

A NEW SPECIES OF *DROSOPHILA HYPOCAUSTA* SUBGROUP  
OF SPECIES FROM MALAYSIA AND THAILAND  
(DIPTERA: DROSOPHILIDAE: *DROSOPHILA*)<sup>1</sup>

FUYUO HIHARA and FEI-JANN LIN

Biological Institute, Ehime University,  
Matsuyama, Ehime 790, Japan  
and

Institute of Zoology, Academia Sinica,  
Nankang, Taipei, Taiwan 115,  
The Republic of China

(Received February 18, 1984)

Fuyuo Hihara and Fei-Jann Lin (1984). A new species of *Drosophila hypocausta* subgroup of species from Malaysia and Thailand. *Bull. Inst. Zool., Academia Sinica* 23(1): 205-209. A new species, *Drosophila siamana*, collected from Malaysia and Thailand, is described. Bibliographic review and a key to the species of *Drosophila hypocausta* subgroup are given. The distribution map of the species of the subgroup including *Drosophila calceolata*, *D. hypocausta*, *D. nasutoides*, *D. neohypocausta*, *D. pararubida*, *D. rubida* and *D. xanthogaster* is attached.

The *Drosophila hypocausta* subgroup is one of the subgroups of the *D. immigrans* species group, it consists of seven species, namely, *D. calceolata*, *D. hypocausta*, *D. nasutoides*, *D. neohypocausta*, *D. pararubida*, *D. rubida* and *D. xanthogaster*. In 1979 and 1981, Hihara and his colleagues on an expedition to Southeast Asia, India, Papua New Guinea and Africa for the *Drosophila* collection financially aided by the Ministry of Education, Science and Culture of Japan, collected a new taxon of the subgroup of species from Kuching and Penang (Malaysia) and Chiang Mai (Thailand). Ikeda *et al.* (1983, personal communication) performed experiments on the reproductive isolation, courtship behavior and mating sounds among *D. hypocausta*, *D. neohypocausta* and the new taxon, found that the new one differs in the courtship displays and

mating sounds from those of the former two known species. Moreover, the insemination tests between the new taxon and *D. hypocausta* showed that only 4.5% in average, compared with the conspecific insemination, have been inseminated, but between the new taxon and *D. neohypocausta* showed completely discriminated. The new taxon is very similar to *D. hypocausta* in general features except the differences in the color of male flies and some minor inconspicuous characters. The present paper discusses the systematics and the distribution of the species of *D. hypocausta* subgroup and describes the new taxon.

#### SYSTEMATIC ACCOUNTS

The *Drosophila hypocausta* subgroup of species characterizes sexual dimorphism, in which males are usually darker at older ages

1. Grants were supported by the Ministry of Education, Science and Culture of Japan (Nos. 548001, 404149 and 504344) and the National Science Council, the Republic of China (NSC72-0201-B001a-31).

or males have dark spots on their abdomen and females lack the dark body color or have only small spots on their abdomen. The key to the species and distribution of the species of the subgroup are given.

**(A) Key to the species of *Drosophila hypocausta* subgroup**

1. Male very dark at older ages.....2  
Male not so dark at older ages.....4
2. Male black parts including mesonotum, pleura, abdomen and all legs.....3  
Male not so dark, only with dark brown on pleura.....*D. siamana*
3. Male very dark, tropical species .....*D. hypocausta*  
Male not that dark, subtropical species .....*D. neohypocausta*

4. Male with two distinct black spots on 6th tergite.....5  
Male without black spots on abdomen..6
5. Female's anal plate black..*D. xanthogaster*  
Female's anal plate yellowish brown.....  
.....*D. calceolata*
6. Eggs with four filaments, indistinctive caudal bands on tergites .....  
.....*D. pararubida*  
Eggs with two filaments, male abdomen becomes more intensely colored posteriorly.....*D. rubida*

**(B) The distribution of the species of *Drosophila hypocausta* subgroup**

1. *Drosophila calceolata* Duda  
*D. calceolata* Duda, 1926: 94, 105.  
Distribution: only reported from Sumatra.

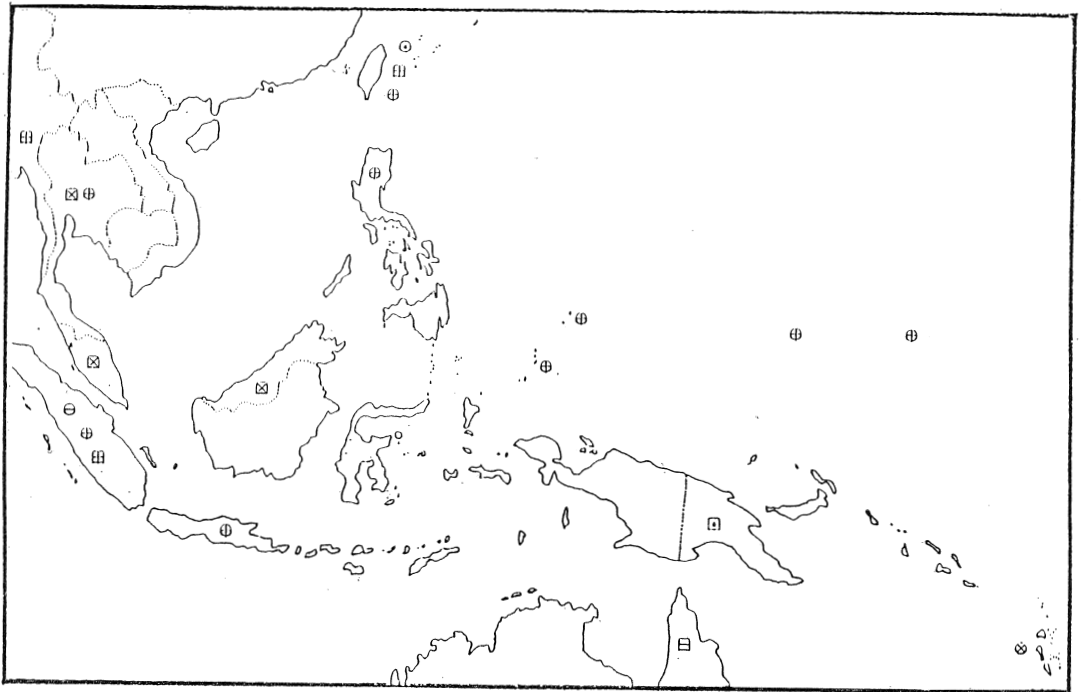


Fig. 1. The distribution map of *Drosophila hypocausta* subgroup of species.

- |                                   |                                      |
|-----------------------------------|--------------------------------------|
| ○ <i>Drosophila calceolata</i>    | ■ <i>Drosophila pararubida</i>       |
| ⊕ <i>Drosophila hypocausta</i>    | □ <i>Drosophila rubida</i>           |
| ⊗ <i>Drosophila nasutoides</i>    | ⊞ <i>Drosophila xanthogaster</i>     |
| ● <i>Drosophila neohypocausta</i> | ⊠ <i>Drosophila siamana</i> sp. nov. |

2. *Drosophila hypocausta* Osten Sacken

*D. hypocausta* Osten Sacken, 1882: 245. Hennig, 1941: 151. Wheeler and Takada, 1964: 186.

Distribution: Philippines, Taiwan, Java, Sumatra, Palau, Yap, Truk, Ponape, Thailand.

3. *Drosophila nasutoides* Okada

*D. hypopygialis* Malloch, 1934: 307.

*D. nasutoides* Okada, 1964: 449. New name for *D. hypopygialis*.

Distribution: only reported from Samoa.

4. *Drosophila neohypocausta* Lin & Wheeler

*D. neohypocausta* Lin & Wheeler, 1973 in Lin & Tseng, 1973: 23.

Distribution: Taiwan and Burma (Toda collected an isofemale stock in 1981).

5. *Drosophila pararubida* Mather

*D. pararubida* Mather, 1961: 251.

Distribution: only known from Papua New Guinea.

6. *Drosophila rubida* Mather

*D. rubida* Mather, 1960: 248.

Distribution: only known from Australia.

7. *Drosophila siamana* Hihara & Lin

*D. siamana* Hihara & Lin, 1984. This paper.

Distribution: Malaysia and Thailand.

8. *Drosophila xanthogaster* Duda

*D. xanthogaster* Duda, 1924: 248. Hennig, 1941: 151; Lin & Tseng, 1973: 22.

Distribution: Taiwan and Sumatra.

(C) Description of *Drosophila siamana*, sp. nov.

Male and female: Body about 3.0 mm in length. Eyes dark red, finely pilose. Frons reddish brown. Periorbits light brown. Carina light brown, flat above, narrow, lower portion wider, gradually shifting to buccal margin. Ocellar triangle dark brown, narrow. Antennae with third joint reddish brown. Arista branches long, 5 upper and 3 below in addition to an irregular terminal fork. Orals 2, second oral as long as vibrissa. Palpus brown, rounded at tip, with a few prominent and

many shorter setae below. Cheek 1/5 as broad as the greatest diameter of eyes.

Mesonotum and scutellum dull brown. Humerals 2. Acrostichal hairs in 8 rows. Length distance of dorsocentrals 1/3 of its cross distance. Sternopleurals 3, sterno-index 0.7. Thoracic pleura of older male with dark brown patches, but they are absent in female and younger male flies.

Legs yellowish brown. Inner side of femur of foreleg with a row of about 9 stout bristles. Apical bristle on middle tibia. Preapical bristles on all three tibiae. Two prominent bristles on metatarsus of hind leg.

Wing slightly dusky, comparatively broad. Veins light brown. Posterior cross vein clouded.  $R_{2+3}$  almost straight.  $R_{4+5}$  and M parallel. C-index about 4.0; 4V-index 1.2; 4c index 1.9; 5x index 1.0 and Ac-index 1.5.  $C_1$  bristle 1;  $C_3$  fringe 1/2. Halteres yellow.

Abdominal tergites dark brown in older males, dull light brown entirely in younger males, dull light brown with triangular brown caudal band on second to fifth tergites in females. Abdominal sternites quadrate, caudal tip of female 7th sternite separates into two flaps. Male genitalia as shown in Figures 2A-2C. Ovipositor (Fig. 2D): lobe reddish brown, narrowly pointed at tip, with about 13 marginal and 7 discal orange brown teeth. Testis (Fig. 2E) dark brown, with about 5 outer and 4 inner coils. Paragonia pale, thickened, folded about 1.5 times, basally fused to testicular duct. Ejaculatory bulb (Fig. 2F) oval, with a pair of hook-shaped caecae. Spermatheca (Figs. 2G, 2H) brown in color and rounded, ventral receptacle with about 16 kinky coils. Mid-intestine (Fig. 2I) with 2.5 to 3.0 coils. Posterior branches of malpighian tubules closely apposed with each other at tip, common stalk short.

Holotype: ♂ in a stock Y-110, originated from a single fertilized female collected on Penang Island, Malaysia, XI 23, 1979 (Watanabe, Fuyama and Hihara). The type is deposited at the Biological Institute, Ehime University.

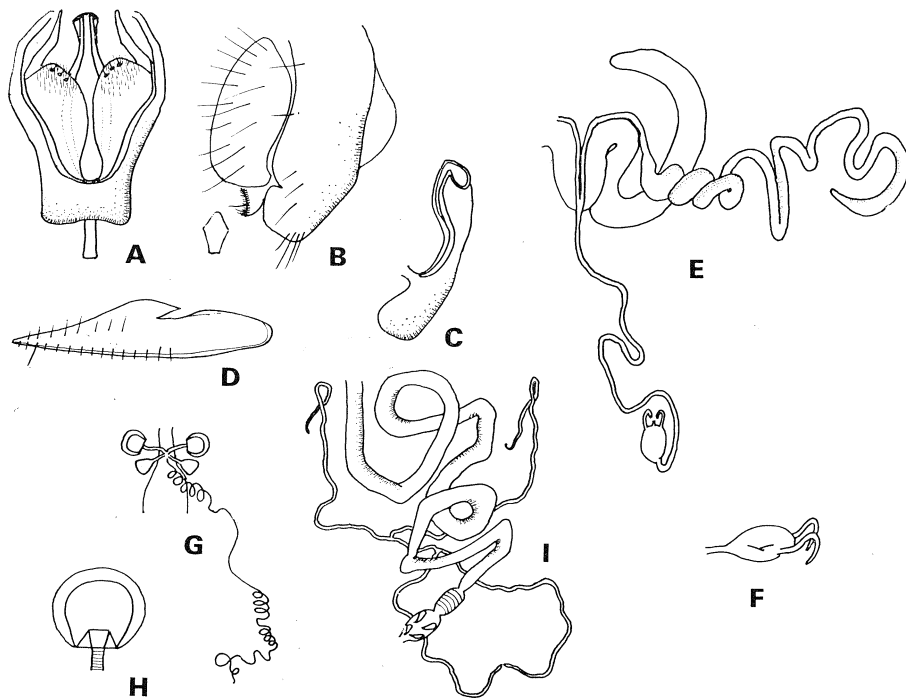


Fig. 2. *Drosophila siamara* sp. nov.

- |                                      |                                       |
|--------------------------------------|---------------------------------------|
| A. Phallic organ                     | F. Ejaculatory bulb                   |
| B. Periphallic organ                 | G. Female internal reproductive organ |
| C. Aedeagus                          | H. Spermatheca                        |
| D. Egg guide                         | I. Digestive systems                  |
| E. Male internal reproductive organs |                                       |

Other specimens (in stocks) examined: Nakon Nayok, Thailand, XII 3, 1979, Stock nos. Z-17, Z-18 (Watanabe, Fuyama and Hihara); Chiang Mai, Thailand, XII 19, 1981, Stock nos. CNX-451, CNX-452, CNX-459, CNX-462, CNX-472, CNX-473 and CNX-476 (Kitagawa and Hihara).

Distribution: Malaysia (Mainland and Borneo) and Thailand.

Relationships: This species closely resembles *D. hypocausta* in general features, but differs from the latter in the shape of aedeagus and in having  $C_3$  fringe larger and two prominent bristles on the metatarsus of the hind legs.

Remarks: One of the author (Hihara) collected both the present species and *D. hypocausta* at the same dumping ground in the

outskirts of Chiang Mai City of northern Thailand on December 19th, 1971. Thus the two species are regarded as sympatric in the geographical sense.

## REFERENCES

- DUDA, O. (1924) Die Drosophiliden des Deutschen Entomologischen Institutes der Kaiser Wilhelm-Gesellschaft aus Sauter's Formosan Ausbeute. *Arch. Naturg.*, **90**(A) 3: 235-249.
- DUDA, O. (1926) Fauna sumatrensis. *Suppl. Ent.*, **14**: 42-116.
- HENNIG, W. (1941) Verzeichnis der Dipteren von Formosa. *Ent. Beihefte*, **8**: 147-154.
- IKEDA, H., F. HIHARA, N. ASADA, K. FUJIWARA and F. J. LIN (1983) Reproductive isolation among three species belonging to the *Drosophila hypocausta* subgroup of the *D. immigrans* species

- group (unpublished data presented to the Ministry of Education, Science and Culture of Japan).
- LIN, F. J. and H. C. TSENG (1973) The *Drosophila immigrans* species group in Taiwan with description of five new species. *Bull. Inst. Zool., Academia Sinica*, **12**: 13-26.
- MATHER, W. B. (1960) Additions to the *Drosophila* fauna of Australia. *Univ. Queenl. Paper*, **1**: 229-239.
- MATHER, W. B. (1961) *D. pararubida*, a new species of *Drosophila* from New Guinea. *Univ. Queenl. Paper*, **1**: 251-256.
- MALLOCH, J. R. (1934) Insects of Samoa and other Samoan terrestrial Arthropoda. Part VI. *Diptera Fasc.*, **8**: 267-328.
- OKADA, T. (1964) Drosophilidae (Diptera) of Southeast Asia, collected by the Thai-Japanese Expedition 1961-1962. *Nature & Life in Southeast Asia*, **3**: 439-466.
- OSTEN SACKEN, C. R. (1882) Diptera from Philippine Islands brought home by Carl Semper. *Berl. Ent. Zeit.*, **26**: 187-254.
- WHEELER, M. R. and H. TAKADA (1964) Insect Micronesia, Diptera: Drosophilidae. *Insects Micronesia*, **14**(6): 163-242.

## 從馬來西亞及泰國採集到之 *Drosophila hypocausta* 亞種羣之一新種

日原 冬生 林 飛 棧

本文描述由馬來西亞及泰國所採集到之一新種 *Drosophila siamana*，本種屬於 *Drosophila hypocausta* 亞種羣。本文也把此亞種羣之各種果蠅的分佈情形、分類簡索表、種名及異名作一簡要的敘述。