

**A review of the *Delias clathrata* group  
from Irian Jaya and Papua New Guinea**  
(Lepidoptera, Pieridae)

by

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**Abstract.** The recent acquisition of new *Delias* material from the central mountain range of Irian Jaya creates a new view on the *Delias clathrata* group, as defined by TALBOT. As now treated nineteen species and eighteen subspecies are recognized within this group, of which one species and six subspecies are described as new. Four species are given a new status that leads to four new combinations; one subspecies name is treated as a synonym.

## Introduction

Since 1990 I have paid special attention to the butterflies of the *Delias clathrata* group—in TALBOT's Monograph (1928–1937) group 15—for several reasons: many new discoveries, sympatry of those that were thought subspecies and the very beautiful appearance of these butterflies.

The presentation of the *clathrata* group in YAGISHITA (1993) is poor, and moreover some new material was published since. These two reasons, in combination with the need to raise some subspecies up to species level and to make some new combinations, made me decide to revise this group.

A review of this group was not easy, because most of the species are rare to very rare or occur in hard-to-reach localities. Besides that, many members of this group are underrepresented in settlements of *Delias* specimens found at rest. The results from some areas—where it seems that different (sub)species are in transition—and the sometimes insufficient-labelled specimens obtained from collectors were a second and third problem I faced. I mean this. Many specimens from Papua New Guinea are labelled Kerowagi, followed by month and year, without name of village or river, without altitude. This information does not mean that these specimens were collected at Kerowagi nor in its close environment, but only that they were distributed via (IFTA) Kerowagi, where collectors brought or send them to. The same we find with specimens from the area Mulia, Sinak dan Ilu. From Nabire one or more dealers visit these places and buy the results from the local people. Labelling Mulia, Sinak Ilu, a combination of these places or even Nabire, followed by a month and year, gives more information about the visits of the dealer, than about the origine of the butterflies. In cases like this same data do not guarantee sympatry of specimens. Therefore these specimens are less valuable for scientific purpose.

All publications about the *clathrata* group and the material in various museums and private collections in Indonesia, Australia, Japan, United Kingdom, France, Germany, the Netherlands and the U.S.A., were the basis for this review, which will not be the final word. Although many specimens, books and articles were to my disposal, I feel this is still very limited. New material and more intensive studies—especially concerning genitalia and DNA—could lead to another view, than brought in this study.

## Depositories

The abbreviations given below have been used in the list of material and throughout the text.

AMNH	American Museum of Natural History, New York City, U.S.A.
AY	Private collection of AKIRA YAGISHITA, Tokyo, Japan
BMNH1	The Natural History Museum, Museum collection, London, U.K.
BMNH2	The Natural History Museum, Type collection, London, U.K.
BMNH3	The Natural History Museum, ROTHSCHILD collection, London, U.K.
BMNH4	The Natural History Museum, LEVICK collection, London, U.K.
BT	Private collection of BERNARD TURLIN, Andrésey, France
DB	Private collection of DANNY BURK, Mishawaka, U.S.A.
DM	Private collection of DAVID MANNERING, Three Oaks, Hastings, Kent, U.K.
DSM	Darwin State Museum, Moscow, Russia
EMEM	Entomologisches Museum Eitschberger, Marktleuthen, Germany
FU	Private collection of FUNAHASHI, Nagoya, Japan
GG	Private collection of FRED GERRITS, Buderim, Australia
HA	Private collection of HAYAMI ARIMA, Tokyo, Japan
HM	Private collection of author, Jayapura, Indonesia
JL	Private collection of JEAN-FRANÇOIS LABBÉ, Olivet, France
KMNH	Kitakyushu Museum of Natural History, Tokyo, Japan
MZB	Museum Zoologicum Bogoriense, Bogor, Indonesia
PS	Private collection of PHIL SAWYER, Sunbury, Australia
RG	Private collection of ROBERT GOTTS, Winmalee, Australia
RMNH	Nationaal Natuurhistorisch Museum (Rijksmuseum van Natuurlijke Historie), Leiden, The Netherlands
SM	Private collection of SADAYUKU MORITA, Tokyo, Japan
SN	Private collection of SHOJI NAKANO, Tokyo, Japan
SS	Private collection of SATOSHI SAKUMA, Kanagawa, Japan
UF	Collection of University of Florida, College of Liberal Arts & Sciences, Gainesville, Florida, U.S.A.
VS	Private collection of VOLKER SCHNEIDER, Heidelberg, Germany
VT	Private collection of VASIL K. Tuzov, Moscow, Russia
ZMA	Instituut voor Taxonomische Zoölogie, Zoölogisch Museum, Amsterdam, The Netherlands
ZMB	Zoologisch Museum Berlin, Germany

## Taxonomy

### The identity of the *clathrata* group

HÜBNER [1820] divided the various white butterflies in a number of genera. The fifth group was mentioned *Deliaden*, *Deliades*, with genus name *Delias*. As diagnosis HÜBNER stated "Die Flügel buntfärbig, die Senken nahe an ihrer Wurze roth gefleckt." This means: "the wings are colourful; the hindwings near their basis with red spots." TALBOT (1928) stated that probably the genus *Huphina* provided the ancestral form of *Delias*, a form with a black or white or yellow under surface to the hindwing, without definite pattern. The many and most diverse and distinct patterns cause that the relationships are too obscure to be unravelled at that time. TALBOT realized that classifying the forms within the genus *Delias* was difficult, and added that future discoveries might necessitate some changes. When TALBOT (1937) defined the *clathrata* group, he recognized seven species with only four subspecies. He stated that this group is allied to the *albertisi* group, to which it bears a general structural genital resemblance. Also the pattern of this group—although not homogenous—resembles that in the *albertisi* group. TALBOT mentioned three external features of this group, i.e. (1) a black discal spot on the underside of the hindwing and also (2) a short subbasal band, which is sometimes only

represented by a spot; (3) the inner area of the hindwing powdered with yellow or orange scales. Finally TALBOT (1937) mentioned that the *clathrata* group and *albertisi* group (group 14) together seemed to have a closer relationship to the species of the *bornemanni* group (group 7), than to the members of the *niepelti* group (group 16). After TALBOT new publications increased the number of species and subspecies in this group.

The new material added to this group after TALBOT (1937), which material surely is related with the older members of this group, made the three external features of this group, as mentioned by TALBOT, less relevant as three characteristic features for all members of the *clathrata* group. At one hand the number of exceptions increased, on the other hand similar features can be found in (species of) other groups. TALBOT mentioned already the close relationship with the *albertisi* group; and that these two groups together have "a closer relationship to the species of the *bornemanni* group, than to the members of the *niepelti* group". These clarifications and the new material available now lead to another understanding of relationships within the genus *Delias*, than the TALBOT's in his Monograph. This was already worked out in the unpublished manuscript of REISSINGER (1991) and I agree with his opinion that the *albertisi* group, the *caroli* group, the *bornemanni* group and the *geraldina* group partly (i. e. *hypomelas*, *argentata*, *heroni*, *itamputi*, *thompsoni*, *sphenodiscus* and *nigropunctata*) are more or less strongly related to the *clathrata* group, and probably should be included.

Nevertheless, I restrict me in this review to the *clathrata* group, as defined by TALBOT. However, the three external features should be seen in combination, and in addition a fourth feature, a small black border from apex to anal area, which is not connected with black band. This leads to the combination of the following external features on the underside of hind wing:

1. a black band in the basal area; in some species very broad, forming a black hook with the black area along the anal margin, in some other species integrated in black inner part and sometimes reduced to one or more concentrations of black scales;
2. a black discal spot outside the discal cell, which is very obvious in some species; in other species reduced or nearly absent; in still other species absent, but sometimes showing some signs of a former black spot, at the discal edge of the black area;
3. a powdering of yellow, orange or maroon to brown scales at inner area (= anal border);
4. a thin black border from apex to anal area, not connected with black band in basal area at inner margin.

These four features together—with all their varieties—are to define the *clathrata* group and to separate it from the other groups, especially from the *albertisi* group (with broad black border), from the *bornemanni* group (with the absence of coloured scales at inner area and/or small black border connected with black band), and from the members of the *geraldina* group (with absence of coloured scales at inner area and/or black discal spot partly inside discal cell).

However, these features are no easy instruments to define the various species within this group. To make a good diagnosis of the species, I decided to divide the *clathrata* group in the following subgroups:

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| <p>I. <i>clathrata</i> subgroup, including</p> <ol style="list-style-type: none"> <li>1. <i>clathrata</i> ROTHSCILD, 1904</li> <li>2. <i>neeltje</i> GERRITS &amp; MASTRIGT, [1993]</li> </ol> <p>II. <i>elongatus</i> subgroup, including</p> <ol style="list-style-type: none"> <li>1. <i>elongatus</i> KENRICK, 1911</li> </ol> <p>III. <i>mariae</i> subgroup, including</p> <ol style="list-style-type: none"> <li>1. <i>mariae</i> JOICEY &amp; TALBOT, 1916</li> <li>2. <i>menoensis</i> JOICEY &amp; TALBOT, 1922</li> <li>3. <i>bobaga</i> MASTRIGT, 1990</li> <li>4. <i>sigit</i> MASTRIGT, 1990</li> <li>5. <i>walshae</i> ROEPKE, 1955</li> <li>6. <i>hemianops</i> GERRITS &amp; MASTRIGT, [1993]</li> <li>7. <i>fioretti</i> MASTRIGT, 1996</li> </ol> | <p>IV. <i>catocausta</i> subgroup, including</p> <ol style="list-style-type: none"> <li>1. <i>catocausta</i> JORDAN, [1912]</li> <li>2. <i>sawyeri</i> spec. nov.</li> </ol> <p>V. <i>mira</i> subgroup, including</p> <ol style="list-style-type: none"> <li>1. <i>mira</i> ROTHSCILD, 1904</li> <li>2. <i>inexpectata</i> ROTHSCILD, 1915</li> <li>3. <i>roepkei</i> SANFORD &amp; BENNETT, 1955</li> <li>4. <i>hiemalis</i> ROEPKE, 1955</li> <li>5. <i>autumnalis</i> ROEPKE, 1955</li> <li>6. <i>nakanokeikooe</i> YAGISHITA, 1993</li> </ol> <p>VI. <i>klossi</i> subgroup, including</p> <ol style="list-style-type: none"> <li>1. <i>klossi</i> ROTHSCILD, 1915</li> </ol> |
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### Taxonomic history of the species involved

*D. clathrata* is described by ROTHSCHILD (1904) from the rivers Aroa and Angabunga in South East Papua New Guinea. JORDAN (1930) added *D. clathrata limata* from Herzog Mountains. PARSONS (1998) expressed his doubt about this subspecies in saying that considering the regional and local variability of *clathrata*, *limata* is probably not a valid race. GERRITS & MASTRIGT [1993] described a closely related species from the central mountain range in Irian Jaya (about 800 km to the west) as *D. neeltje*, the same species was later described by YAGISHITA (1993) as *D. clathrata sakumai*.

*Delias elongatus* is described by KENRICK (1911) not from a male, as stated but from a female, from the Arfak Mountains, the northwest part of Irian Jaya, not North-East Dutch New Guinea as mentioned by TALBOT (1937). No new subspecies or closely related species are known.

*Delias catocausta* is described by JORDAN (1912, not 1911 as usually stated) from Mount Goliath. ROEPKE (1955) described *D. catocausta nigerrima* as "a weak subspecies, if any" from the Andreae River, about 60 km west of Mount Goliath. New material from Korupun and Silakma made me decide to treat *nigerrima* as a synonym of *catocausta*. MASTRIGT (1990) finally described *D. catocausta eefi*, from Tembagapura at the southside of Puncak Jaya (former Carstensz Peak), based on seven males; here I add the description of the female. Tuzov (1995) put this taxon on species level and added "(bona sp.?)"

As a result of the WOLLASTON expedition to the Snow Mountains of south Irian Jaya, ROTHSCHILD (1915) described *D. klossi*. ROEPKE (1955) added *D. klossi chrysanthemum* from Ibele Valley and Puncak Trikora (former Mount Wilhelmina). New material from Tembagapura, Ilaga, Mulia, Kanggime, Korupun, Langda and even from Star Mountains shows a large variety, which will lead here to the description of two new subspecies.

From the same expedition resulted *D. inexpectata* ROTHSCHILD, 1915, based on a single male. ROEPKE (1955) and D'ABRERA (1971, 1977, 1990) treated this species as a subspecies of *D. mira*. YAGISHITA (1993) reinstalled it to species level as is accepted in this review.

*D. mariae* was originally described by JOICEY & TALBOT (1916) from the Wandammen Mountains—not from the Arfak Mountains as mentioned by TALBOT (1937). Other than the two males and two females, collected by A., C. & F. PRATT in November 1914, no additional specimens were recorded. JOICEY & TALBOT (1922) described *D. mariae menooensis* from the Weyland Mountains, where the PRATTS took a series of both sexes on Mount Kunupi and in Menoo Valley from November 1920 to January 1921.

ROEPKE (1955) described *D. mariae walshae* from a male and female taken at the Ibele Valley/Top Camp 1938–1939. This subspecies treated by D'ABRERA (1971, 1977, 1990) as a synonym for *D. mariae menooensis*. YAGISHITA (1993) brought *walshae* to species level and pictured two males and two females from Ilu, Mulia and Ilaga. SAKUMA (1999) described *D. hemianops sanaeae* from Pass Valley from a single male. This subspecies will be treated here as subspecies of *Delias walshae*, which occurs in the nearby Baliem Valley. ROEPKE (1955) described *D. mariae boschmai* from two males, taken at the Arabu River, 1800 m, in October 1939. In this paper *walshae* will be treated as a good species, as done by YAGISHITA (1993) and Tuzov (1995), *menooensis* will be brought to species level and *boschmai* will be treated as subspecies of *menooensis*.

MASTRIGT (1990) described *D. sigit* from fiftyfour males, recorded in the Ilaga-Mulia-Ilu area. YAGISHITA (1993) pictured the female and put *sigit* as a subspecies of *mariae*. So did Tuzov (1995). MASTRIGT (1990) also described *D. bobaga* from twentyseven males, collected in the Kamu Valley and in the Mapia area, and later (1996b) described and pictured the female and added a new subspecies from a more eastern area as *D. bobaga homeyo*.

GERRITS & MASTRIGT [1993] described *D. hemianops* from six males and two females, collected at Abmisibil in Star Mountains.

MASTRIGT (1996b) described *D. fioretti* from six males and one female, collected at Pass Valley, north of Baliem Valley.

*Delias mira* was originally described by ROTHSCHILD (1904) from the Aroa and Angabunga River in the Owen Stanley Range, South East Papua New Guinea. ROTHSCHILD (1925) added *D. mira reversa* from the Sattleberg and Rawlinson Mountains. JORDAN (1930) described *D. mira excelsa* from Herzog Mountains. PARSONS (1998) sank *excelsa* to synonym of *D. mira mira*, an interpretation that will not be

taken over here. SANFORD & BENNETT (1955) published *D. mira roepkei* from Kerowagi and Kundiawa, Simbu Province, Papua New Guinea. In the same year ROEPKE described *D. mira autumnalis* from Baliem Valley in Irian Jaya and *D. mira hiemalis* from Arabu River, Paniai. Tuzov (1995) brought *autumnalis* to species level, with addition "(bona sp.?)", and put *hiemalis* as a subspecies. Also PARSONS (1998) stated that *autumnalis* should be considered as a distinct species. This paper I follow Tuzov and PARSONS, and describe *autumnalis* as a good species. In addition will be described two new subspecies. NAKANO (1994) described *D. mira michiae* from five males, collected at Pass Valley. Probably this species was known by Tuzov (1995) when he mentioned *mira* ssp. n. from Baliem Valley. TAZOV & CHURKIN (1998) described *D. mira mavrodii* from Baliem Valley. Here *michiae* will be treated as subspecies of *D. autumnalis* and *mavrodii* as a junior synonym for *michiae*. *D. hiemalis* will be brought to species level, while in addition two new subspecies will be described. *D. mira flabella* MASTRIGT, 1996, will be treated as subspecies of *D. hiemalis*. YAGISHITA (1993) did not accept *roepkei* as a good subspecies and put it as "*f. roepkei*" under *D. excelsa*, which was taken over by Tuzov (1995). Here *roepkei* will be brought to species level. ARIMA (1996) described *D. mira cieko* from nine males, collected at Waniak, on the northern side of the central mountain range between Baliem Valley and Star Mountains. In the same article he pictured (Pl. 1, fig. 8) a female of "*Delias mira* ssp." which is probably the female of *michiae*. MASTRIGT (1996b) described *D. mira reissingeri* from various localities in the eastern part of the central mountain range in Irian Jaya. Here *D. mira reissingeri* will be treated as junior synonym for *D. mira cieko*, and *cieko* as subspecies of *D. roepkei*. YAGISHITA (1993) described *D. nakanokeikoe* from four males, recorded in the Ilu-Mulia area. MASTRIGT (1996b) added *nakanokeikoe jali* from Pass Valley, described from two males.

### Keys to the (sub)species of the *clathrata* group

1. Underside of forewing with band of large creamy subapical and terminal spots from costa to inner margin *D. elongatus*
  - Underside of forewing with less developed spots which are yellow, orange, red or brown. . . . . 2
2. Underside of hindwing with large brown or brown grey discal area. 6
  - Underside of hindwing much brighter . 3
3. Underside of hindwing with seven brown streaks: in the under part of discal cell and in the upper parts of cells Rs, M<sub>1</sub>, M<sub>2</sub>, M<sub>3</sub>, Cu<sub>1a</sub> and Cu<sub>1b</sub> . . . . 4
  - Underside of hindwing with inner part black and outer part bright: from pale yellow to deep orange. 13
4. Underside of forewing with discal cell totally covered by dark streak. . . . . 5
  - Underside of forewing with discal cell partly covered by dark streak. . . . . *D. neeltje*
5. Underside of hindwing with dark discal area only divided by veins *D. clathrata clathrata*
  - Underside of hindwing with dark discal area smaller and with more white between streaks . . . . . *D. clathrata limata*
6. On underside of hindwing between dark discal area and black border no colouration, coloured streaks or coloured diffusion 7
  - On underside of hindwing between dark discal area and black border coloured streaks or bright coloured spots in cells Cu<sub>1b</sub>, Cu<sub>1a</sub> and M<sub>3</sub>, sometimes extending to M<sub>2</sub>, M<sub>1</sub> or Rs. . . . . 22
7. Underside of forewing totally black. 8
  - Underside of forewing white with black border only. . 9
8. Underside of hindwing brown with veins in same colour *D. catocausta catocausta*
  - Underside of hindwing with white veins *D. catocausta eefi*
9. Underside of hindwing without white line between dark discal area and black border *D. sawyeri*
  - Underside of hindwing with white line between dark discal area and black border 10
10. Underside of hindwing from middle of costal border to apex black . . . *D. klossi klossi*
  - Underside of hindwing with black spot at middle of costal border followed by a thin brown streak towards apex. 11

11. Underside of hindwing with less obvious white veins . . . . . *D. klossi chrysanthemum*
- Underside of hindwing with very striking white veins, especially Rs and M<sub>3</sub> . . . . . 12
12. Upperside of hindwing with regular black border of about 3 mm width . . . . . *D. klossi gome*
- Upperside of hindwing with very narrow border, which is undulate at inner edge from fore M<sub>2</sub> to tornus . . . . . *D. klossi okse*
13. Underside of hindwing inner part of costa white . . . . . 14
- Underside of hindwing with black costa . . . . . 18
14. Underside of hindwing with red basal spot . . . . . 15
- Underside of hindwing with yellow basal spot . . . . . 16
15. Underside of hindwing largely yellow orange . . . . . *D. inexpectata*
- Black area on underside of hindwing dominant, enclosing the outer part of the discal cell . . . . . *D. mariae*
16. Small yellow basal spot at underside of hindwing bordered by black area . . . . . *D. sigit*
- Broad yellow basal spot on underside of hindwing connected with yellow scales of anal area . . . . . 17
17. Deep yellow colour on underside of hindwing . . . . . *D. bobaga bobaga*
- Pale yellow colour on underside of hindwing . . . . . *D. bobaga homeyo*
18. Underside of hindwing with red basal spot . . . . . 19
- Underside of hindwing without basal spot . . . . . 20
19. Underside of forewing with much black diffusion . . . . . *D. menooensis menooensis*
- Underside of forewing with large white area . . . . . *D. menooensis boschmai*
20. Border between black and light areas on underside of hindwing convex . . . . . 21
- Border between black and light areas on underside of hindwing a more-or-less straight line . . . . . 23
21. Underside of hindwing pale yellow . . . . . *D. walshae walshae*
- Underside of hindwing deep yellow to orange . . . . . 22
22. Under- and upperside of forewing with broad black border absorbing dc-bar . . . . . *D. walshae saccaeae*
- Under- and upperside of forewing with reduced black border; dc-bar visible . . . . . *D. walshae ilu*
23. Underside of forewing black, except marginal border . . . . . *D. hemianops*
- Underside of forewing with large white area having black veins . . . . . *D. fioretti*
24. Underside of hindwing with white veins . . . . . 25
- Underside of hindwing with coloured veins . . . . . 29
25. Underside of hindwing with yellow or orange basal spot . . . . . *D. autumnalis michiae*
- Underside of hindwing with red to brown basal spot . . . . . 26
26. Underside of hindwing with red . . . . . 27
- Underside of hindwing with brown basal spot . . . . . 28
27. Underside of forewing largely white . . . . . *D. autumnalis autumnalis*
- Underside of forewing black . . . . . *D. autumnalis hiberna*
28. Underside of hindwing with vivid maroon basal spot . . . . . *D. nakanokeikoeae nakanokeikoeae*
- Underside of hindwing with dark brown basal spot . . . . . *D. nakanokeikoeae jali*
29. Underside of hindwing with yellow basal spot . . . . . 30
- Underside of hindwing with red to brown basal spot . . . . . 34
30. Upperside of forewing up to 30% white . . . . . 31
- Upperside of forewing more than 40% white . . . . . 33
31. Underside of hindwing with bright yellow spot in lower 1/3 . . . . . *D. mira excelsa*
- Underside of hindwing with pale yellow spot in lower 1/3 . . . . . 31
32. Underside of hindwing with pale yellow spot filling about 4/5 of cells M<sub>3</sub> and Cu<sub>1a</sub> . . . . . *D. mira mira*
- Underside of hindwing with pale yellow spot filling less than 2/3 of cells M<sub>3</sub> and Cu<sub>1a</sub> . . . . . *D. mira reversa*
33. Underside of forewing with small yellow subapical spots . . . . . *D. roepkei roepkei*
- Underside of forewing with large yellow or orange subapical spots . . . . . *D. roepkei cieko*
34. Underside of forewing partly white and with black diffusion . . . . . 35
- Underside of forewing black with only anal border white . . . . . 36

35. Underside of hindwing with yellow anal area and yellow subterminal parts of cells 2A, Cu<sub>1b</sub> and Cu<sub>1a</sub> *D. hiemalis hiemalis*  
 Underside of hindwing with orange brown anal area and white subterminal parts of cells 2A, Cu<sub>1b</sub> and Cu<sub>1a</sub>, with short orange brown streaks. *D. hiemalis flabella*
36. Underside of hindwing with large brown orange central area and reduced light part at inner side of black border *D. hiemalis labbei*  
 Underside of hindwing with dirty brown central area and very broad light area at inner side of black border. *D. hiemalis nemangkawi*

## Distribution

All members of the *clathrata* group are endemic on the mainland of Irian Jaya and Papua New Guinea, the island—in literature—known as New Guinea. Former German New Guinea and former British New Guinea became together Papua New Guinea (P.N.G.) east from the 141° E. longitude; and at the westside former Dutch New Guinea became the Indonesian province West Irian and now named Irian Jaya. Neither subspecies nor close related species are known from regions outside of this island. The members of this *clathrata* group are found in mountainous areas and none of these is known from below 1,400 meters. In Irian Jaya most of them occur between 1,600 and 2,400 meters. Two exceptions may be noticed, i. e. *D. inexpectata* that normally is collected from about 2,600 to over 3,000 meters and *D. klossi* that seems to be more common over 2,400 meters. In Papua New Guinea *D. roepkei* is recorded up to 3,600 meters.

From the nineteen species recognized on New Guinea, in the most western mountain ranges only one species is known from the Arfak Mountains and another one from the Wandammen Mountains. From the Weyland Mountains, Kamu Valley and Paniai District the same three species are known. In the more eastern Homeyo area also three species are found. Four species are recognized from the more southern area around the Carstensz Peak. The largest number (seven) of members of the *clathrata* group occurs in environment of Mulia, Ilaga and Ilu. Farther to the east the number of sympatric species is decreasing: six species are known from Pass Valley, four from Baliem Valley, three from the southside of the central mountain range at Korupun and at Langda (close to Mount Goliath); and also three from Star Mountains. From Chimbu Province (often written as Simbu Prov.), Herzog Mountains two species are known; from the Rawlinson Mountains on the Houn-peninsula only one, and two species again from Owgarra/Woitape area and from the Owen Stanley Range.

Seven species are very local and are only known from a single locality or area. Two species have a quite wide distribution; only a single species is known from both sides of the 141° E. longitude, the border between Irian Jaya and Papua New Guinea. However, it is not impossible that two species found near the border in Irian Jaya, will be found also at the PNG-side. Only there is no recent material from Star Mountains at Papua New Guinea side available.

In table 1 and on map 1 the distribution of the members of the *clathrata* group is set out systematically. However, from the eighteen areas mentioned, thirteen are in Irian Jaya and only five in Papua New Guinea. Less detailed, incomplete and doubtful data from Papua New Guinea (besides the mostly well-dated material in BMNH) and the lots of material available from Irian Jaya (besides collections in BMNH, MZB, RMNH and ZMA a large number of specimens often collected by author himself and local assistants) explain the more detailed data of distribution in Irian Jaya in comparison with Papua New Guinea, although the vastness of the mountain ranges in both parts is more or less similar. So, it is not impossible that in the future more new (sub)species will be found in Papua New Guinea, when unknown areas will become target for new surveys.

Finally can be stated that all species occurring in more than one area according to table 1, probably occur in one vast area, enclosing the separate areas of table 1, which is more or less visible in map 1. The absence of *catocausta* in the Ilaga-Mulia-Ilu area, in Pass Valley and in Baliem Valley cannot be seen as an exception, as this species occurs only at the southside of the central mountain range and is absent in the "interior" or northside of the central mountain range.

The members of the *clathrata* group are poorly represented in large settlements of *Delias* resting on wet stones along rivers. Generally spoken never large groups or populations of this group are found (in contrary with the members of *geraldina* group, *eichhorni* group, *iltis* group or *weiskei* group), but only one or a few specimens on the same spot and time. On the other hand the number of females recorded is relatively high. Two reasons may be mentioned. At first that—as said above—these *Delias* are less found in settlements, existing of (nearly) only males. Another reason is the lower altitude in the mountain ranges where these species are found, so that the locality where females occur—often the highest altitude of the area where in the males occur—is not to far from population centers and can be reached with not too extreme efforts.

table 1: distribution of all members *Delias clathrata* group

name of species / area	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
<i>D. elongatus</i>	x																	
<i>D. catocausta</i>							x				x	x						
<i>D. sawyeri</i>														x				
<i>D. neeltje</i>								x										
<i>D. clathrata</i>														x	x		x	x
<i>D. klossi</i>						x	x	x	x	x	x	x	x					
<i>D. mariae</i>	x																	
<i>D. menoaensis</i>			x	x	x													
<i>D. bobaga</i>			x	x	x	x												
<i>D. sigit</i>								x										
<i>D. walshae</i>								x	x	x								
<i>D. hemianops</i>													x					
<i>D. fioretti</i>									x									
<i>D. inexpectata</i>						x												
<i>D. hiemalis</i>			x	x	x	x	x	x										
<i>D. autumnalis</i>								x	x	x								
<i>D. nakanokeikoe</i>								x	x									
<i>D. roepkei</i>									x	x	x	x	x	x				x
<i>D. mira</i>															x	x	x	
number of spp.	1	1	3	3	3	3	4	7	6	4	3	3	3	3	2	1	2	2

explanation of the areas 01–18 in table 1

#### IRIAN JAYA

01. Arfak Mountains

02. Wandammen Mountains

03. Weyland Mountains

04. Kamu Valley (Moanemani)

05. Paniai/Lake district (including Tigi & Tage), former Wisselmeren

06. Homeyo area (east of Lake district)

07. Tembagapura/Puncak Jaya (former Carstensz Peak)

08. Ilaga-Mulia-Ilu (between Homeyo and Baliem Valley)

09. Pass Valley (from top mountain at KM 52 to north east)

10. Baliem Valley (incl. River Suwage at KM 48), Gunung Trikora (former Wilhelmina top) & Habbema Lake

11. Korupun (between Baliem Valley and Landa)

12. Langda and Mount Goliath (about 140° longitude in southern part of central mountain range)

13. Star Mountains (including Gunung Mandala, former Juliana Top) only west of 141° longitude.

#### PAPUA NEW GUINEA

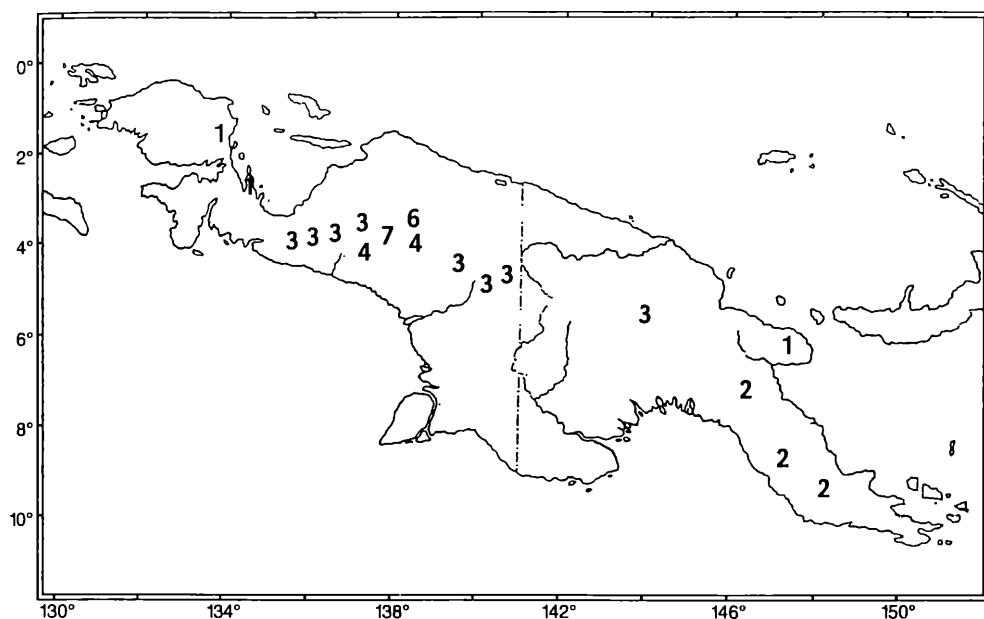
14. Chimbu Province

15. Herzog Mnts.

16. Rawlingson Mnts.

17. Owgarra/Woitape and environment

18. Owen Stanley Range



Map 1: Distribution of members of *Delias* group 15 (see table 1)

## Descriptions

### *Delias clathrata* subgroup

#### Diagnosis

The *Delias clathrata* subgroup consists of *Delias clathrata* ROTHSCHILD, 1904 and *Delias neeltje* GERRITS & MASTRIGT, [1993]. These species differ from all other species in this group on the underside of the hindwing by a submedian band of seven brown to grey brown spots from costa to dorsum, without covering the veins.

### *Delias clathrata* ROTHSCHILD, 1904

(map 2)

#### Diagnosis

*Delias clathrata* differs from *Delias neeltje* by the yellow subapical and terminal spots on the underside of the forewing.

### *Delias clathrata clathrata* ROTHSCHILD, 1904

(map 2, figs 1–6)

ROTHSCHILD (1904: 315, pl. XI, figs 7, 8, 9): *Delias clathrata*

FRUHSTORFER (1910: 130, t. 56e): *Delias clathrata*

N.B. FRUHSTORFER wrongly mentioned "R. & J." as author

TALBOT (1928: 31, 50): *Delias clathrata*  
 TALBOT (1929: 112, pl. IV, fig. 93): *Delias clathrata*  
 TALBOT (1932: 102): *Delias clathrata*  
 TALBOT (1937: 354–355): *Delias clathrata clathrata*  
 D'ABRERA (1971: 142): *Delias clathrata clathrata*  
 D'ABRERA (1971: figs): *Delias clathrata*  
 D'ABRERA (1977: 142): *Delias clathrata clathrata*  
 D'ABRERA (1977: figs): *Delias clathrata*  
 D'ABRERA (1990: 142): *Delias clathrata clathrata*  
 D'ABRERA (1990: figs): *Delias clathrata*  
 YAGISHITA (1993a: 256–257): *Delias clathrata clathrata*  
 YAGISHITA (1993b: 264–265): *Delias clathrata clathrata*  
 TUZOV (1995: 118): *Delias clathrata clathrata*  
 PARSONS (1998: 320, pl. 38 fig. 953–954): *Delias clathrata clathrata*

#### Designation of lectotype

ROTHSCHILD (1904) described *Delias clathrata* on base of a series of males and females from Owgarra, north of head of Aroa River, collected by A. S. MEEK at the end of May, 1903; without designating a holotype. Herewith I designate as lectotype that specimen in BMNH3, labelled as syntype ♂ by PHIL ACKERY.

#### Material examined

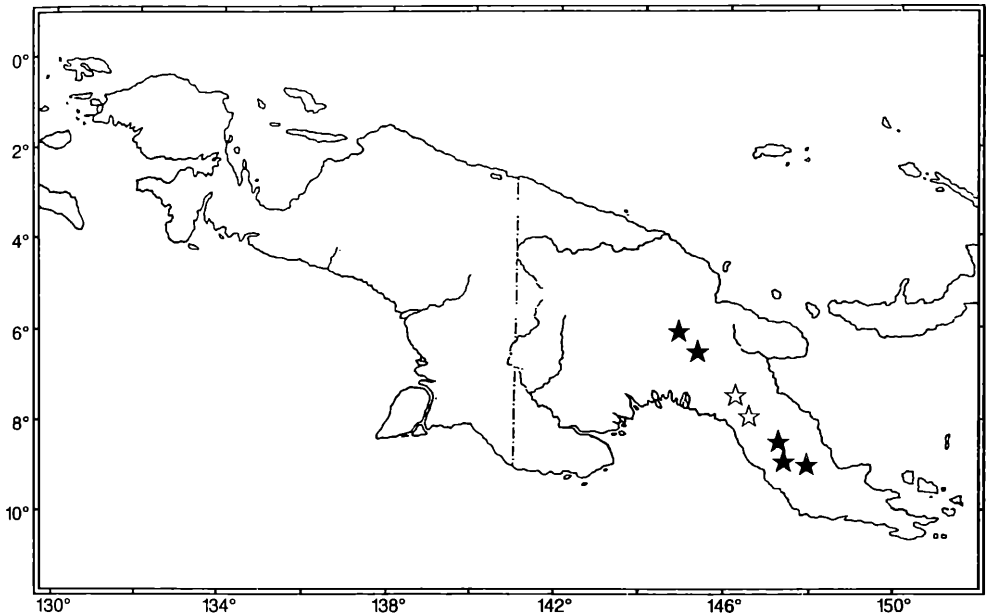
Lectotype ♂: Owgarra, north of head of Aroa River, end of May 1903, A. S. MEEK, BMNH3. Paralectotypes: same data, 7 ♂♂, 3 ♀♀, BMNH3. Other material: Owgarra, B.N.G. (MEEK), 13 ♂♂, 3 ♀♀, BMNH1; Owgarra, B.N.G. (MEEK), 1907, 1 ♂, 1 ♀, BMNH1; BR N. Guinea, 2 ♂♂, BMNH1; Angabunga River affl. of St. Joseph R, Brt. N. Guinea, 6000 ft upwards, Nov. 04–Febr. 05, A. S. MEEK, 10 ♂♂, 5 ♀♀, BMNH3; 10 ♂♂, BMNH4; Nov.–Jan. 1904–1905, 1 ♂, ZMB; Owgarra BNG, 1 ♂, ZMB; ex Madame FOURRIER, 1 ♂, BMNH4; Simbu Prov., Kerowagi, VII.1986, 1 ♂, BT; idem, XI.1988, 2 ♂♂, BT; Owen Stanley R, PNG. 800 m, V.1972, 1 ♂, BT; idem, 24.IX.1973, 1 ♂, HM; Jimmi, WHP, IV.1989, 1 ♂, HM; Gumine, Simbu, V.1990, 1 ♂, HM; Kerowagi, Simbu, IV.1990, 2 ♂♂, HM; idem, IX.1990, 1 ♂, HM; VIII.1992, 1 ♂, HM; PNG. S.H.P., X.1998, 1 ♂, DM; PNG, Chimbu Prov. Kerowagi, III.1988, 1 ♂, DM; same data, but II.1990, 1 ♀, DM; 1 ♂, ZMA; VI.1990, 1 ♀, ZMA; X.1990, 1 ♂, ZMA; VII.1991, 1 ♂, ZMA; IX.1991, 1 ♂, ZMA; I.IX.1998, 1 ♂, DM; Gumine, 1 ♂, DM; X.1988, 1 ♂, DM; 1 ♂, EMEM.

#### Diagnosis

*Delias clathrata clathrata* ROTHCHILD, 1904 differs from *Delias clathrata limata* JORDAN, 1930 in the underside of the hindwing by a submedian band of larger spots, leaving narrow light lines along the veins.

#### Description

Male. Upperside of forewing is white with black costal border which does not absorb black dc-bar. Black border along termen is much broader at apex than at tornus; inner edge is serrate. Basal area bears greyish black diffusion. There are three subapical spots. Costa is black, entering discal cell. Veins are clearly visible. Upperside of hindwing is white, with thin black border. Basal area has some greyish black diffusion. Underside of forewing is white. Black border along termen, narrowing towards tornus; inner edge is strongly serrate. Large black streak from base along costa, is covering whole discal cell and via vein R3 connected with terminal border, cutting off small white spot between R<sub>3</sub> and tornus. A white triangle widening from R<sub>3</sub> to whole inner margin, has greyish veins. There are three bright orange red subapical spots, followed by two very small terminal ones. Underside of hindwing is white with a dark subbasal triangular spot from costa towards top of inner margin, crossing discal cell at subbasal level and including a white basal mark that is posteriorly yellow. A broad band, consisting of seven distinctly separate dark brown spots, leads from costa to inner margin, crossing discal cell at submedian level. Some specimens have a black submarginal spot reaching dc-bar. Anal area bears



Map 2: Distribution of *Delias clathrata* ROTHSCHILD, 1904

★ *D. clathrata clathrata* ROTHSCHILD, 1904; ☆ *D. clathrata limata* JORDAN, 1930.

yellow and black scales. Costal margin is white; however, not at inside from white basal mark. Terminal border has undulate inner edge from Rs to 3A. In some specimens is brown diffusion on (a part of) the white areas on underside of hindwing. Length of forewing: 29–32 mm.

Female. As male. However, upperside for wing with broader black costa and larger black border, absorbing black dc-bar and having three white subapical spots, followed by one or two terminal ones. Upperside of hindwing has black border of 3 mm width. Underside both wings as in male. Length of forewing: (26) 29–32 mm.

### ***Delias clathrata limata* JORDAN, 1930**

(map 2, figs 7–10)

JORDAN (1930a: 277): *Delias clathrata limata*

JORDAN (1930b: 56–60, pl. III, fig. 8): *Delias clathrata limata*

TALBOT (1932: 102): *Delias clathrata limata*

TALBOT (1937: 355–356): *Delias clathrata limata*

D'ABRERA (1971: 142): *Delias clathrata limata*

D'ABRERA (1977: 142): *Delias clathrata limata*

D'ABRERA (1990: 142): *Delias clathrata limata*

YAGISHITA (1993a: 256–257): *Delias clathrata limata*

YAGISHITA (1993b: 264–265): *Delias clathrata limata*

TUZOV (1995: 118): *Delias clathrata limata*

PARSONS (1998: 320): *Delias clathrata limata* ("is probably not a valid race")

### Designation of lectotype

JORDAN (1930) described *Delias clathrata limata* on base of 1 ♂ and 6 ♀♀, collected by A. C. EICHORN

at Edie Creek on Westside of Herzog Mountains, in early 1928; without designating a holotype. Here with the only male, labelled as holotype (in BMNH3), is designated as lectotype.

#### Material examined

Lectotype ♂: Edie Creek, West Side of Herzog Mts, 6100 ft, early 1928, A. C. EICHORN, BMNH3. Paralectotypes: same data, 6 ♀♀, BMNH3.

#### Diagnosis

*Delias clathrata limata* JORDAN, 1930 differs from *Delias clathrata clathrata* ROTSCHILD, 1904 in the underside of the hindwing by a submedian band of smaller spots, leaving wide light lines along veins.

#### Description

Male. Upperside of forewing is white with black costal border that does not absorb black dc-bar. Black border bears three subapical spots, followed by three terminal ones. Black costa is entering discal cell. Upperside of hindwing is white, with thin black border. Basal area has some grey-black diffusion. Underside of forewing with much reduced white area. Underside of hindwing white with a dark subbasal triangular spot from costa towards top of inner margin, crossing discal cell at subbasal level and including a white basal mark which is posteriorly yellow; however, less obvious than in *clathrata clathrata*. A broad band, consisting of seven distinctly separate dark brown spots, leads from costa to inner margin, crossing discal cell at submedian level. These spots are smaller than in *clathrata clathrata*. Anal area has yellow and black scales. Costal margin is white, however, not at inside from white basal mark. Terminal border has undulate inner edge from Rs to 3A. Length of forewing: 26 mm.

Female. As male. However, upperside for wing is slightly yellow, with broader black costa and larger black border, absorbing black dc-bar. Length of forewing: 27–29 mm.

#### Discussion

From Welya, WHP, Papua New Guinea a single species is known which looks quite different on underside of hindwing. The ground colour is not white with some greyish brown diffusion, but creamy brown, including the veins; no white parts at all. The yellow spot in the black band from base to middle of costal margin is larger and separate by a black line from white costal margin. PARSONS (1998) pictures the underside as *Delias clathrata* ssp. As long no more material is available I will treat this as just a "dark" form.

#### *Delias neeltje* GERRITS & MASTRIGT, [1993]

(map 3; figs 11–12)

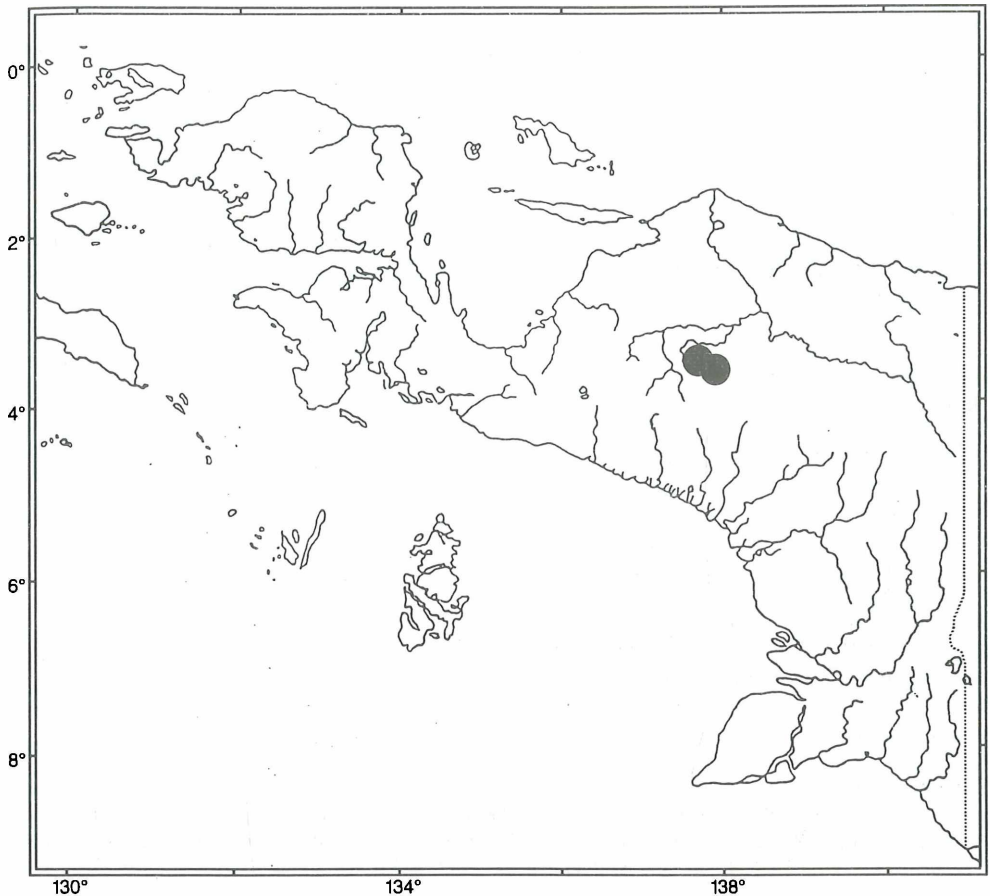
GERRITS & MASTRIGT ([1993]: 385–386, 401, 402): *Delias neeltje*  
YAGISHITA (1993a: (Synonym) 256–257): *Delias clathrata sakumai*  
YAGISHITA (1993b: (Synonym) 264–265): *Delias clathrata sakumai*  
TUZOV (1995: 118): *Delias sakumai* (bona sp.?) [sic!]

#### Material examined

Holotype ♂: Irian Jaya, Central Bergland, MULIA River Jambi, X.1991, G. GERRITS, MZB. Paratypes: Kembruk-Sinak, River Jambi, VI.1990, 2 ♂♂, GG; 1 ♂, DM; idem, IX.1990, 1 ♂, GG; VII.1993, 4 ♂♂, JL; Mulia, River Jambi, X.1991, 2 ♂♂, GG; Sinak, VI.1991, 1 ♂, HM; Kembruk-Sinak, II.1991, 2 ♂♂, GG; 1 ♂, DB; idem, Desa Djambu, XI.–XII.1990, 1 ♂, HM; 1 ♂, MZB; Mulia-Ilu, VII.1991, 1 ♂, GG; 1991, 1 ♂, GG; 1 ♂, ex HM, ZMA; Ilu, IX.1991, 1 ♂, HM; VI.1992, 1 ♂, HM.

#### Diagnosis

This taxon differs from *D. clathrata* ROTSCHILD, 1904, including the subspecies *limata* JORDAN, 1930 on the underside of the forewing by the red subapical and terminal spots.



Map 3: Distribution of *Delias neeltje* GERRITS & MASTRIGT, [1993]

#### Description

Male. Upside of forewing is creamy white with black costal border, which does not enter cell but forms a narrow dc-bar, not reaching distal lower angle of cell. Black border along termen is much broader at apex than at tornus; its inner edge is serrate. Basal area has grey-black diffusion. There are two pinkish red subapical stripes in cells  $R_3$  and  $R_4$ . Veins are clearly visible. Upside of hindwing is creamy white and translucent: pattern underside visible from above. Basal area has greyish black diffusion. Veins are clearly visible. Narrow black border along termen is undulate. Underside of forewing is milky white. Black border along termen is narrowing towards tornus; its inner edge serrate. It does not enter posterior half of discal cell and narrowly reaches black border of apex, enclosing one white spot at distal  $\frac{2}{3}$  of costa. A band is formed of four bright subapical spots with the second, largest one pointed inwards. Veins are clearly visible. Underside of hindwing is snowy white with a dark subbasal band from costa towards dorsum, crossing discal cell at subbasal level. A second much broader band consists of seven distinctly separate black spots, from costa to dorsum, crossing discal cell at submedian level. Basal area and dorsum are rich dark yellow; costal margin is white. There is a small black pearshaped band from costa to dark yellow basal area. Black marginal border is narrow and undulate at innerside. Length of forewing: 27–31 mm.

Female. unknown.

## Name

The name "neeltje", a noun in apposition, is in honour of Mrs. NEELTJE GERRITS-VLASBLOM, the wife of Mr G. GERRITS.

***Delias elongatus* subgroup**

## Diagnosis

This subgroup consist of only one species *Delias elongatus* KENRICK, 1911 and differs from all other subgroups in the *clathrata* group by a black upperside of the forewing, having a long row this subapical and terminal spots.

***Delias elongatus* KENRICK, 1911**

(map 4; figs 13–18)

KENRICK (1911: 19 + pl. III, fig. 4): *Delias elongatus*

N.B.: figured is ♀, and not ♂ as mentioned by JOICEY, NOAKES & TALBOT (1916)

JOICEY, NOAKES & TALBOT ([1916]: 364, pl. LVI, fig. 2): *Delias elongatus*

TALBOT (1928a: 31, 45): *Delias elongatus*

TALBOT (1937: 352–353 + pl. LX, fig. 5): *Delias elongatus*

D'ABRERA (1971: 142 + figs): *Delias elongatus*

D'ABRERA (1977: 142 + figs): *Delias elongatus*

D'ABRERA (1990: 142 + figs): *Delias elongatus*

YAGISHITA (1993a: 255): *Delias elongatus*

YAGISHITA (1993b: 262–263): *Delias elongatus elongatus*

TUZOV (1995: 118): *Delias elongatus*

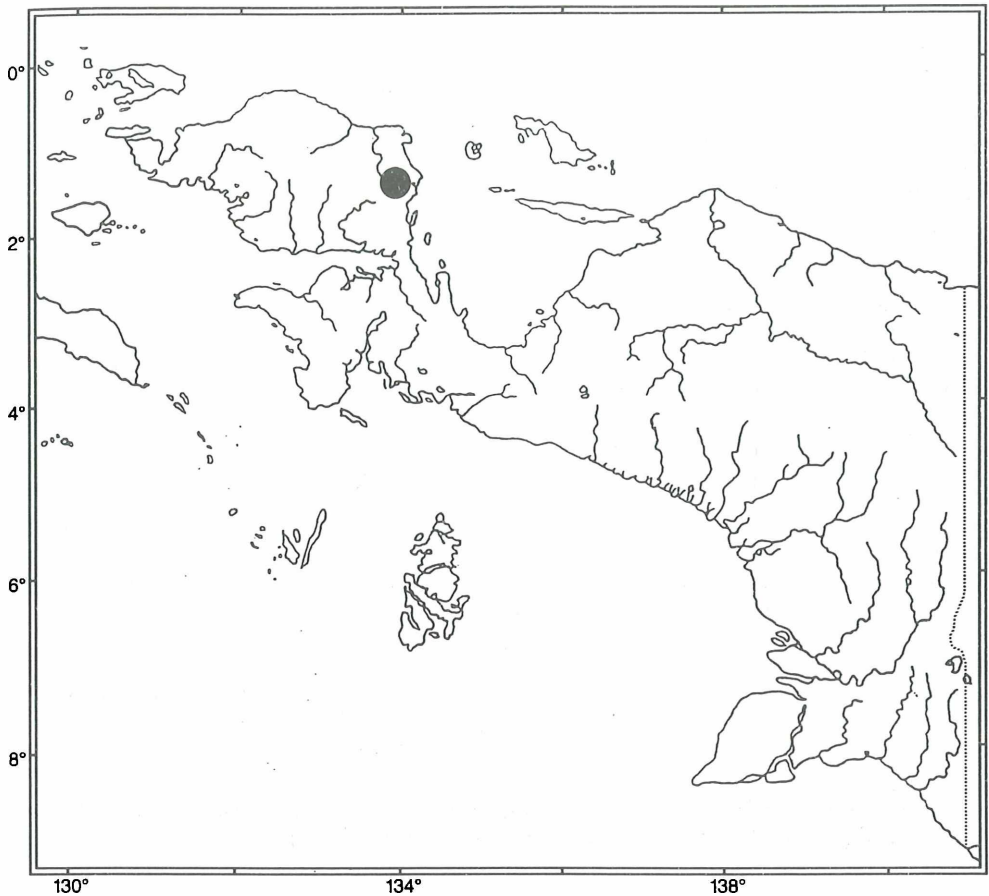
## Material examined

Holotype ♀: Arfak Mts Mt Koberai, 8,050 ft, Febr. 1911, BMNH2. Neallotype [sic!]: Anggi Lakes, Arfak Mts 6000 ft North N. Guinea, March 1914, A. C. & F. PRATT, 1 ♂, BMNH2; Other material: same data, 1 ♂, BMNH1, 1 ♂, BMNH3; 3 ♀♀, BMNH1; Irian Jaya, Arfak Mts, Anggi Lakes, 12.III.1977, 1 ♂, BMNH1; Arfak Mts III.–V.1977, leg. BENNIE TALISMAN, 1 ♂, 1 ♀, HM; Anggi Lakes, Umgebung Hing, 600–1500 m, II.–IV, VI.–VIII.1977, 4 ♂♂, 6 ♀♀, EMEM; Arfak Mts, West Irian, 14.X.1977, coll. J. HIRSCHMANN, 1 ♂, 1 ♀, BMNH1; Arfak Mts I.1987, 1 ♂, DM; 1987, 1 ♂, DM; no data, 1 ♂, DM; f-♀ *anggi*: Anggi Lakes, Umgebung Hing, 600–1500 m, II.–IV, VI.–VIII.1977, 2 ♀♀, EMEM; Arfak Mts West Arfak, Angi Lakes, 18.VI.1978, 1 ♀, HM.

## Description

Male. Upperside of forewing is black with three vague subapical spots, followed by three vague terminal ones. At innerside of radius some grey diffusion. Upperside of hindwing is white with regular black border from Rs to tornus; width about 3 mm, slightly broader at M<sub>1</sub>. At base, in Sc+R<sub>1</sub>, in discal cell and in upperparts of Rs, M<sub>1</sub> and M<sub>2</sub> a grey to black diffusion, which is darker close to costa. Inner part of costa is white. Underside of forewing is black with three yellow subapical streaks, followed by a yellow terminal band to inner margin, interrupted by black veins. A triangular white area from M<sub>1</sub>, widening to whole length of inner margin, has some blackish diffusion and black veins. Underside of hindwing is creamy with black border of same size as upperside. From middle of costa a black band crosses upper part of discal cell and turns along 1A+2A. Between band and black base a large light-yellow streak, connected with broad band of black and golden scales covering cells 1A+2A and 3A. Discal cell and upper half of Cu<sub>1b</sub> and upper parts of M<sub>1</sub>, M<sub>2</sub>, M<sub>3</sub> and Cu<sub>1a</sub> are brown. There is a small black spot at top of M<sub>2</sub>. Veins are black. Length of forewing: 30–32 mm.

Female. Upperside of forewing is brown-black with three yellowish subapical spots, followed by four terminal ones; all larger than in male. Grey diffusion is more obvious; radius is black. Upperside of



Map 4: Distribution of *Delias elongatus* KENRICK, 1911

hindwing is white, with some wider black border. Black diffusion not covering median part of discal cell; however connected with postmedian black spot in  $M_1$  and  $M_2$ . Underside of forewing as in male, with more obvious subapical spots and terminal band and more reduced white area. Underside of hindwing is as in male, with larger black postmedian spot, crossing vein  $M_2$ . Subterminal parts of veins not black. Besides the above-described female with upperside of hindwing white, another form exists with yellow upperside of forewing. Other characteristic features of this form, f-♀ *anggi*, are: on upperside of forewing the four larger yellowish terminal spots and on underside of hindwing the creamy part which is not pale, but very vivid. Length of forewing: 27–32 mm.

### *Delias mariae* subgroup

#### Diagnosis

This subgroup differs from all other subgroups on the underside of hindwing by a larger black band at basal part that is connected with black border in cell 3A.

***Delias mariae* JOICEY & TALBOT, 1916**

(map 5, figs 19–22)

JOICEY & TALBOT (1916: 69–70): *Delias mariae*JOICEY & TALBOT (1916: pl. VI, figs 3, 4 (nec 1, 2)): *Delias mariae*N.B. in text wrongly mentioned figs 1, 2 (= *Delias tessei*)TALBOT (1928: 31, 45): *Delias mariae mariae*TALBOT (1932: 102): *Delias mariae mariae*TALBOT (1937: 361–362, 606, 623, pl. XIV, fig. 105, pl. XXIX, fig. 102): *Delias mariae mariae*ROEPKE (1955: 239, 258): *Delias mariae mariae*D'ABRERA (1971: 143): *Delias mariae mariae*D'ABRERA (1977: 143): *Delias mariae mariae*D'ABRERA (1990: 143): *Delias mariae mariae*YAGISHITA (1993a: 264–265): *Delias mariae mariae*YAGISHITA (1993b: 273): *Delias mariae mariae*TUZOV (1995: 119): *Delias mariae mariae***Designation of lectotype**

JOICEY & TALBOT (1916) described *Delias mariae mariae* on base of 2 ♂♂ and 2 ♀♀, collected by A., C., & F. PRATT in the Wandammen Mountains, in November 1914, without designating a holotype. TALBOT (1937) labelled a male as type and a female as allotype. Herewith I designate the above-mentioned by TALBOT as type labelled male (in BMNH2) as lectotype.

**Material examined**

Lectotype ♂: Wandammen Mts, 6000 ft Dutch New Guinea, Nov. 1914, A. C. &amp; F. PRATT, BMNH2.

Paralectotypes: same data, 1 ♂, BMNH1, 1 ♀, BMNH2, 1 ♀, BMNH3.

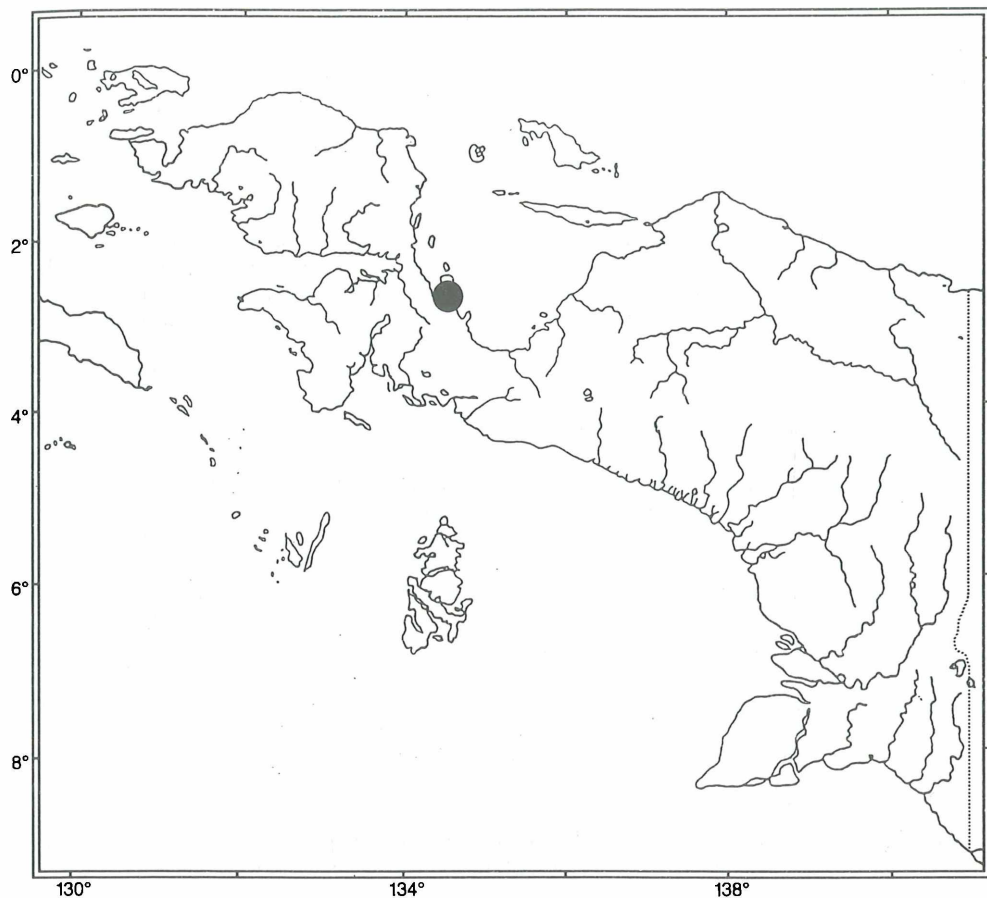
**Diagnosis**

This species can easily be separated from all other species by the black area at the inner part of the underside of hindwing, which encloses one large and one small orange spot.

**Description**

Male. Upperside of forewing is white with greyish diffusion. Black border, serrate at innerside reaching to about  $\frac{1}{3}$  of wing along costa to  $M_3$ , becoming less so towards tornus, bears two vague white subapical spots. Upperside of hindwing is translucent white and has narrow black border from  $R_s$  to tornus. Underside of forewing is white. Black border, with same size as on upperside, bears three orange subapical spots, followed by three poor terminal spots of same colour. Broad black band closes whole discal cell and crosses greyish-white median vein. Underside of hindwing has black inner part, that is bordered by narrow, light orange postmedian band. Subterminal area is white. Black border is undulate at inner edge from white costa to 3A. Black part at inner side, connected with costa in  $Sc+R_1$ , includes red basal spot, large orange spot, consisting of under part of discal cell and upper parts of  $M_1$  and  $M_2$ , and narrow orange streak in  $Cu_{1b}$ . Anal area has some brownish diffusion. Length of forewing: 28 mm.

Female. Upperside of forewing is white with brownish diffusion. Brown-black border with three white to orange subapical spots, reaching to discal cell, is broader towards inner margin than on male. Upperside of hindwing is translucent dirty white with some grey diffusion in base. Brown-black border is broader than on male and undulate at inner side; inner edge is less significant. Underside of both wings is generally as in male. Black border on underside of forewing is somewhat broader along inner margin with more obvious small terminal spots. From base along discal cell is some grey-brown diffusion. Length of forewing: 30 mm.



Map 5: Distribution of *Delias mariae* JOICEY & TALBOT, 1916

***Delias menooensis* JOICEY & TALBOT, 1922 stat. nov.**  
(map 6)

**Diagnosis**

*Delias menooensis* JOICEY & TALBOT, 1922 differs from all species within the *mariae* subgroup on the underside of hindwing by the red basal spot entirely surrounded by black.

***Delias menooensis menooensis* JOICEY & TALBOT, 1922 stat. nov.**  
(map 6, figs 23–28)

JOICEY & TALBOT (1922: 313–314): *Delias mariae menooensis*

JOICEY & TALBOT (1924: pl. VII, fig. 2): *Delias mariae menooensis*

TALBOT (1928: 31, 46): *Delias mariae menooensis*

TALBOT (1929: 112, 114, pl. IV, fig. 96, pl. VI, fig. 24): *Delias mariae menooensis*

TALBOT (1932: 102): *Delias mariae menooensis*

TALBOT (1937: 362–363, pl. XXIX, fig. 102): *Delias mariae menooensis*

ROEPKE (1955: 240, 258): *Delias mariae menooensis*

- D'ABRERA (1971: 143 + figs): *Delias mariae menooensis* (= *walshae* ROEPKE?) [sic!]  
 D'ABRERA (1977: 143 + figs): *Delias mariae menooensis* (= *walshae* ROEPKE?) [sic!]  
 D'ABRERA (1990: 143 + figs): *Delias mariae menooensis* (= *walshae* ROEPKE syn. n.) [sic!]  
 YAGISHITA (1993a: 264–265): *Delias mariae menooensis*  
 YAGISHITA (1993b: 273): *Delias mariae menooensis*  
 TUZOV (1995: 119): *Delias mariae menooensis*

#### Designation of lectotype

JOICEY & TALBOT (1922) described *Delias mariae menooensis* on base of “a series of both sexes”, collected by C., F. & J. PRATT on Mount Kunupi, in the Menoo Valley, labelled November–December 1920 or December 1920–January 1921, without designating a holotype. TALBOT (1936) labelled a male as type and a female as allotype (now in BMNH3). Herewith I designate as lectotype above-mentioned as type labelled male in BMNH3.

#### Material examined

Lectotype ♂: Mt Kunupi, Menoo Valley, Weyland Mts 6000 ft, Dutch N. Guinea, Dec. 1920–Jan. 1921, C. F. & J. PRATT, BMNH2. Paralectotypes: same data, but Nov.–Dec. 1920, 1 ♀, BMNH2; same data as above, 22 ♂♂, 10 ♀♀, BMNH1; 4 ♂♂, 2 ♀♀, BMNH3; 80 ♂♂, 10 ♀♀, BMNH4; 1 ♀, ZMB; Dec.–Jan. 1920/21, 1 ♀, DM, 1 ♂, 1 ♀, RMNH; 1 ♂, ZMB; 3500–6000 ft, XI.–I.1920/21, 2 ♂♂, HM; 2 ♂♂, 1 ♀, ZMA; Other material: Modio, River Wapa, 29.V.1984, 1 ♀, ZMA; S. slope Cntrl Weyland Mts Magoda, 2100 m, 15.X.1995, 5 ♂♂, HM; Kab. Paniai, Magoda 5, 2100 m, 5.VIII.1995, 1 ♂, HM; Peg. Weyland 9.VIII.1995, 1 ♂, HM; 18.VIII.1995, 2 ♂♂, HM; 18.XI.1995, 4 ♂♂, HM; Magoda 9, 2100 m, 15.XII.1995, 2 ♂♂, HM; 17.XII.1995, 3 ♂♂, HM; Degeodai 2100 m, 5.XII.1995, 1 ♂, HM; no data, 1 ♂, 1 ♀, EMEM.

#### Diagnosis

*Delias menooensis menooensis* JOICEY & TALBOT, 1922 differs from *Delias menooensis boschmai* ROEPKE, 1955 on the underside of hindwing where the black basal band is extending into the discal area, often connected with (and sometimes obsurbing) the black discal spot.

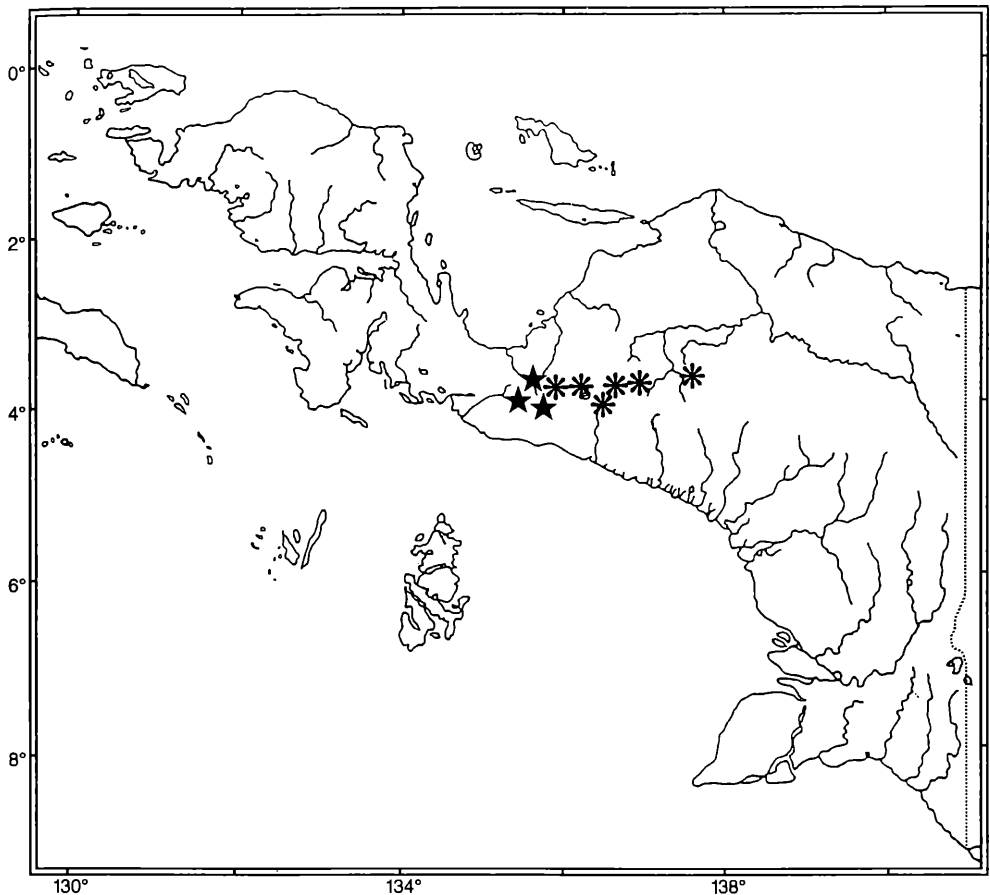
#### Description

**Male.** Upperside of forewing is white. Black border from 1 mm outside discal cell to tornus has serrate inner edge and bears a small white subapical spot. Black costa enters discal cell slightly. Discal cell-bar is black. Upperside of hindwing is translucent white with narrow black border less than 1 mm wide. Underside of forewing is mainly black and has very often a small grey patch along costa, outside discal cell. A white triangular area with black diffusion and often with black veins fills area from discocellular to tornus. Underside of hindwing is divided in black inner half, including a small red basal spot, and dark yellow to orange outer half with white veins. The border between the black and light part from from cell Sc+R<sub>1</sub> to cell 2A is very irregular. In only a few specimens a black spot on M<sub>3</sub> is separate from the black innerpart. Most often it is connected only along Cu<sub>1a</sub>. In many other species it is also connected along M<sub>2</sub>, causing a small orange spot in the black inner part. In a single specimen the black spot is an integral part of the black inner half without orange spot. Black border about 1 mm wide in Rs to 2.5 mm at tornus with slightly undulate inner edge, is separate from black inner part in Sc+R<sub>1</sub>. Length of forewing: 27–31 mm.

**Female.** Upperside of forewing has some black diffusion at inner edge of black border and black costa. Black border bears two white subapical spots. Upperside of hindwing is as on male, only with somewhat wider black border. Underside of both wings is as on male. However, the black spot on M<sub>3</sub> is nearly always at both sides connected with black inner half, cutting off a small orange spot. Black border is slightly wider. Red basal spot has sometimes some black diffusion. Length of forewing: 27–32 mm.

#### Name

The name “menooensis”, a adjective in apposition, is derived from “Menoo”, the name of river in the valley where type-material was found.



Map 6: Distribution of *Delias menooensis* JOICEY & TALBOT, 1922

★ *D. menooensis menooensis* JOICEY & TALBOT, 1922; \* *D. menooensis boschmai* ROEPKE, 1955.

***Delias menooensis boschmai* ROEPKE, 1955 comb. nov.**

(map 6, figs 29–32)

ROEPKE (1955: 239–240, 258, pl. VI, fig. 17, pl. VIII, fig. 20): *Delias mariae boschmai*

D'ABRERA (1971: 143): *Delias mariae boschmai*

D'ABRERA (1977: 143): *Delias mariae boschmai*

D'ABRERA (1990: 143): *Delias mariae boschmai*

YAGISHITA (1993a: 264–265): *Delias mariae boschmai*

YAGISHITA (1993b: 273): *Delias mariae boschmai*

TUZOV (1995: 119): *Delias mariae boschmai*

**Material examined**

Holotype ♂: West New Guinea, Wissel Lakes, Arabu Camp, 1800 m, 15.X.1939, Prof. Dr H. BOSCHMA, RMNH. Other material: Tuguwai, 7.III.1978, 1 ♂, HM; Obano Utara, 1 ♂, JL; Kamu Valley, River Buda, 14.XI.1989, 1 ♂, ZMA; N.E. Kamu, Ekemanida, River Tuka, 23.–30.X.1989, 1 ♂, HM; (Paniai), III.1977, R. STRAATMAN, 1 ♂, HM; Mapia, XII.1992, 1 ♂, HM; Mapia, Timeepa to Nabire, X.–XI.1993, 2 ♂♂, HM;

Obano, Camp HO17, 2250 m, 23.I.1994, 1 ♀, JL; 8.II.1994, 1 ♂, JL; 20.X.1994, 1 ♀, JL; 15.I.1995, 1 ♂, HM; 25.II.1995, 1 ♀, JL; Obano NE, Mogomoga, 1.VIII.1995, 3 ♂♂, HM; Obano, Mogomoga 16, 1800 m, 17.XII.1995, 1 ♂, HM; Kecamatan Homeyo, Sabisa, River Bayabu, 26.II.1992, 3 ♂♂, HM; 4.–9.V.1992, 4 ♂♂, HM; Idem, Debabu, 7.X.1994, 2 ♂♂, HM; 22.X.1994, 1 ♂, HM; 31.X.1994, 2 ♂♂, HM; 1 ♂, ZMA; 7.XI.1994, 2 ♂♂, HM; 5.XII.1995, 1 ♂, DM; Kecamatan Homeyo, Bilai, River Bayabu II.1993, 3 ♂♂, 1 ♂, ZMA; Baylabu, River Kaimabu, 1.III.1992, 1 ♂, DM; Homeyo, I.1993, 1 ♂, HM, 1 ♂, ZMA; Homeyo, 2 ♂♂, DM; Mulia, II.1992, 1 ♂, DM; South Homeyo, 1995, 1 ♂, JL.

#### Diagnosis

*Delias menooensis boschmai* ROEPKE, 1955 differs from *Delias menooensis menooensis* JOICEY & TALBOT, 1922 on the underside of the hindwing where the black basal band is not extending into the discal area, leaving a large oval orange discal area with a black spot in the middle.

#### Description

Male. Upperside of forewing is white, with black border from 3 mm outside discal cell to tornus, bearing two small white subapical spots and with serrate inner edge. Black costa is slightly entering discal cell. Discal cell-bar is black. At base is some black diffusion. Upperside of hindwing is translucent white with narrow black border less than 1 mm wide. Underside of forewing is white with black border of same size as on upperside, bearing three red subapical and one or two elongated red terminal spots, often followed by one or two very small orange or white spots. Black area from base to discal cell-bar is filling nearly whole discal cell. There is some black diffusion at inner part of mainly black base. Underside of hindwing is orange. Inner part from middle of costa to middle of cubitus and from there to tornus is black, including a red basal spot, often accompanied by white line along inner border. Black spot in  $M_2$  and  $M_1$  is more-or-less rounded and of variable size. Black border is about 1 mm wide at Rs to 2.5 mm at tornus with slightly undulate inner edge, and is narrowly connected with black inner part in Sc+R<sub>1</sub>. Length of forewing: (25) 27–30 mm.

Female. Unknown.

#### Name

The name “boschmai”, a genitive of a noun in apposition, is in honour of Prof. Dr H. BOSCHMA, who collected the holotype.

#### *Delias bobaga* MASTRIGT, 1990

(map 7)

#### Diagnosis

*Delias bobaga* MASTRIGT, 1990 differs from all the other members in the *mariae* subgroup on the underside of hindwing by a condense powdering of yellow scales between black base and black basal band.

#### *Delias bobaga bobaga* MASTRIGT, 1990

(map 7, figs 33–36)

MASTRIGT (1990: 197–204, figs 3, 7): *Delias bobaga*

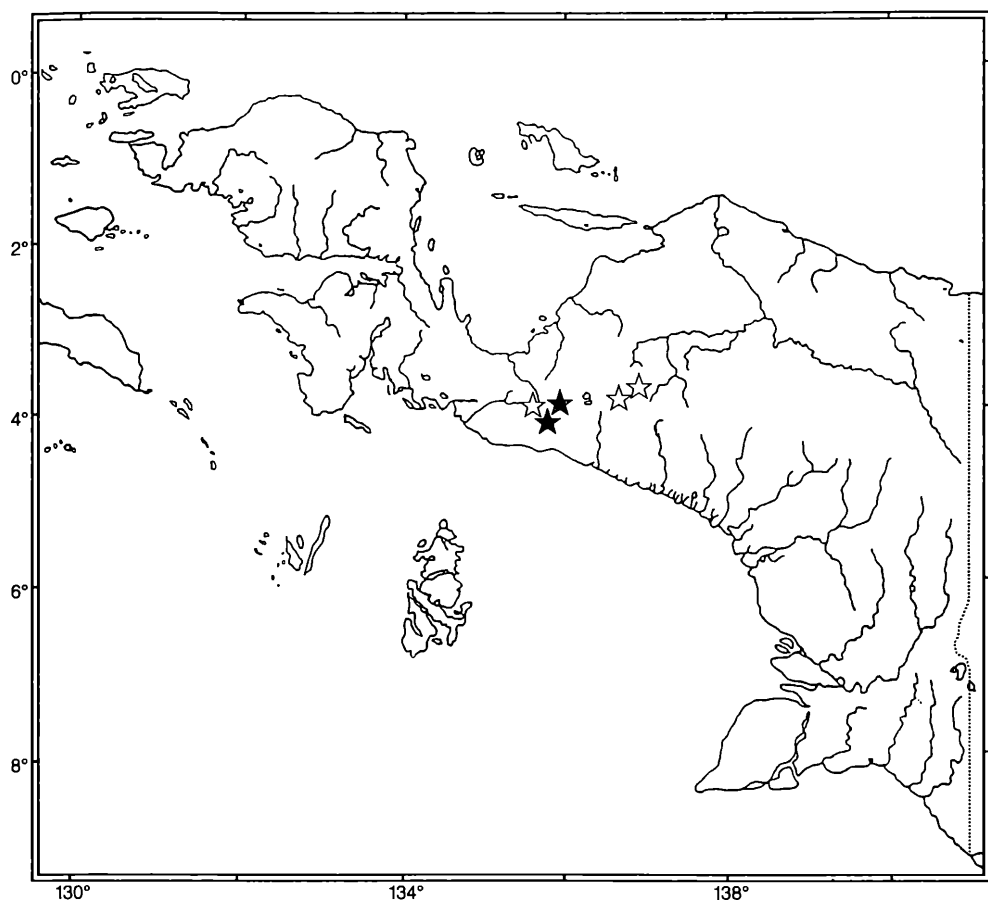
YAGISHITA (1993a: 267): *Delias bobaga*

YAGISHITA (1993b: 274 + figs): *Delias bobaga bobaga*

TUZOV (1995: 119): *Delias bobaga*

#### Material examined

Holotype ♂: Kamu Valley, 1700 m, IX. 1989, don. HENK VAN MASTRIGT, ZMA. Paratypes: same data, 1 ♂, MZB; 1 ♂, GG; 1 ♂, DM; Kamu Valley: Ekemanida, River Tuka & Enau, 1700–1800 m, 23.–30.X.1990,



Map 7: Distribution of *Delias bobaga* MASTRIGT, 1990

★ *D. bobaga bobaga* MASTRIGT, 1990; ☆ *D. bobaga homeyo* MASTRIGT, 1996.

3 ♂♂, HM; River Mouna, 1.II.1990, 5 ♂♂, GG; River Epugewo, 2.II.1990, 1 ♂, HM; Idadagi, River Migu, 21.II.1990, 1 ♂, HM; Idadagi, River Bedonaka, 20.IV.1990, 1 ♂, HM; River Budau, 10.XI.1989, 1 ♂, PS; River Ode, 2.II.1990, 2 ♂♂, GG, 1 ♂, DM; Mapia area: River Okagou, 7.XII.1989, 1 ♂, ex GG, HM; 17.XII.1989, 1 ♂, HM; River Otika, 8.XII.1989, 1 ♂, HM; River Yatuwou, 9.XII.1989, 1 ♂, GG; River Gudopena, 11.XII.1989, 1 ♂, GG; River Ude, 13.XII.1989, 1 ♂, GG; River Piyakoywa, 1 ♂, GG; River Okagou & Yatuwou, 25.–26.XI.–1989, 1 ♂, UF; Mapia, River Iyage, 13.XII.1989, 1 ♂, ZMA. Other material: Kecamatan Mapia, Gopouya, River Ude, 17.–18.XI.1990, 1 ♂, 1 ♀, HM; River Godopene, XI.–XII.1989, 1 ♂, DM; Mapia, River Siriwo, 24.VIII.1991, 1 ♂, HM; Mapia, Degowo, River Degowo, 26.VIII.1991, 1 ♂, HM; Mapia, XII.1992, 1 ♂, HM; Mapia, Timeepa to Nabire, X.–XI.1993, 2 ♂♂, HM; Kamu, Mogotugo, River Idewa, 29.IX.1991, 1 ♂, HM; Ekomani, River Mouma, 15.III.1990, 1 ♂, DM; Bomomani, Kunuwo, River Otika, 31.VII.1991, 1 ♂, DM; Moanemani, 1800 m, 16.XI.1992, coll. B. TURLIN, 1 ♂, BMNH1; Mogomogo, Camp 16, 1800 m, 23.IX.1995, 1 ♀, JL.

#### Diagnosis

*Delias bobaga bobaga* MASTRIGT, 1990 differs from *Delias bobaga homeyo* MASTRIGT, 1996 on the underside of the hind wing by its vivid yellow colour.

### Description

Male. Upperside of forewing is white to creamy white with broad, black costal border, entering discal cell and with black dc-bar. Black border along termen much broader at apex than at tornus and has a strongly serrate inner edge; sometimes absorbing black dc-bar. Upperside of hindwing is creamy white and translucent with narrow black border; pattern of underside entirely visible from above. Underside of forewing is milky white. Black border, which is more reduced than on upperside, bears three red subapical spots and a terminal one. Anterior part of discal cell is black, via  $M_2$  connected to black border, separating a small, yellowish spot. Underside of hindwing is yellow with white veins and black submarginal spot just outside discal cell. From middle of costa a broad, curved, black line extends through inner part of discal cell along yellow green anal area to the bottom of cell  $Cu_{1b}$ , where it is connected by thin black line connected to the broad, black border, from Rs to 3A. Inner part of costa is white. Base is yellow with small black triangle at inner part. Length of forewing: 26–30 mm.

Female. Wing pattern, both upperside and underside, is comparable to that of males. On upperside of forewing is some black diffusion at inner edge of black border, bearing three small subapical spots, which look pinkish because of the red subapical spots on underside of forewing. Veins are greyish. On upperside of hindwing is black border some broader as on male and has greyish veins. On underside of forewing are red subapical spots and terminal spot larger than on male. On underside of both wings are veins grey. Length of forewing: 28–29 mm.

### Name

The name “bobaga”, a noun in apposition, is the vernacular word for butterfly used by the Ekagi people in the Paniai district, where this butterfly occurs.

### *Delias bobaga homeyo* MASTRIGT, 1996

(map 7, figs 37–42)

MASTRIGT (1996b: 33, map 8, Pl. 2, fig. 13, Pl. 5, fig. 34): *Delias bobaga homeyo*

### Material examined

Holotype ♂: Kecamatan Homeyo, Sabina, River Bayabu, 26.II.1992, MZB. Paratypes: same data, 1 ♂, HM; same data, but 1.III.1992, 1 ♂, ex GG, FU; 1 ♂, GG; 1.I.1993, 1 ♂, ex GG, PS; 1.II.1993, 1 ♂, HM; 1 ♂, ZMA; Kecamatan Homeyo, Debabu, 9.V.1991, 2 ♂♂, GG; same data but 4.IX.1991, 1 ♂, GG; 22.X.1994, 2 ♂♂, HM; 7.X.1994, 1 ♂, HM; 31.X.1994, 2 ♂♂, HM; 5.XII.1994, 1 ♂, ex HM, MZB; 18.III.1995, 1 ♂, HM; Homeyo 4.IX.1991, 1 ♂, HM; Homeyo, 2 ♂♂, DM; Magoda Camp HM9, 1950 m, 18.XI.1995, 1 ♂, HM. Other material: Homeyo, River Debabu, 5.XII.1994, 1 ♂, GG; Magoda Camp HM9, 3°56'S, 135°52'E 2100 m, IX.1995, 1 ♂, DM; 1 ♂, GG; 2 ♀♀, JL; 18.XI.1995, 1 ♂, GG; 17.XII.1995, 1 ♂, HM; 2.II.1996, 1 ♀, JL; 15.II.1996, 3 ♂♂, GG; 3 ♂♂, HM; 10.III.1996, 1 ♂, DM; 1.IV.1996, 1 ♂, GG; 12.IV.1996, 1 ♂, GG; 1 ♀, JL; Peg. Weyland, Degeodai, 2100 m, 5.XII.1995, 1 ♂, HM; North of Detai, 3°33'S, 136°21'E, 11.V.1996, 1 ♂, FL.

### Diagnosis

*Delias bobaga homeyo* MASTRIGT, 1996 differs from *Delias bobaga bobaga* MASTRIGT, 1990 on the underside of the hind wing by its creamy to pale yellow colour, instead of the vivid yellow colour on the nominate subspecies.

### Description

Male. Upperside of forewing is white to creamy white with broad, black costal border, entering discal cell. Dc-bar is black. Black border, with two small white subapical spots, is much broader at apex than at tornus, sometimes absorbing black dc-bar. Inner edge is strongly serrate. Upperside of hindwing is creamy white and translucent; narrow black border with undulate inner edge; pattern of underside entirely visible from above. Underside of forewing is milky white. Black border is more reduced than on upperside and bears three orange subapical spots and a very vague terminal spot. Anterior part of

discal cell is black, and connected to black border along  $M_2$ , separating a small, whitish spot. Under-side of hindwing is creamy with a black submarginal spot just outside discal cell. From middle of costa a broad, curved, black line extends through inner part of discal cell along yellow-green anal area to the bottom of cell 2A, where it is connected by thin black line to the broad black border, from Rs to 3A. Inner part of costa is white. Base is creamy to yellow and has a small black triangle at inner part. Length of forewing: 26–29 mm.

Female. Unknown.

#### Discussion

When I described this subspecies in 1996, I had—besides a series from Homeyo—a single specimen from Weyland Mountains, which I put as paratype. Now I realize that this material from Magoda and Degeodai is collected west of the Kamu Valley (where *bobaga bobaga* occurs). However,—even after receiving more material from Weyland Mountains—I cannot find characteristic features to differentiate between these and *Delias bobaga homeyo* from the Homeyo area.

#### Name

The name “homeyo”, a noun in apposition, is the name of the “kecamatan” (district/municipality) where this species occurs.

#### *Delias sigit* MASTRIGT, 1990

(map 8, figs 43–46)

MASTRIGT (1990: 197–204, figs 2, 6): *Delias sigit*

YAGISHITA (1993a: 264–265): *Delias mariae sigit*

YAGISHITA (1993b: 272–273 + figs): *Delias mariae sigit*

TUZOV (1995: 119): *Delias mariae sigit*

#### Material examined

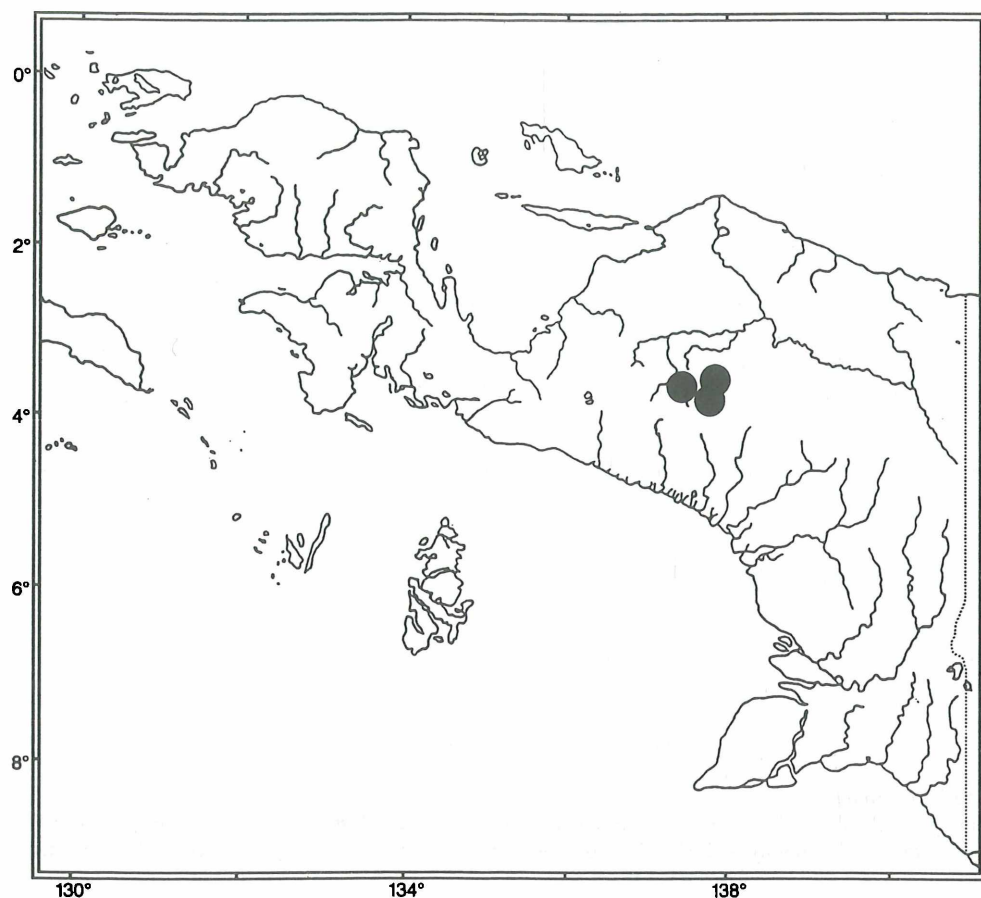
Holotype ♂: IRIAN JAYA, Central Bergland, Ilaga, River Jila, 7.VI.1988, HENK VAN MASTRIGT, ZMA. Paratypes: same data as holotype, 2 ♂♂, HM; sama data but 9.IV.1988, 5 ♂♂, ZMA; 6 ♂♂, MZB; 22.V.1988, 2 ♂♂, HM; 2 ♂♂, BT; 2 ♂♂, ex HM, ZMA; 27.VIII.1988, 2 ♂♂, MZB; 2 ♂♂, HM; 1 ♂, BT; 2.V.1990, 2 ♂♂, HM; 4.V.1990, 2 ♂♂, HM; 1 ♂, ex HM, UF; 7.VI.1991, 1 ♂, EMEM; Ilaga, River Mum, 22.I.1989, 1 ♂, ZMA; Ilaga, 10.VIII.1988, 1 ♂, MZB; 1 ♂, HM; 1 ♂, BT; 1 ♂, GG; 15.XI.1991, 2 ♂♂, EMEM; Mulia-Sinak, VI.–VII.1989, 2 ♂♂, GG; Beoga, XII.1989, 5 ♂♂, GG; ex GG: 2 ♂♂, DM; 1 ♂, HM; Mulia, IX.1990, 10 ♂♂, GG. Other material: Mulia-Sinak, X.–XI.1990, 2 ♂♂, DM; 5 ♂♂, HM; V.1991, 1 ♂, ZMA, 1 ♂, 2 ♀♀, HM; 1 ♂, ZMA; Mulia, II.1991, 3 ♂♂, DM; IX.1991, 5 ♂♂, HM; X.1991, 1 ♂, DM; Mulia, 2000 m, VI.1990, 3 ♂♂, DM; VII.1993, 3 ♀♀, JL; Mulia-Ilu, X.–XI.1990, 1 ♂, DM; II.1991, 1 ♂, ZMA; IX.–X.1991, 1 ♂, DM; VI.1992, 4 ♂♂, HM, X.–XI.1990, 1 ♂, HM; 1 ♂, ZMA; Sinak, XI.1992, 1 ♂, HM; 1 ♀, ZMA; Sinak, 2200 m, 15.XII.1992, 1 ♂, JL; Ilu, II.1991, 1 ♂, HM; IX.1991, 2 ♂♂, HM; Ilaga, River Jila, X.1990, 1 ♂, DM; IX.1991, 1 ♂, DM; K. Apoa, 12.V.1995, 2 ♂♂, HM.

#### Diagnosis

*Delias sigit* MASTRIGT differs from the other species in this group on the underside of the hind wing by a V-shaped black area the base, including a yellow pear-shaped spot which is separated from the costa by a thin white line.

#### Description

Male. Upperside of forewing is milky white with broad black costal border, entering discal cell; dc-bar is black. Black border along termen, much broader at apex than at tornus, has slightly serrate inner edge, often with one or two subapical spots; second one is very small. Upperside of hindwing is milky white with narrow black border and translucent: pattern of underside entirely visible from above. Underside of forewing is milky white. Black border is narrower than on upperside and bears three yellow



Map 8: Distribution of *Delias sigit* MASTRIGT, 1990

subapical and one or two very small terminal spots. Large anterior part of discal cell is black, passing dc-bar. Base of wing has some black and grey diffusion. Underside of hindwing is yellow to yellowish orange with white veins. A rounded black submarginal spot reaches dc-bar. Broad black anal part with some greyish green diffusion is connected to white costa, cutting off a yellow basal streak. Black border from Sc+R<sub>1</sub> to 1A+2A is increasing in width from less than 1 mm to 3 mm. Length of forewing: 25–29 mm.

Female. Upside of forewing is creamy white. Black costa enters discal cell; dc-bar is black. Black border bears three subapical white spots, sometimes followed by one or two very small terminal ones. Upside of hindwing is creamy, translucent white, with black border of same size as underside: width about 2 mm. Underside of both wings is as in male; only on underside forewing some more black diffusion at base. Length of forewing: 28–30 mm.

#### Name

The name “sigit”, a noun in apposition, is derived from “sigit-sigit”, the vernacular word for butterfly, used by the Dani people in the Ilaga valley, where this butterfly occurs.

***Delias walshae* ROEPKE, 1955**

(map 9)

**Diagnosis**

*Delias walshae* ROEPKE, 1955 differs from all above-mentioned species of the *mariae* subgroup by the absence of a basal spot on the underside of hindwing. It differs from *D. hemianops* GERRITS & MASTRIGT, [1993] and *D. fioretti* MASTRIGT, 1996 on the underside of hindwing by its yellow colour instead of orange in the two nominate species.

***Delias walshae walshae* ROEPKE, 1955**

(map 9, figs 47–50)

ROEPKE (1955: 239, 258): *Delias mariae walshae*ROEPKE (1955: 239): *Delias clathrata (walshae) walshae* (= *Delias mariae walshae*)D'ABRERA (1971: 143): *Delias mariae menooensis* (?) [sic]D'ABRERA (1977: 143): *Delias mariae menooensis* (?) [sic]D'ABRERA (1990: 143): *Delias mariae menooensis* (syn.n.)YAGISHITA (1993a: 266): *Delias walshae* (partim)TUZOV (1995: 119): *Delias walshae***Material examined**

Holotype ♂: Neth. Ind.-Amer. New Guinea Exped., Ibele Valley, 2250 m, 15.XI.1938, RMNH. Paratype: Neth. Ind.-Amer. New Guinea Exped., Top Camp, 2100 m, 4.II.1939, 1 ♀, RMNH. Other material: Makki, River Merogum, 26.X.1989, 1 ♂, HM; 31.X.1989, 1 ♂, HM; 9.–11.XII.1991, 1 ♂, HM; River Makki, 25.X.1989, 1 ♂, HM; 12.XI.1991, 1 ♂, HM; Makki, River Wane, 9.XI.1991, ZMA.

**Diagnosis**

*Delias walshae walshae* ROEPKE, 1955 differs from the newly described subspecies *walshae ilu* and from *walshae sanaeae* SAKUMA, 1999 by the large white area on the underside of forewing and a pale yellow to creamy colour on the underside of hindwing.

**Description**

Male. Upperside of forewing is white. Black border, from top of discal cell to tornus sometimes absorbing black dc-bar, bears two small white subapical spots; inner edge is irregular. There is a small white spot outside top of discal cell. Costa and posterior part of discal cell are black. Upperside of hindwing is translucent white with narrow black border (about 1 mm). Underside of forewing is white with black border slightly narrower than on upperside, bearing three orange subapical and two elongated orange terminal spots, followed by a very small less-coloured one. Black area is variable in size, from a black band from base to dc-bar, filling nearly whole discal cell except narrow anterior part, to largely black diffusion. Between black costa and black discal cell is a thin white to grey line. Veins are grey to black. Underside of hindwing is creamy. Basal part from middle of costa via middle of cubitus towards tornus is black, without basal spot. There is a black spot in  $M_2$  and  $M_1$  just outside discal cell. Very regular black border is getting wider from a thin line at costa to 2 mm at tornus. Length of forewing: 26–27 mm.

Female. Upperside of forewing is smudged white with somewhat broader black border than in male, especially in  $Cu_{1a}$ ,  $Cu_{1b}$  and 2A. Upperside of hindwing is smudged, translucent white with slightly broader black border than in male. Underside of forewing has broader black border than on upperside, including three orange subapical spots, followed by two or three terminal ones, of which the last one is poorly developed. Underside hindwing is as in male with black border as on upperside. Length of forewing: 25 mm.

**Name**

The name “walshae”, an genitive of a noun in apposition, dedicated to Mrs. M. E. WALSH, an assiduous entomologist who has contributed largely to our knowledge of Indonesian butterflies.

***Delias walshae ilu* subsp. nov.**

(map 9, figs 51–56)

YAGISHITA (1993b: 272–273 + figs): *Delias walshae walshae***Type-material**

Holotype ♂: Mulia, IX.1990, HM. Paratypes (64 ♂♂, 10 ♀♀): as holotype, 1 ♂, HM; 6 ♂♂, 1 ♀, GG; same data, but II.1991, 1 ♀, GG; Homeyo, River Begabu, 16.III.1994, 1 ♂, DM; Sinak-Mulia, X.–XI.1990, 1 ♂, HM; 1 ♂, ZMA; Mulia-Ilu, X.–XI.1990, 6 ♂♂, GG; XI.1990, 4 ♂♂, GG; II.1991, 4 ♂♂, 1 ♀, GG; X.1991, 1 ♂, GG; 1991, 7 ♂♂, 1 ♀, GG; II.1992, 1 ♀, GG; VI.1992, 1 ♂, HM; XI.–XII.1991, 2 ♂♂, 1 ♀, HM; 4 ♂♂, DM; Ilu, II.1991, 1 ♂, GG; IX.1991, 2 ♂♂, HM; VII.1993, 3 ♂♂, 1 ♀, JL. Form: Mulia, IX.1990, 1 ♂, GG; Mulia-Ilu, X.–XI.1990, 4 ♂♂, GG; II.1991, 6 ♂♂, 2 ♀♀, GG; 1 ♂, ZMA; X.1991, 1 ♂, GG; 1991, 6 ♂♂, GG, 1992, 1 ♀, GG.

**Diagnosis**

This taxon differs from *Delias walshae walshae* ROEPKE, 1955 in its vivid yellow colour on underside of hindwing and from *Delias walshae sanaeae* SAKUMA, 1999 on the underside of forewing by its large white area.

**Description**

**Male.** Upperside of forewing is white. Black border is slightly narrower than in *walshae walshae* from top of discal cell to tornus with irregular inner edge and bearing two small white subapical spots. Black dc-bar is partly visible. Costa and posterior part of discal cell are black. Upperside of hindwing is translucent white with narrow black border (about 1 mm). Underside of forewing is white with black border slightly narrower than on upperside, bearing three orange subapical and two orange elongated terminal spots, followed by a very small less-coloured one. A large black streak from base to dc-bar fills nearly whole discal cell, except narrow anterior part and is narrowly connected with black border. Some black diffusion is in base. Between black costa and black discal cell is a thin white to grey line. Veins are grey to black. Underside of hindwing is basally black and distally yellow. Basal black part from middle of costa to anal area includes about half of discal cell and has no basal spot. Black spot in  $M_1$  and  $M_2$  lies just outside discal cell. Very regular black border is getting broader from a thin line at costa to 2 mm at tornus. Length of forewing: 24–29[28] mm.

**Female.** Upperside of forewing is smudged white with slightly broader black border, bearing four subapical spots, of which first and last are very poor. Upperside of hindwing is smudged translucent white with slightly broader black border than in male. Underside of forewing has narrower black border than on upperside, including three orange subapical spots, followed by three terminal ones, of which the last one is poorly developed. Underside of hindwing is as in male with black border as on upperside. Length of forewing: 28–29 mm.

**Note:** A small number of males and females are known with a small concentration of yellow scales in base on underside of hindwing. These specimens are regarded as a form of this taxon.

**Derivation of name**

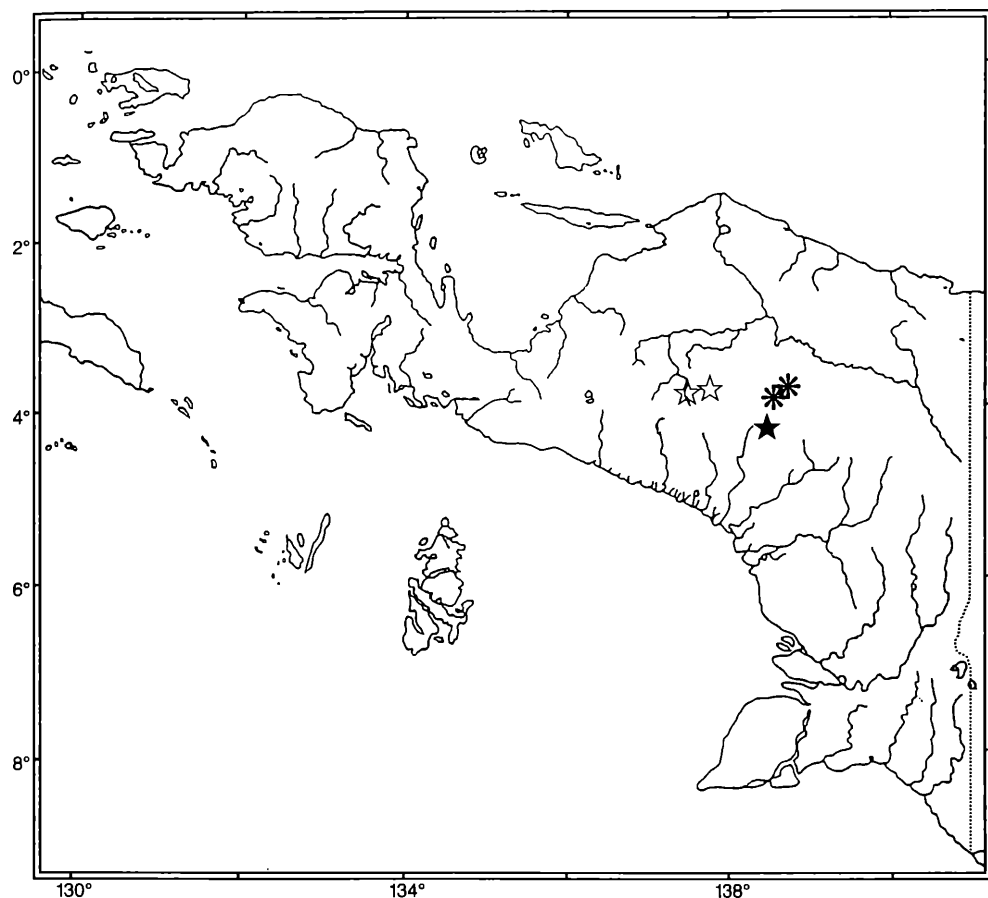
The name “ilu”, a noun in apposition is the name of a “kecamatan” (district/municipality) where this subspecies is found.

***Delias walshae sanaeae* SAKUMA, 1999 comb. nov.**

(map 9, figs 57–65)

SAKUMA (1999: 14–15, pl. 2, figs 3–4): *Delias hemianops sanaeae***Material:**

Holotype ♂: Pass Valley, March 1993; SS. Other material: Pass Valley, River Bion, 10.VII.1992, 2 ♂♂,



Map 9: Distribution of *Delias walshae* ROEPKE, 1955

★ *D. walshae walshae* ROEPKE, 1955

☆ *D. walshae ilu* subspec. nov.

✱ *D. walshae sanaeae* SAKUMA, 1999.

HM; 1 ♂, ZMA; idem, but 7.VII.1992, 1 ♂, HM; 16.VII.1992, 1 ♂, ZMA; 8.IX.1992; 1 ♂, HM; 15.IX.1992, 1 ♂, HM; 16.IX.1992, 1 ♂, HM; 10.–11.VI.1995, 1 ♂, HM; River Ibem, 19.–20.IX.1992, 1 ♂, HM; 24.IX.1992, 3 ♂♂, HM; 26.IX.1992, 1 ♂, HM; 27.IX.1992, 3 ♂♂, 1 ♀, HM; 19.X.1992, 2 ♂♂, HM; 23.XI.1992, 1 ♂, HM; 27.VI.1992, 1 ♂, HM; 8.XII.1992, 1 ♂, HM; 2.–6.VIII.1993, 1 ♂, HM; River Dibem, 1.–3.X.1992, 1 ♂, HM; River Bi, 13.VII.1992, 1 ♂, ZMA; 19.–20.IX.1992, 1 ♂, HM; River Ameagi, 1.XII.1992, 1 ♀, HM; 24.VIII.1995, 1 ♀, HM; 13.–15.VI.1995, 1 ♂, ZMA; River Suwage, 11.VIII.1992, 1 ♂, ZMA; 9.IX.1992, 1 ♂, HM; 25.–28.II.1997, 1 ♂, HM; 21.–26.IV.1997, 4 ♂♂, HM; 12.–14.V.1997, 2 ♂♂, HM; 28.VII.–6.VIII.1997, 2 ♂♂, HM; 18.–24.VIII.1997, 7 ♂♂, HM; 1.–4.XI.1998, 1 ♂, HM; 11.–21.I.1999, 1 ♂, DM; 1 ♂, GG; 1 ♂, RG; Pass Valley, 30.XII.1994, 1 ♂, JL.

#### Diagnosis

*Delias walshae sanaeae* SAKUMA, 1999 differs from *Delias walshae walshae* ROEPKE, 1955 and *Delias walshae ilu* by the vast area with black diffusion on underside of forewing.

### Description

Male. Upperside of forewing is white. Black border from inside discal cell to tornus has irregular inner edge and bears none, one, two or three very small white subapical spots. Black dc-bar is sometimes partly visible. Costa and posterior part of discal cell are black. Upperside of hindwing is translucent white with narrow black border (about 1 mm). Underside of forewing is white with black border slightly narrower than on upperside, bearing three orange subapical and two elongated orange terminal spots, followed by a very small less coloured one. Black area extending from base fills whole discal cell. Central part has black diffusion. Between black costa and black discal cell thin white to grey line. Veins are grey to black. Underside of hindwing is basally black and distally yellow. Basal black part from middle of costa to anal area includes more than half of discal cell and is without basal spot. Black spot in  $M_1$  and  $M_2$  very variable: in some specimens connected with basal black inner part, in other specimens as in *walshae walshae*, still others with two very small spots and even four specimens without postmedian spot (including holotype). Very regular black border widens from a thin line at costa to 2 mm at tornus. Length of forewing: 24–29[27] mm.

Female. Upperside of forewing is smudged white with somewhat broader black border than in male, especially in  $Cu_{1a}$ ,  $Cu_{1b}$  and 2A. Upperside of hindwing is smudged translucent white with slightly broader black border than in male. Underside of forewing with broader black border than on upperside, including three orange subapical spots, followed by two or three terminal ones, of which the last one is poorly developed. Underside of hindwing is as in male with black border as on upperside. Length of forewing: 25–27 mm.

### Name

The name "*sanaeae*", a genitive of a noun in apposition, is named after the author's mother, Sanae.

### Discussion

SAKUMA (1999) described this species from a single specimen only and put it as a subspecies of *D. hemianops* GERRITS & MASTRIGT, [1993], probably because of the absence of the black spot in  $M_1$  and  $M_2$  on the underside of hindwing. However, from a large series of specimens from the same locality, I learn that absence of that postmedian black spot is an exception and that all kinds of varieties are found in which this spot is stronger or weaker. Also the pattern on the underside of forewing is typical *walshae* for its large white area and reduced black border and not as *hemianops*, which underside of forewing is black. Because of these features *sanaeae* is put as a subspecies of *walshae*.

### *Delias hemianops* GERRITS & MASTRIGT, [1993]

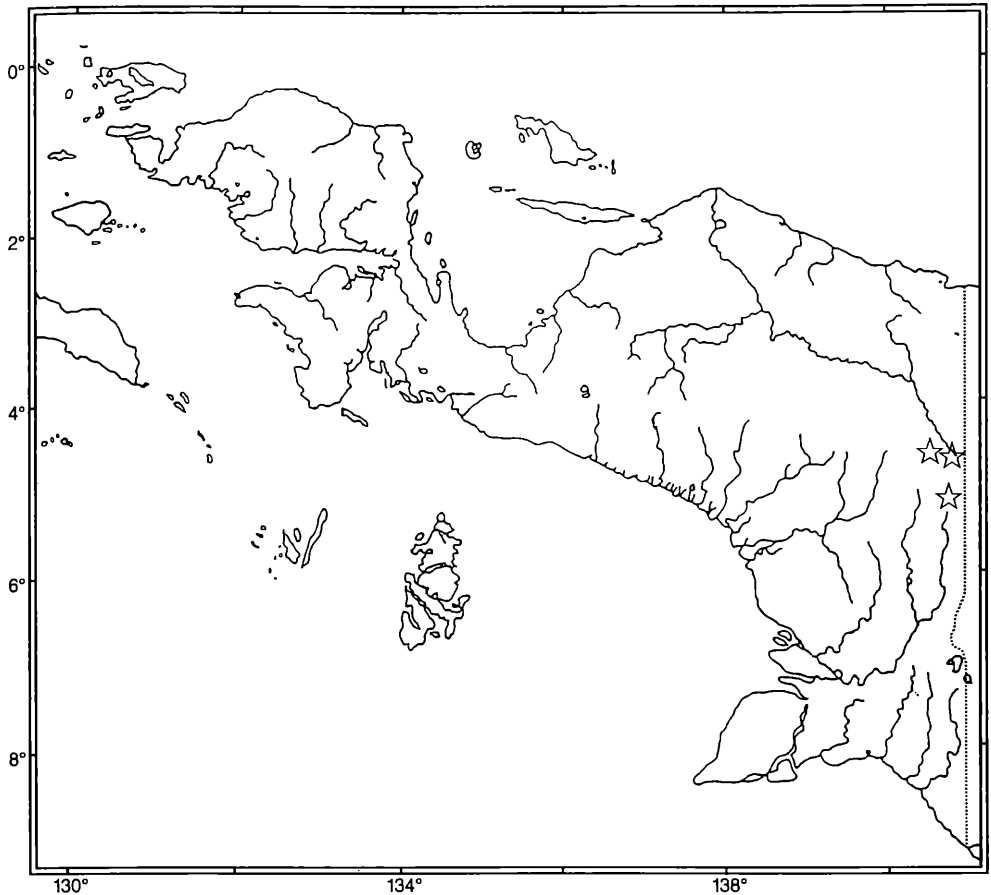
(map 10, figs 66–70)

GERRITS & MASTRIGT ([1993]: 389–390, 401, 402): *Delias hemianops*

SAKUMA (1999: 14): *Delias hemianops*

### Material examined

Holotype ♂: Irian Jaya, Pegunungan Bintang, Abmisibil 2000 m, River Okbon, 25.IV.1991, HENK VAN MASTRIGT, MZB. Paratypes: same data as holotype, 25.VI.1991, 1 ♀, ZMA; 22.–27.I.1992, 1 ♂, ZMA; Batimban, River Okkim 1900 m, IX.1987, 1 ♂, MZB; 23.IX.1991, 1 ♂, HM; Puncak Lukon, 24.V.1991, 1 ♂, HM; 1 ♂, ex HM, GG; Gunung Lukon 25.VII.1991, 1 ♀, HM. Other material: Batimban, Sabin, River Raleplina, 20.V.1995, 2 ♂♂, HM; Batimban, River Mong, 5.XI.1995, 1 ♂, HM; 6.II.1996, 2 ♂♂; 30.VIII.1996, 1 ♀, HM; 22.IX.1996, 1 ♀, HM; River Lukon, 21.V.1995, 1 ♂, HM; 28.VII.1995, 1 ♂, HM; 23.VIII.1995, 1 ♂, HM; 7.VI.1997, 1 ♂, 1 ♀, HM; 12.IX.1997, 1 ♂, HM; 19.–20.VII.1998, 1 ♂, HM; 25.VIII.1998, 1 ♂, GG; 3 ♂♂, HM; 25.I.1999, 1 ♂, BMNH1; 1 ♂, RG; Gunung Lukon, Kutmong, 17.XII.1995, 1 ♂, HM; River Okkim, 17.II.1996, 1 ♂, ZMA; Bupban, River Mu, 9.III.1996, 1 ♂, ZMA; Sabin, River Tapi, 17.III.1996, 1 ♂, HM; River Okpeti, II.1997, 1 ♂, GG; Abmisibil, River Okbon, 19.–24.VIII.1992, 1 ♂, HM; Abmisibil, River Okse, 6.–7.IV.1997, 2 ♂♂, HM; 14.VI.1997, 2 ♂♂, HM.



Map 10: Distribution of *Delias hemianops* GERRITS & MASTRIGT, [1993]

#### Diagnosis

*Delias hemianops* GERRITS & MASTRIGT, [1993]—together with *Delias walshae* ROEPKE, 1955 and *Delias fioretti* MASTRIGT, 1996—differs from the other members of this subgroup on the underside of the hindwing by the black part from the base extending into discal area and without basal spot. *Delias hemianops*—together with *Delias fioretti*—differs from *Delias walshae* on the underside of hindwing by the more or less straight border (not concave) between the basal black area and orange yellow part. *Delias hemianops* differs from *Delias fioretti* on the upperside of the forewing by absence of the black veins and on the underside of hindwing by narrow black border.

#### Description

Male. Upperside of forewing is milky white with broad black costal border, entering discal cell. Black border along termen is much broader at apex than at tornus, without subapical or terminal spots. Inner edge is curved and slightly diffuse. Upperside of hindwing is milky white and translucent: pattern of underside visible from above, with narrow black border. Underside of forewing is nearly totally black with three orange subapical spots and sometimes one or two very small orange terminal spots. At least a small part of cell 2A is white with some black diffusion, sometimes reaching to vein  $Cu_{10}$ . Underside of hindwing is black at innerside and at outside orange with white veins. Black border varies

in width from less than 1 mm at Sc+R<sub>1</sub>, to 4 mm at Cu<sub>1b</sub>. Separation between black and orange is more-or-less straight to irregular, from middle of costal margin to tornus, cutting off under part of discal cell; however, with one exception. Length of forewing: 26–28 mm.

Female. Upperside of both wings is as in male with slightly broader black border. Forewing bears four orange subapical spots, of which the two outer ones are very poorly developed. Underside of both wings is as in male; only subapical and terminal spots on underside of forewing are somewhat larger. Length of forewing: 27–28 mm.

#### Name

The name “hemianops”, an adjective in apposition, is derived from the medical term “hemianopsia”, half blindness. This name characterises the composition of the hindwing underside, distinctive for this butterfly.

#### *Delias fioretti* MASTRIGT, 1996

(map 11, figs 71–74)

MASTRIGT (1996b: 21, 33–34, map 9, Pl. 2, fig. 11–12, Pl. 6, fig. 32–33): *Delias fioretti*

#### Material examined

Holotype ♂: Pass Valley, River Bion, 17.VII.1992, MZB. Paratypes: idem, but 1.IX.1992, 1 ♂, HM; 15.VII.1992, 1 ♂, ex HM, ZMA; 13.XII.1992, 1 ♂, MZB; River Ibm, 21.II.1992, 1 ♀, HM; 4.VIII.1992, 1 ♂, HM; 5.VIII.1992, 1 ♂, HM. Other material: Pass Valley, River Suwage, 18.–24.VIII.1997, 1 ♂, HM.

#### Diagnosis

*Delias fioretti* MASTRIGT, 1996 differs from all the members of this subgroup on the upperside of forewing by the black veins and on the underside of hindwing by the broad black border.

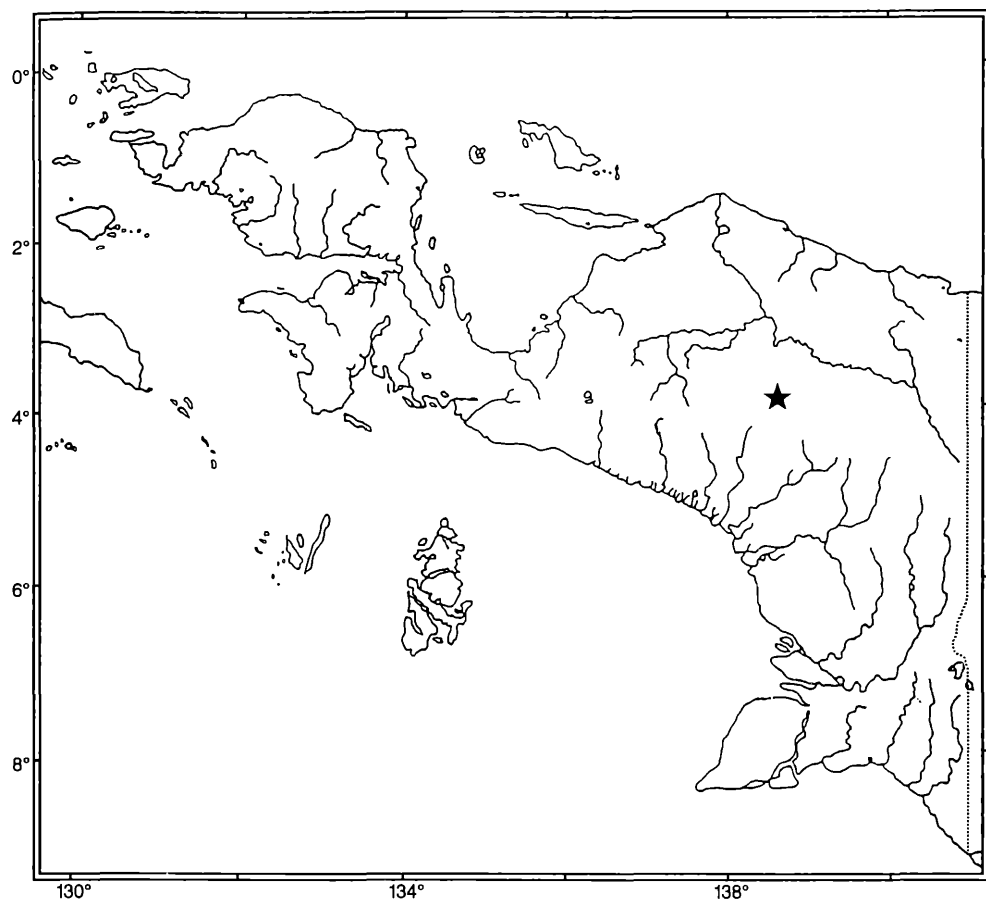
#### Description

Male. Upperside of forewing is white; base and distal cell black. Narrow black border from dc-bar to tornus bears two vague white subapical spots. Veins between distal cell and terminal border are black. There is some black diffusion at edges of black areas and veins. Upperside of hindwing is translucent white with a regular black border of 2 mm width from apex to tornus, having some black diffusion at inner edge. Underside of forewing is white. Black terminal border is slightly broader than on upperside and has an orange subapical band, followed by one separate orange terminal spot. Base is black; discal cell is as on upperside with some black diffusion close to dc-bar. Veins are black. Underside of hindwing is black basally and distally orange with white veins. Black border is as on upperside. Border between black and orange is more-or-less straight, from middle of costal margin to tornus, cutting off under part of discal cell. Some veins in orange area are black at basal part. Length of forewing: 26–28 mm.

Female. As male. However, black border on upperside of forewing is broader, with three white subapical and two smaller terminal spots. Upperside of hindwing has broader black border than in male. On underside of forewing black border is somewhat broader in Cu<sub>1a</sub> and Cu<sub>1b</sub>, having a second orange terminal spot. Length of forewing: 29 mm.

#### Name

The name “fioretti”, a noun in apposition, means little flowers and is borrowed from the title of a collection of essays about Saint Francis of Assisi and his first companions: “I Fioretti di San Francesco”



Map 11: Distribution of *Delias fioretti* MASTRIGT, 1996

### *Delias catocausta* subgroup

#### Diagnosis

*Delias catocausta* subgroup differs from the other subgroups on the underside of hindwing by the dark brown or grey colouration and the absence of light obvious colouration, except in the basal spot.

### *Delias catocausta* JORDAN, [1912]

(map 12)

#### Diagnosis

*Delias catocausta* JORDAN, [1912] differs from *Delias sawyeri* subsp. nov. on the underside of hindwing by a white band between brown or grey discal area and black terminal border.

### *Delias catocausta catocausta* JORDAN, 1912

(map 12, figs 75–81)

JORDAN (1912: 591–592): *Delias catocausta*

TALBOT (1928: 31, 48, 50): *Delias catocausta*

N.B.: not from SW PNG, as mentioned in text

TALBOT (1929: 112, pl. IV, fig. 94): *Delias catocausta*

TALBOT (1932: 102): *Delias catocausta*

TALBOT (1937: 357–358, 606, 623, pl. XIV, fig. 103, pl. XXIX, fig. 100, pl. XLIX, fig. 3): *Delias catocausta*

TOXOPEUS (1944: 141–142): *Delias catocausta*

ROEPKE (1955: 238–239, 257): *Delias catocausta catocausta*

ROEPKE (1955: 238): *Delias clathrata (catocausta) nigerrima* (= ROEPKE (1955: 238): *Delias catocausta nigerrima*? [sic])

ROEPKE (1955: 257): *Delias catocausta nigerrima*

D'ABRERA (1971: 142 + figs): *Delias catocausta* (= *nigerrima*)

D'ABRERA (1977: 142 + figs): *Delias catocausta* (= *nigerrima*)

D'ABRERA (1990: 142 + figs): *Delias catocausta* (= *nigerrima*)

YAGISHITA (1993a: 258–259): *Delias catocausta catocausta*

YAGISHITA (1993b: 266–267): *Delias catocausta catocausta*

TUZOV (1995: 118): *Delias catocausta*

### Designation of lectotype

JORDAN [1912] described *Delias catocausta* on base of “a long series ♂♂ and a few ♀♀”, collected by A. S. MEEK at Mount Goliath, on Jan.–Febr. 1911, without designating a holotype. Herewith I designate as lectotype that male in BMNH3, labelled as syntype by PHIL ACKERY.

### Material examined

Lectotype ♂: Mt Goliath 5–7000 ft, Central Dutch New Guinea about 139°E, Jan.–Febr. 1911, A. S. MEEK, BMNH2. Paralectotypes: same data 23 ♂♂, 6 ♀♀, BMNH3; 8 ♂♂, 1 ♀, BMNH1; 8 ♂♂, 1 ♀, BMNH4; 2 ♂♂, ZMB. Holotype ♂ *D. catocausta nigerrima* ROEPKE, 1955: Ned. Nieuw Guinea, loc. ign. ? Andreae River, >2000 m, 1911 DUMAS, RMNH. Other material: Silakma, River Koluk, 26.III.–9.IV.1992, 1 ♂, HM; Ninya, River Koluk, 17.–19.IX.1991, 1 ♂, HM; Ninya, River Wantek, 2400 m, 1.–7.IX.1991, 1 ♂, HM; Korupun, River Asso, 11.–15.III.1990, 1 ♂, DM; III.1991, 1 ♂, HM; 31.III.–1.IV.1991, 1 ♂, 1 ♀, HM; 21.V.1991, 1 ♂, HM; 18.–22.IX.1991, 1 ♂, HM; 23.–30.IX.1991, 2 ♂♂, HM; 5.–21.XI.1992, 1 ♂, ZMA; 22.–27.II.1993, 2 ♂♂, HM; 1 ♂, ZMA; 25.–30.I.1993, 2 ♂♂, HM; 22.III.1993, 1 ♂, HM; 17.–24.IV.1993, 1 ♂, HM; 6.–11.IX.1993, 1 ♀, HM; 11.–16.X.1993, 1 ♂, HM; 9.–10.XII.1993, 1 ♂, ZMA; 4.–9.XII.1995, 1 ♂, ZMA; 12.–17.V.1996, 2 ♂♂, ZMA; Korupun Selatan, River Gwanenda, 10.–12.XII.1991, 1 ♂, HM; 1 ♂, ZMA; River Deisul, 15.–19.III.1994, 2 ♂♂, ZMA; Korupun, 18.–22.IX.1991, 1 ♂, HM; River Mulakik & Pelakik, 19.I.–9.II.1991, 1 ♀, ZMA; River Weimin, 25.VIII.–17.IX.1992, 1 ♀, HM; 20.–25.III.1995, 1 ♂, EMEM; 24.–29.VI.1996, 1 ♂, ZMA; Langda, River Bibwe, 29.XI.1988, 1 ♂, HM; 30.XI.1988, 2 ♂♂, HM; 1 ♂, ZMA; 1.XII.1988, 1 ♂, ZMA; 3.XII.1988, 1 ♂, HM; 5.XII.1988, 1 ♂, ZMA; 1.–7.XII.1988, 1 ♂, ZMA; 7.IV.1989, 1 ♂, DM; 1.–3.V.1989, 1 ♂, HM; 9.–10.V.1989, 1 ♂, HM; 25.IX.1989, 2 ♂♂, HM; Langda, Kerabuk, River Teri, 10.V.1991, 1 ♀, HM; 22.–29.VI.1991, 1 ♂, DM; 2.–20.IX.1991, 1 ♂, EMEM; 4.–20.VI.1992, 1 ♂, 1 ♀, ZMA; 2.–18.IX.1992, 1 ♂, EMEM; Sumtamom–Dirik, River Onnyi, 3.–24.IX.1991, 1 ♂, HM; no data, 1 ♂, EMEM.

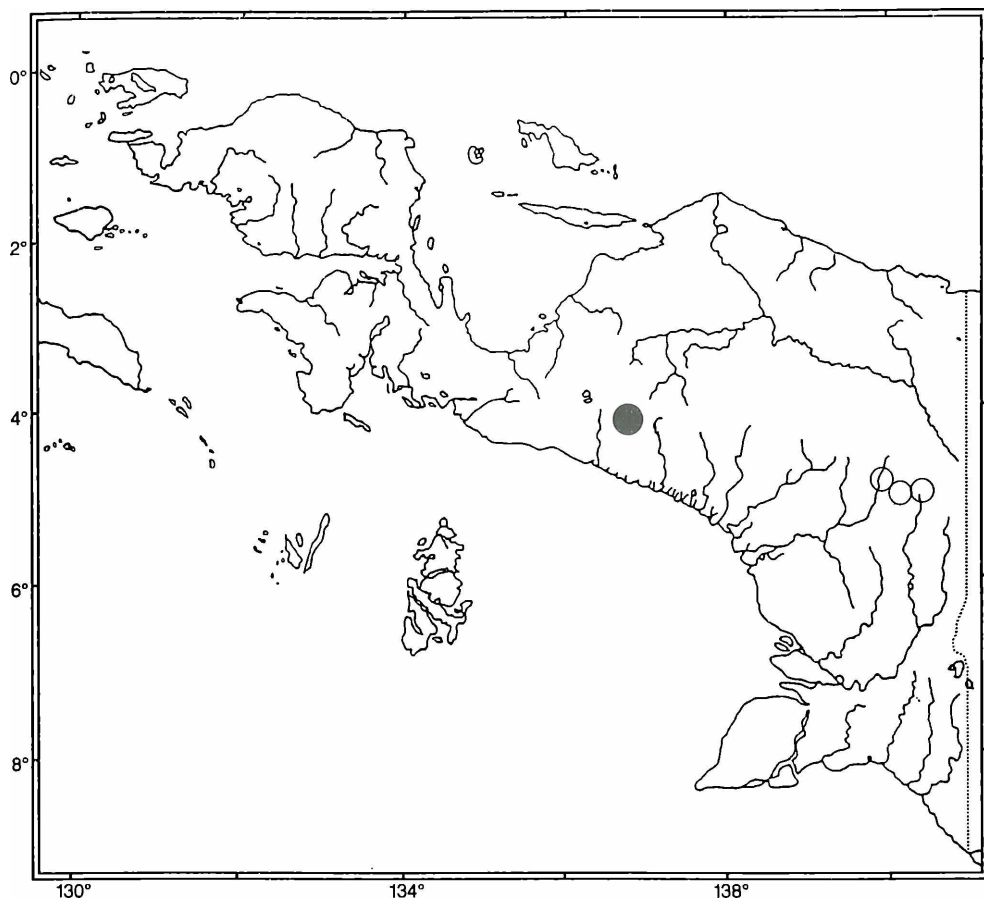
Note: The location of Mount Goliath is not about 139°E, but about 140°E.

### Diagnosis

*Delias catocausta catocausta* JORDAN, [1912] differs from *Delias catocausta eefi* MASTRIGT, 1990 on the underside of forewing by the red subapical spots (instead of yellow) and on the underside of hindwing by the dark brown colour of the discal area, including the veins.

### Description

Male. Upperside of forewing is milky white; tornus and border along termen are black. There is a thick, black dc-bar. The black border is much broader at apex than at tornus, has serrate inner edge and sometimes bears one poorly developed subapical spot. Base of forewing has some blackish diffusion. Upperside of hindwing is milky white with very narrow black border. Underside of forewing is black



Map 12: Distribution of *Delias catocausta* JORDAN, 1912

○ *D. catocausta catocausta* JORDAN, 1912; ● *D. catocausta eefi* MASTRIGT, 1990.

with three yellow subapical spots, followed by two very small terminal ones. Inner edge of border is serrate. Cell 2A is white, sometimes slightly entering  $Cu_{1b}$ . Underside of hindwing is dark brown. Some veins are partly black. There is a small black spot close to discal cell on vein  $M_2$ . Lower part of cell  $Cu_{1b}$  is black. Cell along costa, inner part of discal cell and cells 2A and 3A form a black hook with small to very small yellow basal spot and greyish green diffusion along anal area in 3A. Narrow black border from cell Rs to anal area is undulate at inner edge and separate from dark brown discal part by some white from Rs to tornus, which is more obvious in  $M_1$ ,  $M_2$ ,  $Cu_{1a}$  and  $Cu_{1b}$ . Length of forewing: 26–30 mm.

In only one specimen the underside of hindwing shows some variety: the black spot near discal cell on vein  $M_2$  is reduced to a few black scales in cell  $M_2$ . Also the yellow spot at the base is much more reduced. The veins are greyish white.

Female. Upperside of forewing is greyish white with some broader black border than in male, bearing three white subapical spots with sometimes a yellow tinge (from underside). Upperside of hindwing is greyish white with black 3 mm wide border, which undulate at inner edge. Underside of forewing has greyish diffusion, of variable density; however not black. Black border bears three orange yellow subapical spots, followed by three very small terminal ones. Underside of hindwing is brown or diffuse

brown, with more reduced black border than in male. White areas between brown discal area and black border is very variable; however, more obvious than in male. Length of forewing: (27) 29–30 mm.

#### Discussion

A good series of new material from Korupun, at the south side of the central mountain range between Baliem Valley and Mount Goliath, shows a variety in the various specimens of the same localities. Therefore I follow YAGISHITA (1993) and Tuzov (1995) and consider the “weak subspecies, if any” described by ROEPKE (1955) as *Delias catocausta nigerrima* as a synonym for *D. catocausta catocausta*.

#### *Delias catocausta eefi* MASTRIGT, 1990

(map 12, figs 82–85)

MASTRIGT (1990: 197–204, figs 4, 8): *Delias catocausta eefi*

YAGISHITA (1993a: 258): *Delias catocausta eefi*

YAGISHITA (1993b: 266): *Delias catocausta eefi*

Note: On map in textbook and in illustrated part *eefi* is wrongly mentioned as occurring in Star Mountains, instead of in the Tembagapura area.

Tuzov (1995: 118): *Delias eefi* (bona sp.?) [sic!]

#### Material examined

Holotype ♂: Irian Jaya, Tembagapura 2000 m, 17.XI.1979, VAN MASTRIGT, ZMA. Paratypes: same data, 1 ♂, DR; same data but 19.XI.1979, 1 ♂, HM; 1 ♂, MZB; Tembagapura, 2000 m, 1980, 2 ♂♂, RG; 1983, 1 ♂, GG; Tembagapura, River Wanogong, 2000 m, 1989, 1 ♂, HM. Other material: Tembagapura, River Waa, 1850 m, 10.II.1991, 1 ♂, HM; 2100 m, 11.X.1991, PANGEMAN, 1 ♀, EMEM; 16.II.1992, 1 ♂, DM; 20.VI. 1992, 2 ♂♂, HM; 21.XII.1992, 1 ♂, HM; River Waa atas, 22.VII.1992, 1 ♂, HM; River Kawiki, 2.VIII.1992, 1 ♂, HM; River Agawagang, 1850 m, 24.III.1991, 1 ♀, HM; Tembagapura, II.1991, 1 ♂, DM; I.–II.1992, 1 ♂, HM; 1991, 1 ♂, HM.

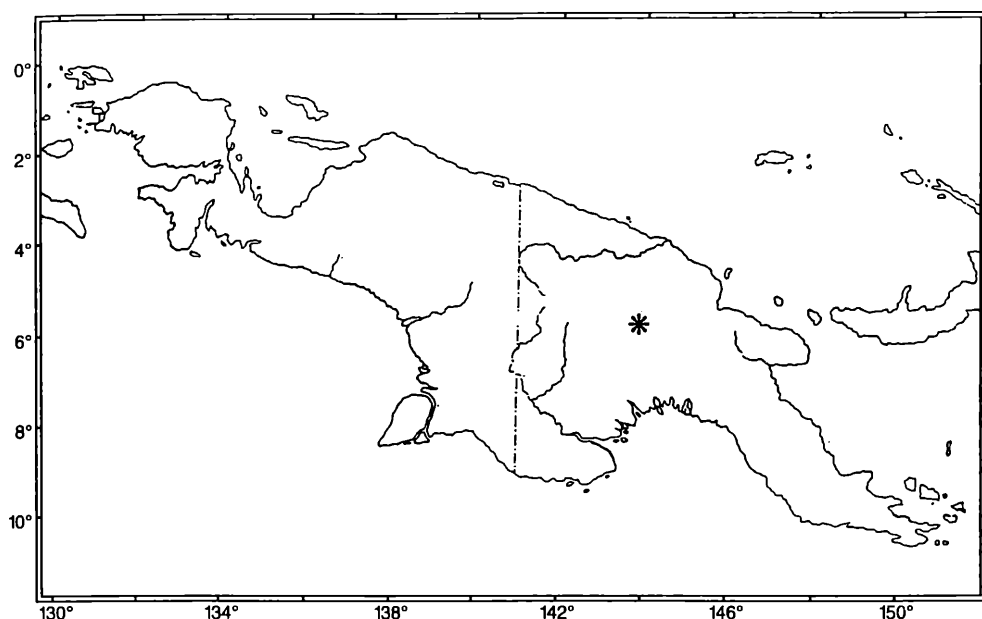
#### Diagnosis

*Delias catocausta eefi* differs from *D. catocausta catocausta* by its red subapical and terminal spot on underside of forewing and on underside of hind wing by is grey ground colour, its white veins and its red basal spot.

#### Description

Male. Upperside of forewing is milky white; tornus and border along termen are black. There is a black LDC. The black border is much broader at apex than at tornus, has serrate inner edge and bears two poorly developed subapical spots. Base of forewing has some blackish diffusion. Upperside of hindwing is milky white with very narrow black border. Underside of forewing is grey at inner side; black veins connect grey area with black border along termen, which has three red subapical spots and two very small terminal ones. Inner edge of border is serrate. A white band with some grey diffusion separates dark inner part from black border, widening from less than 1 mm on top to 7 mm along tornus. Underside of hindwing is grey with white veins, bearing a small black spot close to discal cell on vein  $M_2$ . Cell along costa, inner part of discal cell and cells  $Cu_{1b}$ , 2A and 3A form a black hook including a small red basal spot and greyish green diffusion along anal area in cells 2A and 3A. Narrow black border from cell Rs to anal area is undulate at inner edge and separated from grey discal part by white line from cell Rs, getting broader in  $M_1$ ,  $M_2$ ,  $Cu_{1a}$  and somewhat narrower again in  $Cu_{1b}$ . Border between this white line and grey inner part is vague and diffuse from  $M_1$  to  $Cu_{1b}$ . Length of forewing: 26–30 mm.

Female. Upperside of forewing is greyish white and bears two pink subapical spots. Black dc-bar is small. Upperside of hindwing is translucent, greyish white. Border from Rs to tornus is grey-black with undulate inner edge. Underside of forewing is grey to black, with white postmedian triangular band



Map 13: Distribution of *Delias sawyeri* spec. nov.

from  $M_1$  widening towards inner margin, partly covered with grey diffusion. Dark grey border bears three red subapical spots, followed by three very small terminal ones. Underside of hindwing is as in male, with somewhat broader white area between black border and dark discal area, which is not so dark as in male. There is a black spot on  $M_2$  just outside discal cell. Length of forewing: 27 mm.

#### Name

The name "eefi" is an genitive of a noun in apposition, in honour of my father, the late Mr EEF VAN MASTRIGT, who awakened the author's interest in nature and especially in butterflies.

#### Discussion

*D. catocausta eefi* MASTRIGT, 1990, is described as a subspecies of *catocausta*. However, there is more than one reason to consider raising it on species level, as the other ground colour and the white veins on the underside of the hindwing and the fact that no *catocausta* are found between Puncak Jaya and Korupun (the most western locality where *catocausta catocausta* is found). This consideration is expressed by Tuzov (1996) when he added "(bona sp.?)"

#### *Delias sawyeri* spec. nov.

(map 13, figs 86–87)

#### Type-material

Holotype ♂: Papua New Guinea, Engga Prov. Poketamanda, Mt Nose, 15.VII.1968, PH. SAWYER, PS.

#### Diagnosis

*Delias sawyeri* spec. nov. differs from *Delias catocausta* JORDAN, [1912], on the underside of hindwing by the large brown discal area with is bordered by black terminal border, without a white band at inner edge of black border.

**Description**

Male. Upperside of forewing is white; tornus, dc-bar and border along termen are black. The black border is much broader at apex than at tornus, has serrate inner edge and bears three subapical spots, one very poorly developed followed by two larger ones. Upperside of hindwing is white with very narrow black border. Underside of forewing is white with black border as same size as on upperside, bearing three large yellow subapical spots, followed by three very small yellow terminal ones. A brown-black streak from brown-black base till black border cuts off thin white line along a of black costa and covers midcell partly. Underside of hindwing is dark brown, with rounded black submarginal spot reaching dc-bar, and regular black border, which not undulate at inner edge. Black base includes small yellow basal spot. Inner border of yellow basal spot, inner part of discal cell and cells 2A and 3A powdered with black scales between the brown ones; however, there is no hooked black band. There is some greyish green diffusion along anal area in 3A. Length of forewing: 26 mm.

Female: unknown.

**Derivation of name**

The name "sawyeri" is a genitive of a noun in apposition, in honour of Mr PHIL SAWYER, who is largely interested in the genus *Delias* and recorded this type.

***Delias mira* subgroup****Diagnosis**

This subgroup differs from all other subgroups on the upperside of hindwing, having a broad black border from costal margin to terminal border where it abruptly reduced to a thin line, about  $M_2$ .

For years and years all new species related to *D. mira* have been described as subspecies of this species. Even *inexpectata*, originally described as a new species, was later put as a subspecies of *D. mira*. Much new material coming up in the last twenty years—including sympatric material—postulates a number of separate species. In recent publications *D. mira mira*, *D. mira reversa* and *D. mira excelsa* were never pictured. May be this lack in information brought YAGISHITA (1993) to the conclusion that *D. mira roepkei* is a synonym (form) of *D. mira excelsa*. PARSONS (1998) declared *excelsa* a synonym of *D. mira mira*, because of the variability within both taxa. The more localities are known where members of this complex occur, the more difficult it will be to separate the various species and subspecies. On one hand the sympatry of members of this subgroup force to recognize separate species. On the other hand all kind of varieties in neighbouring localities make it hard to define the different species. Within this subgroup six separate species are recognized, i. e. *inexpectata*, *hiemalis*, *nakanoikeikoe*, *autumnalis*, *roepkei* and *mira*. The first four species are known only from Irian Jaya. *D. roepkei* ssp. is known from Irian Jaya and P.N.G., from the Pass Valley to the Owen Stanley Range. *D. mira* ssp. is found in the eastern part of the central mountain range of Papua New Guinea and on the Huon peninsula.

***Delias mira* ROTHSCILD, 1904**

(map 14)

**Diagnosis**

As said above, for years and years all new species related to *D. mira* have been described as subspecies of this species. Results from all over Irian Jaya and Papua new Guinea gave on new view and leads to the conclusion that *D. mira* (sensu stricto) occurs only in the eastern part of Papua New Guinea, including two subspecies *D. mira reversa* and *D. mira excelsa*.

*Delias mira* differs from *D. autumnalis* ROEPKE, 1955, *D. inexpectata* ROTHSCILD, 1915, and *D. nakanoikeikoe* YAGISHITA, 1996 on the underside of the hind wing, where the ground colour includes the veins;

from *D. roepkei* SANFORD & BENNETT, 1955 and *D. hiemalis* ROEPKE, 1955 by its pale spot at both cells  $M_3$ ,  $Cu_{1a}$  and  $Cu_{1b}$ .

so under diagnosis of *D. roepkei* SANFORD & BENNETT, 1955 stat. nov.

***mira mira* ROTHSCHILD, 1904**

14, figs 88–91)

CHILD (1904: 315–316, pl. II, fig. 12, 13): *Delias mira*

FORSTER (1910: 130): *Delias mira*

(1928: 31, 50): *Delias mira mira*

(1929: 112, pl. IV, fig. 95): *Delias mira mira*

(1932: 102): *Delias mira mira*

(1937: 358–360, pl. XIV, fig. 104, XXIX, fig. 101): *Delias mira mira*

E (1955: 240, 242, 258): *Delias mira mira*

ERA (1971: 143 + figs): *Delias mira mira*

ERA (1977: 143 + figs): *Delias mira mira*

ERA (1990: 143 + figs): *Delias mira mira*

IITA (1993a: 260–261): *Delias mira mira*

IITA (1993b: 269): *Delias mira mira*

(1995: 119): *Delias mira mira*

NS (1998: 320, pl. 38: figs 949–950): *Delias mira mira*

**Designation of lectotype**

CHILD (1904) described *Delias mira* on base of one pair, collected by A. S. MEEK in Owgarra, of head of Aroa River, at the end of May 1903, without designating a holotype. Herewith the is designated as lectotype.

**Material examined**

type ♂: Owgarra, north of head of Aroa River, end of May '03, S. MEEK, BMNH3. Paralectotype: data, 1 ♀, BMNH3. Other material: Angabunga River affl. of St. Joseph River Brit. N. Guinea ft upwards Nov. '04 – Febr. '05, A. S. MEEK, 1 ♂, BMNH1; 2 ♂♂; BMNH3; Woitape, IX.1972, HM; IX.1992, 1 ♂, HM; 2000 m, 25.III.1971, 1 ♂, GG.

**Differential diagnosis**

*mira mira* ROTHSCHILD, 1904 differs from *D. mira excelsa* JORDAN, 1930 and from *D. mira a* ROTHSCHILD, 1925 by its more reduced white parts on upperside of forewing.

**Description**

Upperside of forewing is black, except small smudged white inner part, to  $\frac{2}{3}$  of inner margin including lower part of discal cell. Three small white subapical spots are followed by two or three or terminal ones. Upperside of hindwing is translucent white: pattern on underside is visible from above. Black area at apex from middle of costa to end of vein  $Cu_{1a}$ , with diffuse inner edge, is followed by narrow border to tornus. Underside of forewing is black, with three orange subapical spots, followed by two somewhat smaller terminal ones of same colour and including small grey spot at  $R_1$ . Cell grey white from base to tornus. Underside of hindwing is brown. Black band from base to middle of costa enclosing large yellow spot is bordered by white line along costa. At  $R_s$  is white spot, followed by black border, which is undulate at inner edge from  $M_2$  to tornus. At least three black postmedian are sometimes more-or-less connected to irregular postmedian band. Outer parts of cells 2A,  $Cu_{1a}$  and  $M_3$  are goldish yellow and connected with narrow white band that runs at inner side of border, sometimes to  $R_s$ , and that is interrupted by black vein-tips. Anal area is covered with

Female. As male. However, upperside of forewing has larger white area. Black border bears three subapical and three terminal spots. Upperside of hindwing has black border from  $Cu_{1a}$  to tornus, which is more reduced than in male. Underside of forewing has much larger subapical and terminal spots. On underside of hind is postmedian band reduced to two spots. Length of forewing: 29 mm.

***Delias mira excelsa* JORDAN, 1930**

(map 14, figs 92–96)

JORDAN (1930a: 278): *Delias mira excelsa*

JORDAN (1930b: 59, pl. III, fig. 1): *Delias mira excelsa*

TALBOT (1932: 102): *Delias mira excelsa*

TALBOT (1937: 360–361): *Delias mira excelsa*

ROEPKE (1955: 242, 258): *Delias mira excelsa*

D'ABRERA (1971: 143): *Delias mira excelsa*

D'ABRERA (1977: 143): *Delias mira excelsa*

D'ABRERA (1990: 143): *Delias mira excelsa*

YAGISHITA (1993a: 260–261): *Delias mira excelsa*, including f. *roepkei*

TUZOV (1995: 119): *Delias excelsa*

PARSONS (1998: 320): *Delias mira mira*

**Designation of lectotype**

JORDAN (1930) described *Delias mira excelsa* on base of 6 ♂♂ and 7 ♀♀, collected by A. F. EICHORN at Edie Creek, on Westside of Herzog Mountains, in early 1928, without designating a holotype. Here with I designate as lectotype that specimen in BMNH3, labelled as syntype ♂ by Mr PHIL ACKERY.

**Material examined**

Lectotype ♂: Edie Creek, Westside of Herzog Mts 6100 ft, early 1928, A. F. EICHORN, BMNH3. Paralectotypes: same data, 4 ♂♂, 6 ♀♀, BMNH3; 1 ♂, 1 ♀, BMNH4. Other material: Wau, III.1973, 1 ♂, HM; 1 ♂, ZMA; 2300 m, 3.V.1982, 1 ♂, DM; 2000 m, 6.I.1986, 1 ♂, GG; 1700 m, 6.I.1986, 1 ♂, 1 ♀, GG; Morobe District, 6.4 km West of Wau, Namie Creek, on Mt Kaindi road, 1560–1600 m, 14.IX.1972, THOMAS W. DAVIES, 1 ♂, BMNH1; 11 km West of Wau, 2000 m, 25.II.1973, 1 ♂, BMNH1; Mt Kaindi, 2000 m, 19.VIII.1974, 1 ♂, GG; 7000 ft, 10.XII.1974, 1 ♀, HM; 5500 ft, 16.VI.1975, 1 ♂, GG; 5.V.1976, 1 ♂, GG.

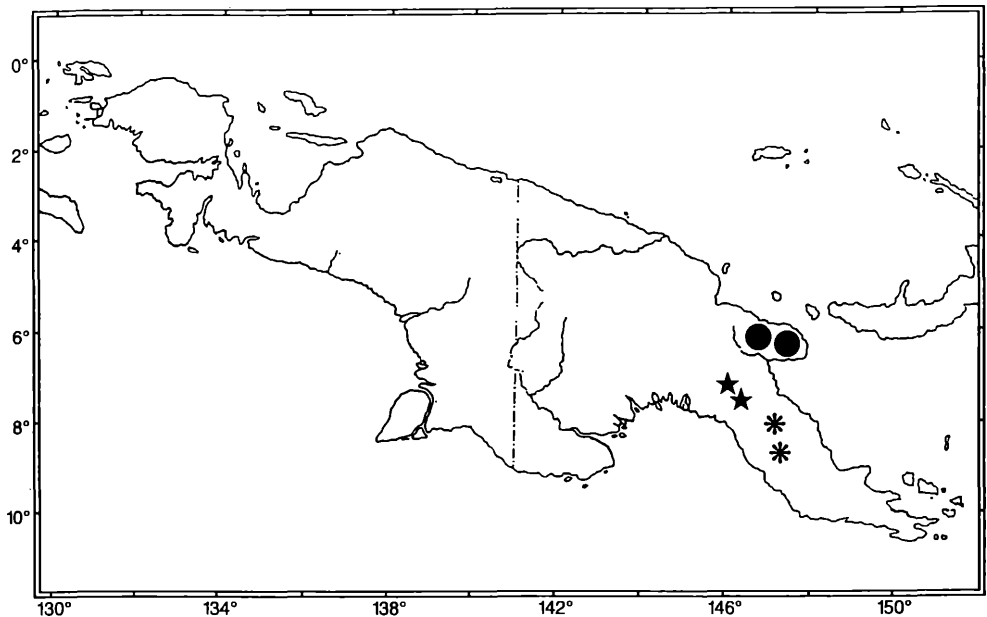
**Diagnosis**

*Delias mira excelsa* JORDAN, 1930 differs from *D. mira mira* ROTHSCHILD, 1904 and from *D. mira reversa* ROTHSCHILD, 1925 by its larger white parts on upperside of forewing.

**Description**

Male. Upperside of forewing is outwardly black, with larger inner white part than in *mira mira*. Black border has slightly curved and diffuse inner edge including top of discal cell to postmedian part of inner margin, with no, one or two vague subapical spots. Upperside of hindwing is as in *mira mira*. Underside of forewing is black, with smaller orange subapical and terminal spots. At  $R_1$  small lies a grey spot. Cell 2A is white from base to tornus. Sometimes grey diffusion covers median part of  $Cu_{1b}$  and  $Cu_{1a}$ . Underside of hindwing is brown. Black band from base to middle of costa enclosing large yellow spot is bordered by white line along costa. At Rs is yellowish spot, followed by black border, which is undulate at inner edge from  $M_1$  to tornus. Postmedian black spot in cells  $M_1$  and  $M_2$ , is sometimes slightly entering  $M_3$ , but never connected with concentration of black scales in  $Cu_{1b}$ . Outer parts of cells 2A,  $Cu_{1b}$ ,  $Cu_{1a}$  and  $M_3$  are deep goldish yellow. Black and gold diffusion covers anal area. Length of forewing: 29–30 mm.

Female. As male. However, upperside of forewing has greyish white area; black border bears three subapical and one or two terminal spots. On upperside of hindwing has broader black apical area, es-



Map 14: Distribution of *Delias mira* ROTHSCHILD, 1904

\* *D. mira mira* ROTHSCHILD, 1904; ★ *D. mira excelsa* JORDAN, 1930; ● *D. mira reversa* ROTHSCHILD, 1925.

pecially in  $M_1$  and  $M_2$ , abruptly decreasing along  $M_3$ . Underside of forewing bears much larger sub-apical and terminal spots; sometimes with a third terminal one. Underside of hindwing is as male, however with small white triangular area along margin border. Length of forewing: 28–31 mm.

#### ***Delias mira reversa* ROTHSCHILD, 1925**

(map 14, figs 97–98)

- ROTHSCHILD (1925: 675–676): *Delias mira reversa*  
 TALBOT (1928: 31, 49): *Delias mira reversa*  
 TALBOT (1932: 102): *Delias mira reversa*  
 TALBOT (1937: 360, Pl. XLIX, Fig. 4): *Delias mira reversa*  
 ROEPKE (1955: 242, 258): *Delias mira reversa*  
 D'ABRERA (1971: 143): *Delias mira reversa*  
 D'ABRERA (1977: 143): *Delias mira reversa*  
 D'ABRERA (1990: 143): *Delias mira reversa*  
 YAGISHITA (1993a: 260–261): *Delias mira reversa*  
 YAGISHITA (1993b: 269): *Delias mira reversa*  
 TUZOV (1995: 119): *Delias mira reversa*  
 PARSONS (1998: 320): *Delias mira reversa*

#### Designation of lectotype

ROTHSCHILD (1925) described *Delias mira reversa* on base of 3 ♂♂; two of them collected by KEYSER in the Rawlinson Mountains, the inland of the Huon Gulf; the third one from the Sattlerberg Mountains, without designating a holotype. TALBOT (1936) regarded the male from the Sattlerberg Mountains as type. Herewith the above-mentioned male from the Sattlerberg Mountains is designated as lectotype.

**Material examined**

Lectotype ♂: Sattleberg Inlands, 1500 m, 1 ♂, BMNH3. Paralectotypes: Rawlinson Mts, inland Huon Gulf, KEYSSER, 1 ♂, BMNH1; 1 ♂, BMNH3.

**Diagnosis**

*Delias mira reversa* ROTHSCILD, 1925 differs from *D. mira excelsa* JORDAN, 1930 and from *D. mira mira* ROTHSCILD, 1904 by its much smaller extent of pale yellow area on underside of forewing.

**Description**

Male. Upperside forewing has small white area in base to middle of inner margin. Black border bears three subapical and two or three terminal spots. Upperside of hindwing is as in *mira mira*. Underside of forewing is black, with three orange subapical and three terminal spots, smaller than in *mira mira* but slightly larger than in *mira excelsa*. At  $R_1$  is small grey spot. Cell 2A is partly white, sometimes entering median part of  $Cu_{1b}$ . Underside of hindwing is brown. Black band from base to middle of costa enclosing large yellow spot is bordered by white line along costa. At  $R_s$  is white spot, followed by black border, which is undulate at inner edge from  $M_1$  to tornus. Postmedian black spot in cells  $M_1$  and  $M_2$  is smaller than in *mira excelsa*. Concentration of black scales cover in  $Cu_{1b}$  partly. Light outer parts of cells 2A,  $Cu_{1b}$ ,  $Cu_{1a}$  and  $M_3$  are creamy to light yellow and reduced. It continues as narrow white band at inner edge of black border to apex. Black and goldish diffusion covers anal area. Length of forewing: 30 mm.

Female. Unknown.

***Delias roepkei* SANFORD & BENNETT, 1955 stat. nov.**

(map 15)

**Diagnosis**

The (nearly always) black underside of forewing and the bright yellow and sharply defined spot in cells  $M_3$ ,  $Cu_{1a}$  and  $Cu_{1b}$  on the underside of the hindwing make it easy to distinguish this species from all the others. New "roepkei like" material from various localities in Irian Jaya and the sympatry with other new related species, made me decide to bring it on species level.

In consequence of *roepkei* now being raised to species level, an earlier-described subspecies of *mira* will be put as subspecies of *roepkei*, i. e. *cieko* ARIMA, 1996. Comparison of this taxon with *D. mira reissingeri* MASTRIGI, 1996 leads to the conclusion that *reissingeri* is synonymous with *cieko*.

***Delias roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov.**

(map 15, figs 99–110)

SANFORD & BENNETT (1955: 3–4, pl. I, fig. 3): *Delias mira roepkei*

ROEPKE (1955: 256, 258): *Delias mira roepkei*

D'ABRERA (1990: 143): *Delias mira roepkei*

YAGISHITA (1993a: 260): *Delias mira excelsa* f. *roepkei*

YAGISHITA (1993a: 261): *Delias mira excelsa*

YAGISHITA (1993b: 268–269): *Delias mira excelsa*

TUZOV (1995: 119): *Delias mira excelsa*

PARSONS (1998: 320, pl. 38: figs 951–952): *Delias mira roepkei*

**Material examined**

Holotype ♂: Mt Hagen, Central Highlands, New Guinea, at 7500 to 12,000 ft, June 21 to August 1, 1950 (E. T. GILLIARD), AMNH. Paratypes: 10 ♂♂, AMNH; 8 ♂♂, BMNH1; 1 ♂, BMNH2; Behind Nondugl, Wahgi Valley, South Slope. Central Highlands, New Guinea, at 5200 ft, on April 22nd, 1950, 2 ♂♂, AMNH; 2 ♂♂, BMNH. (type-material in AMNH unseen). Other material: P.N.G. Simbu Prov. Kerowagi,

III.1969, pres. by J. A. EBNER, 1 ♂, BMNH1; 1973, 1 ♂, HM, I.1974, 1 ♂, EMEM; VIII.1974 14 ♂♂, EMEM; X.1974, 4 ♂♂, EMEM; 1975, 1 ♂, HM; X.1978, 1 ♂, EMEM; 2 ♂♂, ZMA; XI.1978, 1 ♂, ZMA; 1978, 4 ♂♂, ZMA; VIII.1979, 1 ♂, ZMA; IX.1980, 4 ♂♂, BMNH1; X.1979, 1 ♂, EMEM; V.1981, 1 ♂, HM; IX.1981, 1 ♂, HM; IV.1982, 1 ♂, ZMA; V.1982, 1 ♂, HM; 1 ♂, ZMA; VI.1982, 1 ♂, HM; IX.1982, 1 ♂, HM; 5.I.1983, 1 ♂, EMEM; 6.I.1983, 1 ♂, EMEM; X.1983, 1 ♂, HM; IV.1984, 1 ♂, HM; II.1986, 2 ♂♂, HM; V.1986, 1 ♂, HM; 1 ♂, ZMA; VII.1987, 1 ♂, HM; VIII.1987, 1 ♂, HM; 3 ♂♂, ZMA; XI.1987, 7 ♂♂, HM; III.1988, 1 ♂, HM; III.1990, 1 ♂, HM; X.1990, 1 ♂, HM; XII.1991, 1 ♂, HM; Bismarckberge, 1969, 1 ♂, EMEM; 2.VI.1970, 1 ♂, EMEM; 2.IX.1970, 1 ♂, EMEM; 11.I.1971, 1 ♂, EMEM; 1.V.1971, 1 ♂, EMEM; 1.IX.1971, 1 ♂, EMEM; 10.IX.1971, 1 ♂, EMEM; V.1977, 8 ♂♂, EMEM; Mt. Wilhelm, 1 ♂, BMNH1; VI.1985, 3 ♂♂, BMNH1; 2700 m, 1978, 8 ♂♂, 1 ♀, EMEM; IX.1979, 2 ♀♀, 19 ♂♂, EMEM; 8000 ft, VIII.1979, 1 ♂, EMEM; IX.1979, 49 ♂♂, EMEM; 3 ♂♂, ZMA; VII.1985, 3 ♂♂, BMNH1; VIII.1985, 4 ♂♂, BMNH; Dengalagu, IX.1978, 1 ♂, EMEM; Gembogol, VI.1980, 1 ♂, HM; Mt Otto, 7500 ft, 7.X.1972, 1 ♂, HM; 7000 ft, 12.VI.1972, 1 ♂, HM; 5.VIII.1972, 1 ♂, ZMA; Mt Michael, 7000 ft, 26.XII.1976, 1 ♂, HM; 7200 ft, 12.X.1972, 1 ♂, ZMA; Frigano, 7000 ft, 1.VII.1972, 1 ♂, HM; 1.X.1972, 1 ♂, HM, Watya Hagen, 8000 ft, 19.I.1970, 1 ♂, HM; 26.XI.1978, 2 ♂♂, HM; 28.IX.1981, 1 ♂, HM; Hagen Range, Anji Creek, 8000 ft, IX.1974, 3 ♂♂, HM; Pap Creek, 8000 ft, 24.X.1969, 1 ♂, ZMA; Walya 8000 ft, 27.IX.1981, 1 ♂, ZMA; East Hagen District, Daulo Pass, 8000 ft, VIII.1971, 1 ♂, BMNH1; Owen Stanley Range, 2200 m, 31.V.1977, 1 ♂, BMNH1; 2000 m, 24.IX.1978, 4 ♂♂, ZMA; Owen Stanley Range, Kokoda Trail, 7.V.1973, 2 ♂♂, EMEM; 24.IX.1973, 5 ♂♂, EMEM; 27.X.1974, 1 ♂, EMEM; 28.X.1974, 1 ♂, EMEM; 14.VI.1975, 1 ♂, EMEM; 10.IX.1975, 1 ♂, EMEM; 1.I.1976, 2 ♂♂, EMEM; 10.I.1976, 1 ♂, EMEM; 14.I.1976, 1 ♂, EMEM; I.1976, 2 ♂♂, EMEM; VI.1976, 1 ♂, EMEM; XI.1976, 1 ♀, EMEM.

#### Diagnosis

This subspecies differs from *D. roepkei cieko* ARIMA, 1996 by its reduced yellow subapical spots on the underside of the forewing.

#### Description

**Male.** Upside of forewing is white with black costa and broad to very broad black border, bearing none, one, two or three small, white subapical spots; in one specimen followed by two very small greyish terminal spots. Inner edge of black border is often slightly curved from inside discal cell to inner margin at about 4 mm from tornus; sometimes—when black border more reduced—inner edge more or less straight. At outer side of white area is some black diffusion. Upside of hindwing is white; broad black border from apex to vein  $Cu_{1a}$  is at inner edge more-or-less straight and bordered by some black diffusion, followed by a thin black line to tornus. Underside of forewing is black with three small yellow subapical spots, followed by one or two (exceptionally three) smaller terminal spots. Along costal margin, outside discal cell lies a small, elongated white spot. Cell 2A white, exceptionally slightly extending to  $Cu_{1b}$ . Underside of hindwing is dark brown. Black band from base to middle of costal margin encloses a large yellow spot bordering white part of costal margin. This black band is separated from black border by a small white spot. Inner edge of black border is undulate. Between dark brown area and black border is sometimes some white in  $M_1$  or  $M_2$ . Often large sharply defined pale yellow to pinkish area in  $M_3$ ,  $Cu_{1a}$  and  $Cu_{1b}$ , not reaching discal cell; sometimes not so sharply defined. A black continue or broken band lies from  $M_1$  to 1A+2A. Anal margin is goldish yellow with some black diffusion towards base. Length of forewing: (23) 27–31 mm.

**Female.** Upside of forewing is white with broad black border, bearing three subapical and two terminal spots. Inner edge black border is rounded and slightly diffuse. White part is more reduced than in male. Upside of hindwing is as in male. Underside of forewing is black with small white triangular area from white inner margin in cell 2A to midcell, covered with some black diffusion. Three large deep yellow subapical spots are followed by two large terminal ones of same colour. Underside of hindwing as in male; however, ground colour is much darker brown. Length of forewing: 28 mm.

#### Name

The name “roepkei” is a genitive of a noun in apposition, in honour of Professor W. ROEPKE.

# Discussion

Examinations of large series of *Delias roepkei* from Simbu Province and other parts of P.N.G. show a large variety. Even within the nine paratypes in the BMNH1, all from Mount Hagen, two different forms were found: one with a broad black border the same varieties are present and four specimens have a much more reduced black border on upperside of forewing and a more straight inner edge at the black border on the upperside of hindwing. A group of specimens can be separated because of three features: (a) in upperside of forewing reduced white area with curved edge; (b) in underside of hindwing light spot in terminal part of cells  $M_3$ ,  $Cu_{1a}$  and  $Cu_{1b}$  more or less rectangular and (c) with pale yellow colour. The sympatry of these two varieties may be led to the recognition of two different species. However, the varieties in the paratypes, together with less accurate data concerning localities and altitudes on many other specimens, restrain me from describing a new species.

Apart from these varieties, PARSONS (1998) pictured the underside of a "normal" form and of a "white" form of *D. mira roepkei*, from Kerowagi. The white form shows white (instead of yellow) subapical and marginal spots on underside of forewing and underside of hindwing is brown (not dark brown), having a large white spot within black band from base to middle of costal margin and with a white area in outer part of cells  $M_3$ ,  $Cu_{1a}$  and  $Cu_{1b}$ .

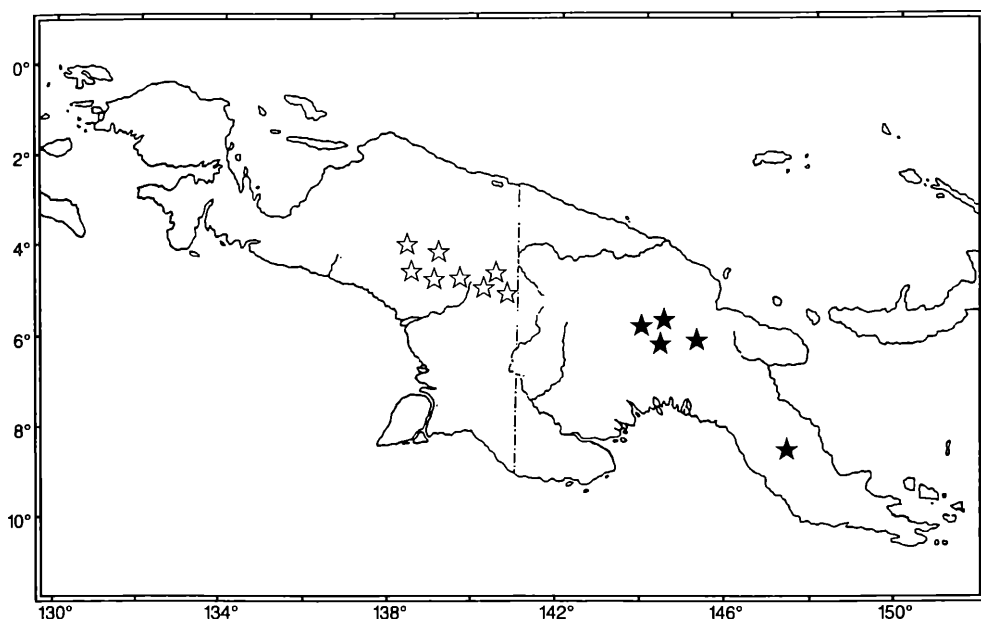
***Delias roepkei cieko* ARIMA, 1996 comb. nov. (= *Delias mira reissingeri* MASTRIGT, 1996 syn. nov.)**  
(map 15, figs 111–122)

ARIMA (1996: 11, pl. 1, figs 7–10): *Delias mira cieko*

MASTRIGT (1996: 38–40, pl. 3, figs 16–17, pl. 6, figs 37–38): *Delias mira reissingeri*

# Material examined

Holotype ♂: Waniak, E. Wamena, Irian Jaya, Indonesia; Nov. 1994, KMNH. Paratypes: same data as holotype, 8 ♂♂, HA (material in HA unseen). Other material: form A: Pass Valley, River Bion, 15.VII.1992; 1 ♂, HM; River Ibem, 19.X.1992, 1 ♂, HM; River Ameagi, 13.X.1992, 1 ♂, HM; 24.VIII.1995, 1 ♂, HM; River Watlangku, 31.I.–1.II.1992, 1 ♂, HM; River Suwage, 22.IX.1992, 1 ♂, HM; form B: Pass Valley, River Bion, 2.IX.1992, 1 ♂, HM; River Ibem, 19.X.1992, 1 ♀, HM; form C: Pass Valley, River Bion, 6.VII.1992, 1 ♂, HM; 13.IX.1992, 1 ♂, HM; 16.IX.1992, 1 ♂, HM; River Ibem, 13.VII.1992, 1 ♂, HM; 19.X.1992, 2 ♂♂, HM; 14.–15.XI.1993, 2 ♂♂, HM; 5.V.1995, 1 ♂, HM; 6.–7.VI.1995, 1 ♂, DM; River Dibem 2.X.1992, 1 ♂, HM; River Suwage, 28.X.1992, 1 ♂, HM; 21.–26.IV.1997, 2 ♂♂, HM; 12.–14.V.1997, 1 ♂, HM; 18.–24.VIII.1997, 2 ♂♂, ZMA; 22.–26.I.1998, 1 ♂, ZMA; River Ameagi, 30.XI.1992, 1 ♂, HM; 2.XII.1992, 1 ♂, HM; 3.XII.1992, 1 ♂, HM; 9.–11.V.1995, 1 ♂, HM; 21.VII.1995, 1 ♂, HM; Pass Valley, Irian Jaya, 1 ♀, HA; form D: Pass Valley, River Bion, 10.VII.1992, 1 ♂, HM; 16.VII.1992, 1 ♂, HM; 2.VIII.1992, 1 ♂, HM; 3.VIII.1992, 1 ♂, HM; 16.IX.19.–92, 1 ♂, HM; 3.–4.VI.1993, 1 ♂, DM; River Ibem, 19.X.1992, 1 ♂, HM; 13.II.1993, 1 ♂, HM; River Ameagi, 2.XII.1992, 2 ♂♂, HM; 3.XII.1992, 2 ♂♂, HM; 24.VIII.1995, 1 ♂, HM; 9.–11.V.1995, 1 ♂, HM; (labelled as holotype of *D. mira reissingeri*): Korupun, 139°38', River Asso, 30.III.–1.IV.1991, 1 ♂, MZB; (labelled as paratypes of *D. mira reissingeri*): Silakma (Soba-Ninya), River Koluk, 2.I.–4.II.1992, 1 ♂, ZMA; 25.III.–9.IV.1992, 1 ♂, HM; Ninya, 139°16', 4°22', River Wantek, 2400 m, 1.–7.IX.1991, 1 ♂, HM; River Koluk, 17.–19.IX.1991, 1 ♂, HM; Korupun, River Asso, III.1991, 2 ♂♂, 1 ♀, HM; 2 ♂♂, ex HM, EMEM; 6 ♂♂, ZMA; 30.III.–1.IV.1991, 3 ♂♂, HM; 6 ♂♂, ZMA; 2 ♂♂, DM; 19.IV.1991, 1 ♂, HM; 20.V.1991, 1 ♂, ZMA; 21.VI.1991, 1 ♂, ZMA; 18.–22.IX.1991, 1 ♂, EMEM; 1.–3.I.1992, 1 ♂, HM; 1.–2.VI.1992, 6 ♂♂, EMEM; 1 ♀, ZMA; 21.–25.IX.1992, 1 ♂, EMEM; 22.III.1993, 3 ♂♂, HM; 17.–24.IV.1993, 1 ♀, HM; 16.–21.VIII.1993, 1 ♂, HM; 6.–11.IX.1993, 1 ♂, HM; 8.–12.XI.1993, 1 ♂, HM; 1.–6.I.1994, 2 ♂♂, 3 ♀♀, HM; 24.–29.IV.1995, 19 ♂♂, ZMA; 2 ♂♂, BMNH1; 12.–17.V.1995, 1 ♂, HM; 10 ♂♂, EMEM; 17 ♂♂, ZMA; 21.–26.VIII.1995, 8 ♂♂, ZMA; 2 ♂♂, VS; 18.–23.IX.1995, 2 ♂♂, HM; 4 ♂♂, ZMA; 10 ♂♂, VS; River Mulakik & Pelakik, 19.I.–19.II.1991, 3 ♂♂, HM; River Weimin, 3.VI.1992, 3 ♂♂, HM; 2 ♂♂, ZMA; 26.–31.XII.1994, 4 ♂♂, ZMA; 20.–25.III.1995, 11 ♀♀, ZMA; 1.–6.V.1995, 10 ♂♂, ZMA; 6 ♂♂, VS; 24.–29.VI.1995, 22 ♂♂, ZMA; 2 ♂♂, VS; 4 ♂♂, HM; 9.–14.X.1995, 2 ♂♂, ZMA; River Deisul, 9.–14.I.1995, 10 ♂♂, ZMA; Korupun, 30.IV.–11.V.1992, 8 ♂♂, ZMA; Yamin, River Ausung 2.–3.VII.1991, 2 ♂♂, ZMA; Longda, 1.–15.II.1991, 1 ♂, HM; 1 ♂, ZMA; River Bibwe,

Map 15: Distribution of *Delias roepkei* SANFORD & BENNETT, 1955★ *D. roepkei roepkei* SANFORD & BENNETT, 1955; ☆ *D. roepkei cieko* ARIMA, 1996.

30.XI.1988, 1 ♂, ZMA; 5.XII.1988, 1 ♂, HM; 17.–19.IV.1989, 1 ♂, HM; 20.–24.IV.1989, 1 ♂, HM; 9.–10.V.1989, 2 ♂♂, HM; Langda, Kerabuk, River Teri, 4.–20.VI.1992, 1 ♂, ZMA; Peg. Bintang, Abmisibil, River Oktanglap, 12.IX.1985, 1 ♂, HM; 14.IX.1985, 1 ♂, HM; 22.X.19.–86, 1 ♂, HM; 18.VII.1987, 1 ♂, HM; River Okpeti, 18.IX.1991, 1 ♂, EMEM; River Okbon, 11.–14.II.1991, 3 ♂♂, HM; 20.III.1991, 1 ♂, HM; 21.–25.VI.1991, 2 ♂♂, EMEM; 11.–14.VII.1991, 1 ♂, JP; 19.–24.VIII.1992, 2 ♂♂, EMEM; 15.IX.1995, 1 ♂, ZMA; Batimban, River Okkim, 11.–12.XII.1990, 1 ♂, HM; 11.–14.II.1991, 3 ♂♂, HM; 20.III.1991, 1 ♂, HM; 11.VIII.1991, 1 ♂, HM; 28.IX.1991, 2 ♂♂, GG; Gunung Lukon, 24.V.1991, 3 ♂♂, HM; River Lukon, 22.VII.1995, 1 ♂, HM; 28.VII.1995, 1 ♂, HM; River Takpalngi, 1.V.1995, 1 ♂, HM; Kutmong, River Bapkal, 6.X.1995, 1 ♂, HM; Kutmong, Okbetel, River Tup, 18.VII.1995, 2 ♂♂, EMEM; 2 ♂♂, ZMA; Okbetel, River Ngupel, 8.VIII.1994, 2 ♂♂, BMNH1; 2 ♂♂, ZMA; River Palep, 11.VIII.1995, 1 ♂, ZMA; River Mong, 2 ♂♂, DM; Kulempun, Sabin, River Ralepina, 20.VII.1995, 1 ♂, ZMA; 1 ♂, HM; (not labelled as paratypes of *D. mira reissingeri*): Silakma (Soba-Ninya), 4.XI.1991, 1 ♂, DM; Silakma, 20.I.–4.II.1992, 2 ♂♂, ZMA; Korupun, 18.–22.IX.1991, 2 ♂♂, GG; River Asso, III.1991, 2 ♂♂, GG; 21.IV.1991, 1 ♂, DM; 20.VI.1991, 2 ♂♂, ZMA; 23.–30.IX.1991, 7 ♂♂, ZMA; 14.–16.X.1991, 1 ♂, DM; 20.X.1991, 2 ♂♂, DM; 30.X.–5.XI.1991, 4 ♂♂, EMEM; 1.–2.VI.1992, 1 ♂, ZMA; 21.–25.IX.1992, 1 ♂, DM; 2 ♂♂, EMEM; 1.–8.V.1993, 1 ♂, 1 ♂, DM; 16.V.1994, 2 ♂♂, EMEM; 15.–20.I.1996, 1 ♀, HM; 11.–16.III.1996, 1 ♂, HM; 31.III.–1.IV.1996, 1 ♂, ZMA; 1.–10.IV.1996, 1 ♀, HM; 21.–26.VIII.1996, 2 ♂♂, ZMA; 16.–21.IX.1996, 1 ♂, HM; River Gwanende, 18.–22.IX.1991, 2 ♂♂, DM; 10.–12.XII.1991, 4 ♂♂, DM; 18.XII.1991, 2 ♂♂, DM; River Weimin, 25.VIII.–17.IX.1992, 1 ♂, ZMA; 25.IX.1992, 1 ♂, DM; 22.–27.IV.1994, 2 ♂♂; 24.–29.VI.1996, 1 ♀, ZMA; River Bimak, 3.–8.III.1997, 1 ♂, HM; River Neve, 16.–17.V.1991, 1 ♂, EMEM; Gunung Sekun, 18.–25.VIII.1997, 3 ♂♂, HM; Langda, 20.VIII.1992, 1 ♂, ZMA; 26.VIII.1992, 1 ♂, ZMA; River Kap-Kap, 11.V.1991, 1 ♂, ZMA; Kerabuk, 10.–28.X.1992, 1 ♂, DM; River Minyo, 16.–20.VI.1993, 1 ♂, ZMA; River Teri, 4.–20.VI.1992, 1 ♂, ZMA; River Mongoltungtung, 1.–2.IV.1992, 1 ♂, EMEM; Batimban, River Okkim, 2.–4.VI.1991, 2 ♂♂, ZMA; 13.IX.1991, 1 ♂, ZMA; 23.XI.1991, 1 ♂, ZMA; V.1994, 2 ♂♂, ZMA; 17.III.1996, 1 ♂, ZMA; 24.IV.1997, 1 ♂, HM; Star Mountains, VI.1995, 1 ♂, GG; Abmisibil, River Oktanglap, 11.IX.1985, 1 ♂, ZMA; 22.IX.1991, 1 ♂, ZMA;

22.IX.1991, 1 ♂, ZMA; River Okbon, 2000 m, 11.–12.XII.1990, 1 ♂, ZMA; 11.VIII.1991, 1 ♂, ZMA; 28.VIII.1991, 1 ♂, DM.

#### Diagnosis

*D. roepkei cieko* ARIMA, 1996 (including junior synonym *D. mira reissingeri* MASTRIGT, 1996) differs from *D. roepkei roepkei* by its large yellow or orange subapical and terminal spots on underside of hindwing. Although *cieko* is a very consistent in the vast eastern part of the central mountain range of Irian Jaya (from Waniak, via Korupun and Langda, to Abmisibil in Star Mountains), I prefer to include the very variable specimens from Pass Valley where this subspecies appears sympatric in a number of varieties, which can be described in the following four forms:

- form A: upperside of forewing with orange subapical and terminal spots; underside of forewing with white triangle; underside of hindwing with orange spot in base;
- form B: upperside of forewing with orange subapical and terminal spots; underside of forewing without white triangle; underside of hindwing with orange spot in base;
- form C: upperside of forewing with yellow subapical and terminal spots; underside of forewing with white triangle; underside of hindwing with yellow spot in base.
- form D: upperside of forewing with yellow subapical and terminal spots; underside of forewing without white triangle; underside of hindwing with yellow spot in base.

#### Description

**Male.** Upperside of forewing is white with black costa and broad black border; with one to three very small, white subapical spots. Inner edge of black border is slightly curved from inside discal cell to inner margin, at about 4 mm from tornus. Median vein is partly black. At base some greyish blue diffusion. Upperside of hindwing is translucent white: pattern of underside partly visible from above. At base is some greyish blue diffusion. Black border is about 5 mm wide along  $M_1$  and is getting narrower towards tornus and apex where it is ending abruptly. Underside of forewing is black (form B and D) or with white triangle (form A and C); having three deep yellow or orange subapical spots, which are followed one or two poorly developed terminal ones of same colour (in form A and B orange; in form C and D yellow). Underside of hindwing is dark brown with black veins and sometimes black spot in cell  $M_1$  and/or at border of bright area. Black basal and costal area includes pear-shaped spot of more or less same colour as subapical spots on underside hindwing, bordering white costa. Between this black area and black border is a small white spot. Black border undulate to triangular at inner edge. Yellow area in bottom of cells  $M_3$ ,  $Cu_{1a}$  and  $Cu_{1b}$  is variable in shape and sometimes connected with white spots at inner edge of black border in cells  $M_2$  and  $M_1$ . Anal area covered yellow and black diffusion. Length of forewing: 24–28 mm.

**Female.** Upperside of forewing is black, except the inner part, including lower part of discal cell and half of inner margin, which is smudged white to grey. Border bears three white subapical spots, followed by two terminal ones. Upperside of hindwing is yellowish, with broader black border than in male. Underside of forewing is black, with some yellow subapical and terminal spots, which larger than in male. On underside of hindwing is large brown area sometimes much lighter than in males. Length of forewing: 26–28 mm.

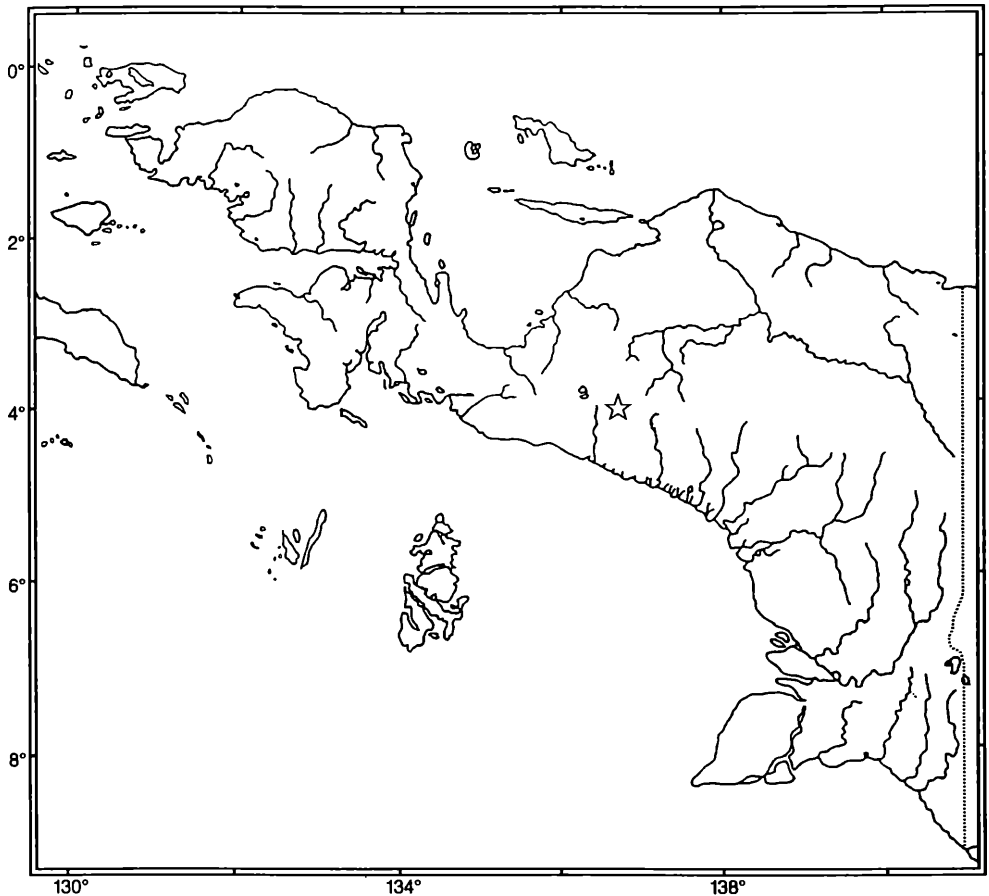
**Note:** Within a long series of males two aberrations were found which I want to mention here. One specimen has a dark creamy upperside of fore and hindwing. The other specimen has a pale yellow colouration on subapical spots on underside of forewing and basal spot on underside of hindwing; the light area in bottom of cells  $M_3$ ,  $Cu_{1a}$  and  $Cu_{1b}$  is creamy.

#### *Delias inexpectata* ROTHSCHILD, 1915

(map 16, figs 123–132)

ROTHSCHILD (1915a: 9): *Delias inexpectata*

ROTHSCHILD (1915b: pl. I, fig. 4): *Delias inexpectata*



Map 16: Distribution of *Delias inexpectata* ROTHSCHILD, 1915

- TALBOT (1928: 31, 47): *Delias inexpectata*  
 TALBOT (1932: 102): *Delias inexpectata*  
 TALBOT (1937: 356–357): *Delias inexpectata*  
 ROEPKE (1955: 242, 258): *Delias mira inexpectata*  
 D'ABRERA (1971: 143): *Delias mira inexpectata*  
 D'ABRERA (1977: 143): *Delias mira inexpectata*  
 D'ABRERA (1990: 143): *Delias mira inexpectata*  
 YAGISHITA (1993a: 259): *Delias inexpectata*  
 YAGISHITA (1993b: 266–267 + figs): *Delias inexpectata inexpectata*  
 TUZOV (1995: 118): *Delias inexpectata*

#### Material examined

Holotype ♂: Carstensz Peak, Utaqua R, 5000–10000 ft, Febr.–Mrch 1913, A. F. R. WOLLASTON, BMNH3.  
 Other material: Tembagapura, XII.1990, 1 ♂, HM; 1991, 5 ♂♂, HM; I.–II.1992, 2 ♂♂, HM; 19.IV.1991, 1 ♂, HM; IX.–X.1991, 1 ♂, HM; medio 1995, 2 ♂♂, 1 ♀, HM; XI.1995, 2 ♂♂, DM; Tembagapura, N. Wanagon Valley, 2700–3000 m, VIII.1990, 1 ♂, HM; Tembagapura, River Waa, 2400 m, 28.III.1992, 1 ♂, HM; 6.IV.1992, 1 ♂, HM; 2200 m, 28.XII.1991, 1 ♂, HM; 22.VI.1992, 2 ♂♂, HM; 24.XI.1992, 1 ♂,

HM; 28.XI.1992, 1 ♂, ZMA; 2100 m, 9.XII.1991, 1 ♂, HM; 6.XI.1992, 1 ♂, EMEM; 2000 m, 14.XI.1991, 1 ♀, HM; River Agawagung, 1800–1860 m, VIII.–IX.1990, 1 ♀, HM; 6200 ft, 24.III.1991, 1 ♂, ZMA; Zaogkamtunnel, 8.IX.1992, 1 ♂, HM; 30.VIII.1992, 1 ♂, ZMA; 20.IX.1992, 1 ♂, ZMA; 14.IX.1992, 1 ♂, ZMA.

#### Diagnosis

On the underside of the hindwing *inexpectata* is very variable. The holotype shows a very small black submarginal dot. Other specimens have a large black streak, surrounding the mid cell and connected with the black anal area. However, the large variety and the less accurate data about the localities restrain me from further differentiation.

#### Description

**Male.** Upperside of forewing is black, except about  $\frac{1}{5}$  of wing, at innerside, which is white to grey white, and has one or two very small white subapical spots. Upperside of hindwing is white with a black border of 1 to 1.5 mm from Rs to  $M_2$ , narrowing in cell  $M_2$  to a thin line as far as tornus. In holotype black border in Rs and  $M_1$  is about 4 mm wide. Underside of forewing is black with a longish grey dot along costa at outside of discal cell and some greyish scaling along middle of inner margin and upwards to vein  $Cu_{1b}$ . Three large more-or-less connected red subapical spots are followed by three to five small terminal spots with colour from red in the first one via orange to pinkish-white in the last. Underside of hindwing is orange with white veins. Black base includes red basal spot, separated from black band margin of wing by a white streak. Cell 3A has dark brown orange diffusion. Outer parts of  $Cu_{1b}$  and 1A+2A are dark orange. Inner parts of these cells and of discal cell are blackish to black.  $M_2$  bears black spot close to discal cell. Both black areas are very variable in shape and size. Very poorly developed in holotype. Large spot on  $M_2$  is sometimes connected with black area in 2A by broad, black band or entering discal cell. Black border from Rs to 3A is separate from black base by small greyish spot at apex. Inner edge of border is undulate from  $M_3$  to 1A+2A. Length of forewing: 25–27 mm.

**Female.** As male, however, on upperside of forewing grey white part is more reduced. Three white subapical spots are followed with three smaller terminal spots. Partial black border on upperside of hindwing is somewhat broader. There is blackish diffusion in  $M_2$  and  $M_3$ . Underside of forewing bears more developed terminal spots than on upperside. The first and second are connected with three subapical spots. The third one is orange and yellow, fourth one whitish. White streak runs along inner margin. On underside of hindwing a broad black postmedian band runs from  $M_1$  to black area in 2A. Length of forewing: 27.5–28 mm.

#### *Delias hiemalis* ROEPKE, 1955 stat. nov.

(map 17)

The sympatry of *autumnalis* and *hiemalis*, as in the Mulia-Illaga-Illu area, made me decide to bring both to species level, with the characteristic difference being the colour of the veins on the underside of the hindwing: in *autumnalis* obviously white, in *hiemalis* of the same brown colour as the other wing parts. The possibility of a good species distinct from *autumnalis* was already recognized by ROEPKE (1955) when he stated that its underside pattern is so obviously different from *autumnalis* that one might consider it as a separate species, at least as a species “in statu nascendi”. Four subspecies are recognized, i. e. *hiemalis* ROEPKE, 1955, *flabella* MASTRIGT, 1996 comb. nov., *labbei* subsp. nov. from Weyland Mountains and *nemangkawi* subsp. nov. from Tembagapura. Specimens of *D. hiemalis hiemalis* sometimes can be totally black on the underside of forewing. However, less accurate data about localities restrain me from describing a new subspecies. I mention it as a form: *f. hitam* (Indonesian word for black).

***Delias hiemalis hiemalis* ROEPKE, 1955 stat. nov.**

(map 17, figs 133–136)

ROEPKE (1955: 241–242, 258, pl. VIII, fig. 19): *Delias mira hiemalis*D'ABRERA (1971: 143): *Delias mira hiemalis*D'ABRERA (1977: 143): *Delias mira hiemalis*D'ABRERA (1990: 143): *Delias mira hiemalis*YAGISHITA (1993a: 260–261): *Delias mira hiemalis*YAGISHITA (1993b: 268–269 + figs): *Delias mira hiemalis*Tuzov (1995: 119): *Delias autumnalis hiemalis***Material examined**

Holotype ♂: West New Guinea, Wissel Lakes, Arabu Camp, 1800 m, 10.X.1939, Prof. Dr H. BOSCHMA, RMNH. Other material: Ebowo, East Paniai, 2200 m, VII.1996, 1 ♂, JL; Homeo Lama, Beabu, 27.V.1991, 4 ♂♂, HM; Homeyo, 2 ♂♂, DM; I.1993, 5 ♂♂, DM; 2 ♂♂, HM; 8.X.1993, 3 ♂♂, HM; 1 ♂, ZMA; Kecamatan Homeyo, River Debabu, 9.V.1991, 6 ♂♂, GG; 4.IX.1991, 1 ♂, GG; 25.I.1992, 2 ♂♂, GG; I.1993, 12 ♂♂, GG; 5.IV.1994, 3 ♂♂, GG; 22.X.1994, 3 ♂♂, 1 ♀, HM; 31.X.1994, 2 ♂♂, HM; 7.XI.1994, 1 ♂, HM; 5.XII.1994, 1 ♂, GG; 18.III.1995, 1 ♂, HM; Homeyo, Baylabu, 14.–21.III.1992, 1 ♂, DM; 25.II.1992, 1 ♂, DM; River Kaimalu, 21.I.1992, 1 ♂, GG; II.1992, 4 ♂♂, GG; Homeyo, Zombandong, I.1992, 1 ♂, GG; Sud Homeyo, HN2, 2400 m, 3°53'S 136°46'E, 15.VI.1993, 1 ♂, JL; Beoga, XII.1989, 3 ♂♂, GG; 1 ♂, HM; Ilaga, 10.VIII.1988, 2 ♂♂, HM; II.1991, 2 ♂♂, GG; Ilaga, River Jila, 22.V.1988, 1 ♂, HM; 20.VII.1988, 1 ♂, HM; 22.VIII.1988, 2 ♂♂, ZMA; 27.VIII.1988, 4 ♂♂, HM; 9.IV.1989, 11 ♂♂, ZMA; 2.V.1990, 2 ♂♂, HM; 4.V.1990, 8 ♂♂, HM; X.1990, 1 ♂, HM; 4.VI.1990, 4 ♂♂, HM; 15.–20.XI.1990, 2 ♂♂, EMEM; 1 ♂, HM; 29.XII.1990, 3 ♂♂, DM; 7.VII.1991, 1 ♂, DM; River Mum, 22.I.1989, 2 ♂♂, HM; 15.XI.1991, 2 ♂♂, EMEM; River Wulu, 22.III.1992, 3 ♂♂, ZMA; River Namungun, 9.XI.1985, 1 ♂, HM; 1 ♂, ZMA; Mulia, VI.1990, 1 ♂, HM; IX.1990, 1 ♂, GG; 1 ♂, HM; 2 ♂♂, ZMA; VII.1991, 1 ♂, ZMA; IX.1991, 1 ♂, HM; Muliallu, VI.1992, 2 ♂♂, ZMA; 1993, 1 ♂, GG; Sinak-Mulia, VII.1990, 1 ♂, ZMA; X.–XI.1990, 1 ♂, ZMA; VI.1992, 1 ♂, ZMA; Ilu, Tingimanui, 2500 m, XII.1989, 1 ♂, GG; Kecamatan Sinak, XI.1992, 1 ♂, HM. *f-hitam*: Sugapa, I.1991, 3 ♂♂, GG; Ilaga, River Jila, 9.IV.1989, 7 ♂♂, ZMA; Mulia, IX.1990, 20 ♂♂, GG; II.1991, 1 ♂, GG; VI.1992, 2 ♂♂, HM; IX.1990, 1 ♂, HM; IX.1991, 1 ♂, HM; Mulia, 2000 m, VI.1990, 5 ♂♂, GG; VII.1993, 3 ♂♂, JL; Sinak-Mulia, VII.1990, 1 ♂, GG; X.–XII.1990, 1 ♂, ZMA; VI.1992, 1 ♂, ZMA; Mulia-Sinak, 6.VII.1989, 1 ♂, GG; Kecamatan Sinak, 2200 m, 16.XI.1992, 3 ♂♂, JL; 17.XI.1992, 1 ♂, JL; idem 2250 m, 16.XI.1992, 2 ♂♂, JL; XI.1992, 1 ♂, HM; Mulia-Ilu, VII.1991, 7 ♂♂, GG; X.1991, 6 ♂♂, GG; 1991, 10 ♂♂, GG; Ilu-Mulia, 1993, 7 ♂♂, GG; Tingimanui (Ilu), 2500 m, XII.1989–I.1990, 7 ♂♂, GG.

**Diagnosis**

*Delias hiemalis hiemalis* ROEPKE, 1955 differs from *labbei* and *nemangkewi* on the underside of forewing because of its partly white area and from *flabella* MASTRIGT, 1996 on the underside of hind wing where colourfull strikes are yellow (instead of orange brown on *flabella*).

**Description**

Male. Upperside of forewing is greyish-white with broad black border, absorbing dc-bar, to inner margin at about ¾ from tornus, bearing three small, pink-looking subapical spots, as colour of underside comes through. Upperside of hind wing is translucent greyish white with black apical part from middle of costal margin into cell Cu<sub>1a</sub>. Inner edge of black part is more-or-less straight and diffuse. From cell Cu<sub>1a</sub> to anal area runs small black terminal line. Underside of forewing is black with three large and one small red subapical spot, followed by two very small pink ones. A small greyish white spot is at R<sub>1</sub>. Postmedian area from M<sub>2</sub> to inner margin is white with black vein parts and some black diffusion. Underside of hindwing is black from base to Rs, including a dark red elongated spot, anteriorly with a few white scales. At veinend of Rs are some greyish scales, followed by black border to tornus, which inner edge is undulate. Large dark brown area, including vein parts, is separated from black border by light band from Rs to anal area, increasing in width and in colouration: from creamy white to yellow orange. Basal part of 3A has brown diffusion. Without a clear geographical separation, a number of

specimens are recognized with underside of forewing black. This black form I mention as f. *hitam* ("hitam" is the Indonesian word for black). Length of forewing: 28–29 mm. Female. Unseen. Plate 128.9 in YAGISHITA (1993b).

***Delias hiemalis flabella* MASTRIGT, 1996 comb. nov.**

(map 17, figs 137–141)

MASTRIGT (1996b: 35–37, pl. 2, fig. 14, pl. 5, fig. 35): *Delias mira flabella*

**Material examined**

Holotype ♂: N. E. Kamu, River Tuka & Ekau, 1700–1800 m, Ekamanida, 29.–30.X.1990, ex coll. HM, ZMA. Paratypes: Moanemani, Idadagi, River Ode, 7.XII.1989, 1 ♂, GG; Modio, I.1992, 1 ♂, GG; Obano, Camp HO17 3°53' S 136°11' E, 2250 m, 17.I.1994, JEAN-FRANÇOIS LABBÉ, 1 ♀, JL; same data, but 29.I.1994, 3 ♂♂, JL; 25.II.1994, 1 ♀, JL; V.1994, 3 ♂♂, JL; 20.I.1995, 1 ♂, HM; 2300 m, I.1994, 2 ♂♂, BT; 8.II.1994, 1 ♂, HM; V.1994, 1 ♂, BT; V. 1995, 2 ♂♂, ex HM, MZB; 2100 m, 4 ♂♂, HM; Obano N.E. Hogomuga, 1.VIII.1995, 1 ♂, HM. Other material: Timeepa, VIII.1993, 1 ♂, GG; Obano, 2250 m, 20.I.1995, 1 ♂, HM.

**Diagnosis**

*Delias hiemalis flabella* MASTRIGT, 1996 differs from the other *D. hiemalis* spp. by the light subterminal area with short orange brown streaks.

**Description**

**Male.** Uppside of forewing is black with black costal margin. Inner part is about  $\frac{1}{3}$  creamy white with black diffusion in base. Uppside of hindwing is creamy white with same black border as in *hiemalis hiemalis*. Underside of forewing is black with three orange to red subapical spots, followed by one large and two very small terminal spots; last one is white. White to grey spot is at  $R_1$ . Postmedian area is often totally black, sometimes with much black diffusion. Cell 2A is white with some black diffusion. Underside of hindwing has black base up to  $R_s$ , including an elongated dark red-brown spot, anteriorly narrowly white. At apical vein-end of  $R_s$  runs small greyish-white line with sometimes some orange-brown diffusion. Black border, from apex to tornus, has undulate inner edge from  $M_2$  to tornus. Large dark brown area is separated from black border by white band from  $R_s$  to anal area, increasing in width, to over 6 mm in  $Cu_{1b}$ . In postmedian segment of each cell between apex and tornus is a short orange to orange-brown streak, from inside brown area towards the termen, which is very variable in size (from only a few mm to nearly reaching black border). Length of forewing: 27–29 mm.

**Female.** Wing pattern, both upperside and underside is comparable to that of males. Upperside has slightly broader black borders; upperside of forewing bears one or two vague subapical spots. Upperside of hindwing has some yellow diffusion in anal area. Length of forewing: 28–30 mm.

**Name**

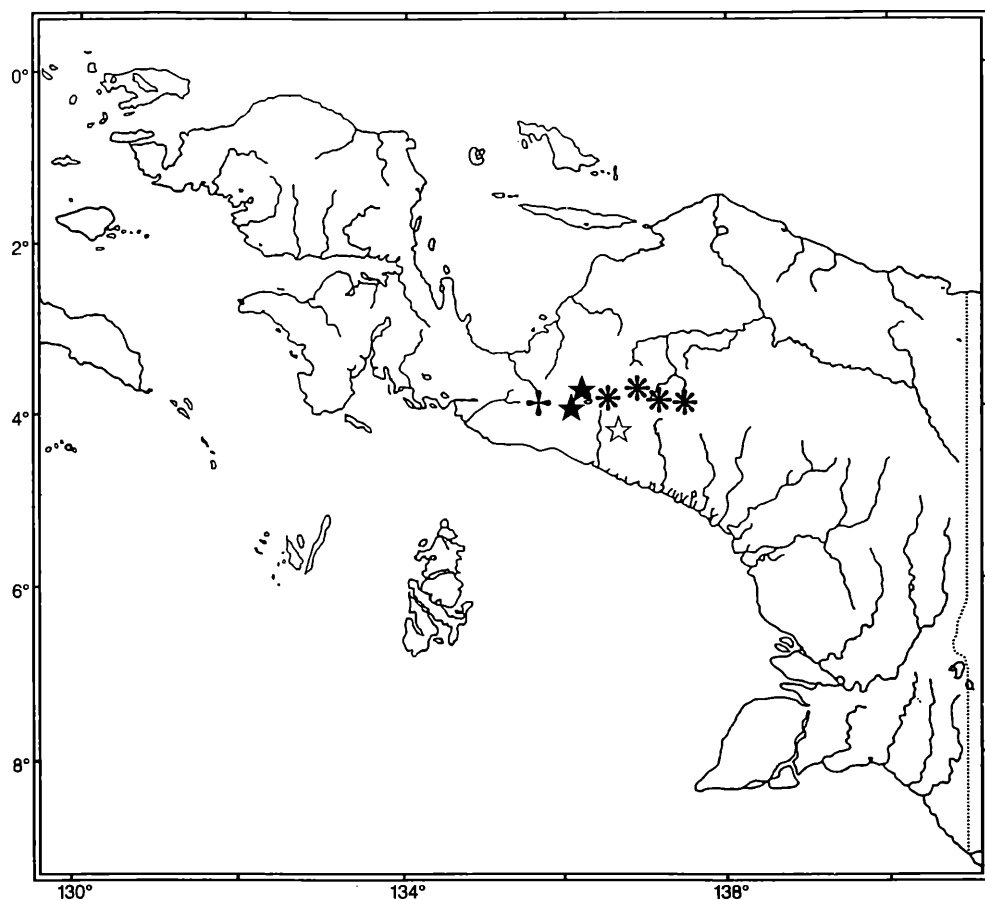
The name "flabella", a noun in apposition, means "fan", is given, because of resemblance with a fan on underside of hindwing.

***Delias hiemalis labbei* subspec. nov.**

(map 17, figs 142–144)

**Type-material**

Holotype ♂: Irian Jaya, Peg. Weyland, Magoda Camp HM9, 2100 m, 3°56'S 135°52'E, 18.XI.1995, JL; Paratypes (10 ♂♂): same data, but 18.VIII.1995, 1 ♂, JL; 31.VIII.1995, 2 ♂♂, JL; IX.1995, 4 ♂♂, JL; 15.X.1995, 1 ♂, JL; 18.XI.1995, 1 ♂, HM; SW Weyland Mnts. Idedua, River Pokwai, 2000 m, 21.XI.1993, 1 ♂, JL.



Map 17: Distribution of *Delias hiemalis* ROEPKE, 1955

\* *D. hiemalis hiemalis* ROEPKE, 1955

★ *D. hiemalis flabella* MASTRIGT, 1996

+ *D. hiemalis labbei* subsp. nov.

☆ *D. hiemalis nemangkawi* subsp. nov.

#### Diagnosis

This subspecies differs from subspecies *hiemalis* ROEPKE, 1955 and *flabella* MASTRIGT, 1996 by the black underside of the forewing and larger black border on upperside of forewing. It differs from the newly described *hiemalis nemangkawi* by the large dark orange-brown area on underside of hindwing with consequently narrower light band at inner side of black border.

#### Description

Male. Upperside of forewing is black with black costal margin. Black terminal border is somewhat broader than in *hiemalis hiemalis*, especially in  $M_3$  and  $Cu_1$ . White basal part has some grey diffusion. Upperside of hindwing is creamy white with same black border as in *hiemalis hiemalis*. Underside of forewing is black with three small orange red subapical spots, followed by one or two very small white terminal spots. A very small grey spot is at  $R_1$ . Cell 2A is white. Underside of hindwing has black base up to  $R_s$ , including an elongated dark red-brown spot, anteriorly narrowly white. From apex to tornus

runs a black border, with inner edge undulate from  $M_2$  to tornus. Large maroon to red-brown area is separated from black border by white band from  $R_s$  to anal area, increasing in width and narrower than in *hiemalis hiemalis* to about 2–4 mm in  $Cu_{1b}$ . In postmedian segment of each cell between apex and tornus is a short orange-brown to maroon streak, from inside brown area towards the termen, less obvious because of larger central area, which has more or less the same colour. Anal area is orange-brown. Length of forewing: 27–28 mm.

Female. Unknown.

#### Derivation of name

The name “labbei” is the genitive of a noun in apposition, in honour to Mr JEAN-FRANÇOIS LABBÉ, who was collecting *Delias* in the western part of Irian Jaya and from whom I received some specimens.

#### *Delias hiemalis nemangkawi* subsp. nov.

(map 17, figs 145–146)

#### Type-material

Holotype ♂: IRIAN JAYA, Tembagapura, IX.1991, HM (damaged).

#### Diagnosis

This single specimen of *D. hiemalis nemangkawi* differs from all other *hiemalis* subspecies by its very reduced white part (less than  $\frac{1}{3}$ ) on upperside of forewing, its black underside of forewing where only cell 2A is white.

#### Description

Male. Upperside of forewing is mainly black; with two very small subapical dots. About  $\frac{1}{3}$  is smooth white along inner margin narrowing to central part and slightly entering discal cell with some black diffusion. Upperside of hindwing is smooth white with black border from middle of costal margin passing distal end of vein  $M_3$ , followed by black spots at end of veins  $Cu_{1a}$  and  $Cu_{1b}$ . Underside of forewing is black, except cell 2A which is white. Three subapical spots, filled with a light brown colouration in the centre, leaving a small white circle at outer part, are followed by one small whitish terminal spot. Underside of hindwing has black base extending to  $R_s$ , including an elongated spot, posteriorly brown and anteriorly with white line along costal border. A black line (2 mm wide) separates dark brown anal area from discal cell. From vein-end of  $R_s$  towards tornus runs black border, which is slightly broadening. Its inner edge is undulate from  $M_1$  to tornus. Large dark brown area at basal side is separated from black border by broad light band from  $R_s$  to anal area, increasing in width to  $M_1$  and slightly decreasing to anal area. Orange-brown streaks in light area between all veins, are very poor and colourless in  $R_s$  to bright and broad in  $Cu_{1b}$ . Vein  $M_1$  and main parts of veins surrounding discal cell are bordered by obvious, white lines. Close to discal cell are two small black spots: one on vein  $M_2$ , the other on vein  $M_3$ . Length of forewing: 28 mm.

Female. Unknown.

#### Derivation of name

The name “nemangkawi”, a noun in apposition, is the vernacular name of the Puncak Jaya, formerly Carstensz Peak, where this species is found.

#### *Delias autumnalis* ROEPKE, 1955 stat. nov.

(map 18)

#### Diagnosis

A few authors, as ROEPKE (1955), REISSINGER (1991, unpublished manuscript), TUZOV (1995) and PARSONS (1998), introduced the idea this taxon probably could be a good species. In this paper *autumnalis*

is brought on species level. The white veins on the underside of the hindwing are a characteristic feature of this species and for *Delias nakanokeikoe* YAGISHITA, 1996. Also *Delias mira michiae* NAKANO, 1994, is recognized as a subspecies of *autumnalis* because of the white veins on the underside of hindwing. In addition a new subspecies is described. *D. autumnalis* differs from *nakanokeikoe* on the underside of hindwing by its larger and much lighter subterminal area.

***Delias autumnalis autumnalis* ROEPKE, 1955 stat. nov.**

(map 18, figs 147–153)

ROEPKE (1955: 240–241, 258, pl. VI, fig. 18, pl. VIII, fig. 18): *Delias mira autumnalis*

D'ABRERA (1971: 142–143 + figs): *Delias mira autumnalis*

D'ABRERA (1977: 142–143 + figs): *Delias mira autumnalis*

D'ABRERA (1990: 142–143 + figs): *Delias mira autumnalis*

N.B.: By Mistake D'ABRERA notes that ♀ is unknown.

YAGISHITA (1993a: 260–261): *Delias mira autumnalis*

YAGISHITA (1993b: 268–269 + figs): *Delias mira autumnalis*

TUZOV (1995: 119): *Delias autumnalis autumnalis* (bona sp.?) [sic!]

PARSONS (1998: 320): *Delias mira autumnalis*

**Material examined**

Holotype: Neth. Ind.-Amer. New Guinea Exped., 2600 m, Moss Forest Camp, 24.X.1938, L. J. TOXOPEUS. Other types: A long series of ♂♂, 45 (exceptional) to 53 mm, 50 mm being the average, Moss Forest and Ibele Valley, 2200–2700 m, X.–XII.1938. 5 ♀♀, 49–52 mm, with allotype (data as holotype, but 2700 m, 23.X.1938), Moss Forest, 2600–2850 m, VII. and X.1938, RMNH; from which 4 ♂♂ in BMNH1; 10 ♂♂ in MZB; 2 ♂♂ ex RMNH, in EMEM. Other material: Tiom, River Kuyage, 20.–21.XII.1990, 1 ♂, HM; Tiom, Air Garam, 11.X.1990, 1 ♀, HM; 17.VII.1991, 1 ♀, HM; 12.–22.X.1995, 1 ♂, HM; Air Garam II, 2.–7.XII.1991, 2 ♂♂, EMEM; River Simo, 12.VIII.1991, 1 ♀, HM; Makki, River Makki, 2000 m, 2.–14.III.1989, 2 ♂♂, DM; 7.–16.V.1989, 2 ♂♂, HM; 5 ♂♂, ZMA; 28.X.1989, 4 ♂♂, MZB; 1 ♂, ZMA; 1700 m, 12.XI.1990, 3 ♂♂, EMEM; 24.I.1991, 2 ♂♂, EMEM; 6.–10.IV.1991, 2 ♂♂, EMEM; 8.–15.IX.1991, 2 ♂♂, EMEM; 1 ♂, MZB; River Pengi, 2.–9.II.1989, 1 ♂, HM; 2.–14.III.1989, 1 ♂, ZMA; River Karobak, 7.–16.V.1989, 2 ♂♂, ZMA; River Kuga, 7.–16.V.1989, 3 ♂♂, DM; 1 ♀, HM; 1 ♂, ZMA; River Sinum, 2000 m, 5.–7.I.1991, 1 ♂, EMEM; 21.III.1991, 2 ♂♂, EMEM; 3.IV.1991, 4 ♂♂, EMEM; 4.IX.1991, 1 ♂, MZB; 5.–7.IX.1991, 1 ♂, EMEM; 27.–28.IX.1991, 1 ♂, EMEM; River Wagai, 2.–9.II.1989, 1 ♂, HM; River Merogum, 2000 m, 7.–16.V.1989, 1 ♂, ZMA; 26.X.1989, 3 ♂♂, DM; River Wane, 2.–14.III.1989, 3 ♂♂, ZMA; 30.X.–1.XI.1989, 4 ♂♂, ZMA; 1700 m, 7.–9.XI.1991, 2 ♂♂, EMEM; Makki, 8.–12.VI.1989, 4 ♂♂, ZMA; Habbema, River Opir, 18.–19.XII.1992, 1 ♂, HM; 4.VII.1993, 1 ♂, DM; River Habbema, 4.I.1993, 1 ♂, JL; 28.–30.XII.1992, 2 ♀♀, HM; 1 ♀, ZMA; 10.–13.VI.1993, 2 ♂♂, EMEM; 6.–13.V.1995, 1 ♂, HM; River Baliem, 20.–22.II.1974, 1 ♂, EMEM; Welesi, River Wesi 2000 m, 22.I.1991, 2 ♂♂, EMEM; 8.–9.III.1991, 4 ♂♂, EMEM; 20.IV.1991, 2 ♂♂, EMEM; 8.V.1991, 1 ♂, DM; 19.V.1991, 2 ♂♂, EMEM; 25.V.1991, 4 ♂♂, DM; 28.V.1991, 2 ♂♂, HM; 1 ♂, ZMA; 18.–21.VI.1991, 4 ♂♂, DM; 30.X.1991, 4 ♂♂, DM; River Mil, 23.VIII.1986, 1 ♂, HM; 12.IX.1986, 1 ♂, HM; 19.IX.1986, 1 ♂, HM; 27.IX.1986, 2 ♂♂, 28.IX.1986, 2 ♂♂, ZMA; HM; 3.X.1986, 1 ♂, HM; 1 ♂, ZMA; 4.XII.1986, 1 ♂, HM; 2 ♂♂, ZMA; 16.XII.1986, 1 ♂, HM; 2 ♂♂, ZMA; 1.VII.1988, 1 ♂, ZMA; 10.V.1991, 1 ♂, DM; River Sigit-Sigit, 2000 m, 23.VIII.1986, 2 ♂♂, HM; 12.IX.1986, 2 ♂♂, HM; 4.XII.1986, 2 ♂♂, ZMA; River Walalagait, 2000 m, 16.XII.1986, 2 ♂♂, HM; Daela, I.1979, 4 ♂♂, ZMA; 16.IX.1984, 2 ♂♂, HM; 6.III.1985, 2 ♂♂, ZMA; 7.III.1985, 2 ♂♂, HM; 2300–2800 m, 13.–18.XI.1983, 1 ♂, ZMA; River Dagum, 2300 m, 24.III.1989, 1 ♂, ZMA; 1.–5.IV.1989, 3 ♂♂, ZMA; 26.–28.V.1989, 6 ♂♂, ZMA; 28.–29.V.1989, 3 ♂♂, DM; 23.–24.VIII.1989, 2 ♂♂, HM; 1 ♂, MZB; 1.–2.VII.1990, 8 ♂♂, EMEM; River Mbi, 2800 m, 25.–27.V.1989, 4 ♂♂, ZMA; River Jaboge, 26.V.1989, 1 ♂, ZMA; River Kuruagi, 20.VI.1989, 2 ♂♂, HM; 28.VII.1989, 1 ♀, HM; 1 ♂, ZMA; 23.–26.VIII.1989, 2 ♂♂, HM; 15.–18.I.1990, 1 ♂, HM; 8.III.1990, 4 ♂♂, HM; 1 ♂, ZMA; 4.–9.IV.1990, 2 ♂♂, EMEM; 17.VII.1990, 2 ♂♂, EMEM; Daela-Ibele, 8.III.1985, 1 ♂, ZMA; N.W. Baliem Valley, River Yagarak, 24.VII.1989, 1 ♂, ZMA; 2.IV.1990, 8 ♂♂, EMEM; 1.–3.IX.1990, 6 ♂♂, EMEM; 1.–

3.XII.1990, 1 ♂, HM; River Kumil, 29.I.–2.II.1990, 1 ♂, MZB; 23.XI.1990, 2 ♂♂, MZB; Kanggime, River Kopage, 8.IV.1992, 2 ♂♂, HM; River Anggenagi, 12.–14.IV.1992, 1 ♂, HM; River Jilik, 15.–18.IV.1992, 1 ♂, DM; 2 ♂♂, EMEM; River Pagona, 2 ♂♂, DM; River Newa, 29.VII.–2.VIII.1992, 3 ♂♂, HM; 1 ♂, ZMA; River Tenokwi, 8.–10.IX.1992, 2 ♂♂, EMEM; 2 ♂♂, HM; River Lile, 14.–15.IX.1992, 4 ♂♂, EMEM; 1 ♂, HM; 1 ♂, ZMA; River Kilanggu, 26.–27.VIII.1992, 6 ♂♂, EMEM; River Kou, 21.–22.VIII.1992, 2 ♂♂, EMEM; River Faki, 18.–20.VIII.1992, 4 ♂♂, EMEM; River Tinggu, 23.–28.VIII.1992, 6 ♂♂, EMEM; River Watinggi, 4 ♂♂, EMEM; River Lali, 11.–12.IX.1992, 4 ♂♂, EMEM; River Abul, 3 ♂♂, EMEM; River Udawe, 1 ♂, EMEM; River Uluk, 4 ♂♂, EMEM; River Mugi, 2 ♂♂, EMEM; Gunung Gilu Bedu, River Cale, 4.–5.XI.1992, 2 ♂♂, HM; Kecamatan Tiom, Kuyawagi, River Negeya, 18.II.1990, 1 ♂, HM; River Nengoeragime, 23.–25.IX.1993, 1 ♂, HM; River Genalu, 4.–6.VIII.1993, 3 ♂♂, HM; 9.–15.VIII.1993, 2 ♀♀, HM.

#### Diagnosis

*Delias autumnalis autumnalis* ROEPKE, 1955 differs from subspecies *D. autumnalis hiberna* subsp. nov. on the underside of forewing, which is largely white; it differs from *D. autumnalis michiae* NAKANO, 1994 by the subapical and terimal spots on underside of hindwing and basal spot on underside of hindwing which are red.

#### Description

**Male.** Upperside of forewing has very reduced greyish white area, including the proximal and lower half of the discal cell to the middle of the inner margin. Black border has none, one or two very small subapical spots. Upperside of hindwing is greyish-white with black apical part from middle of costal margin to vein-end of Cu<sub>1a</sub>. Inner edge of black part is more-or-less straight and diffuse. From Cu<sub>1a</sub> to anal area runs small black terminal line. Underside of forewing is translucent white, edge of upperside black border visible; black border from outside discal cell to tornus is about half as wide as on upperside, with three red subapical spots, followed by three terminal ones, decreasing in size. Inner edge of black border is slightly curved, with some diffusion. Large black streak from base, covering entire or nearly entire discal cell and crossing dc-bar, does—very exceptionally—reach black subapical border, enclosing a small greyish white spot at R<sub>1</sub>. Underside of hindwing has small black spot in the base, not always connected with incidently-interrupted black band along radial sector and Rs, enclosing an elongated spot, which is posteriorly red and anteriorly, along costal margin, white. At vein-end of Rs runs white line, followed by black border to tornus with inner edge is undulate. Discal part of wing is earth brown of variable intensity, with white veins. Lower parts of M<sub>3</sub>, Cu<sub>1a</sub>, Cu<sub>1b</sub> and 2A are creamy white with yellow to orange diffusion. Anal area has orange and dark brown diffusion. In some specimens dark spots are visible on brown area by accumulation of black scales. However, border between dark brown and light area is very variable. Often the light area extends to M<sub>1</sub> or M<sub>2</sub>. Even, in a few specimens, whole cell Rs is creamy with a large yellow to orange streak and a little brown diffusion. Length of forewing: 27–32 mm.

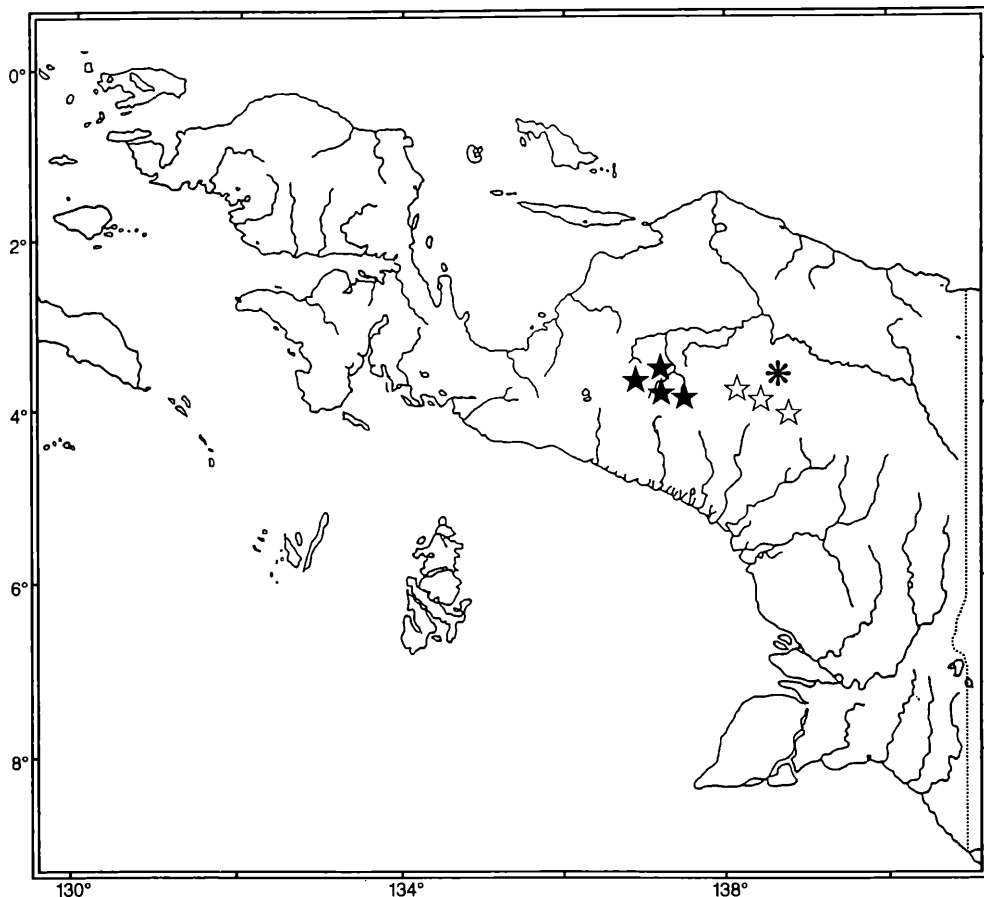
**Female.** Size of black and white areas on both wings are about the same as in male, but the border of hindwing is more sharply and obliquely ending in Cu<sub>1a</sub>. Its colour is brownish black. In forewing two or three apical spots are more distinct, often followed by one or two poor terminal spots. The white triangular area is more reduced. Anal area of hindwing is straw yellow. Underside of both wings is about same as in male, but in forewing the three apical and two or three terminal spots are slightly larger. Length of forewing: 29–31 mm.

#### *Delias autumnalis hiberna* subsp. nov.

(map 18, figs 154–160)

#### Type-material

Holotype ♂: IRIAN JAYA, Peg. Sentral, Mulia-Sinak, VII.1990, HM. Paratypes (231 ♂♂, 15 ♀♀): as holotype, 1 ♂, GG; Homeyo, 9.V.1991, 1 ♂, ZMA; Sugapa, I.1991, 14 ♂♂, GG; Sinak-Mulia, VI.–VII.1989, 1 ♂, GG; VII.1990, 2 ♂♂, HM; X.–XI.1990, 46 ♂♂, ZMA; V.1991, 2 ♀♀, HM; VI.1992, 6 ♂♂, ZMA; Mulia,



Map 18: Distribution of *Delias autumnalis* ROEPKE, 1955

☆ *D. autumnalis autumnalis* ROEPKE, 1955

★ *D. autumnalis hiberna* subsp. nov.

\* *D. autumnalis michiae* NAKANO, 1994.

2000m, VI.1990, 2 ♂♂, GG; 1 ♂, ZMA; IX.1990, 7 ♂♂, DM; 13 ♂♂, 2 ♀♀, GG; 5 ♂♂, HM; 1 ♂, ZMA; X.1991, 15 ♂♂, GG; VI.1992, 1 ♂, EMEM; Mulia-Ilu, X.-XI.1990, 2 ♂♂, 3 ♀♀, GG; XI.1990, 1 ♂, GG; VII.1991, 24 ♂♂, 1 ♀, GG; 6 ♂♂, HM; IX.-X.1991, 3 ♂♂, DM; X.1991, 2 ♂♂, GG; 1991, 34 ♂♂, GG; VI.1992, 5 ♂♂, HM; 1 ♂, ZMA; 1992, 3 ♀♀, GG; 1993, 4 ♂♂, GG; Kembruk-Sinak, VII.1990, 1 ♂, GG; 2 ♂♂, HM; Ilu, VI.1990, 2 ♂♂, DM; 4 ♂♂, GG; 5 ♂♂, HM; XI.1989-I.1990, 1 ♂, GG; IX.1990, 3 ♂♂, 1 ♀, HM; II.1991, 1 ♂, HM; VI.1993, 4 ♂♂, JL; VII.1993, 1 ♂, 3 ♀♀, JL; V.1994, 1 ♂, JL; Ilu, Tunggunamui, 2500 m, XII.1989, 2 ♂♂, GG; XII.1989-I.1990, 4 ♂♂, GG; 2 ♂♂, HM.

#### Diagnosis

This subspecies differs from *autumnalis autumnalis* ROEPKE, 1955 and *autumnalis michiae* NAKANO, 1994 by its more extensive black parts on underside of forewing, which are not restricted to black streak in discal cell, but fill other major parts of wing. The underside of the forewing is not as black in the female as in the male. However, more extended black area than in the female of *autumnalis autumnalis*.

## Description

Male. Upperside of both wings is as in *autumnalis autumnalis*. Underside of forewing is black with three red subapical spots, followed by one or two very small red terminal ones. A small grey spot is in  $R_1$ .  $1A+2A$  is white, sometimes entering  $Cu_{1b}$ . Underside of hindwing is as in *autumnalis autumnalis*; however generally brown colour is darker and light area is nearly always extending to  $M_1$ . Length of forewing: 25–29 mm.

Female. As female of *autumnalis autumnalis*. However, underside of forewing has vast black area, leaving a triangular white part from dc-bar widening towards inner margin. Length of forewing: 27–28 mm.

## Derivation of name

The name “hiberna”, an adjective in apposition, derived from the Latin word “hibernus” (wintry), because of the darker colouration than in *autumnalis* (autumnal).

***Delias autumnalis michiae* NAKANO, 1994 comb. nov.**

(= *Delias mira mavrodii* Tuzov & CHURKIN, 1998 syn. nov.)

(map 18, figs 161–164)

NAKANO (1994: 4–7): *Delias mira michiae*

TUZOV (1995: 119): *Delias* ssp. n. [sic!]

TUZOV & CHURKIN (1998: 46–48): *Delias mira mavrodii*

## Diagnosis

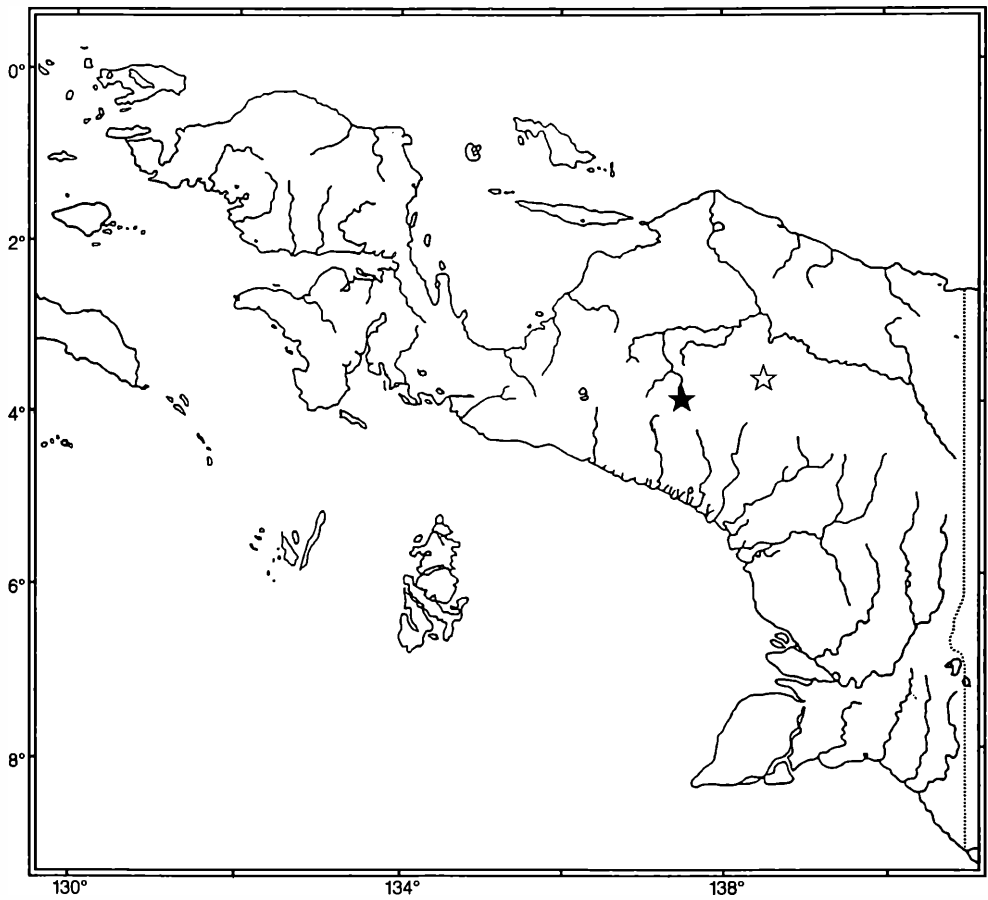
The subspecies *michiae* (including *mavrodii*, syn. nov.) differs from *autumnalis* by the colour of the subapical and terminal spots (on the underside of forewing) and of the basal spot (on the underside of hindwing), which is yellow to orange, and not red.

## Material:

Holotype ♂: Pass Valley, Wamena, Irian Jaya, Indonesia, 21. Mar. 1993, SN. Paratypes: same data as holotype, 1 ♂, 17 Mar. 1992, 2 ♂♂, 23 Mar. 1993, 1 ♂, SN & SM (from publication only). Other material: Balim Valley, Seg River, Watlanggu, 1800 m, 19.I.1995, 1 ♂, VT/DSM (holotype *D. mira mavrodii*); idem, 1 ♂, VT (paratype *D. mira mavrodii*); Pass Valley, 10.I.1995, 1 ♂, JL; Pass Valley River Suwagi, KM 48, 11.–21.I.1999, 2 ♂♂, HM.

## Description

Male. Upperside of forewing is white with black costa and broad black border. Inner edge of black border is irregular from inside discal cell to inner margin, at about 4 mm from tornus. Median vein is partly black. At base is some blue-grey diffusion. Upperside of hindwing is translucent white: pattern of underside partly visible from above. Some greyish blue diffusion is at base and inner edge of black border. Black border is about 5 mm wide along  $M_1$  and getting narrower towards tornus and apex where it is ending abruptly. Underside of forewing is translucent white: inner edge black border upper-side forewing visible, and has reduced black border with three orange subapical spots, followed by one to three poorly developed terminal ones of same colour. Black streak from base to black border covers whole discal cell, leaving a small greyish white spot at  $R_1$ . Underside of hindwing is brown with white veins. Black basal and costal area includes pear-shaped orange-yellow spot, bordering white costa. Between this black area and black border is a small white spot. Black border is undulate to triangular at inner edge. White postmedian segment has small dark yellow streaks in bottom of cells  $M_3$ ,  $Cu_{1a}$  and  $Cu_{1b}$  and some grey diffusion in cells  $M_1$ ,  $M_2$  and  $M_3$ . Anal area has yellow and black diffusion. Length of forewing: 24–28 mm. (15.0 mm as written in original description must be a mistake). Female. Unknown. However, plate 1, fig. 8 in ARIMA (1996), is probably a picture of underside of this female.



Map 19: Distribution of *Delias nakanokeikoe* YAGISHITA, 1993

★ *D. nakanokeikoe nakanokeikoe* YAGISHITA, 1993

☆ *D. nakanokeikoe jali* MASTRIGT, 1996.

***Delias nakanokeikoe* YAGISHITA, 1993**

(map 19)

**Diagnosis**

*Delias nakanokeikoe* YAGISHITA, 1993 differs from the other species in this subgroup on the underside of hind wing by its maroon brown ground colour with light veins and a dark maroon brown basal spot.

***Delias nakanokeikoe nakanokaikoe* YAGISHITA, 1993**

(map 19, figs 165–166)

YAGISHITA (1993a: 1–2, 263): *Delias nakanokeikoe*

YAGISHITA (1993b: 270–271): *Delias nakanokeikoe nakanokeikoe*

TUZOV (1995: 119): *Delias nakanokeikoe*

MASTRIGT (1996: 37): *Delias nakanokeikoe nakanokeikoe*

**Material examined**

Holotype ♂: West Irian, Ilu-Mulia, VII.1991, AY. Paratypes: same data, but VI.1991, 1 ♂, AY; III.1992, 1 ♂, AY; 1 ♂, ex AY, HM; Other material: Ilu/Mulia, X.–X.1990, 2 ♂♂, GG; VI.1993, 1 ♂, JL.

**Diagnosis**

This subspecies differs from *D. nakanokeikoe jali* MASTRIGT, 1996 on underside of forewing by its maroon brown colour instead of dark brown.

**Description**

Male. Upperside of forewing is white with black costa and broad black border, bearing one or two very small, white subapical spots. Inner edge of black border is more-or-less straight from inside discal cell to inner margin, about  $\frac{1}{3}$  from tornus. Median vein is partly black. At base and at outer side of white area is some black diffusion. Upperside of hindwing is white with some black diffusion at base and at inner edge of black border. In underside of forewing discal cell connected with black border, which is narrower than on upperside, especially in cells  $Cu_{1b}$  and 2A, bearing three red-brown subapical spots, followed by two or three very small brighter terminal ones. In central area black diffusion is variable in density and size. Underside of hindwing is maroon brown. Veins are white. Base is black, having long maroon basal spot, bordered at costal side with thin white line and at underside by black streak widening to middle of costa. Between this black streak and black border is an elongated white spot, connected with white costal vein. Black border is undulate at vein-tips. Between dark brown area and black border lies a narrow white area, very narrow at costal margin and getting broader towards tornus. This white area and the anal area have some orange-red diffusion. Anterior part of cell Rs is maroon. Length of forewing: 26–29 mm.

Female. Unknown.

***Delias nakanokeikoe jali* MASTRIGT, 1996**

(map 19, figs 167–168)

MASTRIGT (1996b: 21, 37–39, map 11, pl. 3, fig. 15, pl. 6, fig. 36): *Delias nakanokeikoe jali*

**Material examined**

Holotype ♂: Pass Valley, River Ameagi, 13.X.1992, ex HM, ZMA. Paratype: Pass Valley km 55, River Watlangku, 26.–31.IV.1992, 1 ♂, HM. Other material: Pass Valley, River Ameagi, 21.–22.I.1994, 1 ♂, HM.

**Diagnosis**

This subspecies differs from the nominate one in the smaller black border on upperside of forewing and in the darker brown colour and less obvious white veins on underside of hindwing.

**Description**

Male. Upperside of forewing is greyish white with black costa and broad black border, having two or three very small white subapical spots. Inner edge of black border is curved from top of discal cell to inner margin, at about 4 mm from tornus. Median vein is partly black. At base and at outer side of white area is some black diffusion. Upperside of hindwing is greyish white with some black diffusion at base and at inner edge of black border, which is about 5 mm along  $M_1$  and getting narrower towards the apex and tornus. Underside of forewing is largely dark grey to black. Inner margin is either white with some black diffusion towards the centre of the wing, or with large triangular white area. Black median vein and black outer parts of  $Cu_{1a}$  and  $Cu_{1b}$  visible. Underside of hindwing is dark brown with some black diffusion. Veins are white. Base is black, having long brown basal spot, bordered at costal side with thin white line and at underside by black streak widening to middle of costa. Between this black streak and black border is a small white spot. Black border is undulate at  $M_2$ , and triangular at

M<sub>3</sub>, Cu<sub>1a</sub> and Cu<sub>1b</sub>. Between dark brown area and black border lies a narrow white area, which is very narrow at costal margin and getting broader to tornus. This white area and the anal area have some yellowish-brown and black diffusion. Length of forewing: 26–28 mm.

Female. Unknown.

#### Name

The name “jali”, a noun in apposition, is the name of a large tribe in the interior of Irian Jaya. The type locality is inside its territory.

#### Discussion

This species seems to be the connection between *hiemalis* and *autumnalis*. On one hand the large black areas on the underside of forewing and a dark reddish-brown basal spot on underside of hindwing make it close to *hiemalis*. On the other hand the white veins on the underside of hindwing resemble those of *autumnalis*. The different size of the black border on upperside of forewing and the variety in colour of underside of hindwing between specimens from Mulia/Ilu area and Pass Valley, leads to the recognition of two different subspecies.

### *Delias klossi* subgroup

#### Diagnosis

*Delias klossi* subgroup differs from all other subgroups in the *clathrata* group on the underside of forewing by its large subapical spots, which are white at the innerside and brown at the apical side.

### *Delias klossi* ROTHSCHILD, 1915

(map 20)

In literature up to now, *klossi* is mentioned only from the WOLLASTON expedition (1 ♂ only) and many males and eight females from the Third Archbold Expedition in the Irian Jaya central mountain range, in the environment of Baliem Valley, by ROEPKE (1955), described as *klossi chrysanthemum*. YAGISHITA (1993) mentioned both and pictures six specimens from Mulia (including two aberrations) as *klossi chrysanthemum*. However, five of them belong to a here newly described subspecies; the sixth one is probably wrongly labelled and is *klossi klossi*. Besides the new material from the Mulia-Ilaga-Ilu area, also material became available from Tembagapura (*klossi klossi*), and from many spots in the central mountain range: most westerly from Homeyo, which I treat together with the Ilaga-Mulia-Ilu specimens as *klossi gome* subsp. nov.; further on from Kanggime, Tiom, Pass Valley, Baliem Valley and from the eastern part of the central mountain range, such as Silakma, Korupun and Langda (*klossi chrysanthemum*) and from Star Mountains (*klossi okse* subsp. nov.). Results on *klossi* from P.N.G. are unknown.

### *Delias klossi klossi* ROTHSCHILD, 1915

(map 20, figs 169–172)

ROTHSCHILD (1915a: 9): *Delias klossi*

ROTHSCHILD (1915b: pl. I, fig. 27): *Delias klossi*

TALBOT (1928: 31, 47): *Delias klossi*

TALBOT (1932: 102): *Delias klossi*

TALBOT (1937: 364): *Delias klossi*

ROEPKE (1955: 243, 258): *Delias klossi klossi*

D'ABRERA (1971: 143): *Delias klossi klossi*

D'ABRERA (1977: 143): *Delias klossi klossi*

D'ABRERA (1990: 143): *Delias klossi klossi*

YAGISHITA (1993a: 262): *Delias klossi klossi*

YAGISHITA (1993b: pl.129, fig. 6): *Delias klossi chrysanthemum*

YAGISHITA (1993b: 271): *Delias klossi klossi*

TUZOV (1995: 119): *Delias klossi klossi*

#### Material examined

Holotype ♂: Carstensz Peak, Utakwa River, 5,000–10,000 ft, Febr.–Mrch 1913, A. F. R. WOLLASTON, BMNH3. Other material: Tembagapura, River Wanogong 1800 m, I.1989–IX.1990, 1 ♂, HM; 1 ♂, ZMA; River Waa, 1991, 1 ♂, PANGEMANAN, EMEM; 8.I.1992, 1 ♂, BT; 4.II.1991, 1 ♂, GG; 1994–1996, 1 ♂, GG; 2300 m, 16.XII.1991, 1 ♂, HM; 28.XII.1991, 1 ♂, ZMA; 2200 m, 8.VI.1992, 1 ♂, HM; 16.IX. 1992, 1 ♂, HM; 2000 m, 1 ♂, ZMA; 4.XI.1991, 1 ♂, HM; 2100 m, 16.I.1992, 1 ♂, GG; River Kawik, 2400 m, 26.XII.1991, 1 ♂, GG; Ridge Camp, 2700–3000 m, 24.VIII.1992, 1 ♂, HM; Tembagapura, 5.X.1991, 1 ♂, GG; XII.1991, 2 ♂♂, GG; 1995, 1 ♂, GG.

#### Diagnosis

*Delias klossi klossi* differs from the other subspecies on the underside of the hindwing by a black streak from the middle of the costal margin to the apex.

#### Description

Male. Upperside of forewing is white with black border at inner edge serrate with three subapical and one or two very poor terminal spots. Black dc-bar is partly visible. Upperside of hindwing is greyish white with often a band of black diffusion at inner edge of black border in cells  $M_1$  and  $M_2$ , sometimes including two or three vague greyish spots. Underside of forewing is white. Black border is same in size as on upperside, but at inner edge less serrate and slightly smooth. Grey diffused band in discal cell, connected with thin black dc-bar, separated from black costal margin. Three large white subapical spots are filled apically with very small to moderate brown streak, followed by two or three terminal spots. Black dc-bar sometimes connected with black border, however always visible. At base is some grey diffusion. Underside of hindwing is dark brown with very narrow veinal areas, sometimes hardly visible, especially Rs. At innerside of black undulate border is a white line from Rs to tornus, slightly widening and also undulate, not entering along veins  $Cu_{1a}$  and  $Cu_{1b}$ . No concentrations of black diffusion on brown segments. Length of forewing: 27–31 mm.

Female. Unknown.

#### Name

The name “klossi” is a genitive of a noun in apposition, in honour of Mr KLOSS.

#### Discussion

Most of the recently collected specimens from Tembagapura (at the southern side of the central mountain range) have an area of black diffusion at the inner edge of the black border on the upperside of the hindwing. This feature is absent in the holotype and in a few other—less fresh—specimens.

#### *Delias klossi gome* subsp. nov.

(map 20, figs 173–178)

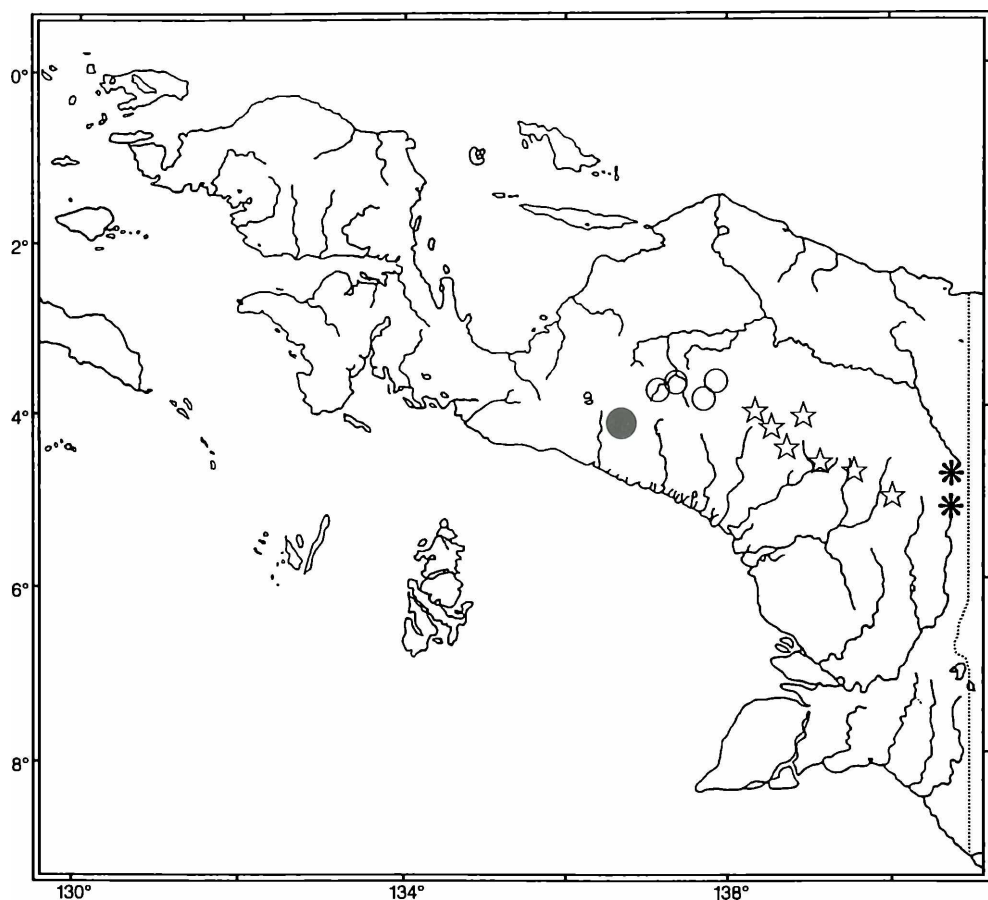
YAGISHITA (1993a: 262): *Delias klossi chrysanthemum* (partim)

YAGISHITA (1993b: pl. 129, figs 1–5): *Delias klossi chrysanthemum*

YAGISHITA (1993b: 271): *Delias klossi chrysanthemum* [sic!] (partim)

#### Type material

Holotype ♂: Ilaga, River Namungun, 2350 m, 9.XI.1985, HM. Paratypes (261 ♂♂, 5 ♀♀): as holotype, 3 ♂♂, HM; 4 ♂♂, ZMA; same data but 18.V.1988, 2 ♂♂, HM; 27.XI.1988, 8 ♂♂, GG; 12.XII.1988, 2 ♂♂,

Map 20: Distribution of *Delias klossi* ROTHSCHILD, 1915● *D. klossi klossi* ROTHSCHILD, 1915○ *D. klossi gome* subsp. nov.☆ *D. klossi chrysanthemum* ROEPKE, 1955\* *D. klossi okse* subsp. nov.

DM; 4 ♂♂, GG; 26.III.1989, 1 ♂, DM; 3 ♂♂, ZMA; 10.V.1995, 1 ♂, EMEM; River Jila, 1800 m, 7.VI.1988, 2 ♂♂, HM; 27.VIII.1988, 1 ♂, HM; 9.IV.1989, 2 ♂♂, DM; 1 ♂, ZMA; 15.–20.XI.1990, 4 ♂♂, EMEM; 18.IV.1991, 2 ♂♂, EMEM; 7.VI.1991, 1 ♂, HM; IX.1991, 5 ♂♂, HM; 24.VI.1992, 2 ♂♂, EMEM; River Nakimo, 8.XI.1985, 2 ♂♂, HM; 6.–8.XI.1985, 1 ♂, ZMA; 21.I.1989, 2 ♂♂, BT; 13.IV.1993, 3 ♂♂, HM; River Wuluen, 11.XII.1988, 4 ♂♂, GG; IX.1991, 5 ♂♂, HM; 9.XII.1991, 2 ♂♂, DM; 1 ♂, HM; 10.I.1992, 5 ♂♂, HM; 22.III.1992, 10 ♂♂, ZMA; 8.III.1993, 1 ♂, DM; 4 ♂♂, HM; River Mum, 1850 m, 22.I.1980, 2 ♂♂, GG; 26.IV.1992, 2 ♂♂, HM; Ilaga, 18.V.1988, 1 ♂, BT; 22.V.1988, 2 ♂♂, GG; 3 ♂♂, BT; 14.VIII.1988, 1 ♂, DM; 1 ♂, BT; II.1991, 9 ♂♂, GG; 7.VI.1991, 1 ♂, HM; Ilaga, 2300 m, 18.VIII.1988, 1 ♂, leg. JF. LABBÉ, JL; idem, but 21.VIII.1988, 1 ♂, JL; 10.IX.1991, 1 ♂, GG; 8.X.1993, 4 ♂♂, HM; 1 ♂, ZMA; Homeyo, River Debabu, 9.V.1991, 2 ♂♂, GG; I.1993, 2 ♂♂, GG; 5.IV.1994, 2 ♂♂, GG; 22.X.1994, 1 ♂, HM; 2 ♂♂, ZMA; 26.X.1994, 1 ♂, HM; 31.X.1994, 1 ♂, HM; 2 ♂♂, ZMA; 7.XI.1994, 2 ♂♂, HM, 6 ♂♂, ZMA; Homeyo, Baylabu, River Kaimalu, 21.I.1992, 2 ♂♂, DM; 1 ♂, GG; 25.II.1992, 2 ♂♂, GG; 1.III.1992, 1 ♂, GG; Homeyo Selatan, 2600 m, 3°53' S, 136°48' E, 2.IX.1992, leg. JF. LABBÉ,

1 ♂, BT; idem, but 3°48'51"S, 136°46'E, 9.IX.1992, leg. JF. LABBÉ, 2 ♂♂, BT; idem, but 2900 m, 3°53'S, 136°44'E, 15.VI. 1993, leg. JF. LABBÉ, 1 ♀, JL; Sugapa, I.1991, 6 ♂♂, GG; Mulia, 2000 m, IX.1990, 12 ♂♂, DM; Mulia, IX.1990, 13 ♂♂, GG; 3 ♂♂, HM; IX.-X.1991, 2 ♂♂, DM; 1992, 3 ♂♂, BT; VII.1993, 1 ♀, JL; Sinak-Mulia, VI.-VII.1989, 1 ♂, GG; VII.1990, 3 ♂♂, GG; 1 ♂, HM; X.-XI.1990, 41 ♂♂, ZMA; VI.1992, 1 ♂, ZMA; Kecamatan Sinak, XI.1992, 2 ♂♂, HM; Sinak, 2500 m, 14.XI.1992, leg. JF. LABBÉ, 1 ♂, JL; idem, but 16.XI.1992, 1 ♂, JL; Mulia-Ilu, X.-XI.1990, 2 ♂♂, GG; 1 ♂, ZMA; XI.1990, 2 ♂♂, GG; II.1991, 1 ♀, GG; IX.-X.1991, 1 ♂, ZMA; X.1991, 6 ♂♂, GG; 1991, 1 ♂, GG; VI.1992, 1 ♂, HM; 1992, 2 ♀♀, GG; Ilu, 2000 m, VI.1990, 4 ♂♂, GG; Ilu, Tingimanui, 2500 m, XII.1989-I.1990, 1 ♂, GG; Beoga, XII.1989, 3 ♂♂, GG; Kanggime, Gunung Gelu Bedu 4.-5.XI.1992, River Cale, 1 ♂, HM; 1 ♂, ZMA; River Kupage, 18.-19.IV.1992, 1 ♂, DM, 1 ♂, HM.

#### Diagnosis

*Delias klossi gome* subspec. nov. differs from the three other subspecies by its regular black border on the upperside of hindwing and by large white lines on the underside of hindwing especially along Rs and M<sub>1</sub> and at the inner edge of the black border in cells Cu<sub>1a</sub>, Cu<sub>1b</sub> and 2A.

#### Description

**Male.** Upperside of forewing is white, with black costal border. Black border along termen, that is much broader at apex than at tornus, and somewhat broader than in *klossi*, not serrate at inner edge, and slightly entering discal cell, absorbing dc-bar. Two or three subapical spots occasionally followed by one terminal spot. Upperside of hindwing is translucent white with regular black border from Rs to tornus, sometimes entering anal margin; with width of 2 to 3 mm in M<sub>2</sub> and slightly reducing to both sides. Incidentally inner edge undulate from Cu<sub>1a</sub> to tornus. Underside of forewing is white with black costal border, largely entering discal cell, partly split by soft greyish white line from base upwards. Black terminal border is of same size as on upperside including three large subapical spots, largely filled with brown streak, followed by three terminal spots which sometimes with some brown, especially first one. Underside of hindwing is maroon brown, lighter than in *klossi*, with obvious white veins, especially Sc+R<sub>1</sub> and Rs. Black border at inner edge undulate to triangular at the veins, accompanied by white line from Rs widening towards tornus and largely entering along veins Cu<sub>1a</sub>, Cu<sub>1b</sub> and 1A+2A. In Sc+R<sub>1</sub> a black streak crosses vein Sc+R<sub>1</sub>, followed by thin brown streak towards apex. Concentrations of black scales form a black interrupted band, maximal from inside cell M<sub>1</sub> to inside Cu<sub>1b</sub> just outside discal cell and often much shorter. Length of forewing: 26–29 mm.

**Female.** Upperside of forewing is creamy to yellowish white with broad black border, including three subapical and two terminal white spots. Upperside of hindwing is translucent creamy white: pattern of underside visible from above, with broad black border, irregular at inner edge. Subbasal part has some yellow gloom. Underside of both wings has no significant differences in comparison with male. Length of forewing: 28–29 mm.

#### Derivation of name

The name "gome", a noun in apposition, is the name of a village in the Ilaga valley where I was staying when I was collecting in that area.

#### *Delias klossi chrysanthemum* ROEPKE, 1955

(map 20, 179–187)

ROEPKE (1955: 243, 258, pl. VI, figs 19, 20, pl. VIII, fig. 17): *Delias klossi chrysanthemum*

D'ABRERA (1971: 143 + figs): *Delias klossi chrysanthemum*

D'ABRERA (1977: 143 + figs): *Delias klossi chrysanthemum*

D'ABRERA (1990: 143 + figs): *Delias klossi chrysanthemum*

YAGISHITA (1993a: 262): *Delias klossi chrysanthemum* (partim)

YAGISHITA (1993b: 271; *klossi chrysanthemum* [sic!]) (partim)

TUZOV (1995: 119): *Delias klossi chrysanthemum*

Material examined

Holotype ♂: Neth.Ind.-Amer. New Guinea Exped., 2800 m, Moss Forest Camp 5.XI.1938, L. J. Toxopeus. Paratypes: as holotype, 2600–3000 m, VIII. and IX.1938, many ♂♂; Ibele Valley, 2250 m, 4 ♀♀, Moss Forest, 2800–2950 m, VII., X. and XI.1938, 3 ♀♀ (with allotype: 22.VIII.1938, 2950 m), RMNH; 3 ♂♂, 1 ♀, BMNH1; 2 ♂♂, EMEM; 5 ♂♂, MZB. Other material: Daela, River Yaboge, 29.V.1987, 2 ♂♂, HM; 1 ♂, 1 ♀, ZMA; 30.V.1987, 2 ♂♂, 1 ♀, HM; 2800 m, 24.V.1989, 3 ♂♂, ZMA; 22.VI.1989, 1 ♀, HM; 23.VI.1989, 1 ♂, 1 ♀, HM; 20.–23.VI.1989, 1 ♂, ZMA; 10.VIII.1989, 1 ♂, DM; 2 ♀♀, HM; 11.VIII.1989, 8 ♂♂, EMEM; 1 ♂, DM; 10.–11.VIII.1989, 1 ♂, 1 ♀, ZMA; 1.–2.IX.1989, 1 ♀, HM; 6.IX.1989, 1 ♂, HM; 1.–2.XII.1989, 1 ♂, MZB; Habbema, 2700 m, 1 ♂, ZMA; River Dagum, 2000 m, 1.–6.IV.1983, 2 ♂♂, ZMA; 26.–29.V.1989, 1 ♂, ZMA; Daela, 2300–2900 m, 2 ♂♂, DM; IV.–VI.1989, 3 ♂♂, ZMA; Daela-Ibele, 8.III.1985, 1 ♂, HM; River Kumil, 29.VII.1989, 1 ♂, ZMA; 27.XI.–2.XII.1989, 2 ♂♂, HM; 29.I.–2.II.1990, 11 ♂♂, MZB; 1.–4.III.1990, 2 ♂♂, EMEM; 4.–7.V.1990, 2 ♂♂, MZB; 6.VIII.1990, 1 ♂, 1 ♀, ZMA; 4.–5.IX.1990, 4 ♂♂, MZB; River Sinum, 1.II.1991, 2 ♂♂, MZB; 4.IX.1991, 1 ♂, MZB; River Wulem, 4.–5.XII.1989, 1 ♀, HM; 1 ♀, ZMA; 5.–7.III.1990, 4 ♂♂, HM; 7.VIII.1990, 2 ♂♂, EMEM; 2 ♂♂, MZB; 3.IX.1990, 2 ♂♂, MZB; River Mbi, 2800 m, 25.V.1989, 4 ♂♂, DM; 7.–8.VII.1989, 1 ♂, ZMA; 8.VIII.1989, 1 ♂, ZMA; 9.VIII.1989, 1 ♀, ZMA; 18.VIII.1989, 1 ♂, DM; 7.IX.1990, 7 ♂♂, EMEM; 1 ♂, HM; 2 ♂♂, MZB; Welesi, River Mil, 2000 m, 23.VIII.1986, 1 ♂, HM; 3.X.1986, 1 ♂, HM; 19.IX.1990, 1 ♀, DM; River Wesi, 25.IV.1991, 1 ♂, MZB; Habbema, River Opir, 18.–19.XII.1992, 2 ♂♂, HM; 22.II.1993, 1 ♂, HM; 5.–10.X.1993, 2 ♂♂, HM; Kanggime, River Paki, 18.–20.VIII.1992, 2 ♂♂, HM; River Wadinagi, 31.VII.–4.VIII.1992, 1 ♂, HM; River Gunbari, 5.–6.VIII.1992, 1 ♂, HM; River Newa, 29.VII.–2.VIII.1992, 1 ♂, HM; River Naligi, 22.–24.VI.1995, 1 ♂, EMEM; River Lile, 14.–15.IX.1992, 1 ♂, HM; River Kupage, 18.–19.IV.1992, 1 ♂, HM; Tiom, Air Garam, 2.VIII.1991, 1 ♂, DM; 2.–13.II.1993, 3 ♂♂, HM; Air Garam II, 20.V.1990, 2 ♂♂, ZMA; Kecamatan Tiom, Kuyawagi, River Agadugi atas, 20.–22.IX.1993, 1 ♂, HM; Tiom 1800 m, 2.–9.III.1989, 1 ♂, ZMA; 2000 m, 8.–12.VI.1989, 1 ♂, ZMA; Makki, River Makki, 8.–10.VI.1989, 1 ♂, DM; 28.X.1989, 1 ♂, ZMA; 2.–9.II.1989, 1 ♂, ZMA; 7.–16.V.1989, 1 ♂, ZMA; 11.–15.XI.1991, 4 ♂♂, DM; 10.–13.XII.1991, 3 ♂♂, DM; River Wane, 2000 m, 27.X.1989, 2 ♂♂, DM; 1.XI.1989, 1 ♂, DM; River 7.–16.V.1989, 1 ♂, ZMA; River Sinum, 21.II.1991, 1 ♂, EMEM; 21.III.1991, 2 ♂♂, MZB; 7. + 9.XI.1991, 2 ♂♂, MZB; River Penggi, 12.–14.III.1989, 1 ♂, ZMA; River Meragom, 26.–31.X.1989, 1 ♂, ZMA; Baliem Valley, River Yagarak, 10.XI.1990, 2 ♂♂, EMEM; 15.XI.1990, 1 ♂, 1 ♀, DM; River Pera, 21.XI.1990, 1 ♂, DM; River Wesi, 1 ♂, DM; Pass Valley, River Watlangku, 31.I.–1.II.1992, 1 ♂, HM; 24.–28.II.1992, 2 ♂♂, HM; 26.–31.V.1992, 2 ♂♂, DM; 3 ♂♂, HM; River Bion, 25.–30.I.1992, 2 ♂♂, HM; 10.–14.IV.1992, 1 ♂, HM; 15.–17.VII.1992, 1 ♂, HM; 3.VIII.1992, 1 ♂, HM; 13.–15.IX.1992, 1 ♂, HM; 10.–14.X.1992, 2 ♂♂, DM; 6.–7.VIII.1992, 4 ♂♂, EMEM; 7.V.1995, 17 ♂♂, EMEM; 12.–15.X.1995, 1 ♂, HM; River Ibem, 22.X.1992, 3 ♂♂, EMEM; 3.XII.1992, 1 ♂, HM; 14.–17.XI.1992, 2 ♂♂, DM; 17.XII.1992, 2 ♂♂, DM; 4.–7.XI.1993, 2 ♂♂, HM; 4.–5.V.1995, 1 ♂, EMEM; 17.X.1995, 1 ♂, HM; River Ameagi, 23.X.1992, 1 ♂, HM; 30.XI.–3.XII.1992, 2 ♂♂, HM; 21.I.1994, 1 ♂, HM; 14.–17.II.1994, 1 ♂, HM; 9.–11.V.1995, 1 ♂, EMEM; River Suwage, 11.VII.1992, 1 ♂, HM; 12.V.1995, 2 ♂♂, EMEM; 1 ♂, HM; 20.VI.1995, 1 ♂, EMEM; 25.–28.II.1997, 1 ♂, HM; 12.–14.V.1997, 1 ♂, HM; 18.–24.VIII.1997, 1 ♂, HM; Silakma, River Koluk, 20.I.–4.II.1992, 3 ♂♂, HM; Korupun, River Asso, III.1991, 2 ♂♂, HM; 31.III.–1.IV.1991, 2 ♂♂, HM; 19.IV.1991, 1 ♂, HM; 23.–30.IX.1991, 1 ♂, HM; 14.–16.X.1991, 1 ♂, HM; 18.–22.IX.1991, 1 ♂, HM; 1.–2.VI.1992, 1 ♂, ZMA; 21.–25.IX.1992, 3 ♂♂, HM; 22.–27.II.1993, 1 ♂, HM; 7.XII.1993, 1 ♂, HM; 1.–4.IX.1995, 2 ♂♂, EMEM; 4.–9.XII.1995, 1 ♂, HM; River Okrukumak, 2.–5.XII.1996, 1 ♂, HM; Gn. Sekun, 18.–23.VIII.1997, 2 ♂♂, HM; River Gwanenda, 10.–12.XI.1992, 1 ♂, ZMA; River Weimin, 22.–27.IV.1994, 1 ♂, ZMA; 26.–31.XII.1994, 1 ♂, EMEM; Langda, River Bibwe, 9.XII.1988, 1 ♂, HM; 1.IV.1989, 1 ♂, ZMA; 17.–19.IV.1989, 2 ♂♂, HM; 1.–3.V.1989, 1 ♂, HM; 9.–10.V.1989, 1 ♂, HM; Langda, 1.–15.II.1991, 1 ♂, HM; Langda Kabruk, 10.–28.X.1992, 2 ♂♂, DM.

Diagnosis

ROEPKE (1955) separated this subspecies from the nominate one by its having at least three pure white subapical spots on the forewing upperside, a forth and fifth (terminal) one often being present. On upperside of forewing the undulate black border and on the underside of hindwing the white veinal areas and the absence of the black streak from middle of inner margin to apex are other features to separate this subspecies.

### Description

Male. Uppside of forewing is white, with black costal border, slightly entering discal cell. Black border along termen, that is much broader at apex than at tornus and mostly absorbs black dc-bar, bears three subapical spots, followed by one or two terminal ones. Inner edge is serrate from  $M_3$  to tornus. Uppside of hindwing is white with black border from Rs to tornus, which is undulate from  $M_3$  to tornus. Underside of forewing is white with black costal border. Blackish streak from base to dc-bar sometimes connected with costal border. Black border of same size as on upperside has three large subapical streaks, largely filled with brown, followed by three terminal spots with sometimes some brown, especially in first one. Underside of hindwing is brown, mostly lighter than in *klossi* or *gome*. In some specimens basal and distal parts have different brown colouration. White veinal area is variable; however, more obvious than in *klossi*, but less than in *gome*. Black border at inner edge undulate to triangular at vein ends. At inner side of black border is a white line from Rs to tornus, slightly widening, especially in cells  $Cu_{1a}$  and  $Cu_{1b}$ . In  $Sc+R_1$  a black streak, crossing vein  $Sc+R_1$  is followed by narrow brown streak to apex. In most specimens concentrations of black scales cause an often-interrupted black band of variable size just outside discal cell; maximum from vein  $M_1$  to inside  $Cu_{1b}$ . Length of forewing increases going from west to east: 27–29 mm (Kanggime/Tiom), 28–30 mm (Baliem Valley), (28) 30–33 mm (Pass Valley), 30–33 mm (Korupun and Langda).

Female. Uppside of forewing is greyish white with dark brown border, slightly broader than in male, with three white subapical spots, followed by two terminal ones and with a smooth inner edge. In base is some grey diffusion. Uppside of hindwing is translucent greyish white with slightly broader black border than in male, which is largely undulate from  $M_2$  to tornus. The black brown "lunula" just outside discal cell in  $M_1$  and  $M_2$ , mentioned by ROEPKE (1955) is missing in some specimens, which I mention as f-♀ *deluna*. In base is some greyish diffusion. Length of forewing: 28–30 mm.

### *Delias klossi okse* subspec. nov.

(map 20, figs 188–189)

### Type material

Holotype ♂: IRIAN JAYA, Star Mountains, Abmisibil, River Okse, 6.–7.IV.1997, HM. Paratypes (4 ♂♂): as holotype, 2 ♂♂, HM; idem, but 29.I.1999, 1 ♂, HM; idem, River Okbon, 14.IV.1991, 1 ♂, HM.

### Diagnosis

*Delias klossi okse* subspec. nov. differs from the three above mentioned subspecies by its narrow black border on upperside of hindwing.

### Description

Male. Uppside of forewing is white, with black costal border. Black border along termen, much broader at apex than at tornus, is of same size as in *gome*, but at inner edge is serrate, slightly entering discal cell and absorbing dc-bar. There are three subapical spots followed by none, one, two or three very small terminal dots. Uppside of hindwing is translucent white with narrow black border from Rs to tornus, which is undulate at inner edge from  $Cu_{1a}$  to tornus. Underside of both wings is as in *gome*, but with three white terminal spots on underside of forewing and with black border on underside of hindwing that is not undulate but with triangular spots at vein ends. Length of forewing: (25) 29–30 mm.

Female. Unknown.

### Derivation of name

The name "okse", a noun in apposition, is the name of the river where holotype and two paratypes were collected.

**Alphabetical list of all names connected with the *clathrata* group**

<i>anggi</i>	<i>D. elongatus</i> f-♀ <i>anggi</i> forma nov.
<i>autumnalis</i>	<i>D. autumnalis autumnalis</i> ROEPKE, 1955 stat. nov.
<i>bobaga</i>	<i>D. bobaga bobaga</i> MASTRIGT, 1990
<i>boschmai</i>	<i>D. menooensis boschmai</i> ROEPKE, 1955 comb. nov. originally described as <i>D. mariae boschmai</i>
<i>catocausta</i>	<i>D. catocausta catocausta</i> JORDAN, [1912]
<i>chrysanthemum</i>	<i>D. klossi chrysanthemum</i> ROEPKE, 1955
<i>cieko</i>	<i>D. roepkei cieko</i> ARIMA, 1996 comb. nov. originally described as <i>D. mira cieko</i>
<i>clathrata</i>	<i>D. clathrata clathrata</i> ROTHSCHILD, 1904
<i>deluna</i>	<i>D. klossi chrysanthemum</i> f-♀ <i>deluna</i> forma nov.
<i>eefi</i>	<i>D. catocausta eefi</i> MASTRIGT, 1990
<i>elongatus</i>	<i>D. elongatus</i> KENRICK, 1911
<i>excelsa</i>	<i>D. mira excelsa</i> JORDAN, 1930
<i>fioretti</i>	<i>D. fioretti</i> MASTRIGT, 1996
<i>flabella</i>	<i>D. hiemalis flabella</i> MASTRIGT, 1996 comb. nov. originally described as <i>D. mira flabella</i>
<i>gome</i>	<i>D. klossi gome</i> subspec. nov.
<i>hemianops</i>	<i>D. hemianops</i> GERRITS & MASTRIGT, [1993]
<i>hiberna</i>	<i>D. autumnalis hiberna</i> subspec. nov.
<i>hiemalis</i>	<i>D. hiemalis hiemalis</i> ROEPKE, 1955 stat. nov. originally described as <i>D. mira hiemalis</i>
<i>hitam</i>	<i>D. hiemalis hiemalis</i> f. <i>hitam</i> forma nov.
<i>homeyo</i>	<i>D. bobaga homeyo</i> MASTRIGT, 1996
<i>ilu</i>	<i>D. walshae ilu</i> subspec. nov.
<i>inexpectata</i>	<i>D. inexpectata</i> ROTHSCHILD, 1915
<i>jali</i>	<i>D. nakanokeikoe jali</i> MASTRIGT, 1996
<i>klossi</i>	<i>D. klossi klossi</i> ROTHSCHILD, 1915
<i>labbei</i>	<i>D. hiemalis labbei</i> subspec. nov.
<i>limata</i>	<i>D. clathrata limata</i> JORDAN, 1930
<i>maria*</i>	<i>D. campbelli maria</i> TALBOT, 1937 (occ. because of <i>mariae</i> ) renamed as <i>D. campbelli cyclops</i> MASTRIGT, 1996
<i>mariae</i>	<i>D. mariae</i> JOICEY & TALBOT, 1916
<i>mavrodii</i>	<i>D. mira mavrodii</i> TUZOV & CHURKIN, 1998 syn. nov. for <i>D. autumnalis michiae</i> NAKANO, 1994
<i>menooensis</i>	<i>D. menooensis menooensis</i> JOICEY & TALBOT, 1922 stat. nov. originally described as <i>D. mariae menooensis</i>
<i>michiae</i>	<i>D. autumnalis michiae</i> NAKANO, 1994 comb. nov. originally described as <i>D. mira michiae</i>
<i>mira</i>	<i>D. mira mira</i> ROTHSCHILD, 1904
<i>nakanokeikoe</i>	<i>D. nakanokeikoe nakanokeikoe</i> YAGISHITA, 1993
<i>neeltje</i>	<i>D. neeltje</i> GERRITS & MASTRIGT, [1993]
<i>nemangkawi</i>	<i>D. hiemalis nemangkawi</i> subspec. nov.
<i>nigerrima</i>	<i>D. catocausta nigerrima</i> ROEPKE, 1955 synonym for <i>D. catocausta catocausta</i> JORDAN, [1912]
<i>okse</i>	<i>D. klossi okse</i> subspec. nov.
<i>reissingeri</i>	<i>D. mira reissingeri</i> MASTRIGT, 1996 syn. nov. for <i>D. roepkei cieko</i> ARIMA, 1996 comb. nov.
<i>reversa</i>	<i>D. mira reversa</i> ROTHSCHILD, 1925
<i>roepkei</i>	<i>D. roepkei roepkei</i> SANFORD & BENNETH, 1955 stat. nov. originally described as <i>D. mira roepkei</i>

<i>roepkei</i> *	<i>D. leucias roepkei</i> NIEUWENHUIS & HOWARTH, 1969 (occupied) renamed and put on species level as <i>D. nieuwenhuisi nieuwenhuisi</i> MASTRIGT, 1989
<i>roepkei</i> *	<i>D. ibelana roepkei</i> SCHMITT, 1992 (occupied) renamed as <i>D. fascelis amungme</i> MASTRIGT, 1996 comb. nov.
<i>sanaeae</i>	<i>D. walshae sanaeae</i> SAKUMA, 1999 comb. nov. Originally described as <i>D. hemianops sanaeae</i>
<i>sakumai</i>	<i>D. clathrata sakumai</i> YAGISHITA, 1993 (syn. nov.) junior synonym for <i>D. neeltje</i> GERRITS & MASTRIGT, [1993]
<i>sawyeri</i>	<i>D. sawyeri</i> spec. nov.
<i>sigit</i>	<i>D. sigit</i> MASTRIGT, 1990
<i>walshae</i>	<i>D. walshae walshae</i> ROEPKE, 1955 stat. nov. originally described as <i>D. mariae walshae</i>

\* These names are mentioned here only because they are junior synonyms of names used in the *Delias clathrata* group. The (sub)species themselves do not belong to the *Delias clathrata* group.

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## Colour plate I (figs 1–18):

1. Upperside of *D. clathrata clathrata* ROTHSCHILD, 1904 lectotype ♂
2. Underside of *D. clathrata clathrata* ROTHSCHILD, 1904 lectotype ♂
3. Upperside of *D. clathrata clathrata* ROTHSCHILD, 1904 paralectotype ♀
4. Underside of *D. clathrata clathrata* ROTHSCHILD, 1904 paralectotype ♀
5. Upperside of *D. clathrata clathrata* ROTHSCHILD, 1904 form
6. Underside of *D. clathrata clathrata* ROTHSCHILD, 1904 form
7. Upperside of *D. clathrata limata* JORDAN, 1930 lectotype ♂
8. Underside of *D. clathrata limata* JORDAN, 1930 lectotype ♂
9. Upperside of *D. clathrata limata* JORDAN, 1930 paralectotype ♀
10. Underside of *D. clathrata limata* JORDAN, 1930 paralectotype ♀
11. Upperside of *D. neeltje* GERRITS & MASTRIGT, [1993] holotype ♂
12. Underside of *D. neeltje* GERRITS & MASTRIGT, [1993] holotype ♂
13. Upperside of *D. elongatus* KENRICK, 1911 holotype ♀
14. Underside of *D. elongatus* KENRICK, 1911 holotype ♀
15. Upperside of *D. elongatus* KENRICK, 1911 ♂ (neoallotype)
16. Underside of *D. elongatus* KENRICK, 1911 ♂ (neoallotype)
17. Upperside of *D. elongatus* KENRICK, 1911 f-♀ *anggi*
18. Underside of *D. elongatus* KENRICK, 1911 f-♀ *anggi*

1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18



## Colour plate II (figs 19–36):

19. Upperside of *D. mariae* JOICEY & TALBOT, 1916 lectotype ♂
20. Underside of *D. mariae* JOICEY & TALBOT, 1916 lectotype ♂
21. Upperside of *D. mariae* JOICEY & TALBOT, 1916 paralectotype ♀
22. Underside of *D. mariae* JOICEY & TALBOT, 1916 paralectotype ♀
23. Upperside of *D. menooensis menooensis* JOICEY & TALBOT, 1922 stat. nov. lectotype ♂
24. Underside of *D. menooensis menooensis* JOICEY & TALBOT, 1922 stat. nov. lectotype ♂
25. Upperside of *D. menooensis menooensis* JOICEY & TALBOT, 1922 stat. nov. paralectotype ♀
26. Underside of *D. menooensis menooensis* JOICEY & TALBOT, 1922 stat. nov. paralectotype ♀
27. Underside of *D. menooensis menooensis* JOICEY & TALBOT, 1922 stat. nov. ♂ form
28. Underside of *D. menooensis menooensis* JOICEY & TALBOT, 1922 stat. nov. ♂ form
29. Upperside of *D. menooensis boschmai* ROEPKE, 1955 comb. nov. holotype ♂
30. Underside of *D. menooensis boschmai* ROEPKE, 1955 comb. nov. holotype ♂
31. Upperside of *D. menooensis boschmai* ROEPKE, 1955 comb. nov. ♀
32. Underside of *D. menooensis boschmai* ROEPKE, 1955 comb. nov. ♀
33. Upperside of *D. bobaga bobaga* MASTRIGT, 1990 holotype ♂
34. Underside of *D. bobaga bobaga* MASTRIGT, 1990 holotype ♂
35. Upperside of *D. bobaga bobaga* MASTRIGT, 1990 ♀
36. Underside of *D. bobaga bobaga* MASTRIGT, 1990 ♀

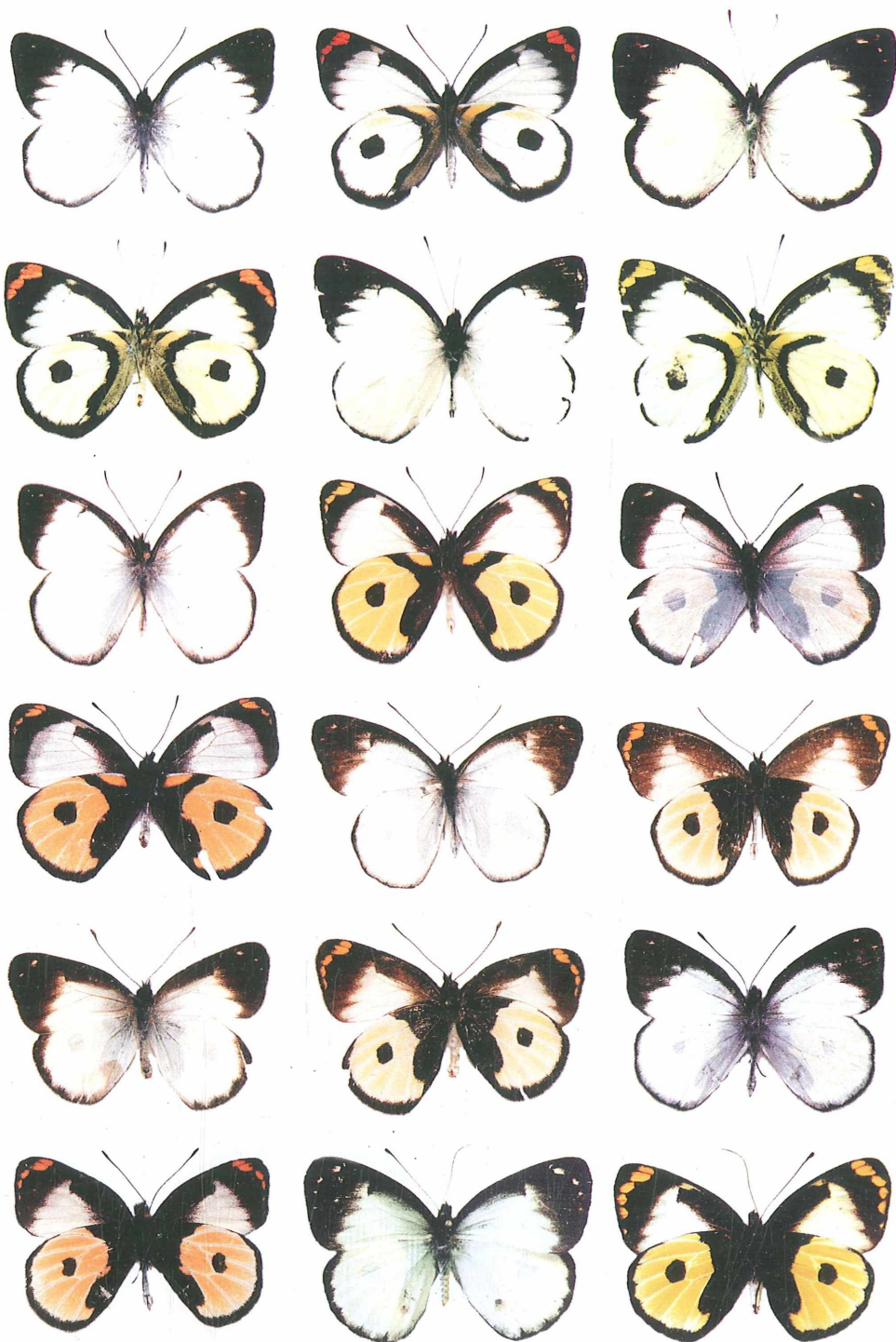
19	20	21
22	23	24
25	26	27
28	29	30
31	32	33
34	35	36



## Colour plate III (figs 37–54):

37. Upperside of *D. bobaga homeyo* MASTRIGT, 1996 holotype ♂
38. Underside of *D. bobaga homeyo* MASTRIGT, 1996 holotype ♂
39. Upperside of *D. bobaga homeyo* MASTRIGT, 1996 ♀
40. Underside of *D. bobaga homeyo* MASTRIGT, 1996 ♀
41. Upperside of *D. bobaga homeyo* MASTRIGT, 1996 ♂ ab.
42. Underside of *D. bobaga homeyo* MASTRIGT, 1996 ♂ ab.
43. Upperside of *D. sigit* MASTRIGT, 1990 holotype ♂
44. Underside of *D. sigit* MASTRIGT, 1990 holotype ♂
45. Upperside of *D. sigit* MASTRIGT, 1990 ♀
46. Underside of *D. sigit* MASTRIGT, 1990 ♀
47. Upperside of *D. walshae walshae* ROEPKE, 1955 holotype ♂
48. Underside of *D. walshae walshae* ROEPKE, 1955 holotype ♂
49. Upperside of *D. walshae walshae* ROEPKE, 1955 paratype ♀
50. Underside of *D. walshae walshae* ROEPKE, 1955 paratype ♀
51. Upperside of *D. walshae ilu* subspec. nov. holotype ♂
52. Underside of *D. walshae ilu* subspec. nov. holotype ♂
53. Upperside of *D. walshae ilu* subspec. nov. paratype ♀
54. Underside of *D. walshae ilu* subspec. nov. paratype ♀

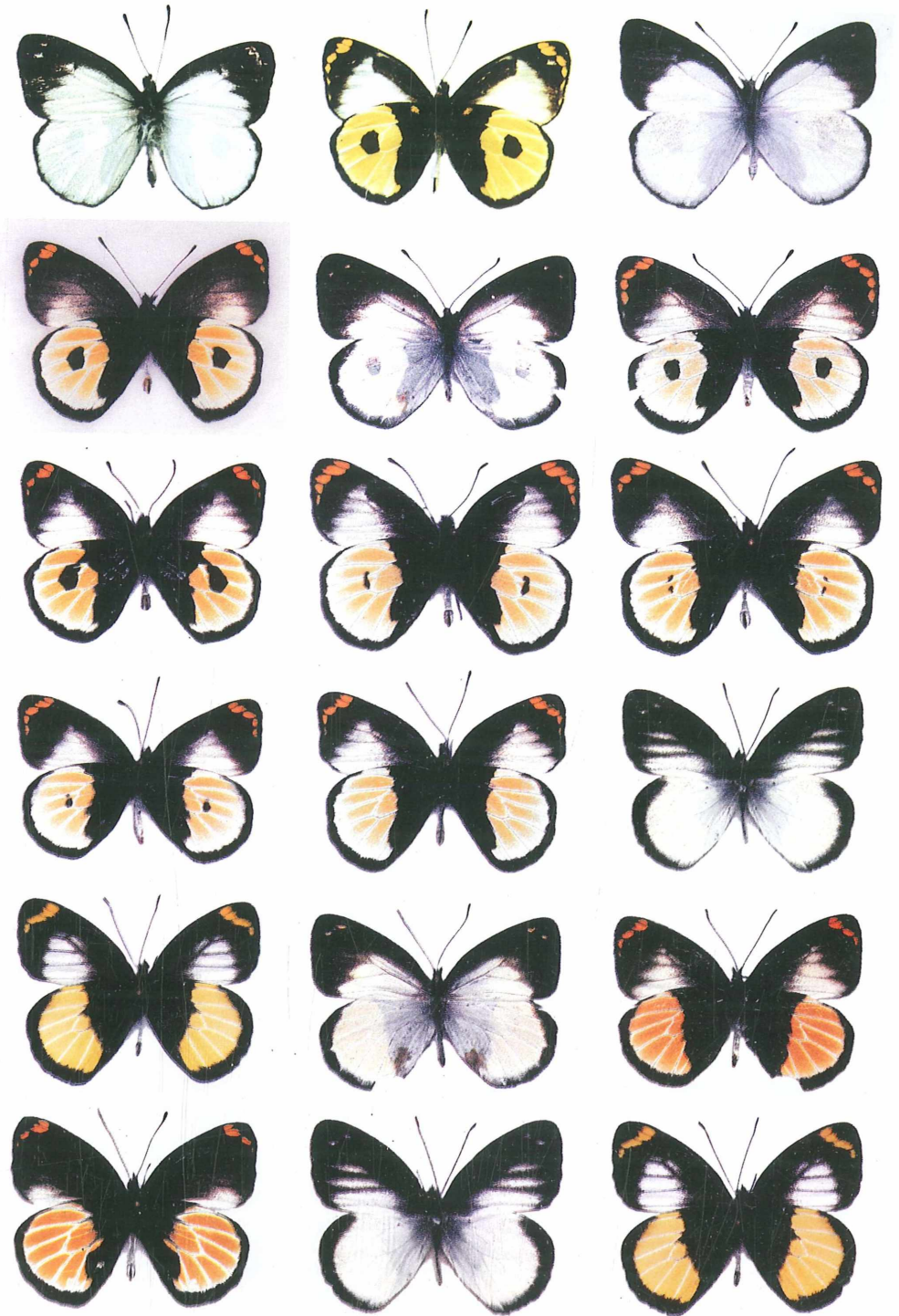
37	38	39
40	41	42
43	44	45
46	47	48
49	50	51
52	53	54



## Colour plate IV (figs 55–72):

55. Upperside of *D. walshae ilu* subsp. nov. ♂ ab.
56. Underside of *D. walshae ilu* subsp. nov. ♂ ab.
57. Upperside of *D. walshae sanaeae* SAKUMA, 1999 comb. nov. ♂
58. Underside of *D. walshae sanaeae* SAKUMA, 1999 comb. nov. ♂
59. Upperside of *D. walshae sanaeae* SAKUMA, 1999 comb. nov. ♀
60. Underside of *D. walshae sanaeae* SAKUMA, 1999 comb. nov. ♀
61. Underside of *D. walshae sanaeae* SAKUMA, 1999 comb. nov. ♂ form
62. Underside of *D. walshae sanaeae* SAKUMA, 1999 comb. nov. ♂ form
63. Underside of *D. walshae sanaeae* SAKUMA, 1999 comb. nov. ♂ form
64. Underside of *D. walshae sanaeae* SAKUMA, 1999 comb. nov. ♂ form
65. Underside of *D. walshae sanaeae* SAKUMA, 1999 comb. nov. ♂ form (as holotype)
66. Upperside of *D. hemianops* GERRITS & MASTRIGT, [1993] holotype ♂
67. Underside of *D. hemianops* GERRITS & MASTRIGT, [1993] holotype ♂
68. Upperside of *D. hemianops* GERRITS & MASTRIGT, [1993] paratype ♀
69. Underside of *D. hemianops* GERRITS & MASTRIGT, [1993] paratype ♀
70. Underside of *D. hemianops* GERRITS & MASTRIGT, [1993] ab.
71. Upperside of *D. fioretti* MASTRIGT, 1996 holotype ♂
72. Underside of *D. fioretti* MASTRIGT, 1996 holotype ♂

55	56	57
58	59	60
61	62	63
64	65	66
67	68	59
70	71	72



## Colour plate V (figs 73–90):

73. Upperside of *D. fioretti* MASTRIGT, 1996 paratype ♀
74. Underside of *D. fioretti* MASTRIGT, 1996 paratype ♀
75. Upperside of *D. catocausta catocausta* JORDAN, [1912] lectotype ♂
76. Underside of *D. catocausta catocausta* JORDAN, [1912] lectotype ♂
77. Upperside of *D. catocausta catocausta* JORDAN, [1912] paralectotype ♀
78. Underside of *D. catocausta catocausta* JORDAN, [1912] paralectotype ♀
79. Upperside of *D. catocausta nigerrima* ROEPKE, 1955 holotype ♂
80. Underside of *D. catocausta nigerrima* ROEPKE, 1955 holotype ♂
81. Underside of *D. catocausta catocausta* JORDAN, 1912 ab.
82. Upperside of *D. catocausta eefi* MASTRIGT, 1990 holotype ♂
83. Underside of *D. catocausta eefi* MASTRIGT, 1990 holotype ♂
84. Upperside of *D. catocausta eefi* MASTRIGT, 1990 ♀
85. Underside of *D. catocausta eefi* MASTRIGT, 1990 ♀
86. Upperside of *D. sawyeri* spec. nov. holotype ♂
87. Underside of *D. sawyeri* spec. nov. holotype ♂
88. Upperside of *D. mira mira* ROTHSCCHILD, 1904 lectotype ♂
89. Underside of *D. mira mira* ROTHSCCHILD, 1904 lectotype ♂
90. Upperside of *D. mira mira* ROTHSCCHILD, 1904 paralectotype ♀

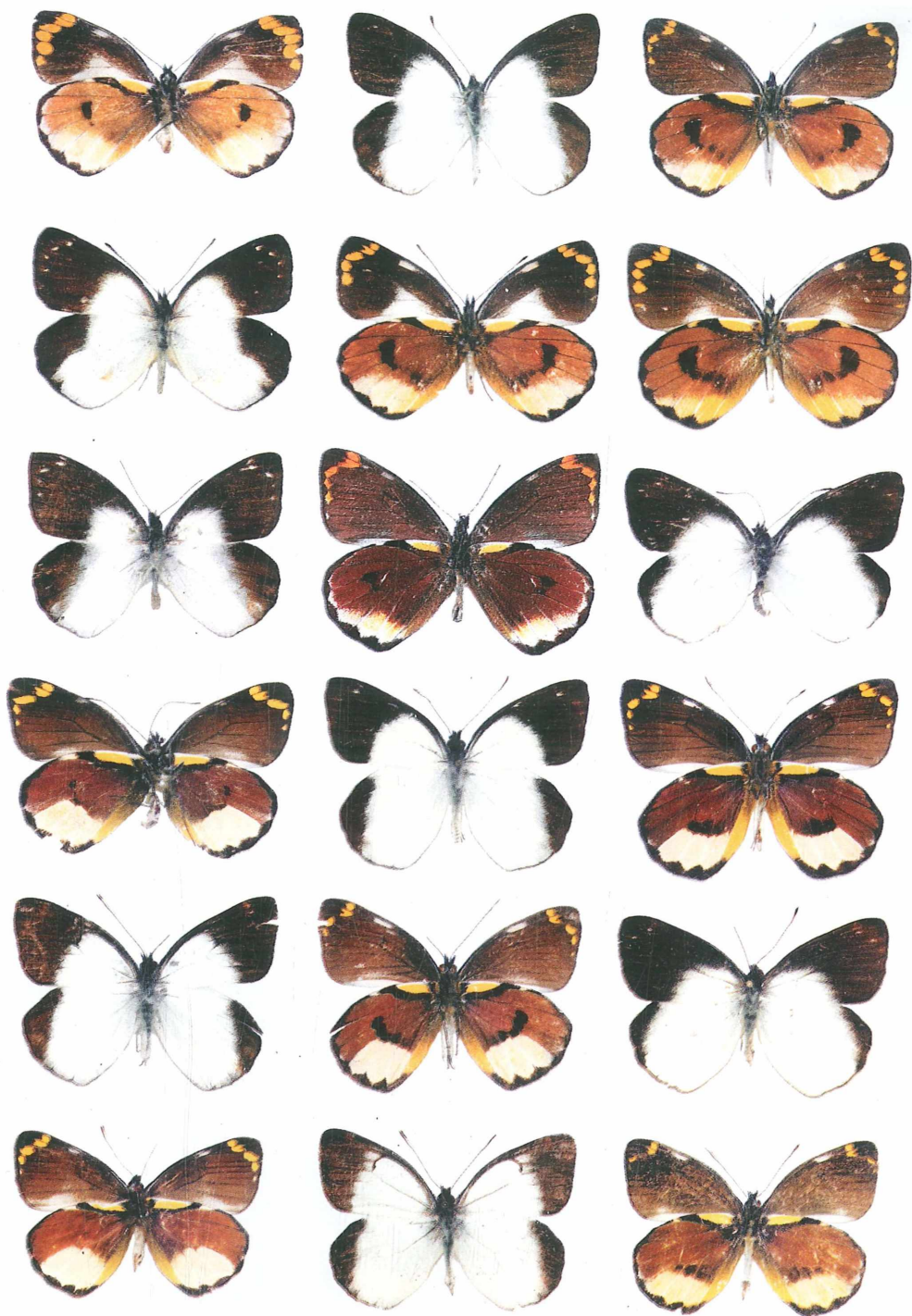
73	74	75
76	77	78
79	80	81
82	83	84
85	86	87
88	89	90



## Colour plate VI (figs 91–108):

91. Underside of *D. mira mira* ROTHSCILD, 1904 paralectotype ♀
92. Upperside of *D. mira excelsa* JORDAN, 1930 lectotype ♂
93. Underside of *D. mira excelsa* JORDAN, 1930 lectotype ♂
94. Upperside of *D. mira excelsa* JORDAN, 1930 paralectotype ♀
95. Underside of *D. mira excelsa* JORDAN, 1930 paralectotype ♀
96. Underside of *D. mira excelsa* JORDAN, 1930 paratype ♂
97. Upperside of *D. mira reversa* ROTHSCILD, 1925 lectotype ♂
98. Underside of *D. mira reversa* ROTHSCILD, 1925 lectotype ♂
99. Upperside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. paratype ♂
100. Underside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. paratype ♂
101. Upperside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. paratype ♂ variety
102. Underside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. paratype ♂ variety
103. Upperside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. paratype ♂ variety
104. Underside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. paratype ♂ variety
105. Upperside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. paratype ♂ variety
106. Underside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. paratype ♂ variety
107. Underside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. ♂ variety
108. Underside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. ♂ variety

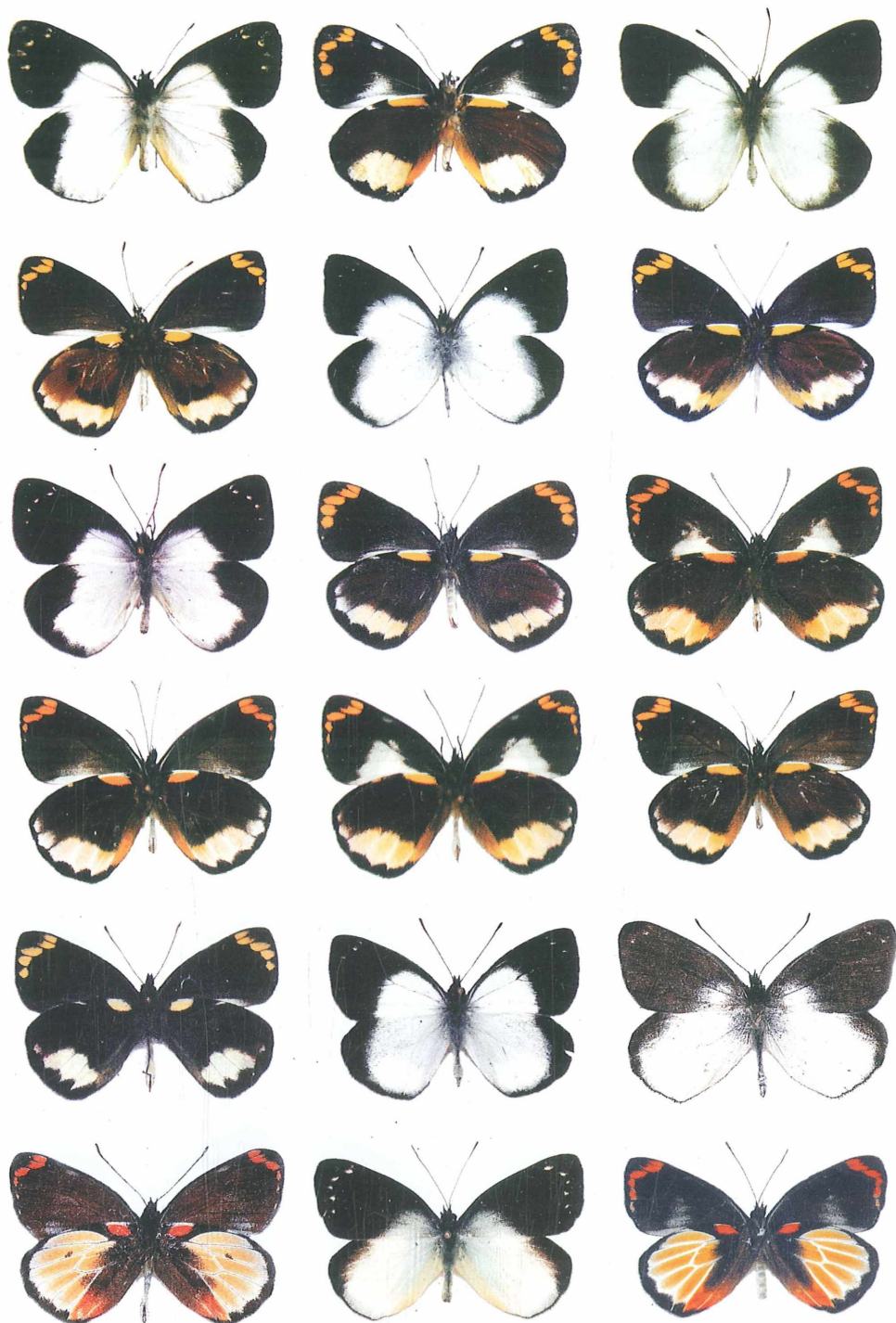
91	92	93
94	95	96
97	98	99
100	101	102
103	104	105
106	107	108



## Colour plate VII (figs 109–126):

109. Upperside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. ♀  
 110. Underside of *D. roepkei roepkei* SANFORD & BENNETT, 1955 stat. nov. ♀  
 111. Upperside of *D. roepkei cieko* ARIMA, 1996 comb. nov. paratype ♂  
 112. Upperside of *D. roepkei cieko* ARIMA, 1996 comb. nov. paratype ♂  
 113. Upperside of *D. roepkei cieko* ARIMA, 1996 comb. nov. (labeled as *D. mira reissingeri* MASTRIGT, 1996 holotype ♂)  
 114. Underside of *D. roepkei cieko* ARIMA, 1996 comb. nov. (labeled as *D. mira reissingeri* MASTRIGT, 1996 holotype ♂)  
 115. Upperside of *D. roepkei cieko* ARIMA, 1996 comb. nov. (labeled as *D. mira reissingeri* MASTRIGT, 1996 paratype ♂)  
 116. Underside of *D. roepkei cieko* ARIMA, 1996 comb. nov. (labeled as *D. mira reissingeri* MASTRIGT, 1996 holotype ♂)  
 117. Underside of *D. roepkei cieko* ARIMA, 1996 comb. nov. ♂ form A  
 118. Underside of *D. roepkei cieko* ARIMA, 1996 comb. nov. ♂ form B  
 119. Underside of *D. roepkei cieko* ARIMA, 1996 comb. nov. ♂ form C  
 120. Underside of *D. roepkei cieko* ARIMA, 1996 comb. nov. ♂ form D  
 121. Underside of *D. roepkei cieko* ARIMA, 1996 comb. nov. ♂ ab.  
 122. Underside of *D. roepkei cieko* ARIMA, 1996 comb. nov. ♂ ab.  
 123. Upperside of *D. inexpectata* ROTHSCHILD, 1915 holotype ♂  
 124. Underside of *D. inexpectata* ROTHSCHILD, 1915 holotype ♂  
 125. Upperside of *D. inexpectata* ROTHSCHILD, 1915 ♀  
 126. Underside of *D. inexpectata* ROTHSCHILD, 1915 ♀

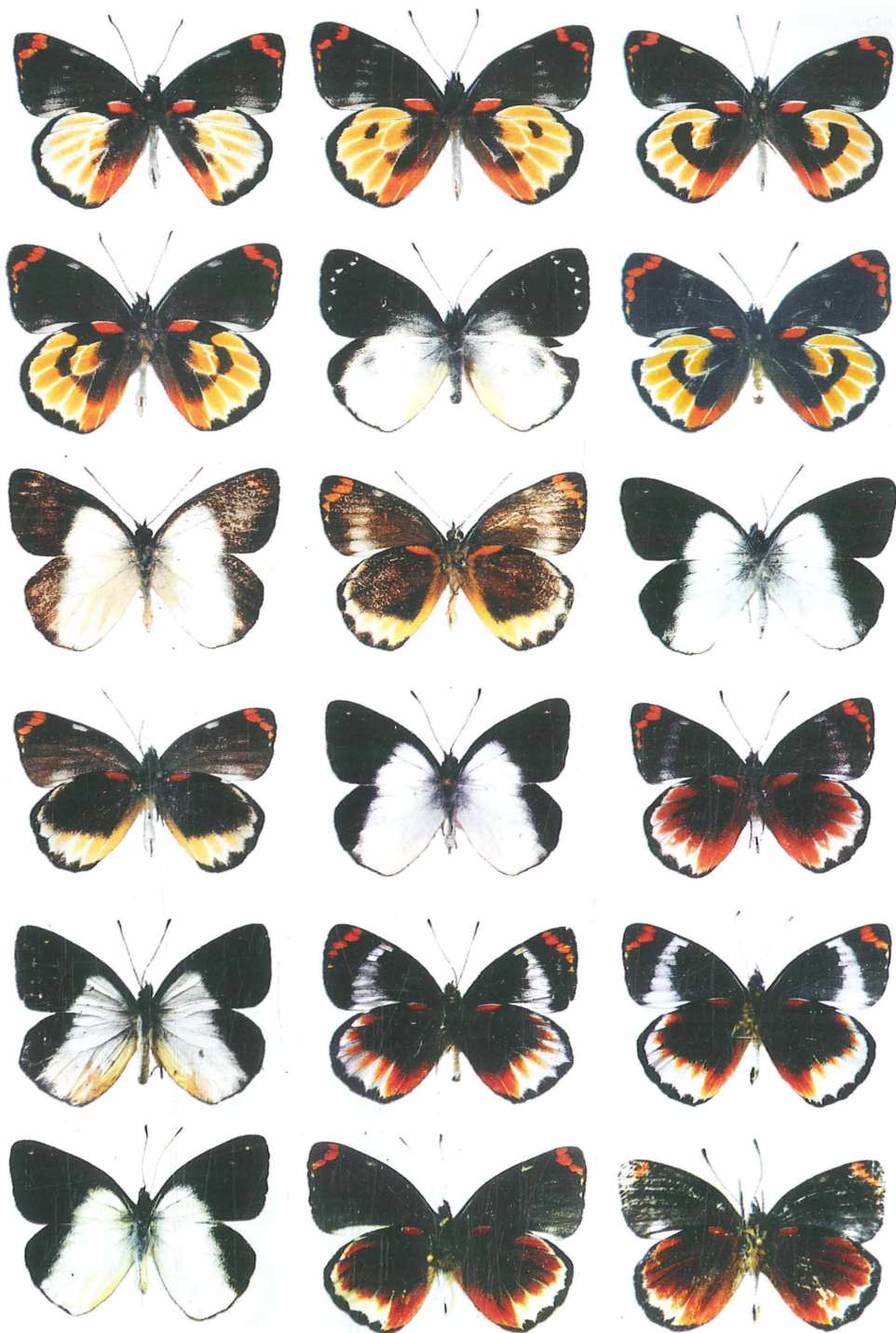
109	110	111
112	113	114
115	116	117
118	119	120
121	122	123
124	125	126



## Colour plate VIII (figs 127–144):

127. Underside of *D. inexpectata* ROTHSCILD, 1915 ♂ form
128. Underside of *D. inexpectata* ROTHSCILD, 1915 ♂ form
129. Underside of *D. inexpectata* ROTHSCILD, 1915 ♂ form
130. Underside of *D. inexpectata* ROTHSCILD, 1915 ♂ form
131. Upperside of *D. inexpectata* ROTHSCILD, 1915 ♀ form
132. Underside of *D. inexpectata* ROTHSCILD, 1915 ♀ form
133. Upperside of *D. hiemalis hiemalis* ROEPKE, 1955 stat. nov. holotype ♂
134. Underside of *D. hiemalis hiemalis* ROEPKE, 1955 stat. nov. holotype ♂
135. Upperside of *D. hiemalis hiemalis* ROEPKE, 1955 f. *hitam* ♂
136. Underside of *D. hiemalis hiemalis* ROEPKE, 1955 f. *hitam* ♂
137. Upperside of *D. hiemalis flabella* MASTRIGT, 1996 comb. nov. holotype ♂
138. Underside of *D. hiemalis flabella* MASTRIGT, 1996 comb. nov. holotype ♂
139. Upperside of *D. hiemalis flabella* MASTRIGT, 1996 comb. nov. paratype ♀
140. Underside of *D. hiemalis flabella* MASTRIGT, 1996 comb. nov. paratype ♀
141. Underside of *D. hiemalis flabella* MASTRIGT, 1996 ♂ form
142. Upperside of *D. hiemalis labbei* subspec. nov. holotype ♂
143. Underside of *D. hiemalis labbei* subspec. nov. holotype ♂
144. Underside of *D. hiemalis labbei* subspec. nov. paratype ♂

127	128	129
130	131	132
133	134	135
136	137	138
139	140	141
142	143	144



## Colour plate IX (figs 145–162):

145. Upperside of *D. hiemalis nemangkawi* subspec. nov. holotype ♂  
 146. Underside of *D. hiemalis nemangkawi* subspec. nov. holotype ♂  
 147. Upperside of *D. autumnalis autumnalis* ROEPKE, 1955 stat. nov. holotype ♂  
 148. Underside of *D. autumnalis autumnalis* ROEPKE, 1955 stat. nov. holotype ♂  
 149. Upperside of *D. autumnalis autumnalis* ROEPKE, 1955 stat. nov. paratype ♀  
 150. Underside of *D. autumnalis autumnalis* ROEPKE, 1955 stat. nov. paratype ♀  
 151. Underside of *D. autumnalis autumnalis* ROEPKE, 1955 stat. nov. ♂ form  
 152. Underside of *D. autumnalis autumnalis* ROEPKE, 1955 stat. nov. ♂ form  
 153. Underside of *D. autumnalis autumnalis* ROEPKE, 1955 stat. nov. ♂ form  
 154. Upperside of *D. autumnalis hiberna* subspec. nov. holotype ♂  
 155. Underside of *D. autumnalis hiberna* subspec. nov. holotype ♂  
 156. Upperside of *D. autumnalis hiberna* subspec. nov. paratype ♀  
 157. Underside of *D. autumnalis hiberna* subspec. nov. paratype ♀  
 158. Underside of *D. autumnalis hiberna* subspec. nov. paratype ♀ form  
 159. Underside of *D. autumnalis hiberna* subspec. nov. paratype ♂ form  
 160. Underside of *D. autumnalis hiberna* subspec. nov. paratype ♂ form  
 161. Upperside of *D. autumnalis michiae* NAKANO, 1994 stat. nov. holotype ♂  
 162. Underside of *D. autumnalis michiae* NAKANO, 1994 stat. nov. holotype ♂

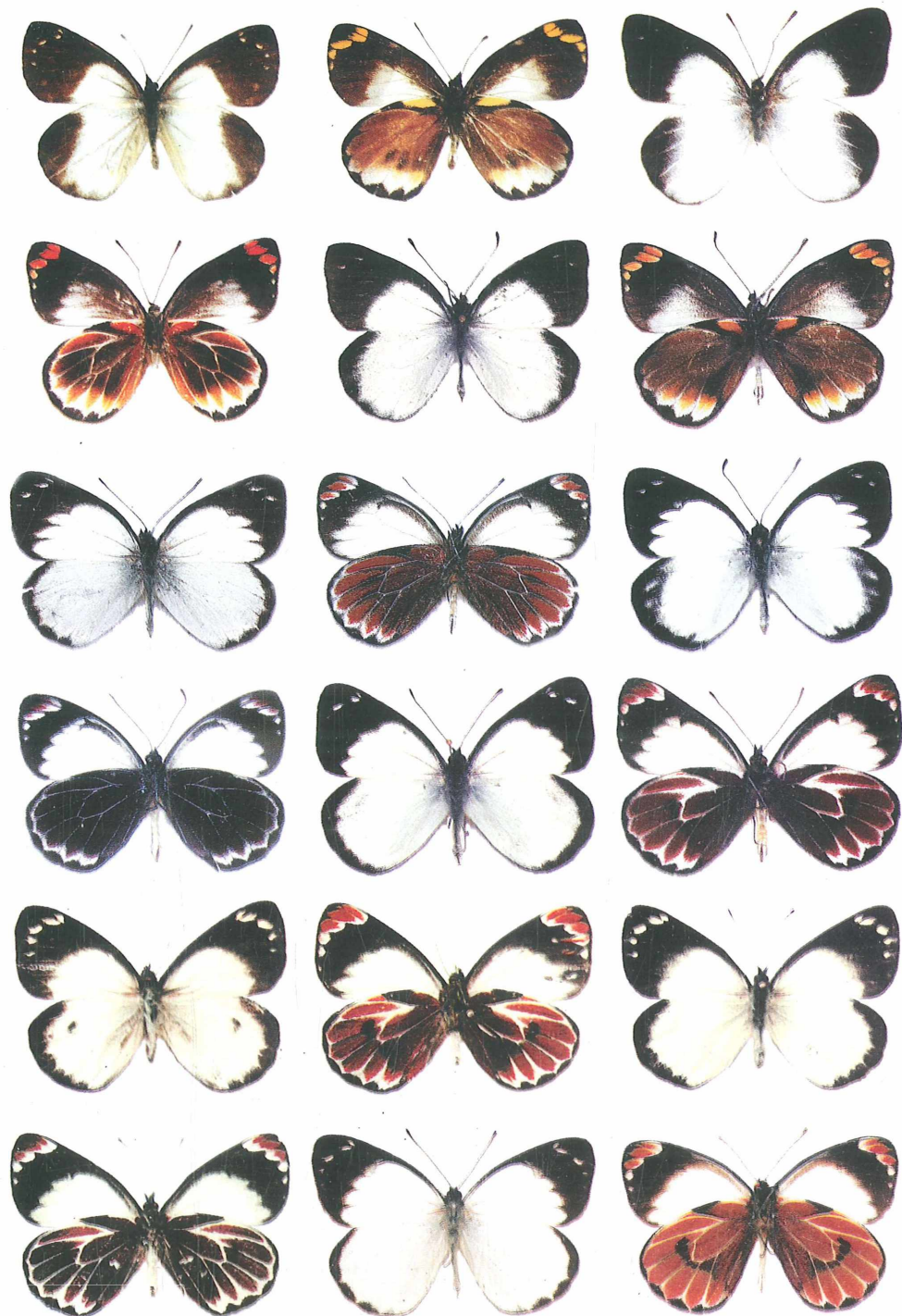
145	146	147
149	149	150
151	152	153
154	155	156
157	158	159
160	161	162



## Colour plate X (figs 163–180):

163. (probably) Upperside of *D. autumnalis michiae* NAKANO, 1994 stat. nov. ♀  
 164. (probably) Underside of *D. autumnalis michiae* NAKANO, 1994 stat. nov. ♀  
 165. Upperside of *D. nakanokeikoe nakanokeikoe* YAGISHITA, 1993 holotype ♂  
 166. Underside of *D. nakanokeikoe nakanokeikoe* YAGISHITA, 1993 holotype ♂  
 167. Upperside of *D. nakanokeikoe jali* MASTRIGT, 1996 holotype ♂  
 168. Underside of *D. nakanokeikoe jali* MASTRIGT, 1996 holotype ♂  
 169. Upperside of *D. klossi klossi* ROTHSCHILD, 1915 holotype ♂  
 170. Underside of *D. klossi klossi* ROTHSCHILD, 1915 holotype ♂  
 171. Upperside of *D. klossi klossi* ROTHSCHILD, 1915 ♂ frequent form  
 172. Underside of *D. klossi klossi* ROTHSCHILD, 1915 ♂ frequent form  
 173. Upperside of *D. klossi gome* subspec. nov. holotype ♂  
 174. Underside of *D. klossi gome* subspec. nov. holotype ♂  
 175. Upperside of *D. klossi gome* subspec. nov. paratype ♀  
 176. Underside of *D. klossi gome* subspec. nov. paratype ♀  
 177. Upperside of *D. klossi gome* subspec. nov. paratype f-♀ *deluna*  
 178. Underside of *D. klossi gome* subspec. nov. paratype f-♀ *deluna*  
 179. Upperside of *D. klossi chrysanthemum* ROEPKE, 1955 holotype ♂  
 180. Underside of *D. klossi chrysanthemum* ROEPKE, 1955 holotype ♂

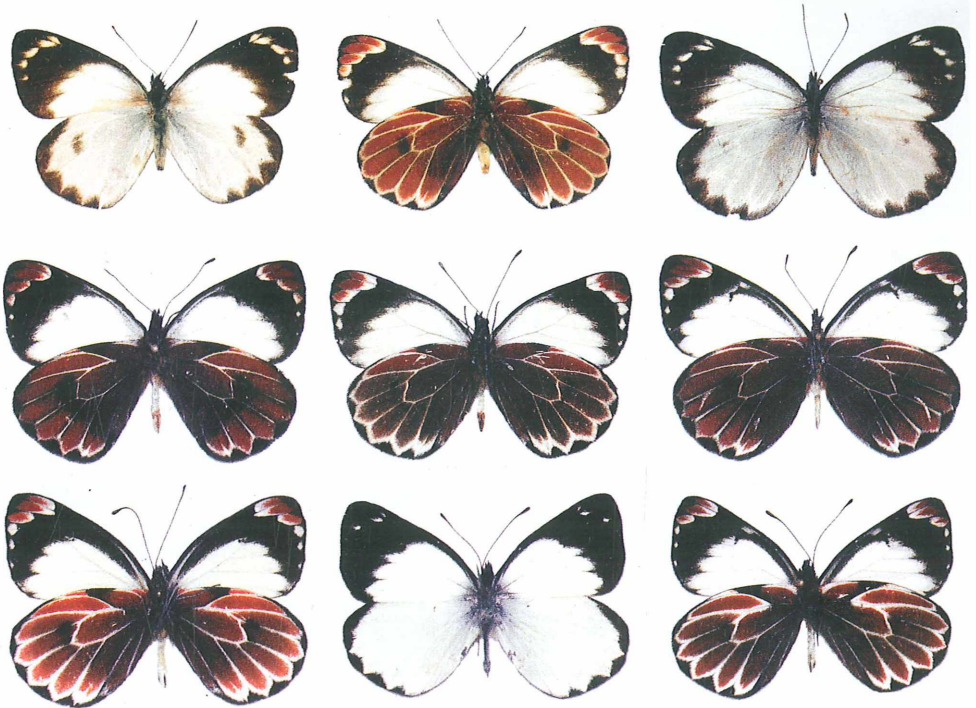
163	164	165
166	167	168
169	170	171
172	173	174
175	176	177
178	179	180



Colour plate XI (figs 181–189):

181. Upperside of *D. klossi chrysanthemum* ROEPKE, 1955 paratype ♀  
 182. Upperside of *D. klossi chrysanthemum* ROEPKE, 1955 f-♀ *deluna*  
 183. Underside of *D. klossi chrysanthemum* ROEPKE, 1955 form  
 184. Underside of *D. klossi chrysanthemum* ROEPKE, 1955 form  
 185. Underside of *D. klossi chrysanthemum* ROEPKE, 1955 form  
 186. Underside of *D. klossi chrysanthemum* ROEPKE, 1955 form  
 187. Upperside of *D. klossi okse* subsp. nov. holotype ♂  
 188. Underside of *D. klossi okse* subsp. nov. holotype ♂  
 189. Underside of *D. klossi chrysanthemum* ROEPKE, 1955 paratype ♀

181	182	183
184	185	186
187	188	189



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