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East-Asian species of Lauxaniidae (Diptera). Genera *Trigonometopus* Mcq., *Protrigonometopus* Hendel

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Descriptions of the following new species are given: *Trigonometopus alboapicalis*, *T. cuneatus*, *T. eborifacies*, *T. forficula*, *T. nigripalpis*. *Sapromyza deceptor* Malloch and *S. sexlituris* Shatalkin are transferred in *Protrigonometopus*.

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Key words. Diptera, Lauxaniidae, *Protrigonometopus*, *Trigonometopus*, East-Asian species.

Introduction

The present paper is one of the series of papers dealing with the East-Asian fauna of lauxaniid flies. Here are summarized the results of the examination of two genera. The study is based on collections of the Zoological Museum of Moscow State University and Zoological Institute in St. Petersburg. In the list given below five new species are described. Types of new species are deposited in both institutions mentioned above.

Genus *Trigonometopus* Macquart, 1835

The genus *Trigonometopus* is heterogeneous and contains at least two species groups. One of them (*Trigonometopus* s. str.), examplified by the Palaearctic species *T. frontalis* Mg., is characterized by the third antennal segment pointed apically, fore or situated on level of anterior margin of eye, 2 *st*. Only one species *T. frontalis* has hitherto been recorded as Palaearctic. When sorting through my material of this species from the Far East I much to my astonishment found out two specimens which evidently represent new species, described below as *T. eborifacies*. The second group (subgenus *Tetroxyrhina*) was known from several Oriental species. The determination of this group requires clarification as generic characters have not been sufficiently appreciated. Hendel (1938) in his key compared it with *Dichozyrhina* based on *D. fuscipennis* Hendel from Samoa and characterized by 2 *st* in contrast to 1 *st* in *Tetroxyrhina*. Stuckenberg (1971) has found that difference to be unsufficient. The type species of *Tetroxyrhina* — *T. submaculipennis* Malloch, has the third antennal segment rounded apically (not pointed as in *Trigonometopus* s. str.), bicolor halteres with yellow stem and brown knob, black spot between antenna and eye, and 1 *st*. Worthy of note the structure of epandrium. In *Trigonometopus* it forms a ring structure as a result of the ventral expansion of its lateral sectors. In *Tetroxyrhina* caudal margin of epandrium on each side forms a lobe which in *T. forficula* sp. n. reach very large size. The several East-Asian species keyed out below agree with the type species in all these characters and are undoubtedly congeneric with the latter. A few Oriental species (*T. albiseta* Bezzi, *T. brevicornis* Meij., *T. tinctipennis* Meij.) which Shewell (1977) placed in *Tetroxyrhina* have the yellow halteres and possibly belong to the separate subgenus. I have not seen these species and they were not included in the key.

Key to the East-Asian species of *Trigonometopus*

1. 3rd antennal segment pointed apically. Fore or situated on level of anterior margin of eye. Halteres yellow. 2 *st.* Subgenus *Trigonometopus* 2
— 3rd antennal segment rounded apically. Fore or situated on level being 1/3—1/2 of eye length distant from anterior margin of eye. Halteres with brown knob. 1 *st.* Subgenus *Tetroxyrhina* 3
2. *r-m* and *dm-cu* clear. Face with whitish stripe. A very small dark brown spot right anterior margin of eye. — Far East (Primorskiy Kray) . . . . . ***T. eborifacies*** sp. n.
— *r-m* posteriorly and *dm-cu* anteriorly brownish bordering. Face wholly yellow without whitish stripe. No brown spot between each antenna and eye. — Transpalaearctic species . . . . . ***T. frontalis*** Mg.
3. Arista and its hairs white. — Vietnam, Thailand . . . . . ***T. alboapicalis*** sp. n.
— Arista dark brown 4
4. Palpi dark brown. Femora mostly dark brown. Thailand . . . . . ***T. nigripalpis*** sp. n.
— Palpi and femora yellow 5
5. Length of frons from hind ocelli to anterior margin about 2 times longer than its width at center. — Taiwan . . . . . ***T. brunneicosta*** Malloch
— Frons broader, about 1.5 times as long as its width. Wings with costal darkening and both cross veins bordering 6
6. Abdomen dark brown, almost black with washed longitudinal yellow stripe. Epandrium with long and thick lobes equal to half length of preabdomen. — Japan . . . . . ***T. forficula*** sp. n.
— Abdomen black, on anterior margin of each tergite with broad yellow band which may or may not extends to its lateral margins. Epandrial lobes very short. — Taiwan, Vietnam . . . . . ***T. submaculipennis*** Malloch

***Trigonometopus* (*Trigonometopus*) *eborifacies* Shatalkin sp. n.**

Diagnosis. This is second Palaearctic species of *Trigonometopus* s. str. Characters distinguishing it from *T. frontalis* include the presence of the whitish facial stripe, a very small dark brown spot near the anterior margin of eye, greyish spots in apical third of cells r_{2+3}, r_{4+5}, and m_{1+2}, the absence of border with brown on *r-m* and *dm-cu*.

Type locality. Holotype. Male, **Russia**, Primorskiy Kray, Ussuriysk, Kamenushka [Приморский край, окрестности Уссурийска, Каменушка], 25.VII.1984 (Shatalkin).

Paratype. Male, same locality as holotype, 30.VII. 1984 (Shatalkin). *Description.* Male. Head yellow. Frons with a pair brownish stripes. A very small dark brown spot right anterior margin of eye. Face with broad whitish stripe clearly standing out against yellow background, and without brown stripes. Eyes with very short dispersed hairs. Antennae yellow, 3rd segment pointed at the apex as in *T. frontalis*. Arista whitish and pubescent. Frons strongly stretched: its length in profile from anterior margin to anterior margin of eye about 1.8 times less than length of eye (about 3.0—3.3 times in *T. frontalis*); height of frons from anterior margin to hind ocelli about 1.3—1.4 times more than its width. Short bristles in anterior part of frons noticeably less than those of *T. frontalis*. 2 *or*, anterior one located on level of anterior margin of eye. Ocellar bristles small, hairlike. Palpi yellow. Thorax yellow, mesonotum with very slight brownish stripes. 1 *h*, *ph* absent, 2 *npl*, 0+3 *dc*, 2 *ac*, 1 *ppl*, 1 *mspl* (no second strong mesopleural bristle, usual for *T. frontalis*), 2 *stpl*. Legs wholly yellow, without any distinct dark marking. Preapicals on all tibiae. Wings yellowish, with yellow veins. *r-m* and *dm-cu* without clouds; cells r_{2+3}, r_{4+5}, and m_{1+2}, in apical third with small greyish spot each. Section of M_{1+2} between *r-m* and *dm-cu* about 1.8 times more than previous one and about 1.2 times more than ultimate one. Halteres yellow. Abdomen yellow.

Body length 3.1 (3.6 — paratype) mm; wing length 3.0 (3.4) mm.

Female unknown.

***Trigonometopus* (*Tetroxyrhina*) *alboapicalis* Shatalkin sp. n.**

Diagnosis. T. alboapicalis sp. n. can be distinguished from all species keyed above in having the white arista and the white tip of wing between R_{2+3} and M_{1+2}. These features relate it to *T. albiseta* Bezzi but the latter differs in important characters such as the presence of a pair of brown facial stripes, broad brown marks on middle and hind femora. Besides this species has tarsi darkened and halteres yellow.

Type locality. Holotype. Male, **Vietnam**, pr. Hanoi, 70 km NW Hanoi, Ba Vi, 400 m, forest, 22.XI.1990 (Nartshuk).

Paratypes. 2 females, same locality as holotype, 22.XI.1990 (Nartshuk); female, **Vietnam**, Ha Son, Binh Ky Son, Cao Phong, 29.X.1990 (Nartshuk); female, **Vietnam**, Tam Dao, Vinh Phu, 1000 m, forest 16.XI. 1990 (Belokobylskij); female, **Vietnam**, Mai Chou, pr.Ha Son Binh, forest. 3.XI.1990 (Belokobylskij); female, **Thailand**, Khao Sok, 5.XI.1995 (Mostovski).

Description. Male. Frons greyish brown. A yellow spot on each side between posterior *or*, *vti* and *vte*. Ocellar triangle dark brown. Occiput grey brown, median occipital sclerite yellow. A large black spot between each antenna and eye. Face yellow with small vertical keel on upper part, fovea greyish. Eyes with very short dispersed hairs, which about 2 times shorter than those in *T. frontalis*. 1st antennal segment yellow; next ones yellowish brown; 3rd segment slightly triangular (but not pointed at the apex) with apical darkening. Arista white with brownish base; aristal hairs white, short: width of its feathering noticeably more than thickness its basal part. Frons slightly stretched: its length in profile from anterior margin to anterior margin of eye about 5 times less than length of eye; height of frons from anterior margin to hind ocelli about 1.3—1.4 times more than its width. Short bristles in anterior part of frons well developed. 2 *or*, anterior one located on level divided eye in two. Ocellar bristles developed, equal to height of ocellar triangle. Palpi yellow. Thorax greyish brown; mesonotum with 3 narrow yellow stripes, extending its entire length and over scutellum; two lateral of them on line of *dc*, and with yellow bordering of humeral calli. A narrow yellow stripe enveloping humeral callus from side and upper margin of mesopleuron; sternopleuron posteriorly, hypopleuron and pteropleuron yellow, but latter with brownish spot in lower part. Metanotum greyish brown. 1 *h*, *ph* absent, 2 *npl*, 0+3 *dc*, 4 *ac*, 1 *ppl*, 1 *mspl* (no second strong mesopleural bristle), 1 *stpl*. Legs yellow, all tibiae with apical brown ring, 2—5 segments of fore tarsi brownish. Preapicals on all tibiae. Wings brownish in apical third but cells r_{2+3} and r_{4+5} narrowly white apically; anterior part of wing slightly brownish; *r-m* and *dm-cu* with clouds. Section of M_{1+2} between *r-m* and *dm-cu* about 1.4 times less than previous one and about 1.8 times less than ultimate one. Halteres with brown knob. Abdomen yellow with a pair of spots on each tergite. Epandrium yellow with short triangular brown lobes.

Body length 3.7 mm; wing length 3.6 mm.

Female differs from male in having more broader tergal spots. Body length 3.6—4.0 mm; wing length 3.7—4.0 mm.

Trigonometopus (*Tetroxyrhina*) *cuneatus* Shatalkin sp. n.

Diagnosis. Morphologically the species is most like the Formosan species *T. submaculipennis* Malloch. *T. cuneatus* sp. n. is distinguished from the latter by the undeveloped black spot between each antenna and eye, reduced to the narrow black stroke on the border between frons and parafacial.

Type locality. *Holotype*. Male, **Vietnam**, Tam Dao, Vinh Phu, 1000 m, forest 12.XI.1990 (Belokobylskij).

Paratypes. 1 male, 1 female, same locality as holotype, 12.XI.1990 (Belokobylskij); female, **Vietnam**, Ha Son, Binh Ky Son, Cao Phong, 27.X.1990 (Nartshuk).

Description. Male. Head yellow. Frons with 3 brown stripes, middle long and two lateral short, extending from anterior margin of frons to anterior *or*. A yellow short stripe on each side between posterior *or* and *vte*. Ocellar triangle dark brown. Occiput brownish, but median occipital sclerite yellow. A black stroke (instead of black spot of other species) between each antenna and eye. Face yellow with small vertical keel on upper part, fovea without spot. Eyes with very short dispersed hairs, which about 2 times shorter than those in *T. frontalis*. 1st antennal segment yellow; next ones yellowish brown; 3rd segment rounded apically. Arista brown with microscopical hairs. Frons slightly stretched: its length in profile from anterior margin to anterior margin of eye about 7 times less than length of eye; height of frons from anterior margin to hind ocelli about 1.9—2.0 times more than its width. Short bristles in anterior part of frons well developed. 2 *or*, anterior one located on level divided eye in two. Ocellar bristles developed, equal to height of ocellar triangle. Palpi yellow. Thorax greyish brown; mesonotum with 3 narrow yellow stripes, extending its entire length and over scutellum; two lateral of them on line of *dc*, and with yellow bordering of humeral calli. A narrow yellow stripe enveloping humeral callus from side and upper margin of mesopleuron; sternopleuron posteriorly, hypopleuron and pteropleuron yellow, but latter with brownish spot in lower part. Metanotum greyish brown. 1 *h*, *ph* absent, 2 *npl*, 0+3 *dc*, 4 *ac*, 1 *ppl*, 1 *mspl*, 1 *stpl*. Legs yellow, 2—5 segments of fore tarsi brownish. Preapicals on all tibiae. Wings brownish, in anterior part cells r_{2+3} and r_{4+5} without white apical edging; *r-m* and *dm-cu* without clouds. Section of M_{1+2} between *r-m* and *dm-cu* equal to previous one and about 1.3—1.4 times less than ultimate one. Halteres with brown knob. Abdomen brownish yellow with a pair of narrow brown spots on posterior margin of each tergite. Epandrium yellow with short triangular yellow lobes, which more acuter than those of previous species.

Body length 4.0 (4.2 — paratype) mm; wing length 3.5 (4.0) mm.

Female differs from male in having more broader tergal spots. Body length 4.5 mm; wing length 4.0 mm.

Trigonometopus (*Tetroxyrhina*) *forficula* Shatalkin sp. n.

Diagnosis. New species can be distinguished from other members of *Tetroxyrhina* by the abdominal coloration pattern. The males are unique among all species of subgenus in having the epandrium with the excessive extension of caudal lobes.

Type locality. Holotype. Male, **Japan**, Kyushu, Kita-Kyushu, Kagamihaga, 29.XI.1981 (E. Sugoniaev).

Paratypes. 2 males, same locality as holotype, 29.XI.1981 (E. Sugoniaev).

Description. Male. Head dark brown. Frons with a pair of yellowish brown stripes extending along eyes from anterior *or* to vertex. Ocellar triangle black. A large black spot between each antenna and eye. Face yellow with small vertical keel on upper part. Eyes with very short dispersed hairs, which about 2 times shorter than those in *T. frontalis*. Antennae dark yellow, 3rd segment rounded (not pointed at the apex). Arista brown with microscopical hairs. Frons slightly stretched: its length in profile from anterior margin to anterior margin of eye about 4.0—4.2 times less than length of eye; height of frons from anterior margin to hind ocelli about 1.3 times more than its width. Short bristles in anterior part of frons well developed. 2 *or*, anterior one located on level divided eye in two. Ocellar bristles well developed, almost equal to length of *pvt*. Palpi yellow. Thorax dark grey; mesonotum with 3 narrow brownish yellow stripes, extending its entire length and over scutellum; two lateral of them on line of *dc*. A narrow yellow stripe enveloping humeral callus from side and upper margin of mesopleuron; mesopleuron and pteropleuron with washed yellowish spots. 1 *h*, *ph* absent, 2 *npl*, 0+3 *dc*, 4 *ac*, 1 *ppl*, 1 *mspl*, 1 *stpl*. Legs yellow, 2—5 segments of fore tarsi brownish. Preapicals on all tibiae. Wings strongly brownish in anterior part, cells r_{2+3} and r_{4+5} without white apical edging, *r-m* and *dm-cu* with clouds. Section of M_{1+2} between *r-m* and *dm-cu* about 1.4—1.5 times less than previous one and about 1.8—1.9 times less than ultimate one. Halteres with brown knob. Abdomen dark brown, almost black with washed longitudinal yellow stripe. Epandrium yellow with long thick caudally directed brown lobes equal to half length of preabdomen.

Body length 3.8 mm; wing length 4.0 mm.

Female unknown.

Trigonometopus (*Tetroxyrhina*) *nigripalpis* Shatalkin sp. n.

Diagnosis. The species is distinguished by its striped face, very broad, not stretched frons and by other characters given in the key.

Type locality. Holotype. Male, **Thailand**, Khao Sok, 5.XI.1995 (Mostovski).

Description. Male. Frons brown, with dark brown median stripe, extending from anterior margin of frons to *pvt*. Ocellar triangle black. Upper occiput greyish brown, median occipital sclerite and lower occiput yellow. A large black spot between each antenna and eye contiguosus to both. Face yellow with acute vertical keel on upper part; a dark brown stripe on each side extending from keel to ptilinal suture and further along frontogenal suture to mouth where it unites with analogous stripe on other side of face; one more a brown stripe on parafacial extending to gena. Genae yellow with longitudinal dark brown stripe on each side. Eyes with very short dispersed hairs, which about 2 times shorter than those in *T. frontalis*. Antennae yellowish brown; 3rd segment rounded at the apex. Arista brown with microscopic hairs. Frons practically not stretched: its length in profile from anterior margin to anterior margin of eye about 12 times less than length of eye; height of frons from anterior margin to hind ocelli almost equal to its width. Short bristles in anterior part of frons well developed. 2 *or*, anterior one located on level divided eye in two. Ocellar bristles developed, equal to height of ocellar triangle. Clypeus, mouthparts, and palpi darkbrown. Thorax dark brown, almost black; mesonotum with 3 narrow yellow stripes, extending its entire length and over scutellum; two lateral of them on line of *dc*, and with a pair of yellow stripe on each side extending from humeral callus (its inner margin and its lateral side) to base of wing. Pleura with yellowish spot in front spiracule, and narrow yellow stripe on upper margin of sternopleuron. 1 *h*, *ph* absent, 2 *npl*, 0+3 *dc*, 4 *ac*, 1 *ppl*, 1 *mspl*, 1 *stpl*. Legs brownish yellow, coxae and femora except for basal and apical parts dark brown, 4—5 segments of fore tarsi dark brown. Preapicals on all tibiae. Anterior part of wing brownish, this brownish area extending to R_{4+5} in basal part and to M_{1+2} in apical third; cells r_{2+3} and r_{4+5} without white stripe apically; *r-m* and *dm-cu* with clouds. Section of M_{1+2}

between *r-m* and *dm-cu* about 1.3 times less than previous one and about 1.8 times less than ultimate one. Halteres with slightly brown knob. Abdomen brown with narrow black bands on hind margin of tergites. Epandrium yellow with short nipple-shaped black lobes.

Body length 3.4 mm; wing length 3.0 mm.

Female unknown.

Genus *Protrigonometopus* Hendel, 1938

This genus was erected by Hendel for a single species *P. maculifrons* Hendel from China. This species possesses some distinctive characters: *Trigonometopus*-like form of head, frons in anterior part with numerous porrect hairs, a row of strong bristles along lower parafacial, eyes with very short dispersed hairs, reclinate anterior *or*, well developed *ph* (in contrast to *Trigonometopus*), black thickly haired arista. When studying *Trigonometopus*-like forms I have turned my attention to what the anterior *or* in some species (for instance, in Palaearctic *T. frontalis*) is situated far forwards, on level of anterior margin of eye. Of all species characterized by well developed *ph* that position of or takes place in *P. maculifrons* and *Sapromyza sexlituris* described recently by me (Shatalkin, 1992) from materials from the Far East. Both species as it turned out have much in common in the colouring of head, characterized by the system of black spots, haired eyes (connection with *Trigonometopus*), and are possibly congeneric. It is difficult at this stage to decide on the limits of *Protrigonometopus* definitely. I have before me only two females of *P. maculifrons*. It is necessary to study the male genitalia for more correct conclusion. There is no doubt that *sexlituris* have been assigned to *Sapromyza* erroneously and in reality this species is closest to *P. maculifrons*. One more species, *Sapromyza deceptor* Malloch, described from Taiwan, is also included here because it has not been possible to discover any satisfactory characters for separating it from two other species of *Protrigonometopus*. Shewell (1977: 195) placed this species in *Trigonometopus*; he however omitted one important character — the presence of well developed posthumeral bristle and therefore *S. deceptor* is not congeneric with *T. frontalis*.

Protrigonometopus deceptor (Malloch, 1927) comb. n.

Material. Male, **Vietnam**, Tam Dao, Vinh Phu, 1000 m, forest 11.XI.1990 (Nartshuk).

Diagnosis. Head yellow. Frons without brownish stripes. Ocellar triangle black. A large black spot between each antenna and eye. Face yellow with small vertical keel on upper part, fovea slightly brownish. Eyes with very short dispersed hairs. Antennae yellow, 3rd segment rounded (not pointed at the apex). Arista brownish and pubescent. Frons slightly stretched: its length in profile from anterior margin to anterior margin of eye about 5 times less than length of eye. Short bristles in anterior part of frons well developed. 2 *or*, anterior one located on level of anterior margin of eye. Ocellar bristles developed, but small. Palpi yellow. Thorax yellow, mesonotum yellowish brown with 6 washed dark brown stripes. 1 *h*, 1 *ph*, 2 *npl*, 0+3 *dc*, 4 *ac*, 1 *ppl*, mesopleuron without additional strong bristle, directed downwards, 1 *stpl*, Legs wholly yellow, without any distinct dark marking. Wings clear. Halteres yellow. Abdomen yellow.

Distribution. P. deceptor was described from a single Formosan female. It is a second finding of this species.

Protrigonometopus maculifrons Hendel

Material. Male, **Japan**, Kyushu, Kita-Kyushu, Kagamihaga, 29.XI.1981 (E. Sugoniaev).

Diagnosis. This species is really distinguished by the pattern of head spots. Another outstanding character is the thickly pubescent arista.

Distribution. The species occurs in Japan, Korea, and China. It therefore may be found in Primorskiy Kray.

Protrigonometopus sexlituris (Shatalkin, 1992) comb. n.

Material. Male, **Japan**, Kyushu, Kita-Kyushu, Kagamihaga, 29.XI.1981 (E. Sugoniaev).

Diagnosis. This species is characterized by the four facial spots (in contrast to two ones in previous species), and the simple arista.

Distribution. P. sexlituris was described from Primorskiy Kray. It is mentioned in Japan for the first time.

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