

THE GEOGRAPHICAL RACES OF  
*TROIDES MINOS* (CRAMER)  
(LEPIDOPTERA: PAPILIONIDAE)

MASAO OKANO and JOZABURO OHKURA\*

Up to the present, *Troides minos* (CRAMER, 1779) and *T. aeacus* (C. & R. FELDER, 1860) have been regarded as distinct species belonging to the *aeacus*-species-group by all the previous authors. The former is confined to the western side of Peninsular India, but the latter is widely distributed from North India to China (West, Central and South), Indo-China and Malaya, and is divided into several geographical races. In this paper we think that *T. minos* and *T. aeacus* belong to the same species which is divided into four geographical races: *minos*, *aeacus*, *thomsonii*, and *kaguya*.

In preparing this paper we wish to express our hearty thanks to Mr. T.G. HOWARTH, Prof. Dr. TAKASHI SHIRÔZU and Mr. KIKUMARO OKANO for their kindness rendered in various ways; thanks are also due to Mr. TERUO HASEGAWA for the gift of specimens.

*Troides minos* is closely related to *T. rhadamantus* (LUCAS) in the general structure of the male genitalia, but the former is easily separable from the latter in having the harpe which is not extended ventrally at basal one third. The following forms are different one another in wing size and shape, body colour, and wing pattern, but it shows them to be conspecific that there is no distinct difference in the structure of the male genitalia.

***Troides minos minos* (CRAMER, 1779)**

(Pl. 1, figs. 1-4, ♂; Pl. 2, figs. 1-4, ♀; Text-figs. 1, ♂ abdomen, 6, ♀ abdomen, 10, valva of ♂ genitalia)

*Papilio minos* CRAMER, 1779: 4.

*Papilio minos*: BINGHAM, 1907: 16-17.

*Papilio minos*: JORDAN, 1909: 25, pl. 9b, ♂, c, ♀.

*Troides minos*: BRYK, 1929: 47.

*Troides helena minos*: EVANS, 1932: 42.

*Troides helena minos*: TALBOT, 1939: 64-66, pl. 1, figs. 1, larva, 2, pupa.

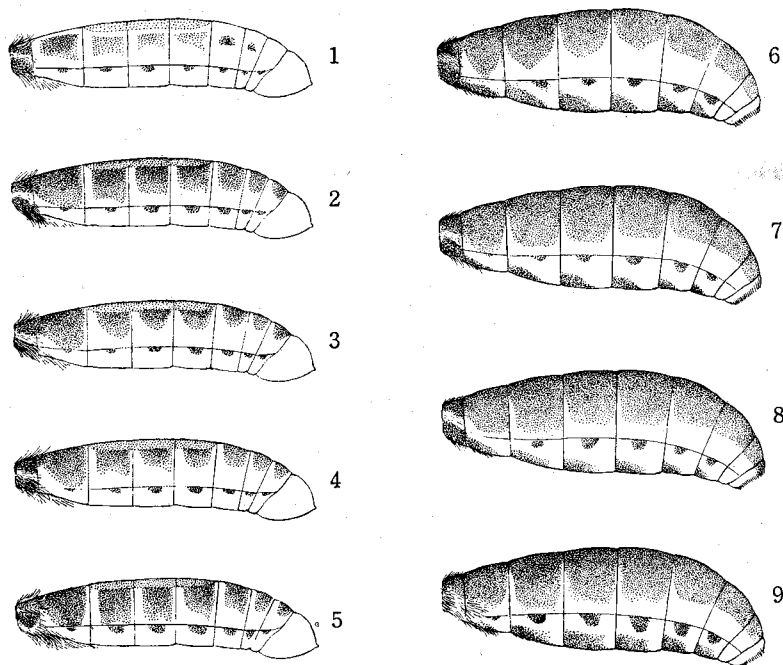
*Troides minos*: ZEUNER, 1943: 115, 127-129, 184, fig. 23, valva of ♂ genitalia.

*Troides minos*: D'ABRERA, 1975: 248-249, figs. ♂♀.

Male. Generally larger in wing size than the other races. Similar in wing shape

---

\*Shakujii-cho 4-22-7, Nerima-ku, Tokyo.

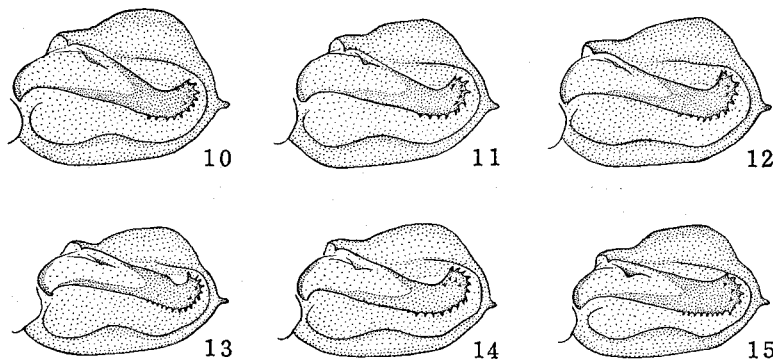


Text-figs. 1-5. Male abdomens of *Troides minos*.

1, ssp. *minos*; 2 & 3, ssp. *aeacus*; 4, ssp. *thomsonii*; 5, ssp. *kaguya*.

Text-figs. 6-9. Female abdomens of *Troides minos*.

6, ssp. *minos*; 7, ssp. *aeacus*; 8, ssp. *thomsonii*; 9, ssp. *kaguya*.



Text-figs. 10-15. Right valvae of the male genitalia of *Troides minos*.

10, ssp. *minos*; 11 & 12, ssp. *thomsonii*; 13, ssp. *thomsonii*; 14 & 15, ssp. *kaguya*.

to *kaguya*, the forewing is broader than in *aeacus* and *thomsonii*, and the termen is not concave. The vein-stripes on the forewing verso are white, not tinged with golden yellow as in the other races. The black marginal band of the hindwing is broader than in the other races. The space 1b of the hindwing recto is generally filled with black, but sometimes the black area is reduced as in *kaguya*. The black patches on the abdomen are by far more weakly developed than in the other races,

thus the androconial patches become much more prominent.

Female. In wing size, similar to *aeacus* and *kaguya* and much larger than *thomsonii*. The white vein-stripes on the forewing recto are less strongly tinged with grey than in the other races. The black postdiscal spots on the hindwing are generally smaller than in *kaguya*. The space 1b of the hindwing recto is almost filled with blackish brown. The black patches on the abdomen are slightly reduced than in the other races.

Male genitalia. The right valva is broader than in the other races. The harpe is armed with about 16 teeth.

Length of forewing: 70–82 mm., ♂; 83–91 mm., ♀.

Distribution: Western Ghats, South India.

Specimens examined: 5♂3♀, Nilgiri Hills (1,000 m.), Madras.

***Troides minos aeacus* (C. & R. FELDER, 1860) stat. nov.**

(Pl. 1, figs. 5–8, ♂; Pl. 2, figs. 5–8, ♀; Text-figs. 1 & 2, ♂ abdomen, 7, ♀ abdomen, 11 & 12, valva of ♂ genitalia)

*Ornithoptera aeacus* C. & R. FELDER, 1860: 225.

*Ornithoptera rhadamantus*: LEECH (nec LUCAS), 1893: 513.

*Papilio aeacus*: BINGHAM, 1907: 15–16.

*Papilio* (*Ornithoptera*) *aeacus*: SEITZ, 1907: 8, Pl. 1a, ♀, b, ♂.

*Papilio aeacus aeacus*: JORDAN, 1909: 25.

*Troides aeacus* var. *aeacus*: BRYK, 1929: 49.

*Troides aeacus* var. *praecox*: BRYK, 1929: 49.

*Troides aeacus*: EVANS, 1932: 43.

*Troides aeacus aeacus*: TALBOT, 1939: 68–69.

*Troides aeacus aeacus*: ZEUNER, 1943: 115, 127–129, 184, fig. 24, valva of ♂ genitalia.

(?) *Troides aeacus praecox*: ZEUNER, 1943: 115, 127–129, 184.

*Troides* (*Troides*) *aeacus aeacus*: NAKAHARA & KUROSAWA, 1958: 20, pl. 21, fig. 1, ♂.

*Troides aeacus aeacus*: IGARASHI, 1966: 1–3, 21–23, pl. 1, figs. 1a–1e, egg & larva, pl. 2, figs.

1a–1d, pupa, pl. 7, figs. 1–8, larva, pl. 11, figs. 1–3, pupa, pl. 17, fig. 1, ♀.

*Troides aeacus praecox*: DEGEORGES, 1974: [2–3], figs. ♂♀.

*Troides aeacus aeacus*: D'ABRERA, 1975: 240–243, figs. ♂♀.

*Troides aeacus aeacus*: OKANO, 1977: 9, fig. ♂.

*Troides aeacus aeacus*: PINRATANA, 1977: 5.

*Troides aeacus praecox*: PINRATANA, 1977: 5, figs. ♂ ♀, 6, fig. ♀ [nec *thomsonii*].

Male. In wing size, similar to *kaguya* and generally larger than *thomsonii*. The forewing is broader and the termen is less strongly concave than in *thomsonii*. The white vein-stripes on the forewing verso are more strongly developed than in the other races. The stripe along the vein 1b is most strongly developed of all the races, but it is often reduced in the specimens from Thailand. The black marginal band of the hindwing is narrower, and more strongly convex between the veins than in *minos*. The black area in the space 1b of the hindwing recto is more reduced than in *kaguya*. The black patches on the abdomen are more strongly developed than in *thomsonii*, but they are often reduced in the specimens from Thailand.

Female. In wing size, similar to *minos* and *kaguya* and much larger than *thomsonii*. The vein-stripes on the forewing are most strongly developed of all the races, and often extended well even in the cell. The black postdiscal spots on the hindwing are generally smaller than in *kaguya*. The black patches on the abdomen are slightly more reduced than in *kaguya*.

Male genitalia. The right valva is slightly narrower than in *minos* and somewhat broader than in *thomsonii* and *kaguya*. The harpe is armed with about 17 teeth.

Length of forewing: 62-76 mm., ♂; 82-92 mm., ♀.

Distribution: West Himalayas; North-East India; Tibet; West, Central and South China; Burma; Thailand; Cambodia.

Specimens examined: 3♂, Godavari, Nepal; 9♂3♀, Khasi Hills, Assam; 1♂, Chiangdao, Thailand; 2♂, Chiangmai, Thailand; 3♂3♀, Ratchaburi, Thailand.

Sometimes a black postdiscal spot is placed in the space 2 of the hindwing in male as figured by D'ABRERA (1975). We examined two specimens of this form from Nepal collected by Mr. TERUO HASEGAWA.

LEECH (1893) says, "the Chinese specimens vary in size and also in the shade of the golden yellow of secondaries; the majority, however, agree in most respects with Sikkim examples of the species." Also JORDAN (1909) says, "many specimens from Shan States as small as *thomsonii*" and "in specimens from West China the abdomen beneath is on the whole more extended black than in those from India."

#### ***Troides minos thomsonii* (BATES, 1875) stat. nov.**

(Pl. 1, figs. 9-12, ♂, Pl. 2, figs. 9-12, ♀; Text-figs. 4, ♂ abdomen, 8, ♀ abdomen, 13, valva of ♂ genitalia)

*Ornithoptera aeacus* var. *thomsonii* BATES, 1875: 546.

*Papilio aeacus thomsoni* [misspelling]: JORDAN, 1909: 25.

*Troides aeacus* var. *thomsonii*: BRYK, 1929: 49.

*Troides aeacus thomsonii*: ZEUNER, 1943: 115, 127-129, 184.

*Troides aeacus thomsonii*: CORBET & PENDLEBURY, 1956: 93-94, 435.

*Troides aeacus thomsonii*: D'ABRERA, 1975: 246-247, figs. ♂♀.

*Troides aeacus thomsonii*: FLEMING, 1975: 15, pl. 2, fig. P3, ♂, pl. 3, fig. P3, ♀.

*Troides aeacus thomsonii*: OKANO, 1977: 8-9, fig. ♂.

*Troides aeacus thomsoni* [misspelling]: PINRATANA, 1977: 6, fig. ♂.

*Troides aeacus thomsonii*: CORBET & PENDLEBURY, 1978: 67-68, 421.

Male. Generally smaller in wing size than the other races. The forewing is narrower, and the termen is more strongly concave than in *aeacus*. The hindwing is more sharply produced at the tornus, and the termen is less strongly convex at the veins than in the other races. The vein-stripe along the vein 1b of the forewing verso is more reduced than in the other races. The black area in the space 1b of the hindwing recto is more reduced than in *aeacus*. The black patches on the abdomen are generally more reduced than in *aeacus*.

Female. The smallest in wing size of all the races. The vein-stripe along the

vein 1b of the forewing verso is much shorter and narrower than in the other races. The black postdiscal spots on the hindwing are smaller than in *aeacus*. The black patches on the abdomen are developed as in *aeacus*.

Male genitalia. The right valva is as broad as in *kaguya* and narrower than in *minos* and *aeacus*. The harpe is armed with about 19 teeth.

Length of forewing: 58–62 mm., ♂; 63–73 mm., ♀.

Distribution: Thailand (Peninsular area); West Malaysia.

Specimens examined: 1♂1♀, Taiping, West Malaysia; 1♂1♀, Ipoh, West Malaysia; 5♂3♀, Cameron Highland, West Malaysia; 1♂2♀, Kampong Sahm, West Malaysia.

***Troides minos kaguya* (NAKAHARA & ESAKI, 1930) stat. nov.**

(Pl. 1, figs. 13–16, ♂; Pl. 2, figs. 13–16, ♀; Text-figs., 5, ♂ abdomen, 9, ♀ abdomen, 14 & 15, valva of ♂ genitalia).

*Papilio aeacus formosanus*: JORDAN, 1909: 25.

*Troides aeacus* var. *formosanus*: BRYK, 1929: 49.

*Papilio* (*Ornithoptera*) *aeacus kaguya* NAKAHARA & ESAKI, 1930: 209–210.

*Papilio aeacus kaguya* ab. *kuroboshi* NOMURA, 1937: 43, pl. 7, fig. 1, ♂.

*Papilio aeacus kaguya* ab. *maeboshi* HIRAYAMA, 1941: 118, pl. 14, fig. ♂.

*Troides aeacus formosanus*: ZEUNER, 1943: 115, 127–129, 184.

*Troides aeacus kaguya*: OKANO & OHKURA, 1959: 2, pl. 1, figs. 1a, ♂, 1b, ♀.

*Troides aeacus kaguya*: SHIRÔZU, 1960: 11–12, 436, pl. 1, figs. 1, ♂, 2, ♀, text-figs. 7, ♂ genitalia, 8, distribution map.

*Troides aeacus kaguya* ♂f. *kuroboshi* and ♂f. *maeboshi*: SHIRÔZU, 1960: 436.

*Troides aeacus kaguya*: D'ABRERA, 1975: 244–245, figs. ♂♀.

*Troides aeacus kaguya*: OKANO, 1977: 9, fig. ♂.

Male. In wing size, similar to *aeacus* and much larger than *thomsonii*. The forewing is slightly broader, and the termen is less strongly concave than in *aeacus*. The vein-stripe along the vein 1b of the forewing verso is narrower than in *aeacus* from Nepal and Assam. The black marginal band of the hindwing is more strongly convex between the veins than in the other races. The black area in the space 1b of the hindwing recto is more extended than in *aeacus*, thus it approaches to that of *minos*. The frons wears a few red hairs before the antennae. The base of the abdomen verso is decorated with red hairs. The black patches on the abdomen are most strongly developed of all the races.

Female. In wing size, similar to *minos* and *aeacus*, and much larger than *thomsonii*. The vein-stripes on the forewing are narrower than in *aeacus*. The black postdiscal spots on the hindwing are generally larger than in the other races. The frons and the base of the abdomen verso are decorated with red hairs. The black patches on the abdomen are more strongly developed than in the other races.

Male genitalia. The right valva is as broad as in *thomsonii* and narrower than in *minos* and *aeacus*. The harpe is armed with about 19 teeth.

Length of forewing: 67–74 mm., ♂; 79–87 mm., ♀.

Distribution: Formosa.

Specimens examined: 10♂8♀, Hengchun.

f. *kuroboshi* NOMURA (Pl. 1. figs. 14 & 16): A black postdiscal spot is placed in the space 2 of the hindwing.

We could find one example of this form among 10 males of *kaguya*.

f. *maeboshi* HIRAYAMA: A black postdiscal spot is placed in the space 7 of the hindwing.

We have no example of this form.

### References

- BINGHAM, C. T. 1970. The fauna of British India, including Ceylon and Burma, Butterflies, 2. (esp.: 15-17).
- BRYK, F. 1929. Papilionidae 1. Lepidopterorum Catalogus, 35. (esp.: 47-49).
- CORBET, A. S. & PENDLEBURY, H. M. 1956. The butterflies of the Malay Peninsula, ed. 2. (esp.: 93-94, 435).
- CORBET, A. S. & PENDLEBURY, H. M. 1978. The butterflies of the Malay Peninsula, ed. 3, revised by J. N. ELIOT. (esp.: 67-68, 421).
- D'ABRERA, B. 1975. Birdwing butterflies of the world. (esp.: 240-249).
- DEGEORGES, F. A. 1974. Butterflies in Thailand, 1. (esp.: [2-3]).
- EVANS, W. H. 1932. The identification of Indian butterflies. (esp.: 42-43).
- FLEMING, W. A. 1975. Butterflies of West Malaysia and Singapore, 1. (esp.: 15, pls. 2-3).
- HIRAYAMA, S. 1941. On two aberrant forms of Formosan butterflies. Mushi no Sekai, 4: 118-119. pl. 14 (in Japanese).
- HIURA, I. & ALAGAR, R. E. 1971. Studies on the Philippine butterflies chiefly collected by the co-operative survey by the Osaka Museum of Natural History and the National Museum of the Philippines, 1969, 1. Papilionidae. Bull. Osaka Mus. Nat. Hist., 24: 29-44, pls. 1-4.
- HOWARTH, T. G. 1977. A list of the type-specimens of *Ornithoptera* in the British Museum (Nat. Hist.). Bull. Brit. Mus. Nat. Hist. (Ent.), 36: 153-169.
- IGARASHI, S. 1966. Butterflies of Nepal (immature stages). Spec. Bull. Lep. Soc. Jap., 2: 1-73, pls. 1-18.
- JORDAN, K. 1909. In Seitz, Die Gross-Schmetterlinge der Erde, 9. (esp.: 25, pl. 9).
- LEECH, J. H. 1893. Butterflies from China, Japan, and Corea. (esp.: 513).
- NAKAHARA, W. & ESAKI, T. 1930. New names for two Formosan *Papilio*-species. Zephyrus, 2: 209-210 (in Japanese).
- NAKAHARA, W. & KUROSAWA, Y. 1958. Selected butterflies of the world illustrated in colours. (esp.: 20, pl. 21) (in Japanese).
- NOMURA, K. 1937. A new aberrant form of *Papilio aeacus kaguya* Nakahara et Esaki and a gynandromorph of *Ixias pyrene insignis* Butler. Zephyrus, 7: 43-44, pl. 7 (in Japanese).
- OKANO, M. & OHKURA, J. 1959. Butterflies of Formosa. (esp.: 2, pl. 1) (in Japanese).
- OKANO, M. & OHKURA, J. 1979. The geographical races of *Troides rhadamantus* (Lucas). Artes Liberales, 24: 95-100, pls. 1-3.
- OKANO, T. 1977. Birdwing butterflies of West Malaysia. Nature and Insects, 12 (12): 7-9 (in Japanese).
- PINRATANA, A. 1977. Butterflies in Thailand, 1. (esp.: 5-6).
- SEITZ, A. 1907. In Seitz, Die Gross-Schmetterlinge der Erde, 1. (esp.: 8, pl. 1).
- SHIRÔZU, T. 1960. Butterflies of Formosa in colour. (esp.: 11-12, 436, pl. 1) (in Japanese).
- TALBOT, G. 1939. The fauna of British India, including Ceylon and Burma, Butterflies, 1. (esp.: 64-66, 68-69, pl. 1).

ZEUNER, F. E. 1943. Studies in the systematics of *Troides* Hübner and its allies; Distribution and phylogeny in relation to the geological history of the Australasian Archipelago. Trans. Zool. Soc. Lond., 25: 107-184.

### Explanation of Plates

#### Plate 1.

- Figs. 1-4. *Troides minos minos* (CRAMER, 1779), ♂.
- Fig. 1. Nilgiri Hills, Madras, Aug., 1978.
  - Fig. 2. Nilgiri Hills, Madras, Nov., 1977.
  - Fig. 3. Nilgiri Hills, Madras, Nov., 1977. Underside.
  - Fig. 4. Underside of fig. 2.
- Figs. 5-8. *Troides minos aeacus* (C. & R. FELDER, 1860), ♂.
- Fig. 5. Khasi Hills, Assam, Oct., 1955.
  - Fig. 6. Chiangmai, Thailand, Apr., 1979.
  - Fig. 7. Underside of fig. 5.
  - Fig. 8. Underside of fig. 6.
- Figs. 9-12. *Troides minos thomsonii* (BATES, 1875), ♂.
- Fig. 9. Kampong Sahom, West Malaysia, Jul., 1977.
  - Fig. 10. Cameron Highlands, West Malaysia, Feb., 1977.
  - Fig. 11. Underside of fig. 9.
  - Fig. 12. Underside of fig. 10.
- Figs. 13-16. *Troides minos kaguya* (NAKAHARA & ESAKI, 1930), ♂.
- Fig. 13. Hengchun, Formosa, Apr., 1975.
  - Fig. 14. Hengchun, Formosa, Apr., 1967.
  - Fig. 15. Hengchun, Formosa, Feb., 1955. Underside.
  - Fig. 16. Underside of fig. 14.

#### Plate 2.

- Figs. 1-4. *Troides minos minos* (CRAMER, 1779), ♀.
- Fig. 1. Nilgiri Hills, Madras, Sept., 1978.
  - Fig. 2. Nilgiri Hills, Madras, Oct., 1977.
  - Fig. 3. Underside of fig. 1.
  - Fig. 4. Underside of fig. 2.
- Figs. 5-8. *Troides minos aeacus* (C. & R. FELDER, 1860), ♀.
- Fig. 5. Khasi Hills, Assam, May, 1979.
  - Fig. 6. Ratchaburi, Thailand, Sept., 1978.
  - Fig. 7. Underside of fig. 5.
  - Fig. 8. Underside of fig. 6.
- Figs. 9-12. *Troides minos thomsonii* (BATES, 1875), ♀.
- Fig. 9. Kampong Sahom, West Malaysia, Jun., 1977.
  - Fig. 10. Ipoh, West Malaysia, Mar., 1972.
  - Fig. 11. Underside of fig. 9.
  - Fig. 12. Underside of fig. 10.
- Figs. 13-16. *Troides minos kaguya* (NAKAHARA & ESAKI, 1930), ♀.
- Fig. 13. Hengchun, Formosa, Jun., 1956.
  - Fig. 14. Hengchun, Formosa, Feb., 1955.
  - Fig. 15. Underside of fig. 13.
  - Fig. 16. Underside of fig. 14.

