic regions. A single species of *Stilpon* has been described from the Oriental region (Smith, 1965). Additionally, some fossil species of the genus are known from the Dominican and Baltic ambers (Meunier, 1908; Cumming & Cooper, 1992; Janzen, 2002).

*Stilpon* occurs in the same environment as *Nanodromia* and can easily be confused with it. *Nanodromia* Grootaert, 1994,

also a genus of very small flies, was described from Papua New Guinea. It has the wing cells br and bm equally long, while the upper cell br is distinctly shorter than the lower cell bm in *Stilpon*. Both genera occur together in Thailand. *Stilpon* with its 15 species in Thailand is more speciose and abundant, especially in the Northeast. *Nanodromia* is less common since we have seen only 4 species in Thailand so far (Grootaert & Shamshev, 2004).

The present paper is the first comprehensive study of *Stilpon* from the Oriental region. All species, including *S. divergens* Smith known from Nepal only (Smith, 1965), are keyed. The phylogenetic relationships of the new species and the gland-like structures on the male abdomen are discussed.

### MATERIALS AND METHODS

The flies were collected by sweep netting, but most were collected in Malaise traps. One trap was placed along the border of a bamboo wood at the Field Research Station (FIRS) at Na Haeo (Loei province, Northeast Thailand). This trap was operational during 2.5 years (1999-2001, coll. Verapong

Kiatsoonthorn & P. Grootaert) and the samples were collected weekly. In addition, some material came from Malaise traps at the same site, operational in April and May 2003. All material was stored originally in 70% ethanol.

Holotypes are mostly conserved in the country of origin. Paratypes are conserved in the zoological collections of Srinakharinwirot University in Bangkok (SWU), in the Zoological Reference Collection of the Raffles Museum of Biodiversity Research, National University of Singapore (ZRC) and the Royal Belgian Institute of Natural Sciences (RBINS). Type localities are not designated in the text, but are the localities of the holotype.

Terms used for adult structures primarily follow those of McAlpine (1981), although the terminology for the antenna is taken from Stuckenbergs (1999). Homologies for the male and female terminalia follow Cumming & Cooper (1992) and Sinclair (2000). To facilitate observations, the terminalia were macerated in hot 85% lactic acid and immersed in glycerine. Drawings of morphological features were made with a camera lucida attached to a compound microscope.

In descriptions and key, right and left side of the male terminalia are based on the unrotated position viewed posteriorly, such that in the illustrations the right surstyli appears on the readers left side and vice versa. All male terminalia are figured in their unrotated position. When describing the new species of *Stilpon* we mainly used the format applied by Cumming & Cooper (1992). Thus, we considered that it would be helpful for future comparative studies of the genus.

## SYSTEMATICS

### *Stilpon* Loew, 1859

*Agatachys* Meigen, 1830. Nomen nudum. Cited as a MS name of Winthem in specific synonymy under *Tachydromia celeripes* Meigen (= *graminum* Fallén, 1915).

*Stilpon* Loew, 1859. Subgenus of *Drapetis* Meigen. Type species: *Tachydromia graminum* Fallén, 1815 (des. by Loew, 1864).

*Tetraneurella* Dahl, 1909. Type species: *Tetraneurella beckeri* Dahl, 1909 (mon.) (= *graminum* Fallén, 1915).

*Pseudostilpon* Séguy, 1950. Type species: *Tachydromia paludosa* Perris, 1852 (orig. des.).

**Diagnosis.** – Very small flies, 1.0–2.5 mm long. **Male.** Head dark brown to black in ground-colour. Eyes with ommatrichia, contiguous in facial part. Ommatidia slightly enlarged below antennae. Frons linear to sublinear, narrow to fairly wide, entirely or partially tomentose. Face strongly convex. Gena barely extended below eye. Ocellar tubercle with 2 pairs of bristles. One pair of prominent inclinate vertical bristles. Antennae placed below or near middle of head; scape small; pedicel large and globose, with long ventral preapical bristle; postpedicel small, ovate, with well prominent dorsoapical extension; stylus dorsoapical, long. Palpus elongate-ovate, with distinct apical seta. Proboscis slightly recurved.

Thorax black brown to yellow in ground-colour. Scutum not shiny and entirely tomentose or partly or entirely shiny and lacking tomentum. Postpronotal lobe undifferentiated. Postalar callus partially differentiated. Thoracic bristles mostly hardly prominent; acrostichals arranged in 2 complete or incomplete rows posteriorly or absent; dorsocentrals in 2 or more rows, often undifferentiated from intra-alar setulae, complete or incomplete posteriorly. Mesopleuron largely shiny, tomentose along dorsal margin. Metaepimeron large. Halter with knob yellow to black, rarely absent.

Wing normally developed or sometimes shortened, broad or narrow; hyaline, more or less infuscate or with distinct pattern. Microtrichia uniform or lengthened in some parts of wing. Costal setae short or long. Rs originating halfway along R1. R2+3 complete or incomplete. Cell br short, distinctly less than length of cell bm. Crossvein bm-cu nearly transverse. A1 and crossvein CuA2 absent.

Legs short, often with distinct colour pattern. Fore femur thickened. Mid femur slender to barely thickened, usually armed with bristles and spinules or spines arranged in specific patterns. Hind femur evenly thickened or constricted near middle, with well prominent anterodorsal bristles. Fore tibia more or less spindle-like, usually lacking prominent bristles; Mid tibia often armed with ventral spinules; hind tibia slender, lacking prominent bristles, rarely with modified posterior apical comb. Tarsi unmodified, except slightly to moderately expanded basitarsus.

Abdomen with segments 1–7 lightly sclerotized, subequal in length or some segments shortened, rarely segments 1–2 modified; segment 8 always short, partially concealed by segment 7; squamiform lateral setae absent. Gland-like intersegmental structures present or absent.

Hypopygium asymmetrical, rotated 90° to the right. Epandrium completely divided. Left epandrial lamella small and fused to hypandrium, with long or greatly reduced to absent bristles in apical part. Left surstyli divided into 3 (or 4) lobes; upper lobe with or without surstyli comb. Right epandrial lamella usually large, positioned ventrally. Right surstyli large to moderately large, undivided, sometimes with apical spines. Cerci, including subepandrial sclerite, fused together basally, rarely fused completely into one large lobe, sometimes greatly reduced. Left cercus usually large, with or without apical spines. Right cercus undivided or divided, sometimes with apical spines. Phallus elongate, well sclerotized, hair-like or, rarely, straight or very short and rather weakly sclerotized; single rod-shaped ejaculatory apodeme present.

**Female.** Similar to male except ordinary setation on mid legs, unmodified hind femur, wing microtrichia and abdominal segments 1–2. Abdomen without gland-like structures. Terminalia short to elongate. Tergite 8 not fused laterally with sternite 8. Sternite 8 entire, or with apex hinged and partly or completely separated from base. Tergite 9 absent. Sternite 9 reduced to small internal sclerite. Tergite 10 absent. Sternite

10 plate-like or desclerotized medially, positioned below proctiger. Cercus elongate-ovate or broad-ovate. Spermatheca membranous, sac-like.

### Key to *Stilpon* species from the Oriental region

1. Male ..... 2
- Female (unknown in *S. crassinervis*, *S. khorngkeun*, *S. malayensis*, *S. monospinatus* and *S. yai*) ..... 18
2. Thorax wholly black to brown ..... 3
- Thorax at least with yellow pleurae ..... 12
3. Hind femur constricted and bent near middle. Hind tibia (Fig. 71) with long spur-like posterior apical comb. Abdominal tergite 1 (Fig. 84) produced laterally into small corner-like projection bearing 3 black spine-like bristles. Cerci (Fig. 73) completely fused into one large elongate oval lobe ..... *S. paradoxus*
- Hind femur evenly thickened toward middle. Hind tibia with ordinary posterior apical comb. Abdominal tergite 1 unmodified. Cerci more or less separated, except base .... 4
4. Distance between apices of veins R2+3 and R4+5 nearly 1.5 times shorter than distance between apices of veins R1 and R2+3. R4+5 strongly curved at apex (Fig. 41). Hind tarsomere 1 brown ..... *S. khorngkeun*
- Distance between apices of veins R2+3 and R4+5 longer than distance between apices of veins R1 and R2+3. R4+5 evenly arcuate or straight. Hind tarsomere 1 yellow ..... 5
5. R4+5 and M parallel and straight in apical part. Mid femur (Fig. 76) with 3 black antero- and 2 longer posteroventral spines in basal half ..... *S. yai*
- R4+5 and M more or less divergent and arcuate in apical part. Mid femur with less numerous black spines ..... 6
6. Fore tibia with 1 erect ventral bristle in apical part. Wing brown before and beyond vein M ..... 7
- Fore tibia clothed in ordinary setulae. Wing lacking prominent pattern, more or less infuscate, usually somewhat deeper along veins ..... 8
7. Mid femur (Fig. 5) with 1 black short ventral spine just beyond middle, 3 long yellowish bristles in basal part and row of anteroventral brownish spinules before middle. Abdomen with gland-like structures between tergites 3-2 and 2-1. Left surstyli with markedly developed surstyliar comb (Fig. 8). Left cercus (Fig. 9) divided, with 3 apical spines ..... *S. spinicercus*
- Mid femur (Fig. 1) lacking black spines, only with 3-4 yellow long ventral bristles in basal part. Abdomen without gland-like structures. Left surstyli (Fig. 3) with hardly prominent surstyliar comb. Left cercus (Fig. 2) undivided, with 1 apical spine ..... *S. monospinatus*
8. Fore tibia brownish to brownish yellow. Mid femur brownish at least in apical third ..... 9
- Fore tibia and mid femur yellow ..... 11
9. Mid femur (Fig. 60) with swelling in basal part, bearing 1 long black anteroventral spine near middle. Hind femur brownish in apical third ..... *S. nhamdam*
- Mid femur slender, with different armature. Hind femur largely brownish ..... 10
10. Mid femur (Fig. 64) bearing 2 black spines beyond middle. Hind femur almost wholly brown, yellowish brown in extreme base ..... *S. trilobatus*
- Mid femur with 3 posteroventral bristles in basal half. Hind femur blackish in apical 3/4. Nepal ..... *S. divergens* Smith
11. Hind femur yellowish brown to brownish in apical 2/3. Halter with contrastingly black knob and pale yellow stem. Abdomen (Fig. 80) with gland-like structures between tergites 4-3 and 3-2 ..... *S. lek*
- Hind femur entirely yellow. Halter pale, knob with slight brownish tinge. Abdomen (Fig. 81) with gland-like structures between tergites 5-4, 4-3 and 3-2 ..... *S. lekkwar*
12. Scutum black, pleurae yellow. Mid femur (Fig. 54) with 2 short dark posteroventral spines in basal 1/3 and 1 similar anteroventral spine in apical 1/3. Abdomen (Fig. 83) with gland-like structures between tergites 2-3 and 3-4. Upper lobe of left surstyli (Fig. 57) with markedly developed surstyliar comb ..... *S. malayensis*
- Scutum entirely yellow or with indistinct brownish spots near postalar calli. Mid femur with pale basal bristles only. Abdomen without gland-like structures. Upper lobe of left surstyli lacking surstyliar comb ..... 13
13. Fore tibia and tarsomere 1 brown ..... 14
- Fore tibia and tarsomere 1 yellow ..... 15
14. Postpronotal bristle long. Acrostichal and dorsocentral bristles minute on prescutellar depression. Left cercus (Fig. 16) long, right cercus undivided, short, broad, subrectangular ..... *S. isaanensis*
- Postpronotal bristle hardly prominent. Acrostichal and dorsocentral bristles quite long and distinct on prescutellar depression. Left cercus (Fig. 22) very short, right cercus consisting of two lobes ..... *S. laawae*
15. Vein R2+3 flattened at apex. Distance between apices of veins R2+3 and R4+5 nearly 3.0 times longer than distance between apices of veins R1 and R2+3 ..... *S. crassinervis*
- Vein R2+3 ordinary. Distance between apices of veins R2+3 and R4+5 at most 2.0 times longer than distance between apices of veins R1 and R2+3 ..... 16
16. Hind trochanter (Fig. 31) with 2 black ventral spines. Hind femur with 3-4 fairly long anteroventral bristles in apical part. Abdominal segment 8 with ordinary bristles. Left cercus (Fig. 33) long, slender ..... *S. seeluang*
- Hind trochanter lacking black spines. Hind femur with 5-6 fairly long anteroventral bristles in apical part. Abdominal segment 8 with 2 very long bristles. Left cercus short ..... 17
17. Wing brownish before and beyond vein M. Left cercus (Figs. 26, 28) with 3 very long spines ..... *S. nhamyaaw*
- Wing with indistinct pattern, more or less evenly infuscate. Left cercus (Fig. 37) with ordinary bristles ..... *S. taksin*
18. Thorax black to brown ..... 19
- Thorax yellow ..... 24
19. Fore tibia brownish to brownish yellow ..... 20
- Fore tibia and mid femur yellow ..... 22
20. Hind femur brownish in apical 1/3 ..... *S. nhamdam*
- Hind femur largely brown to blackish ..... 21
21. Hind femur blackish in apical 3/4 ..... *S. divergens* Smith
- Hind femur almost wholly brown, yellowish brown in extreme base ..... *S. trilobatus*
22. Wing brown before and beyond vein M ..... *S. spinicercus*
- Wing lacking prominent pattern, more or less infuscate ..... 23
23. Hind femur yellowish brown to brownish in apical 2/3 ..... *S. lek* / *S. paradoxus*
- Hind femur entirely yellow ..... *S. lekkwar*
24. Postpronotal bristle long. Acrostichal and dorsocentral bristles minute on prescutellar depression ..... *S. isaanensis*
- Postpronotal bristle hardly prominent. Acrostichal and dorsocentral bristles quite long and distinct and reaching base of scutellum ..... *S. laawae*
25. Hind femur with 3-4 fairly long anteroventral bristles in apical part ..... *S. seeluang*
- Hind femur with 5-6 fairly long anteroventral bristles in apical part ..... 26
26. Wing brownish before and beyond vein M ..... *S. nhamyaaw*
- Wing with indistinct pattern, more or less evenly infuscate ..... *S. taksin*

### The *S. graminum* species group

The group is mainly accepted here following Cumming & Cooper (1992). Members of this group are characterised by an entirely black thorax and tomentose scutum, complete rows of acrostichal setulae, lack of gland-like structures on male abdomen (except *S. spinicercus*), at least 1 spine on the left cercus of the male terminalia, and shortened female terminalia. Two species found now from the Oriental region belong to the *S. graminum* group. The group is most diverse in the Palaearctic region (about 9 species), though at least 2 species of this group are known from the Nearctic and Afrotropical regions.

#### *Stilpon monospinatus*, new species

(Figs. 1-4)

**Material examined.** – Holotype – male, THAILAND: Phang-Nga province, Khao Sok, river banks in rain forest, sample n° 96035, 6 Apr.1996, coll. P. Grootaert (coll. RBINS).

Paratypes – 1 male, Phang-Nga, Khao Lak, Nangtong, beach forest, sample n° 96046, 7 Apr.1996, coll. P. Grootaert (coll. RBINS).

**Diagnosis.** – Species with black thorax. Male: mid femur with

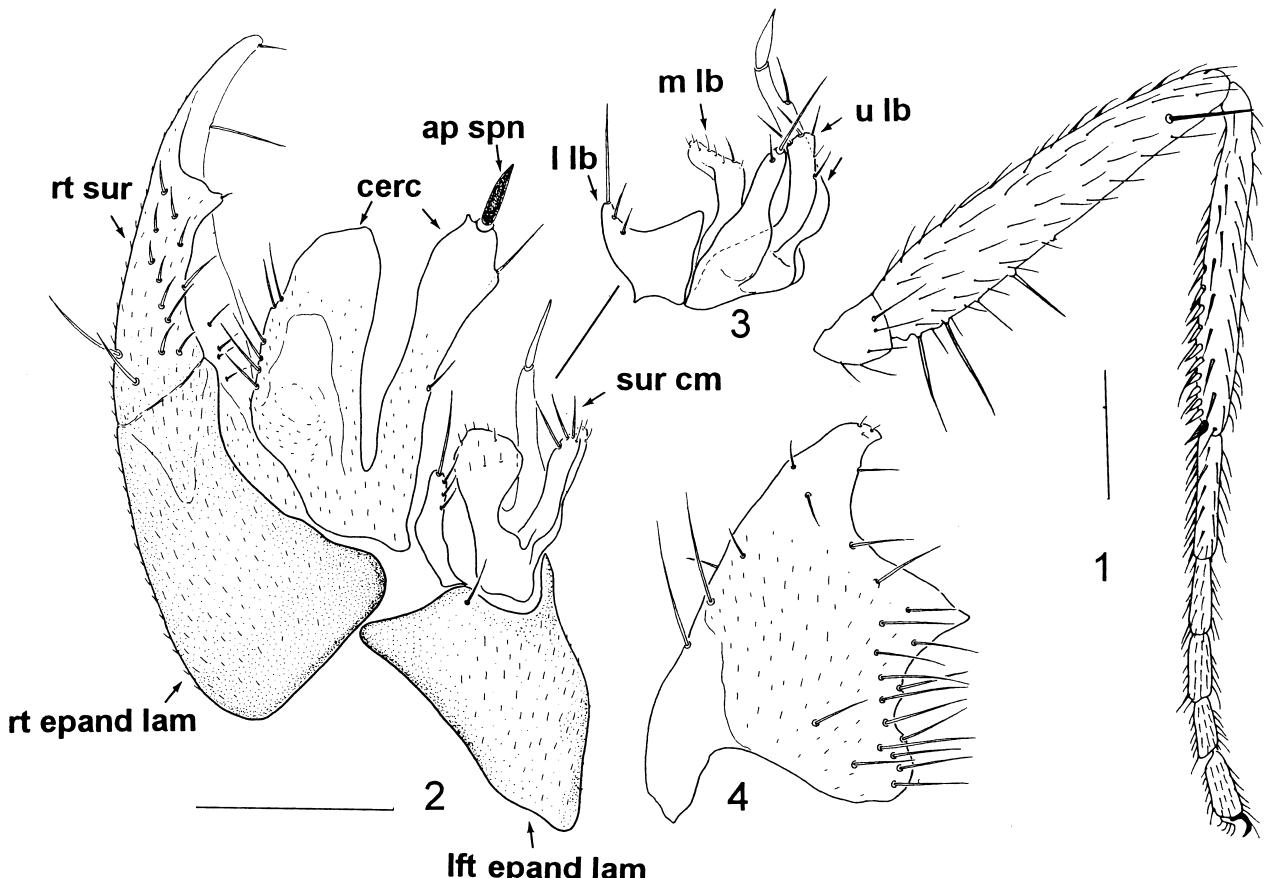
3-4 yellow ventral bristles in basal 1/3, abdominal gland-like structures lacking, left surstyli without surstylyar comb, left cercus with 1 short apical spine.

**Description.** – *Male*. Head black in ground-colour, with minute ocellars and moderately long inner verticals. Antenna brownish yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus pale.

Thorax black to dark brown. Scutum entirely tomentose. Postpronotal bristle long, inclinate. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs yellow with colour pattern: fore tibia and fore tarsomere 1 entirely brownish yellow, hind femur brownish yellow in apical 1/2, mid femur with brownish tinge in apical part. Mid coxa with 2 brown bristles on outer side. Hind trochanter lacking spinules. Mid femur (Fig. 1) slender, with 3-4 yellow long bristles in basal 1/3. Hind femur (viewed laterally) more or less evenly thickened, with row of short (shorter than femur is wide) anterodorsal bristles and row of prominent short dorsal bristles. Fore tibia with 1 dark erect bristle in apical part. Mid tibia with pale ventral spinules. Hind tibia unmodified.

Wing normally developed, covered with uniform microtrichia; with pattern consisting of 2 brownish, large,



Figs. 1-4. *Stilpon monospinatus*, new species, male. 1, mid leg, anterior view, 2, hypopygium, ventral view, 3, left surstyli, lateral view, 4, right surstyli, dorsal view; ap spn – apical spine, cerci, l lb – lower lobe of left surstyli, lft epand lam – left epandrial lamella, m lb – medial lobe of left surstyli, rt epand lam – right epandrial lamella, rt sur – right surstyli, sur cm – surstylyar comb, u lb – upper lobe of left surstyli. Scale bar: 0.1 mm.

elongate oval spots separated more or less distinctly by pale basal half of vein M; remainder parts finely infuscate. Costal vein with short setulae along anterior margin. Vein R<sub>2+3</sub> about 2.5 times longer than R<sub>s</sub>. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> 1.5 times longer than distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M slightly divergent and evenly arcuate in apical part. Halter with elongate, contrastingly black knob and pale stem.

Abdomen largely dirty yellow, lacking gland-like structures, bearing mostly scattered dark setulae which are longer on pregenital segments, with all tergites (except segment 8) subequal in length, tergites 1-2 unmodified.

Hypopygium (Fig. 2) brown. Hypandrium with 4 long bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 1 short bristle in apical part. Left surstyli (Fig. 3) with upper lobe divided; lower part rather small, subrectangular, with surstyliar comb greatly reduced, upper part elongate, slender, with short apical spine. Right surstyli (Fig. 4) large, with excision on upper margin, bearing numerous marginal bristles, lacking spines. Left cercus unbranched, narrow, elongate, somewhat broadened in apical part, with 1 short spine at apex, lacking long bristles in basal part. Right cercus unbranched, nearly as long as but almost 2 times broader than left cercus in middle

part, more or less rounded at apex, lacking spines, with some short bristles on right margin. Phallus short.

*Female.* Unknown.

**Measurements.** – Body length 1.4-1.7 mm, wing length 0.9-1.1 mm.

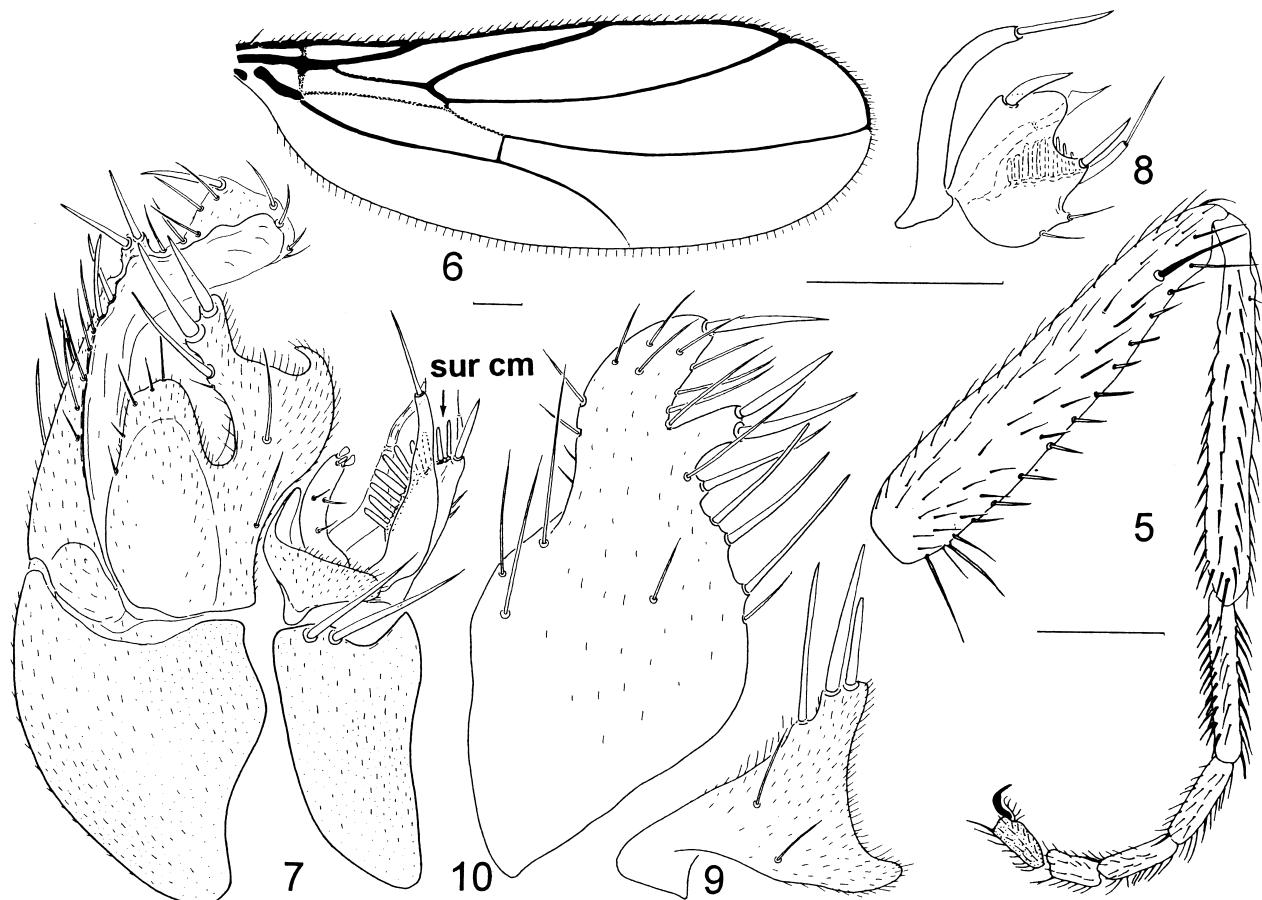
**Etymology.** – The name of this species refers to the single spine on the male left cercus.

**Phylogenetic relationships.** – The relationships of *S. monospinatus* are unclear beyond inclusion within the *S. graminum* species group, primarily due to the presence of an apical spine on the male left cercus.

**Distribution and seasonal occurrence.** – Thailand. Known from two localities of Phang-Nga Province. All records are from April. Collected on river banks in rain forest and in beach forest.

*Stilpon spinicercus*, new species  
(Figs. 5-10)

**Material examined.** – Holotype - male, THAILAND: Chantaburi



Figs. 5-10. *Stilpon spinicercus*, new species, male. 5, mid leg, anterior view, 6, wing, dorsal view, 7, hypopygium, ventral view, 8, upper lobe of left surstyli, dorsal view, 9, left cercus, right lateral view, 10, right surstyli, dorsal view; sur cm – surstyliar comb. Scale bar: 0.1 mm.

Province, Lachamunkorn, in secondary rain forest, sample n° 22003, 27 Mar.2002, coll. P. Grootaert (coll. RBINS).

Paratypes – Loei province, Na Haeo FIRS, Malaise trap: 1 male, 13-20 Mar.2000; 2 males, 15-21 Apr.2001; 2 males, 2 females, 29 Apr.2001; 1 male, 17-24 Jun.2001; 1 male, 24 Sep.-1 Oct.2001; 1 female, 2-4 Dec.2001; 2 males, 1 female, Na Haeo, 4 Feb.2001, coll. Verapong Kiatsoonthorn & P. Grootaert (in coll. SWU, ZRC & RBINS).

**Diagnosis.** – Species with black thorax, most similar to *S. monospinatus*. Male: mid femur with black ventral spine just beyond middle, abdomen with gland-like structures between tergites 3-2 and 2-1, left cercus with 3 apical spines.

**Description.** – *Male*. Head black in ground-colour, with minute ocellars and long, cruciate inner verticals. Antenna yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus yellow.

Thorax dark brown. Scutum entirely tomentose. Postpronotal bristle long, inclinate. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with colour pattern: hind femur brownish yellow in apical 2/3, fore tarsomere 5 brown, mid and hind tarsomere 5 brownish yellow; otherwise legs yellow. Mid coxa with 2 brown bristles on outer side. Hind trochanter lacking spinules. Mid femur (Fig. 5) with 3 yellowish long bristles in extreme base, row of anteroventral brownish spinules before middle and 1 short black spine just beyond middle. Hind femur (viewed laterally) evenly thickened toward middle, with row of 8 fairly long anteroventral bristles in apical part and some prominent dorsal bristles in basal half. Fore tibia with 1 erect bristle in apical part. Mid tibia with hardly prominent spinules in apical part. Hind tibia unmodified.

Wing (Fig. 6) normally developed, covered with uniform microtrichia; with pattern consisting of 2 brownish, large, elongate oval spots separated more or less distinctly by pale basal half of vein M; remainder parts finely infuscate, apex almost hyaline. Vein R<sub>2+3</sub> about 2.0 times longer than R<sub>s</sub>. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> subequal to distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M divergent and evenly arcuate in apical part. Halter with contrast black elongate knob and pale stem.

Abdomen largely yellowish brown, bearing mostly scattered dark setulae which are longer on pregenital segments, with all tergites (except segment 8) of subequal in length, tergites 1-2 unmodified. Narrow gland-like structures present between tergites 3-2 and 2-1.

Hypopygium (Fig. 7) brown. Hypandrium with 2 strong bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 2 long bristles in apical part. Left surstyli with upper lobe (Fig. 8) divided; lower part broadened, with markedly developed surstyli comb and 2 short apical spines, upper part elongate,

slender. Right surstyli (Fig. 10) large, subtriangular, divided into 2 lobes in apical part, bearing numerous strong marginal bristles; right lobe with 1 and left lobe with 2 spines, respectively. Left cercus (Fig. 9) branched in apical part, lacking long marginal bristles in basal part, with right lobe bearing 3 long apical spines. Right cercus unbranched, short, subrectangular, lacking spines, bearing several short marginal bristles. Phallus short.

**Female.** In most respects identical to male. Mid femur with row of yellowish bristles. Abdomen lacking gland-like structures. Terminalia shortened. Segment 8 normally sclerotized. Proximal margin of sternite 8 without 2 anteriorly directed rods. Apex of sternite 8 separated from base. Sternite 10 uniformly sclerotized, not fused with ventroapical margin of tergite 8. Cercus elongate oval, brownish yellow, clothed in setulae of different length.

**Measurements.** – Body length 1.6-1.9 mm, wing length 1.4-1.7 mm.

**Etymology.** – The name of this species refers to the 3 spines on the male left cercus.

**Phylogenetic relationships.** – The relationships of *S. spinicercus* are unclear beyond inclusion within the *S. graminum* species group. The structure of the female terminalia and the upper lobe of the left surstyli may suggest closer relationships with the *S. graminum* (Fällen) and its allies, though the structure of the right surstyli resembles that in *S. nubilus* Collin. *S. spinicercus* is the only species of this group which has the gland-like structures on the male abdomen.

**Distribution and seasonal occurrence.** – Thailand. Known from two areas: Loei and Chantaburi provinces. Records are almost from the whole year, except July, August, and most part of September.

### The *S. seeluang* species group

This is hitherto unknown group of *Stilpon*. Members of this group are characterised by yellow thorax, tomentose scutum, complete rows of acrostichal setulae, lack of gland-like structures on male abdomen, small male terminalia with the left cercus lacking apical spines, minute or absent bristles in apical part of the left epandrial lamella, shortened female terminalia. The entire group is presently known only from the Oriental region and includes 6 species. *S. leleupi* Smith described from South Africa (Smith, 1969) may also belong to this group.

### *Stilpon crassinervis*, new species (Figs. 11-14)

**Material examined.** – Holotype - male, THAILAND: Phang-Nga province, Khao Sok, sample n° 96035, 6 Apr.1996, coll. P. Grootaert (coll. RBINS).

Paratypes – Pethburi province, Pa Dang, 1 male, 25 Mar.2001 (coll. RBINS).

**Diagnosis.** – Species with yellow thorax. Can be readily distinguished from all other species of this group by vein R<sub>2+3</sub> flattened at apex.

**Description.** – *Male*. Head black in ground-colour, with minute ocellars and short inner verticals. Postpedicel pale yellow, paler than scape and pedicel, nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus yellow.

Thorax almost wholly yellow. Scutum entirely tomentose, scutal spots almost invisible, postalar calli dark. Postpronotal bristle hardly prominent. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with colour pattern: hind femur brownish yellow in apical 2/3; otherwise legs yellow. Hind trochanter lacking spinules. Mid femur (Fig. 11) slender, with 1 long anterior subapical bristle and row of 4 yellow, rather long, ventral bristles. Hind femur (viewed laterally) evenly thickened toward middle, with 1 row of anteroventral bristles becoming longer toward apex of femur (3 subapical bristles longest) and some hardly prominent dorsal bristles in basal part. Mid tibia straight, slender, lacking prominent ventral spinules. Hind tibia slightly arcuate, with more distinctly prominent ventral setulae and unmodified posterior apical comb.

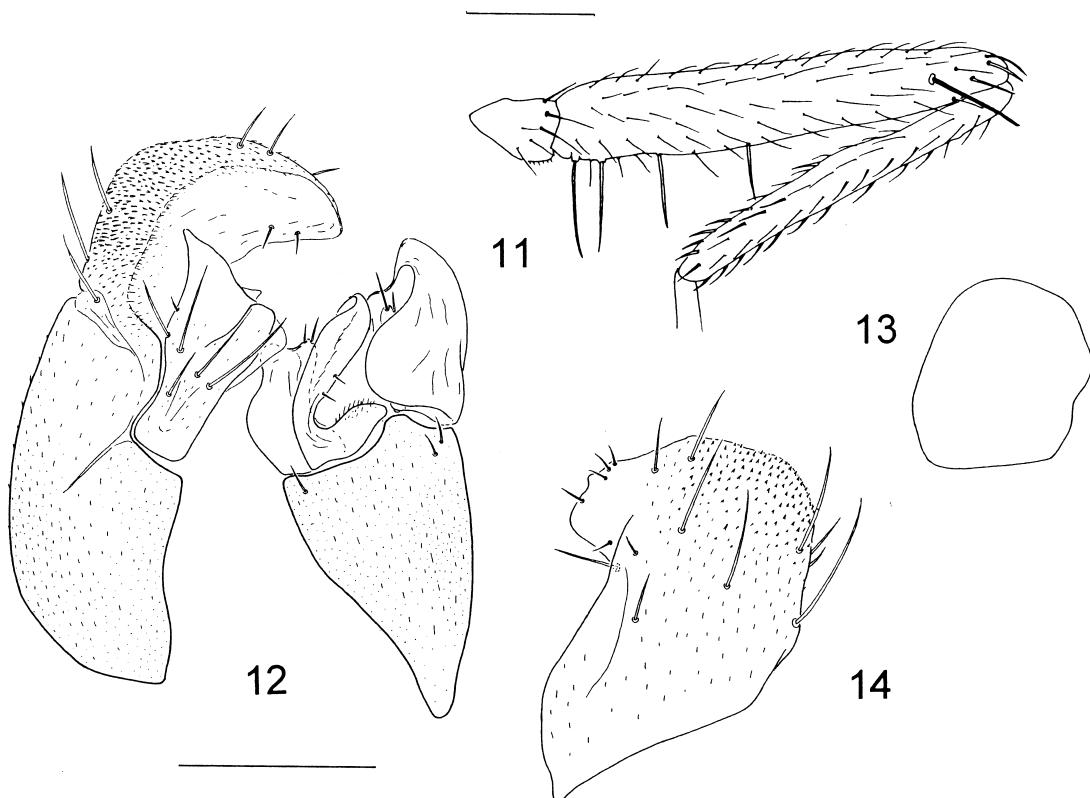
Wing normally developed, covered with uniform microtrichia, finely infuscate, somewhat deeper along longitudinal veins. Costal vein with ordinary short setulae on anterior margin. Vein R<sub>2+3</sub> flattened at apex, about 1.5 times longer than R<sub>s</sub>. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> nearly 3.0 times longer than distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M divergent and evenly arcuate in apical part. Halter with contrast black, elongate knob and pale yellow stem.

Abdomen largely brownish yellow, lacking gland-like structures, with segments 1-2 unmodified, bearing mostly scattered short setulae; tergites 1-2 yellowish, segment 8 with 2 very long and several shorter bristles.

Hypopygium (Fig. 12) brown, small. Hypandrium with 2 long bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 1 minute bristle in apical part. Left surstyli with upper lobe (Fig. 13) divided; lower part small, slender, lacking surstyliar comb, upper part moderately large, subglobular, lacking bristles. Right surstyli (Fig. 14) large, elongate, covered with spinules in apical part. Cerci almost completely fused into one lobe, lacking spines, with several bristles of different length in basal part; left cercus hardly prominent, short, rectangular; right cercus pointed at apex. Phallus short.

*Female*. Unknown.

**Measurements.** – Body length 1.5-1.7 mm, wing length 1.1-1.3 mm.



Figs. 11-14. *Stilpon crassinervis*, new species, male. 11, mid leg, anterior view, 12, hypopygium, ventral view, 13, upper lobe of left surstyli, dorsal view, 14, right surstyli, dorsal view. Scale bar: 0.1 mm.

**Etymology.** – The name of this species refers to the widening of the tip of vein R4+5.

**Phylogenetic relationships.** – The relationships of *S. crassinervis* are unresolved beyond inclusion within the *S. seeluang* species group. However, the presence of 2 very long bristles on the segment 8 of the male abdomen, the general structure of the male terminalia and, especially, the greatly reduced cerci suggest this species is allied with *S. laawae*, *S. nhanyaaw*, and *S. taksin*.

**Distribution and seasonal occurrence.** – Thailand. Known from two provinces rather south: Phang-Nga and Petchaburi. Records from the end of March to the beginning of April.

***Stilpon isaanensis*, new species**

(Figs. 15-19)

**Material examined.** – Holotype - male, THAILAND: Loei province, Na Haeo, riverbanks in gallery forest at FIRS, sample n° 2017, 23 May.2000, coll. P. Grootaert (SWU).

Paratypes – Na Haeo, malaise trap at FIRS: 1 male, 22-29.Oct.1999; 1 male, 42, 7-18.Dec.1999; 1 male, 12-28 Jun.2000; 1 female, 29.Apr-6 May.2001; 1 male, 12/61, 29-5.Aug.2001, coll. Verapong Kiatsoonthorn & P. Grootaert (in coll. SWU, RBINS, ZRC). 1 male, 4 females, Khring Nam

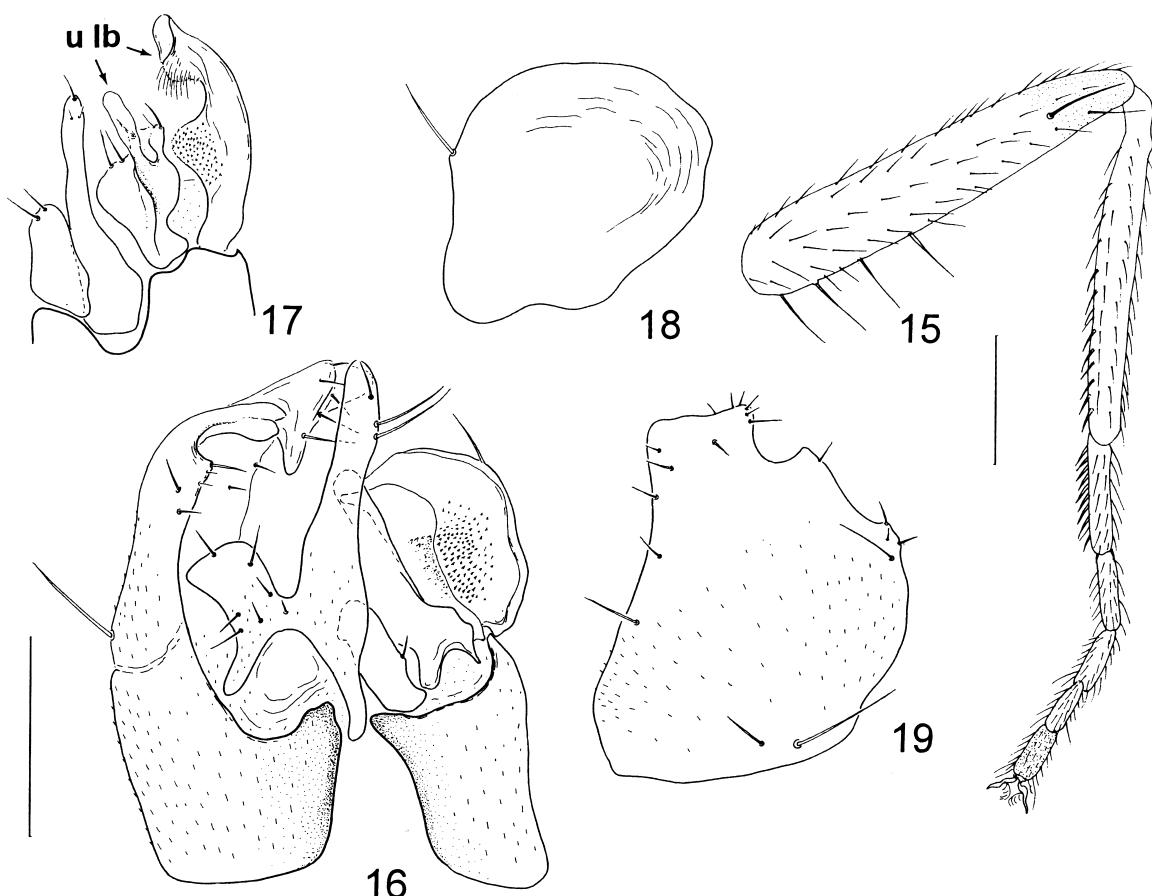
Tok, sample n° 23041, 20 May.2003, coll. P. Grootaert; 1 male, 1 female, Malaise trap in bamboo wood at FIRS, 24 May.2003 (leg. P. Grootaert). (in coll. SWU, RBINS and ZRC).

**Diagnosis.** – Species with yellow thorax. Fore tibia and tarsomere 1 brownish, postpronotal bristle long, scutal pattern indistinct, rows of acrostichal and dorsocentral bristles very short posteriorly.

**Description.** – *Male*. Head black in ground-colour, with inconspicuous ocellars and moderately long inner verticals. Antenna with pedicel yellow, postpedicel brown. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus pale yellow.

Thorax almost wholly yellow. Scutum entirely tomentose, with 2 pale brownish, indistinct, posterolateral spots, including postalar calli which are deeper darkened; scutellum and postnotum with brownish posterior margin; pleural sutures (especially in darker specimens) brownish in varying extent. Postpronotal bristle long, brown, inclinate. Dorsocentral and acrostichal setulae very short on prescutellar depression.

Legs yellow with colour pattern: hind femur in apical 2/3, fore tibia (except extreme base), fore tarsomere 1, fore and



Figs. 15-19. *Stilpon isaanensis*, new species, male. 15, mid leg, anterior view, 16, hypopygium, ventral view, 17, left surstylos, lateral view, 18, upper lobe of left surstylos, dorsal view, 19, right surstylos, dorsal view; u lb – upper lobe of left surstylos. Scale bar: 0.1 mm.

mid tarsomeres 5 brownish (in darker specimens also mid femur somewhat brownish in apex); otherwise legs yellow. Hind trochanter with 2 brown spinules. Mid femur (Fig. 15) slender, with 1 long anterior subapical bristle and row of 4 yellow, rather long, ventral bristles. Hind femur (viewed laterally) evenly thickened toward middle, with 1 row of anteroventral bristles becoming longer toward apex of femur (3 subapical bristles longest) and some hardly prominent dorsal bristles in basal part. Fore tibia lacking prominent bristles. Mid tibia straight, slender, with hardly prominent ventral spinules. Hind tibia slightly arcuate, with ventral setulae more distinctly prominent.

Wing normally developed, covered with uniform microtrichia; almost uniformly infuscate, somewhat deeper along longitudinal veins. Costal vein with ordinary short setulae on anterior margin. Vein R<sub>2+3</sub> about 2 times longer than R<sub>s</sub>. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> nearly 2 times longer than distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M almost parallel and slightly arcuate in apical part. Halter with contrast black elongate knob and pale yellow stem.

Abdomen yellowish, lacking gland-like structures, with segments 1-2 unmodified, bearing mostly scattered short setulae, segment 8 with moderately long bristles.

Hypopygium (Fig. 16) dark brown, rather small. Hypandrium with 2 long bristles just beyond its middle. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, lacking bristles in apical part. Left surstyli (Fig. 17, 18) with upper lobe divided; lower part lacking surstyli comb, upper part large, subglobular, with 1 short bristle. Right surstyli (Fig. 19) large, hemispherical. Left cercus unbranched, digitiform, lacking spines, with 2 long and 1 shorter bristles in apical part. Right cercus undivided, short, subrectangular, lacking spines, with several short bristles. Phallus short.

**Female.** In most respects identical to male. Palpus brownish yellow. Hind trochanter lacking black spines. Terminalia shortened. Segment 8 normally sclerotized. Proximal margin of sternite 8 without 2 anteriorly directed rods. Apex of sternite 8 hinged and partially separated from base. Sternite 10 uniformly sclerotized, not fused with ventroapical margin of tergite 8. Cercus elongate oval, brownish yellow, clothed in setulae of different length.

**Measurements.** – Body length 1.4-1.7 mm, wing length 0.9-1.2 mm.

**Etymology.** – The name refers to the Isaan region where the species was found.

**Phylogenetic relationships.** – The relationships of this species are unresolved beyond inclusion within the *S. seeluang* species group.

**Distribution and seasonal occurrence.** – Thailand. Known from one locality in the Loei province. Quite common with

records from the end of April to the beginning of August, October and December. Collected in bamboo wood and also from riverbanks in gallery forest.

***Stilpon laawae, new species***

(Figs. 20-24)

**Material examined.** – Holotype - male, THAILAND: Nakhon Nayok, Chulachomkla, along brook in shade, sample n° 97163, 12 Nov.1997, coll. P. Grootaert (coll. RBINS).

Paratypes – 1 male, same locality as holotype. Loei province, Na Haeo FIRS in Malaise trap, 3-10 Sep.1999, coll. P. Grootaert; 1 female, coll. Verapong Kiatsoonthorn & P. Grootaert; 1 male, Na Haeo, Chang Tok waterfall, sample n° 23035, 17 May.2003, coll. P. Grootaert (in coll. SWU & RBINS).

**Diagnosis.** – Species with yellow thorax, most similar to *S. isaanensis* differing from it in having quite long acrostichal and dorsocentral bristles throughout, hardly prominent postpronotal bristle and very short left cercus male terminalia.

**Description.** – *Male.* Head black in ground-colour, with minute ocellars and inner verticals. Postpedicel pale yellow, paler than scape and pedicel, nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus yellow.

Thorax almost wholly yellow. Scutum entirely tomentose, scutal spots almost invisible, postpronotal calli dark. Postpronotal bristle hardly prominent. Dorsocentrals in multiple rows. Acrostichals 2-serial.

Legs yellow, with colour pattern: fore tibia (except base) and fore tarsomere 1 brown; otherwise legs yellow. Hind trochanter lacking spinules. Mid femur (Fig. 20) slender, with 4 long yellowish bristles in basal part. Hind femur (viewed laterally) evenly thickened toward middle, with 1 row of anteroventral bristles becoming longer toward apex of femur (3 subapical bristles longest) and some hardly prominent dorsal bristles in basal part. Fore tibia greatly incrassate, lacking prominent ventral bristles. Mid tibia lacking prominent ventral spinules. Hind tibia unmodified.

Wing (Fig. 21) normally developed, covered with uniform microtrichia, finely infuscate. Costal vein with ordinary short setulae on anterior margin. Distance between apices of veins R<sub>2+3</sub> and R<sub>4+5</sub> about 2.0 times longer than distance between apices of veins R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M slightly divergent and evenly arcuate in apical part. Halter with contrast black, elongate knob and pale yellow stem.

Abdomen largely brownish yellow, lacking gland-like structures, with segments 1-2 unmodified, bearing mostly scattered short setulae; tergites 1-2 yellowish, segment 8 with 2 very long and several shorter bristles.

Hypopygium (Fig. 22) pale brown, small. Hypandrium with

2 long bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 1 minute bristle in apical part. Left surstyli with upper lobe (Fig. 23) divided; lower part elongate, lacking surstyliar comb, upper part moderately large, subglobular, with 1 short bristle. Right surstyli (Fig. 24) large, rather elongate oval, lacking spines. Left cercus unbranched, short, slender, lacking spines, with 1 long bristle in apical part. Right cercus consisting of two lobes, lacking spines; left lobe short, broad, with several bristles basally; right lobe hardly prominent, rounded. Phallus short.

**Female.** In most respects identical to male. Palpus brownish yellow. Terminalia shortened. Segment 8 normally sclerotized. Proximal margin of sternite 8 without 2 anteriorly directed rods. Apex of sternite 8 hinged and partially separated from base. Sternite 10 uniformly sclerotized, not fused with ventroapical margin of tergite 8. Cercus elongate oval, brownish yellow, clothed in setulae of different length.

**Measurements.** – Body length 1.4-1.7 mm, wing length 0.9-1.2 mm.

**Etymology.** – This species is dedicated to Dr. La-aw Ampornpan from Srinakharinwirot University who stimulated our studies of the Thai fauna.

**Phylogenetic relationships.** – The relationships of this species are unresolved beyond inclusion within the *S. seeluang* species group. However, the presence of 2 very long bristles on the segment 8 of the male abdomen, the general structure of the male terminalia and, especially, the greatly reduced cerci suggest this species is allied with *S. crassinervis*, *S. nhomyaaw*, and *S. takson*.

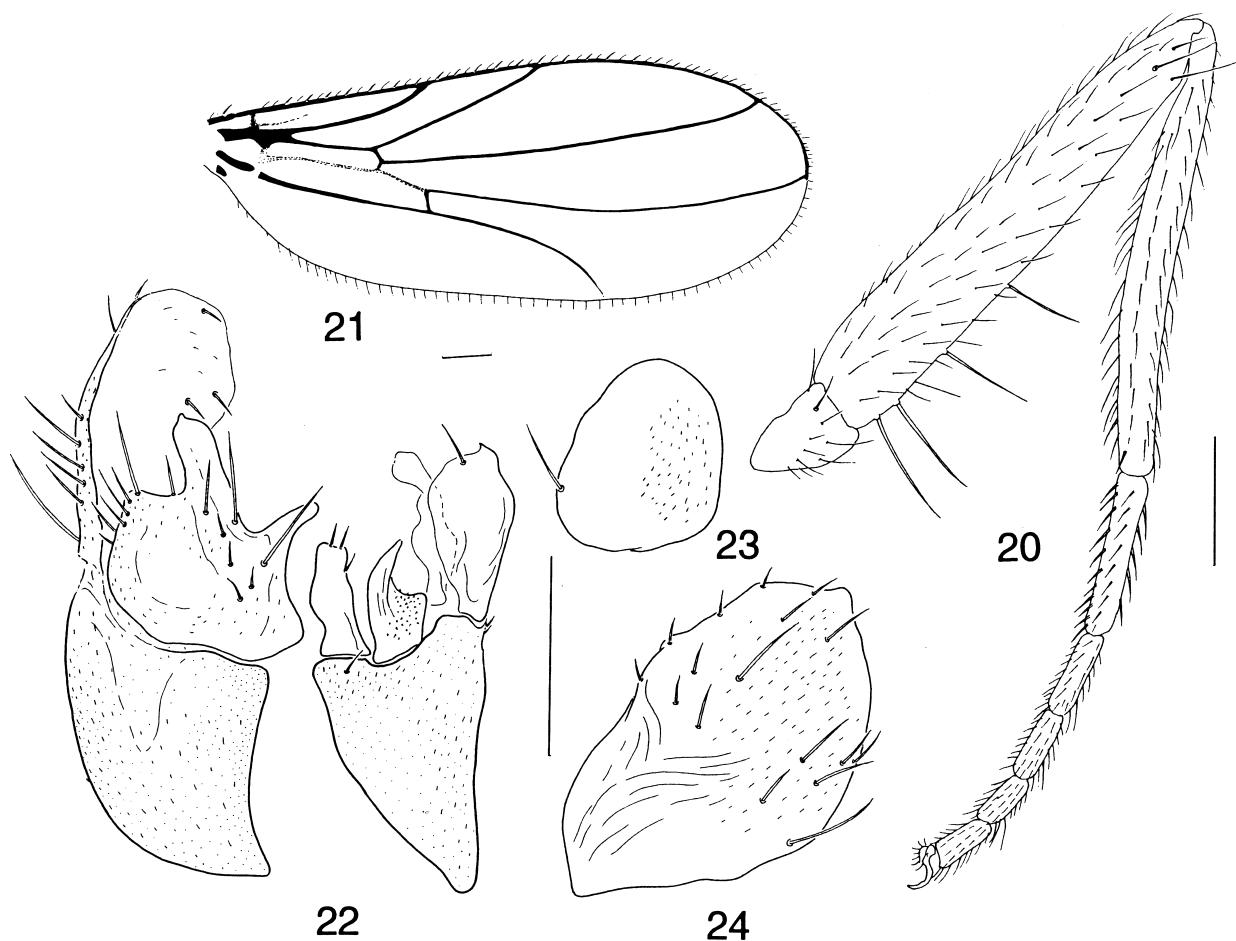
**Distribution and seasonal occurrence.** – Thailand. Known from two localities, respectively in Central and Northeast Thailand. Records from the beginning of September to the beginning of October.

***Stilpon nhomyaaw*, new species**  
(Figs. 25-29)

**Material examined.** – Holotype - male, THAILAND: Ranong province, Ranong, rain forest, along stream, sample n° 96028, 6 Apr.1996, coll. P. Grootaert (coll. RBINS).

Paratypes – 5 males, 2 females, same data as in holotype (RBINS).

**Diagnosis.** – Species with yellow thorax, resembles *S. laawae* differing from its by yellow fore tibia and tarsomere 1, wing



Figs. 20-24. *Stilpon laawae*, new species, male. 20, mid leg, anterior view, 21, wing, dorsal view, 22, hypopygium, ventral view, 23, upper lobe of left surstyli, dorsal view, 24, right surstyli, dorsal view. Scale bar: 0.1 mm.

pattern consisting of two distinct brownish spots. Male: abdominal segment 8 with 2 very long bristles, left cercus with 3 very long spines in middle part.

**Description.** – *Male*. Head black in ground-colour, with minute ocellars and hardly prominent inner verticals. Antenna yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus pale.

Thorax almost entirely yellow. Scutum with 2 indistinct brownish spots near postalar calli, entirely tomentose. Postpronotal bristle hardly prominent. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with colour pattern: hind femur brownish yellow in apical 3/4, otherwise legs yellow. Mid coxa with 2 brown bristles on outer side. Hind trochanter lacking spinules. Mid femur (Fig. 25) slender, with 4 long yellow bristles in basal 1/2. Hind femur (viewed laterally) more or less evenly thickened, with row of anterodorsal bristles (5-6 subapical longer) and some prominent anterior and dorsal bristles in apical part. Fore tibia with ordinary setulae. Mid tibia lacking ventral spinules. Hind tibia with some longer ventral setulae, posterior apical comb unmodified.

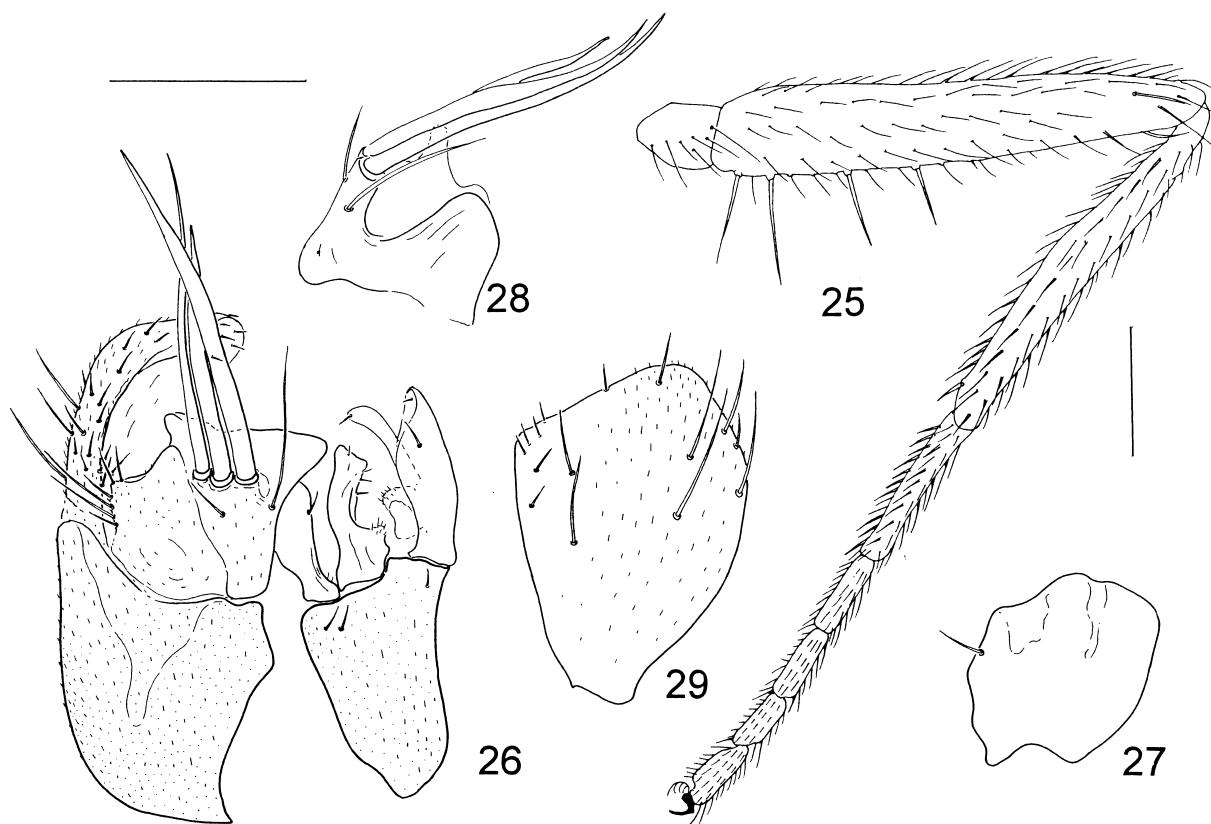
Wing normally developed, covered with uniform microtrichia; with pattern consisting of 2 brownish, large, elongate oval spots separated more or less distinctly by pale

basal half of vein M; remainder parts finely infuscate. Costal vein with short setulae along anterior margin. Vein R<sub>2+3</sub> about 1.5 times longer than Rs. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> about 1.5 times longer than distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M almost parallel and evenly arcuate in apical part. Halter with elongate, contrast black knob and pale stem.

Abdomen lacking gland-like structures. Segments 1-2 largely pale yellow, remainder segments yellowish brown and stronger sclerotized. Segment 8 with 2 very long and several shorter bristles.

Hypopygium (Fig. 26) brown, small. Hypandrium with 2 long bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 2 minute bristles in apical part. Left sursty whole with upper lobe (Fig. 27) divided; lower part elongate, lacking sursty whole comb, upper part subglobular, with 1 short bristle. Right sursty whole (Fig. 29) fairly large, somewhat broadened toward apex, with more or less rounded upper margin. Left cercus (Fig. 28) unbranched, hardly prominent, with 3 very long spines. Right cercus unbranched, hardly prominent, with several marginal bristles of different length. Phallus short.

*Female*. In most respects identical to male. Terminalia shortened. Segment 8 normally sclerotized. Proximal margin of sternite 8 without 2 anteriorly directed rods. Apex of sternite 8 hinged and partially separated from base. Sternite



Figs. 25-29. *Stilpon nhamyaaw*, new species, male. 25, mid leg, anterior view, 26, hypopygium, ventral view, 27, upper lobe of left sursty whole, dorsal view, 28, left cercus and subepandrial sclerite, right lateral view, 29, right sursty whole, dorsal view. Scale bar: 0.1 mm.

10 uniformly sclerotized, not fused with ventroapical margin of tergite 8. Cercus elongate oval, brownish yellow, clothed in setulae of different length.

**Measurements.** – Body length 1.4-1.7 mm, wing length 0.9-1.2 mm.

**Etymology.** – The name “nham” (spine in Thai) “yaaw” (long in Thai) refers to the long spines on the male left cercus.

**Phylogenetic relationships.** – The relationships of this species are unresolved beyond inclusion within the *S. seeluang* species group. However, the presence of 2 very long bristles on the segment 8 of the male abdomen, the general structure of the male terminalia and, especially, the greatly reduced cerci suggest this species is allied with *S. laawae*, *S. crassinervis*, and *S. nhomyaaw*.

**Distribution and seasonal occurrence.** – Thailand. Known from one locality in South Thailand. Recorded from the beginning of April in a rain forest.

***Stilpon seeluang*, new species**

(Figs. 30-35)

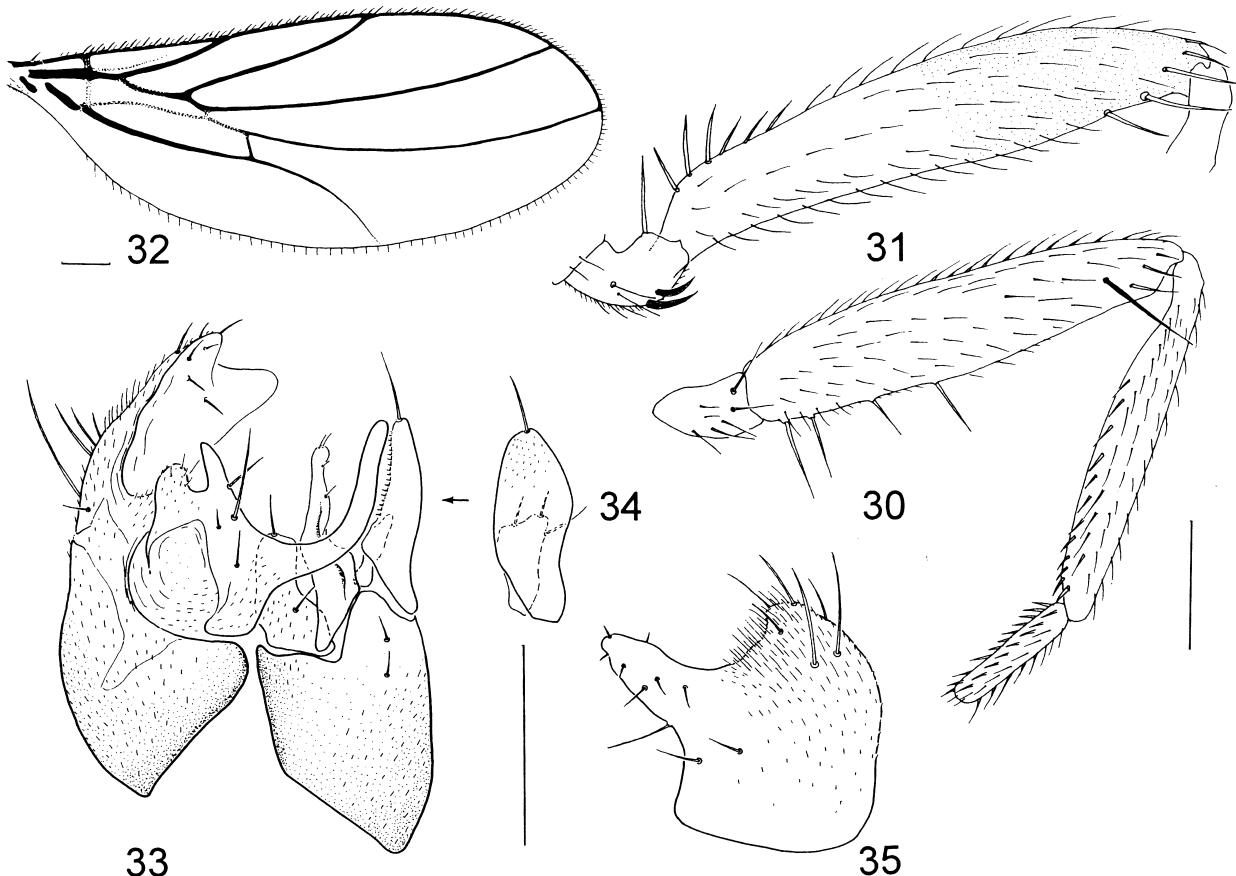
**Material examined.** – Holotype - male. THAILAND: Loei province, Na Haeo, FIRS, near waterfall, sample n° 20013, 23 May.2000, coll. P. Grootaert (SWU).

Paratypes – 2 males, 7 females, same data as in holotype. Na Haeo, FIRS, Malaise trap along a dry deciduous forest, coll. Verapong Kiatsoonthorn & P. Grootaert: 1 male, 3-10 Sep.1999; 1 female, 10-17 Sep.1999; 1 male, 1 female, 8-15.Oct.1999; 1 female, 4-27.Aug.2000; 1 male, 3-10 Mar.2001; 1 male, 18-25 Mar.2001; 1 female, 25 Mar.2001-1 Apr.2001; 1 female, 29 Apr.-6 May.2001; 1 female, 20-29 May.2001; 2 females, 29 May.-4 Jun.2001; 1 male, 17-24 Jun.2001; 1 female, 29-5.Aug.2001; 1 male, Na Haeo, Chang Tok Waterfall, river bed, sample n° 23035, 17 Jun.2003, coll. P. Grootaert (coll. SWU, RBINS & ZRC).

**Diagnosis.** – Species with yellow thorax. Hind femur in apical 2/3 and tarsomere 5 of all legs (usually more distinctly on fore leg) brownish yellow; otherwise legs yellow. Male: mid femur with 4 yellowish ventral bristles in basal part, hind trochanter with 2 black spinules.

**Description.** – *Male*. Head black in ground-colour, with minute ocellars and short inner verticals. Antenna yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus pale yellow, small.

Thorax almost wholly yellow. Scutum entirely tomentose; with 2 brownish, more or less rounded, distinctly bordered, posterolateral spots including postalar calli; scutellar margins and postnotum brownish; pleural sutures (especially in darker specimens) brownish in varying extent. Postpronotal bristle short, hardly prominent. Dorsocentrals in multiple rows,



Figs. 30-35. *Stilpon seeluang*, new species, male. 30, mid leg, anterior view, 31, hind leg, anterior view, 32, wing, dorsal view, 33, hypopygium, ventral view, 34, upper lobe of left surstylos, dorsal view, 35, right surstylos, dorsal view. Scale bar: 0.1 mm.

complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with colour pattern: hind femur in apical 2/3 and tarsomere 5 of all legs (usually more distinctly on fore leg) brownish yellow; otherwise legs yellow. Hind trochanter (Fig. 31) with 2 black spinules. Mid femur (Fig. 30) slender, with 1 long anterior subapical bristle, bearing 4 yellow to brownish yellow, rather long, ventral bristles in basal half. Hind femur (viewed laterally) evenly thickened toward middle, with 1 row of short (3-4 subapical bristles longer) anteroventral bristles and some short dorsal bristles in basal part. Fore tibia lacking prominent bristles. Mid tibia straight, rather slender, lacking prominent ventral spinules. Hind tibia slightly arcuate, with ventral setulae more distinctly prominent, posterior apical comb unmodified.

Wing (Fig. 32) normally developed, covered with uniform microtrichia; almost uniformly infuscate, somewhat deeper along longitudinal veins. Costal vein with ordinary short setulae on anterior margin. Vein R<sub>2+3</sub> about 3 times longer than R<sub>s</sub>. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> 1.2-1.3 times longer than distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M slightly divergent and evenly arcuate in apical part. Halter with contrast black, elongate knob and pale yellow stem.

Abdomen largely yellow, becoming darker toward hypopygium, with segments (except segment 8) weakly sclerotized and subequal in length, covered mostly with scattered ordinary pale setulae, lacking gland-like structures. Segments 1-2 unmodified. Segment 8 short, bearing moderately long bristles.

Hypopygium (Fig. 33) dark brown, rather small. Hypandrium with 2 long bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 2 minute bristles in apical part. Left surstyli with upper lobe (Fig. 34) divided; lower part small, lacking surstyliar comb, upper part elongate oval, with 1 short bristle. Right surstyli (Fig. 35) with deep excision, lacking spines. Left cercus unbranched, digitiform, lacking apical spines and long bristles in basal part. Right cercus consisting of two short lobes, lacking spines. Phallus short.

*Female.* In most respects identical to male. Palpus brownish yellow. Hind trochanter lacking black spines. Terminalia shortened. Segment 8 normally sclerotized. Proximal margin of sternite 8 straight, without 2 anteriorly directed rods. Apex of sternite 8 hinged and partially separated from base. Sternite 10 uniformly sclerotized, not fused with ventroapical margin of tergite 8. Cercus elongate oval, brownish yellow, clothed in setulae of different length.

**Measurements.** – Body length 1.4-1.7 mm, wing length 0.9-1.0 mm.

**Etymology.** – “See” (colour in Thai) “luang” (yellow in Thai), refers to the yellow colour of the thorax.

**Phylogenetic relationships.** – The relationships of this species are unresolved beyond inclusion within the *S. seeluang* species group.

**Distribution and seasonal occurrence.** – Thailand. Only known from Northeast Thailand, Loei province. Quite common and recorded from March till October.

***Stilpon taksin, new species***  
(Figs. 36-39)

**Material examined.** – Holotype - male, THAILAND: Songkhla province, Ban Di Luang, beach forest, sample n° 97148, 30.Oct.1997, coll. P. Grootaert (coll. RBINS).

Paratypes – 1 male, 1 female, same data as in holotype (RBINS).

**Diagnosis.** – Species with yellow thorax, most similar to *S. nhamyaaw*. Differs primarily from its by indistinct pattern of wing and setose left cercus of male terminalia.

**Description.** – *Male.* Head black in ground-colour, with minute ocellars and hardly prominent inner verticals. Antenna yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus pale.

Thorax almost wholly yellow. Scutum with 2 indistinct brownish spots near postalar calli, entirely tomentose. Postpronotal bristle hardly prominent. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with colour pattern: hind femur with brownish tinge in apical 3/4, otherwise legs yellow. Mid coxa with 2 brown bristles on outer side. Hind trochanter lacking spinules. Mid femur (Fig. 36) slender, with 4 long yellow bristles in basal 1/2. Hind femur (viewed laterally) more or less evenly thickened, with row of anterodorsal bristles (5-6 subapical longer) and some prominent anterior and dorsal bristles in apical part. Fore tibia with ordinary setulae. Mid tibia lacking ventral spinules. Hind tibia with some longer ventral setulae, posterior apical comb unmodified.

Wing normally developed, covered with uniform microtrichia; with indistinct pattern, more or less evenly infuscate. Costal vein with short setulae along anterior margin. Vein R<sub>2+3</sub> about 1.5 times longer than R<sub>s</sub>. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> about 2 times longer than distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M almost parallel and evenly arcuate in apical part. Halter with elongate, black knob and pale stem.

Abdomen lacking gland-like structures. Segments 1-2 largely pale yellow, remainder segments yellowish brown and stronger sclerotized. Segment 8 with 2 very long and several shorter bristles.

Hypopygium (Fig. 37) brown, rather small. Hypandrium with

2 long bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, lacking bristles in apical part. Left surstyli with upper lobe (Fig. 38) divided; lower part slender, lacking surstyliar comb, upper part subglobular, with 1 short bristle. Right surstyli (Fig. 39) fairly large, rather elongate oval, with rounded apex, lacking spines. Left cercus unbranched, slender, short, lacking spines, with several bristles of different length in basal part. Right cercus consisting of two lobes, lacking spines; right lobe hardly prominent, with several marginal bristles of different length; left lobe short, broad, rounded at apex. Phallus short.

**Female.** In most respects identical to male. Terminalia shortened. Segment 8 normally sclerotized. Proximal margin of sternite 8 without 2 anteriorly directed rods. Apex of sternite 8 hinged and partially separated from base. Sternite 10 uniformly sclerotized, not fused with ventroapical margin of tergite 8. Cercus elongate oval, brownish yellow, clothed in setulae of different length.

**Measurements.** – Body length 1.4-1.7 mm, wing length 0.9-1.2 mm.

**Etymology.** – “Taksin” (south in Thai) refers to south of Thailand where this species was found.

**Phylogenetic relationships.** – The relationships of *S. taksin* are unresolved beyond inclusion within the *S. seeluang* species group. However, the presence of 2 very long bristles on the segment 8 of the male abdomen, the general structure of the male terminalia and, especially, the greatly reduced cerci suggest this species is allied with *S. laawae*, *S. crassinervis*, and *S. nhamyaaw*.

**Distribution and seasonal occurrence.** – Thailand. Only known from one locality in South Thailand. The record is from October (end of rainy season in South Thailand).

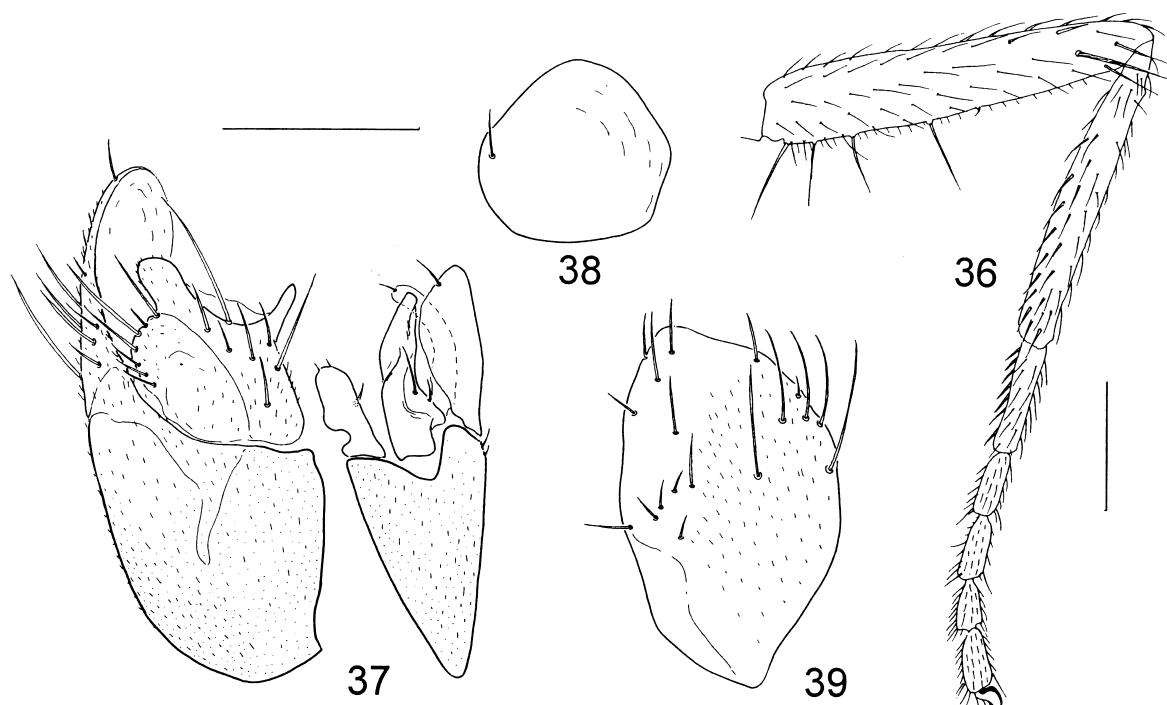
### The *S. divergens* species group

Cumming & Cooper (1992) have recognised this group to include a single species known just from the Oriental region only. Additionally, they noted also some undescribed species from Africa and Japan. We have added to this group another 6 species described below. Members of the *S. divergens* species group are characterised by an entirely black thorax (except *S. malayensis*) and tomentose scutum, complete rows of acrostichal setulae, presence of gland-like structures on the male abdomen (unclear in *S. divergens*), undivided upper lobe of left surstyli, markedly developed surstyliar comb, bilobed right cercus, a long ventral bristle on left cercus, setose left cercus, long bristles in apical part of left epandrial lamella, elongate hair-like phallus, elongate female terminalia and sternite 8 of the female terminalia with upper apex not partially separated from base.

### *Stilpon khorngkeun*, new species (Figs. 40-44)

**Material examined.** – Holotype - male, THAILAND: Loei province, Na Haeo, FIRS, Malaise trap in bamboo forest at Na Haeo FIRS, 1 male, 7-14 May.2000, coll. P. Grootaert (SWU).

Paratypes – Same data as in holotype: 1 male, 17-24 Sep.1999; 1 male, 24-30 Apr.2000; 1 male, 13-20 May.2001; 1 male, 29 May.-4 Jun.2001; 1 male, 7-14 Jul.2001, coll. Verapong



Figs. 36-39. *Stilpon taksin*, new species, male. 36, mid leg, anterior view, 37, hypopygium, ventral view, 38, upper lobe of left surstyli, dorsal view, 39, right surstyli, dorsal view. Scale bar: 0.1 mm.

Kiatsoonthorn & P. Grootaert; 2 males, Na Haeo FIRS, Malaise trap n° 1 in bamboo wood, 25 May 2003 (leg. P. Grootaert); 3 males, Na Haeo FIRS, base of waterfall, sample n° 23029, 16 May 2003 (leg. P. Grootaert). (in coll. SWU, RBINS & ZRC).

**Diagnosis.** – Species with black thorax, differing from other species from the Oriental region by R4+5 strongly curved in apical part and by brown hind tarsomere 1.

**Description.** – *Male*. Head black in ground-colour, with minute anterior ocellars, short (half as long as inner verticals) posterior ocellars and long inner verticals. Antenna yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus brownish yellow.

Thorax brown. Scutum entirely tomentose. Postpronotal bristle long, inclinate. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

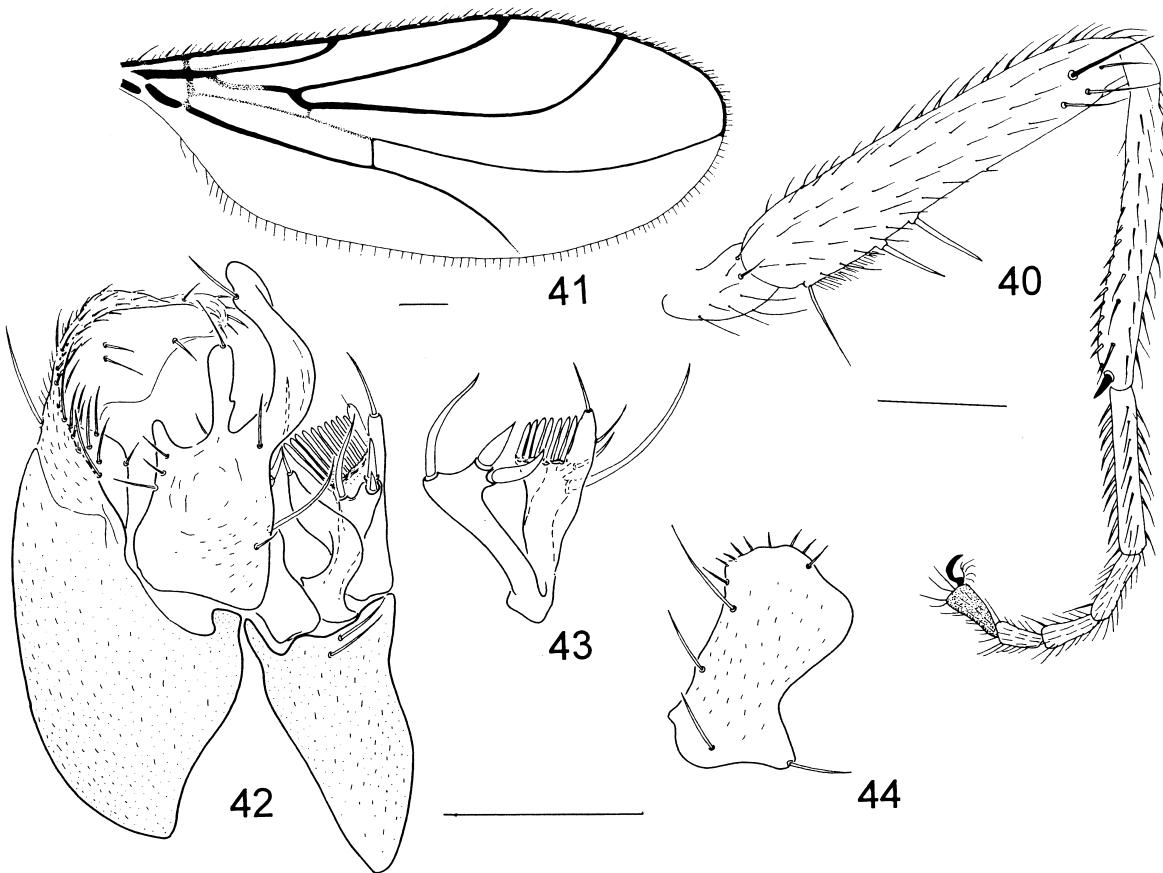
Legs with colour pattern: hind femur brownish yellow in apical 2/3, tarsomere 5 of all legs and hind tarsomere 1 brown; otherwise legs yellow. Hind trochanter lacking spinules. Mid femur (Fig. 40) slender, with long pale ventral bristles in extreme base and 2 ventral yellowish spines nearer to middle. Hind femur (viewed laterally) evenly thickened toward middle, with short anterodorsal bristles (3 subapicals longer),

lacking prominent dorsal bristles near base but with prominent dorsal bristles in apical part. Fore tibia with short, hardly prominent, brownish, posterodorsal bristle at apex, lacking prominent ventral bristles. Mid tibia considerably shorter than mid femur, with rows of ventral spinules and 1 longer subapical spinule. Hind tibia unmodified.

Wing (Fig. 41) normally developed, covered with uniform microtrichia, finely infuscate. Costal vein with ordinary short setulae on anterior margin. Veins R2+3 and R4+5 thickened, darker than other veins (especially R4+5). Vein R2+3 about 3 times longer than Rs. Distance between apices of R2+3 and R4+5 nearly 1.5 times shorter than distance between apices of R1 and R2+3. R4+5 strongly curved at apex. R4+5 and M divergent in apical part. Vein CuA1 not quite reaching wing margin. Halter with brown elongate knob (one specimen had a very dark knob) and pale stem.

Abdomen largely yellowish brown, bearing mostly scattered dark setulae which are longer on pregenital segments, with all tergites (except segment 8) of subequal in length, tergites 1-2 unmodified. Narrow gland-like structures present between tergites 4-3 and 3-2.

Hypopygium (Fig. 42) brown. Hypandrium with 2 strong bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 2 moderately long bristles in apical part. Left surstyli with



Figs. 40-44. *Stilpon khorngkeun*, new species, male. 40, mid leg, anterior view, 41, wing, dorsal view, 42, hypopygium, ventral view, 43, upper lobe of left surstyli, dorsal view, 44, right surstyli, dorsal view. Scale bar: 0.1 mm.

upper lobe (Fig. 43) undivided, with markedly developed surstyłar comb. Right surstyłus (Fig. 44) moderately large, sublinear, more or less rounded at apex, lacking spines. Left cercus unbranched, digitiform, fairly long, lacking spines, with 1 strong ventral bristle in middle part and 1 thinner marginal bristle basally. Right cercus consisting of two lobes, lacking spines; left lobe elongate, somewhat broadened toward apex; right lobe short, tapered toward apex. Phallus long, hair-like, curved.

*Female.* Unknown.

**Measurements.** – Body length 1.4-1.7 mm, wing length 0.9-1.2 mm.

**Etymology.** – “Khong” (curved) “keun” (upwards) refers to the fact that the vein  $r4+5$  is strongly curved upward.

**Phylogenetic relationships.** – The relationships of this species are unresolved beyond inclusion within the *S. divergens* group. Presumably the sister species to *S. lekkwar* based on the presence of apical spines on the middle part of the male left surstyłus.

**Distribution and seasonal occurrence.** – Thailand. Only known from one locality in Northeast Thailand in the Loei province. Records are from April till June and one more record in September.

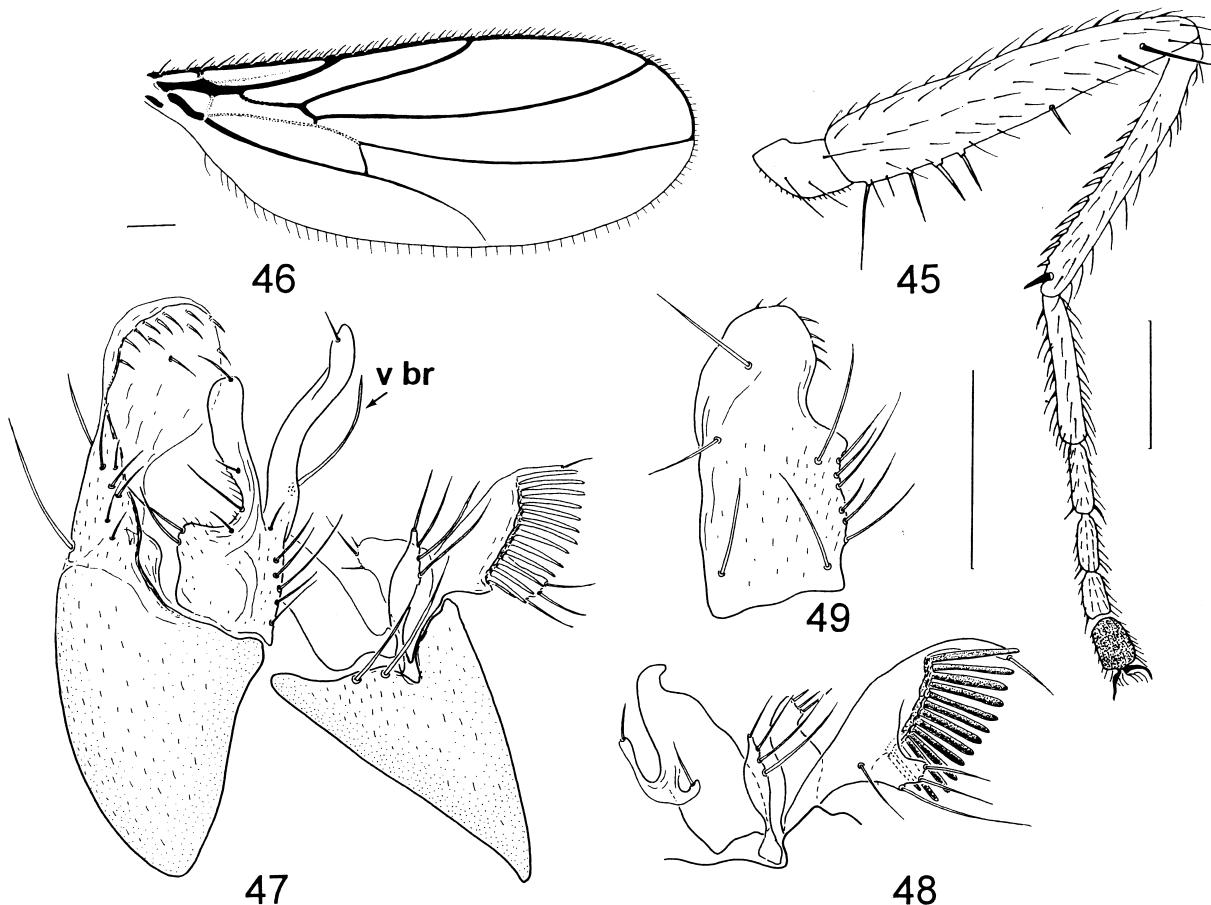
***Stilpon lek, new species***  
(Figs. 45-49)

**Material examined.** – Holotype – male, THAILAND: Loei province, Na Haeo, near waterfall at FIRS, sample n° 20013, 23 May.2000, coll. P. Grootaert (SWU).

Paratypes – 1 male, same locality as in holotype, sample n° 98064, 23.V.1998, coll. P. Grootaert; 2 females, same data as in holotype; 2 males, 1 female, Na Haeo, near stream at FIRS, sample n° 2026, 27 May.2000, coll. P. Grootaert; 1 male, Na Haeo, near stream on mud banks at FIRS, sample n° 21035, 6 May.2001, coll. P. Grootaert; 1 male, 2 females, Na Haeo, FIRS Malaise trap, 18-25 Dec.2001, coll. P. Grootaert; 1 male, 1 female, same locality as in holotype, sample n° 21033, 6 May.2001, coll. P. Grootaert. (SWU, RBINS, ZRC).

**Diagnosis.** – Species with black thorax, fore tibia yellow. Male: mid femur with 1 short black anteroventral spine just beyond middle, abdomen with gland-like structures between tergites 4-3 and 3-2. Halter contrastingly black.

**Description.** – *Male.* Head black in ground-colour, with minute anterior ocellars, somewhat longer posterior ocellars and long, cruciate inner verticals. Antenna yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus brownish yellow, small, subtriangular.



Figs. 45-49. *Stilpon lek*, new species, male. 45, mid leg, anterior view, 46, wing, dorsal view, 47, hypopygium, ventral view, 48, left surstyłus, dorsal view, 49, right surstyłus, dorsal view; v br – ventral bristle. Scale bar: 0.1 mm.

Thorax wholly dark brown. Scutum entirely tomentose. Postpronotal bristle long, black, inclinate. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with colour pattern: hind femur in apical 2/3 yellowish brown to brownish, fore tarsomere 5 dark brown, mid and hind tarsomere 5 pale brown; in darker specimens mid and hind coxae, mid and hind tibiae and mid femur at apex with brownish tinge. Hind trochanter lacking spines. Mid femur (Fig. 45) with 4 yellowish ventral bristles in basal half and 1 short black anteroventral spine just beyond middle. Hind femur (viewed laterally) evenly thickened toward middle; with row of 5 long anteroventral bristles in apical part and some prominent dorsal bristles. Fore tibia lacking prominent bristles. Mid tibia with rows of ventral spinules in apical half and 1 longer subapical spinule. Hind tibia unmodified.

Wing (Fig. 46) normally developed, covered with uniform microtrichia; almost uniformly infuscate, somewhat paler along posterior margin. Costal vein with ordinary short setulae on anterior margin. Vein R<sub>2+3</sub> about 3 times longer than R<sub>s</sub>. Distance between apices of veins R<sub>2+3</sub> and R<sub>4+5</sub> about 1.3 times longer than distance between apices of veins R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M divergent and evenly arcuate in apical part. Halter with contrast black, elongate knob and pale yellow stem.

Abdomen largely pale brown, with segments (except segment 8) weakly sclerotized, segment 8 wholly brown. Segments 1-2 unmodified. Narrow gland-like structures present between tergites 4-3 and 3-2 (Fig. 80). Tergites 3 and 4 shortened. Almost all tergites with scattered minute brownish setulae, tergites 7 and 8 with moderately long bristles. Sternites with similar setation but sternites 3 and 4 bearing 1 pair of inclinate bristles.

Hypopygium (Fig. 47) dark brown. Hypandrium with 2 strong bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, bearing 2 short bristles in apical part. Left surstyli with upper lobe (Fig. 48) undivided, broadened toward apex, with markedly developed surstyliar comb. Right surstyli (Fig. 49) rather small, rounded apically, sublinear, lacking spines. Left cercus unbranched, elongate, digitiform, lacking spines, with 1 long ventral bristle in middle part and several shorter marginal bristles basally. Right cercus consisting of two lobes, lacking spines; left lobe elongate, digitiform, somewhat broadened toward apex; right lobe small, rounded, with 2 long apical bristles. Phallus long, hair-like, curved.

*Female.* In most respects identical to male. Fore tarsomere 5 pale brown, mid and hind tarsomere 5 pale yellow. Mid femur with yellowish ventral bristles only. Mid tibia lacking spinules. Halter with pale brownish knob. Abdomen lacking gland-like structures. Terminalia elongate. Segment 8 stronger sclerotized than preabdomen. Proximal margin of sternite 8 without 2 anteriorly directed rods. Apex of sternite 8 not partially separated from base. Sternite 10 uniformly sclerotized, not fused with ventroapical margin of tergite 8.

Cercus elongate oval, brownish yellow, clothed in setulae of different length.

**Measurements.** – Body length 1.5-1.9 mm, wing length 0.9-1.2 mm.

**Etymology.** – “Lek” means small in Thai and it refers to the small size of the species

**Phylogenetic relationships.** – The relationships of this species are unresolved beyond inclusion within the *S. divergens* group.

**Distribution and seasonal occurrence.** – Thailand. Known from one locality in Northeast Thailand. Records mainly in May, but one record also in December.

***Stilpon lekkwar, new species***  
(Figs. 50-53)

**Material examined.** – Holotype – male, THAILAND: Loei province, Na Haeo, near waterfall at FIRS, sample n° 20013, 23 May.2000, coll. P. Grootaert (coll. RBINS).

Paratypes – 1 male, 17-24 Jun.2001; 2 males, 17-24.IX.99; 1 female, 29 Apr.2001-6 May.2000; 1 female, 8-15 Apr.2001; 1 male, 30 Apr.-7 May.2000; 1 male, 1 female, 7-14 May.2000, same locality as in holotype, coll. P. Grootaert. 2 males, Khring Nam Tok, sample n° 23041, 20 May.2003, coll. P. Grootaert; 1 male, Na Haeo FIRS, Malaise trap n° 2 in bamboo wood, 24 Apr.2003 (leg. P. Grootaert). (SWU, RBINS, ZRC).

**Diagnosis.** – Species with black thorax, very similar to *S. lek* but somewhat smaller, hind femur entirely yellow, male abdomen with gland-like structures between tergites 5-4, 4-3 and 3-2. Halter pale brown.

**Description.** – *Male.* Head black in ground-colour, with minute anterior ocellars, somewhat longer posterior ocellars and long, cruciate inner verticals. Antenna yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel. Palpus brownish yellow.

Thorax wholly dark brown. Scutum entirely tomentose. Postpronotal bristle long, black, inclinate. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with fore tarsomere 5 blackish brown, mid and hind tarsomere 5 pale brown; otherwise legs yellow. Hind trochanter lacking spinules. Mid femur (Fig. 50) with row of 4 brownish yellow bristles in basal 1/3, bearing 1 antero- and 1 posteroventral short spines just beyond middle. Hind femur (viewed laterally) evenly thickened toward middle; with 6-7 long anteroventral and some prominent dorsal bristles. Fore tibia lacking prominent bristles. Mid tibia with rows of ventral spinules in apical half and 1 longer subapical spinule. Hind tibia unmodified.

Wing normally developed, covered with uniform microtrichia; almost uniformly infuscate, somewhat paler along posterior margin. Costal vein with ordinary short setulae on anterior margin. Distance between apices of veins R<sub>2+3</sub> and R<sub>4+5</sub> about 1.5 times longer than distance between apices of veins R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M divergent and evenly arcuate in apical part. Halter pale, knob with slight brownish tinge.

Abdomen with tergites 1-2 unmodified. Narrow gland-like structures present between tergites 5-4, 4-3, and 3-2 (Fig. 81). Tergites 3 and 4 shortened. Segment 8 with short bristles.

Hypopygium (Fig. 51) dark brown. Hypandrium with 2 long bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, bearing 2 long bristles in apical part. Left surstyli with upper lobe (Fig. 52) undivided, with markedly developed surstyliar comb. Right surstyli (Fig. 53) rather small, rounded apically, lacking spines. Left cercus unbranched, elongate, digitiform, lacking spines, with 1 long, spine-like, ventral bristle in middle part and 3 thinner marginal bristles basally. Right cercus consisting of two lobes, lacking spines; left lobe slender, digitiform; right lobe small, rounded. Phallus long, hair-like, curved.

*Female*. In most respects identical to male. Mid femur with yellowish bristles in basal part, lacking black spines. Mid tibia lacking ventral spinules. Abdomen lacking gland-like structures. Terminalia elongate. Segment 8 stronger sclerotized than preabdomen. Proximal margin of sternite 8

without 2 anteriorly directed rods. Apex of sternite 8 not partially separated from base. Sternite 10 uniformly sclerotized, not fused with ventroapical margin of tergite 8. Cercus elongate oval, brownish yellow, clothed in setulae of different length.

**Measurements.** – Body length 1.2-1.4 mm, wing length 0.8-0.9 mm.

**Etymology.** – “Lek” (small) “kwar” (more) refers to the fact that this species is even smaller than its sibling *S. lek*.

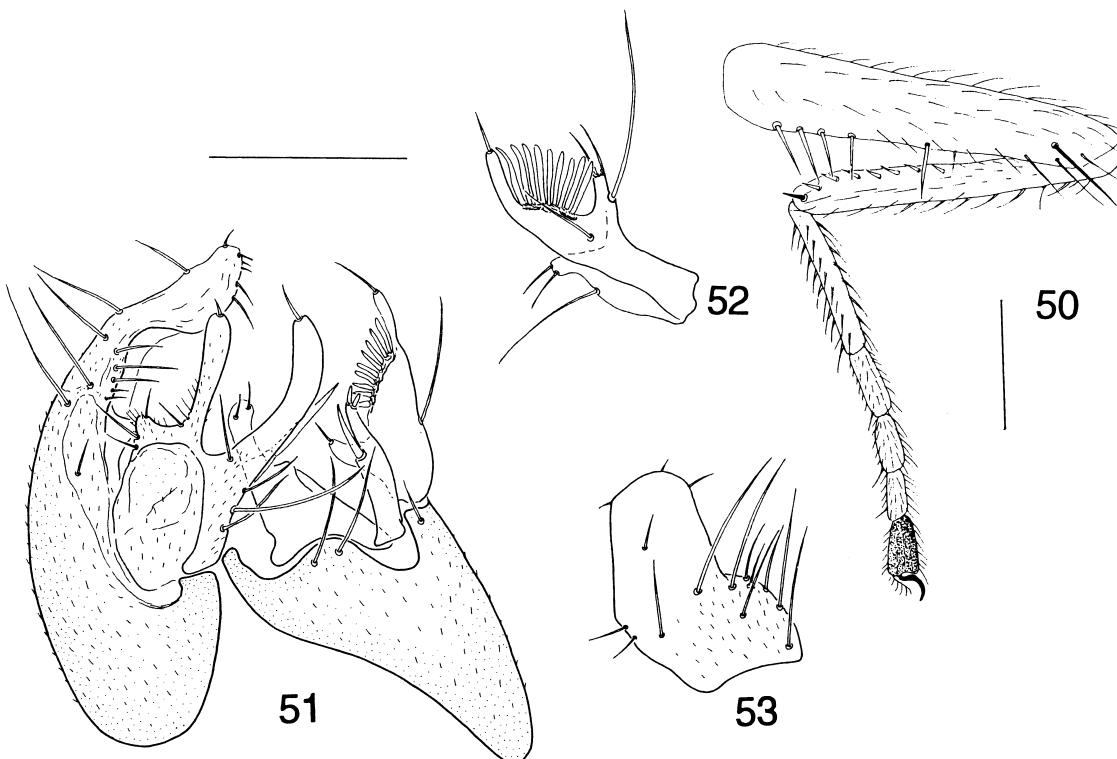
**Phylogenetic relationships.** – The relationships of this species are unresolved beyond inclusion within the *S. divergens* group.

**Distribution and seasonal occurrence.** – Thailand. Known from one locality in Northeast Thailand only. Records from April, May and June, but one record also from September.

***Stilpon malayensis*, new species**  
(Figs. 54-59)

**Material examined.** – Holotype - male, SINGAPORE: Nee Soon, swamp, sample n° 22054, 4 Dec.2002, coll. P. Grootaert (ZRC).

**Diagnosis.** – Species with brown mesoscutum and yellow pleurae, otherwise similar to *S. lek* differing from it by armature of male mid femur and details of male terminalia.



Figs. 50-53. *Stilpon lekwar*, new species, male. 50, mid leg, anterior view, 51, hypopygium, ventral view, 52, upper lobe of left surstyli, dorsal view, 53, right surstyli, dorsal view. Scale bar: 0.1 mm.

**Description.** – *Male*. Head black in ground-colour, with minute ocellars and long inner verticals. Antenna and palpus brownish yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel.

Thorax with brown prothoracic sclerites and mesoscutum, otherwise yellow. Scutum entirely tomentose. Postpronotal bristle long, inclinate. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

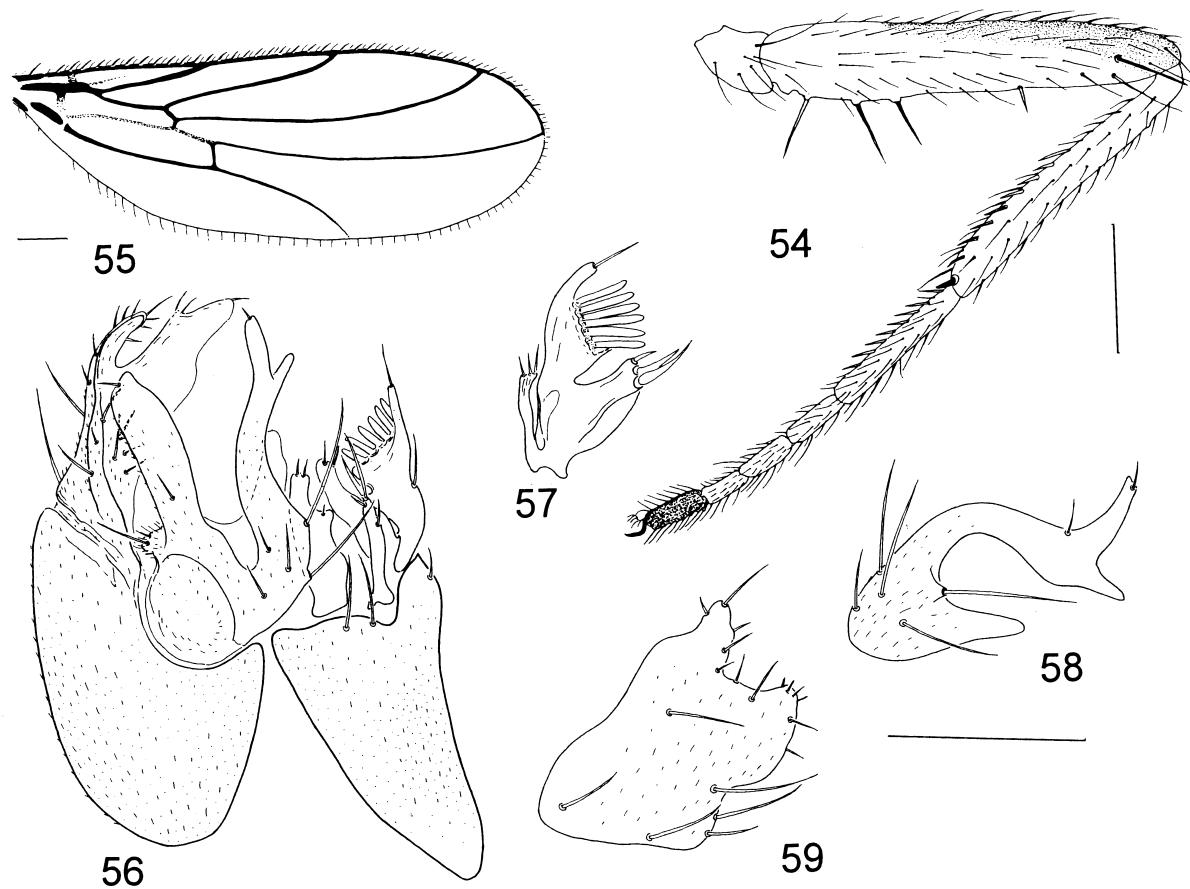
Legs with colour pattern: mid femur in apical 1/3, hind femur in apical 3/4, mid and hind tarsomere 5 brownish, fore tarsomere 5 black, fore tibia and fore tarsomere 1 brownish yellow. Mid coxa with 2 brown bristles on outer side. Hind trochanter lacking spinules. Mid femur (Fig. 54) slender, with 2 short dark posteroventral spines in basal 1/3, 1 similar anteroventral spine in apical 1/3 and yellow bristle in extreme base. Hind femur (viewed laterally) more or less evenly thickened, with row of anterodorsal bristles becoming longer toward apex and row of prominent dorsal bristles. Fore tibia lacking prominent ventral bristles. Mid tibia with rows of ventral spinules and 1 longer subapical spinule. Hind tibia unmodified.

Wing (Fig. 55) normally developed, covered with uniform microtrichia; more or less uniformly, rather deep infuscate.

Costal vein with long setulae along anterior margin. Vein R<sub>2+3</sub> about 2.5 times longer than Rs. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> 1.2 times longer than distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M slightly divergent and arcuate in apical part. Halter with elongate, contrast black knob and pale stem.

Abdomen largely dirty yellow, bearing mostly scattered dark setulae which are longer on pregenital segments, with all tergites (except segment 8) subequal in length, tergites 1-2 unmodified. Gland-like structures present between tergites 4-3 and 3-2 (Fig. 83); posterior space consisting of three parts, with lateral parts subglobular.

Hypopygium (Fig. 56) brown. Hypandrium with 2 strong bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 2 fairly long bristles in apical part. Left surstyli with upper lobe (Fig. 57) undivided, with markedly developed surstyliar comb. Right surstyli (Fig. 59) moderately large, sublinear, with excision on upper margin. Left cercus (Fig. 58) mostly long, slender, divided into two lobes in apical part, lacking spines, with 1 long ventral and 2 similar left marginal bristles in basal part. Right cercus divided into lobes, lacking spines; left lobe long, broad; right lobe hardly prominent, rounded at apex. Phallus long, hair-like, curved.



Figs. 54-59. *Stilpon malayensis*, new species, male. 54, mid leg, anterior view, 55, wing, dorsal view, 56, hypopygium, ventral view, 57, upper lobe of left surstyli, dorsal view, 58, left cercus and subepandrial sclerite, right lateral view, 59, right surstyli, dorsal view. Scale bar: 0.1 mm.

*Female*. Unknown.

**Measurements.** – Body length 1.5 mm, wing length 1.2 mm.

**Etymology.** – The name refers to the region where it was first found.

**Phylogenetic relationships.** – The relationships of this species are unresolved beyond inclusion within the *S. divergens* group.

**Distribution and seasonal occurrence.** – Singapore. Found in one locality only, in December during the rainy season in Singapore.

***Stilpon nhamdam*, new species**

(Figs. 60-63)

**Material examined.** – Holotype - male, THAILAND: Loei province, Na Haeo, river banks in gallery forest at Na Haeo FIRS, sample n° 20026, 27 May.2000, coll. P. Grootaert (SWU).

Paratypes – 1 female, same data as in holotype; 1 male, Na Haeo, base waterfall at FIRS, sample n° 21033, 6 May.2001, coll. P. Grootaert; 1 male, 1 female, Na Haeo, in gallery forest along stream at FIRS, sample n° 21035, 6 May.2001, coll. P. Grootaert; 7 males, 8 females, Dan Sai, along pond in village (between school and market), sample n° 21038, 8 May.2001, coll. P. Grootaert; 1 male, Na Haeo, gallery forest

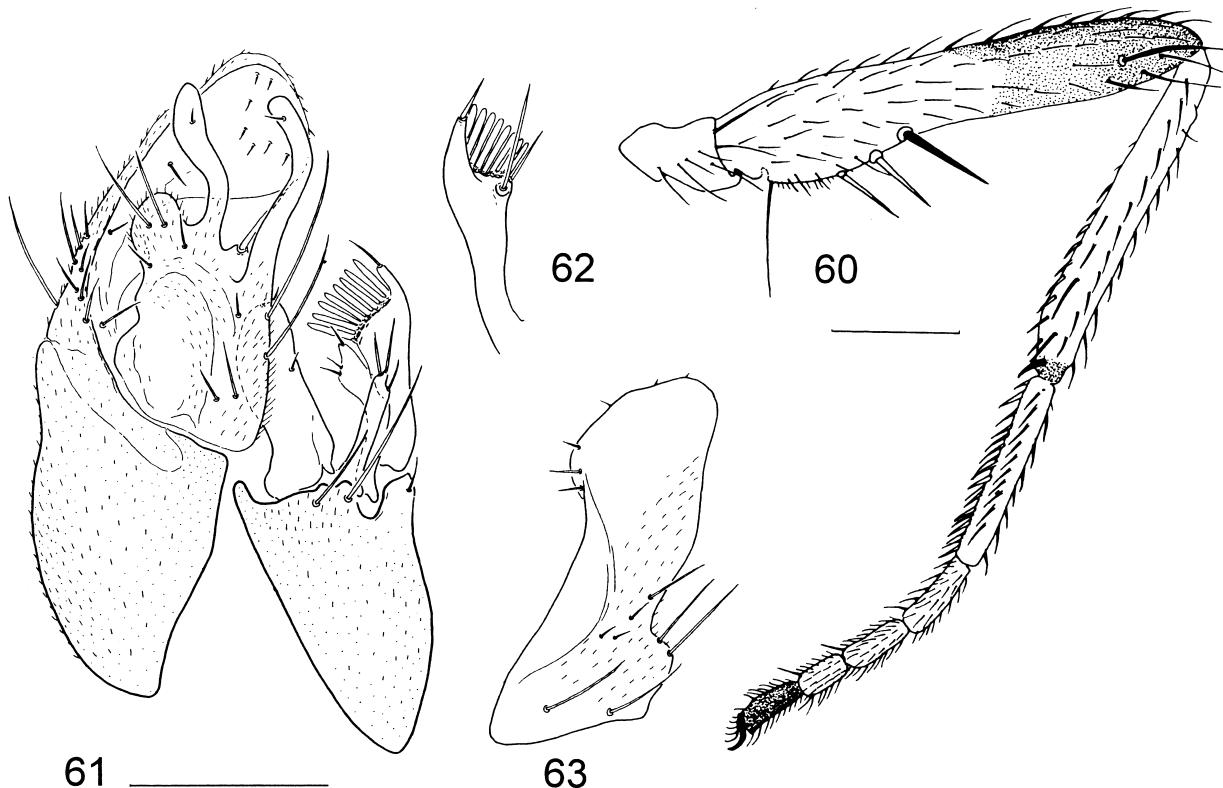
along stream at FIRS, sample n° 21044, 8 May.2001, coll. P. Grootaert; 4 males, 7 females, Khring Nam Tok, river bed, sample n° 21046, 9 May.2001, coll. P. Grootaert; 2 males, Khring Nam Tok, sample n° 23041, 20 May.2003, coll. P. Grootaert; 2 males, 2 females, Chang Nam Tok, river bed, sample n° 21047, 9 May.2001, coll. P. Grootaert. (in coll. SWU, RBINS, ZRC).

**Diagnosis.** – Species with black thorax and mostly yellow hind femur. Male: mid femur with basal swelling and long black anteroventral spine.

**Description.** – *Male*. Head black in ground-colour, with minute ocellars and long, cruciate inner verticals. Antenna and palpus brownish yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel.

Thorax dark brown. Scutum entirely tomentose. Postpronotal bristle long, inclinate. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with colour pattern: hind femur in apical 2/3, mid femur in apical 1/3, fore tibia entirely (paler at base), fore tarsomere 1 (becoming paler toward apex), mid and hind tarsomere 5 brownish, fore tarsomere 5 contrast brown; tarsomeres 2-4 pale yellow; otherwise legs yellow. Mid coxa with 2 brown bristles on outer side. Hind trochanter lacking spinules. Mid femur (Fig. 60) with swelling in basal part, bearing long black anteroventral spine near middle, 2 shorter brownish



Figs. 60-63. *Stilpon nhamdam*, new species, male. 60, mid leg, anterior view, 61, hypopygium, ventral view, 62, upper lobe of left surstylos, dorsal view, 63, right surstylos, dorsal view. Scale bar: 0.1 mm.

posteroventral spines and 1 long brownish yellow bristle in extreme base. Hind femur (viewed laterally) evenly thickened toward middle, with row of 7 anterodorsal subapical bristles which scarcely longer than femur is deep and row of well prominent dorsal bristles in basal half. Fore tibia lacking prominent ventral bristles. Mid tibia shortened, with hardly prominent ventral spinules in apical part and 1 longer spinule at apex. Hind tibia unmodified.

Wing normally developed, covered with uniform microtrichia, more or less uniformly infuscate. Vein R<sub>2+3</sub> about 3.0 times longer than R<sub>s</sub>. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> subequal to distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M strongly divergent in apical part. Halter with contrast black elongate knob and pale stem.

Abdomen largely yellowish brown, bearing mostly scattered dark setulae which are longer on pregenital segments, with all tergites (except segment 8) of subequal in length, tergites 1-2 unmodified. Narrow gland-like structures present between tergites 4-3 and 3-2.

Hypopygium (Fig. 61) brown. Hypandrium with 2 long bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 2 long bristles in apical part. Left surstyli with upper lobe (Fig. 62) undivided, with markedly developed surstyliar comb. Right surstylus (Fig. 63) moderately large, elongate, sublinear, more or less rounded at apex, lacking spines. Left cercus unbranched, digitiform, fairly long, lacking spines, with 1 strong ventral bristle and 2 thinner long marginal bristles basally. Right cercus consisting of two lobes, lacking spines; left lobe digitiform, fairly long, somewhat broadened in apical part; right lobe short, broad, rounded at apex. Phallus long, hair-like, curved.

**Female.** In most respects identical to male. Mid femur with row of yellowish bristles. Abdomen paler. Terminalia elongate. Segment 8 strongly sclerotized. Proximal margin of sternite 8 without 2 anteriorly directed rods. Apex of sternite 8 not partially separated from base. Sternite 10 uniformly sclerotized, not fused with ventroapical margin of tergite 8. Cercus elongate oval, brownish yellow, clothed in setulae of different length.

**Measurements.** – Body length 1.4-1.7 mm, wing length 0.9-1.2 mm.

**Etymology.** – “Nham” (spine), “dam” (black) refers to ventral black spine on the mid femur.

**Phylogenetic relationships.** – The relationships of this species are unresolved beyond inclusion within the *S. divergens* group.

**Distribution and seasonal occurrence.** – Thailand. Only known from Loei province in Northeast Thailand, but there known from various sites. Quite common in May. Not found in the Malaise trap, although it was common along the nearby stream.

***Stilpon trilobatus*, new species**  
(Figs. 64-68)

**Material examined.** – Holotype – male, THAILAND: Dan Sai, along pond in village (between school and market), sample n° 21038, 8 May.2000, coll. P. Grootaert (SWU).

Paratypes – 1 male, Krabi, Huai waterfall, river banks, sample n° 97113, 24.Oct.1997, coll. P. Grootaert; 1 male, Songkhla province, Ban Khlong Kua, in old rubber plantation, sample n° 97142, 29.Oct.1997, coll. P. Grootaert; 2 males, 5 females, same data as in holotype; 1 female, Na Haeo, in gallery forest along stream at FIRS, sample n° 21035, 6 May.2001, coll. P. Grootaert. (in coll. SWU, RBINS & ZRC).

**Diagnosis.** – Species with black thorax and almost wholly brown hind femur. Male: mid femur slender, with a row of almost equally long ventral bristles, 1 or 2 black spines in apical third.

**Description.** – **Male.** Head black in ground-colour, with minute anterior ocellars, somewhat longer posterior ocellars and long inner verticals. Antenna and palpus light brown to brownish yellow. Postpedicel nearly 2.0 times longer than wide. Style about 5 times longer than postpedicel.

Thorax dark brown. Scutum entirely tomentose. Postpronotal bristle long, inclinate. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with colour pattern: mid femur in apical 1/2, hind femur (except extreme base) and tarsomere 5 of all legs brownish; fore tibia, fore tarsomeres 1-4, hind coxa and hind tarsomere 1 brownish yellow; otherwise legs yellow. Mid coxa with 2 brown bristles on outer side. Hind trochanter lacking spinules. Mid femur (Fig. 64) slender, with 2 anteroventral subapical bristles, 1 long yellowish bristle in extreme base, row of 7-8 yellowish to brownish yellow long spine-like bristles before middle and 1 or 2 similar black spine-like bristles beyond middle of femur. Hind femur (viewed laterally) evenly thickened toward middle, with row of anterodorsal bristles becoming longer toward apex (4-5 subapical bristles scarcely longer than femur is deep) and row of prominent dorsal bristles. Fore tibia lacking prominent ventral bristles. Mid tibia with rows of ventral spinules and 1 longer subapical spinule. Hind tibia unmodified.

Wing normally developed, covered with uniform microtrichia; more or less uniformly and rather deep infuscate. Costal vein with ordinary short setulae on anterior margin. Vein R<sub>2+3</sub> about 3.0 times longer than R<sub>s</sub>. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> 1.2-1.3 times longer than distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M divergent and evenly arcuate in apical part. Halter with elongate, contrast knob and pale stem.

Abdomen largely yellowish brown, bearing mostly scattered dark setulae which are longer on pregenital segments, tergites 1-2 unmodified, tergite 3 narrowed. Gland-like structures

present between tergites 4-3 and 3-2 (Fig. 82), with posterior space broader, consisting of three parts.

Hypopygium (Fig. 65) brown, large. Hypandrium with 2 long bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 2 long bristles in apical part. Left surstyli with upper lobe (Fig. 66) undivided, with markedly developed surstyliar comb. Right surstyli (Fig. 68) moderately large, broadened in basal part, more or less rounded at apex, lacking spines. Left cercus (Fig. 67) unbranched, slender, somewhat broadened at apex, very long, lacking spines, with 1 long ventral and 2 similar marginal bristles basally. Right cercus consisting of two lobes, lacking spines; left lobe slender, very long; right lobe slender, nearly 2 times shorter than left one. Phallus long, hair-like, curved.

**Female.** In most respects identical to male. Mid femur with row of yellowish bristles. Hind femur slender. Postabdomen elongate, strongly sclerotized, concolorous with thorax, tergite 8 distinctly separated from sternite 8. Proximal margin of sternite 8 without 2 anteriorly directed rods. Apex of sternite 8 not partially separated from base. Sternite 10 uniformly sclerotized, not fused with ventroapical margin of tergite 8. Cercus elongate oval, brownish, clothed in setulae of different length.

**Measurements.** – Body length 1.4-1.7 mm, wing length 0.9-1.2 mm.

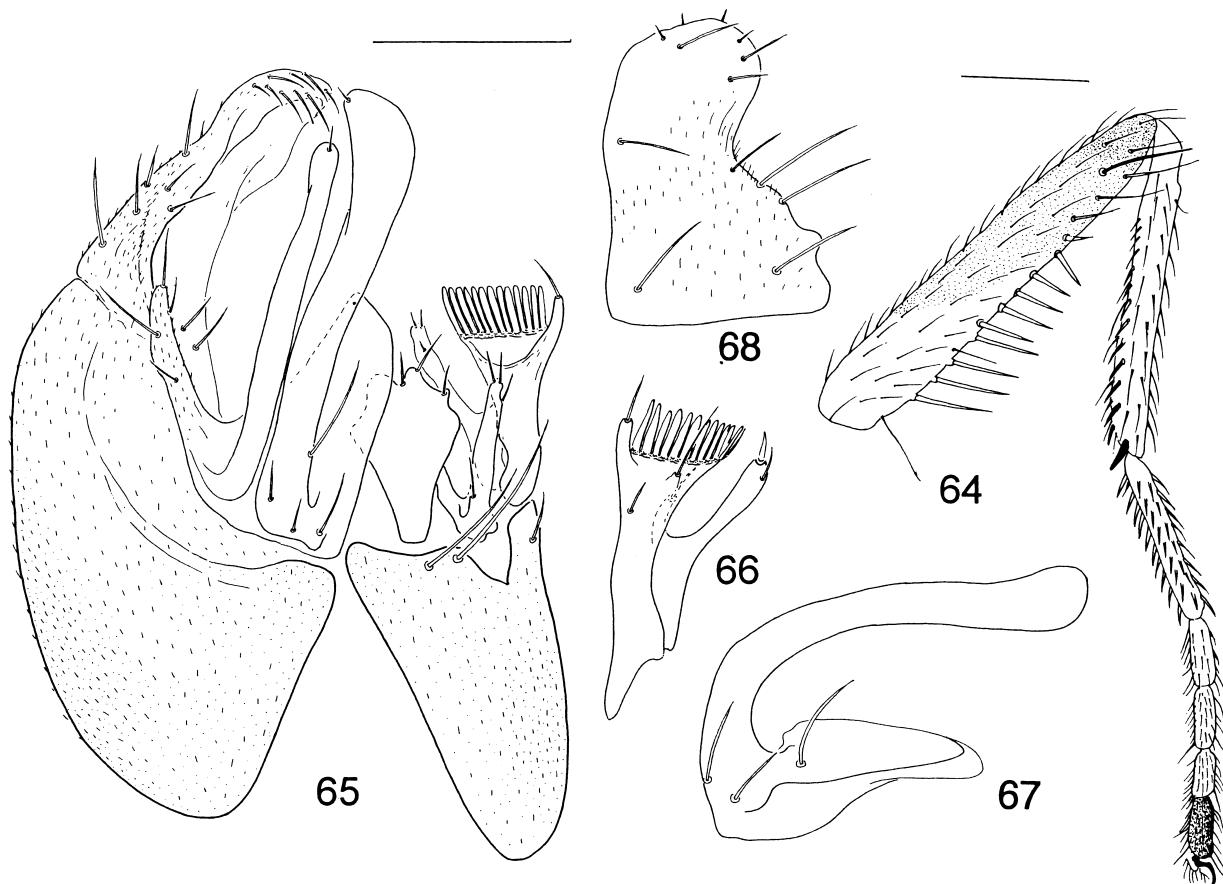
**Etymology.** – The name of this species refers to the trilobed posterior abdominal gland.

**Phylogenetic relationships.** – The relationships of this species are unresolved beyond inclusion within the *S. divergens* group.

**Distribution and seasonal occurrence.** – Thailand. A species with a wide distribution: Northeast to South Thailand (Loei, Krabi and Songkhla provinces). Records in the North from May, October in the South.

#### The species of uncertain group position

Two species described below are difficult to include within some of the species groups proposed. Certainly, they could be ascribed to as separate groups with a single species included. However, we consider that it would be prematurely. Undoubtedly, many new species of *Stilpon* will be described in the future and additional intermediate forms may yet be found.



Figs. 64-68. *Stilpon trilobatus*, new species, male. 64, mid leg, anterior view, 65, hypopygium, ventral view, 66, upper lobe of left surstyli, dorsal view, 67, left cercus and subepandrial sclerite, right lateral view, 68, right surstyli, dorsal view. Scale bar: 0.1 mm.

Both species cannot be included in the *S. varipes* species group primarily because they share, like all other species known from the Old Word, entirely tomentose scutum and complete rows of acrostichal setulae. These species can be distinguished from the species of the *S. graminum* group by setose male cerci. The species of the *S. seeluang* group have yellow thorax, small male terminalia, unmodified abdominal segments and different structure of the male terminalia.

***Stilpon paradoxus*, new species**  
(Figs. 69-75)

**Material examined.** – Holotype – male, THAILAND: Loei province, Na Haeo, riverbanks in gallery forest at FIRS, sample n° 2020, 24 May.2000, coll. P. Grootaert (SWU).

Paratypes – 6 males, 6 females, same data as in holotype; 2 males, 5 females, Na Haeo, sample n° 99016, 10 Feb.1999, coll. P. Grootaert. (SWU, ZRC, RBINS).

**Diagnosis.** – Species with black brown thorax, differing from all other species from Oriental region by a set of unique characters of male, including constriction in middle hind femur, spur-like posterior apical comb on hind tibia, modified abdominal tergites 1-2, completely fused cerci; female habitually very similar to *S. lek* but with shortened terminalia.

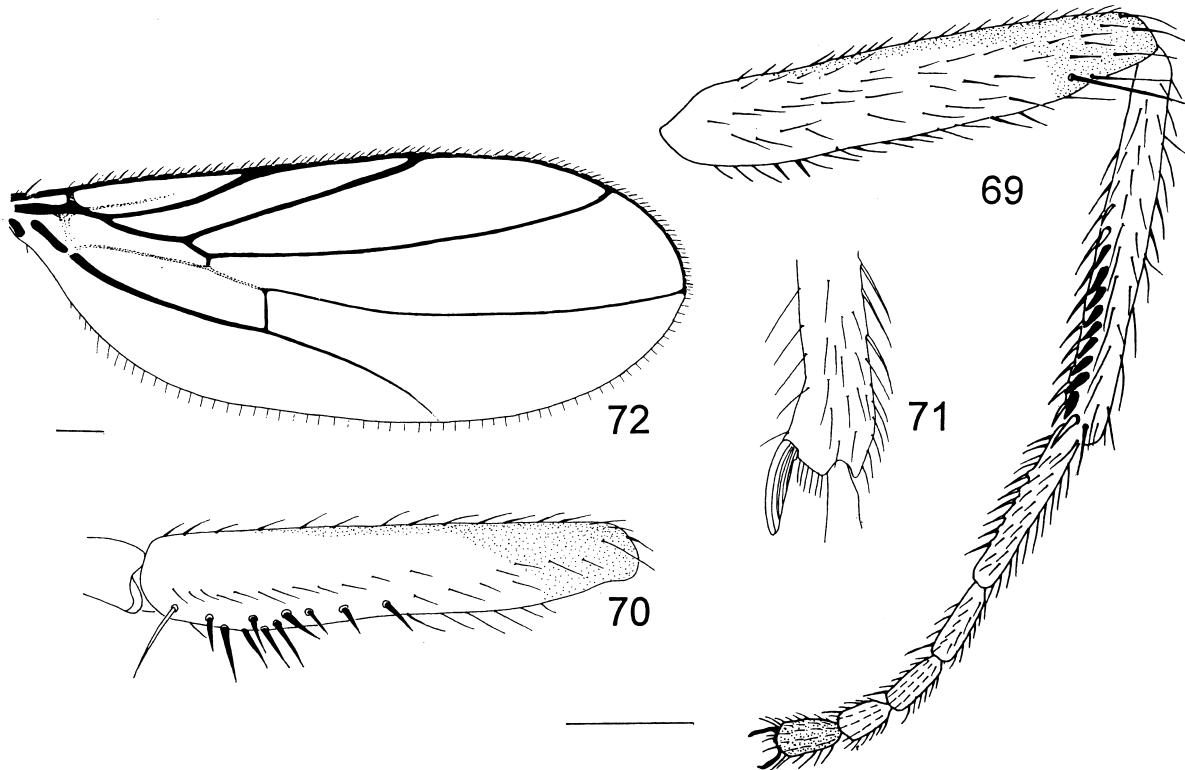
**Description.** – *Male*. Head black in ground-colour, with minute anterior and posterior ocellars and long cruciate inner verticals. Antenna brownish yellow (in darker specimens postpedicel and style darker). Postpedicel nearly 2.0 times

longer than wide. Style about 5 times longer than postpedicel. Palpus pale.

Thorax wholly black brown. Scutum entirely tomentose. Postpronotal bristle long, black, inclinate. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with colour pattern: hind coxa in extreme base; mid femur in apical 1/3, hind femur in apical 2/3 and tarsomere 5 of all legs brownish; fore tibia and fore tarsomere 1 with brownish tinge; otherwise legs yellow. Hind trochanter lacking spinules. Mid femur (Fig. 69, 70) slender, with 1 long anterior subapical bristle, 1 long yellow basal bristle, 8 black spinules in basal 1/3 and 2 posteroventral spinules in middle. Hind femur (viewed laterally) constricted and bent near middle, broader in apical half; with row of 8 fairly long (scarcely longer than femur is deep) anteroventral bristles in apical part, row of 5-6 dorsal bristles in basal part and 3-4 dorsal spinules just beyond midpoint of femur. Fore tibia lacking prominent bristles. Mid tibia straight, rather slender, with rows of ventral spinules and 1 longer subapical spinule. Hind tibia (Fig. 71) with posterior apical comb greatly modified, long, spur-like.

Wing (Fig. 72) normally developed, covered with uniform microtrichia; almost uniformly infuscate, somewhat deeper along longitudinal veins. Costal vein with ordinary short setulae on anterior margin. Vein R<sub>2+3</sub> about 3 times longer than R<sub>s</sub>. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> nearly 1.3 times longer than distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M divergent and slightly arcuate in apical



Figs. 69-72. *Stilpon paradoxus*, new species, male. 69, mid leg, anterior view, 70, mid femur, posterior view, 71, apical part of hind tibia, dorsal view, 72, wing, dorsal view. Scale bar: 0.1 mm.

part. Halter with contrast black, elongate knob and pale yellow stem.

Abdomen with hardly prominent gland-like structures at least between tergites 3-4 and 4-5. Tergite 1 (Fig. 84) produced laterally into projection bearing 3 spine-like black bristles of different length and resting into a shallow sclerotized excavation on tergite 2; tergite 3 with posteromarginal spinules; tergites 4-6 with minute posteromarginal setulae; tergite 7 with short ordinary bristles, segment 8 with short bristles. Sternites bearing ordinary bristles becoming more numerous and stronger toward hypopygium.

Hypopygium (Fig. 73, 74) dark brown, large. Hypandrium with 2 strong bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, bearing 2 long bristles in apical part. Left surstyli with upper lobe largely divided; lower part with markedly developed narrow surstyliar comb, upper part long, slender, fused with lower part basally. Right surstyli large, elongate oval, lacking spines. Cerci completely fused into one large lobe, which is subequal in size and similar in shape to right surstyli, lacking spines, ventral and marginal bristles. Phallus (Fig. 75) elongate, straight, strongly sclerotized.

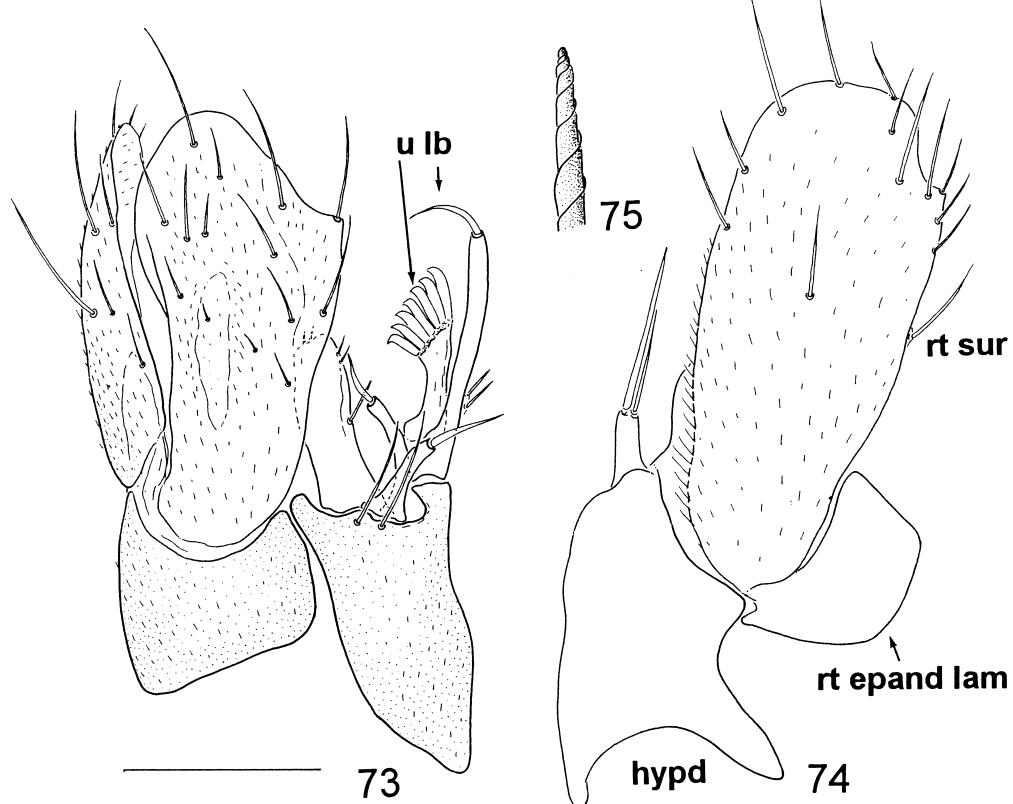
**Female.** In most respects identical to male. Mid femur with 1 row of yellow ventral bristles becoming longer toward base of femur, longest bristle longer than femur is broad. Hind femur slender, with ordinary setation. Mid tibia lacking

spinules. Hind tibia with short posterior apical comb. Halter with brownish knob. Abdomen lacking gland-like structures and with unmodified tergites 1-2. Terminalia shortened. Segment 8 normally sclerotized. Proximal margin of sternite 8 without 2 anteriorly directed rods. Apex of sternite 8 partially separated from base. Sternite 10 uniformly sclerotized, not fused with ventroapical margin of tergite 8. Cercus elongate oval, brownish yellow, clothed in setulae of different length.

**Measurements.** – Body length 1.5-1.8 mm, wing length 1.2-1.3 mm.

**Etymology.** – In reference to a unique set of characters which this species possesses.

**Phylogenetic relationships.** – The relationships of *S. paradoxus* are unresolved. In this species the female terminalia are shortened and, thus, it appears to be more closely related to the *S. graminum* and *S. seeluang* groups. In *S. paradoxus* the upper lobe of the left surstyli is almost completely divided that could also support this conclusion. However, the phylogenetic value of such condition is not quite clear at present. It should be noted that within a *S. graminum* + *S. seeluang* clade most of the known species have a completely divided upper lobe of the left surstyli (*S. spinicercus*, *S. monospinatus*, the *S. graminum* species complex and the entire *S. seeluang* species group). Although, the upper lobe of the left surstyli is undivided in the *S.*



Figs. 73-75. *Stilpon paradoxus*, new species, male. 73, hypopygium, ventral view, 74, same, left lateral view, 75, phallus, dorsal view; hypd – hypandrium, rt epand lam – right epandrial lamella, rt sur – right surstyli, u lb – upper lobe of left surstyli. Scale bar: 0.1 mm.

*nubilus* species complex. *S. paradoxus* has the surstyłar comb and the gland-like structures on the male abdomen. However, the first character is very homoplastic within the genus, whereas the second one is likely to be plesiomorphous. In the shape of the male hind femur (constricted and bent near middle) this species resembles some North American species, e.g. *S. curvipes* Melander or *S. varipes* Loew (Cumming & Cooper, 1992). However, this appears to be due to the homoplastic nature of this character rather than an evidence of some direct relationships. Besides of the characters noted, *S. paradoxus* possesses a set of unique features, which place them aside of all other *Stilpon* species. In this species the male abdominal segments 1-2 are greatly modified. Together they appear to form a special device of uncertain functional value. The male terminalia are also very peculiar. The cerci are completely fused into a large lobe, which is strictly similar in size and shape to the right surstyłus. The right epandrial lamella is small and it is distinctly smaller than the left epandrial lamella (in Tachydromiinae normally vice versa). The phallus is elongate, straight, thick and strongly sclerotized (elongate, hair-like and curved in the *S. divergens* species group, very short and rather weakly sclerotized in the *S. graminum* and *S. seeluang* groups). Unfortunately, at the present state of our knowledge of the genus, almost all these characters are usefulness for the discussion some relationships of this species. Some of them are insufficiently studied in

the Drapetini on the whole (e.g., aedeagal complex). The phylogenetic value of others may be clarified when new undescribed species are discovered.

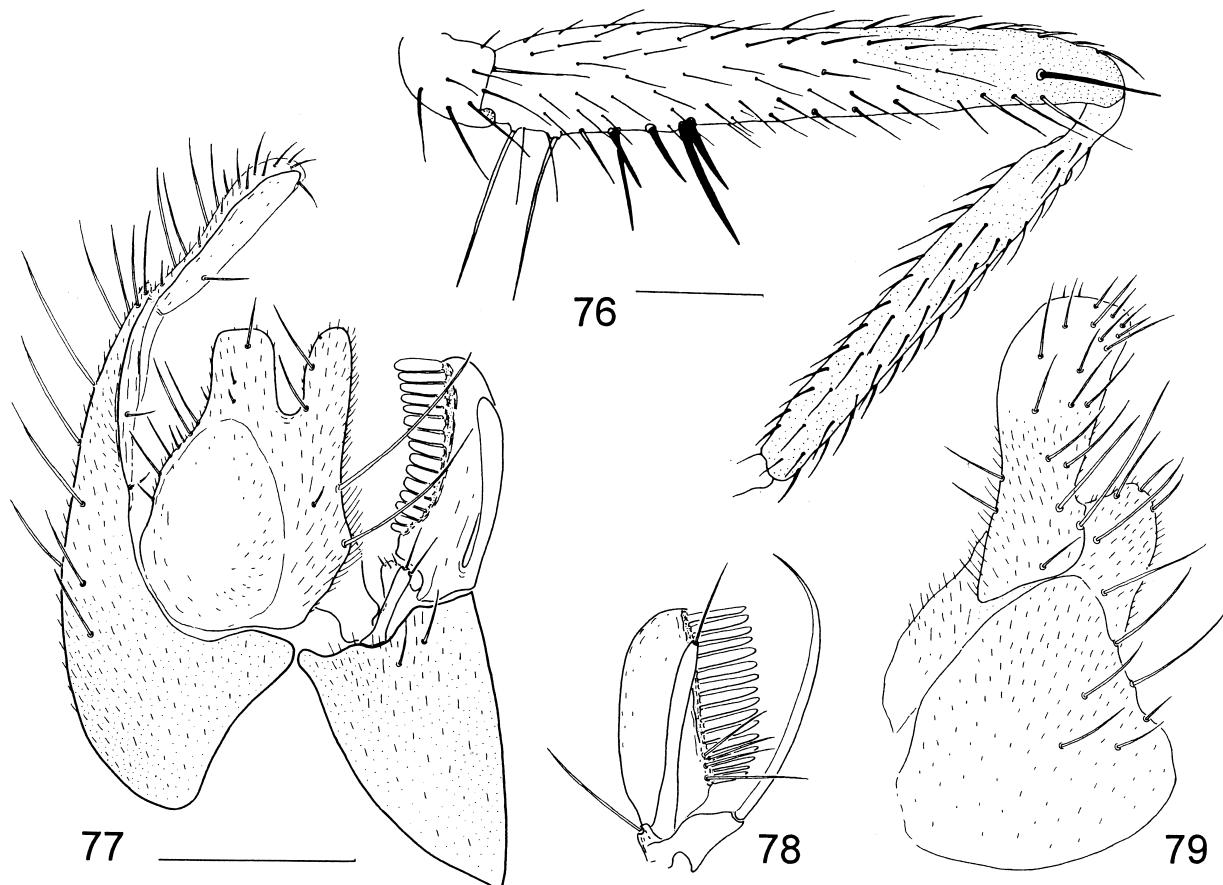
**Distribution and seasonal occurrence.** – Thailand. Known from one locality only. Records are from the first decade of February to late May. Collected on riverbanks in gallery forest.

*Stilpon yai*, new species  
(Figs. 76-79)

**Material examined.** – Holotype – male, THAILAND: Loei Province, Na Haeo, Chang Tok, riverbed, sample n° 21047, 9 May.2001, coll. P. Grootaert (coll. RBINS).

**Diagnosis.** – Readily distinguished from other species known from Oriental region by its large size, veins R<sub>4+5</sub> and M parallel and straight in apical part, male mid femur with 3 black antero- and 2 longer posteroventral spines in basal half.

**Description.** – *Male*. Head black in ground-colour, with minute anterior ocellars, somewhat longer posterior ocellars and long inner verticals. Antenna and palpus brownish yellow. Postpedicel nearly 1.5 times longer than wide. Style nearly 8 times longer than postpedicel.



Figs. 76-79. *Stilpon yai*, new species, male. 76, mid leg, anterior view, 77, hypopygium, ventral view, 78, upper lobe of left surstyłus, dorsal view, 79, right epandrial lamella and right surstyłus, dorsal view. Scale bar: 0.1 mm.

Thorax dark brown. Scutum entirely tomentose. Postpronotal bristle long, inclinate. Dorsocentrals in multiple rows, complete posteriorly. Acrostichals 2-serial, complete posteriorly.

Legs with colour pattern: hind femur brownish in apical 1/2; fore tibia, fore and mid tarsi, mid femur at apex, mid and hind coxae brownish yellow. Mid coxa with 2 brown bristles on outer side. Hind trochanter lacking spinules. Mid femur (Fig. 76) slender, with 3 short black antero- and 2 longer posteroventral spines in basal 1/2, bearing 2 long yellow bristles in extreme base. Hind femur (viewed laterally) more or less evenly thickened, with row of anterodorsal bristles becoming longer toward apex and row of prominent dorsal bristles. Fore tibia lacking prominent ventral bristles. Mid tibia with ordinary setation, lacking ventral spinules. Hind tibia unmodified.

Wing normally developed, covered with uniform microtrichia; more or less uniformly, rather deep infuscate. Costal vein with long setulae along anterior margin. Vein R<sub>2+3</sub> about 2.5 times longer than R<sub>s</sub>. Distance between apices of R<sub>2+3</sub> and R<sub>4+5</sub> 1.5 times longer than distance between apices of R<sub>1</sub> and R<sub>2+3</sub>. R<sub>4+5</sub> and M parallel and straight in apical part. Halter with elongate, contrast black knob and pale stem.

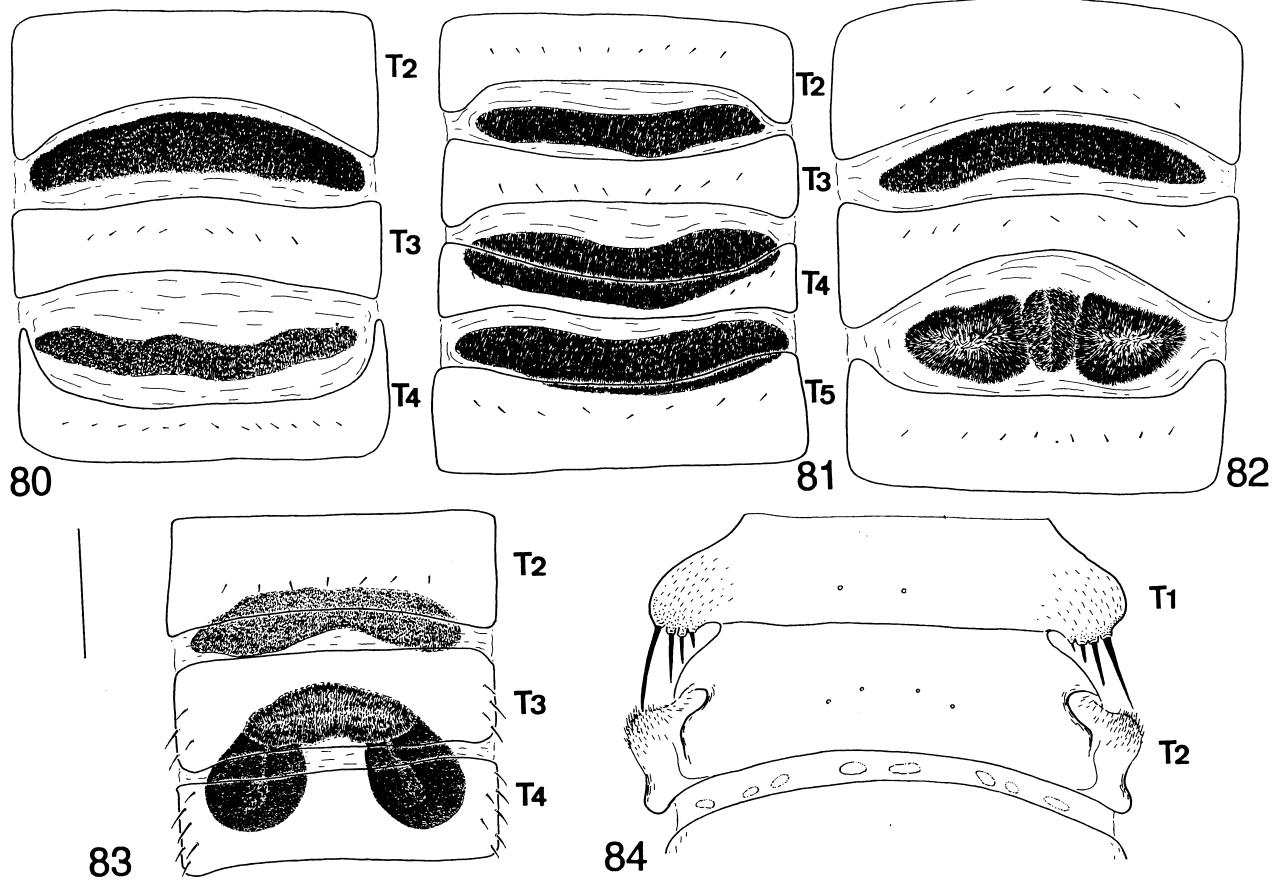
Abdomen largely dirty yellow, bearing mostly scattered dark setulae which are longer on pregenital segments, with all tergites (except segment 8) of subequal in length, tergites 1-2 unmodified. Hardly prominent gland-like structures present between tergites 6-5, 5-4, 4-3 and 3-2. Segment 8 with moderately long bristles.

Hypopygium (Fig. 77) brown, large. Hypandrium with 2 short bristles in apical part. Epandrium completely divided. Left epandrial lamella small, fused to hypandrium, with 2 short bristles in apical part. Left surstyli with upper lobe (Fig. 78) largely divided; lower part with greatly developed surstyliar comb, upper part digitiform, fused with lower part basally. Right surstyli (Fig. 79) moderately large, sublinear, more or less rounded at apex, bearing numerous bristles of different length, lacking spines. Left cercus unbranched, short, fairly broad, rounded at apex, lacking spines and ventral bristle, with 2 very long left marginal bristles in basal part. Right cercus unbranched, short, rectangular, lacking spines. Phallus short.

*Female.* Unknown.

**Measurements.** – Body length 2.5 mm, wing length 2.2 mm.

**Etymology.** – In reference to the largest size of this species



Figs. 80-84. Details of male abdomen, dorsal view. 80, *Stilpon lek*, new species, 81, *Stilpon lekkwar*, new species, 82, *Stilpon trilobatus*, new species, 83, *Stilpon malayensis*, new species, 84, *Stilpon paradoxus*, new species; T – tergite. Scale bar: 0.1 mm.

among all others found until now from the Oriental region, "yai" means big in Thai.

**Phylogenetic relationships.** – The relationships of *S. yai* are unresolved. The main problem originates because of unknown female of this species. The presence of 2 long marginal bristles in basal part of cercus may indicate *S. yai* is closer related to some species of the *S. divergens* species group. However, it has no a long ventral bristle on the left cercus, whereas the presence of this bristle appears to support a monophyly of this group. The structure of the phallus resembles that in the *S. graminum* and *S. seeluang* species groups. However, this character is insufficiently studied in many other *Stilpon* species. *S. yai* has setose left cercus and 2 distinct bristles in apical part of the left epandrial lamella. So, it cannot be included in the *S. graminum* or *S. seeluang* species groups, respectively. *S. yai* shares the same condition of the left surstyli as in *S. paradoxus* (upper part largely separated). Additionally, in *S. yai* the right surstyli appears to be enlarged and cerci might exhibit some tendency to be completely fused (presumably, the conditions toward those found in *S. paradoxus*). However, the last two arguments are hypotheses only. Whereas the condition of the left surstyli noted is a too weak argumentation to discuss some relationships between these two species at present. Like some North American species, *S. yai* has the elongate costal setulae. But, again, this is probably a quite homoplastic character because the lack of the scutal tomentum supports well the monophyly of these Nearctic species.

**Distribution and seasonal occurrence.** – Thailand. Known from one locality. The only record is from the beginning of May. Collected from riverbed.

## DISCUSSION

### The phylogenetic relationships within *Stilpon*

The phylogenetic relationships within *Stilpon* are difficult to resolve with the data currently available. The main problem deals with the unclear sister relationships of the genus. Nevertheless, Cumming & Cooper (1992) discussed the most evident phylogenetic patterns within *Stilpon*. We tested the implication of the newly described species on their preliminary conclusions. The hypothesised phylogenetic relationships of the species of *Stilpon* are presented in Fig. 85. The cladogram is a result of the heuristic search performed using the programs NONA (Goloboff, 1999) and, to submit the data matrix, WINCLADA (Nixon, 1999). The data matrix (Table 1) consisted of 23 morphological characters. We should specially note here that the cladogram presented does not pretend on a rigorous cladistic analysis. Such analysis is impossible at present because the sister relationships of *Stilpon* are unresolved. That was the reason why we did not indicate the precise outgroup. To resolve this problem a special study is needed that, however, is beyond of the scope of this paper. Nevertheless, we considered that it would be helpful for the future studies to visualise the possible relationships within *Stilpon*. It is clear that this preliminary

analysis is mainly based on the characters which phylogenetic value is more or less evident. In some cases they were checked in other closely related taxa of the Drapetini.

The monophyly of *Stilpon* has been accepted here, following Cumming & Cooper (1992), to be substantiated by two apomorphies: linear to sublinear frons (character 1) and male terminalia with a single ejaculatory apodeme (character 20). Although, the first condition appears to present in some closely related genera (Grootaert, 1994). Three informal species groups of *Stilpon* have been previously recognised: *S. varipes* group, *S. graminum* group, and *S. divergens* group (Cumming & Cooper, 1992).

The lack of the scutal tomentum (character 4) and acrostichal setulae (at least partial, character 6) was considered to support the monophyly of the *S. varipes* species group. Our data confirm this conclusion. All species treated in the present paper share an entirely tomentose scutum and complete rows of acrostichal setulae. The absence of the gland-like structures on the male abdomen (character 9) could also indicate close relationships of the species of this group. However, this condition is present in some other species of *Stilpon*.

The monophyly of the *S. graminum* species group was substantiated by the apomorphic development of apical spines on the left cercus of the male terminalia. Within this clade two monophyletic lineages have been recognised: *S. graminum*, s. str., (upper lobe of the left surstyli completely divided, female terminalia shortened, with the apex of sternite 8 hinged and at least partially separated from the base) and *S. nubilus* (upper lobe of the left surstyli lacking comb, sternite 10 of the female terminalia fused with anteroventral margin of tergite 8).

The implication in the analysis of the newly described species indicates that the *S. graminum* clade sensu Cumming & Cooper (1992) is likely to belong to a broader branch of *Stilpon*. This clade could be substantiated by the apomorphic shortening of the female terminalia (character 21) and the partial or complete division of the upper lobe of the left surstyli of the male terminalia (character 12), assuming subsequent reversal in *S. nubilus* Collin and its allies. The clade appears to include two main lineages.

The first lineage agrees more or less with the concept of the *S. graminum* group sensu Cumming & Cooper (1992) (character 17). However, the relationships within the group are not quite evident. *S. spinicercus*, the *S. graminum* and *S. nubilus* complexes form one clade based on two characters of the male terminalia, namely the presence of 2-3 apical spines on the left cercus (character 17.2) and the prolonged apically right surstyli (character 15). The *S. graminum* and *S. nubilus* appear to be the sister complexes of the species. This conclusion may be based on the shape of the female cercus (character 22), which is broad oval in these species. The absence of the abdominal gland-like structures could also support this clade. However, this is a homoplastic condition within *Stilpon*. The monophyly of the *S. nubilus* complex is supported by the apomorphic presence of the apical spines

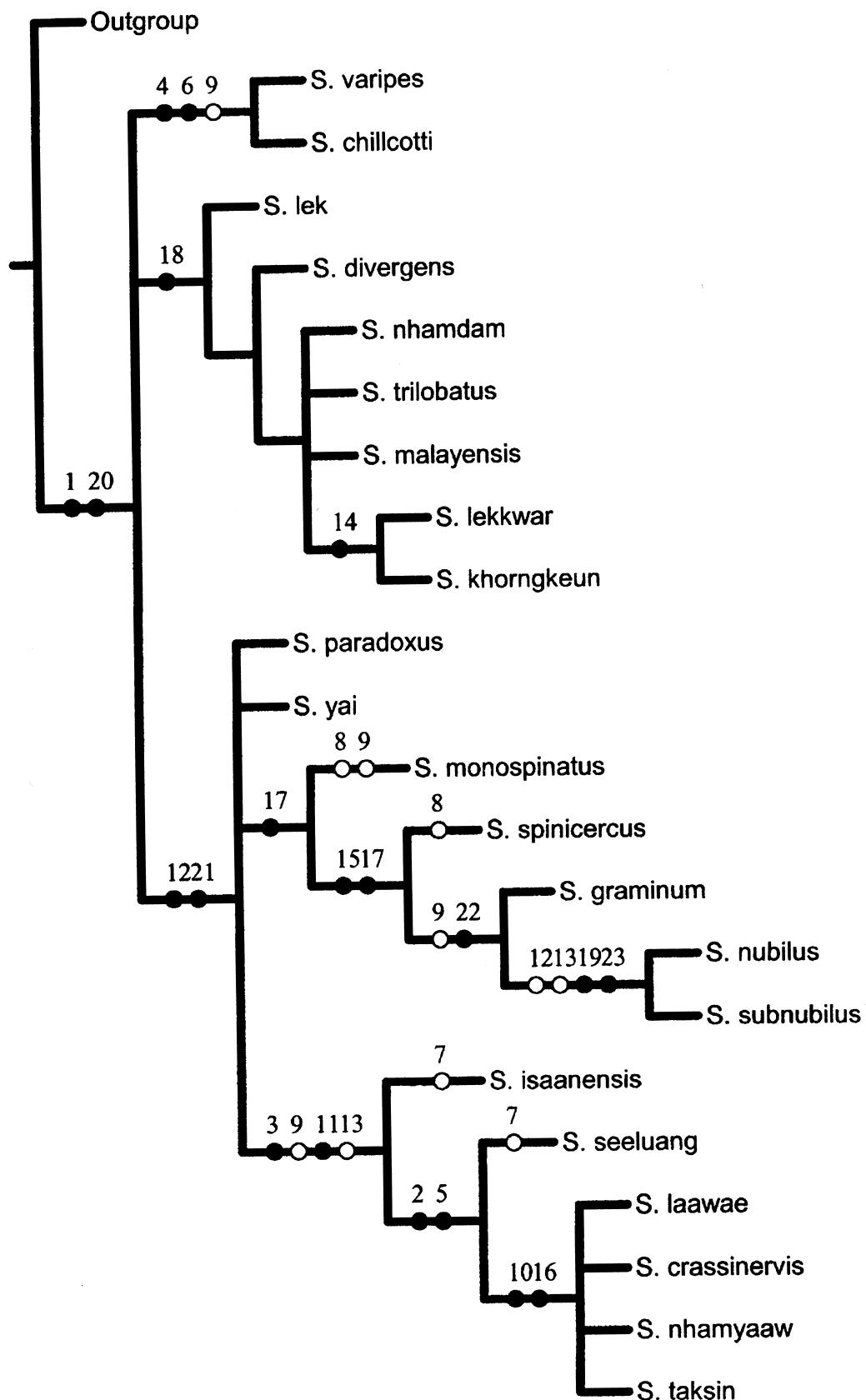


Fig. 85. Hypothesised phylogenetic patterns of the species of *Stilpon*. Number refer to characters discussed under "Phylogenetic relationships within *Stilpon*". Black dots = presumably non-homoplastic apomorphies; white dots = presumably homoplastic apomorphies. Strict consensus tree (Length = 32, C.I. = 0.75, R.I. = 0.90) of the three most parsimonious cladograms produced by analysis of the data matrix in Table 1.

on the male right cercus (character 19) and a feature of the female terminalia, namely the fusion of sternite 10 with anteroventral margin of tergite 8 (character 23). Additionally, in the *S. nubilus* complex the surstyler comb of the male left cercus (character 13) is absent. But the loss of the surstyler comb of the male terminalia is likely to be a homoplastic feature within the genus. We did not find any characters to support the monophyly of the *S. graminum* complex of the species sensu Cumming & Cooper (1992). In these species the upper lobe of the left surstylos of the male terminalia is completely divided. But, again, it is a homoplastic condition within *Stilpon*.

The relationships of *S. spinicercus* and *S. monospinatus*, which were described in the present paper, are not clear. In *S. spinicercus* the male terminalia are more similar to those in *S. nubilus*. However, the female terminalia resembles those in *S. graminum*. *S. spinicercus* is the only known species of this clade which has the abdominal gland-like structures in the male. *S. monospinatus* is the most problematic species of this lineage on the whole. It was included into the *S. graminum* group primarily due to the presence of a single apical spine on the left cercus of the male terminalia. If such, than *S. monospinatus* might be most similar to the presumed basal condition of the *S. graminum* lineage. Unfortunately, the female is not found yet in this species. The presence of an erect ventral bristle (character 8) on the male fore tibia may suggest *S. monospinatus* is allied with *S. spinicercus*. The abdominal gland-like structures are absent in this species.

The second lineage of the *Stilpon* clade with the shortened female terminalia includes several phenetically very similar and uniform species. The lineage is united on the bases of the completely yellow thorax (character 3) and minute or absent bristles in apical part of the left epandrial lamella of the male terminalia (character 11). The additional characters could be a complete division of the upper lobe of the left surstylos, the lack of the surstyler comb and the gland-like abdominal structures on the male abdomen. However, they appear to be homoplastic within the genus. We ascribed all species belonging to this lineage to as a separate species group within *Stilpon* (*S. seeluang* species group). The group is likely to constitute the sister relationships with the *S. graminum* species group. Within this newly recognised group *S. laawae*, *S. crassinervis*, *S. nhamyaaw*, and *S. taksin* are presumably closely related, sharing the greatly reduced male cerci (character 16) and 2 very long bristles on the male abdominal segment 8 (character 10). The relationships within this assemblage of the species are not resolved. The reduced inner vertical (character 2) and postpronotal (character 5) bristles may indicate the closer relationships between *S. seeluang* and the preceded complex of species. The presence of 2 spines on the male hind trochanter (character 7) may suggest some affinity of *S. seeluang* and *S. isaanensis*. Both species, especially *S. isaanensis*, appear to demonstrate the basal condition of the male terminalia for this group in the whole. One species included in *S. seeluang* group, namely *S. nhamyaaw*, has 3 long spines on the left cercus of the male terminalia. However, these spines are unlikely to be homologous with those found in the species of the *S.*

*graminum* group. These spines are not apical in their position (vs. apical in the *S. graminum* group). Additionally, the topography of the strong long bristles on the left cercus in *S. crassinervis*, apparently a sister species to *S. nhamyaaw*, may indicate that just these bristles are homologous with the spines in *S. nhamyaaw*.

The relationships of two remaining species of this clade, *S. paradoxus* and *S. yai* are unclear. We have already discussed the possible affinities of these species in details (see "Phylogenetic relationships" under the respective descriptions). To summarise, *S. paradoxus* possesses many peculiar, autapomorphic features. It may represent a new, hitherto unknown group of the *Stilpon* species. *S. yai* was included in this clade provisionally since the female of this species has not been found yet. Some features may suggest these species to be closer related. However, this is speculation only and future discoveries of the genus are needed to clarify the relationships of these species.

The assemblage of the species ascribed to as the *S. divergens* group is the most problematic unit within the genus. Cumming & Cooper (1992) recognised this group based on the plesiomorphic characters only: scutum entirely tomentose, rows of acrostichal setulae complete, setose left cercus of the male terminalia. Additionally, they noted that this group may be paraphyletic or even represent the stem group within the genus. Indeed, following this definition we should include the *S. seeluang* species group just into the *S. divergens* group. However, the *S. seeluang* group is quite distinctive lineage within *Stilpon* and it constitutes the sister relationships with *S. graminum* group. We consider that, preliminary, at least one apomorphic feature (long ventral bristle on the left cercus of the male terminalia, character 18) could support the monophyly of the *S. divergens* species group. The relationships within the *S. divergens* group and with other groups of *Stilpon* are not resolved at present. Within the group *S. lekkwar* and *S. khorngkeun* appear to be the sister species based on the presence of the apical spines on the middle lobe of the left surstylos (character 14). The precise recognition of the *Stilpon* sister group relationships within the Drapetini is likely to be especially important for the rigorous cladistic analysis of this unit.

This also could be attributed to the *S. varipes* species group. The monophyly of the group is well supported by the lack of the scutal tomentum and incomplete acrostichal setulae. However, the relationships of the *S. varipes* group with other groups of *Stilpon* are not so evident. The main problem is likely to deal with our insufficient knowledge of the genus from the East Asia and western part of the North America.

#### Notes about the gland-like structures in *Stilpon*

In several *Stilpon* species studied from the Oriental region we found, for the first time in the genus, gland-like structures on the male abdomen. This character is a common and well known feature of some Drapetini genera allied to *Stilpon*, e.g. *Elaphropeza*, *Drapetis*, *Crossopalpus*, *Dusmetina*,

*Isodrapetis*, *Nanodromia*, and *Austrodrapetis* (Collin, 1961; Smith, 1964; Smith and Davies, 1965; Cumming & Cooper, 1992; Plant, 1999, Grootaert & Shamshev, 2003). These gland-like structures are considered to deal with epigamic behaviour (Smith and Davies, 1965). Stark (1990) suggested that the structures on the tergites were associated with a stridulatory organ in *Elaphropeza*. An electronmicroscopic study however showed the presence of glandular cells in *Elaphropeza* so that we suppose that the glands produce pheromones (Grootaert, unpublished observations).

The structures found in *Stilpon* are very similar, in their external appearance, to those in *Drapetis* (A. Stark, personal communication). However, the fine details should be checked in the future. These structures were found in all species belonging to the *S. divergens* group (unclear in *S. divergens*), *S. spinicercus* (*S. graminum* group) and *S. paradoxus* and *S. yai* (species with uncertain group position). The gland-like structures are difficult to recognise without special preparation in the dry specimens and, especially, in specimens with shrunken abdomen. No any external features, that could indicate the presence of the gland-like structures, have been found. The gland-like structures usually look like simple, elongate, narrow, darkened spaces with a pilose vestiture. Rarely, they consist of three lobes (*S. trilobatus* and *S. malayensis*) or, sometimes, they are partly concealed by the corresponding tergites. In most species the gland-like structures occupy intersegmental spaces between tergites 4-3 and 3-2 (*S. khorngkeun*, *S. lek*, *S. malayensis*, *S. nhamdam*, *S. trilobatus*), *S. spinicercus* – between tergites 3-2 and 2-1, in *S. lekkwar* – between tergites 5-4, 4-3 and 3-2. In *S. paradoxus* and *S. yai* they are indistinct and present between tergites 5-4, 4-3 and tergites 6-5, 5-4, 4-3, 3-2, respectively.

The presence of the gland-like structures in *Stilpon* may support the hypothesis that the genus is closer related to *Elaphropeza*, *Drapetis*, *Crossopalpus*, *Dusmetina*, and *Austrodrapetis* (Cumming & Cooper, 1992; Grootaert, 1994) rather than to *Chersodromia* (Chvála, 1975). Within the genus these structures were apparently lost in the *S. varipes*, *S. seeluang*, and *S. graminum* (except *S. spinicercus*) species groups.

### Concluding remarks

To conclude, the genus *Stilpon* is very well represented in the Oriental region. Seventeen species are now recognised from this region, which is more than from other biotic regions. The Oriental fauna of the genus demonstrates a great morphological diversity, including both species with many relatively plesiomorphic features and species possessing many apomorphic characters. These arguments may support the hypothesis that the early evolution of the genus occurred in the Oriental region (Cumming & Cooper, 1992). Four informal groups of species are now recognised within *Stilpon*. The *S. graminum* group includes species from the Oriental, Palaearctic, and Nearctic regions. The *S. varipes* and *S. divergens*, and *S. seeluang* groups are only presented in the Nearctic and Oriental regions, respectively. However, this

pattern of distribution reflects our insufficient knowledge of the genus rather than the real relationships between the regions. Undoubtedly, our paper is only first step toward a detailed study of the genus *Stilpon* from the Oriental region.

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### LITERATURE CITED

Chvála, M., 1975. The Tachydromiinae (Dipt. Empididae) of Fennoscandia and Denmark. *Fauna entomologica Scandinavica*, 3: 336 pp. Klampenborg, Denmark.

Collin, J. E., 1961. Empididae. In *British Flies*. Vol. 6. Cambridge. 782 pp.

Cumming, J. M. & B. E. Cooper, 1992. A revision of the Nearctic species of the Tachydromiinae fly genus *Stilpon* Loew (Diptera: Empidoidea). *The Canadian entomologist*, 124: 951-98.

Dahl, F., 1909. Die Gattung *Limosina* und die biocönotische Forschung. *Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin*, 1909: 360-377.

Fallén, C. F., 1915. *Empididae Sveciae*. Lundae. 16 pp.

Goloboff, P. A., 1999. – *NONA, version 2. Program and documentation*. Fundación e Instituto Miguel Lillo, Tucumán.

Grootaert, P., 1994. Two new genera of empidoid flies (Diptera, Empidoidea, Hybotidae, Tachydromiinae) from Melanesia. *Studia dipterologica*, 1: 141-156.

Grootaert, P. & I. V. Shamshev, 2003 (2004). New species of the genus *Nanodromia* Grootaert (Diptera: Empidoidea, Hybotidae) from Thailand and Singapore. *The Natural History Journal of Chulalongkorn University*, 3(2): 41-52.

Janzen, J.-W., 2002. Arthropods in Baltic Amber. 167 pp, Germany: Ampyx-Verlag, Halle (Saale).

Loew, H., 1859. Neue Beiträge zur Kenntniss der Dipteren. Sechster Beitrag. *Programm der Königlichen Realschule zu Meseritz*, 1859: 1-50.

Loew, H., 1864. Ueber die schlesischen Arten der Gattungen *Tachypeza* Meig. (*Tachypeza*, *Tachista*, *Dysaletria*) und *Microphorus* Macq. (*Trichina* und *Microphorus*). *Zeitschrift für Entomologie*, Breslau, 14: 1-50.

McAlpine, J. F., 1981. Morphology and terminology – Adults. Pp. 9-63. In: McAlpine, J. F. et al. (eds.), *Manual of Nearctic Diptera*, Vol. 1, Agriculture Canada, Research Branch, Monograph 27, 674 pp; Ottawa.

Meigen, J. W., 1830. Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten. Vol. 6. Hamm. 401 pp.

Meunier, F., 1908. Monographie des Empidae de l'ambre de la Baltique et catalogue bibliographique complet sur les Diptères fossiles de cette résine. *Annales des Sciences naturelles (Zoologie)*, (ser. 9) **7**: 81-135, pl. 3-12.

Nixon, K., 1999. *WINCLADA, ver. 0.9.9beta. Program and documentation in cladistics.com*. New York: Ithaca.

Perris, E., 1852. Seconde excursion dans les Grandes-Landes. *Annales de la Société Linnéenne de Lyon*, **1850/1852**: 145-216.

Plant, A., 1999. New species of *Isodrapetis* Collin, 1928 (Diptera, Empidoidea, Hybotidae) with a detailed diagnosis of the genus. *Studia dipterologica* **6**: 279-294.

Séguy, E., 1950. Un nouveau genre de Corynétine du Midi de la France (Dipt., Empididae). *Vie et milieu*, **1**: 83-87.

Sinclair, B.J., 2000. Morphology and terminology of Diptera male terminalia. Pp. 53-74. In: Papp, L. & B. Darvas (eds.), *Contributions to a Manual of Palaearctic Diptera*, **1**. 978 pp., Budapest: Science Herald.

Smith, K. G. V., 1964. A remarkable new genus and two new species of Empididae (Tachydromiinae, Drapetini) from the Cook Islands. *Pacific Insects*, **6**: 247-251.

Smith, K. G. V., 1969. The Empididae of southern Africa (Diptera). *Annals of the Natal Museum*, **19**: 1-342.

Smith, K. G. V. & R. G. Davies, 1965. Gland-like abdominal structures of possible epigamic function in the Diptera. *Nature*, **207**: 321-322.

Stark, A., 1990. Interpretation abdominaler und tibialer Strukturen bei Dipteren der Gattung *Elaphropeza* (Hybotidae, Empidoidea) als Stridulationsapparat. *Zoologisher Anzeiger*, **224**: 211-224.

Stuckenbergs, B. R., 1999. Antennal evolution in the Brachycera (Diptera), with a reassessment of terminology relating to the flagellum. *Studia dipterologica*, **6**: 33-48.

Appendix. 1. Data matrix of character states for the phylogenetic analysis of species of *Stilpon*. 0, plesiomorphic state; 1, apomorphic state; ?, missing data. Characters are coded as binary, except character 17 (vestiture of the male left cercus) which was treated as an unordered multistate character.

	Characters 1234567891111111112222 01234567890123
Outgroup	000000000000000000000000
<i>S. varipes</i>	10010100100000000001000
<i>S. chillcotti</i>	10010100100000000001000
<i>S. graminum</i>	10000000100100102001110
<i>S. nubilus</i>	10000000100010102011111
<i>S. subnubilus</i>	10000000100010102011111
<i>S. spinicercus</i>	10000001000100102001100
<i>S. monospinatus</i>	10000001100100001001???
<i>S. seeluang</i>	1110101010110000001100
<i>S. isaanensis</i>	10100010101110000001100
<i>S. laawae</i>	11101000111110010001100
<i>S. crassinervis</i>	11101000111110010001???
<i>S. nhamyaaw</i>	11101000111110010001100
<i>S. taksin</i>	11101000111110010001100
<i>S. lek</i>	10000000000000000000101000
<i>S. lekkwar</i>	10000000000000000000101000
<i>S. khornkeun</i>	10000000000000000000101???
<i>S. nhamdam</i>	10000000000000000000101000
<i>S. trilobatus</i>	10000000000000000000101000
<i>S. malayensis</i>	10000000000000000000101???
<i>S. divergens</i>	10000000000000000000101000
<i>S. paradoxus</i>	10000000000000000000101000
<i>S. yai</i>	10000000000000000000101000

Appendix 2. List of characters for the analysis of the phylogenetic patterns within *Stilpon*.

1. Frons: triangular (0), linear (1).
2. Inner vertical bristles: long (0), hardly prominent (1).
3. Thorax colour: black (0), completely yellow (1).
4. Scutum vestiture: entirely tomentose (0), lacking tomentum (1).
5. Postpronotal bristle: long (0), hardly prominent (1).
6. Acrostichal setulae: complete (0), incomplete or absent (1).
7. Male hind trochanter: lacking spinules (0), with 2 spinules (1).
8. Erect ventral bristle on male fore tibia: absent (0), present (1).
9. Abdominal gland-like structures: present (0), absent (1).
10. Male segment 8: with moderately long bristles (0), with at least 2 very long bristles (1).
11. Bristle(s) in apical part of left epandrial lamella: long (0), hardly prominent or absent (1).
12. Upper lobe of left surstyli: undivided (0), partly or completely divided into 2 parts (1).
13. Surstyliar comb: present (0), absent (1).
14. Apical spines on mid lobe of the left surstyli: absent (0), present (1).
15. Right surstyli: not prolonged apically (0), prolonged apically (1).
16. Male cerci: well prominent (0), reduced (1).
17. Apical spine(s) on the male left cercus: absent (0), 1 spine (1), 2-3 spines (2).
18. Long ventral bristle in basal part of the left cercus: absent (0), present (1).
19. Apical spines on the right cercus: absent (0), present (1).
20. Ejaculatory apodeme: paired (0), single (1).
21. Female terminalia: elongate (0), shortened (1).
22. Female cercus: elongate oval (0), broad oval (1).
23. Sternite 10 of female terminalia: not fused with ventroapical margin of tergite 8 (0), fused with ventroapical margin of tergite 8 (1).