

## A Revision of the Genus *Isosturmia* TOWNSEND (Diptera, Tachinidae)

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**Abstract** *Isosturmia* is revised: five nominal species are recognized and *I. pilosa* sp. nov. is described and illustrated from Japan. A key to 6 species is provided. *Isosturmia chatterjeeana* BARANOV is newly synonymized with *I. picta* BARANOV. *Leiosiopsis aristalis* TOWNSEND is newly synonymized with *Isosturmia inversa* TOWNSEND not with *I. intermedia*, and *Epixorista episcopa* TOWNSEND and *E. ocellaris* TOWNSEND newly with *I. intermedia*.

### Introduction

Since MESNIL (1949) revised the genus *Drino* ROBINEAU-DESVOIDY s. lat., *Isosturmia* TOWNSEND has been treated as a subgenus of *Drino*. But recent authors consider it as a full genus containing 6 species from Japan and the Oriental Region (CROSSKEY, 1976; HERTING, 1984). These species closely resemble each other and it is sometimes difficult to correctly identify them. It is especially true for females and they were sometimes combined with different male species. In this revision I recognize 5 nominal species of *Isosturmia* and describe a new species from Japan. A key to 6 species of the genus is provided.

*Isosturmia* species are ovoviviparous and Lymantriidae, Satyridae and Cossidae are reported as hosts of the genus (CROSSKEY, 1976; NAKASUJI, 1978; KOIZUMI, 1964; SCHAEFER & SHIMA, 1981). *Isosturmia chatterjeeana* known as a parasitoid of *Euproctis* species in India is here considered to be conspecific with *I. picta* which has also been reported parasitic on *Euproctis* species in Japan. The same species is also reported parasitic on *Mycalesis gotama* which is an endemic pest of the rice plant in Japan, but it is due to misidentification. *Mycalesis gotama* is in reality attacked by *I. intermedia* in Japan.

It is difficult to deduce the phylogenetic relationships of the genera of Goniinae because of their strong diversity in external morphological structures. At present I think that *Isosturmia* is related to *Carcelia* ROBINEAU-DESVOIDY judging from the close resemblance in the male and female genital structures.

In its distribution *Isosturmia* seems to be restricted to the Oriental and Eastern Palearctic Regions as far north as Hokkaido, Japan. It is likely that no species of the genus occurs in New Guinea where many Oriental tachinid genera are found. The genus has been also unknown from the Afrotropical Region.

### Materials and Methods

Material has been studied from the following collections: Bernice P. Bishop Museum, Honolulu (BPBM); Biological Laboratory, College of General Education, Kyushu University, Fukuoka (BLKU); British Museum (Natural History), London (BMNH); Canadian National Collection, Ottawa (CNC); Department of Entomology, University of the Philippines, Los Baños (UPLB); Entomological Institute, Hokkaido University, Sapporo (EIHU); Institut für Pflanzenschutzforschung Kleinmachnow, Eberswalde (IPF); Kitakyushu Museum of Natural History, Kitakyusyu (KMNH); Osaka Museum of Natural History, Osaka (OMNH); U. S. National Museum, Washington, D. C. (USNM); Zoölogisch Museum, Universiteit van Amsterdam, Amsterdam (ZMA).

Abbreviations for chaetotaxy of the thorax and legs follow those used by CROSSKEY (1973). Measurements were made in a similar manner to SHIMA (1984).

### Genus *Isosturmia* TOWNSEND

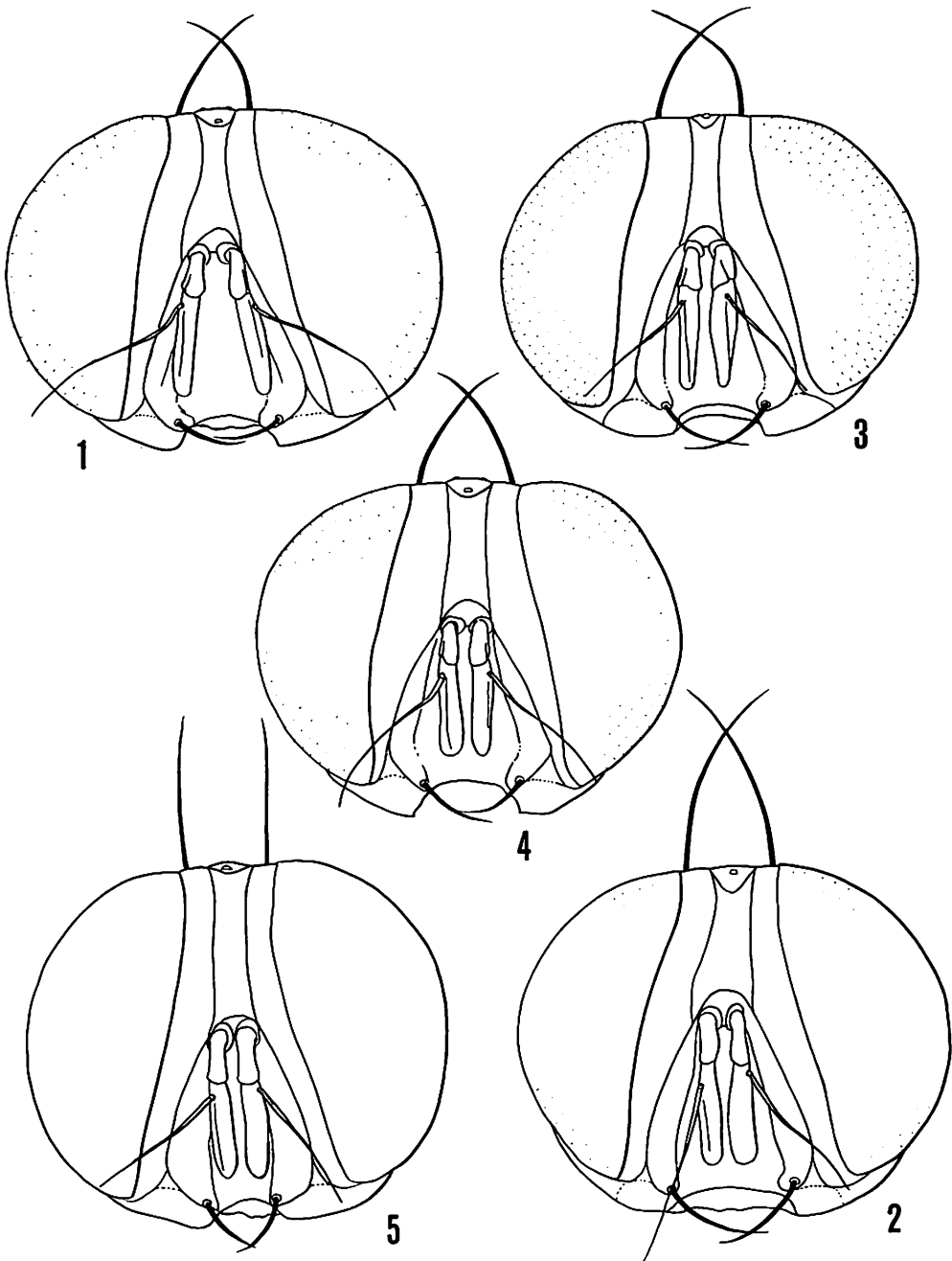
*Isosturmia* TOWNSEND, 1927: 67. Type species: *Isosturmia inversa* TOWNSEND, 1927, by original designation.

*Epixorista* TOWNSEND, 1927: 61. Type species: *Epixorista episcopa* TOWNSEND, 1927 (= *Isosturmia intermedia* TOWNSEND, 1927), by original designation.

*Leiosiopsis* TOWNSEND, 1927: 62. Type species: *Leiosiopsis aristalis* TOWNSEND (= *Isosturmia inversa* TOWNSEND, 1927), by original designation.

*Zygocarcelia* TOWNSEND, 1927: 64. Type species: *Zygocarcelia cruciata* TOWNSEND, 1927, by original designation.

*Diagnosis.* Medium-sized eryciine flies; head semicircular; eye large, almost bare to distinctly short-haired; profrons subequal to or slightly wider than gena; parafacial and facial ridge bare; occiput flat, without black setulae behind postocular row; ocellar seta fine or indistinct; 2-3 (usually 2) reclinate orbital setae and no proclinate seta in ♂, 2 proclinate orbital setae in ♀; vibrissa nearly level with lower margin of face; arista bare, basal 2 segments short, 3rd segment thickened on basal 1/3-1/4; propleural seta fine, distinctly shorter than prostigmatic seta; 3+3 *ac*; 3+4 *dc*; 1+3 *ia*; 2 lateral scutellar setae; apical scutellar setae crossing, directed upwards; 1+1, 1+2 or 2+2 *stpl* setae; wing hyaline, tegula and basicosta black; 2nd costal sector bare below; basal node of vein R<sub>4+5</sub> with 2-5 fine hairs dorsally and ventrally; lower calypter large, inner margin abutted to scutellum and outer margin markedly down-curved; fore tibia with 2 *p* setae; mid-tibia with 1 *ad*, 2 *pd* and 1 *v* setae; intermediate abdominal terga without median discal seta; ♂ 4th abdominal venter with hair-fascicle of dense and fine hairs. ♂ genitalia: 6th tergum of 2 small hemitergites, without hair; 6th abdominal spiracle in membrane in front of syntergum 7+8; cerci in dorsal view at most narrowly separated from each other on apical portion; surstylus sometimes with dense short hairs on apical portion; hypandrium not remarkably small in comparison with epandrium; epiphallus present; mid-ventral portion



Figs. 1–5. Male head of *Isosturmia* spp. in frontal view. 1. *inversa* (holotype); 2. *japonica*; 3. *pilosa* sp. n.; 4. *intermedia* (holotype); 5. *picta*.

of distiphallus rather expanded laterally and ventrally. ♀ genitalia: 6th tergum longitudinally divided into 2 hemitergites; 6th and 7th abdominal spiracles both on 6th tergum; 7th tergum longitudinally divided into 2 hemitergites; 7th sternum with apical portion rounded and free from intersegmental membrane; 8th tergum of small triangular hemitergites; 8th sternum small; epiproct weak but distinct, without hair.

*Remarks.* This genus resembles *Palexorista* TOWNSEND in general appearance, but differs from it in its fine hair-like ocellar seta, bare parafacial and 2–5 hairs on basal node of wing vein  $R_{4+5}$ . They are also different in male genitalia: In *Palexorista* the cerci are rather widely separated from each other, the distiphallus is not expanded laterally and ventrally on mid-ventral portion and the hypandrium is small in comparison with the epandrium; whereas in *Isosturmia* the cerci are at most narrowly separated from each other, mid-ventral portion of distiphallus is expanded laterally and the hypandrium is not much small. I rather consider that *Isosturmia* is allied to *Carcelia* ROBINEAU-DESVOIDY s. lat. because of the resemblance in the male and female genitalia. Both genera also resemble each other in having large eye and fine propleural seta.

#### Key to species of *Isosturmia*

1. Inner vertical setae crossing each other; face  $3/5$ – $3/4$  as wide as long between vibrissae; usually 1+1 or 1+2 *stpl* setae in ♂, 2+2 in ♀; hair-fascicle on ♂ 4th abdominal venter quadrate; ♀ fore tarsus not strongly dilated, 5th tarsomere elongate and rather wide, longer than 4th (♀ of *cruciata* and *pilosa* unknown) ..... 2
  - Inner vertical setae parallel to each other; face about  $1/2$  as wide as long between vibrissae; almost always 2+2 *stpl* setae in ♂ and ♀; hair-fascicle on ♂ 4th abdominal venter roundish; ♀ fore tarsus dilated, 4th tarsomere widened and elongate, longer than 5th ..... *picta*
2. Abdomen broadly shining black in ground color on dorsum, at most rather narrowly reddish on side of syntergum 1+2 to 4th tergum, with whitish pollinosity ..... 3
  - Abdomen broadly reddish brown in ground color, densely yellowish white pollinose ..... *cruciata*
3. Hairs on parafrontal dense, those on abdomen short, dense, and suberect; 3rd abdominal tergum usually with 2 median marginal setae in ♂, which are shorter than 4th abdominal tergum, in ♀ sometimes with 4; lateral median portion of 4th abdominal tergum at most with erect long hairs; mid-tibia without strong hairs distinguished from others ..... 4
  - Hairs on parafrontal sparse, those on abdomen long, dense and erect; 3rd abdominal tergum with 4–6 (usually 4) strong median marginal setae in ♂ and ♀, which are subequal to length of 4th

- abdominal tergum; lateral median portion of 4th abdominal tergum with several strong bristle-like hairs; mid-tibia usually with 2 rather strong hairs situated upper and lower portion of strong *ad* seta..... *japonica*
4. Eye sparsely short-haired or almost bare; gena 0.1–0.13 of eye height; ♂ 2nd and 3rd abdominal terga each with short and fine median marginal setae, those on 2nd tergum hair-like or at most 1/2 as long as 3rd and those on 3rd tergum at most 1/2 as long as 4th tergum ..... 5
- Eye distinctly short-haired; gena 0.14–0.16 of eye height; ♂ 2nd and 3rd abdominal terga each with longer and stronger median marginal setae, those on 2nd tergum about 3/4 as long as 3rd tergum and those on 3rd about 4/5 as long as 4th; abdominal dorsum densely pollinose, 3rd tergum whitish pollinose on anterior 2/3, 4th on anterior 4/5 and 5th on anterior 1/3; ♀ unknown..... *pilosa*
5. ♂: Vertex 0.19–0.21 of head width; head about 3/5 as long as high in profile; 3rd abdominal dorsum pollinose on anterior 1/3, 4th on anterior 2/3 and 5th on 1/3; 2nd abdominal tergum with 2 short but distinct median marginal setae about 1/2 as long as 3rd tergum. ♀: Vertex in frontal view 0.56–0.58 of width between eyes at vibrissal level; 6th abdominal sternum long, subequal in length to 5th sternum, posterior apex narrowly rounded; intersegmental membrane between 6th and 7th abdominal sterna about 3/4 as long as 6th sternum ..... *inversa*
- ♂: Vertex 0.22–0.24 of head width; head shorter, about 4/7 as long as high in profile; 3rd abdominal tergum pollinose on anterior 2/3, 4th on anterior 3/4 and 5th on anterior 1/2; 2nd abdominal tergum sometimes without distinct median marginal setae, at most with fine ones which are about 1/3 as long as 3rd tergum. ♀: Vertex 0.6–0.65 of width between eyes at vibrissal level; 6th abdominal sternum short, about 2/3 as long as 5th, posterior apex rather broadly rounded; intersegmental membrane between 6th and 7th abdominal sterna about 2/3 as long as 6th sternum ..... *intermedia*

*Isosturmia inversa* TOWNSEND

(Figs. 1, 6, 8–9, 17–18, 23–24, 33–34)

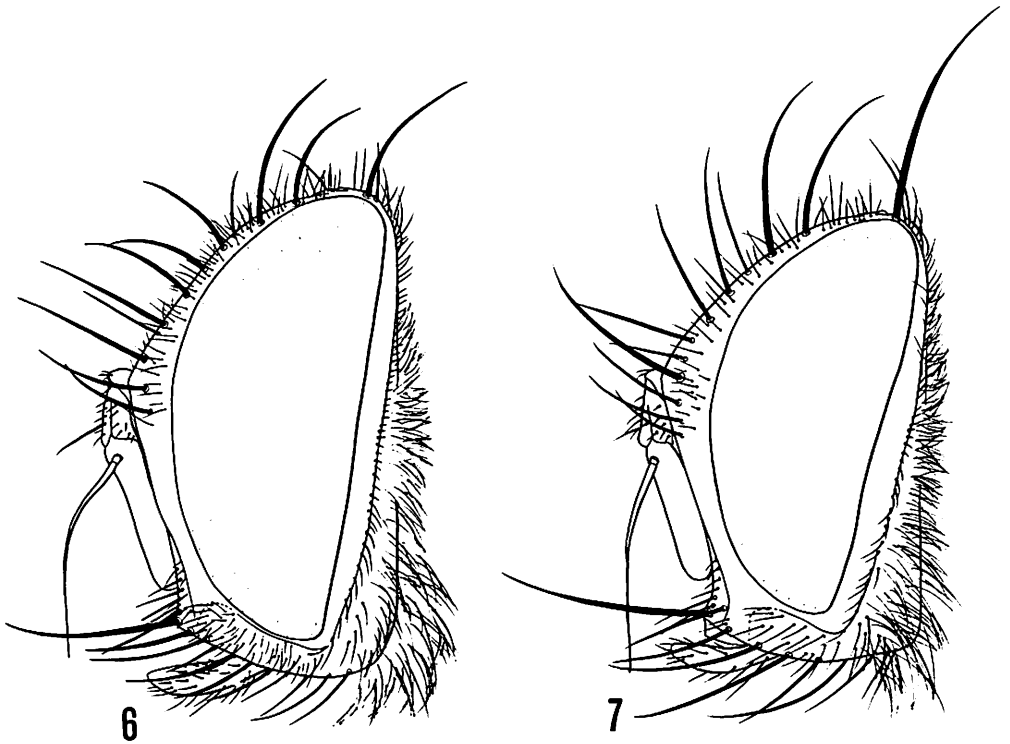
*Isosturmia inversa* TOWNSEND, 1927: 67.*Leiosiopsis aristalis* TOWNSEND, 1927: 62. **Syn. nov.***Sturmia trisetosoides* BARANOV, 1932: 78.*Drino (Isosturmia) inversa*: MESNIL, 1949: 37.

*Drino (Isosturmia) inversa*: MESNIL, 1951: 201.

*Isosturmia inversa*: CROSSKEY, 1967: 102 (part).

*Isosturmia inversa*: CROSSKEY, 1976: 238 (part).

♂. Head densely grayish white pollinose, parafrontal pale yellowish white pollinose, upper portion dark grayish; interfrontal area brown; antenna brown, apices of 1st and 2nd segments narrowly reddish; arista pale brown; palpus reddish yellow, darkened on basal 1/2. Head about 3/5 as long as high in profile; vertex 0.19–0.21 of head width in dorsal view, 0.44–0.46 of width between eyes at vibrissal level in frontal view; interfrontal area about 5/8 of parafrontal at middle; parafrontal longer than parafacial in profile (6 : 5); parafacial subequal to width of 3rd antennal segment at middle height; face about 3/4 as wide as long between vibrissae or slightly less; gena about 0.1–0.12 of eye height. Parafrontal with dense and fine hairs; inner vertical setae crossing each other, 2/5–1/2 of eye height; outer vertical seta very fine and hair-like; ocellar seta very fine and hair-like; 2 reclinate orbital setae, anterior seta slightly stronger than posterior seta and about 5/6 as long as inner vertical seta; 8–10 frontal setae, longest seta subequal to inner vertical seta, lowest seta nearly level with apex of 2nd antennal segment. Antenna falling short of lower margin of face by about 3/5 length of 2nd segment; 3rd segment about 3× as long as 2nd, about 3.6× as long as wide. Arista about 1.2× as long as 2nd and 3rd antennal



Figs. 6–7. Male head of *Isosturmia* spp. in profile. 6. *inversa* (holotype); 7. *japonica*.

segments combined. Palpus weakly clavate apically, slightly shorter than 3rd antennal segment. Eye sparsely short haired.

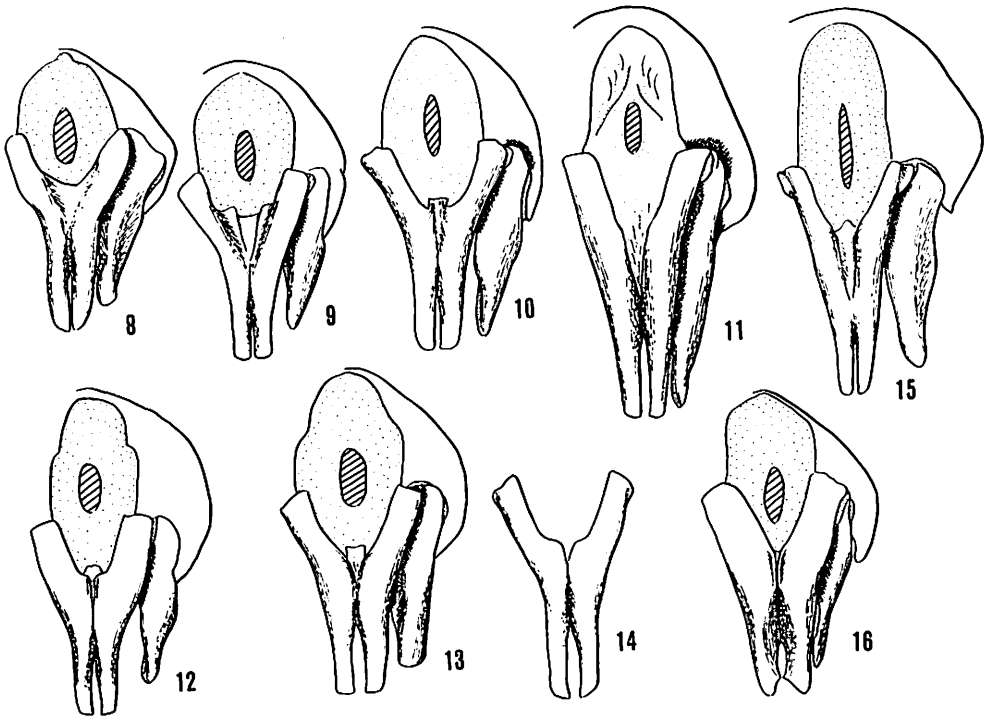
Thorax black in ground color, scutellum narrowly reddish brown on posterior portion; dorsum densely pale yellowish gray pollinose, with rather broad 5 black longitudinal vittae, middle vitta sometimes absent on prescutum, scutellum pale yellowish gray pollinose on posterior 2/3, pleural region with thinner grayish pollinosity. Hairs fine dense and erect, slightly stronger on scutellum and finer on pleura; 1+2 *stpl* setae, lowest seta about 1/2 as long as foremost one; basal scutellar seta about 1.3× as long as scutellum and subequal in length to subapical seta; distance between bases of two subapical scutellar setae subequal to or slightly more than that between basal and subapical setae of same side.

Wing thinly and evenly tinged with pale brown; lower calypter pale brownish. Second costal sector about 2/3 as long as 3rd and 1.4× as long as 4th; vein  $M_1$  from discal crossvein to its bend 3/5–4/7 as long as that from bend to apex, about 2× as long as distance between bend and wing margin.

Legs brownish black; hind tibia with a closely set row of *ad* setae, with or without distinct submedian stronger seta among them, a row of 6–8 *pd* setae and 5–6 *v* setae; fore claw and pulvillus slightly longer than 5th tarsomere.

Abdomen brownish black, reddish on side and venter of 3rd tergum and anterolateral portion and venter of 4th; 5th tergum shining dark reddish brown; dorsum densely pale yellowish gray pollinose; 3rd tergum pollinose on anterior 1/3, pollinosity diffusing to anterior 1/4 on median portion and extending to anterior 1/2 on side; 4th tergum pollinose on anterior 2/3, pollinosity diffusing to anterior 1/2 on both lateral portions; 5th tergum pollinose on anterior 1/3; venter thinly whitish pollinose on entire syntergum 1+2 and 3rd tergum and narrow anterior portion of 4th. Hairs on dorsum fine, dense and suberect, becoming sparser and stronger posteriorly; 2nd tergum with 2 median marginal and 1 lateral marginal setae, the former about 1/2 as long as 3rd tergum; 3rd tergum with 2 median marginal and 1 strong lateral marginal setae, the former 1/3–2/5 as long as 4th tergum; 5th tergum with irregularly set discal setae and a regular row of marginal setae; venter with finer hairs than dorsum, 4th tergum with hair-fascicle of long and dense hairs, which occupies posterior 3/4 of tergum; venter of 5th tergum with dull yellowish nap. Genitalia: Cerci in dorsal view strongly narrowed from base to basal 2/5, narrowly separated from each other nearly on apical 1/4, in lateral view rather weakly narrowed from base to apical portion; surstylus narrow, weakly narrowed apically, apical 1/2 portion bearing many short hairs; postgonite short; epiphallus long; distiphallus rather strongly expanded laterally on mid-ventral portion.

♀. Differing from ♂ as follows: Head more whitish pollinose; vertex 0.23–0.25 of head width, in frontal view 0.56–0.58 of width between eyes at vibrissal level; parafrenal subequal in length to parafacial in profile; parafacial about 3/5 as wide as 3rd antennal segment at middle height; face about 2/3 as wide as long between vibrissae; parafrenal sparsely haired; all head setae strong; outer vertical seta about 2/5 of eye height; 2 strong



Figs. 8–16. Male cerci, surstylus and epandrium of *Isosturmia* spp. in dorsal view. 8. *inversa* (holotype); 9. *inversa* (Borneo); 10. *japonica*; 11. *pilosa* sp. n.; 12. *intermedia* (Formosa); 13. *intermedia* (Java); 14. *intermedia* (holotype); 15. *cruciata* (holotype); 16. *picta* (India).

proclinate orbital setae, subequal in length to anterior reclinate orbital seta; anterior reclinate and proclinate orbital setae usually closely set each other; 5–6 frontal setae; 2+2–3 *stpl* setae; wing vein  $M_1$  more angulated; 5th tarsomere of fore leg elongate, about 2× as long as 4th; claws and pulvilli short, about 1/2 as long as 5th tarsomere; abdomen with stronger and sparser hairs; 2nd abdominal tergum with 2 median marginal setae which are subequal to length of 3rd tergum; 3rd abdominal tergum with 2–4 strong median marginal setae; 4th abdominal tergum without hair-fascicle on venter; 5th abdominal tergum strongly narrowed to apex. Genitalia: 6th tergum narrowly divided into 2 hemitergites; 6th sternum subequal in length to 5th sternum; intersegmental membrane between 6th and 7th abdominal sterna about 3/4 as long as 6th sternum; 7th tergum narrowly divided into 2 hemitergites, anteroventral portion fused with 7th sternum; 7th sternum distinctly curved ventrally on posterior portion.

Body length, 8.2–8.8 mm; wing length, 6.9–7.2 mm.

*Distribution:* Formosa, Malaysia (Sarawak), Indonesia (Sumatra).

*Type material examined:* Holotype ♂ of *Isosturmia inversa*, INDONESIA, Sumatra, Tandjung Gadang, Sumatra's Westkust, 1,000 m, 1926, E. JACOBSON (ZMA); holotype ♀



of *Leiosiopsis aristalis*, INDONESIA, Sumatra, Fort de Kock, 920 m, 1926, E. JACOBSON (ZMA); lectotype ♂ of *Sturmia trisetosoides*, FORMOSA, Tainan, iv. 1910, H. SAUTER (IPF); paralectotype ♀ of *S. trisetosoides*, same date as lectotype (IPF).

*Other specimen examined:* MALAYSIA: Sarawak—1 ♂, Kampong Pueh, Lundu District, 690–1,500 m, 6–12. vi. 1958, T. C. MAA (BPBM).

*Remarks.* The female of this species is very similar to that of *I. intermedia* and they may be reliably distinguished only by the genital structure. CROSSKEY (1976) treated *Leiosiopsis aristalis* TOWNSEND known only from female as a junior synonym of *I. intermedia*, but I think that it is same as *inversa*. The female genitalia of *aristalis* are very similar to those of *Sturmia trisetosoides* BARANOV and apparently different from those of *intermedia* females which were reared from the same host species as that of *intermedia* males in Japan. MESNIL and PSCHORN-WALCHER (1968) recorded *inversa* from Hokkaido, but it is due to misidentification of the following species.

***Isosturmia japonica* (MESNIL)**

(Figs. 2, 7, 10, 19, 35–36, 44–45)

*Drino (Isosturmia) chatterjeeana japonica* MESNIL, 1957: 13.

*Isosturmia chatterjeeana japonica:* MESNIL & PSCHORN-WALCHER, 1968: 153.

*Isosturmia inversa:* MESNIL & PSCHORN-WALCHER, 1968: 153 (misidentification).

*Isosturmia japonica:* HERTING, 1984: 54.

♂. Very closely resembling *I. inversa*, but differing as follows: Parafrontal usually more yellowish pollinose and sparsely haired, all setae on head stronger than in *inversa*; inner vertical seta slightly less than 2/3 of eye height; longest seta of frontal setae always shorter than inner vertical seta; gena rather sparsely haired; 3rd antennal segment slightly less than 3× 2nd; palpus subequal in length to 3rd antennal segment; eye almost bare; thoracic dorsum densely yellowish white pollinose; usually 1+1, sometimes 1+2, *stpl* setae; wing vein M<sub>1</sub> from discal crossvein to its bend about 1.5× as long as distance between bend and wing margin; mid-tibia sometimes with 2 rather strong hairs, each of them inserted on upper and lower portion of *ad* seta; hind tibia with a sparse row of *ad* setae, a strong submedian seta always present; abdomen narrowly reddish on side of 3rd tergum; abdominal dorsum more broadly and densely pollinose, 3rd tergum pollinose on anterior 2/3–3/4, 4th tergum on anterior 3/4–4/5 and 5th on anterior 1/2; hairs on abdominal dorsum long and erect, 4th abdominal tergum with strong bristle-like hairs on lateral submedian portion; venter of 4th tergum with a hair-fascicle of very long and dense hairs, which occupies posterior 4/5–5/6 of tergum; 2nd abdominal tergum with 2–4 (usually 2) strong median marginal setae which are subequal to length of 3rd tergum; 3rd abdominal tergum with 4–6 (usually 4) strong median marginal setae, median pair of which are subequal to length of 4th tergum; dull yellowish nap on venter of 5th abdominal tergum weak. Genitalia: Cerci in dorsal view rather broadly separated from each other on apical 1/5; surstylus in lateral view weakly curved ventrally; epiphallus narrow.

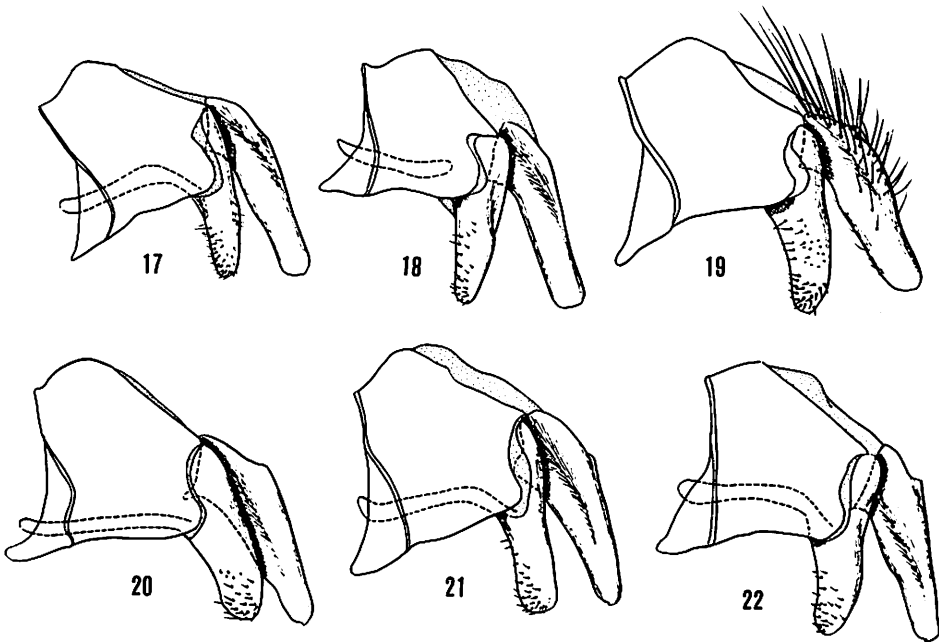
♀. Closely resembling *I. inversa*, and only slightly differing as follows: Vertex 0.25–0.28 of head width; parafacial about 5/6 as long as parafrontal in profile; outer vertical seta 1/2–2/3 as long as inner one; anterior reclinate orbital seta sometimes situated near middle between anterior and posterior reclinate orbital setae; 1+2 or 2+2 *stpl* setae; 2nd abdominal tergum with 2–4 and 3rd with 4–6 strong median marginal setae. Genitalia: Sixth sternum about 2/3 as long as 5th sternum; intersegmental membrane between 6th and 7th sternum about 2/3 as long as 6th sternum; 7th sternum not much curved ventrally; 8th tergum rather long.

Body length, 6.2–9.1 mm; wing length, 5.7–8.5 mm.

*Distribution*: Japan (Hokkaido, Honshu, Shikoku, Kyushu).

*Type material examined*: Holotype ♂ of *Isosturmia chatterjeeana japonica*, JAPAN, Hokkaido, Hiroo, Obihiro, 23. viii. 1954, S. TAKANO (CNC).

*Other specimens examined*: JAPAN: Hokkaido—1 ♂, Shiretoko, 3. viii. 1960, S. TAKANO (CNC); 1 ♀, Iwaobetsu, Shiretoko, 4. viii. 1967, H. SHIMA (BLKU); 1 ♂, Mt. Rausu, 200–900 m, 4. viii. 1967, H. SHIMA (CNC); 3 ♂♂ 5 ♀♀, Berabonai, Ashoro, 22–24. vii. 1967, H. SHIMA; 6 ♂♂ 16 ♀♀, Kiyokawa, Ashoro, 23. viii. 1967, H. SHIMA, A. NAKANISHI & M. HONDA (BLKU); 8 ♂♂ 14 ♀♀, Ashorobuto, 26. vii. 1967, M. HONDA (BLKU, 1 ♀ in CNC); 3 ♂♂ 14 ♀♀, Akan-machi, Kushiro, 31. vii. 1967, H. SHIMA, M. HONDA & A. NAKANISHI (BLKU); 3 ♂♂, Meakan, Obihiro, 6. viii. 1950, S. TAKANO (2 ♂♂ in CNC, 1 ♂ in EIHU); 3 ♂♂, Inada, Obihiro, 4. vii. 1951, 3. viii. 1952, 18. viii. 1954, S. TAKANO (2 ♂♂ in EIHU, 1 ♂ in CNC); 1 ♂, Nukabira, Obihiro, 12. viii. 1955, S. TAKANO (CNC); 2 ♂♂ 2 ♀♀, Mt. Yubari, Sorachi, 14–15. vii. 1967, H. SHIMA; 1 ♀, Pirikapetan, Mt. Satsunai, 27. vii. 1967, H. SHIMA; 1 ♂ 2 ♀♀, Mt. Apoi, Hidaka, 18. vii. 1967, H. SHIMA & M. HONDA; 1 ♀, Mt. Moiwa, Sapporo, 11. vii. 1967, H. SHIMA; 1 ♀, Mt. Muine, 400–1,000 m, Sapporo, 13. viii. 1977, K. OHARA; 1 ♀, Tomakomai, 17. viii. 1977, K. OHARA (BLKU, KMNH IR100, 235Ø236): Honshu—1 ♀, Aoni, Kuroishi City, Aomori, 17. ix. 1978, S. FUKUSHI; 1 ♂, Kosaka, Akita, 22. vii. 1971, S. FUKUSHI; 1 ♂, Mt. Hinoemata, 1,660–2,340 m, Fukushima, 17. vii. 1981, T. GOTO; 2 ♀♀, Urawa, Saitama, 24. v. 1975, 28. v. 1974, K. HARA; 1 ♀, Chichibu, Saitama, 26. v. 1972, K. HARA; 1 ♀, Odashirogahara, Nikko, Tochigi, 23. vii. 1982, T. MATSUMURA (all in BLKU); 1 ♂, Oze, Tochigi, 19. vii. 1950, E. YOSHIDA; 1 ♂, Chuzenji, Tochigi, 12. ix. 1917, E. GALLOIS (all in CNC); 2 ♀♀, Shin-hotaka, Gifu, 12–15. vii. 1969, A. NAGATOMI; 1 ♀, Shimashima-dani, Nagano, 28. vii. 1981, T. GOTO; 1 ♀, Togakushi, Nagano, 6. vii. 1966, H. SHIMA; 1 ♀, Asagai, M.-Echigo, Niigata, 18. vi. 1967, K. BABA; 1 ♀, Mt. Atema, Niigata, 27. vii. 1971, M. HONDA; 3 ♂♂ 3 ♀♀, Mikuni Pass, Niigata, 13. vii. 1966, Y. MIYATAKE & H. SHIMA (all in BLKU); 1 ♀, Hatsutani, Nose, Osaka, 25. ix. 1967, Y. MIYATAKE; 1 ♂, Dorogawa, Nara, 23. vii. 1967, Y. MIYATAKE (all in OMNH); 3 ♂♂ 4 ♀♀, Sasayama, Tanba, Hyogo, 27. v. 2. vi, 10. vi, 13. vi, 27. vi, 13. viii. 1952, K. IWATA; 1 ♂, Hujjioka, Tanba, Hyogo, 4. vii. 1952, M. MIKI; 2 ♀♀, Okanomura, Tanba, Hyogo, 18. vi. 1951, A. NAGATOMI; 1 ♀, Johokumura, Tanba, Hyogo, 17. vi. 1951, A. NAGATOMI (all in BLKU): Shikoku—1 ♀, Kuroson, Kochi, 29. v. 1967, M. HONDA (BLKU); Kyushu—1 ♂, Mt. Aburayama,



Figs. 17–22. Male cerci, surstylus and epandrium of *Isosturmia* spp. in lateral view. 17. *inversa* (holotype); 18. *inversa* (Borneo); 19. *japonica*; 20. *intermedia* (holotype); 21. *intermedia* (Java); 22. *intermedia* (Formosa).

Fukuoka, 6. v. 1977, H. SHIMA; 1 ♀, Mt. Garyu, Fukuoka, 30. vii. 1967, S. MIYAMOTO; 3 ♂♂, Mt. Hikosan, Fukuoka, 8. v. 1967, 26. vi. 1966, M. HONDA & H. SHIMA; 3 ♂♂, Kyusuikei, Mts. Kuju, Oita, 13–14. v. 1968, M. HONDA; 1 ♀, Mt. Hakucho, 1,300 m, Kumamoto, 19. vii. 1977, K. OHARA; 3 ♂♂ 1 ♀, Mt. Ichifusa, Kumamoto, 26. v. 1974, 2. vi. 1966, H. SHIMA; 2 ♂♂, Okawachi, 800–1,100 m, Shiiba-mura, Miyazaki, 24. v. 1974, H. SHIMA; 1 ♂ 4 ♀♀, Ohata Lake, Mts. Kirishima, Kagoshima, 8–9. vi. 1964, H. SHIMA, A. TANAKA & T. NISHIYAMA; 3 ♀♀, Yunono, Mts. Kirishima, 6. vi. 1966, H. SHIMA; 1 ♀, Kurinodake Spa, Mts. Kirishima, 27. vii. 1963, H. SHIMA; 2 ♂♂, Imuta Lake, Kagoshima, 16. v. 1965, A. TANAKA; 1 ♀, Mt. Inaodake, Tashiro-machi, Kagoshima, 13. viii. 1968, K. HASHIMOTO (BLKU, KMNH IR100, 237–238).

*Remarks.* This species was originally described as a subspecies of *I. chatterjeeana*, but I consider both as distinct species having different male and female genitalia. This species seems to be more closely related to *I. inversa* rather than to *I. picta* (= *chatterjeeana*) since many morphological features of *inversa* and *japonica* closely resemble each other and those of *picta* are rather different in this genus as mentioned under *I. picta*.

The pollinose area of the male abdominal dorsum seems to be rather variable in this species. In some specimens 3rd abdominal tergum is densely pollinose on anterior 3/4 and 4th on anterior 4/5, but in others 3rd tergum is rather thinly pollinose on anterior 2/3 and 4th on anterior 3/4. This is regarded as individual variation of this species.

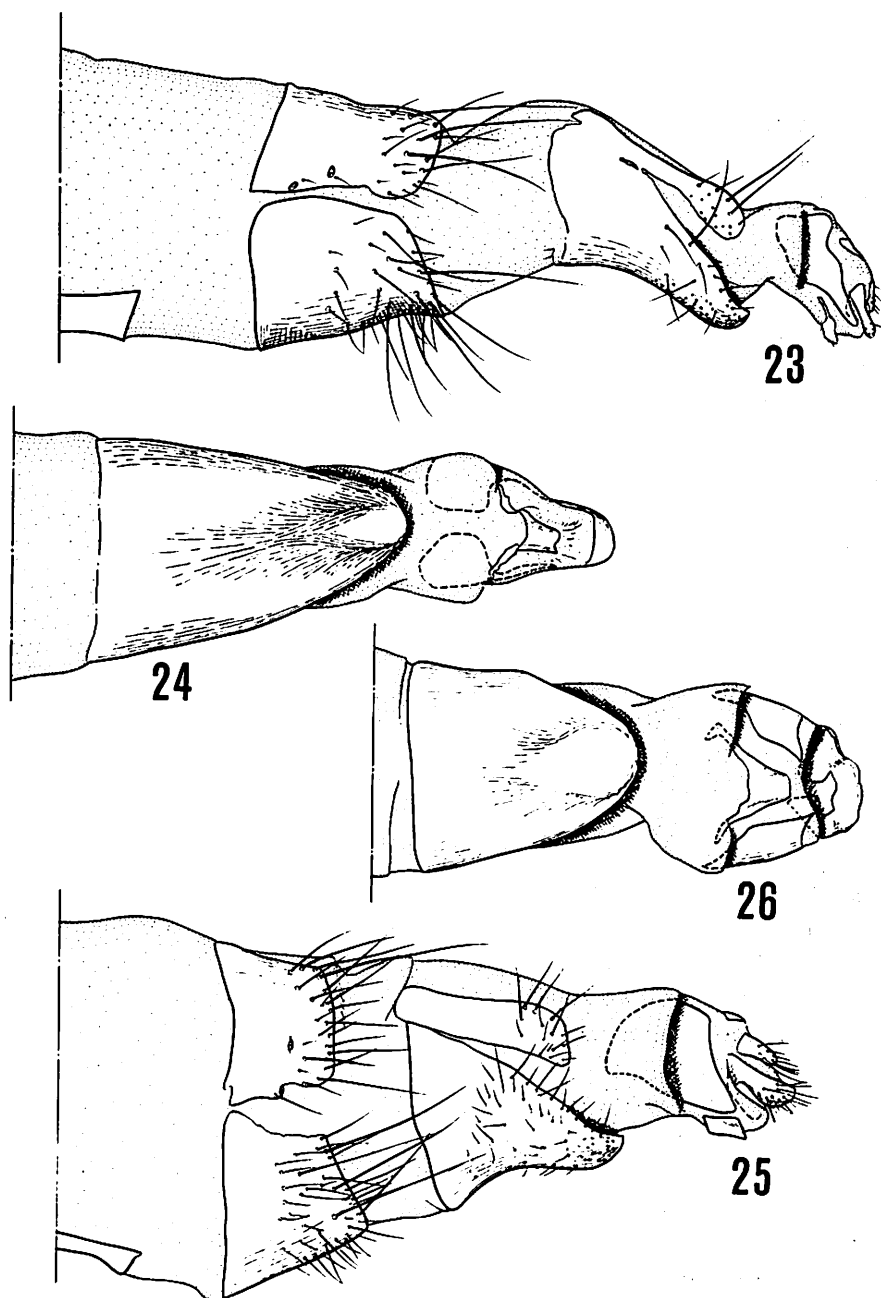
***Isosturmia intermedia* TOWNSEND**  
(Figs. 4, 12-14, 20-22, 25-26, 38-40, 42)

- Isosturmia intermedia* TOWNSEND, 1927: 68.  
*Epixorista episcopa* TOWNSEND, 1927: 61. **Syn. nov.**  
*Epixorista ocellaris* TOWNSEND, 1927: 62. **Syn. nov.**  
*Sturmia trisetosa* BARANOV, 1932: 78.  
*Drino (Isosturmia) trisetosa*: MESNIL, 1949: 37.  
*Drino (Isosturmia) inversa trisetosa*: MESNIL, 1951: 203.  
*Isosturmia intermedia*: CROSSKEY, 1967: 101 (part).  
*Isosturmia intermedia*: CROSSKEY, 1976: 238 (part).  
*Isosturmia chatterjeeana*: NAKASUJI, 1978: 157 (misidentification).  
*Isosturmia chatterjeeana*: HERTING, 1984: 54 (misidentification).

Resembling *I. inversa*, but differing as follows:

♂. Head densely whitish pollinose, upper frontal area slightly grayish yellow, rarely pale yellowish gray; head short, about 4/7 as long as high in profile; vertex 0.22-0.24 of head width in dorsal view, 0.51-0.54 of width between eyes at vibrissal level in frontal view; parafrontal longer than parafacial in profile (4:3); face 3/5-3/4 as wide as long between vibrissae; gena 0.12-0.13 of eye height; inner vertical seta slightly less than 1/2 of eye height; 2 subequally long reclinate orbital setae about 2/3 as long as inner vertical seta; 8-10 frontal setae, longest seta only slightly longer than reclinate orbital seta; antenna falling short of lower margin of face by about 3/4 length of 2nd antennal segment; eye usually more distinctly short-haired than in *inversa*. Thoracic dorsum usually densely grayish white pollinose; with 4 narrow black longitudinal vittae, a narrow median vitta rarely present on scutum, inner and outer vittae narrower than in *inversa*, pollinosity on scutellum thinner and more grayish than on prescutum and scutum; distance between bases of 2 subapical scutellar setae about 1.5× that between basal and subapical setae of same side. Wing hyaline, slightly tinged with pale brown along veins. Hind tibia with a closely set row of *ad* setae, stronger seta absent among them. Abdomen black in ground color; dorsum rather densely whitish pollinose on anterior 2/3 of 3rd tergum, the pollinosity becoming thinner and diffusing to posterior portion, densely whitish pollinose on anterior 3/4 of 4th tergum and on anterior 1/2 of 5th; pollinosity on dorsum rarely tinged with pale yellowish gray; hairs on abdominal dorsum rather denser and finer than in *inversa*; 2nd abdominal tergum at most with a pair of short and weak median marginal setae, sometimes without them; 3rd abdominal tergum with a pair of short median marginal setae which are at most 1/2 as long as 4th tergum. Genitalia: Cerci in dorsal view narrowed posteriorly, separated from each other on apical 1/3, in lateral view nearly straight; surstylus in lateral view broad, with dense short hairs on apical portion; epiphallus broad; distiphallus more weakly expanded laterally than in *inversa*.

♀. Closely resembling *I. inversa*, but differing as follows: Vertex in frontal view 0.6-0.65 of width between eyes at vibrissal level; parafacial only slightly narrower than 3rd antennal segment at middle; anterior reclinate orbital seta sometimes situated near middle



Figs. 23-26. Female genitalia of *Isosturmia* spp. in lateral view (23 & 25) and in ventral view (24 & 26). 23-24. *inversa* (paralectotype of *trisetosoides*); 25-26. *intermedia* (Sulawesi).

between anterior and posterior proclinate orbital setae in profile; abdomen usually broadly shining black, at most narrowly brownish on side of syntergum 1+2; 3rd abdominal tergum whitish pollinose on anterior 2/5-3/5, with 2 median marginal setae; 4th tergum pollinose on anterior 3/5-3/4, with 2 median marginal setae; 5th tergum pollinose on anterior 2/5-1/2. Genitalia: Distinctly shorter than in *inversa*; 6th abdominal tergum broadly divided into 2 hemitergites at mid-dorsal portion; 6th sternum about 2/3 as long as 5th sternum; intersegmental membrane between 6th and 7th sterna about 2/3 as long as 6th sternum; 7th tergum broadly divided into 2 hemitergites, usually separated from 7th sternum or narrowly fused with it on anterior portion; 7th sternum not much curved ventrally on apical portion; 8th tergum broad.

Body length, 6.9-9.3 mm; wing length, 5.2-7.0 mm.

*Hosts*: LEPIDOPTERA, Satyridae: *Lethe diana* (BUTLER); *Mycalesis gotama fulginia* FRUHSTORFER (NAKASUJI, 1978, as *I. chatterjeeana*; FUKUDA *et al.*, 1984, as *I. sp.*).

*Distribution*: Japan (Honshu, Kyushu, Tsushima), Formosa, Thailand, Indonesia (Sumatra, Java, Lombok, Sulawesi, Ambon).

*Type material examined*: Holotype ♂ of *Isosturmia intermedia*, INDONESIA, Sumatra, Fort de Kock, 920 m, 1925, E. JACOBSON (ZMA); holotype ♀ of *Epixorista ocellaris*, INDONESIA, Sumatra, same data as preceding (ZMA); holotype ♀ of *Epixorista episcopa*, same data as preceding, except year 1926 (ZMA); lectotype ♂ of *Sturmia trisetosa*, FORMOSA, Koshun, Kankau, vii. 1912, H. SAUTER (IPF); paralectotypes of *Sturmia trisetosa*: FORMOSA, 1 ♀, same data as lectotype (USNM), 1 ♂, same data as lectotype, except date viii. 1912 (USNM), 2 ♀♀, same data as lectotype, except date 7. viii. 1912 (IPF), 1 ♂2 ♀♀, same data as lectotype, except date ix. 1912 (IPF), 1 ♂, Sokutsu, vi. 1912, H. SAUTER (IPF), 1 ♂, Taihorisho, ix. 1912, H. SAUTER (IPF).

*Other specimens examined*: JAPAN: Honshu- 1 ♂, Yorii, Saitama, 15. vi. 1978, K. HARA; 2 ♂♂, Moroyama, Saitama, 8. ix. 1979, 24. ix. 1978, C. TAMAKI; 2 ♀♀, Irikawa, Niigata, 16. ix. 1967, K. BABA; 1 ♀, Okazaki, Aichi, 6. vii. 1977 ex *Mycalesis gotama fulginia*, F. NAKASUJI; 1 ♀, Ozaike, Shizuoka, v. 1973 ex *Mycalesis gotama fulginia* larva, M. TAKAHASHI; 1 ♂1 ♀, Ikawa-toge, Shizuoka City, ix. 1985 emg. ex *Lethe diana* pupa, M. TAKAHASHI; 1 ♂2 ♀♀, Toyota, Aichi, 5-6. v. 1983 ex *Mycalesis gotama fulginia*, M. TSUJI: Kyushu- 1 ♀, Mt. Ariake, Tsushima, 19. vii. 1968, S. MIYAMOTO & A. NAKANISHI; 1 ♂, Is. Noko, Fukuoka, 5. vii. 1982, H. SHIMA; 1 ♀, Mt. Kunimi, Sasebo, Nagasaki, 13. viii. 1966, Y. IKEZAKI; 1 ♀, Mt. Osuzu, Miyazaki, 20. v. 1966, K. KANMIYA; 1 ♀, Jonodan, Mt. Shibi, Kagoshima, 13. viii. 1965, K. HASHIMOTO; 1 ♀, Iriki-toge, Kagoshima, 16. x. 1966, K. KANMIYA; 1 ♀, Toso, Kagoshima, 14. v. 1964, K. HASHIMOTO; 1 ♂1 ♀, Banzan, Sata, Kagoshima, 22. vii. 1965, K. HASHIMOTO; 1 ♂, Cape Sata, Kagoshima, 30. iv. 1966, A. TANAKA; 1 ♂, Kurio, Is. Yaku, 27. vii. 1967, A. TANAKA; 1 ♀, Nagata, Is. Yaku, 30. vii. 1968, A. NAGATOMI (BLKU, KMNH IR100, 239-240). FORMOSA: 1 ♀, Kuantzuling, 8. vi. 1970, K. NISHIDA; 1 ♂, Sanhsia, 18. vi. 1972, H. M. LIN; 1 ♂, Kending, 10. vi. 1970, K. NISHIDA (all in BLKU). THAILAND: 1 ♂1 ♀, Doi Suthep, 1,278 m, 29. iii-4. v. 1958, T. C. MAA; 1 ♀, Chiangdao, 450 m, Chiangmai Prov., 5-11. iv. 1958, T. C. MAA

(BPBM). INDONESIA: *Java*—2 ♂♂ 2 ♀♀, Puncak, 1,300 m, 14–15. xi. 1973, R. KANO, S. SHINONAGA & H. SHIMA; 1 ♂, Mt. Tjemere, 400–1,400 m, Cirebon, 19, 25. xi. 1973, H. SHIMA; *Lombok*—2 ♂♂, Mt. Pusuk, 300 m, 23. xii. 1973, H. KURAHASHI; *Sulawesi*—1 ♀, Noongan, 1,200 m, 50 km S of Menado, 2–10. xii. 1973, H. SHIMA; *Ambon*—1 ♂, 0–150 m, 2–6. xii. 1973, S. SHINONAGA (BLKU).

*Remarks.* CROSSKEY (1976) treated both *Epixorista episcopa* TOWNSEND and *E. ocellaris* TOWNSEND as junior synonyms of *Isosturmia inversa*, but the genitalia of the holotypes of these species are very similar to those of *intermedia* females which are reliably combined with male *intermedia*. The type specimens of *episcopa* and *ocellaris* are rather different from many other specimens of *intermedia* in general appearances, such as in the rather broadly reddish and broadly pollinose abdomen, but these differences seem to be included in individual variation of this species.

***Isosturmia pilosa* sp. nov.**

(Figs. 3, 11, 27–29, 37)

*Isosturmia inversa*: HERTING, 1984: 54 (part; misidentification).

♂. Head densely whitish pollinose, parafrontal and gena whitish gray or pale yellowish gray pollinose; interfrontal area brown-black; antenna and arista brown-black, apex of 2nd antennal segment and base of 3rd sometimes narrowly reddish; palpus reddish yellow, darkened on basal 1/2–3/5. Head about 3/5 as long as high in profile; vertex 0.23–0.26 of head width in dorsal view, 0.5–0.54 of width between eyes at vibrissal level in frontal view; interfrontal area about 5/8 of parafrontal at middle; parafacial about 5/6 as long as parafrontal in profile, about 3/5 as wide as 3rd antennal segment at middle height; face about 3/4 as wide as long between vibrissae; gena 0.14–0.16 of eye height. Parafrontal with dense fine and long hairs; inner vertical setae crossing each other, 1/2–2/3 as long as eye height; outer vertical seta indistinct; ocellar seta absent; 2–3 reclinate orbital setae, foremost seta usually slightly stronger than others and about 2/3 as long as inner vertical seta; 6–10 frontal setae, upper 1–2 setae sometimes reclinate and lowest seta nearly level with apex of 2nd antennal segment, longest seta subequal to reclinate orbital seta. Antenna falling short of lower margin of face by about 1/2 length of 2nd segment; 3rd segment 3–3.2× as long as 2nd, 3.5–4× as long as wide. Arista about 1.2× as long as 2nd and 3rd antennal segments combined. Palpus clavate, subequal in length to 3rd antennal segment. Eye rather densely short-haired.

Thorax black in ground color, scutellum broadly reddish brown; dorsum densely grayish yellow-white pollinose, with 5 narrow black longitudinal vittae, middle vitta disappearing on scutum; scutellum more thinly whitish pollinose than prescutum and scutum; pleura rather thinly grayish white pollinose. Hairs very fine and dense, on pleura longer than on dorsum; 1+2 *stpl* setae, lowest seta about 2/5 as long as foremost seta; distance between bases of 2 subapical scutellar setae about 3/4 that between basal and subapical setae of same side.

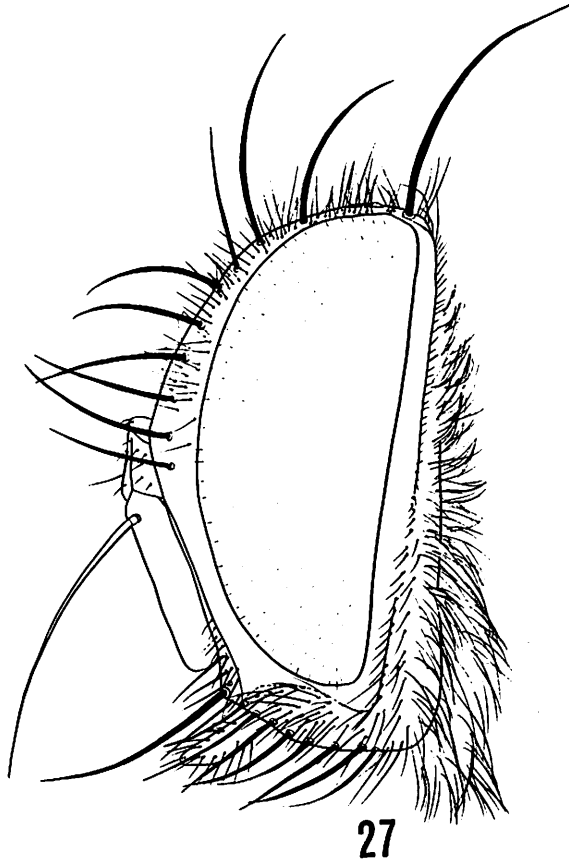


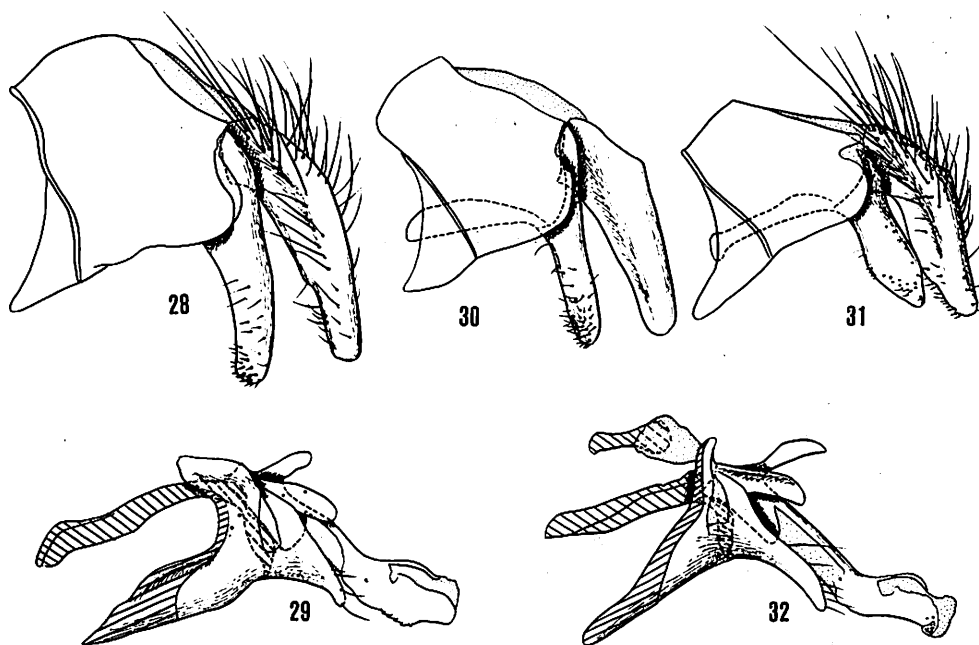
Fig. 27. Male head of *Isosturmia pilosa* sp. n. in profile.

Wing hyaline, thinly tinged with pale brown along veins; lower calypter pale brownish white. Second costal sector  $4/7-2/3$  as long as 3rd,  $1.3-1.5\times$  as long as 4th; vein  $M_1$  from discal crossvein to its bend about  $2/3$  as long as that from bend to apex, about  $1.5\times$  as long as distance between bend and wing margin.

Legs black, tibiae sometimes brownish on middle; hind tibia with a closely set row of *ad* setae, a strong submedian seta present among them; fore claw and pulvillus slightly longer than 5th tarsomere.

Abdomen shining black, reddish brown on side of syntergum 1+2 and 3rd tergum and sometimes on anterolateral portion of 4th; dorsum pale yellowish white pollinose, 3rd tergum rather thinly pollinose on anterior  $2/3$ , the pollinosity thinner on mid-dorsal portion; 4th tergum densely pollinose on anterior  $4/5$  and 5th rather densely on anterior  $1/3$ ; mid-dorsal longitudinal vitta narrow and weak on 4th tergum; venter of entire syntergum 1+2 and 3rd tergum and narrow anterior portion of 4th thinly whitish pollinose; venter of 5th tergum with thin brownish nap. Hairs rather dense strong and





Figs. 28–32. Male genitalia of *Isosturmia* spp.; cerci, surstylus and epandrium in lateral view (28, 30, 31) and hypandrium, pre- and postgonites and aedeagus in lateral view (29, 32). 28–29. *pilosa* sp. n.; 30. *cruciata* (holotype); 31–32. *picta* (India).

suberect on dorsum, long and strong on lateral submedian portion of 4th tergum, fine and recumbent on venter; 2nd tergum always with 2 median marginal setae which are about 3/4 as long as 3rd tergum; 3rd tergum with 2 median marginal setae which are about 4/5 as long as 4th tergum (in small specimens 4 median marginal setae present, lateral pair fine); venter of 4th tergum with broad hair-fascicle of long and dense hairs, which occupies posterior 4/5 of tergum. Genitalia: Cerci in dorsal view convergent each other from base to basal 2/3, narrowly parallel-sided on apical 1/3, in lateral view with ventral margin weakly notched on apical 1/3; surstylus in lateral view weakly narrowed posteriorly, apical portion with dense short hairs; postgonite short, rounded apically; epiphallus short.

♀. Unknown.

Body length, 6.3–9.1 mm; wing length, 5.6–7.6 mm.

*Distribution*: Japan (Honshu, Kyushu).

Holotype ♂, JAPAN, Naidaijin, 600–800 m, Kumamoto, 7. v. 1967, H. SHIMA (BLKU).

Paratypes: JAPAN: *Honshu*—1 ♂, Yorii, Saitama, 15. vi. 1978, K. HARA; 1 ♂, Mt. Tanzawa, Kanagawa, 3. v. 1972, S. SHINONAGA; 1 ♂, Nukadani, Kanazawa City, 30. v. 1974, I. TOGASHI (all in BLKU); 1 ♂, Takinoike, Izumisano City, Osaka, 4. vi. 1967, Y. MIYATAKE (OMNH); *Kyushu*—1 ♂, Mt. Inunaki, Fukuoka, 25. v. 1967, S. MIYAMOTO

(KMNH IR100, 241); 1 ♂, Mt. Inunaki, 28. v. 1982, H. SHIMA (BLKU); 3 ♂♂, same data as holotype (BLKU, KMNH IR100, 242).

*Remarks.* This species resembles *I. inversa*, but may be distinguished from it by the wider vertex and gena and more densely pollinose abdomen. This species also resembles *I. intermedia*, but differs from it in its stronger setae on head and abdomen.

*Isosturmia cruciata* (TOWNSEND)

(Figs. 15, 30)

*Zygocarcelia cruciata* TOWNSEND, 1927: 64.

*Isosturmia cruciata*: CROSSKEY, 1976: 237.

♂. Head missing. TOWNSEND (1927) originally described the male head as follows (TOWNSEND used many abbreviations, but they are shifted here to practical terms): "Frontal profile arcuate, rather longer than facial profile; 3rd antennal segment little more than 2.5× of 2nd segment, upper edge dished in profile beyond [base of] arista; base of antenna hardly above middle of eye height; eye thinly hairy, faintly oblique, reaching vibrissal level; vertex 1/4 of head width, front [=frons] equilateral hind 1/3, then widening to 1/3 of head width at base of antenna; 2 or 3 frontal setae below base of antenna, 6 behind base of antenna, 1 row of frontal setae; 1 vertical seta [=outer vertical seta absent], inner vertical setae decussate; 2 reclinate orbital setae in ♂; frontalia [=interfrontal area] little less than width of parafrontal at middle; no ocellar seta; head faintly brassy; facial plate [=face and epistoma], facialia [=facial ridge] and lower occipital orbit silvery; frontalia and antenna blackish; palpus fulvous, dusky of base."

Thorax black, scutellum yellowish on posterior 2/3; densely pale yellowish pollinose on dorsum, thinly whitish gray pollinose on pleura; dorsum with 5 narrow longitudinal vittae, middle vitta absent on prescutum. Hairs fine, dense and erect on dorsum, longer on pleura, stronger on scutellum; propleural seta very fine, hair-like; 1 + 1 *stpl*, a very fine hair-like seta present on anteroventral portion of posterior *stpl*; basal scutellar seta subequal in length to subapical one and about 1.6× as long as scutellum; distance between bases of 2 subapical scutellar setae about 1.3× that between basal and subapical setae of same side.

Wing hyaline, evenly and weakly tinged with pale brown; lower calypter pale brownish white. Second costal sector about 4/7 as long as 3rd and about 1.5× as long as 4th; vein  $M_1$  from discal crossvein to its bend about 2/3 as long as that from bend to apex, and about 2× as long as distance between bend and wing margin; discal crossvein weakly sinuate, about 1.5× as long as last section of vein  $M_3$ .

Legs missing except for fore leg; fore tibia with 2  $p$  setae, lower seta stronger than upper one.

Abdomen broadly reddish yellow; anterior portion of syntergum 1+2, mid-dorsal longitudinal portion of 3rd tergum, broad mid-dorsal portion and posterior 1/3 of 4th tergum and entire 5th tergum dark reddish brown; 3rd tergum thinly whitish yellow

pollinose on anterior 3/5 of dorsum, the pollinosity becoming thinner and diffusing posteriorly; 4th tergum densely whitish yellow pollinose on anterior 3/4 of dorsum; 5th tergum rather densely yellowish pollinose on anterior 1/2 of dorsum; venter of syntergum 1+2 and 3rd tergum evenly and thinly whitish pollinose; venter of 4th tergum thinly whitish pollinose on narrow anterior portion; 5th tergum with dull yellowish nap on venter. Hairs dense, fine and suberect on dorsum, becoming stronger and sparser posteriorly; venter with finer hairs; venter of 4th tergum with dense and long hair-fascicle on posterior 3/4 of tergum; 2nd tergum with 2 rather fine median marginal and lateral marginal setae, the former about 1/2 as long as 3rd tergum; median marginal setae of 3rd tergum missing but 2 large sockets recognizable, 1 strong lateral marginal seta present on 3rd tergum; 4th tergum with a row of strong marginal setae and with 2-3 rather weak lateral discal setae standing close to marginal setae; 5th tergum with an irregular row of discal setae and a regular row of marginal setae. Genitalia: Cerci in dorsal view evenly narrowed posteriorly, apical 1/3 narrowly separated from each other; surstylus in lateral view narrow and nearly straight, not extending beyond cercal apex.

Length of thorax and abdomen, ca. 6.7 mm; wing length, ca. 7.1 mm.

*Distribution*: Indonesia (Sumatra), Malaysia (Malaya, Sabah)(after CROSSKEY, 1976).

*Type material examined*: Holotype ♂, INDONESIA, *Sumatra*, Air Njurus Bempo, 1,400 m, viii. 1916, E. JACOBSON (ZMA).

*Remarks*. Among many Oriental tachinid specimens examined in this study I have not seen any one corresponding to this species.

### *Isosturmia picta* (BARANOV)

(Figs. 5, 16, 31-32, 41, 43, 46)

*Sturmia picta* BARANOV, 1932: 77.

*Sturmia chatterjeeana* BARANOV, 1934: 484. **Syn. nov.**

*Drino (Isosturmia) picta*: MESNIL, 1949: 37.

*Drino (Isosturmia) picta*: MESNIL, 1951: 205.

*Drino (Isosturmia) chatterjeeana*: MESNIL, 1951: 200.

*Drino picta*: KOIZUMI, 1964: 124.

*Isosturmia picta*: MESNIL & PSCHORN-WALCHER, 1968: 153.

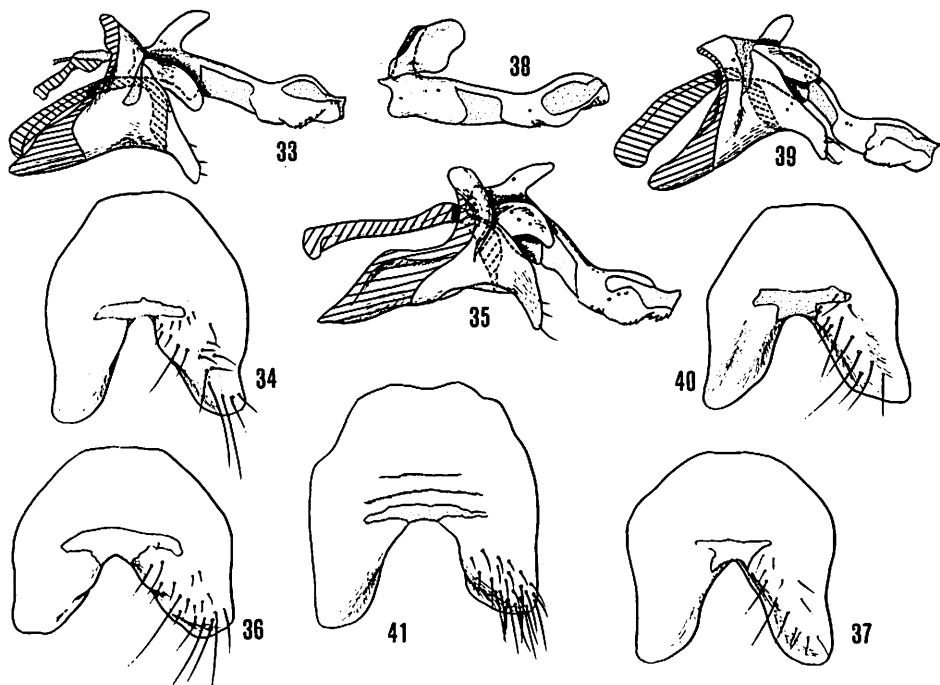
*Isosturmia chatterjeeana*: CROSSKEY, 1976: 237.

*Isosturmia picta*: CROSSKEY, 1976: 238.

*Isosturmia picta*: SCHAEFER & SHIMA, 1981: 382.

*Isosturmia picta*: HERTING, 1984: 54.

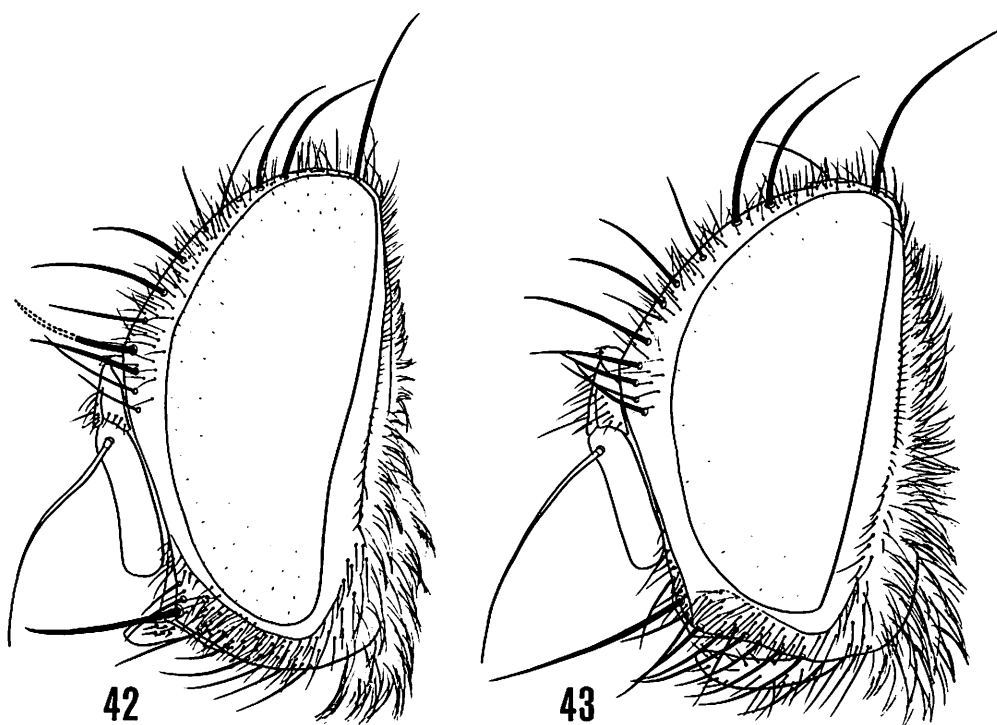
♂. Head silvery grayish white pollinose, upper portion of parafrontal more grayish, occiput whitish pollinose; 1st, 2nd and base 3rd antennal segments reddish yellow, middle portion of 2nd segment sometimes dark brown; arista pale brown; palpus yellow. Vertex 0.18-0.22 of head width; interfrontal area widened anteriorly, slightly wider than parafrontal at middle; face about 3/5 as long as high between vibrissae; parafrontal about 1.2× as long as parafacial in profile; parafacial subequal to width of 3rd antennal segment



Figs. 33–41. Male genitalia (33, 35, 38, 39) and 5th abdominal sternum (34, 36–37, 40–41) of *Isosturmia* spp.; hypandrium, pre- and postgonites and aedeagus in lateral view (33, 35, 39) and postgonite and aedeagus in lateral view (38). 33–34. *inversa* (holotype); 35–36 *japonica*; 37. *pilosa* sp. n.; 38. *intermedia* (holotype); 39–40. *intermedia* (Formosa); 41. *picta* (India).

at middle height; gena 0.15–0.18 of eye height; head about  $\frac{3}{5}$  as long as high in profile. Parafrontal with dense and fine hairs, several of which sometimes descend below lowest frontal seta; inner vertical setae parallel to each other, about  $\frac{1}{2}$  of eye height; outer vertical seta indistinct; 2, sometimes 3, reclinate orbital setae, anterior seta subequal in length to posterior seta and about  $\frac{2}{3}$  as long as inner vertical seta; ocellar seta very fine, hair-like; 8–13 frontal setae, lowest seta nearly level with base of arista; gena with dense and rather fine hairs which are slightly stronger than hairs on parafrontal. Antenna falling short of lower margin of face by about  $\frac{4}{5}$  length of 2nd segment; 3rd segment 2.4–2.8 $\times$  as long as 2nd, about 3 $\times$  as long as wide. Arista about 2 $\times$  as long as 3rd antennal segment, thickened on basal  $\frac{1}{4}$ . Palpus clavate, subequal in length to 3rd antennal segment, with dense hairs. Eye almost bare or sparsely short-haired.

Thorax black, apex of scutellum usually narrowly yellowish; dorsum densely whitish, somewhat bluish gray, pollinose, 4 narrow black longitudinal vittae distinct in posterior view, lateral portion between inner and outer vittae appearing brownish black in some lights; mid-dorsal longitudinal portion of scutellum appearing brownish black in posterior



Figs. 42-43. Male head of *Isosturmia* spp. in profile. 42. *intermedia* (holotype); 43. *picta* (India).

view; pleura thinly grayish white pollinose. Hairs fine and dense; *prst ia* rarely fine; usually 2+2 *stpl* setae; propleural seta rather long; subapical scutellar seta about 1.5× as long as scutellum and slightly longer than basal seta; distance between bases of 2 subapical scutellar setae about 4/5 that between basal and subapical setae of same side.

Wing hyaline, weakly tinged with brown on anterior portion. Second costal sector 1/2-3/5 as long as 3rd and subequal to 4th; vein  $M_1$  from discal crossvein to its bend 3/4-3/5 as long as that from bend to apex, and about 1.5× as long as distance between bend and wing margin; discal crossvein weakly sinuate, about 2× as long as last section of vein  $M_3$ .

Legs black. Hind tibia with a closely set row of *ad* setae, with a submedian strong seta among them.

Abdomen black, side of 3rd tergum and anterolateral portion of 4th narrowly reddish; dorsum densely grayish white pollinose, with brownish reflection on posterior narrow portion of each tergum and on mid-dorsal longitudinal portion; venter of 3rd to 5th terga except on hair-fascicle on 4th thinly whitish pollinose. Hairs dense fine and rather long, strong and sparse on 5th tergum; 2nd tergum sometimes without median marginal seta, at most with 2 fine setae; 3rd tergum usually with 2 median marginal setae which are 1/2-

3/4 as long as 4th tergum; venter of 4th tergum with oblique long circular hair-fascicle which is as long as 4th tergum; 5th tergum strongly tapering to apex. Genitalia: Cerci in dorsal view gradually narrowed apically, narrowly separated from each other on apical 1/5, in lateral view broad, apex weakly hooked ventrally; surstylus weakly constricted near middle, with sparse fine hairs; pregonite long and narrow; epiphallus long; distiphallus rather narrow.

♀. Differing from ♂ as follows: Vertex 0.21–0.25 of head width; interfrontal area about 5/7 of parafrenal at middle; face about 3/5 as wide as long between vibrissae; all setae on head stronger; outer vertical seta about 1/2 as long as inner one; 2 subequally long proclinate orbital setae, slightly longer than reclinate seta; anterior reclinate orbital seta inserted near middle between 2 proclinate orbital setae; 5–7 frontal setae; gena with sparser hairs; antenna falling short of lower margin of face by about 5/8 length of 2nd segment, 3rd segment about 3× as long as 2nd; palpus slightly shorter than 3rd antennal segment, with sparser hairs; fore tarsus with flattened and dilated 2nd to 5th tarsomeres, 5th tarsomere shorter than 4th; claws and pulvilli short; hind tibia with a row of *ad* setae sparser than in ♂; abdominal hairs sparser and more recumbent than in ♂; 4th abdominal tergum without hair-fascicle; 2nd tergum with 2 rather fine median marginal setae; 3rd tergum with 2–4 median marginal setae which are 1/2–1× as long as 4th abdominal tergum; 5th tergum conical, strongly narrowed posteriorly. Genitalia: Elongate; 6th tergum narrowly and longitudinally divided into 2 hemitergites; 6th sternum longer than 5th sternum; intersegmental membrane between 6th and 7th segments slightly shorter than 6th tergum; 7th tergum rather broadly divided into 2 hemitergites, subequal in length to 6th tergum; 7th sternum nearly straight, evenly tapering posteriorly.

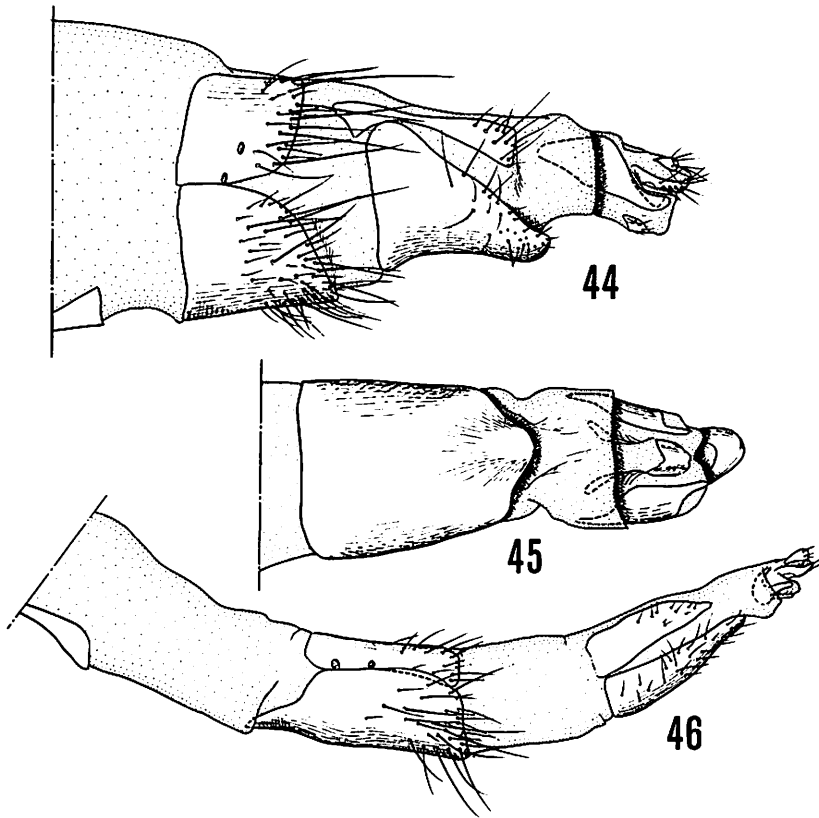
Body length, 6.1–9.9 mm; wing length, 5.1–7.8 mm.

*Hosts*: LEPIDOPTERA, Lymantriidae: *Euproctis bipunctapex* (HAMPSON) (BARANOV, 1934); *E. plana* (WALKER) (CROSSKEY, 1976); *E. flava* (BREMER), *E. pseudoconspersa* STRAND (KOIZUMI, 1964; SHAEFER & SHIMA, 1981).

*Distribution*: Sri Lanka (after CROSSKEY, 1976), India (Utter Pradesh), Nepal, Japan (Honshu, Kyushu, Tsushima), China (Hupei, Fukien, Kwangtung), Formosa, Thailand, Malaysia (Malaya, Sabah, Sarawak), Indonesia (Java), Philippines (Luzon, Mindanao).

*Type material examined*: Lectotype ♂ of *Sturmia picta*, FORMOSA, Kankau, Koshun, 7. viii. 1912, H. SAUTER (IPS); 5 ♂♂ paralectotypes of *S. picta*, same data as lectotype (4 ♂♂ in IPS; 1 ♂ in USDA), 5 ♂♂ 1 ♀, same data as lectotype, except dates iv (1 ♂), v (1 ♂), vi (2 ♂♂), viii. 1912 (1 ♂ 1 ♀) (5 ♂♂ in IPS, 1 ♀ in USDA); holotype ♂ of *Sturmia chatterjeeana*, INDIA, Dehra Dun, U. P., 17. iv. 1934, parasitic on *Euproctis bipunctapex*, S. N. CHATTERJEE (BMNH).

*Other specimens examined*: INDIA: *Utter Pradesh*—3 ♂♂ 3 ♀♀, same data as holotype of *S. chatterjeeana*, except dates 18. iv (2 ♂♂), 20. iv (3 ♀♀), 23. iv. 1939 (1 ♂) (BMNH). NEPAL: *Taplejung District*—1 ♂, between Sangu and Tamrang, Shrubs by path, c. 5,800', 6. xi. 1961, R. L. COE (BMNH). JAPAN: *Honshu*—2 ♀♀, Tokyo, 26–27. x. 1956, S. TAKANO (CNC, EIHU); 1 ♂, Konan, Saitama, 8. vii. 1973, K. HARA; 1 ♂, Otaki,



Figs. 44–46. Female genitalia of *Isosturmia* spp. in lateral view (44, 46) and in ventral view (45). 44–45. *japonica*; 46. *picta* (Japan).

Saitama, 30. vii. 1973, K. HARA; 1 ♀, Tsurugi, Ishikawa, 15. vi. 1984 ex *Euproctis flava* larva, I. TOGASHI (all in BLKU); 1 ♀, Sekigahara, Gifu, 23. vi. 1977 ex *Euproctis pseudoconspersa*, P. W. SCHAEFER (USNM): Kyushu—1 ♂5 ♀♀, Meboro, Mt. Ariake, Tsushima, 15–18. vii. 1968, S. MIYAMOTO & A. NAKANISHI; 1 ♀, Tsushima, 30. vii. 1965, Y. IKEZAKI; 3 ♂♂, Kamisaka-toge, Tsushima, 17. viii. 1982, H. SHIMA; 1 ♂2 ♀♀, Ikenoue, Yamatocho, Saga, 7. vii. 1971 ex *Euproctis pseudoconspersa*, H. MAEBARA; 2 ♂♂, same data as preceding, except dates 10. v.; 1 ♂, Momiki, Gokanoshō, Kumamoto, 19. vii. 1966, R. OISHI; 1 ♀, Mt. Eboshi, Kagoshima, 17. v. 1964, A. TANAKA; 1 ♀, Mt. Takakuma, Kagoshima, 15. viii. 1967, K. KANMIYA; 1 ♂, Makurazaki, Kagoshima, 12. vi. 1966, K. KANMIYA (BLKU, KMNH IR100, 243–244). CHINA: Hupe—1 ♂, Hangchow, 4. vi. 1924, J. F. ILLINGSWORTH (BPBM): Fukien—1 ♀, Bohea Hills, ChungAn 12. ix. 1939, T. C. MA; 13 ♂♂9 ♀♀, same data as preceding, except dates 1. x (1 ♀), 19. x (5 ♂♂ 3 ♀♀), 31. x (4 ♂♂1 ♀), 10. xi. 1939 (4 ♂♂4 ♀♀) (all in BPBM). FORMOSA: 1 ♂, Chihpen, 10. vi. 1972, R. KANO; 1 ♀, Puli, Nantou Hsien, 17. vi. 1970, H. KURAHASHI (all

in BLKU). THAILAND: 1 ♀, Mao Hongson, Chiang Mai, 4. viii. 1978, H. SUZUKI; 2 ♂♂, Sai Yok, Kanchana Buri, 27–29. xii. 1975, W. TUMRASVIN (all in BLKU). MALAYSIA: *Malaya*– 1 ♂, 30 ml N Tapah, 300–600 m, 28. x. 1975, H. SHIMA (BLKU); 1 ♂, Perak, Jor. Camp, 2,000 ft, 25. viii. 1922, E. SHIMOND (BMNH): *Sabah*– 1 ♀, Kiam Base, N of Kinabalu, 4. ii. 1959, T. C. MAA (BPBM); *Sarawak*– 1 ♀, Pangkalap Tobang, 300–450 m, Ban Dist., 5–8. ix. 1958 (BPBM). INDONESIA: *Java*– 1 ♀, Puncak, 1,300 m, 14–15. xi. 1973, H. KURAHASHI; 1 ♂, Mt. Tjemere, 400–1,400 m, Cirebon, 19–25. xi. 1973, H. SHIMA (all in BLKU). PHILIPPINES: *Luzon*– 1 ♀, Baguio, 1,500 m, 20. vi. 1949, C. R. BALTAZAR (BPBM); 1 ♂, Mt. Trail, 6,000 ft, 25. vi. 1957, G. B. VIADO (UPLB): *Mindanao*– 2 ♂♂ 1 ♀, Agko, 1,350–1,700 m, Mt. Apo, 1–2. viii. 1978, A. NAKANISHI & O. YATA (BLKU).

*Remarks.* Although *I. picta* and *chatterjeeana* have been treated as different species, I consider that they are conspecific. The holotype and other specimens used in the original description of *I. picta* are rather teneral and look more whitish than normal specimens. This species is peculiar among the species of this genus in having parallel inner vertical setae, dilated female fore tarsus and elongate female postabdomen.

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