

FIRST RECORD OF THE DANCE FLY GENUS *HILARA* IN THAILAND WITH DESCRIPTIONS OF FIVE NEW SPECIES (INSECTA, DIPTERA, EMPIDIDAE)

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ABSTRACT

The genus *Hilara*, an old dance fly genus that radiated in temperate regions, is reported for the first time in Thailand. Five species new for science of the subgenus *Hilara* (*Hilara*) are described from Northeast Thailand. They were found in a tropical forest at an altitude of about 500 m.

Key words. dance flies, Empididae, *Hilara*, Thailand.

INTRODUCTION

The present paper is the first in a series of articles dealing with the insect fauna around the Field Research Station of Srinakharinwirot University at Na Haeo (Northeast Thailand, Loei Province). Na Haeo is situated in a hilly area at an altitude of about 500 m. The original vegetation was tropical, monsoonal deciduous dipterocarp forest with well-marked dry and wet seasons as well as a winter and a summer. Apart from the neighbouring National Park (Na Haeo), the vegetation has been strongly disturbed by rotational cropping in the forest. The area is further often subjected to seasonal fires. However, the area harbours a fauna which is partly Oriental and partly Palaearctic in origin. It is probably the southern-most area of the Oriental region where many Palaearctic elements are present and it is therefore thought to be very sensitive to global change in climate. Thus, study of this area is quite urgent in order to monitor faunal changes.

In this first paper we deal with the genus *Hilara*, which belongs to the dance flies (Diptera, Empididae). It is an old genus with a global distribution, occurring in all zoogeographical regions, but seems to have its greatest radiation in temperate areas. In the Palaearctic region some 250 species are known, but Milan Chvala is currently describing many new species from relatively well investigated countries in western Europe. In the Oriental region, about 27 species have been described from Burma (FREY, 1952), 4 from India and Pakistan (BRUNETTI, 1920), 3 from Nepal (SMITH, 1965) and 3 species from Taiwan (BEZZI, 1912, 1914). Some species have also been described from China by YANG & WANG (1998), but it is not clear whether they represent "Oriental" or true "Palaearctic"

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species. The genus is not yet reported from the rest of Southeast Asia and is not known from lowland tropical rain forest in New Guinea. It is possible that it occurs in mountainous areas in these tropical regions, but we do not have any records so far. In the Australasian region as considered by EVENHUIS (1989), 6 species are known from Australia and 15 from New Zealand. *Hilara* species have been found to be quite abundant in South Australia and many species are to be described (BICKEL, in litt.).

Hilara has a complex biology and it is therefore a suitable indicator for site quality assessment (GROOTAERT & POLLET, 2001). The larvae live in the soil and are predacious. The adult male hunts for small prey floating on the surface of pools, ponds, brooks or streams. It picks up the prey and often wraps it in a silk cocoon, which is produced by silk glands in the enlarged fore basitarsi. Eventually the male carrying the cocoon joins a female swarm. Females tend to inspect the male with its "present" and when the female dives under the male to grab the prey, the male grabs the female's thorax and mating can start. Generally, the couple leaves the swarm for some vegetation. While the female feeds on the prey, the male continues to mate.

This behaviour is specific and has a number of variants. Light intensity of the area (GROOTAERT, 1994) determined by the coverage of the canopy, the presence of markers in the landscape, the type of water surface (running or stagnant, size) all determine where the male hunts and where female swarms are formed. Females sometimes swarm above water, but also terrestrial swarms are formed some distance from the place where the males hunt. Generally, the females fly in a horizontal plane in a rapid to-and-fro movement. However, triangular swarms are known as well, where the females dance up in a slow motion and at the top of the triangle, dive down vertically and fly horizontally back to the point of departure, and dance upwards again. The length of the swarm is limited by light zones (light-shade transition) and probably location markers such as branches or vegetation.

The genus *Hilara* sensu stricto is here reported for the first time in Thailand. Its presence is regarded as an intrusion of Palaearctic elements into the Oriental region, insofar as the latter is a distinct region. We describe 5 new species for science but probably many more undescribed species occur in the area. In western Europe most *Hilara* species appear during spring. Activity is also seasonal here in Na Haeo since we did not find specimens in May, which is the beginning of the rainy season.

The material was only collected by net sweeping and mainly above the water surface of some small streams in gallery forest.

Type material is preserved in alcohol in the collections of the Royal Belgian Institute of Natural Sciences (Brussels) and voucher specimens are preserved at the Biology Department of Srinakharinwirot University (Bangkok).

SYSTEMATIC ACCOUNT

Key to *Hilara* found at Na Haeo (Loei Province)

1. Halteres white. (In addition: 3rd antennal segment black, but basal segments paler; palpi yellow)..... *promboonae* sp. nov.
- Halteres dark (black).....2

2. Palpi yellow; female only, hind tibia club-shaped.....*fistulipoides* sp. nov.
Palpi black; male and female: hind tibia simple.....3
3. Legs yellow (including coxae); fore basitarsus very much swollen and almost as long
as fore tibia.....*isaanensis* sp. nov.
Legs black; fore basitarsus thickened, but not balloon-shaped; basitarsus at most 3/4 of
the length of fore tibia.....4
4. Mid leg with basitarsus bearing apical spines; second tarsal segment basally excavated
.....*loeiensis* sp. nov.
Mid leg with basitarsus and following segments simple.....*thaica* sp. nov.

***Hilara isaanensis* sp. nov.**

(Figs. 1–5)

Material examined.—Holotype male, Thailand, Loei Province, Na Haeo, 13.II.1999, swept from river surface in gallery forest (leg. P. GROOTAERT, sample n°99038); Paratypes: 1 male of same provenance (sample n°99038) and 1 male at 50 m down the river (sample n°99039). All specimens were swept from above a narrow stream in a quite dark gallery forest.

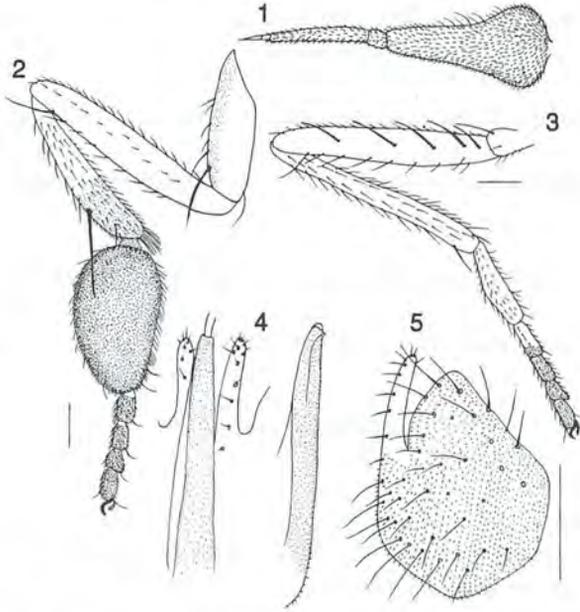
Diagnosis.—A small black species with mainly yellowish legs. Palpi and halteres black. All hairs and bristles black. Fore basitarsus black, very much inflated, as long as fore tibia. Tarsi dark brownish. Middle tarsus with first segment swollen near middle and somewhat distorted. Mesonotum black with 3 darker stripes; acr 4–serial. Terga with very long bristles at hind margin.

Male. Body length: 2.9 mm, wing: 2.25 mm. *Head* black in ground-colour; frons velvety black; in front as wide as base of third antennal segment. Fronto-orbital bristles long, as long as ocellars. Occiput dull black with a row of long black orbitals. Face brownish-black, parallel-sided, slightly narrower than base of third antennal segment. Antennae black (Fig. 1). Third segment twice as long as wide; arista as long as third segment. Palpi brownish black, in apical third with a long black bristle, nearly as long as palpus. Labrum shining brownish-black, half as long as head is high.

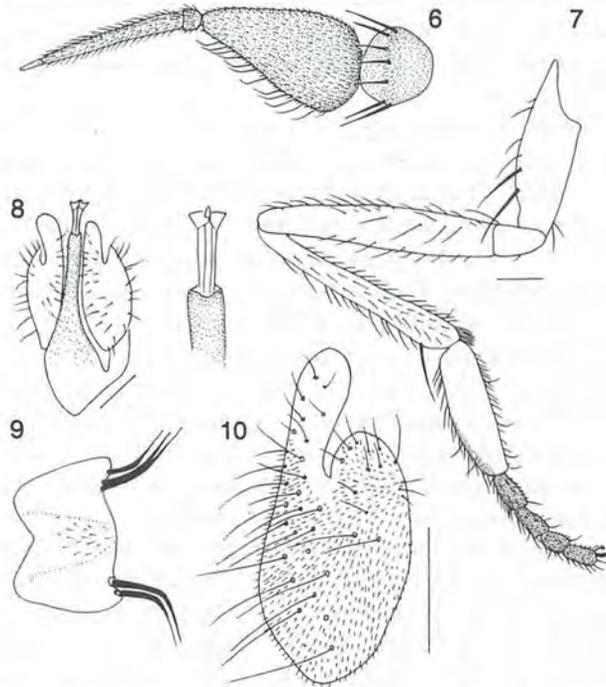
Mesonotum sub-shining black with 3 darker black stripes; humeri, sides of notopleura, postnotum brown; Pleura dark brown. Acr 4–serial, dc uniserial. Humeri bearing short hairs, 1 long posthumeral, 2 notopleurals, 1 supra-alar, 4 scutellars (outer pair a little shorter than inner pair). Prothorax with a pair of black bristles. Pleura bare.

Wing membrane pale brownish tinged, with brown veins. Halteres brown; squamae dark brown with a long paler fringe. Stigma quite distinct.

Legs mainly yellowish, but fore coxae, femora and tibiae sometimes brownish tinged; tarsi brownish to black. If the yellowish parts are darker brown then the fore basitarsi almost black. Bristling on legs black. Fore coxae yellow or completely brown (still much paler than pleura). Fore femur yellow to brown. Basal half of fore tibia paler than apical half. Basitarsus brown to black, contrasting with tibia, following tarsi same colour as basitarsus. Mid and hind coxae brown. Mid femur and tibia brown. Tarsus darker than tibia. Hind femur almost black, tibia brown to black. First and second tarsal segments paler



Figures 1–5. *Hilara isaanensis* sp. nov. paratype male. 1, antenna; 2, fore leg posteriorly, with swollen basitarsus containing silk glands; 3, mid leg anteriorly; 4, hypandrium, dorsal and side; 5, lamella. Scale 0.1 mm



Figures 6–10. *Hilara promboonae* sp. nov., paratype male. 6, antenna; 7, fore leg; 8, hypandrium dorsal and side; 9, sternum 6; 10, lamella. Scale 0.1 mm.

brown than tibia, terminal 3 segments dark brown. Fore femur with only short hairs except for a short posterior, preapical bristle. Fore tibia shorter than femur; apical half much thicker than basal half; a long antero-dorsal and a strong postero-dorsal bristle (sometimes with a second shorter bristle) at apical third. Basitarsus very much swollen (Fig. 2), as long as tibia; covered with short hairs only. Following tarsal segments together, shorter than basitarsus. Mid femur slender with an anterior row of long black bristles (Fig. 3). Mid tibia with only short bristles, except of some preapicals. Middle tarsus with first segment swollen near middle and somewhat distorted (Fig. 3). Hind femur slender with a row of long dorsal bristles and a row of even longer anteroventral bristles growing longer towards tip of femur (there the bristles longer than femur is wide). Hind tibia cylindrical with all bristles shorter than tibia is wide, except for a preapical that is long and distinct.

Abdomen brownish-black, subshining. Hind margins of terga with conspicuously long black bristles; those on terga 5 and 6 as long as length of tergum. Tergum 7 without marginal bristles. Tergum 8 small. Hypopygium (Figs. 4, 5) not very large. Lamella (Fig. 5) with short hairs.

Female. unknown

Derivatio nominis.—The name *isaanensis* refers to the northeastern part of Thailand which is called the Isaan.

Differential diagnosis.—The very much swollen fore basitarsi are a quite obvious character. Similar species from the Oriental region with very swollen fore basitarsi are *H. melanochira* BEZZI, 1912 from Taiwan and probably *H. uncicauda* BEZZI, 1912 from Taiwan and Burma. *H. melanochira*, has pale hairs on the front part of the mesonotum. *H. uncicauda* Bezzi, 1912, a species with brownish yellow pleura, has 3 long bristles on the fore basitarsus. FREY (1952) reports the latter species also from Northeast Burma and points to the possible variability of the number of bristles on the fore basitarsus. According to FREY, the bristles are sometimes lost. We should indeed consider that the new species is closely related to *H. uncicauda*.

Hilara promboonae sp. nov.

(Figs. 6–10)

Material examined.—Holotype male, Thailand, Loei Province, 13.II.1999, swept from stream surface in gallery forest (leg. P. GROOTAERT, sample n°99039); Paratypes: 1 male, 2 females, same provenance as holotype; Na Haeo, Huai Miang, 10.II.1999, 3 males, 1 female (leg. P. GROOTAERT, sample n°99010); Na Haeo, Huai Som Khop, 10.II.1999, 1 male, 4 females (leg. P. GROOTAERT, sample n°99013); Na Haeo, 13.II.1999, 1 male (leg. P. GROOTAERT, sample n°99038); 1 female (leg. P. GROOTAERT, sample n°99042).

Diagnosis.—A small black species with yellowish legs. Palpi and halteres yellow. All hairs and bristles black. Fore basitarsus yellow, swollen, nearly half as long as fore tibia. Tarsal segments 2–5 brown. Middle tarsus with first segment simple. Mesonotum black with 3 darker stripes along the rows of bristles; acr 4–serial. Terga with the usual bristles at hind margin. Segment 6 enlarged, with tergum saddle-shaped, twice as long as 5th tergum, concealing segment 7; sternum 6 with 3 hook-shaped black bristles at apices.

Male. Body length: 2.75 mm; wing length: 2.4–2.5 mm.

Head black in ground-colour; frons velvety black; in front slightly wider than base of third antennal segment. Face about as wide as base of 3rd antennal segment. Fronto-orbital bristles long, as long as ocellars. Occiput dull black with a row of long black orbitals. Face brownish-black, parallel-sided, slightly narrower than base of third antennal segment. Antennae black (Fig. 6), but basal segments paler. Third segment 1.5 times as long as wide; arista at least as long as third segment. Palpi yellow, with a long black bristle apical quarter and many shorter black bristles. Labrum shining brownish-black, a little longer than height of head.

Mesonotum subshining black; a fine greyish dusting present. Acr 4—serial, dc uniserial. Four scutellar bristles, outer pair a little shorter than inner pair. Pronotal collar with a long black bristle at each side. Pleura bare.

Wing membrane pale yellowish tinged with pale brown veins. Stigma yellowish brown. Halteres white. Squamae brown with a short black fringe.

Legs yellow including all coxae and all basitarsi. Tarsal segments 2–5 uniformly brown. All hairs and bristles black. Fore femur slender with short ventral bristles and a distinct posterior preapical. Fore tibia with an apical antero- and a postero-dorsal bristle. Basitarsus slightly longer than half the length of fore tibia, and as long as 4 following tarsal segments together. Mid femur with 4–5 anterior bristles; ventrals very short. Mid tibia simple without any bristles. Hind femur in basal half with long upright dorsal bristles and a row of ventrals about as long as femur is wide. Hind tibia with 4 long dorsals, 2 ventrals: 1 bristle in basal third and 1 in apical quarter.

Abdomen brownish black. Marginal bristles distinct but much shorter than width of each tergum: Segment 6 conspicuously large: tergum saddle-shaped, conjoining segment 7; sternum 6 with 2 or 3 strong black apical bristles at each side (Fig. 9). Genitalia see Figs. 8–10.

Female. Body length: 2.63–3.25 mm; wing length: 2.4–2.75 mm. Identical in colouration of antennae, palpi, halteres, wings and tarsi. Fore femur with a long posterior preapical. Fore tibia also with a pair of apical bristles, but a little shorter than in male. Fore basitarsus not swollen. Hind marginal bristles of terga very short (shorter than in male) except for the first tergum where the bristles are long. Cerci as long as last abdominal segment.

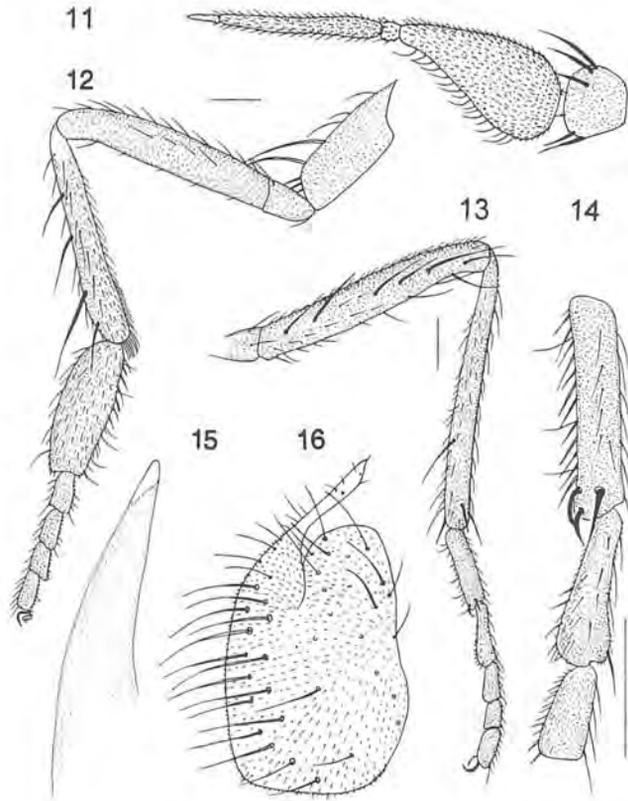
Derivatio nominis.—The present species is dedicated to Associate Prof. Dr. Sumonta Promboon, biologist and rector of Srinakharinwirot University (Bangkok). She stimulated the research at the Na Haeo field station and was the initiator of the co-operation between Srinakharinwirot University and the Royal Belgian Institute for Natural Sciences in Brussels.

***Hilara loeiensis* sp. nov.**

(Figs. 11–16)

Material examined.—Holotype male, Thailand, Loei Province, 13.II.1999, swept from river surface in gallery forest (leg. P. GROOTAERT, sample n°99039); Paratypes: 1 male, 3 females of same provenance as holotype; Na Haeo, 13.II.1999, 2 males, 6 females (leg. P. GROOTAERT, sample n°99042).

Diagnosis.—A small black species with black halteres, palpi, legs and brownish wings. Fore basitarsus swollen, about 3/4 length of fore tibia. Mid basitarsus with apical spines, segment 2 ventrally excavated at basal half, dilated at tip.



Figures 11–16. *Hilara loeiensis* sp. nov., paratype male. 11, antenna; 12, fore leg; 13, mid leg; 14, tarsal segments 1–3 of mid leg; 15, hypandrium; 16, lamella. Scale 0.1 mm.

Male. Body length: 3.1 mm; wing length: 2.5 mm.

Head black in ground-colour; frons black; in front as wide as basal antennal segment. Face narrow, parallel-sided, as wide as basal antennal segment. A pair of long fronto-orbitals bent over the eye. Occiput dull black with a single row of oculars. Antenna black (Fig. 11), 3rd segment twice as long as wide; arista longer than 3rd segment. Palpi brownish black with long black ventral bristles, the longest near apical quarter of palpus; about as long as palpus. Labrum a little longer than half the height of head.

Mesonotum greyish black with 2 greyish stripes between the rows of acr and dc. All hairs and bristles black and quite long. Acr 4 serial, dc uniserial (longer than acr). Four scutellar bristles, inner pair longest. Pleura dark brown, but paler than mesonotum.

Wing membrane brown, even a little darker along costa and R1. Veins dark brown and stigma brown. Halteres black. Squamae brown with a short brown fringe. Pronotal collar with a long black bristle at each side.

Abdomen brownish black. All hind marginal bristles long. Segment 7 free, not hidden in 6th segment. Tergum 7 without bristles, dorsally somewhat excavated to hold the tip of the hypopygium.

Legs black, including coxae. Fore femur (Fig. 12) with a row of posterior bristles and a very long postero-ventral pre-apical. Tibia as long as femur; dorsally with a row of bristles: at least 3 very strong bristles and an antero- postero ventral apical bristle. Basitarsus about 3/4 of the length of the tibia and as long as following 4 segments together. Mid femur (Fig. 13) with a row of long anterior bristles, longer than femur is wide. Mid tibia with a long ventral near apical third. Mid basitarsus with apical spines (Fig. 14), segment 2 ventrally excavated at basal half, dilated at tip. Hind femur with long dorsals and a row of ventral bristles growing longer towards tip. Hind tibia with 3 long posteroventral bristles and 3 long dorsal bristles (including apical). Basitarsus with a very long posteroventral bristle near middle (absent in female).

Male genitalia are shown in Figs. 15, 16.

Female. Body length: 2.75–2.9 mm; wing length: 2.25–2.4 mm. Identical to male in most characters. Fore basitarsi simple, twice as long as following segment. Cerci black, shorter than last abdominal segment.

Derivatio nominis.—The name *loeiensis* refers to Loei Province where this species was found.

Hilara fistulipoides sp. nov.

(Fig. 17)

Material examined.—Holotype female, Thailand, Loei Province, 13.II.1999, swept from river surface in gallery forest (leg. P. GROOTAERT, sample n°99038).

Diagnosis.—A small black species with black antenna and halteres but palpi yellow. Tip of hind tibia club-shaped. Wing clear with brown veins.

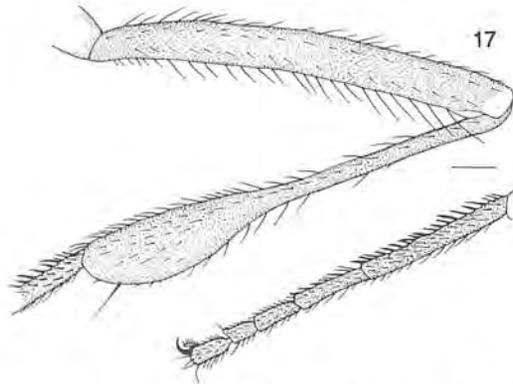
Female. Body length: 3.75 mm; wing length: 3.1 mm.

Head black. Frons as wide as base of 3rd antennal segment. Occiput black, grey dusted. 3rd antennal segment a little more than twice as long as wide; arista much shorter. Fronto-orbital bristles and ocellars probably rubbed off; a few minute hairs present on frons. Palpus yellow, with a fine black bristly hairs in apical quarter, other hairs short and pale.

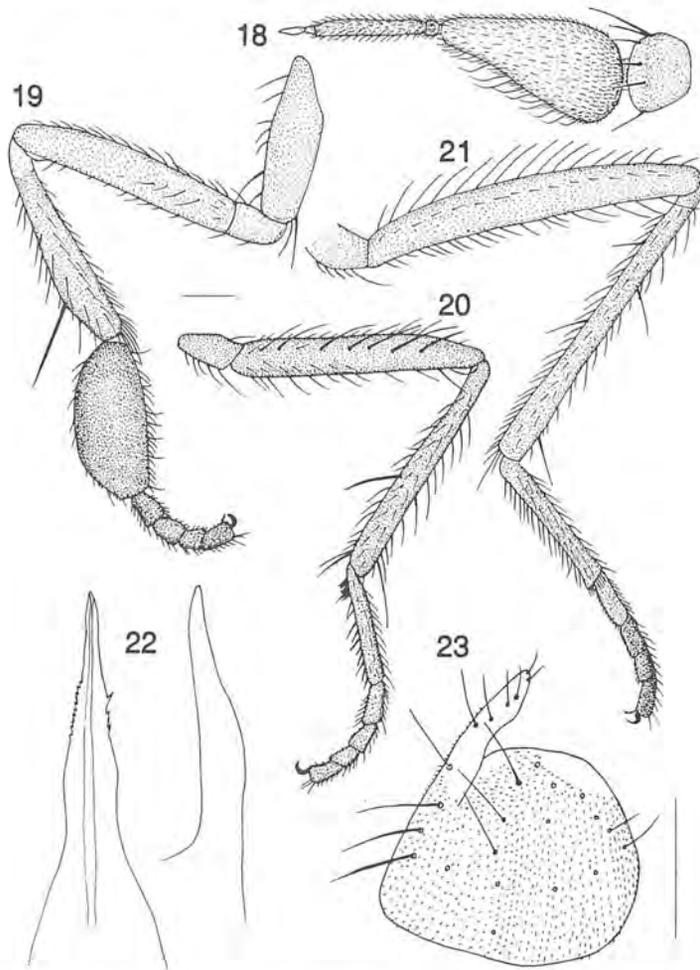
Thorax black. Mesonotum grey dusted with a broad grey stripe along the acr. Acr 4–serial, broadly interspaced; dc uniserial. Humeri, side of notopleura and pteropleura brownish. Scutellum with 4 marginal bristles. Prothoracic collar with a fine hairs at each side (not as strong as in the former species).

Wing membrane clear, veins dark yellowish brown at base of wing, further dark brown. Anal vein a minute spur. Halteres with black knob, stalk a little paler. Squamae brown with a dense fringe composed of quite long pale hairs.

Legs black, but knees, apical half of fore tibia, basitarsus and second tarsal segment of fore and mid legs yellowish. Hind leg completely black. Legs rather slender and all hairs and bristles short. Fore femur with short ventral hairs and a more distinct postero-ventral bristle. Fore tibia with a short black apical bristle. Mid femur with a few uprect anterior bristles as long as femur is wide. Hind femur slender, dorsoventrally arched and apart from some hairs, no uprect dorsal bristles. Base of hind tibia (Fig. 17) very slender, apical 2/5 club-shaped, with inconspicuous dorsal and ventral hairs; a black preapical present.



Figures 17. *Hilara fistulipoides* sp. nov., holotype female. 17, hind leg. Scale 0.1 mm.



Figures 18–23. *Hilara thaica* sp. nov., paratype male. 18, antenna; 19, fore leg; 20, mid leg; 21, hind leg; 22, hypandrium dorsal and side; 23, lamella. Scale 0.1 mm.

Abdomen brownish black. Terga with short pale hairs. Only first tergum with distinct marginal bristles; following terga without marginals. Cercus black, about as long as last abdominal segment.

Derivatio nominis.—The name *fistulipoides* refers to the resemblance with *H. fistulipes*.

Discussion.—Although we found only a single female, we found it worthwhile to describe it because of the striking club-shaped hind tibia. In fact, this species seems closely related to *H. fistulipes* FREY, 1952 from Burma. The latter was also described from a single female and has also slender hind legs without bristles and a spindle-shaped tip of the hind tibiae. Considering also all other characters, they form a species-group. *H. fistulipes* differs from *H. fistulipoides* in that the legs are yellow (including the coxae), t3 and all tarsi are brown and the wings are faintly yellowish brown. In contrast, *H. fistulipoides* sp. nov. has mainly black legs, completely black hind legs and very clear wings.

***Hilara thaica* sp. nov.**

(Figs. 18–23)

Material examined.—Holotype male, Thailand, Loei Province, 13.II.1999, swept from river surface in gallery forest (leg. P. GROOTAERT, sample n°99039); Paratypes: 2 males, same provenance as holotype.

Diagnosis.—A small black species with black antenna, palpi and halteres. Fore basitarsi swollen, about twice as long as deep. Wing brown.

Male. Body length: 2.6–2.9 mm; wing length: 2–2.5 mm.

Head black. Frons broad in front, as wide as base of 3rd antennal segment. A pair of strong fronto-orbitals and some fine hairs present. Face a little narrower than front of frons. Orbitals in a single row, long and strong. Antenna black (Fig. 18). 3rd antennal segment nearly twice as long as wide; arista shorter than 3rd segment. Labrum shining black, rather short, nearly as long as 1/2 height of head. Palpi black, with black bristles; longest at 1/3 of tip and as long as palpus.

Thorax completely black. Mesonotum dull black. Acr and dc densely set. Acr 4–serial diverging, dc uniserial. Pronotal collar with a strong bristle at each side and a number of short black bristles above fore coxae.

Wing brown with brown veins. Halteres black. Squamae brown, fringe densely set with short black hairs.

Legs brownish black (Figs. 19–21) and densely bristled. Fore femur without conspicuous bristles, apart from a short antero-ventral preapical bristle. Fore tibia a little shorter than femur, with a long black dorsal preapical. Tip of tibia narrowing beyond preapical bristle. Fore basitarsus swollen, more than 3/4 of the length of fore tibia and much longer than the following tarsal segments together. Tarsal segments 2–4 quadrate. Mid femur (Fig. 20) with a row of long anterior bristles. Tibia with long dorsal bristles and a long ventral bristle beyond middle; a long dorsal preapical. Mid basitarsus simple, as long as following tarsal segments together. Hind femur (Fig. 21) with long uprect bristles, and ventral bristles short in basal half, longer towards tip. Tibia longer than femur, with a long dorsal in basal third and a preapical; a row of at least 5 long posteroventral bristles. Basitarsus longer than following segments together.

Abdomen black. All terga with long black marginal bristles. Genitalia as in Figs. 22, 23.

Female. Unknown

Derivatio nominis.—The name *thaica* refers to the country of origin.

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