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The Tribe Luciliini from Australian and Oriental Regions

I. Genus *Hypopygiopsis* TOWNSEND (Diptera, Calliphoridae)*

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Synopsis This revision deals with five species of *Hypopygiopsis* which are endemic to the Oriental Region. A new species, *H. tumrasvini* sp. nov., is described from Indochina. *Somomyia infumata* BIGOT from Burma is newly combined with this genus and redescribed based upon specimens (♂ & ♀) recently collected in Thailand.

This is the first part in a series of the studies on Australian and Oriental Luciliini of the family Calliphoridae, which concerns a revision of the genus *Hypopygiopsis* TOWNSEND. The tribe Luciliini is composed of closely allied species of similar appearance, which are commonly called the green bottle flies. They are usually separated into five genera: *Hypopygiopsis*, *Hemipyrellia*, *Dyscritomyia*, *Prostheochaeta*, *Francilia* and *Lucilia*. Their common property is as follows: the development of posterior parasquamal tuft on suprasquamal ridge; lower squama bare; propleura and prosternum hairy; and stem vein bare. The species of this tribe are generally medium-sized, metallic green or blue flies, but those of *Hypopygiopsis* are very large in size, and then some regional species of *Lucilia* show metallic black, purple, or cupreous in body colouration. Adult females are oviparous or larviparous. Their larval habits vary from being parasitic on living animal tissues to feeding on dung and decaying animal matter.

The research was mainly carried out using the specimens which were collected by Tokyo Medical and Dental University Overseas Scientific Research Project 1973 & 1975. Additional collections including types were studied through the kind arrangement by the authorities of museums and institutes. The names of institutions to which the specimens belong are cited in the list of materials examined. The area under the present study covers the Oriental and Australian Regions, which are generally accepted, and includes Hawaii as well as other islands of Polynesia.

The present paper deals with the descriptions of new species, *H. tumrasvini* sp. nov. and a little known species, *H. infumata* (BIGOT), from Indochina. The former is closely related to *H. fumipennis* (WALKER), and the latter to *H. violacea* (MACQUART). These have been known from Malay Peninsula, Sumatra, Java and Borneo. Male genitalia are illustrated in each species except *H. robusta* MALLOCH.

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Genus *Hypopygiopsis* TOWNSEND

Hypopygiopsis TOWNSEND, 1916. Proc. U. S. Nat. Mus. **51**, no. 2152: 300 (Type-species: *Hypopygiopsis splendens* TOWNSEND=*H. fumipennis* (WALKER)).

Distinguished from the other Oriental and Australian genera of Luciliini by the following characteristics:

Diagnosis. Thoracic squama bare; subcostal sclerite covered with black setulae; eyes subholoptic in ♂, dichoptic in ♀; convexity above posterior thoracic spiracle covered with long upstanding hairs. Legs in ♂ with, in ♀ without long fringes of soft hairs, but small weak males sometimes having fringes less developed; femora more or less swollen in ♂, normal in ♀. Abdomen without strong discal and marginal bristles on 2nd and 3rd tergites; second genital segment or epandrium in ♂ with a small lobe of lateral projection on anterior corner; fifth tergite in ♀♀ of *H. violacea* and *H. infumata* having a characteristic posterior margin (Fig. 4d). Hypopygium prominent; aedeagus and parameres characteristic, quite different from those of related genera. Ovipositor rather elongate; spermatheca elongate.

Bionomics. Oviparous and viviparous. Larva breeds in decaying animal matter.

Distribution. Oriental Region.

Key to Species of *Hypopygiopsis*

1. Antennae yellowish orange; facial tomentum golden yellow; tarsi in ♂ without fringe.....(2)
- Antennae dark reddish brown; facial tomentum silver white; tarsi in ♂ with long fringes.....(3)
2. Body metallic violet-blue; tergite 1+2 blue, not black; venter and its hairs not so conspicuously yellow; legs and abdomen robust and stout; only one pair of postsutural *ac**robusta* MALLOCH
- Body metallic bluish green; tergite 1+2 blackish, slightly with dark blue or purple tinge, reddish in ♀; venter and its hairs conspicuously yellow; two pairs of postsutural *ac*(4)
3. Squamae fuscous brown; hind tibia with two long and fine apical *d* and *ad* which are curled apically in ♂*violacea* (MACQUART)
- Squamae whitish, with pale brown tinge; hind tibia with stout strong apical *d* and *ad* in ♂*infumata* (BIGOT)
4. ♂: Mid and hind femora remarkably stout, hind one curved and heavily fringed; mid and hind tibiae with strongly developed fringe; mid tibia with characteristic apical projection. ♀: Posterior margin of tergite 5 subequal to the length of lateral margin of the same tergite*fumipennis* (WALKER)
- ♂: Mid and hind femora normal, hind one slightly curved; mid and hind tibia short and rather sparsely fringed, mid one without chitinous projection. ♀: Posterior margin of tergite 5 about half the length of lateral margin of the tergite*tumrasvini* sp. nov.

Hypopygiopsis robusta MALLOCH*Hypopygiopsis robusta* MALLOCH, 1926. Ann. Mag. nat. Hist. (9) 17: 502.

Type-locality: Sibolangit, Dutch East Indies. Type?

I have never seen specimen of this species before.

Length: 18.0 mm.

Bionomics. Nothing is known.

Distribution. Indonesia.

Hypopygiopsis fumipennis (WALKER) (Fig. 1)*Musca fumipennis* WALKER, 1857. Journ. Proc. Linn. Soc. Lond. 1: 25.*Cynomyia fortis* WALKER, 1857. Journ. Proc. Linn. Soc. Lond. 1: 127.*Hypopygiopsis fortis*: FAN, 1965. Key Common Synanthr. Flies China: 187.*Cynomyia fulviventrif* RONDANI, 1875. Ann. Mus. Civ. Hist. Nat. Genova 7: 425.*Hypopygiopsis splendens* TOWNSEND, 1916. Proc. U. S. Nat. Mus. 51, no. 2152: 300.*Hypopygiopsis splendens*: MALLOCH, 1926. Ann. Mag. nat. Hist. (9) 17: 502.

Type-locality: Singapore. Type in the British Museum (Nat. Hist.), London.

Length: 12.0–20.0 mm.

Specimens examined. MALAYA: 2 ♂♂, 1 ♀, 16 mi. NE. Kuala Lumpur, 1000 f, 8. VI. 1962, E. S. ROSS & D. Q. CAVAGNARO (CAS); 1 ♂ 1 ♀, Kuala Trengganu, 220 m, Pahang, 17. XII. 1958, J. L. GRESSITT (Bishop); 1 ♂, Kuala Tahan, 12–14. XII. 1958, T. C. MAA (Bishop); 1 ♀, King Geo. V Nat'l Park, Gua Che Yatim, 16. XII. 1958, GRESSITT (Bishop). BORNEO: 1 ♀, Liawan, N. Borneo, 14–17. I. 1959, MAA (Bishop); 1 ♂, Forest Camp, 19 km N. of Kalabakan, 21. X.

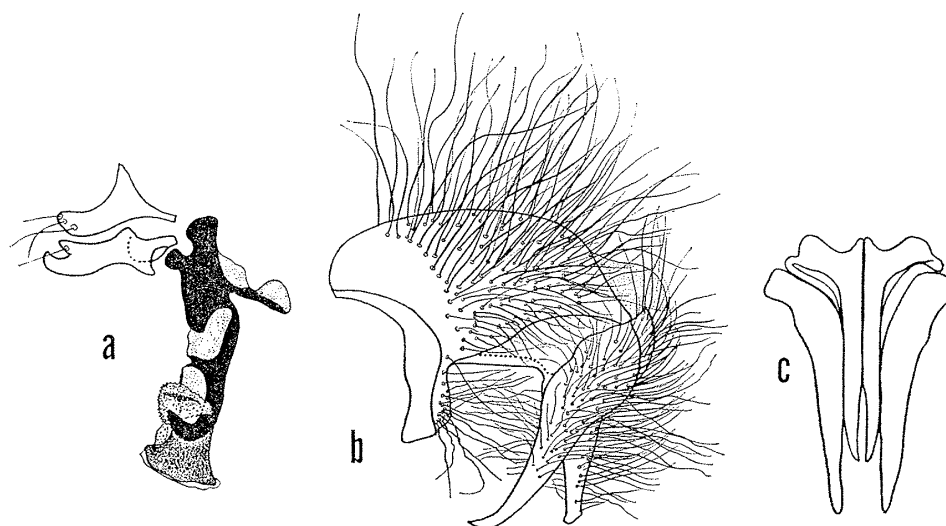


Fig. 1. *Hypopygiopsis fumipennis* (WALKER), male hypopygium. a: Aedeagus, anterior and posterior parameres, lateral view, b: Epandrium, cercus and parolobus, lateral view, c: Cerci and parolobi, caudal view.

1962, K. J. KUNCHERIA (Bishop); 3 ♂♂ 2 ♀♀, Ranau, 500–1100 m, Sabah, 9–10. XI. 1975, S. SHINONAGA; 2 ♂♂ 10 ♀♀, Muara Mongkos, 120 km NE. of Kuching, 25–27. XI. 1975, SHINONAGA; 8 ♂♂ 15 ♀♀, Papar, 50 km. SW. of Kota Kinabalu, Sabah, 13–15. XI. 1975, SHINONAGA & SHIMA; 5 ♂♂ 42 ♀♀, Semongok, 20 km S. of Kuching, 18–21. XI. 1975, SHINONAGA. SUMATRA: 1 ♂, Kabandjahe, 1000 m, Indonesia, 23. XI. 1973, H. KURAHASHI.

Bionomics. Adults are attracted to decaying animal matter in tropical rain forests.

Distribution. Southern Thailand (Trang: TOWNSEND, 1916), Malaya, Singapore, Borneo and Sumatra.

Hypopygiopsis tumrasvini KURAHASHI, new species (Fig. 2)

Male. Head: Eyes bare, separated at narrowest point of frons by a distance equal to 0.09–0.10 of head width; frontal stripe reddish brown, darkened posteriorly, not obliterated; parafrontalia and parafacialia yellow, golden-dusted, the former darkened towards vertex, with sparse hairs which are yellow anteriorly and brownish posteriorly; parafrontalia with ca. 10 pairs of *ori* and several fine interstitial bristles; one prevertical bristale developed; face and facialia yellow, densely golden-dusted; facial carina absent; epistome yellow, golden-dusted, not prominent; facialia with black setulose hairs on lower quarter, the hairs on upper part sometimes brownish; peristomal bristles strong, black; medianae and vibrissaria yellow, densely golden-dusted; jowls and post-jowls yellow, golden-dusted, clothed with yellowish orange hairs; occiput black, silver-grey dusted, blackish haired except for yellow hairs on large portion of central part; antennae entirely yellowish orange, the 2nd segment blackish setulose, with one long bristle, the 3rd segment more than 4× as long as 2nd; arista light brown, long-plumose; palpi yellow entirely.

Thorax: Shining, blue, silver-dusted on anterior parts of dorsum and pleura,

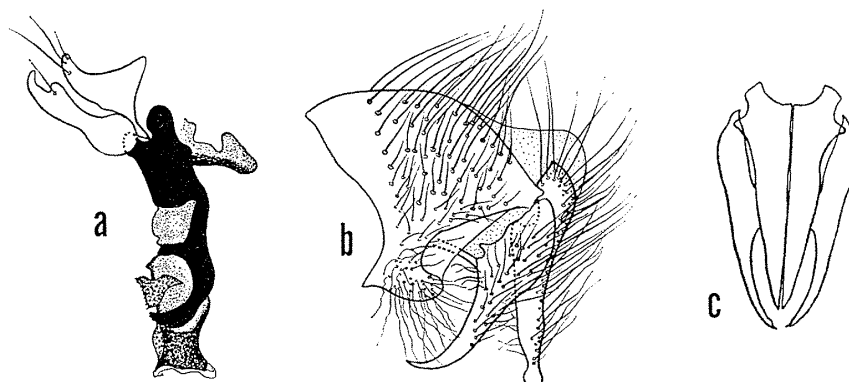


Fig. 2. *Hypopygiopsis tumrasvini* KURAHASHI, sp. nov., male hypopygium. a: Aedeagus, anterior and posterior parameres, lateral view, b: Epandrium, cercus and paralobus, lateral view, c: Cerci and paralobi, caudal view.

longitudinal stripes indistinct; humeri and scutellum concolorous with dorsum, humeri with both yellow and black hairs; posterior calli also concolorous with dorsum, but reddish laterally; propleura and hypopleura yellowish hairy, other pleura blackish hairy, but more or less yellowish hairy in part; prosternum yellow, with yellow hairs; supraspiracular convexity clothed with long, upstanding, fine hairs; pleurotergite with several fine black hairs; post-alar declivity reddish black, with brown hairs; tympanic and posterior parasquamal tufts developed, anterior parasquamal tuft absent; thoracic spiracles blackish brown. Chaetotaxy; *ac* 2+2, *dc* 3+3, *ia* 1+2, *h* 4, *ph* 3, *prs* 1, *sa* 3-4, *pa* 2-3, usually 2 strong *pa*, *n* 2, *sc* 4+1, propleural and prostigmatal bristles well developed.

Wings: Greyish hyaline, slightly infuscated, brown colour being most intense above *r-m* and in distal part of *R*₁; veins dark brown; epaulet and basicosta black; stem-vein bare; subcostal sclerite brown, with black setulae; 3rd longitudinal vein blackish setulose above and below reaching half way to *r-m*; bent of 4th vein forming a right angle; *R*_s open; squama parchment-coloured, thoracic one bare on upper surface. Halteres brown.

Legs: Coxae and trochanters orange; femora, tibiae and tarsi usually shining black; front and mid femora stout, hind femur curved; front and hind femora with soft long hairs ventrally; tibiae almost straight, front tibia with long fringes of soft dark hairs on antero-ventral and postero-ventral surface, with 2-4 *ad*; mid tibia without chitinous projection, with 1 *ad* and 4-5 *pd*; hind tibia with 2 *ad* and 2 *pd*; mid and hind tibiae with short fringes; tarsi without any fringes of hairs; pulvilli orange.

Abdomen: Bluish-green shining, slightly silver grey tomentum; tergite 1+2 bluish black; tergite 1+2 and 3 with decumbent lateral marginal bristles; 4th and 5th tergites with row of strong erect marginal bristles; hairs on tergites blackish; sternites mainly orange, covered with long soft orange pubescence; hypopygium as shown in Fig. 2.

Female. Head: Eyes separated at narrowest point of frons by a distance equal to 0.24-0.27 of head width; frontal stripe about 2× one of parafrontalia just in front of anterior ocellus, narrowed toward antennae, the ratio of the width of the anterior and posterior parts 1: 1.8; parafrontalia provided with ca. 9 pairs of *ori*; *ors* 2+1; *oc* strongly developed; accessory ocellar bristle weakly developed; *ov* and *iv* well developed; *poc* divergent; 1 occipital hair present. Legs: Coxae, trochanters and femora orange, the last not swollen nor curved nor with fringes of hairs; tibiae and tarsi dark brown, without fringes; apices of mid and hind femora also darkened; front tibia with 1 strong *pv*; mid tibia with 1 *ad*, 1 *pd*, 2 *p* and 1 *v*; hind tibia with 2 *ad*, 2 *pd* and 1-2 *av*. Abdomen: With orange reflections on venter; tergite 1+2 also reddish; marginal bristles decumbent; no distinct discal bristles present on 5th tergite; 2nd sternite with rather long orange pubescence; black marginal bristles developed on 2nd to 5th sternites. Otherwise as described for male.

Length: 11.0-14.0 mm.

Holotype (♂), nr. Sai Yok, 500 m, Kanchana Buri, Thailand, 11. IX. 1975, W. TUMRASVIN. Paratypes: 6 ♂♂ 1 ♀, same locality as holotype, 6–11. IX. 1975, R. KANO & H. KURAHASHI; 2 ♂♂, Bang Khen, 1. VI. 1967, 17. IX. 1972, SOMSRI (Kasetsart); 1 ♂ 2 ♀♀, Erawan Water Fall, 500 m, Kanchana Buri, Thailand, 7–10. IX. 1975, KANO; 1 ♂ 2 ♀♀, Khao Yai, 800 m, 60 km S. Pak Chong, 3. X. 1975, KURAHASHI; 1 ♀, Doi Huai Hwer, 1231 m, Fang, 27. IX. 1975, KURAHASHI. Other specimens examined. INDIA: 3 ♂♂ 2 ♀♀, Kanny-Koory, Silchar, Cachar, 22. VI. 1911, 23. VI. 1911, 27. VI. 1911, 7. VII. 1911, C. B. ANTRAM, C. J. WAINWRIGHT collection (B. M. 1948–488). Holotype and several paratypes are preserved in the National Science Museum, Tokyo. Male and female pair of paratypes are also deposited in the Department of Medical Entomology, Faculty of Tropical Medicine, Mahidol University, Bangkok; B. P. Bishop Museum, Honolulu; and British Museum (Nat. Hist.), London.

The specific name of the present species is dedicated to Mr. Watanasak TUMRASVIN, Department of Medical Entomology, Faculty of Tropical Medicine, Mahidol University, for the first discovery of the present species from Thailand.

Bionomics. Adults are found in dense tropical forests. Oviparous.

Distribution. India, Thailand, Cambodia, and S. China (Yunnan & Hainan Isl.: FAN, 1965).

Hypopygiopsis violacea (MACQUART) (Fig. 3)

Cynomyia violacea MACQUART, 1835. Suites a Buff. 2: 233.

Musca infixa WALKER, 1857. Journ. Proc. Linn. Soc. Lond. 1: 25.

Phrissopoda metallica van der WULP, 1892. Midden-Sumatra, 4. N. H. Fauna, pt. 2: 43.

Hypopygiopsis metallica: MALLOCH, 1926. Ann. Mag. nat. Hist. (9) 17: 503.

Type-locality: Java. Type in the Paris Museum.

Length: 9.0–16.0 mm.

Specimens examined. MALAYA: 1 ♂, Kuala Woh, Perak, 15. III. 1940, ex.

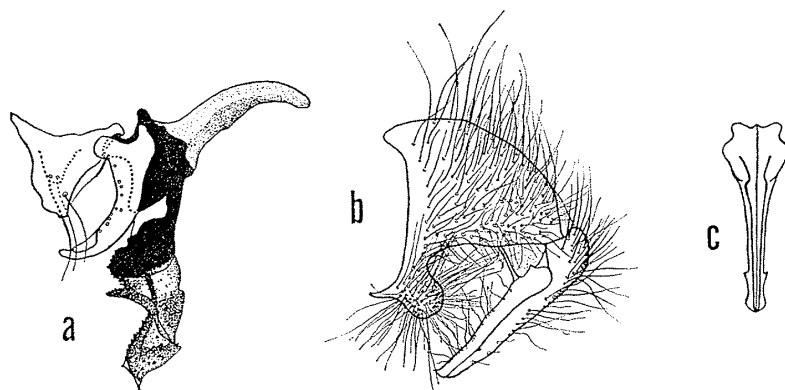


Fig. 3. *Hypopygiopsis violacea* (MACQUART), male hypopygium. a: Aedeagus, anterior and posterior parameres, lateral view, b: Epandrium, cercus and parolobus, lateral view, c: Cerci and parolobi, caudal view.

F. M. S. Museum (B. M. 1955-354); 1 ♂, 16 mi NE. K. Lumpur, 1000 ft, 8. VI. 1962, E. S. ROSS & D. Q. CAVAGNARO (CAS); 1 ♂ 1 ♀, Taman, 5-20 m, Rompin R., SE Pahang, 19. IX. 1960, GRESSITT (Bishop); 6 ♂♂ 9 ♀♀, Bukit Mandul, 20 km W. of K. Lumpur, 1. XI. 1975, H. SHIMA & S. SHINONAGA. SINGAPORE: 1 ♀, Botanic Garden, 50 ft, 20. VIII. 1962, ROSS & CAVAGNARO (CAS); 24 ♂♂ 24 ♀♀, Bukit Timah, 177 m, Bukit Panjan, 16. X. 1975, 3-4. XII. 1975, SHINONAGA & KURAHASHI. BORNEO: 1 ♂, Nanga Pelagus, nr. Kapit, 180-585 m, Sarawak, 7-14. VIII. 1958, T. C. MAA (Bishop); 1 ♀, Rejang Delta, Sarikei Dist., Sarawak, Malaysia, 15-26. VII. 1958, MAA (Bishop); 1 ♀, Ranau, 500 m, W. Coast Residency, British N. Borneo, 22-25. I. 1959, ex. fresh human excrement (Bishop); 3 ♂♂ 19 ♀♀, Semongok, 20 km S. of Kuching, Sarawak, 18. XI. 1975, 21. XI. 1975, SHINONAGA; 32 ♂♂ 89 ♀♀, Papar, 5 km SW. of Kota Kinabalu, Sabah, 13-15. XI. 1975, SHINONAGA & SHIMA; 4 ♂♂ 5 ♀♀, Santubong, 30 km N. of Kuching, 19-20. XI. 1975, SHINONAGA & SHIMA; 15 ♂♂ 26 ♀♀, Balai Ringgin, 100 km N. of Kuching, Sarawak, 22 & 24. XI. 1975, SHINONAGA; 8 ♂♂ 24 ♀♀, Muara Mongkos, 12 km NE. of Kuching, Sarawak, 25-27. XI. 1975, SHINONAGA & SHIMA; 1 ♀, Ranau, 500-1100 m, Sabah, 9-10. XI. 1975, SHINONAGA. SUMATRA: 1 ♀, Kabanjahe, 1000 m, Indonesia, 23. XI. 1973, KURAHASHI. JAVA: 2 ♂♂ 6 ♀♀, Pelabuhantatu, Indonesia, 17. XI. 1973, KURAHASHI; 1 ♂ 1 ♀, Noesa, Kambangan, 8. XII. ?, TERRY collection (Bishop).

Bionomics. Adults are found in tropical rain forests. Larviparous.

Distribution. Malaya, Sembilan Is., Anamba Is. (Sen.-WHITE et al., 1940), Sumatra, Singapore, Borneo and Java.

Hypopygiopsis infumata (BIGOT) (Fig. 4)

Somomyia infumata BIGOT, 1877. Ann. Soc. Ent. Fr. (5) 7: 41.

Thelychaeta infumata: PERIS, 1952. An. Estac. Exp. Aula Dei 3: 185.

Hypopygiopsis violacea: FAN, 1965. Key Common Synanthr. Flies China: 188 (misid.).

Type-locality: Burma. Type in the British Museum (Nat. Hist.), London.

This species was originally described by BIGOT (1877) using a single female from Burma and the locality from where the specimen was caught was not given in the description. I had the privileges to examine the type through the courtesy of Mr. A. C. PONT and Mr. J. P. DEAR, British Museum (Nat. Hist.). Head and tibiae are missing in the type specimen, but stem-vein, posterior margin of 5th tergite and squamal colouration show characteristics of *Hypopygiopsis*. The Thailand forms collected in Kanchana Buri are considered to be conspecific with BIGOT's species. I intend to carefully redescribe the species on the bases of recent materials collected by my field survey. FAN (1965) contributed to the first illustrated hypopygium of the present fly under the name of *H. violacea* (MACQUART).

Male. Head: Eyes bare, separated at narrowest point of frons by a distance equal to 0.10-0.13 of head width; frontal stripe reddish black, not obliterated; parafrontalia and parafacialia fuscous, densely silver-dusted, the former with

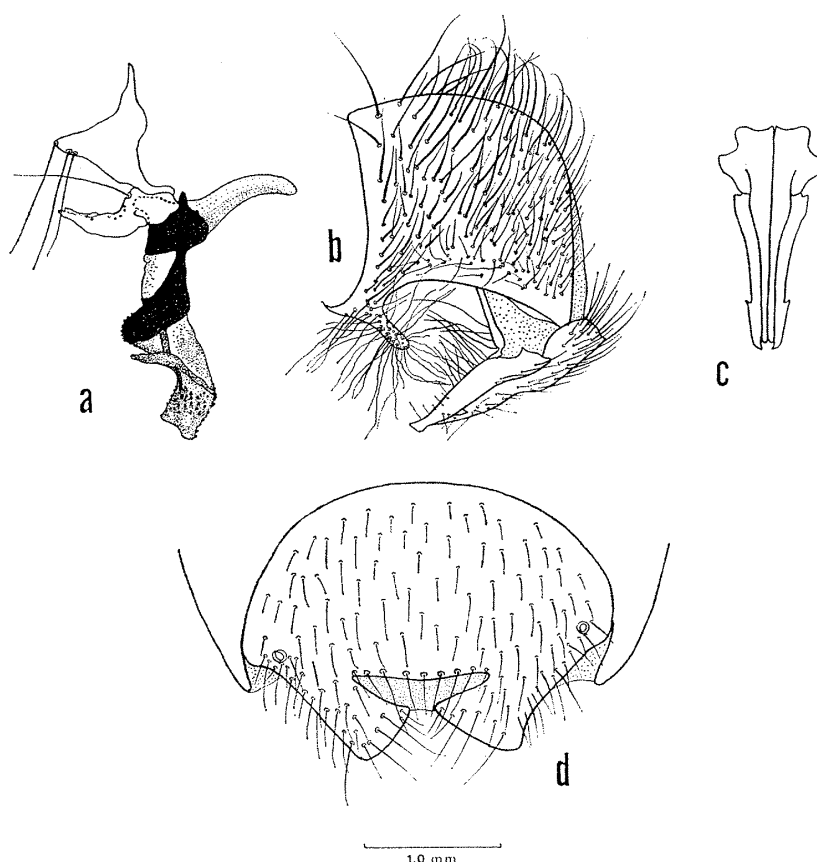


Fig. 4. *Hypopygiopsis infumata* (BIGOT), male hypopygium and female fifth tergite. a: Aedeagus, anterior and posterior parameres, lateral view, b: Epandrium, cercus and parolobus, lateral view, c: Cerci and parolobi, caudal view, d: Female 5th tergite, viewed from posterior end.

sparse hairs which are whitish anteriorly and brownish posteriorly; parafrontalia with ca. 13 pairs of *ori*, upper 5 pairs rather fine; one prevertical bristle developed, several fine setulae present around preverticals; face and facialia light brown, densely silver-dusted; facial carina absent; epistome whitish, not prominent; facialia with black setulae on lower half; peristomal bristles strong, black; medianae reddish brown; vibrissaria yellowish, densely silver-dusted; jowls and post-jowls reddish, silver-dusted, the former clothed with black hairs, the latter with yellow hairs; occiput black, silver-dusted, almost entirely clothed with yellow hairs except for several hairs along lower postorbital bristles; antennae reddish brown, fuscous in part, the 2nd segment blackish setulose, with one long bristle, the 3rd segment more than 4× as long as 2nd; arista light brown on basal half, long plumose; palpi entirely orange.

Thorax: Shining green, sometimes with blue tinge, silver-dusted on anterior part of dorsum and pleura, longitudinal stripes indistinct; humeri and scutellum concolorous with dorsum, humeri with both yellow and black hairs; posterior calli

also concolorous with dorsum, but reddish laterally; propleura with yellow hairs, other pleura blackish hairy; prosternum brown, with fuscous brown hairs; supra-spiracular convexity clothed with long, upstanding, fine hairs; pleurotergite with a patch of black hairs; post-alar declivity reddish black, with fuscous brown hairs; tympanic and posterior parasquamal tufts well developed, anterior parasquamal tuft absent; thoracic spiracles black. Chaetotaxy; *ac* 2+2, *dc* 3+3, *ia* 1+2, *h* 4, *ph* 3, *prs* 1, *sa* 3-4, *pa* 2-3, usually 2 strong *pa*, *n* 2, *sc* 4+1, propleural and prostigmatal bristles well developed.

Wings: Hyaline, slightly infuscated; veins dark brown; epaulet and basicosta black; stem-vein bare; subcostal sclerite brown, with black setulae; 3rd longitudinal vein blackish setulose above and below reaching half way to *r-m*; bent of 4th longitudinal vein forming an obtuse angle; *R*_s open; squama parchment-coloured, thoracic one bare on upper surface. Halteres brown.

Legs: Coxae and trochanters, especially fore ones brownish femora shining black with soft hairs ventrally; tibiae blackish sometimes reddish, with long fringes of soft black hairs on antero-ventral and postero-ventral surfaces; hind tibia curved; front tibia with 4 *ad*; mid tibia without chitinous projection, with 1 *ad*, 1 *pd* and 2 *p*; hind tibia with 3 *ad* and 2 *pd*, apical *d* strong, not fine; tarsi blackish, with long fringes of soft black hairs; pulvilli yellow, brown at base.

Abdomen: Green shining, sometimes with blue tinges, very slightly covered with silver tomentum; tergite 1+2 blackish with dark bluish tinge; tergite 1+2 and 3 with decumbent lateral marginal bristles; 4th and 5th tergite with row of strong marginal bristles; hairs on tergites blackish; sternites and edges of tergites with bunches of fuscous brown and basally black, long, soft hairs; hypopygium as shown in Fig. 4.

Female. Head: Eyes separated at narrowest point of frons by a distance equal to 0.25-0.27 of head width; frontal stripe about 2× one of parafrontalia just in front of anterior ocellus, narrowed toward antennae, the ratio of the width anterior and posterior parts 1:1.3; parafrontalia provided with ca. 9 pairs of *ori*; *ors* 2+1; *oc* strongly developed; *acoc* (accessory ocellar bristles) developed; *ov* and *iv* well developed; *poc* divergent; 1 occipital hairs present. Legs: Hind tibia straight; femora, tibiae and tarsi without fringes of hairs; front tibia with 1 strong *pv*; mid tibia with 1 *ad*, 1 *pd*, 2 *p* and 1 *v*; hind tibia with 2 *ad*, 2 *pd* and 2 *av*. Abdomen: 5th tergite with characteristic cleft on posterior margin; sternites dark brown, with strong marginal bristles. Otherwise as described for male.

Length: 10.0-17.0 mm.

Specimens examined. INDIA: 7 ♂♂ 1 ♀, Kanny-Koory, Silchar, Cachar, 21. VI. 1911, 23. VI. 1911, 27. VI. 1911, 29. VI. 1911, 1. VII. 1911, C. B. ANTRAM, C. J. WAINWRIGHT collection (BM 1948-488). BURMA: Holotype (♀), Birmania, J. BIGOT (BMNH). THAILAND: 101 ♂♂ 67 ♀♀, nr. Sai Yok, Kanchana Buri, 6. IX. 1975, 8. IX. 1975, 9. IX. 1975, 11. IX. 1975, 7. X. 1975, 8. X. 1975, KANO & KURAHASHI; 3 ♂♂ 7 ♀♀, Sai Yok, 500 m, Kanchana Buri, 9-13. XII. 1975, 27-

29. XII. 1975, SHINONAGA & SHIMA; 23 ♂♂ 15 ♀♀, Erawan Water Fall, 500 m, Kanchana Buri, 5. IX. 1975, 7. IX. 1975, 10. X. 1975, 10. XII. 1975, KANO, SHINONAGA & KURAHASHI; 56 ♂♂ 14 ♀♀, Hill, c. 300 m, 30 km SE., Sa Kao, 3. IX. 1975, KURAHASHI; 19 ♂♂ 22 ♀♀, Khao Yai, 366 m, 30 km S. Pak Chong, 5. X. 1975, 6. X. 1975, KANO & KURAHASHI; 44 ♂♂ 4 ♀♀, Khao Yai, 800 m, 60 km S. Pak Chong, 3. X. 1975, 6. X. 1975, KANO & KURAHASHI; 16 ♂♂ 3 ♀♀, Fang Exp. St., 500 m, Fang, 25. IX. 1975, KANO & KURAHASHI; 1 ♂, 20 km E. Chiang Mai, 330 m, 13-15. IV. 1966, J. & J. H. SEDLACEK (Bishop); 1 ♂, Doi Saket, 300 m, C. Chiang Mai, 15. IX. 1975, KANO; 1 ♂, Doi Huai Hwer, 1231 m, Fang, 27. IX. 1975, KURAHASHI; 1 ♂, Nam Tok Mae Klang, Doi Inthanon, 18. IX. 1975, KURAHASHI; 4 ♂♂ 1 ♀, nr. Ban Sap. Bon, 30 km E. Sara Buri, 4. X. 1975, KURAHASHI & KANO; 2 ♂♂, Ban Pong Din, 10 km NE. Doi Saket, 20. IX. 1975, KURAHASHI; 1 ♀, Chien Dao, 24. X. 1961, G. IMADATE (TMDU); 1 ♂ 1 ♀, nr. Burma Bord., 1200 m, Fang, 26. IX. 1975, KURAHASHI. LAOS: 1 ♂, 100 m, Pak-kading, Borikhane Prov., 22. IV. 1965, GRESSITT, J. A. RONDON collection (Bishop). CAMBODIA: 1 ♂ 1 ♀, Banteay Samre, 26. VII. 1964, KANO (TMDU).

Bionomics. Adults are found in dense native forests. Oviparous.

Distribution. S. China (Yunnan, Hainan Isl.: FAN, 1965), Viet Nam, Laos, Cambodia, Thailand and India.

Acknowledgement

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