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On *Nacaduba* and Allied Genera (Lepidoptera, Lycaenidae) **from the Sulawesi Region**

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Abstract The status of the Sulawesi region species of the *Nacaduba* group of genera (*sensu* Tite, 1963) is revised in the light of new evidence from recent captures. A new species, *Nacaduba angelae*, is described. Changes are given to the ranges and status of other taxa.

Keywords Sulawesi, Lycaenidae, Polyommatini, *Nacaduba*, Project Wallace.

Introduction

In a much-needed work, Tite (1963) suggested a synonymic arrangement of the species of *Nacaduba* Moore and allied genera based on material at that time available in the British Museum Natural History Department (BMNH). The 'group' of genera included *Prosotas* H. H. Druce, *Paraduba* Bethune-Baker, *Ionolyce* Toxopeus, *Erysichton* Fruhstorfer, *Catopyrops* Toxopeus and *Petrelaea* Toxopeus as well as *Nacaduba*. Eliot (1973) included all of these, except *Petrelaea*, in his '*Nacaduba* Section' of the Polyommatini, along with *Neolucia* Waterhouse & Turner and *Hypojamides* Riley. In his '*Petrelaea* Section', Eliot included *Pseudonacaduba* Stempffer. As neither *Neolucia*, *Hypojamides* nor *Pseudonacaduba* is represented in the Sulawesi region, Tite's grouping forms a convenient basis for a paper on the related taxa of this area.

In this paper, Tite's arrangement is used as a basis for further consideration of the representatives of the group from the Sulawesi region, including the islands of Banggai, Tukangbesi, Selayar, Sangir, Talaud and the Sula Archipelago as well as the mainland itself. Whilst the limitations of a regional faunistic approach such as this are appreciated, the time available to the author does not currently permit the extensive work required for a comprehensive revision of the group throughout its range. This paper will, however, have the benefit of pulling together diverse information on the Sulawesi representatives which has become available since Tite's review; indeed, Tite's work contained several gaps with regard to the fauna of this particular group of islands. Finally, the paper gives a vehicle for the dissemination of relevant information gained in 1985 during Project Wallace, the Royal Entomological Society's commemorative expedition to the Dumoga-Bone National Park in Sulawesi Utara.

For the species of *Petrelaea*, *Catopyrops* and *Ionolyce*, identification from external characters presents little difficulty. The same is not true for *Prosotas* and *Nacaduba*, for which, in the male, examination of the genitalia is necessary. The work necessary to identify females of

these 2 genera from genitalic examination is not yet complete, although in the different species of *Nacaduba* from Sulawesi, the females are more readily identifiable from external features than are their partners. Keys based on external characters such as the shade of blue or brown, or the transparency of the wing, are notoriously difficult to interpret, so they are not used in this work. Determination of males should be confirmed by reference to the drawings of genitalia. This can be achieved for *Prosotas* from Tite's work whilst for *Nacaduba*, drawings are included here for all Sulawesi species.

The information is presented in the form of an annotated checklist. Distributional information is based on material in the BMNH, RNH Leiden and on specimens collected during Project Wallace, together with data from original descriptions where applicable. The limited amount of altitudinal and temporal data available is given as heights in metres and as months of the year (in Roman numerals).

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Genus *Nacaduba* Moore

Nacaduba angusta azureus (Röber)
(Fig. 5)

Plebeius azureus Röber, 1886: 63, pl 4, fig 19. E. Celebes.

Nacaduba pamela Grose-Smith, 1895: 508, S. Celebes. syn nov.

Nacaduba atromarginata Druce, 1902: 113, pl ii, figs 1 & 2, S. Celebes.

Males show variability in the border on the upperside of the hindwing. Those from the South tend to have a broader dark area up to 3mm wide, while those from the North have only an obscure row of dark sub-marginal inter-neural spots. However, some from the South approach the more 'typical' northerly form. The single male in the BMNH from East Celebes is of the darker form. From the spectrum of material now available, there seems to be very little basis for retaining subspecific names for variations within Sulawesi. I therefore propose the retention of *azureus* Röber as the name for all examples from Sulawesi, Banggai and the Sula

Is. As I have seen only a single battered female from Sangir, I have no grounds for also synonymising *sangira* Fruhstorfer.

Locations: [Mainland]: Macassar (viii,ix), Samanga (xi), Tombugu, Paloe Bay, Tawaya (viii), Dumoga-Bone NP (i,ii), Kabalo 450m (iii), Penlamoran (iv). [Islands]: Sula Besi, Sula Mangole, Banggai.

Nacaduba angusta sangira Fruhstorfer

Nacaduba angusta sangira Fruhstorfer, 1916: 112, Sangir.

See *azureus* above.

Locations: [Islands]: Sangir.

Nacaduba pactolus pactolides Fruhstorfer
(Fig. 6)

Nacaduba pactolus pactolides Fruhstorfer, 1916:115, Celebes & Banggai.

The BMNH collection includes 2 males and one female from the Sula Islands, together with one male from Talaud. These are slightly smaller than males and females from the mainland and Banggai (15-16mm as opposed to 18mm) and have slightly duller brown undersides. I do not believe the former character to be of real significance, whilst the latter is partly due to the age of the specimens. Therefore I propose *pactolides* to cover specimens from all these areas.

Locations: [Mainland]: South Celebes (viii,ix), Tawaya (viii), Paloe Bay, Dumoga-Bone NP (i,ii), Pulu Pulu (v). [Islands]: Sula Besi (x), Talaud, Banggai.

Nacaduba pavana visuna Fruhstorfer

Nacaduba pavana visuna Fruhstorfer, 1916: 110, Celebes.

This species was uncommon during Project Wallace, but males were taken in the Dumoga-Bone NP in January and March at 200-600m altitude. Based on the material available in the BMNH, the subspecies seems to have only a northerly distribution on the mainland of Sulawesi.

Locations: [Mainland]: Toli-Toli (xi,xii), Tontoli, Tawaya (viii), Palu (viii), Dumoga-Bone NP (iii).

Nacaduba hermus hermus Felder

Lycaena hermus Felder, 1860: 457, Amboina.

There are no specimens of *hermus* in the BMNH from anywhere in the Sulawesi region, although there is a single male in coll. Bedford-Russell that appears to be of this species.

Superficially this specimen very closely resembles the nominotypical subspecies from Maluku. Additionally, it bears a label "*N. hermus hermus* GET", based on a genitalic examination by the late G. E. Tite. Whilst I have not been able to trace the preparation on which this determination was based, I can see no reason to doubt Tite's assertion. Furthermore, the existence of *hermus* subspecies in Sundaland, Java, Lombok, the Philippines and Maluku (all the areas with which the Sulawesi region has affinity), suggests that finding *hermus* in Sulawesi itself is no real surprise. One can only hope that more material will become available in time to corroborate this finding.

Locations: [Mainland]: E C Sulawesi, Morowali District (ii).

Nacaduba subperusia paska Eliot
(Fig. 9)

Nacaduba subperusia paska Eliot, 1955: 156, Sula Besi.

When he originally described *paska* from Sula Besi, Eliot remarked that this taxon would "probably be found in Celebes". This certainly appears to have come true with the capture of at least 2 of each sex during Project Wallace. Related material in the BMNH is very sparse, with only 3 males from Sula Besi, one male from Mindanao and one female from Batchian. I have accordingly made no further subspecific differentiation based on the mainland Sulawesi specimens.

Locations: [Mainland]: Dumoga-Bone NP 500-1100m (iii,vii), Danau Mooat 1200m (ii). [Islands]: Sula Besi (x).

Nacaduba sanaya metallica Fruhstorfer

Nacaduba pavana metallica Fruhstorfer, 1916: 110, Celebes.

The BMNH collection contains only the Holotype male labelled 'Nord Celebes', together with a series of both sexes from the Philippines. In Bedford-Russell's collection from Operation Drake, there are 2 specimens which have been identified by Tite as *N. sanaya metallica*. These are a male from Morowali in E. C. Sulawesi and a female from the island of Banggai. The male has been dissected by Tite and the slide, which I have examined, is referenced "Gen G.E.T. A.19.1980" in Tite's own hand. It is similar to the Holotype. The female is similar to *sanaya* females on the underside, although its upperside is almost uniform plain brown. Pending the examination of more material from Mainland Sulawesi and Banggai, I can make no further hypothesis around this female, but include it here for completeness.

Locations: [Mainland]: 'Nord Celebes', Morowali (iii). [Islands]: ?Banggai (ii).

Nacaduba angelae sp. nov.
(Figs. 1 - 4, 11, 17)

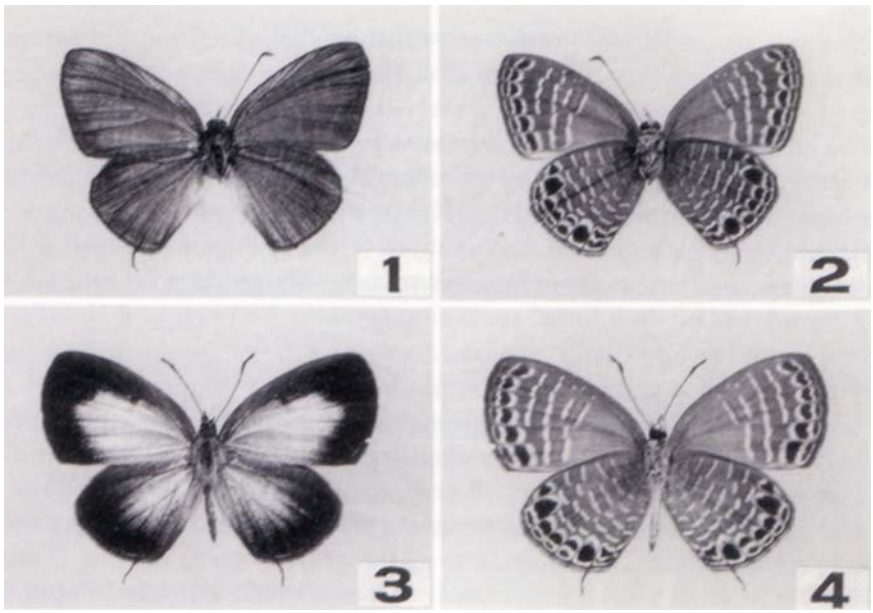
This species is a member of the *hermus* complex of the *pavana* group (both *sensu* Eliot, 1955). It was discovered during Project Wallace, a short series including both sexes being taken at a single location in the Dumoga-Bone NP.

Male frosted purple-blue above with depth of colour increasing distally. Underside markings visible from above by transparency. Marginal border on both wings only a thread, and no dark tornal spots on upperside. Forewing and hindwing cilia inwardly fuscous and outwardly whitish.

Female upperside particularly striking. Both wings with a large whitish discal area heavily overlaid with pale blue irridescent scaling. This blue dusting heaviest basally, becoming paler distally on the forewing and becoming suffused with darker scales towards the hindwing borders. Forewing with a broad dark border about 4mm wide and parallel to the termen from dorsum to vein 4. This border widening to about 5.5mm in spaces 5 and 6, then tapering along the costa, reaching the base in spaces 9 to 12 but not entering the cell which remains white overlaid with blue. Forward half of the disco-cellular vein darkened to form a distinct spot. Hindwing border also dark but slightly variable, in the darkest form extending almost to the base of space 6 and 3.5mm wide in spaces 1b to 5 with inward extensions along the veins. In the lightest variant, the border covering only the outer third of space 6 and only 2mm wide below this. In this form, dark sub-marginal spots discernible in spaces 1b to 5, with pale blue crowns. Again with dark neural streaks on veins 2 to 5 reaching almost to the cell end. In all forms, veins 6 and 7 finely but heavily blackened.

Both sexes with the tail at vein 2 on the hindwing about 3mm long and white tipped. Undersides distinctive and showing only slight sexual dimorphism. Ground colour mid-grey without a trace of brown. Fasciae, which as with all members of the pavana group do not include a sub-basal pair on the forewing, pure white and finely defined in the male, only slightly wider and more diffuse in the female. Forewing spaces between the inner and outer sub-marginal striae charcoal-grey, almost black. Pairs of sub-costal striae in spaces 9 and 10. The same colouring pertaining on the hindwing for the sub-marginal row and also for the marginal areas in spaces 1a, 1b and 3 to 6. The space between the sub-marginal fasciae in space 6 larger than the others, about twice as wide, as in angusta, so that the inner sub-marginal stria almost touches the outer post-discal one. The large tornal spot in space 2 with neither orange crown nor any trace of blue/green metallic scales in any of the 6 specimens.

Male genitalia, Fig 11, generally not unlike others of the genus, with valvae close to *subperusia* and *sanaya*. Clasp of *angelae* narrower again than that of *sanaya* and slightly concave on a lower portion of the dorsal edge. Dorsal extremity a single large point while the ventral extremity similar to both the other species, having a number of angled serrations. Female genitalia, Fig. 17, almost completely resembling *sanaya*; the only slight difference in the single specimen dissected being the shape of the signa.



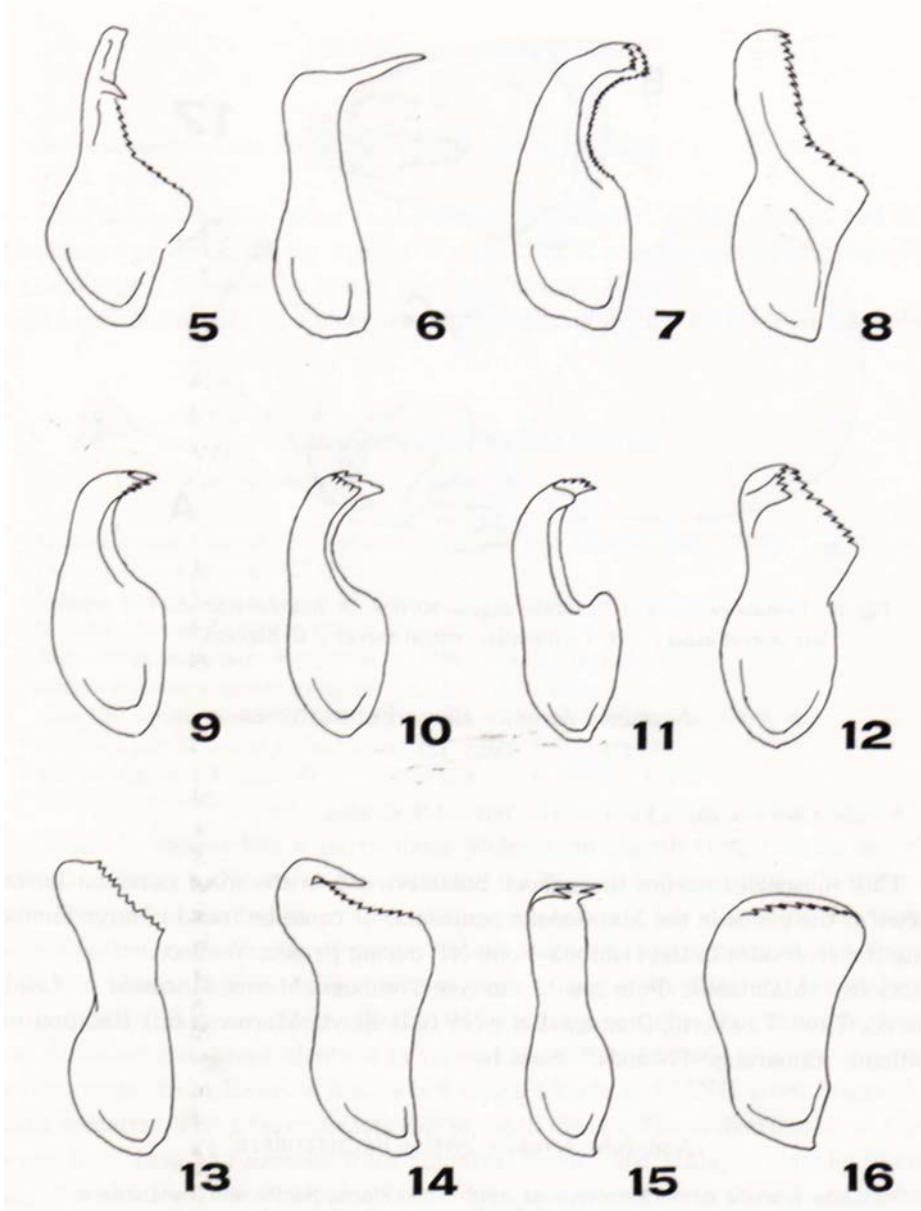
Figs. 1 - 4. *Nacaduba angelae* sp. nov. 1. Holotype ♂, upperside; 2. *Ditto*, underside; 3. Paratype ♀, upperside; 4. *Ditto*, underside.

The differences in the morphology of the valvae are not conclusive at the specific level, as a number of genitalic preparations by Tite (BMNH Collection) show similar variations in *N.s.elioti* Corbet from Burma and Borneo. Indeed, one *elioti* from Mt. Marapok, Sarawak, has almost identical valvae to that of *angelae*. The genitalia of the Type of *metallica* and of a Paratype of *sanaya* from Nias both show a serrate area on the dorsal extremity. As to the signa in the female genitalia, Hirowatari (pers. comm.) states that this shape may vary between individuals in some species of Nacaduba.

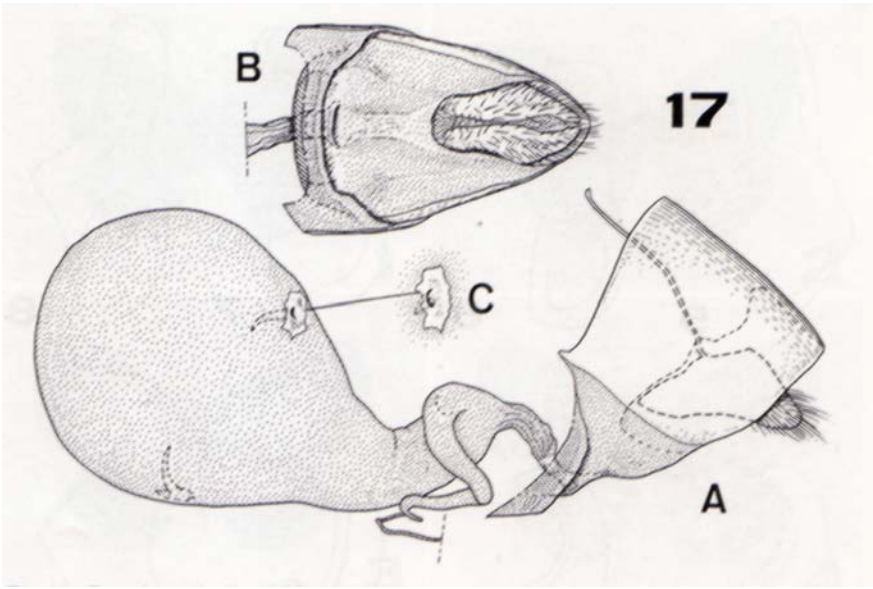
The absence of an orange crown or blue/green metallic scaling in the tornal area of the hindwing differentiates this species from any other Nacaduba in Sulawesi or, possibly, elsewhere. Despite its startlingly individual underside markings, the evidence from the genitalia of both sexes indicates that *angelae* is very closely related to *sanaya*. However, I include it as a new species, rather than as a race of *sanaya*, primarily because of its distinctiveness from and sympatry with *metallica* which appears to retain a fairly constant appearance in both North and Central Sulawesi and the Philippines. The new name is dedicated to the author's wife.

Holotype: Male, N. Sulawesi, 1100m, Dumoga-Bone NP (below summit of Gunung '1440'), 22 iii 1985, (T. W. Harman). Deposited in BMNH. Paratypes:5 females, N. Sulawesi, 1200m, Dumoga-Bone NP (at summit of Gunung '1440'), 5-25 iii 1985, (A. C. Cassidy, J. D. Holloway). Three deposited in BMNH; one in University of Osaka Prefecture, one held in coll. Cassidy.

Locations: [Mainland]: Dumoga-Bone NP, 1100-1200m (iii).



Figs. 5 - 16. Male valvae of *Nacaduba* spp. 5. *N. angusta azureus* (Röber); 6. *N. pactolus pactolides* Fruhstorfer; 7. *N. pavana visuna* Fruhstorfer; 8. *N. hermus hermus* Felder; 9. *N. subperusia paska* Eliot; 10. *N. sanaya metallica* Fruhstorfer; 11. *N. angelae* sp. nov.; 12. *N. berenice eliana* Fruhstorfer; 13 *N. norman titei* Eliot; 14. *N. kurava kurava* (Moore); 15. *N. beroe hayashii* Takanami; 16. *N. calauria calauria* (Felder).



Figs. 17. Female genitalia of *Nacaduba angelae* sp. nov. A. Internal reproductive organs, left lateral aspect; B. Terminalia, ventral aspect; C. Signum.

Nacaduba berenice eliana Fruhstorfer
(Fig. 12)

Nacaduba berenice eliana Fruhstorfer, 1916: 128, Celebes.

This subspecies occurs throughout Sulawesi and is the most common lowland species of the genus in the Minahassan peninsula. It could be found in large numbers along the riversides in the Dumoga-Bone NP during Project Wallace.

Locations: [Mainland]: Palu 200-300m (xi), Tombugu, Maros, Macassar, S. Celebes (viii,ix), Tawi-Tawi (vii), Dumoga-Bone NP (i,ii,iii,vi), Morowali (iii), Bantimurung, Bonthain, Amparang. [Islands]: Sula Is.

Nacaduba berenice zyrthis Fruhstorfer

Nacaduba berenice zyrthis Fruhstorfer, 1916: 128, Flores, Sumba and Tanajampea.

The BMNH holds 3 males from Tanajampea and 2 females from Kalao, both extreme southern locations in the Sulawesi region and close to the subspecies' normal range from E. Java to the Lesser Sundas.

Locations: [Islands]: Tanajampea, Kalao.

Nacaduba normani titei Eliot
(Fig. 13)

Nacaduba normani titei Eliot, 1969: 274, S. Celebes.

This taxon was not found in the Dumoga-Bone NP, or the eastern end of the Minahassan peninsula during Project Wallace, but it was recorded from Tapu-Waru in East-Central Sulawesi in March 1980 by Bedford-Russell.

Locations: [Mainland]: S. Celebes (viii,ix), Donggala (viii,ix), Toli-Toli, Tapu-Waru (iii).

Nacaduba kurava kurava (Moore)
(Fig. 14)

Lycaena atratus Cramer?; Horsfield, 1828: 78, nec. Papilio aratus Cramer, 1782, 4: pl 365.

Lycaena aratus Moore, 1857: 22.

Lycaena kurava Moore, 1857: 22, Java. #

Nacaduba kurava Toxopeus, 1927: 423-432.

Nacaduba berenice isana Fruhstorfer, 1916: 128, W. Java. #

Nacaduba berenice agorda Fruhstorfer, 1916: 134, Java. #

Nacaduba perusia nemana Fruhstorfer, 1916: 134, Macromalayana. # **syn. n.**

Nacaduba perusia astapa Fruhstorfer, 1916: 134, Bali. # **syn. n.**

Nacaduba perusia baweana Fruhstorfer, 1916: 134, Bawean. # **syn. n.**

Nacaduba kurava has a particularly widespread distribution, ranging from Sri Lanka and Japan to Northern Australia and the Bismarck Archipelago. In the region from Thailand to the Lesser Sundas, the species shows a fair degree of constancy in the males but considerable variation in the external appearance of the females. However, similarities do exist, between populations from different island groups, which appear to have no direct correlation with the geography. For example, females from Sulawesi are almost identical in appearance with the female allotype of *baweana* Fruhstorfer, from Bawean, but so is a single female in BMNH from Enggano, off South Sumatra. This axis contrasts sharply with the traditional distribution of *kurava* from Java and *nemana* from Sumatra, Borneo and Malaya. Equally interestingly, females from the Philippines are closest in appearance to those from Sumatra. Within the female series from any one of these locations, there are variations in the depth and extent of the bluish areas as well as in the shape of the dark margins. On the undersides, there is less variation, but the size of the large dark tornal spot often differs between individuals from similar locations.

Type specimens are held in the BMNH for all taxa marked # in the list above. These have been examined and compared, not only with each other but also with the full range of phenotypic variation within the series from each location. The closeness of the Types, together with the overlapping extent of the variability within island populations, leads me to making the synonymies listed above. For the same reasons, I also include in *kurava kurava* specimens

from the Sulawesi region and the Philippines. I have not been able to examine the Types of *mentawica* Riley nor *niasica* Toxopeus and so am in no position to comment on their validity as separate taxa.

The species was only occasionally encountered during Project Wallace, and was found only in the Dumoga-Bone NP area at moderate elevations (500m or higher).

Locations: [Mainland]: Dumoga-Bone NP (iii, iv); Morowali (ii, iii); Sotoako (SE) (iii), S. Celebes (viii,ix), Tawaya (viii,ix). [Islands]: Sula Besi (x), Talaud (ii,iii).

Nacaduba beroe hayashii Takanami
(Fig. 15)

Nacaduba ruficirca elioti Hayashi, 1976: 97, Sulawesi.

Nacaduba beroe hayashii Takanami, (1990).

Hayashi described *ruficirca elioti* from 1 male and 1 female from Sulawesi (no other data). The description of the male was not based on genitalic examination, but was made from superficial characters which do not really differ from typical *beroe* Felder. Also, one of the stated differences between *elioti* and *ruficirca* is the darker, more reddish hue of the underside hindwing tornal orange crown in *ruficirca*, which Tite, in his original description, says distinguishes *ruficirca* from all other species of *Nacaduba*. The female paratype of *elioti* differs from the male on its underside by having the spaces between the marginal and sub-marginal lunules darkened, and the space between the inner and outer post-discal striae on the hindwing is both narrower and more ochreous than the male. However, in males and females of *beroe* taken in N Sulawesi by Cassidy, the sexes are identical to each other in this respect. Additionally, the *elioti* female differs from N Sulawesi *beroe* females by having less distinct marginal spotting on the upperside of the hindwing and no blue scaling on the forewing. In all these respects the paratype *elioti* bears an uncanny resemblance to females of *N. berenice eliana* which occurs throughout Sulawesi and appears to be a misidentified example of this latter taxon.

In view of the invalidity of *elioti* because of the name's earlier use for a subspecies of *sanaya* Fruhstorfer, I believe Takanami is correct in proposing the use of *hayashii* for the Sulawesi representatives of *N. beroe* and that Hayashi's holotype male should be included under this new taxon.

For completion, there follows a description of a series of females in the BMNH from South and North Sulawesi and which I believe should be included under *hayashii*. Upperside dark fuscous brown with irridescent blue discal patch on forewing. This patch just entering the cell on its upper edge and reaching halfway along veins 2 and 3. In 2 specimens, this blue area reduced to only a few scattered scales. Upperside of the hindwing with white inner marginal line in spaces 1b to 6. Also with black sub-marginal spots in these spaces, all with whitish inner demarcation. Underside pale striae with discernible inner brown bands, but the contrast with ground colour not striking. Forewing length 13-14mm.

Locations: [Mainland]: Dumoga-Bone NP 1200m (iii); Gn Muajat, 1100-1780m (iv), Morowali (EC) (iii); Tambusisi (EC) (iii); Goerospalu (?). [Islands]: Kalao (xii).

Nacaduba calauria calauria (Felder)
(Fig. 16)

Lycaena calauria Felder, 1860: 457, Amboina.

Despite its occurrence in Borneo, Java, the Sula Is and Maluku, there still appears to be no record of *calauria* from mainland Sulawesi, although it can be expected to be found there eventually.

Locations: [Islands]: Sula Is (vi - ix).

Genus *Prosotas* Druce

Prosotas aluta alutina Fruhstorfer

Nacaduba aluta alutina Fruhstorfer, 1916: 120, N. Celebes.

No specimens of this taxa were recorded during Project Wallace. The males of this taxa are unusually distinctive in having a broad (2mm) dark border on the upperside of both wings. The white underside striae are fine and clear on a mid-brown ground colour. The female from Banggai in the BMNH collection is unfortunately quite badly rubbed, so a clear, unambiguous description is not really possible.

Locations: [Mainland]: Toli Toli. [Islands]: Banggai.

Prosotas nora nora (Felder)

Lycaena nora Felder, 1860: 458, Amboina.

Prosotas nora nora Felder; Tite, 1963: 92.

This species was common and numerous along river and forest edges in the Dumoga-Bone NP during Project Wallace. The undersides of Sulawesi specimens are variable in ground colour from greyish to ochreous in both sexes.

Locations: [Mainland]: S Celebes, Macassar, Samanga, Bantimurung (vii), Donggala, Tawaya, Paloe Bay, Minahassa, Dumoga-Bone NP 200-1100m (i,ii,iii,viii), Palu (viii), Lore Lindu 600-1200m (viii). [Islands]: Sula Besi, Sula Mangole, Sangir, Talaud.

Prosotas pia elioti Tite

Prosotas pia elioti Tite, 1963: 94. S Celebes (BMNH).

This taxa is only separable from *P. nora* with certainty by dissection of the male genitalia. Despite much searching, no specimens were discovered in N Sulawesi during the 1985 expedition.

Locations: [Mainland:Malino (vi), Lore Lindu (viii).

Prosotas ella Toxopeus

Prosotas ella Toxopeus, 1930: 188. Palu, Central Celebes.

One male only was taken throughout Project Wallace, beside a small river in primary jungle at 300m. It is immediately distinguishable from sympatric *P. nora* by its underside, which is yellower and paler than even the most ochreous female of the latter species. I have not seen a female.

Locations: [Mainland]: Palu, Dumoga-Bone NP 300m (iii).

Prosotas gracilis gracilis (Röber)

Plebeius gracilis Röber, 1886: 67, pl 5, fig 1, Ceram.

Nacaduba gerydomaculata Rothschild, 1915: 139, Central Ceram.

Prosotas gracilis bonthainica Toxopeus. *Nomen nudem*.

One male was taken in N. Sulawesi by Tennent during Project Wallace, and I have seen another male, from Maros in S. Sulawesi taken by Eliot in 1937. Despite the unpublished use of *bonthainica* by Toxopeus for unseen example(s) from, presumably, S. Sulawesi, I can determine no substantive characteristic to separate these examples from typical *gracilis* from Ceram.

Locations: [Mainland]. Maros (iii), Dumoga-Bone NP 200m (vi).

Prosotas dubiosa subardates (Piepers & Snellen)

Lycaena ardates subardates Piepers & Snellen, 1918: 43, Java.

Prosotas dubiosa roepkei Toxopeus, 1929: 242, Java.

Prosotas hybrida Toxopeus, 1929: 241, Java.

Prosotas dubiosa celebica Toxopeus. *Nomen nudem*.

This species has now been recorded from a number of widespread locations in the Sulawesi region, and was regulary encountered during Project Wallace. A breeding colony was observed on a low, spreading Acacia bush, attended by the brown ant *Anoplolepis longipes*. Having examined a number of specimens from the Sulawesi region and the Philippines, I see no reason why *dubiosa* from these areas should not be included under *subardates* along with those from Java and Bali. RNH Leiden has one specimen of each sex from Bonthain, marked *celebica* Tox. MS. No published description can be found under this name, nor have I been able to trace any unpublished manuscript by Toxopeus relating to these specimens.

Locations: [Mainland]: Tawaya (viii,ix), Macassar, Samanga (xi), S Celebes (viii,ix), Dumoga-Bone NP 200m (iv,vi,viii), Bantimurung (vii), Bontaeng (viii), Palu (viii). [Islands]: Sangir (ii,iii), Tanajampea (xii), Kalao (xii).

Genus *Ionolyce* Toxopeus

Ionolyce helicon helicon Felder

Lycaena helicon C Felder, 1860: 457, Amboina.

Plebeius unicolor Röber, 1886: 66, pl 5, Fig 4, Ceram, Key & E Celebes.

Ionolyce helicon helicon Felder; Tite, 1963: 101.

This taxon was quite common in the Dumoga-Bone NP, being encountered from 200 to 1100m.

Locations: [Mainland]: S Celebes (viii,ix), Bonthain 1500m (ii), Samanga (xi), Tombugu, Molino 1200m (i), Dumoga-Bone NP 200-1100m (i,ii,iii,iv), Lore Lindu NP (viii). [Islands]: Sula Besi (x), Talaud.

Genus Catopyrops Toxopeus

Catopyrops ancyra subfestivus (Röber)

Plebeius subfestivus Röber, 1886: 64, Pl 4, Fig 33, Aru, Ceram, Celebes (part).

Nacaduba ancyra subfestivus Röber; Fruhstorfer, 1916: 123, Celebes (part).

Catopyrops ancyra duplicata Toxopeus, 1930: 149, Pl 4, Fig 13a-b, Kalawara, Cent. Celebes.

Catopyrops ancyra subfestivus (Röber); Tite, 1963: 106.

This taxon was occasionally encountered during Project Wallace, but was never common. All the specimens collected were found beside flowing water in the Dumoga-Bone NP.

Locations: [Mainland]: Palu (x), Donggala (viii,ix), Samanga (xi), Bantimurung, Dumoga-Bone NP 200m (i,iii,vii). [Islands]: Talaud (ii,iii), Sangir (ii,iii), Sula Mangole (x), Sula Besi (x), Toekan Besi (xii).

Catopyrops rita bora Eliot

Catopyrops rita bora Eliot, 1956: 37, S Celebes.

No specimens were found in N Sulawesi during Project Wallace.

Locations: [Mainland]: S Celebes, Bonthain (iv), Lompa-Battang 900m (iii), Palu (vii).

Catopyrops rita altijavana Toxopeus

Catopyrops ancyra (subfestivus) altijavana Toxopeus, 1930: 148, Java (Malang).

Catapyrops rita altijavana Toxopeus; Tite, 1963: 107.

The BMNH holds just one male from Tanahjampea.

Locations: [Islands]: Tanahjampea.

Genus Petrelaea Toxopeus

Petrealea dana (de Nicéville)

Nacaduba dana de Nicéville, 1883: 73, pl 1, Fig 15, Bhutan.

Plebeius tobugensis Röber, 1886: 63, E. Celebes.

Lycaena ardeola Staudinger, 1889: 97, Palawan.

Nacaduba obscura Grose Smith, 1894: 574, Humbolt Bay.

Nacaduba ardates var. *dima* Rhé Philipe, 1911: 764, Naga Hills.

Nacaduba ios Waterhouse & Lyell, 1914: 99, Figs 856-857, Thursday Island.

Nacaduba subdubiosa Rothschild, 1915: 29, Utakwa River.

Petrealea dana varia Toxopeus, 1929: 242, Java.

One male was recorded from Tangkoko, N Sulawesi during Project Wallace, while the BMNH holds only 2 males ex-Joicey collection with no further data. So Sulawesian representatives of this widespread species this must still be considered something of a rarity.

Locations: [Mainland]: Celebes, Tombugu, Tangkoko (vii).

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