Notes on *Papilio albinus* Wallace, 1865 (Lepidoptera: Papilionidae) from Papua, Indonesia including descriptions of new subspecies

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Abstract: Three new subspecies of *Papilio albinus* Wallace, 1865 are described from Papua, Indonesia, with the status of the taxon *Papilio albinus* var. *leucophanes* Grose-Smith, 1894 revised as being representative of a distinctive subspecies of *Papilio albinus* Wallace, 1865. Details pertaining to the general ecology and taxonomy of the species are also discussed.

Rangkuman: Tiga subspesies baru *Papilio albinus* Wallace, 1865, dipertelakan dari Papua, Indonesia, dan status *Papilio albinus* var. *leucophanes* Grose-Smith, 1894 direvisi menjadi suatu subspesies tersendiri dari *Papilio albinus* Wallace, 1865. Karangan ini juga membahas rincian menyangkut ekologi umum dan taksonomi spesies tersebut.

Key-words: Misool Island, *Papilio albinus lesches*, *Papilio fuscus*, *Papilio heringi*, Yahukimo, Yapen Island.

Introduction

Papilio albinus Wallace, 1865 was originally described from Dutch New Guinea, the former territory now constituted of the modern Papua and West Papua provinces of Indonesia. This insect also occurs upon several of the Papuan satellite islands such as Batanta, Salawati, Yapen and Waigeo, with its range on the island of New Guinea stretching from Sorong on the west coast of the Doberai Peninsula and eastward to the environs of Port Moresby in the adjacent country of Papua New Guinea. *P. albinus* belongs to a grouping within the Papilionidae that includes *Papilio fuscus* Goeze, 1779 and the Moluccan species *Papilio heringi* Niepelt, 1924.

Within the island of New Guinea and upon certain of its surrounding islands, *P. albinus* occurs sympatrically with *P. fuscus*; however, the former species appears be less frequently encountered in nature. Although *P. albinus* flies at low altitudes, it also inhabits hill-country and more mountainous environments. The species has been confirmed as completing its larval development upon several species of Rutaceae, including *Zanthoxylum ovalifolium* in Papua New Guinea (Parsons 1999).

The nominate subspecies of *P. albinus* (Figs 1-2) is widely distributed from sea level to at least 1,400 metres elevation within the Doberai (Vogelkop) Peninsula; the same population also occurs within the Bomberai and Onin Peninsulas, then eastward to Avona, in the vicinity of Etna Bay, and thence to the Kobowre Range (formerly the Weyland Mountains).

Rothschild (1895) synonymised *P. albinus* var. *sekarensis* Honrath, 1885 (Figs 3-4) with *P. a. albinus*. Examples of *P. albinus* from the Kobowre Mountains exhibit a consistent differentiation in wing shape, which is slightly more rounded in both pairs of wings; the white spotting upon the verso surfaces of the hindwings is also somewhat reduced in the latter population when compared to specimens which occur further westward. Males of the nominate subspecies gathered from the Doberai Peninsula exhibit considerable disparity with respect to the patterning of the verso surfaces of the hindwings, with a particular character being the postmedian white patches which are variable in both configuration and extent. An orange-brown row of submarginal lunules is usually present in varying intensity upon the verso hindwing surfaces; some examples bear a virtually complete row of several strongly marked lunules, whilst a minority of individuals bear only traces of the said markings, or rarely none at all. Examples from southern costal localities such as Fak-Fak, situated on the Onin Peninsula, and Avona, near Etna Bay, appear to present on average the most intense and complete markings in the latter regard.

Papilio albinus lesches Godman & Salvin, 1880 (Fig. 5) occurs in the Port Moresby region of the neighbouring country of Papua New Guinea; *P a. lesches* is clearly distinctive from *P. a. albinus*, with a particularly unique character constituted by the presence of a subapical white patch of colour upon the recto forewing surfaces of both sexes.

Upon examining numerous specimens of *P. albinus* held within both public and private collections and collating the data obtained, the author has reached the positive conclusion that populations from the Jayawijaya Mountains of Papua and Yapen Island, respectively, constitute new subspecies of this taxon; these are herein described as *Papilio albinus yahukimo* **subsp. nov** and *Papilio albinus yapenensis* **subsp. nov**.

Whilst engaged in preliminary research pertaining to the development of a comprehensive study of *P. albinus*, the author was able to closely examine the historical series of this butterfly held by the NHM. Among the specimens diagnosed was a single male specimen with its origin indicated as the Papuan island of Mysol

(Misool). The singularity of this specimen was duly noted, and details of its data retained for future reference. Upon further review of the said specimen, and based upon the uniqueness of some of its characters, the author has elected to describe it herein as being representative of a new subspecies, *Papilio albinus misoolana* **ssp. nov.**

Finally, upon consulting material of *P. albinus* ab. *leucophanes* Grose-Smith, 1892 contained within private collections, in addition to historical specimens held by the NHM, the author believes that the consistency of the specimens examined warrants the status of the said taxon to be elevated to that of a valid subspecies; this new taxon is described herein as *Papilio albinus* ssp. *leucophanes* **stat. nov.**

Depositories

KSP - Koleksi Serangga Papua (Collection of Papuan Insects), Jayapura,Indonesia.
MG - Private collection author, Tettenhall, United Kingdom
NHM - National History Museum - former British Museum of Natural History (BMNH), London, United Kingdom.

Descriptions of three new subspecies

***Papilio albinus misoolana* subsp. nov.**
(Figs 6-7)

Type material: Holotype ♂, Mysol (Misool) Island (original label of faded white paper, stating "Mysol - Wallace", hand-written in black ink) (Fig. 7). The specimen is ex coll. Grose-Smith, and was presented to the NHM by J.J. Joicey in 1931. It is most probable that this specimen was collected on Mysol in 1860 by Charles Allen, an assistant of Alfred Russel Wallace.

Diagnosis: *Papilio albinus misoolana* is clearly distinctive from other described subspecies of *P. albinus*; it exhibits a considerably increased element of white colouration upon the recto surfaces of the hindwings, with the said colouration extending well inside the postmedian area of the hindwing cells and costal areas. The white patches upon the verso of the hindwings are reduced in size, with the subapical scaling of the undersides of the forewings being greyish-white instead of brownish-grey compared to the nominate subspecies of the same insect. *P. a. misoolana* also lacks the white intercostal dashes along the outer margins of the recto surfaces of the forewings, a feature that is present in all other recorded subspecies *P. albinus.*

Description: Male - Length of forewing 57 mm. Head, thorax and abdomen are jet black; the thorax is lightly scaled with dark grey hairs on each segment ventrally, with the abdomen possessing a line of clear white scaling along its length ventrally below the spiracles. The antennae are black; all legs that remain attached to the specimen are black and edged with whitish scaling. Recto wing surfaces are jet black in ground colour, with a dark grey glossy tint; the outer margins of the forewings lack the dashes of white present in other subspecies of the same butterfly. A large patch of bright white colouration is present within the central portion of the recto surfaces of the hindwings; the white colouration also fills approximately one quarter of the median areas of the hindwing cells. The white hindwing patches are dusted with black scales along the median edges, and are clearly defined with respect to the toothed patterning that runs adjacent to the submarginal areas of the hindwings. The remaining original hindwing tail is 1.2 cm in length, the other tail having been attached as a subsequent repair; the remaining tail is of medium thickness for the species, and relatively spatulate at the tip. A very light dusting of brownish-grey scaling is present within the subapical areas of the forewings, extending from the tip each wing to S4; four lines of brownish scales extend acrossthe forewing cells between the basal and discoidal areas.

The verso surfaces of both sets of wings are jet black, and slightly toned with a glossy greyish-blue tint; the outer margins are edged with small bright white dashes within the intercostal spaces on both pairs of wings. A light dusting of greyish-white scaling is present within the subapical areas of the forewings, extending from the tip each wing and downward to S1B. Patches of bright white are present in hindwing spaces S7 to S1B. A light orange marking is present subtornally on each hindwing in S1A, with a smaller trace of the same colour present in S1B; traces of light orange are present as small patches submarginally in S7 to S4 inclusively.

Distribution: Misool (Mysol), Raja Ampat Regency, Papua Barat Province, Indonesia.

Etymology: The subspecific name is derived from Misool (actual Indonesian spelling), in the past often mentioned as Mysol or Mysool.

***Papilio albinus yahukimo* subsp. nov.**
(Figs 8-11)

Type material: Holotype ♂, Jayawijaya Mountains, Yahukimo Regency (1550-1700 m) Papua Province, Indonesia, xii-2008, MG. Paratypes (4 ♂♂ + 2 ♀♀): 1 ♂, same location as the holotype, x-2011, MG; 3 ♂♂, same location as the holotype, ii-2012, MG; 1 ♀,

Jayawijaya Mountains, Yahukimo Regency (1550-1700 m.), Papua Province, Indonesia, xi-2010, MG, 1 ♀, Eilanden River, S.E Dutch New Guinea, Dec.1910, leg. A. S. Meek, NHM.

Diagnosis: *Papilio albinus yahukimo* is clearly separable from both *P. a. albinus* and *P. a. lesches*. Both sexes possess a wingspan which is notably larger than that of other subspecies; the shape of both sets of wings is rounder and broader in both sexes. The white hindwing colouration of the males of *P. a. yahukimo* is modified, often extending strongly into the costal area of the hindwings; the toothed submarginal edges of the white areas adjacent to the hindwing margins are set farther back from the wing margins, creating a larger expanse of black than in the nominate subspecies. The hindwing tails of both sexes are reduced in size when compared to other populations of *P. albinus*, being straight and lacking spatulate tips. With reference to the verso wing surfaces of the male, *P. a. yahukimo* is poorly marked and extremely dark in appearance, particularly when compared to the nominate subspecies; the white verso hindwing spotting is extremely reduced in both sexes, a feature which is further accentuated by the increased size and roundness of the wings. The patterning of the female is appreciably different to that of other populations; it shares the male character of the white hindwing patches being set further inward from the hindwing margins, and also the reduced size and extent of white spotting upon the verso hindwing surfaces.

Description: Male - Length of forewing 63 mm. Head, thorax and abdomen jet black; thorax lightly scaled with dark grey hairs on each segment ventrally, with the abdomen possessing a line of clear white scaling along its length ventrally below the spiracles. The antennae are black; all legs are black and edged with whitish scaling. Recto wing surfaces are jet black in ground colour, and matt in texture; the wing margins are edged with dashes of bright white in the spaces between the veins along of both pairs of wings. A large patch of clear white colouration fills the central portion of the recto surfaces of the hindwings, extending slightly into the distal end of the hindwing cells; the white colouration also clearly extends along the costal margin of the hindwings to the subapical area. The white patterning is dusted with black scales along the median edges, and more clearly defined in the toothed patterning which runs adjacent to the submarginal areas of the hindwings. Each hindwing possesses a tail of 8 mm length; the said tails are straight and unspatulate. A light dusting of greyish-white scaling is present within the subapical areas of the forewings, extending from the tip of each wing to S3; four lines of brownish scales extend across the forewing cells between the basal and discoidal areas.

The verso surfaces of both sets of wings are flat jet black; the wing margins are edged with bright white dashes within the spaces along the outer margins of both pairs of wings. A clearly demarcated dusting of greyish-white scaling is present within the subapical areas of the forewings, extending from the tip each wing to S3, but more intense and defined than on the recto surfaces of the same wings. Three small patches of clear white are present on the hindwings in spaces S6 to S4 inclusive, and a hint of another patch in S7; small patches of greyish-blue scales are present in S6 to S2. A small patch of brownish orange colouration is evident in the tornal area of S1a of each hindwing, with a hint of the same colour in S1b.

Female - Length of forewing 65 mm. Head, thorax and abdomen dark brownish-black; the thorax is lightly scaled with dark grey hairs on each segment ventrally, with the abdomen possessing a line of white scaling along its length below the spiracles. The antennae are dark chocolate brown; all legs are dark brown and edged with creamy white scales. Recto wing surfaces are dark brown in ground colour, and slightly glossy; the wing margins are edged with creamy-white dashes in the spaces between the veins along the outer margins of both pairs of wings. A large patch of rich creamy-white colouration fills the central portion of the recto surfaces of the hindwings, extending slightly into the distal end of the hindwing. The creamy-white areas are dusted with brownish scales along the median edges, and more clearly defined in the toothed patterning which runs adjacent to the submarginal areas of the hindwings. Each hindwing possesses a tail of 1.7 cm in length; the tails are quite straight in form, and moderately spatulate towards the tips. A light dusting of brownish-grey scaling is present within the subapical areas of the forewings, extending from the tip of each wing to S1B inwards as far as the postmedian area; four lines of brownish scales extend across the forewing cells between the basal and discoidal areas.

The verso surfaces of both sets of wings are dark blackish-brown; the ground colour of the hindwings is virtually black; the wing margins are edged with bright white in the spaces between the veins along the outer margins of both pairs of wings. A concentrated dusting of brownish-grey scaling is present within the subapical areas of the forewings, extending downwards from the tip each wing, and gradually decreasing in extent to S2; this scaling is more concentrated in extent than on the recto surfaces of the same wings and is both lighter and more extensive than corresponding scaling on the male. Patches of bright white colouration are present in spaces S7 to S1B of both hindwings, but do not intrude into the hindwing cell; the white patches are crisply defined adjacent to the wing margins, but are dusted with dark brown scaling within the median area; a dusting of bright orange-brown scales is present upon the white patches in S1B and S2. Within the subtornal area of the hindwings, patches of greyish-blue scaling are

present within spaces S1B to S3. A large orange submarginal lunule is present within each of the submarginal spaces of the hindwing undersides, in addition to the subtornal area.

Distribution: *P. a. yahukimo* appears to be encountered most frequently at medium to higher altitudes within the Jayawijaya mountain range. A female specimen of this species held within the NHM collection conforms exactly to the paratype female of the same butterfly contained within the author's collection; the former specimen was captured in December of 1910 by A.S. Meek on the Eilanden River, and has also been designated as a paratype. According to records of Meek's movements within the said area, it is probable that the latter specimen was recorded from the lowlands of what are now the modern Asmat and Yahukimo Regencies of Papua Province.

Etymology: *Papilio albinus yahukimo* is named after the region from which the type specimens were collected, Yahukimo Regency, Papua Province.

***Papilio albinus yapenensis* subsp. nov.**
(Figs 12-14)

Type material: Holotype ♂, Yapen Island, Serui, (0-30 m) Papua Province, Indonesia, 09-17-v-1997, MG; Paratypes (4 ♂♂ + 1 ♀): 4 ♂♂, same data as the holotype, MG; 1 ♀, Yapen Island, Serui, (0-30 m.) Papua Province, Indonesia, 09-v-1997, MG.

Diagnosis: *Papilio albinus yapenensis* is clearly distinctive from the nominate subspecies of the same butterfly, and also *P. a. lesches* and *P. a. yahukimo*. Both sexes of *P. a. yapenensis* lack any trace of the orange submarginal lunules which are present in variable intensity upon the undersides of the hindwings of individuals of both sexes of the nominate subspecies. The patch of white that adorns the central area of the uppersides of the female hindwings of the nominate subspecies is replaced with a richer creamy-white in *P. a. yapenensis*. Additionally, the white markings present upon the underside of the female hindwings in *P. a. yapenensis* are also more extensive than in the nominate subspecies, and extend almost to the wing margins. Both sexes of *P. a. yapenensis* are slightly larger in size than *P. a. albinus*, particularly the female.

Description: Male - Length of forewing 54 mm. Head, thorax and abdomen jet black; the thorax is lightly scaled with dark grey hairs on each segment ventrally, with the abdomen possessing a line of clear white scaling along its length ventrally below the spiracles. The antennae are dark brown; all legs are black and edged with whitish scaling. Recto wing surfaces are jet black in ground colour, and slightly

glossy; the wing margins are edged with dashes of bright white in the spaces between the veins along of both pairs of wings. A large patch of creamy-white colouration fills the central portion of the recto surfaces of the hindwings, extending slightly into the distal end of the hindwing cells. The white areas are dusted with black scales along the median edges, and more clearly defined in the toothed patterning which runs adjacent to the submarginal areas of the hindwings. Each hindwing possesses a tail of 1.3 cm in length; the tails are quite straight in form, and only slightly spatulate at the tips. A light dusting of brownish-grey scaling is present within the subapical areas of the forewings, extending from the tip of each wing to S4; four lines of brownish scales extend across the forewing cells between the basal and discoidal areas.

The verso surfaces of both sets of wings are jet black, and slightly toned with grey; the wing margins are edged with bright white dashes within the spaces between the veins along the outer margins of both pairs of wings. A light dusting of brownish-grey scaling is present within the subapical areas of the forewings, extending from the tip each wing to S4, but more confined in extent than on the recto surfaces of the same wings. Three patches of creamy-white are present in spaces S6 to S4 inclusive, and a hint of another patch in S7; small patches of greyish-blue scales are present in S3 and S2.

Female - Length of forewing 65 mm. Head, thorax and abdomen dark brownish-black; the thorax is lightly scaled with dark grey hairs on each segment ventrally, with the abdomen possessing a line of white scaling along its length below the spiracles. The antennae are dark chocolate brown; all legs are dark brown and edged with creamy white scales. Recto wing surfaces are dark brown in ground colour, and slightly glossy; the wing margins are edged with creamy-white dashes in the spaces between the veins along the outer margins of both pairs of wings. A large patch of rich creamy-white colouration fills the central portion of the recto surfaces of the hindwings, extending slightly into the distal end of the hindwing cells. The creamy-white areas are dusted with brownish scales along the median edges, and more clearly defined in the toothed patterning which runs adjacent to the submarginal areas of the hindwings. Each hindwing possesses a tail of 1.7 cm in length; the tails are quite straight in form, and moderately spatulate towards the tips. A light dusting of brownish-grey scaling is present within the subapical areas of the forewings, extending from the tip of each wing to S1B inwards as far as the postmedian area; four lines of brownish scales extend across the forewing cells between the basal and discoidal areas.

The verso surfaces of both sets of wings are dark blackish-brown; the ground colour of the hindwings is virtually black; the wing margins are edged with bright

white in the spaces between the veins along the outer margins of both pairs of wings. A concentrated dusting of brownish-grey scaling is present within the subapical areas of the forewings, extending downwards from the tip each wing, and gradually decreasing in extent to S2; this scaling is more concentrated in extent than on the recto surfaces of the same wings, and is both lighter and more extensive than corresponding scaling on the male. Patches of bright white colouration are present in spaces S7 to S1B of both hindwings, but do not intrude into the hindwing cell; the white patches are crisply defined adjacent to the wing margins, but are dusted with dark brown scaling within the median area; a dusting of bright orange-brown scales is present upon the white patches in S1B and S2. Within the subtornal area of the hindwings, patches of greyish-blue scaling are present within spaces S1B to S3.

Distribution: Yapen Island, Papua Province, Indonesia.

Etymology: The subspecific name refers to the type locality, Yapen Island, Papua Province.

Some notes on *Papilio albinus leucophanes* Grose-Smith, 1892 stat. nov.

(Figs 15-18)

Taxonomy: Grose Smith (1894) described *Papilio leucophanes* and culminated his description with "One specimen only was, so far as I can ascertain, among Mr Doherty's series of *P. albinus*." Talbot (1895) reviewed this species as *Papilio albinus* ab. *leucophanes* and mentioned that three males and two females were recorded by W. Doherty from September to October of 1892. Jordan (1909-1910) *in* Seitz mentioned *Papilio albinus* ab. *leucophanes*; D'Abrera (1971, 1977, 1990) noted, based upon personal communication with T. Fenner, "that *albinus* occurs as far east as Wewak in New Guinea in lowland forest as well as in the hills." Parsons (1999) quotes Jordan (1909-1910) observing that "in ab. *leucophanes* Grose-Smith, 1894, the HW und. bears only 2 white discal patches."

Type material: Holotype ♂, Humbolt Bay, New Guinea, ix-x-1893, collector W. Doherty, (ex coll. J.J Joicey), NHM; paratype ♂, German New Guinea, Eitape District, Coast Region, 5-600ft, collector J.P. de Verteuil (NHM). **Other material:** (16 ♂♂ + 1 ♀): 1 ♂, Jayapura, Papua Province, Indonesia, ix.2006, MG; 1 ♂, Jayapura, Waena, Bak Air, 30.v.1977, 1 ♂, idem, but 29.v.1983; 2 ♂♂ + 1 ♀, idem, but 5.iv.1985; 1 ♂, idem, but 1.vii.2003; 1 ♂, Sentani, 15.viii.1976; 3 ♂♂, Sentani, kaki Cyclops, 200 m, 19.ii.1995; 1 ♂, Sentani, Pos VII, 7.iii.2006; 5 ♂♂, Lereh, 12-18.ii.2001. All contained in KSP.

Diagnosis: *Papilio albinus leucophanes* **stat. nov.** is clearly distinctive from the nominate subspecies of the same butterfly, being most visually reminiscent of *Papilio albinus yapenensis* Goode, 2012 (see above) which inhabits Yapen Island. The paratype female of *P. a. leucophanes* possesses a strongly marked row of orange submarginal lunules upon the verso surfaces of the hindwings, a character which is totally absent or very faintly evident in females of *P. a. yapenensis*. Given the geographic position of Yapen Island, it is most probable that *P. a. yapenensis* shares a lineage with *P. a. leucophanes*. Examples of *P. a. leucophanes* are also clearly distinctive from *P. a. lesches* Godman & Salvin, 1880, the population of this insect which occurs within the south-eastern hills of Papua New Guinea.

Description: Male - Length of forewing 51-56 mm (av. 53.4 mm). Head, thorax and abdomen dark brownish- black; the thorax is lightly scaled with dark grey hairs on each segment ventrally, with the abdomen possessing white scaling along its length ventrally below the spiracles. The antennae are dark brown; all legs are black and edged with whitish scaling. Ground colour of the recto wing surfaces is jet black, with a brownish tint; the wing margins are edged with dashes of bright white within the intercostal spaces of both pairs of wings. A large patch of clear white colouration fills the central portion of the recto surfaces of the hindwings from S7 to S1B, extending slightly into the median area of the hindwing cells. The white hindwing patches are dusted with black scales along their median edges, and more clearly defined with toothed patterning that runs adjacent to the submarginal areas of the hindwings; each hindwing possesses a short, thin and slightly spatulate tail of 8.5 mm in length. A light dusting of brownish-orange scaling is present within the subapical areas of the forewings, barely extending downwards to S3; four lines of brownish-orange scales extend across the forewing cells between the basal and discoidal areas.

The recto surfaces of both sets of wings are dark brown; the wing margins are edged with dashes of bright white within the intercostal spaces of both pairs of wings. Brownish-grey scaling is present within the subapical areas of the forewings, extending in a narrow patch from the tip of each forewing, downward barely to S4, and more concentrated and well-defined than on the recto surfaces of the same wings. Three patches of creamy-white are present in S4 to S6; a minute dusting of greyish-blue scales is evident adjacent to the said white patches submarginally. Both pairs of wings are slightly more rounded than in *P. a. albinus* or *P. a. yapenensis*.

Female - Length of forewing 53 mm. Head, thorax and abdomen dark brown; the abdomen possesses a line of white scaling along its length below the spiracles.

The antennae are dark chocolate brown; all legs are dark brown and edged with creamy white scales. Recto wing surfaces are medium brown in ground colour; the intercostal margins of both pairs of wings are edged with creamy-white dashes. A large patch of rich creamy-white colouration fills the central portion of the recto surfaces of the hindwings, extending to border the distal end of each hindwing cell. The creamy-white areas are dusted with brownish scales along the median edges, and more clearly defined with toothed patterning that runs adjacent to the submarginal areas of the hindwings. Due to the specimen in question being considerably damaged, both hindwing tails are missing.

The verso surfaces of both sets of wings are dark brown; the intercostal spaces of both pairs of wings are edged with bright white. A concentrated dusting of brownish-grey scaling is present within the subapical areas of the forewings, extending downwards from the tip each wing, and gradually decreasing in extent to S2. Patches of white colouration are present in spaces S7 to S1B of both hindwings, but do not intrude into the hindwing cell; the white patches are crisply defined adjacent to the wing margins, but dusted with brownish-black scaling along the median edges. A submarginal orange lunule is present in all hindwing spaces; within the subtornal area of each hindwing, small patches of greyish-blue scaling are evident within spaces S1B and S2.

Distribution: *Papilio albinus leucophanes* is presently confirmed as inhabiting the northern costal region of the island of New Guinea from Teluk Yos Sudarso (formerly Humboldt Bay) in Papua and eastward to Aitape, Sandaun Province, Papua New Guinea (formerly Eitape, German New Guinea) and Wewak (Fenner in D'Abrera, 1971, 1977, 1990). Specimens of *P. a. leucophanes* have been gathered from sea level to an altitude of approximately 200 metres.

Etymology: The subspecific name is retained from prior classifications of this distinctive subspecies of *P. albinus* as the species *Papilio leucophanes* Grose-Smith, 1894 and *Papilio albinus* ab. *leucophanes* Rothschild, 1895.

Discussion

Although *P. albinus* is frequently encountered in nature, scant attention has been directed at more effectively rationalising the regional populations of the species. By carefully analysing specimens which are representative of its greater geographical range, it has been possible to isolate four distinctive new subspecies of this butterfly.

During June of 1860, Alfred Russel Wallace commenced a voyage from Wahai, on the northern coast of the Moluccan island of Ceram, to the Papuan island of Waigeo.

Wallace intended to harbour at Mysol (Misool) Island en-route in order to replenish the supplies of his young collecting apprentice, Charles Allen, who was sent ahead to Misool by Wallace in order to gather natural history specimens. In a communication from Allen received by Wallace in Ceram, Allen stated that in addition to running low on staple food such as rice, his supply of insect pins had become greatly depleted. Due to unforeseen navigational issues, Wallace did not land at Misool, but was obliged to make his way directly to Waigeo. The specimens collected by Allen on Misool were subsequently shipped to the United Kingdom, together with those collected by Wallace; a proportion of the said materials were set aside for the private study of Wallace, whilst the majority of the balance were offered at auction to museums and private collectors.

Based upon the indicated provenance of the NHM specimen of *P. a. misoolana*, and the fact that the said specimen passed through the hands of both Grose-Smith and Joicey before being presented to the British Museum in 1931, it appears entirely consistent to the author that the said example was indeed collected on Misool in 1860 by Charles Allen, or one of the two Malay collectors who assisted him. The specimen is mounted in the popular style of the era, with the forewings sloped slightly backward; the presence of the original data label, hand written in black ink upon faded paper provides further testament as to the veracity of its origin.

The taxon *Papilio leucophanes* Grose-Smith, 1894 was revised by Rothschild (1895) as *Papilio albinus* ab. *leucophanes*, a position also supported by Jordan (1909-10); Jordan commented that *P. a.* ab. *leucophanes* possessed two white discal patches on the verso surfaces of the hindwings; Jordan's observation appears to be incorrect, as the author's examination of the type specimen and other historical examples of the said taxon held by the NHM, in addition to material contained within other depositories has confirmed that a minimum of three white patches is the norm, with some examples bearing the hint of a fourth patch of white in S7. The visual characters of *P. a. leucophanes* are entirely consistent within a wide area of distribution, a fact which negates its prior classification as an aberration of *P. a. albinus*, or being allied to any other taxa of the same insect.

P. a. yapenensis appears to constitute a geographical isolate which shares a past lineage with *P. a. leucophanes*; although clearly exclusive of each other, the two taxa possess elements within their wing patterning which are mutually exclusive of other populations of the same butterfly.

P. a. yahukimo represents a population which has developed larger size and modified white verso hindwing patterning in both sexes. The tendency towards a rounder wing shape that initially becomes suggested in examples of *P. albinus*

from the Kobowre Mountains is amplified further eastward in *P. a. yahukimo*, the male of which is strongly reminiscent of that of *Papilio aegeus* Donovan, 1805 with respect to its shape, size, patterning and wing colouration.

The confirmation of new Papuan taxa of *P. albinus* was made possible in large part by the author kindly being granted access to historical and type specimens which are often of considerable vintage. As stated in Goode (2011), such materials retain vital importance with respect to resolving the interrelationships of insect populations which may be rarely encountered or infrequently sampled within the modern context. The means by which to seek answers to such questions often remains hidden within the comprehensive reference collections of our museums.

Additional studies are currently in process aimed at further clarifying relationships between the geographical populations of this interesting insect within New Guinea and its surrounding islands.

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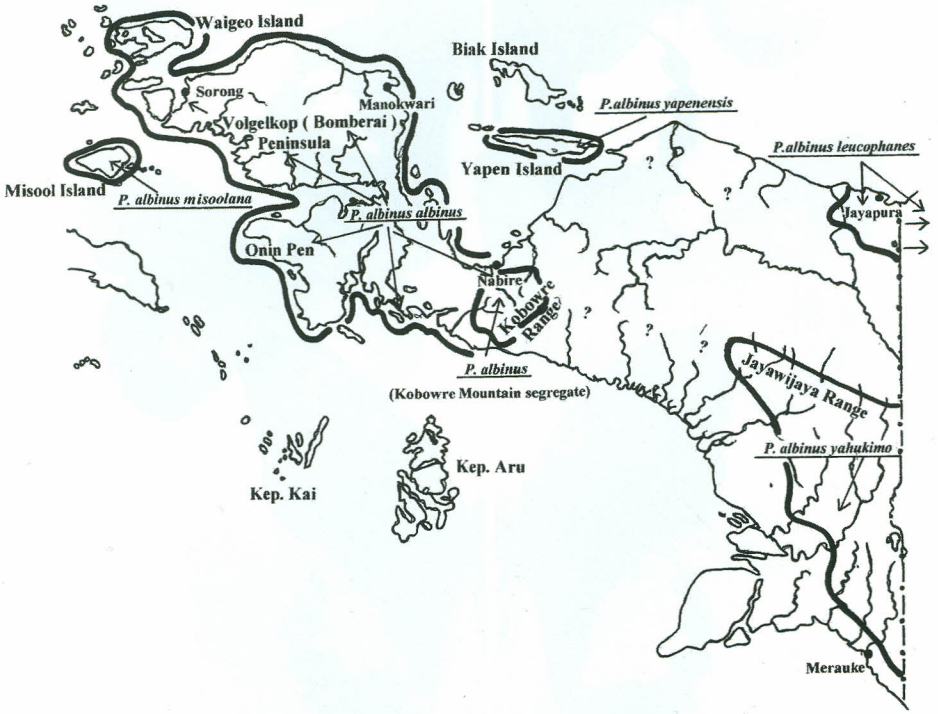

5 Distribution of *Papilio albinus* in Papua, Indonesia

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Figs 1-2. Upperside and underside of *Papilio albinus albinus* from Arfak, Doberai Peninsula, West Papua: 1 ♂; 2. ♀.

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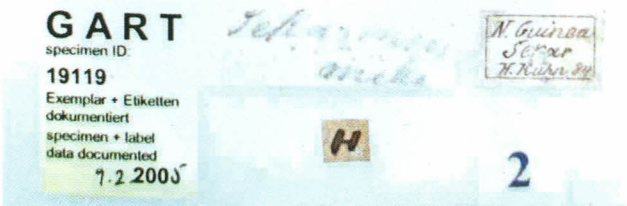

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Figs 3-4. *Papilio albinus* var. *sekarensis* Honrath, 1885 HT ♂ (synonymized with *Papilio albinus albinus*): 3. upperside and underside; 4. labels.

5

6

Fig. 5. Upperside of *Papilio albinus lesches*, HT ♂, NHM.
Fig. 6. upperside/underside *Papilio albinus mysoolana* HT ♂ **subsp. nov.** Misool Island, Papua (NHM).

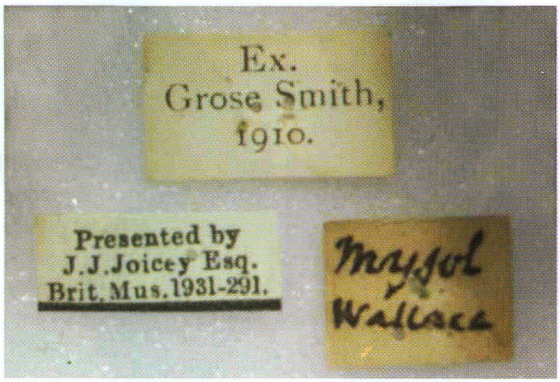

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Fig. 7. original data labels of *Papilio albinus mysoolana* HT ♂ **subsp. nov.** (NHM).
Fig. 8. Upperside and underside of *Papilio albinus yahukimo* **subsp. nov.** HT ♂, Yahukimo Regency, Papua, Indonesia.

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Figs 9-10. Upperside and underside of *Papilio albinus yahukimo* **subsp. nov.** PT, Yahukimo Regency, Papua, Indonesia: 9.♂; 10.♀.

11

12

Fig. 11. Upperside and underside of *Papilio albinus yahukimo* **subsp. nov.** PT♀, Eilanden R., S-E Dutch New Guinea, NHM.
Fig. 12. Upperside and underside of *Papilio albinus yapenensis* **subsp. nov.** HT♂, Yapen Isl., Papua.

13

14

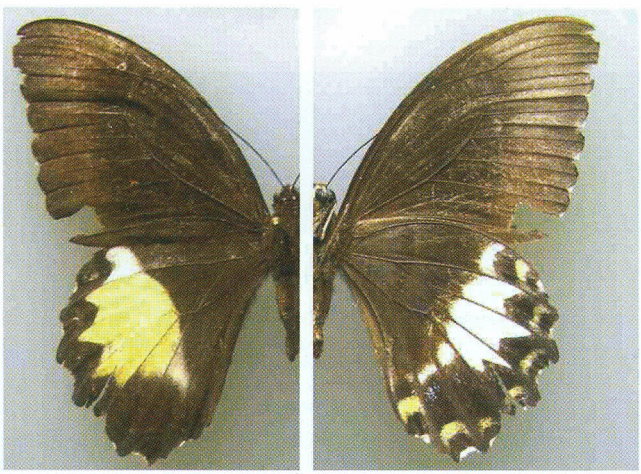
Figs 13-14. Upperside and underside of *Papilio albinus yapenensis* **subsp. nov.** PT, Yapen Isl., Papua: 13.♂; 14.♀.

15

16

Fig. 15. Upp./und. *Papilio albinus leucophanes* **stat. nov.** HT ♂, Humbolt Bay, Dutch New Guinea (NHM).
Fig. 16. original data labels of *Papilio albinus leucophanes* **stat. nov.** HT ♂ (NHM).

17



18

Fig. 17. *Papilio albinus leucophanes* **stat. nov.** PT ♂, German New Guinea, Eitape District, Coast Region, (NHM).
Fig. 18. Upp./und. *Papilio albinus leucophanes* ♀ **stat. nov.**, Jayapura, Waena, (KSP 1038).