

THE GENUS EUREMA OF SOUTH VIET-NAM AND CAMBODIA (Lepidoptera: Pieridae)

SHIRÔZU, TAKASHI

Biological Laboratory, College of General Education, Kyushu University

YATA, OSAMU

<https://doi.org/10.15017/7344049>

出版情報 : Sieboldia : acta biologica . 4 (3), pp.121-135, 1973-07-31. 九州大学教養部生物学教室
バージョン :
権利関係 :



THE GENUS *EUREMA* OF SOUTH VIET-NAM AND CAMBODIA (Lepidoptera: Pieridae)

Takashi SHIRÔZU and Osamu YATA

Biological Laboratory, College of General Education, Kyushu University
Ropponmatsu, Fukuoka 810, Japan

This paper is a taxonomic study of the genus *Eurema* from South Viet-Nam and Cambodia based on the material collected by Mr. Sadanobu Inoue, who made collecting trips at various localities in South Viet-Nam and Cambodia from August 1958 to September 1962.

The genus *Eurema* of Viet-Nam and Cambodia is poorly investigated. Métaye (1957) listed six species of this genus from all Viet-Nam; these are *brigitta*, *laeta*, *hecabe*, *blanda*, *lacteola* and *sari*, and they are all the known species up to the present. The present material is rather rich and seems to contain four additional species besides all of the known species except for *lacteola*. The newly recorded species are *andersoni*, *ada*, *simulatrix* and one undescribed species which is most closely related to *lacteola* and may represent *lacteola* of Métaye. If this assumption is correct, this genus contains nine species in S. Viet-Nam and Cambodia, and these are almost certainly all the *Eurema* species of Viet-Nam and Cambodia. Another species, *tilaha*, is distributed in Indo-China, but the range of this species is seemingly confined to South Burma, Peninsular Thailand and Mergui Archipelago, and can hardly be expected to occur in Viet-Nam and Cambodia.

In the following pages, we give the brief descriptions and illustrations of the male genital organs as well as some wing characters for all the species including the new species and a new subspecies of *simulatrix*.

The following abbreviations are used in the descriptions of the male genitalia and the hindwing venation. P_1 - P_4 : processes of valva of the male genitalia. P_1 : a process near the middle of ventral margin of costa+ampulla region. P_2 : a process beyond the middle of dorsal margin of costa+ampulla region. P_3 : apical process of valva. P_4 : a process or processes at the basal portion or middle of harpe, P_4 usually represented by two or three processes. *udc*: veinlet between origins of veins 7 and 6. *mdc*: veinlet between origins of veins 6 and 5. *ldc*: veinlet between origins of veins 5 and 4.

The specimens examined were collected by Mr. Sadanobu Inoue unless

otherwise specified.

Before going further, we express our sincere thanks to Mr. Sadanobu Inoue of Osaka, Dr. Yoshihiko Kurosawa of National Science Museum, Dr. Hiromasa Sawada of Tokyo University of Agriculture and the authority of the Section of Entomology, Department of Agriculture, Bangkok for their kindness giving the opportunities to study the *Eurema* materials. We are also much indebted to Associate Professor Toyohei Saigusa, Associate Professor Akinori Nakanishi, Mr. Hiroshi Shima and Mr. Jun Emoto of Kyushu University for their kind help during the course of this study.

1. *Eurema brigitta fruhstorferi* (Moore, 1906)

(Pl. 1, figs. 1-2 ♂; Textfig. 1, ♂ genitalia)

Specimens examined: 1 ♀, Binh Tri Đông, 26. x. 1958, Trinh Thieu Kinh leg.; 1 ♂, Saigon, iii. 1959, Trinh Thieu Kinh leg.; 1 ♂, Blao, 1. vii. 1962; 1 ♂, Dalat, 28. vii. 1962.

♂♀. *Upperside*: Ground colour yellow; basal portion of both wings dusted with black scales. In forewing black costal border broad, with its inner margin rather obscure; black distal border broad, with its inner edge regular, not deeply excavated in spaces 2 and 3; fringe black except at the tornus. In hindwing black distal border broad; fringe yellow.

Underside: Both wings dusted with black scales. ♂ without sex-brand. Forewing always without cell spots, but with small black discocellular marking divided into an upper and a lower spots; subapical patches small, faint and appearing in spaces 4 to 8. In hindwing a series of discal spots in spaces 1 to 7 large and obscure; a small spot sometimes present each

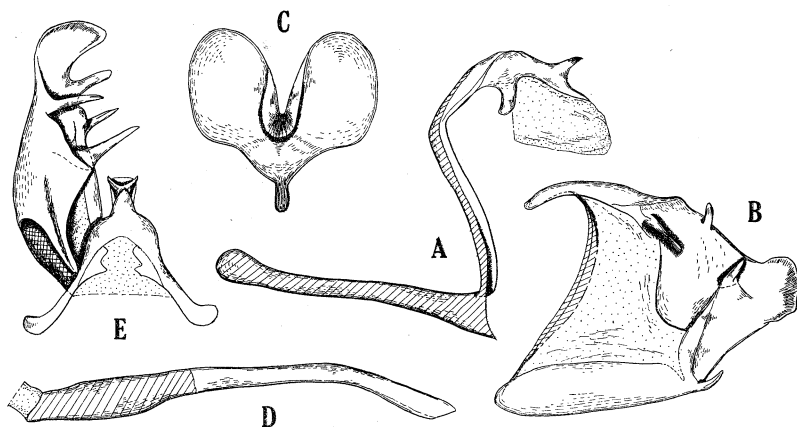


Fig. 1. Male genitalia of *Eurema brigitta fruhstorferi* (Moore, 1906), S. Viet-Nam. A: Lateral aspect of ring. B: Inner aspect of right-hand valva. C: Posterior aspect of juxta. D: Lateral aspect of phallus. E: Dorsal aspect of dorsum and right-hand valva.

in subbasal portion of spaces 1 and 7, but always absent in middle of discoidal cell; a spot in extreme base of space 7 absent; two small black discocellular spots present; a small black dot at apex of each vein.

Distal margin of hindwing rather evenly rounded. Rs, M₁ and M₂ of hindwing arising from cell separately; *udc* nearly as long as *mdc* or shorter, *mdc* about a half length of *ldc*.

Length of forewing: 18-19 mm.

Male genitalia: Tegumen membranous on its anteromedian portion; saccus nearly as long as height of ring; uncus strongly bifurcate at the apex. Valva with P₁ longer than the other processes, and extending posteriorly, P₂ of normal size, P₃ very broad, flat, and much larger than the other processes, P₄ represented by a single process, and with an accessory process produced at posteroventral corner of harpe. Phallus long and slender, suprazonal sheath of aedeagus slightly curving ventrally beyond its middle.

This subspecies is known from Eastern Indo-China and seems to be very closely related to *E. b. rubella* (Wallace, 1867) which is distributed from Ceylon, India, Burma, Nicobar Is. to South China, but in the former the distal black borders are somewhat narrower than those in the latter.

This species is widely distributed from the Indo-Australian Region to the Ethiopian Region.

2. *Eurema laeta sikkima* (Corbet & Pendlebury, 1932)

(Pl. 1, figs. 3-4 ♂, 5-6 ♀; Textfig. 2, ♂ genitalia)

Specimens examined: 1♂, Cap St. Jacques, 10. vi. 1962; 2♂♂, Blao, 1. vii. 1962; 1♀, Bobla, 10. vii. 1962; 1♂, Bobla, 15. vii. 1962.

♂♀. *Upperside*: Ground colour yellow, but sometimes paler in the male; basal portion of both wings dusted with black scales. In forewing black costal border rather broad, but narrowed at basal portion; black distal border broad, weakly excavated in spaces 2 and 3, and strongly narrowed posteriorly in space 1; fringe black except at the tornus; fine discocellular bar present. In hindwing black distal border narrower than in *brigitta*, especially in the male; fringe yellow. ♂ with a salmon-coloured sex-brand at base of space 7 on hindwing. A similar one on forewing underside at base of space 1b.

Underside: Both wings somewhat dusted with black scales. Forewing with only a small upper discocellular spot; cell spots, and subapical and tornal spots always entirely absent. Hindwing with postdiscal markings faint, these of spaces 1, 4 to 6 arranged in a line, those of spaces 2 and 3 forming a line parallel to the former but much distinct; minute black spot in subbasal portion of each space 1 and 7, but that in middle of discoidal cell sometimes absent; a spot in extreme base of space 7 frequent-

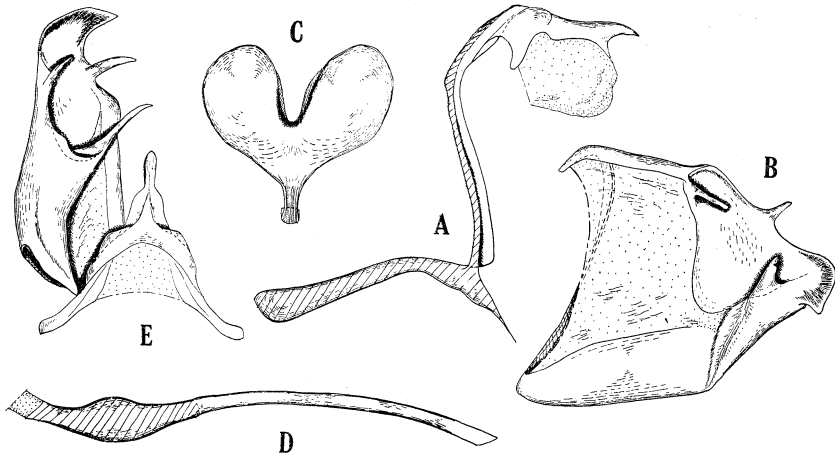


Fig. 2. Male genitalia of *Eurema laeta sikkima* (Corbet & Pendlebury, 1932), S. Viet-Nam. A: Lateral aspect of ring. B: Inner aspect of right-hand valva. C: Posterior aspect of juxta. D: Lateral aspect of phallus. E: Dorsal aspect of dorsum and right-hand valva.

ly omitted; a black upper discocellular spot usually present; a small black dot at apex of each vein.

Hindwing outer margin somewhat angulate at space 3. Rs, M₁ and M₂ of hindwing arising from cell very close together; *udc* nearly as long as *mdc* or shorter, *mdc* about almost 1/4× as long as *ldc*.

Length of forewing: 16–20 mm.

Male genitalia: Structurally resembling those of the preceding species; saccus shorter than height of ring; uncus simple, not bifurcate, its apex bluntly pointed; P₄ of valva represented by a single spine-like process slightly curved ventrally.

This subspecies is distributed from Sikkim, Indo-China to Hainan and Java, and it seems to be very closely related to *E. l. laeta* (Boisduval, 1836) from Ceylon, India to Western Himalayas. Having only a few material of the nominate subspecies, we follow to Talbot (1960) in the subspecific status of the Vietnamese specimens.

This species is distributed in India, China, Japan, Philippines (Luzon Is.), Java, Timor Laut, Key Is., and Queensland.

3. *Eurema hecabe contubernalis* (Moore, 1886)

(Pl. 3, figs. 1–2 ♂, 3–4 ♀; Textfig. 3, ♂ genitalia)

Specimens examined: Binh Tri Đông, 2♂♂, 6♀♀, 28. ix. 1958, 1♂, 2♀♀, 18. x. 1958, 3♂♂, 5♀♀, 22. x. 1958, 1♂, 25. x. 1958, 3♀♀, 26. x. 1958, 3♂♂, 3♀♀, 31. x. 1958, Trinh Thieu Kinh leg., Tân Hôn Đông, 2♂♂, 20.

x. 1958; 6♂♂, 3♀♀, 29. x. 1958, Trinh Thieu Kinh leg.; Saigon, 1♂, 2♀♀, iii. 1959; Bien Hoa, 1♂, 29. vii. 1962; Ba Diem, 1♀, 29. iv. 1962; Thu Duc, 1♂, 24. vi. 1962, 1♀, 31. v. 1962; Bac Lie, 1♀, 14. ix. 1959; Cap St. Jacques, 2♂♂, 2♀♀, 28. i. 1962, 1♂, 26. v. 1962, 2♂♂, 3. vi. 1962; Trang Bom, 1♂, 8. i. 1961, 2♂♂, 6. vii. 1961, 1♂, 10. ix. 1961, 2♂♂, 1♀, 8. x. 1961, 1♂, 10. x. 1961, 1♂, 3♀♀, xi. 1961, 2♂♂, 2. i. 1962, 2♂♂, 1♀, 7. i. 1962, 2♂♂, 14. i. 1962, 2♂♂, 1♀, 21. i. 1962, 1♂, 13. v. 1962; Ben Nom, 1♂, 22. iv. 1962; Dinh Quan, 1♂, 16. vii. 1961, 4♂♂, 25. iii. 1962, 1♂, 25. iv. 1962, 3♂♂, 6. v. 1962, 1♂, 1. vii. 1962; Col de Blao, 1♂, 7. x. 1962; Blao, 1♀, 31. iii. 1962, 2♂♂, 2♀♀, 1. vii. 1962; Bobla, 1♂, 30. iv. 1962, 1♀, 14. v. 1962, 1♀, 27. v. 1962, 1♀, 5. vii. 1962, 1♀, 7. vii. 1962, 1♂, 10. vii. 1962, 1♀, 11. vii. 1962, 1♂, 12. vii. 1962, 1♀, 14. vii. 1962, 1♀, 18. vii. 1962; Dalat, 1♀, 3. i. 1960, 1♀, 29. vii. 1962; Kampot (Cambodia), 2♂♂, 17. vi. 1962; Bokor (Cambodia), 1♀, 7. v. 1961.

♂. *Upperside*: Ground colour bright yellow; only the extreme base of both wing blackish. In forewing black costal border usually broad and distinct, but in dry-season form very narrow and indistinct; black distal border generally broad, and excavated between veins 2 and 4; fringe black except at tornus. In hindwing black distal border usually broad and inner edge sharply defined but in dry-season form fairly narrow; fringe yellow.

Underside: In forewing sex-brand long, extending from near base of wing to origin of vein 2, this brand with a slight purplish tinge or light grey and broader than in any other species of the *hecabe*-group in South Viet-Nam; two spots in discoidal cell, but sometimes disappearing in wet-season form; discocellular spot of an irregular slender ring; apical patch usually absent, but in dry-season form blackish-brown apical patches occupying spaces 4 to 7 but never reaching distal margin as in *blanda*, *sari* and *simulatrix*. In hindwing a series of discal spots in spaces 1 to 7 arranged in an irregular zigzag line, in wet-season form these spots faint, while in dry-season form these spots distinct and in spaces 2 to 6 V-shaped, and that in space 7 bisinuate and directed towards and almost contiguous with discocellular spot; circular spot in basal portion of spaces 1 and 7 and in middle of discoidal cell usually present; minute spot in extreme base of space 8 sometimes present; discocellular spot as in forewing; a small black dot present at apex of each vein.

♀. Similar to male, but usually paler and on upperside dusted with black scales towards base; black distal border broader; faint discocellular bar present in forewing upperside; faint black subternal spot usually present in space 1b on forewing underside.

Hindwing outer margin somewhat angulate at space 3. *udc* less than *mdc*, *mdc* about a half length of *ldc*.

Length of forewing: 19–24 mm.

Male genitalia: Tegumen broad; saccus shorter than height of ring;

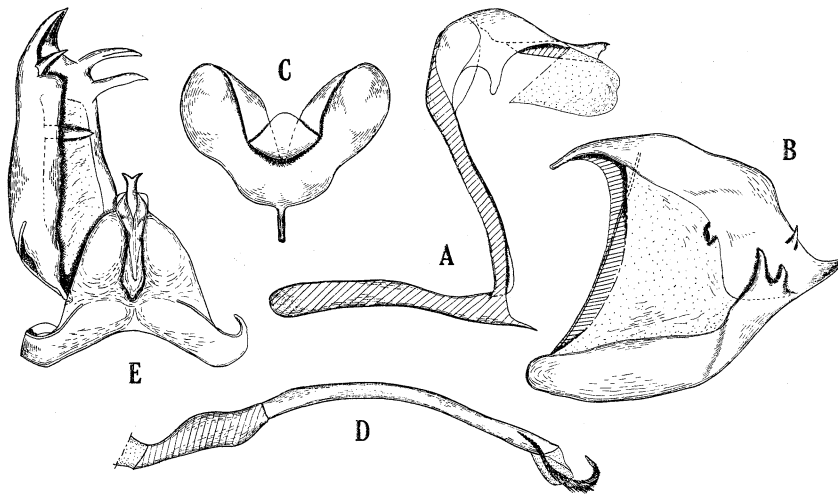


Fig. 3. Male genitalia of *Eurema hecabe contubernalis* (Moore, 1886), S. Viet-Nam.
 A: Lateral aspect of ring. B: Inner aspect of right-hand valva. C: Posterior aspect of juxta. D: Lateral aspect of phallus. E: Dorsal aspect of dorsum and right-hand valva.

valva with P_1 nearly as long as other processes, P_2 long and prominent, P_3 almost triangular and acutely pointed at apex, P_4 represented by two processes resembling each other. Uncus short, projecting posterodorsally with its apex well bicuspid; suprazonal sheath of aedeagus evenly curved ventrally than in the two preceding species.

This subspecies is distributed from the Himalyas, Sikkim, to Indo-China and Malay Peninsula, and it seems to be very closely related to *E. h. borneensis* (Fruhstorfer) which is distributed in Borneo, but in the latter the subapical black patch of the forewing underside always faint or wholly absent. *E. h. hecabe* (Linnaeus) distributed in South China is distinguished from the present subspecies in bearing the yellow fringe.

This species is widely distributed almost all over the Indo-Australian Region and the Ethiopian Region and separated into thirty-seven subspecies (Corbet & Pendlebury, 1932).

4. *Eurema blanda silhetana* (Wallace, 1867)

(Pl. 3, figs. 5-6 ♂, 7-8 ♀; Textfig. 4, ♂ genitalia)

Specimens examined: Trang Bom, 1♂, viii. 1961, 2♀♀, 17. xii. 1961, 2♂♂, 26. i. 1962, 1♀, 7. ii. 1962; Cap St. Jacques, 2♂♂, 28. i. 1962; Dinh Quan, 1♂, 19. vi. 1960, 1♂, 6. v. 1962; Bobla, 1♀, 30. vi. 1962, 1♂, 5. vii. 1962, 1♂, 7. vii. 1962, 2♂♂, 9. vii. 1962, 1♂, 10. vii. 1962; Dalat, 1♂, 15. i. 1962, 1♂, 28. viii. 1962.

♂♀. *Upperside*: Ground colour paler than in *hecabe*. In forewing black costal border narrow and sometimes almost absent, and also black distal border usually narrower, distal border almost always much broader in space 4 than in space 1. In hindwing distal border narrow, but in female fairly broad; fringe black, but mixed with yellow.

Underside: In forewing sex-brand pale salmon-pink and slenderer than in *hecabe*; an additional basal spot besides two ordinary spots in discoidal cell; subapical patches usually much reduced and rarely almost obsolete in wet-season form, but in dry-season form the patches usually broadly developed, especially in spaces 4 to 7, and sometimes partially confluent with obscure brown apical markings. In hindwing spots in basal portion of spaces 1 and 7 and in middle of discoidal cell sometimes 8-shaped; faint spot in the extreme base of space 7 usually present. Other characters as in *hecabe*.

Distal margin of hindwing evenly rounded.

Length of forewing: 20-25 mm.

Male genitalia: Basic structure resembling those of *hecabe*, but P_3 of valva serrate near its apex, distal process of P_4 enlarged and ax-shaped.

This subspecies is distributed from Ceylon and Peninsular India to Indo-China, and the geographically most closely related subspecies is *snelleni* from Peninsular Thailand, Malay Peninsula to Sumatra and Borneo, but in dry-season form of the former the apical patch of forewing

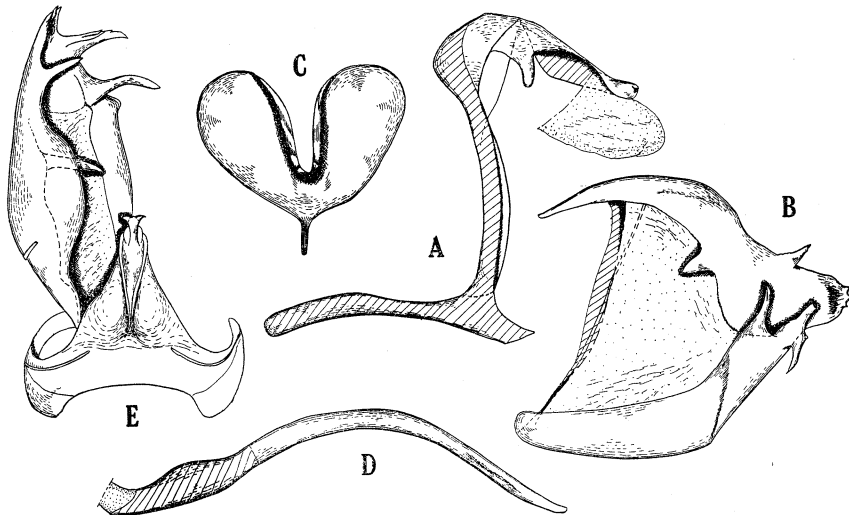


Fig. 4. Male genitalia of *Eurema blanda silhetana* (Wallace, 1867), S. Viet-Nam. A: Lateral aspect of ring. B: Inner aspect of right-hand valva. C: Posterior aspect of juxta. D: Lateral aspect of phallus. E: Dorsal aspect of dorsum and right-hand valva.

underside is strongly developed, while in the latter that is absent or very faint.

This species is distributed from India, China, Indo-China, Formosa to New Guinea and Bismarck Archipelago.

5. *Eurema simulatrix inouei* ssp. nov.

(Pl. 1, figs. 7-8 ♂; Pl. 2, figs. 1-4 ♂; Textfig. 5, ♂ genitalia)

♂. *Upperside*: Ground colour as in *blanda*. In forewing costal border usually narrow. In hindwing inner edge of black distal border serrate and obscure; fringe always black.

Underside: In forewing sex-brand brownish grey and somewhat broader than that of *blanda*; two prominent spots in discoidal cell, of which the larger distal one is always distinctly zigzag-shaped; discocellular spot prominent and a circular spot usually present behind it; apical patch wholly absent or much reduced to a very faint spot in spaces 4 and 5. In hindwing spots in basal portion of space 1 usually 8-shaped, and sometimes so in basal portion of space 7 and in middle of discoidal cell; spot in extreme base of space 7 absent. The other characters almost as in *hecabe*.

Distal margin of hindwing evenly rounded.

Male genitalia: P_2 of valva only weakly produced, proximal process of P_4 slightly sinuate; uncus and phallus resembling those of *hecabe*.

Length of forewing: 22-23 mm.

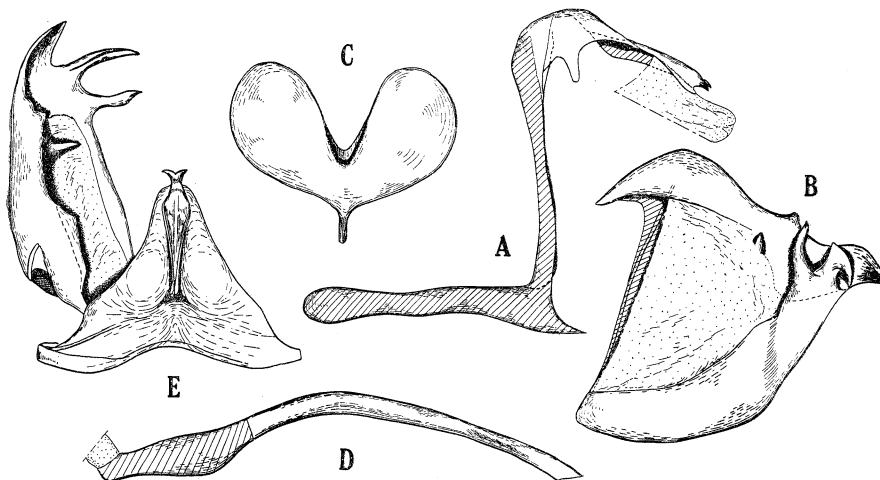


Fig. 5. Male genitalia of *Eurema simulatrix inouei* ssp. nov., S. Viet-Nam. A: Lateral aspect of ring. B: Inner aspect of right-hand valva. C: Posterior aspect of juxta. D: Lateral aspect of phallus. E: Dorsal aspect of dorsum and right-hand valva.

Female: Unknown.

Distribution: South Viet-Nam and Thailand

Holotype ♂. Dinh Quan, South Viet-Nam, 25. iii. 1962, S. Inoue leg. (preserved in Biological Laboratory, College of General Education, Kyushu University). Some paratypes in Mr. S. Inoue's Collection.

Paratypes: 1♂. Dinh Quan, South Viet-Nam, 3. iv. 1960, S. Inoue leg.; 1♂. Dinh Quan, South Viet-Nam, 25. iii. 1962, S. Inoue leg.; 2♂♂. Dinh Quan, South Viet-Nam, 1. vii. 1962, S. Inoue leg.; 1♂. Col de Blao, South Viet-Nam, 7. x. 1962, S. Inoue leg.; 1♂. Kampot, Cambodia, 17. vi. 1962, S. Inoue leg.

The present new subspecies from S. Viet-Nam and Cambodia is quite different from the known subspecies of *simulatrix* in the reduced apical patch of forewing underside which is frequently wholly absent. The similar specimens are also collected at the mountain regions of Thailand. In *E. s. tecmessa* (de Nicéville, 1896) from Burma, Peninsular Thailand, Malay Peninsula, Sumatra and Borneo, the apical patch is strongly developed.

This species is distributed from India, Indo-China to the Philippines and Celebes.

6. *Eurema andersoni andersoni* (Moore, 1886)

(Pl. 4, figs. 1-2 ♂, 3-4 ♀; Textfig. 6, ♂ genitalia)

Specimens examined: Trang Bom, 1♂, 7. viii. 1960, 1♂, 12. xi. 1961, 1♀, 10. vi. 1962, 2♂♂, 15. vii. 1962; 1♂, Ben Nom, 22. iv. 1962; Dinh Quan, 1♂, 7. v. 1959, 2♂♂, 6. v. 1962; 1♂, Banmethuot, 16. viii. 1962; 4♂♂, Kampot (Cambodia), 17. vi. 1962.

♂♀. *Upperside*: Ground colour yellow, and slightly paler than in *hecabe*. Black scales much developed in basal portion of both wings. In forewing costal border broad and distinct; black distal border fairly broad. In hindwing black distal border in the Vietnamese specimens broader than in those from Peninsular Thailand, Malay Peninsula, Sumatra and North Borneo, and this border obscure in space 1, but sometimes black scales scattered toward base of wing; fringe black. ♀ distal border broader than that of ♂.

Underside: In forewing sex-brand brownish grey and slenderer than that of *hecabe*; a single zigzag spot in discoidal cell; discocellular spot usually prominent and sometimes accompanying a small circular spot; apical patch very much reduced, usually represented by faint clouds; subternal spot present in female. In hindwing a series of discal spots in spaces 2 to 6 V-shaped, and arranged in a zigzag line; discal streak in space 7 bisinuate or comma-shaped and directed towards and almost contiguous with discocellular spot; circular spot in basal portion of spaces 1 and 7 and in middle of discoidal cell sometimes irregular 8-shaped; spot

in extreme base of space 7 or 8 absent; discocellular spot of an irregular slender ring; a fine black marginal streak represented by a small black dot at apex of each vein and scattered black scales between dots.

Rs usually stalked with M_1 , even if Rs and M_1 separately, *udc* less than half length of *mdc*, *mdc* less than half length of *ldc*.

Length of forewing: 18-22 mm.

Male genitalia: Tegumen small; P_1 and P_2 of valva slightly produced (the former sometimes obsolete), P_3 almost triangular its apex pointed; P_4 represented by two processes; uncus very long, slightly curved ventrally, with its apical portion strongly projecting posterodorsally and its apex weakly bicuspid; phallus strongly arched dorsally.

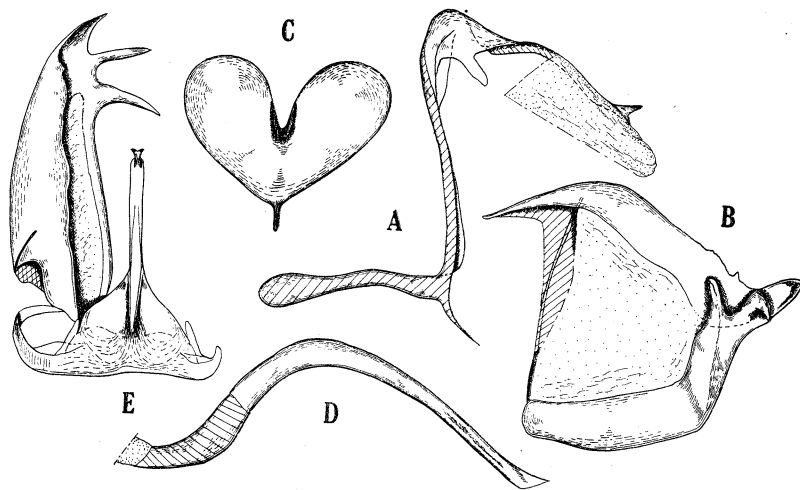


Fig. 6. Male genitalia of *Eurema andersoni andersoni* (Moore, 1886), S. Viet-Nam.
A: Lateral aspect of ring. B: Inner aspect of right-hand valva. C: Posterior aspect of juxta. D: Lateral aspect of phallus. E: Dorsal aspect of dorsum and right-hand valva.

This subspecies is distributed from Indo-China, Malay Peninsula, Langkawi Is., Sumatra to North Borneo and seems to be very closely related to *E. a. udana* (Fruhstorfer, 1910) from West Java, but in the latter the apical markings on the forewing underside are said to be weaker but the other markings more distinct than those in the former.

This species is distributed from India, Sikkim, Indo-China Peninsula, Formosa to Java, Borneo and Palawan.

7. *Eurema sari sodalis* (Moore, 1886)

(Pl. 4, figs. 5-6 ♂; Textfig. 7, ♂ genitalia)

Specimens examined: 6 ♂♂, Kampot (Cambodia), 17. vi. 1962.

♂. *Upperside*: Colour and markings nearly resembling *andersoni*.

Underside: Markings generally weakly developed. In forewing discocellular spot generally small and faint; apical patch large, quadrate and entirely dark chocolate; dark brownish patch at the tornus always present. In hindwing a series of discal spot in spaces 1 to 7 very faint, and arranged in a zigzag line; circular spot in basal portion of spaces 1 and 7 present, but in middle of discoidal cell absent. The other characters almost as in *andersoni*.

Length of forewing: 20-22 mm.

Male genitalia: Structurally resembling those of *andersoni* but uncus shorter and its apical portion much larger.

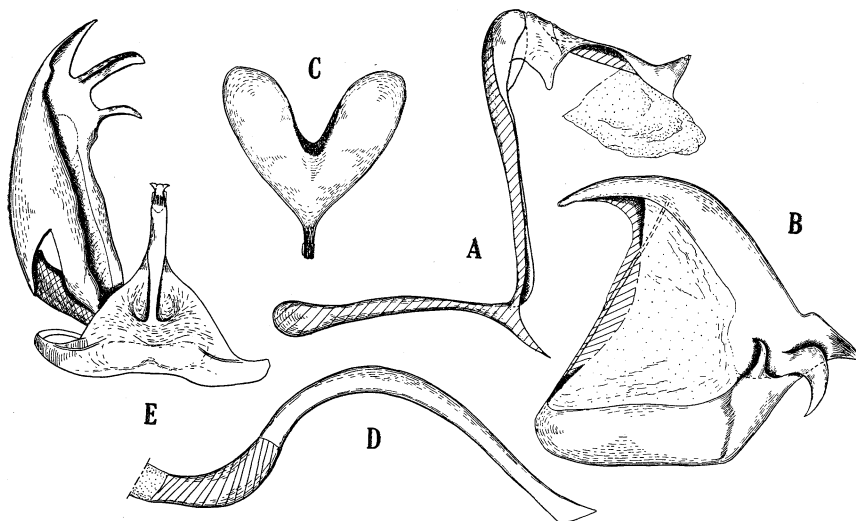


Fig. 7. Male genitalia of *Eurema sari sodalis* (Moore, 1886), Cambodia. A: Lateral aspect of ring. B: Inner aspect to right-hand valva. C: Posterior aspect of juxta. D: Lateral aspect of phallus. E: Dorsal aspect of dorsum and right-hand valva.

This subspecies is distributed from Indo-China, Malay Peninsula, Sumatra to North Borneo, and it seems to be very closely related to *E. s. sari* (Horsfield, 1829) from Java, but in the latter the marking of underside of wings larger and more prominent than those in the former.

This species is distributed in South Burma, Thailand, South Viet-Nam, Cambodia, Malay Peninsula, Sumatra, Borneo, Java and the Phillipines.

8. *Eurema ada iona* (Talbot, 1939)

(Pl. 4, figs. 7-8 ♂)

Specimen examined: 1♂, Col de Blao, 7. x. 1962.

♂. *Upperside*: Ground colour pale greenish yellow. In forewing black costal border very narrow and indistinct. In hindwing black distal border very narrow; fringe black, but mixed with pale greenish yellow. The other characters as in *andersoni*.

Underside: In forewing sex-brand brownish yellow, very short, ending far proximate of origin of vein 2; two prominent spot in discoidal cell; discocellular spot of an irregular, slender ring; apical patch much reduced to small faint spots in spaces 4 to 6. In hindwing a series of discal spots in spaces 2 to 6 obscure, and arranged in a zigzag line; discal streak in space 7 comma-shaped and directed towards and almost contiguous with discocellular spot; prominent circular spot in basal portion of spaces 1 and 7 and in middle portion of discoidal cell, that in space 1 irregularly 8-shaped; a spot at extreme base of space 8 represented by a few scattered black scales; discocellular spot as in forewing; a small black dot at apex of each vein.

Length of forewing: 17.5 mm.

Male genitalia: The male genitalia of the examined specimen were lost by accident, so we give the description of this organ prepared from Bornean specimens.

P₁ and P₂ of valva absent, P₃ elongate triangular, with its apex pointed, distal process of P₄ very flat, broad, and its apical portion somewhat incised, while proximal process very slender; uncus rather long, tapered towards the apex, and slightly curved ventrally, with its apex weakly bicuspid; phallus somewhat curved ventrally.

This subspecies is distributed in Indo-China and Malay Peninsula and it seems to be very closely related to *E. a. toba* (de Nicéville, 1895) which is distributed in N. E. Sumatra, but it is said that in the former the distal borders of forewing upperside are narrowed posteriorly in space 1 and the black distal borders of the hindwing upperside are narrower than in the latter.

This species is rather uncommon and distributed in Burma, Thailand, Viet-Nam, Malay Peninsula, Java, North Borneo and Palawan Is.

9. *Eurema pallida* sp. nov.

(Pl. 5, figs. 1-6 ♂; Textfig. 8, ♂ genitalia)

♂. Wings pale greenish yellow. *Upperside*: In forewing black border of costal margin narrow and indistinct; black distal border more deeply excavated in space 2 than in space 3, and its inner edge in space 1 almost perpendicular to inner margin. In hindwing black distal border very narrow, almost being a black line and rarely reduced to a short fine streak at apex of each vein which are connected with each other by a scattered black scales arranged in a line. Fringe black, but that of hindwing mixed with pale yellow. Only extreme base of both wings blackish.

Underside: Markings not so sharply defined as in *lacteola*. Forewing with two faint spots in discoidal cell, of which the basal one is sometimes omitted; discocellular spot of an irregular slender ring; subapical patches much reduced to a small faint spot in space 4 and rarely in space 5; sex-brand brown, slenderer than that of *hecabe*. In hindwing a series of discal spots in spaces 2 to 6 V-shaped, and arranged in a zigzag line; discal streak in space 7 bisinuate and directed towards and almost contiguous with discocellular spot; a circular spot each in basal portions of spaces 1 and 7 and in middle of discoidal cell; no spot in extreme basal portion of space 7 or 8; discocellular spot as in forewing; a small black dot at apex of each vein.

Distal margin of hindwing evenly rounded. Rs usually stalked with M_1 , even if Rs and M_1 separately, *udc* less than a half length of *mdc*, *mdc* less than a half length of *ldc*.

Male genitalia: Tegumen narrow, triangular in dorsal aspect, somewhat concaved dorsomedially; relative lengths of saccus, ring, dorsum in lateral aspect about 7:8.5:8.5. Uncus very long, slender, extending posteroventrally, with its apical portion strongly projecting posterodorsally, and its apex slightly bicuspid. Valva broad; P_1 shorter than the other processes, P_2 slightly produced and seen as a protuberance, P_3 somewhat slenderer and longer than that of other species of the *hecabe*-group, slightly curving inside, with its apex bluntly pointed, P_4 represented by three processes, which are almost same in length and shape, and fairly curved ventrally. Phallus very long, slender and strongly arched dorsally such as *andersoni*, *sari* and *lacteola*, subzonal portion slightly more than one-fourth in length of phallus. Juxta normal for *Eurema*.

Length of forewing: 19-20 mm.

Female: Unknown.

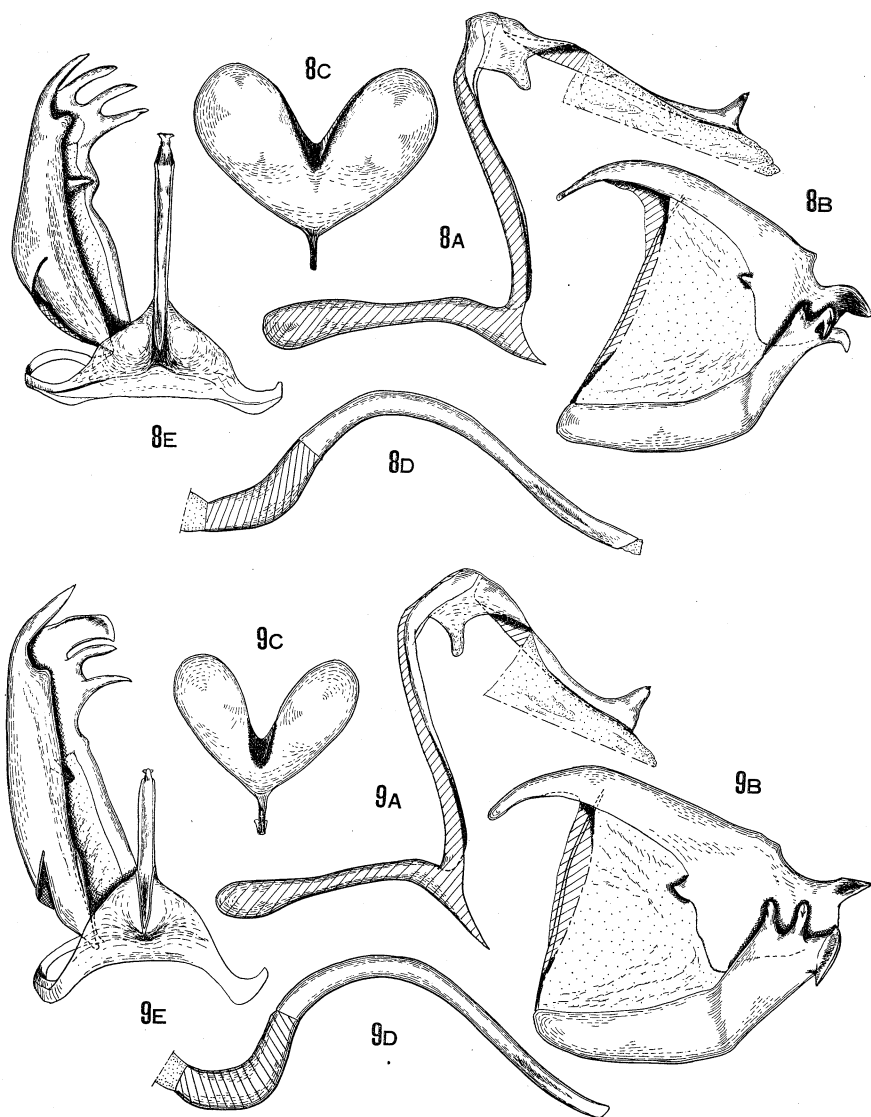
Distribution: South Viet-Nam and Thailand.

Holotype ♂, Bobla, South Viet-Nam, 7. vii. 1962, S. Inoue leg. (preserved in Biological Laboratory, College of General Education, Kyushu University)

Paratypes: 1♂, Bobla, South Viet-Nam, 17. v. 1962, S. Inoue leg.; 1♂, Col de Blao, South Viet-Nam, 7. x. 1962, S. Inoue leg.; 1♂, Chanthaburi, Thailand, collector unknown; 1♂, Nakornrajsima (2000-2600 ft.), Thailand, collector unknown.

Remarks. The present new species seems to be most closely related to *Eurema lacteola* (Distant, 1886) judging from the general appearances and male genital structure, but it may be distinguished from the latter (3♂♂ from Malay Peninsula and 5♂♂, 3♀♀ from Borneo examined) as follows:

In general appearances: 1. Colour of wings paler than in *lacteola*. 2. Underside of wings weakly marked, while in *lacteola* rather distinctly. 3. Black border of costal margin of forewing very faint. 4. Cell spots on underside of forewing generally two, while in *lacteola* only one. 5. Black



Figs. 8-9. Male genitalia of *Eurema* spp. 8: *Eurema pallida* sp. nov., S. Viet-Nam. 9: *Eurema lacteola* (Distant, 1886), N. Borneo. A: Lateral aspect of ring. B: Inner aspect of right-hand valva. C: Posterior aspect of juxta. D: Lateral aspect of phallus. E: Dorsal aspect of dorsum and right-hand valva.

distal border of hindwing very narrow, while in *lacteola* very broad. 6. Circular discoidal cell spot on underside of hindwing present, while in *lacteola* (♂) it is always absent.

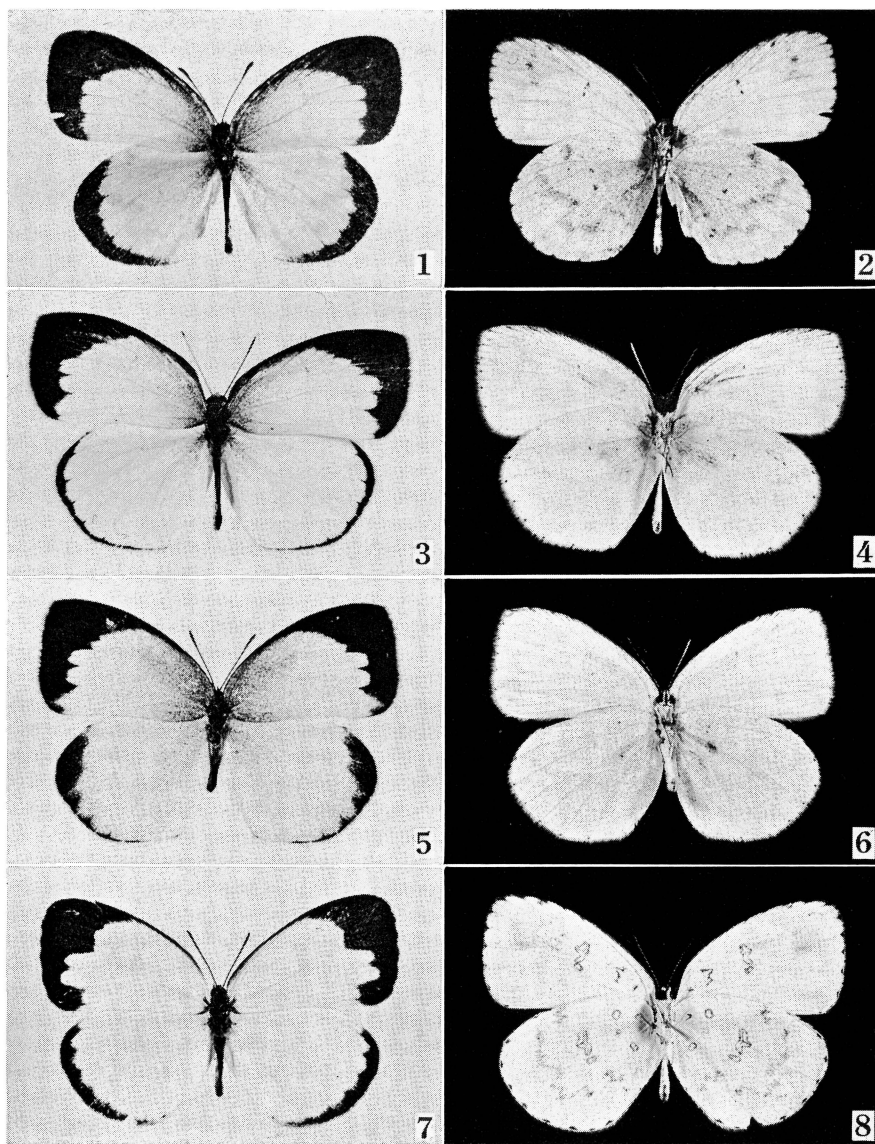
In male genitalia: 1. P_2 appearing as a protuberance, while in *lacteola* almost obsolete. 2. Apex of P_3 of valva not so sharply pointed as in *lacteola*. 3. Distal process of P_4 resembling two other processes, while in *lacteola* much flattened. 4. Uncus longer, with its apical portion not so strongly arched dorsally as in *lacteola*.

Literature

- Corbet, A. S. & Pendlebury, H. M. (1932), A revision of the Indo-Australian species of the genus *Eurema* with special reference to the Malaysian forms. Bull. Raffles Mus. (7): 143-192.
- & ——— (1956), The butterflies of the Malay Peninsula. 2nd ed., London: 135-137.
- Fruhstorfer, H. (1927), Genus *Terias* Swains. in Seitz, Macrolepidoptera of the world 9: 165-172, pl. 73.
- Kawazoé, A. (1966), The Genus *Eurema* of the Oriental Region. Yadoriga (47-48): 17 (In Japanese).
- Métaye, R. (1957), Contribution à l'étude des Lépidoptères du Viet-Nam. Ann. Fac. Sci. Saigon, 1957: 69-106.
- Shirôzu, T. (1960), Butterflies of Formosa in colour: 55-65, Osaka (In Japanese).
- Talbot, G. (1966), The fauna of British India, butterflies 1, 2nd ed.: 513-540, London.

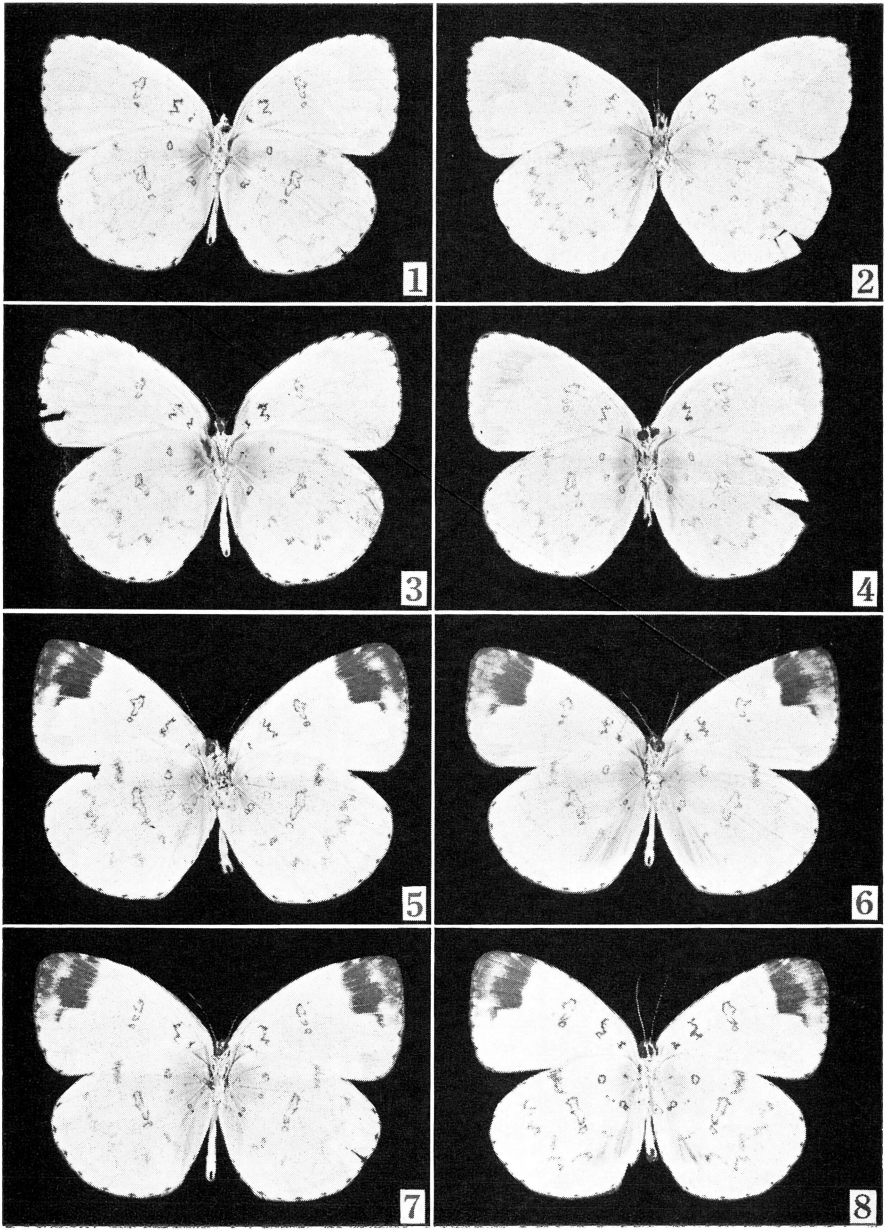
Explanation of Plate 3

1. *Eurema brigitta fruhstorferi* (Moore, 1906), ♂. Dalat, South Viet-Nam, 28. vii. 1962, S. Inoue leg.
2. Ditto, underside.
3. *Eurema laeta sikkima* (Corbet & Pendlebury, 1932), ♂. Bobla, South Viet-Nam, 15. vii. 1962, S. Inoue leg.
4. Ditto, underside.
5. *Eurema laeta sikkima* (Corbet & Pendlebury, 1932), ♀. Bobla, South Viet-Nam, 10. vii. 1962, S. Inoue leg.
6. Ditto, underside.
7. *Eurema simulatrix inouei* Shirôzu et Yata, ssp. nov., ♂ holotype. Dinh Quan, South Viet-Nam, 25. iii. 1962, S. Inoue leg.
8. Ditto, underside.



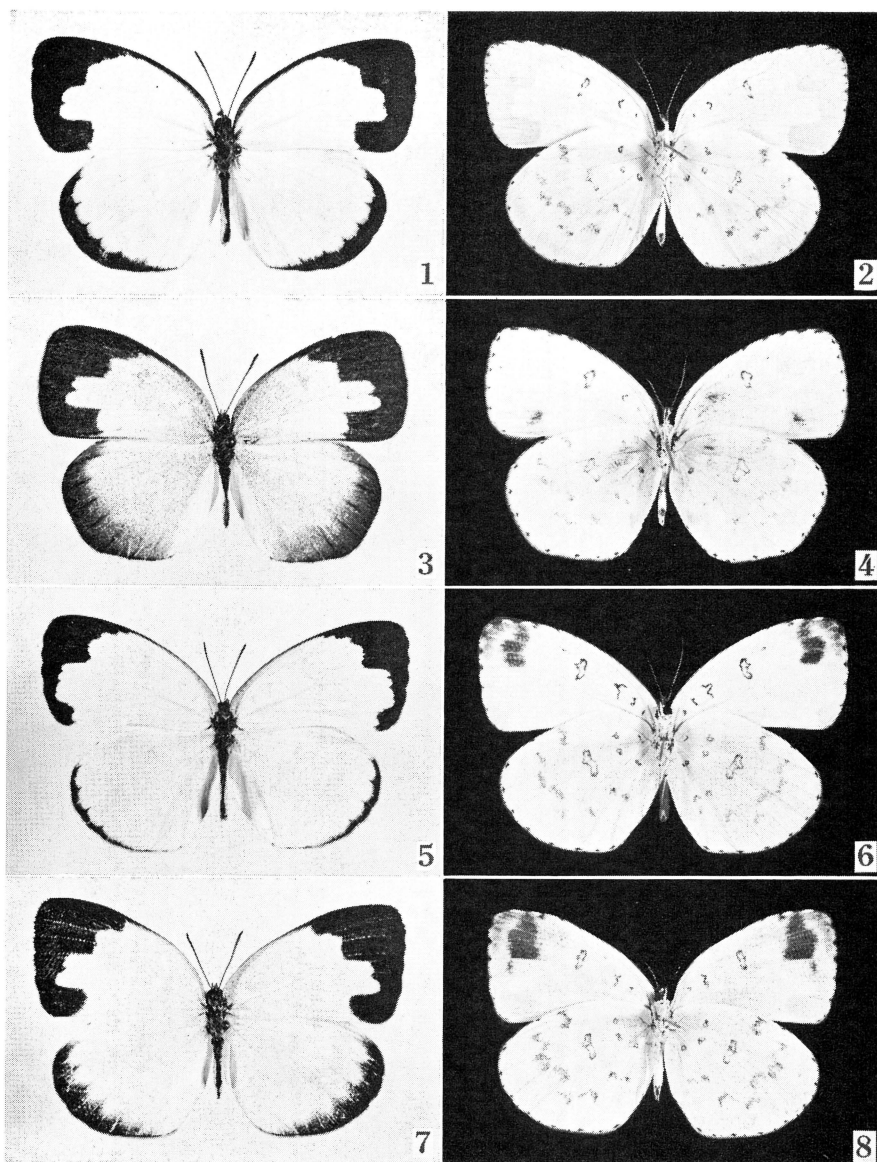
Explanation of Plate 4

1. *Eurema simulatrix inouei* Shirôzu et Yata, ssp. nov., ♂ paratype. Dinh Quan, South Viet-Nam, 1. vii. 1962, S. Inoue leg. underside.
2. *Eurema simulatrix inouei* Shirôzu et Yata, ssp. nov., ♂ paratype. Dinh Quan, South Viet-Nam, 25. iii. 1962, S. Inoue leg. underside.
3. *Eurema simulatrix inouei* Shirôzu et Yata, ssp. nov., ♂ paratype. Col de Blao, South Viet-Nam, 7. x. 1962, S. Inoue leg. underside.
4. *Eurema simulatrix inouei* Shirôzu et Yata, ssp. nov., ♂ paratype. Tukchhov, Kampot, Cambodia, 17. vi. 1962, S. Inoue leg. underside.
5. *Eurema simulatrix tecmessa* (de Nicéville, 1896), ♂. Kao Chong, Trang, Thailand. underside.
6. *Eurema simulatrix tecmessa* (de Nicéville, 1896), ♂. Singapore, Malay Peninsula, 21. iv. 1969. underside.
7. *Eurema simulatrix tecmessa* (de Nicéville, 1896), ♀. Singapore, Malay Peninsula, 21. iv. 1969. underside.
8. *Eurema simulatrix tecmessa* (de Nicéville, 1896), ♂. Samparon, North Borneo, 28. viii. 1968, S. Motoi leg. underside.



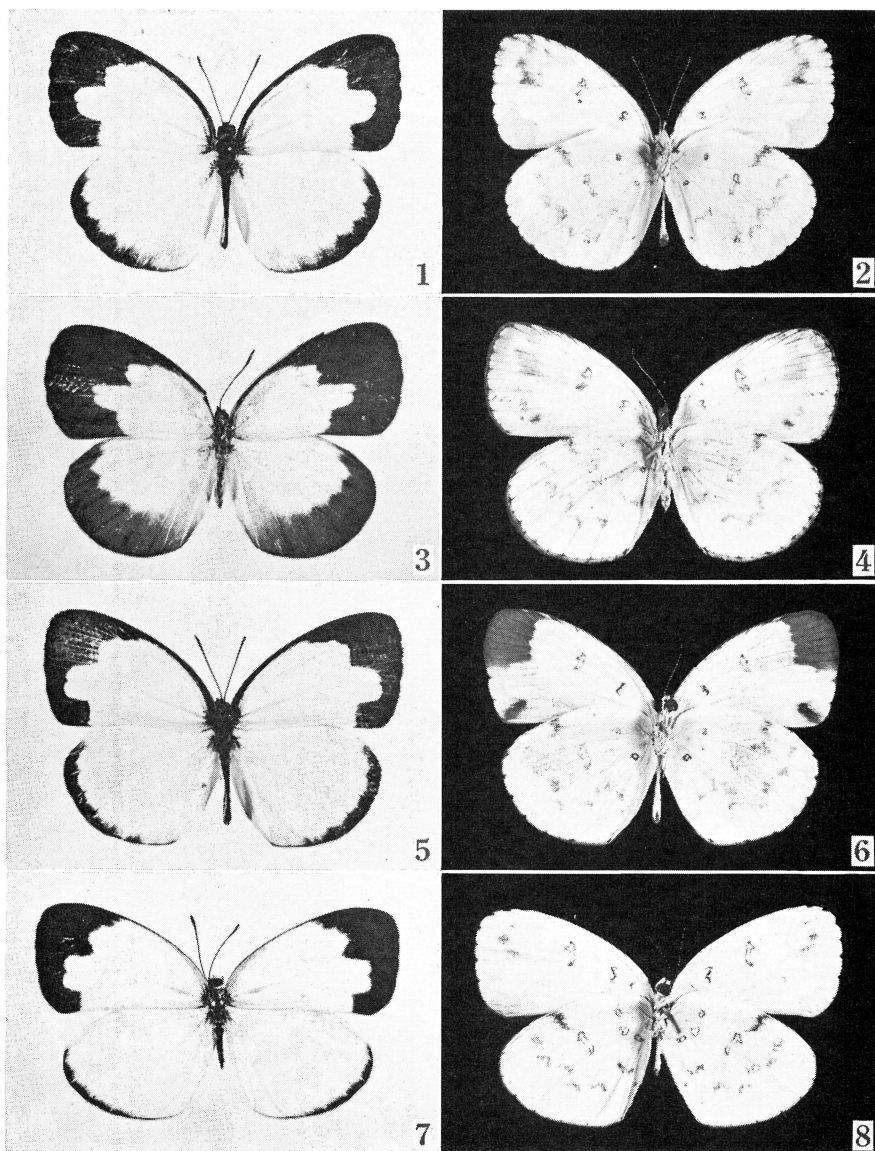
Explanation of Plate 5

1. *Eurema hecabe contubernalis* (Moore, 1886), ♂. Dinh Quan, South Viet-Nam, 6. v. 1962, S. Inoue leg.
2. Ditto, underside.
3. *Eurema hecabe contubernalis* (Moore, 1886), ♀. Blao, South Viet-Nam, 1. vii. 1962, S. Inoue leg.
4. Ditto, underside.
5. *Eurema blanda silhetana* (Wallace, 1867), ♂. Cap St. Jaques, South Viet-Nam, 28. i. 1962, S. Inoue leg.
6. Ditto, underside.
7. *Eurema blanda silhetana* (Wallace, 1867), ♀. Bobla, South Viet-Nam, 30. vi. 1962, S. Inoue leg.
8. Ditto, underside.



Explanation of Plate 6

1. *Eurema andersoni andersoni* (Moore, 1886), ♂. Dinh Quan, South Viet-Nam, 6. v. 1962, S. Inoue leg.
2. Ditto, underside.
3. *Eurema andersoni andersoni* (Moore, 1886), ♀. Trang Bom, South Viet-Nam, 10. vi. 1962, S. Inoue leg.
4. Ditto, underside.
5. *Eurema sari sodalis* (Moore, 1886), ♂. Kampot, Cambodia, 17. vi. 1962, S. Inoue leg.
6. Ditto, underside.
7. *Eurema ada iona* (Talbot, 1939), ♂. Col de Blao, South Viet-Nam, 7. x. 1962, S. Inoue leg.
8. Ditto, underside.



Explanation of Plate 7

1. *Eurema pallida* Shirôzu et Yata, sp. nov., ♂ holotype. Bobla, South Viet-Nam, 7. vii. 1962, S. Inoue leg.
2. Ditto, underside.
3. *Eurema pallida* Shirôzu et Yata, sp. nov., ♂ paratype. Col de Blao, South Viet-Nam, 7. x. 1962, S. Inoue leg.
4. Ditto, underside.
5. *Eurema pallida* Shirôzu et Yata, sp. nov., ♂ paratype. Nakornrajsima (2000-2600 ft.), Thailand.
6. Ditto, underside.
7. *Eurema lacteola* (Distant, 1886), ♂. Sabah, North Borneo, 4. ix. 1970, Y. Yamada leg.
8. Ditto, underside.

