



A new species of *Cassionympha* Van Son (Nymphalidae: Satyrinae) from the southern coast of the Western Cape, with a discussion of its possible evolutionary origins

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Abstract: The genus *Cassionympha* Van Son is discussed and reviewed, and a Neotype of the type species of the genus *Cassionympha cassius* (Godart, 1824) designated. A new species from the southern coast region of the Western Cape is described, and a discussion about the evolutionary origins of the group provided.

Key words: Neotype, genitalia, falces, valves, distribution, dentate

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INTRODUCTION

The genus *Cassionympha* was erected by Van Son (1955) for a single species, *C. cassius* (Godart, 1824), on the basis that it was distinguishable from *Pseudonympha* by its more gradual antennal club, its vestigial falces, and by the precostal vein of the hindwing arising opposite (and not distad of) the junction of veins 7 and 8. Henning and Henning (1997) revised this to include two *Pseudonympha* species, *Pseudonympha detecta* Trimen, 1914 and *Pseudonympha camdeboo* Dickson, 1982, within the genus *Cassionympha*. Previously, Van Son had included *detecta* under *Pseudonympha*, on the basis that the antennae, palpi, wing venation and genitalia closely agree with other species of *Pseudonympha*. This was a surprising conclusion, in the light of the fact that in both *detecta* and its close relative *camdeboo* the hindwing precostal vein arises opposite the junction of veins 7 and 8, as in *cassius*. Furthermore, the structure of their antenna is very similar to *cassius*, while all three species have falces which correspond quite closely to those of *Pseudonympha* (Plate 1). Dissections of the male genitalia of *cassius* were made from Cape Town, as well as from the Eastern Cape, KwaZulu-Natal and Limpopo Provinces without a single one reproducing the vestigial falces illustrated by Van Son. The conclusion is therefore that his

dissection was extracted from a freak specimen. In fact, the proportionate length of the falces to the unci of all three species falls well within the norm for *Pseudonympha*. Henning and Henning further justify the placement of these three species within *Cassionympha* on the basis that the valves of the male genitalia are dentate in all three, but not in *Pseudonympha*. This is not so, as it is a described feature of *camdeboo* that the valves are not dentate; as can be seen, *detecta* occupies a position which is intermediate between the other two in this respect. This is therefore also not a good feature. The female genitalia in all cases lack a signum, though this is a feature which is also present in some species of *Pseudonympha*, such as *magoides*.

However, it must be stated that these three species do form a recognisable grouping because of their similarities in antennae, size, markings, wingshape and habits; unlike all the *Pseudonympha* species, none occur in open grassveld and all are associated with forests or woody scrub. It is doubtful, however, whether these distinguishing features provide sufficient grounds for generic status - especially in the light of the inconsistencies previously outlined. All large genera contain distinctive groupings, which are at most placed under subgenera, and this grouping should not be an exception. Nonetheless, it is felt that this would be a matter best dealt with through a comprehensive DNA analysis of all related genera, so the matter will be left in abeyance until this is undertaken.

DESIGNATION OF TYPES

Since the type locality of *cassius* was given by Godart (1824) as “Cape of Good Hope”, and

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because of the proximity of colonies of the proposed new species to the Cape Peninsula, an effort was made to view the type or types of *cassius*. A search was therefore made in both institutions which Godart used as repositories for his specimens, namely the Paris and Edinburgh Museums. This proved fruitless. As a result, in order to prevent any confusion between these two closely-related species, it was decided to designate a new type specimen for *cassius*. Cape Town was chosen as the type locality simply because prior to 1824, when *cassius* was described, very few naturalists had penetrated South Africa beyond Cape Town. Of these, only Burchell is known to have collected any butterflies at all. Penetration of the country beyond the Hottentots Holland Mountains would have required horses, wagons, and a considerable amount of equipment, and so would not have been undertaken lightly; at this time, the infrastructure of the southern Cape was rudimentary. Cape Town itself, on the other hand, was relatively well explored, and its environs easily accessible to passengers of passing ships. It is therefore highly probable that Godart's types originated from there. A Neotype is therefore designated as follows (Figs 1 & 2):

NEOTYPE (male): Cape Town, Western Cape, 6 November 1954, L. Vári, Ditsong National Museum of Natural History (= DNMNH).

MATERIAL AND METHODS

All material examined is from the Pringle collection of butterflies, with the exceptions of specimens of *C. cassius* provided by Dr André Claassens from Cape Town, Alf Curle from Pringle Bay, and the Neotype male from the DNMNH. Specimens of *cassius* were dissected from the Cape Peninsula, Eastern Cape, KwaZulu- Natal and Limpopo Provinces; those of *C. camdeboo* came from its type locality; and *C. detecta* specimens were dissected from Witsand and the Swartberg mountains. Specimens of the new species were dissected from Cape Aghulas and Pringle Bay. All genitalia were photographed under a SOX dissecting microscope, and loosely stored in vials containing glycerine.

DESCRIPTION

Cassionympha perissinottoi spec. nov.

Male (Figs 7 & 8): Forewing length 17–19.5 mm. Antenna-wing ratio: 0.38 (n = 22). Antennae short, slender, with a gradual club and 29 joints. Palpi long, first joint one third length of second and third joints, all joints with long ribbon-like hairs below, and to a lesser extent above.

Legs: Anterior legs very strongly reduced in the male and hidden in the hairs of the thorax, better developed in the female. Tarsi 5 - jointed, tibia as long as femora, normal legs long and slender.

Upperside (Fig. 7)

Forewing: Ground-colour dark brown, with red markings in the cell, extending to area 2, but not reaching the base or outer margin, and unbroken except for a dark brownish line at the end of the cell. Another dark line extends from the costa basad of this line, which joins it within the reddish patch. Subapical ocellate spot black containing two blue spots, one below the other, with the lower spot positioned slightly further outwards. The ocellus is bordered by a conspicuous golden-yellow ring. Dark brownish submarginal line runs from the apex to area 1, with a dark marginal line along the outer edge. In some specimens, the ground-colour is noticeably darker between these two lines.

Hindwing: Ground-colour as in forewing, with an inconspicuous dark median line running through the cell in some specimens. A dark submarginal line runs from veins 1 to 7, and there is a marginal line along the outer edge. There are two black submarginal spots in areas 2 and 3, with a whitish, or in some cases blue, central dot, and a golden or light brown outer ring.

Underside: As in upperside, but submarginal line fainter, with yellow and reddish irrorations in the costal and apical area, extending along the outer margin as far as area 2.

Hindwing: Ground-colour dark reddish brown in the basal and submarginal areas, with the postmedian area conspicuously lighter, more fawn-coloured. There is a single very small white-centred black spot in areas 2 and 3.

Female (Figs 9 & 10): Forewing length 18–20mm. Antenna-wing ratio: 0.36 (n = 5)

Wings: As in male, but wings slightly longer and more evenly rounded along their outer margins. The underside is darker, and more uniformly reddish-brown along the apex of the forewing, as well as the hindwing, where the postmedian area is only slightly more lightly-coloured.

Male genitalia (Fig. 16):

Uncus fused with tegumen, long and crescent shaped. Tegumen convex, flattened dorsally, falces short, roughly one quarter of length of uncus. Vinculum narrow, broadening towards saccus, saccus shorter than uncus, juxta membranous. Aedeagus (Fig. 12) elongate, narrow and pointed, valves elongate with dorsal margin dentate. Gnathos large and conspicuous.

Female genitalia: Posterior apophyses absent, ductus long, membranous, bursa without signa. Anal lobes long, vestibulum transversely elongate, produced into pointed sclerites.

Type Material

Holotype male: Cape Agulhas, Western Cape, 9 October 2007, E.L. Pringle.

Allotype female: Cape Agulhas, Western Cape, 27 September 2006, R. Perissinotto.

The Holotype and Allotype will be deposited in the DNMNH, Pretoria.

Paratypes: 17 males, 2 females same data as holotype; 4 males, 2 females ibidem, except 10 October 2007. 1 male, 1 female, Pringle Bay, Western Cape, 29 March 2011, H.C. Ficq; 1 male ibidem, except 9 April 2010.

DIAGNOSIS

Cassionympha perissinottoi is closest to *C. cassius* in that it has no rufous patch in the cell of the hindwing upperside, and there are ocelli in areas 2 and 3 of this surface. The wingshape is, however, distinctly different from *cassius*, in that the outer margins of both wings are noticeably less rounded; in this respect, the species much more closely resembles *detecta*. The wingshape is very consistent in all specimens of *perissinottoi* that were examined, whereas in *cassius* there is some variation. In nearly all *cassius* specimens examined the wingshape is similar to those illustrated in Figs 3–6 on Plate 1; however, in a small minority the wings are less rounded, as in the Neotype. The ground-colour of both surfaces is also darker than in *cassius*, as is the red patch of the forewing, which is of a deeper red colouration. These red markings are also generally more restricted in their extent, although there is some variation in this respect. The hindwing underside is also plainer than in *cassius*, lacking the median and subbasal bands normally evident in specimens of the latter. The hindwing ocellate spots are also generally larger and more conspicuous, although there is some variation in this feature as well. In size, Agulhas specimens are on average slightly smaller than *cassius*, whilst those from Pringle Bay are markedly so.

The male genitalia, too, are distinctive from the other members of the genus (see Plate 2). As compared with *cassius*, the uncus is slightly broader, and on the valve the dentate processes on the dorsal section of the valve are much shorter and more numerous. The distal portion of the valve is broader, and the ventral portion less hirsute, with finer hairs. The membrane extending downwards from the base of the tegument to the raised dorsal portion of the valve is broader. The aedeagus is longer and narrower, with the distal portion tapering slightly, and the basal portion strongly upcurved. The aedeagus, in fact, resembles that of *detecta* more closely than that of *cassius*. It should, however, be noted that, while these broad differences in the aedeagus were consistent in all the dissections made (eight of *cassius* and four of *perissinottoi*), there are variations in both length and shape between individuals, and one therefore needs to be circumspect about these features.

The illustrations also show that *detecta* differs considerably from the present species, as well as from *cassius*, in that the uncus is much shorter, while the falces are longer, being more than half the length of the uncus. The valves, too, are narrower, tapering towards the apex, which is

only slightly dentate along the last third of the dorsal section. It also has a comparatively long saccus, almost as long as the uncus. The aedeagus of *detecta* is long, and tapers abruptly along its dorsal margin.

C. camdeboo is very closely related to *detecta*, with rather small differences between their genitalia. In comparison with *detecta*, the uncus is thicker midway along its length, and the falces are shorter and slightly broader. The dorsal margin of the valve is not visibly dentate along the last third of the dorsal section towards the apex, and the relatively narrow distal portion is broader and truncate at its distal end. The aedeagus of *camdeboo* is also long, but tapers gradually along its dorsal margin.

DISTRIBUTION AND HABITS

So far, this species is known from two localities within the Cape Agulhas National Park, as well as from Pringle Bay. It flies with a rapid, bobbing flight in open areas around dense scrub, or in the shade of taller trees. In all known localities, suitable habitat was confined to relatively small areas.

ETYMOLOGY

The present species is named after its discoverer, Dr Renzo Perissinotto, who has over many years contributed greatly to our knowledge of butterfly fauna.

DISCUSSION

It is intriguing that a species such as *Cassionympha cassius*, which is so widespread in the forested and densely wooded areas of South Africa, and remarkably constant in its facies throughout its range, should have fragmented into three distinct species in the southern region of the Western Cape. Since the answer to this phenomenon must be found in the history of the geology and vegetation of this area, it would be useful to examine what is known of this.

65 million years ago, the climate was warmer, wetter, and less windy. The globe was ice free, the ocean uniformly warm, and sea levels were higher, to the extent that much of the coastal plain was inundated. Large bays reached up to 30km inland, penetrating at least as far as present-day Bredasdorp. At this time, most of this region was covered in subtropical forest, which would have suited the ancestors of this group of butterflies.

Antarctica separated from South America between 25 and 15 million years ago, allowing the development of the cold circumpolar current. This caused Antarctica to freeze over, which in turn gave rise to the Benguela Current; these cold ocean conditions had an aridifying effect on the southern and western regions, causing sea levels to drop, as increasing quantities of water became ice. As a result, large areas of sand were exposed, which were invaded by fynbos, and since this was

better adapted to the new conditions, it therefore quickly proliferated. Because the fynbos is fire-prone, other non fire-prone vegetation types, like woodlands and forests, became increasingly restricted. By 5 million years ago, the area began to resemble what we see today, which would have caused the distribution of the ancestors of *Cassionympha* to become increasingly restricted. The past 1.5 million years have been characterised by fluctuations between long glacial cycles, lasting roughly 100,000 years, alternating with brief 10,000 year interglacial periods. The interglacials favoured the establishment of subtropical thicket and afro-montane forest in suitable areas, while during the long glacial periods, summer rainfall declined and sea levels fell. An overall reduction of temperatures by 5 degrees Celsius during the glacial period would have eliminated the more frost-sensitive subtropical plants, and caused the distribution of fire-prone wooded areas to shrink. The last glacial period was between 75,000 and 12,000 years ago, and during its coldest part, the Agulhas shelf was exposed, thereby widening the coastal plain as much as 200 kilometres in places. This would probably account for the strange distribution of species such as *Chrysoritis dicksoni* (Gabriel), which could have expanded its distribution around the coastline during this time.

It is suggested that the present species became isolated from *Cassionympha cassius* during the last glacial period – or perhaps even before that – through the disappearance of suitable habitat south of the main Langeberg-Hottentots Holland range. The species has survived along the southern seaboard in relict patches of Western Cape Milkwood Forest (Mucina and Rutherford, 2006 - Type FOz6), as well as in suitable marshy areas. In the Western Cape, *cassius* occurs in Southern Afro-montane Forest (Mucina and Rutherford, 2006 – Type FOz1) found on south and east facing slopes and in the ravines of the Cape Fold Mountains. The precise relative distribution of these two species remains to be determined, and all SABCA records from these southern regions will need to be reassessed accordingly. It seems probable that *Cassionympha detecta* speciated at an earlier time, because this species has adapted to drier environments such as renosterveld and dry riverine scrub and does not require the more moist environments preferred by *cassius* and *perissinottoi*.

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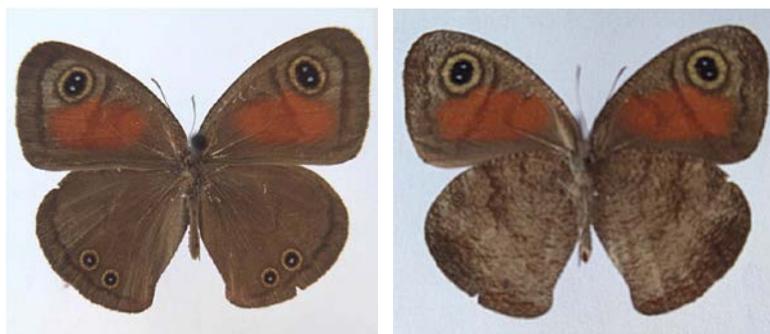
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LITERATURE CITED

- COWLING, R. & RICHARDSON, D. 1995. *Fynbos. South Africa's Unique Floral Kingdom*. Fernwood Press, Cape Town.
- GODART, J.B. 1824. *Encyclopedie Méthodique Histoire Naturelle (Zoologique)* **9**: 526.
- HENNING, G.A. & HENNING, S.F. 1997. Revisional notes on the African Satyrinae (Lepidoptera: Nymphalidae). *Metamorphosis* **8**(3): 135–140.
- MECENERO, S., BALL, J.B., EDGE, D.A., HAMER, M.L., HENNING, G.A., KRÜGER, M., PRINGLE, E.L., TERBLANCHE, R.F. & WILLIAMS, M.C. 2013. *Conservation Assessment of Butterflies of South Africa, Lesotho and Swaziland: Red List and Atlas*. Safronics and Animal Demography Unit.
- MUCINA, L. & RUTHERFORD, M.C. (eds) 2006. *The vegetation of South Africa, Lesotho and Swaziland. Strelitzia* **19**. South African Biodiversity Institute, Pretoria.
- PRINGLE, E.L., HENNING, G.A. & BALL, J.B. (eds) 1994. *Pennington's Butterflies of Southern Africa 2nd Edition*. Struik Winchester, Cape Town.
- VAN SON, G. 1955. *The Butterflies of Southern Africa. Part 2. Nymphalidae: Danainae and Satyrinae*. Transvaal Museum Memoirs **8**: 96.



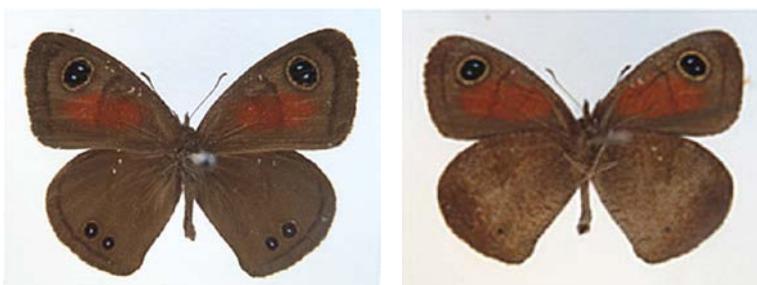
Figures 1 & 2 – *C. cassius* Neotype male recto & verso (Cape Town)



Figures 3 & 4 – *C. cassius* male recto & verso (Suurberg)



Figures 5 & 6 – *C. cassius* female recto & verso (Graskop)

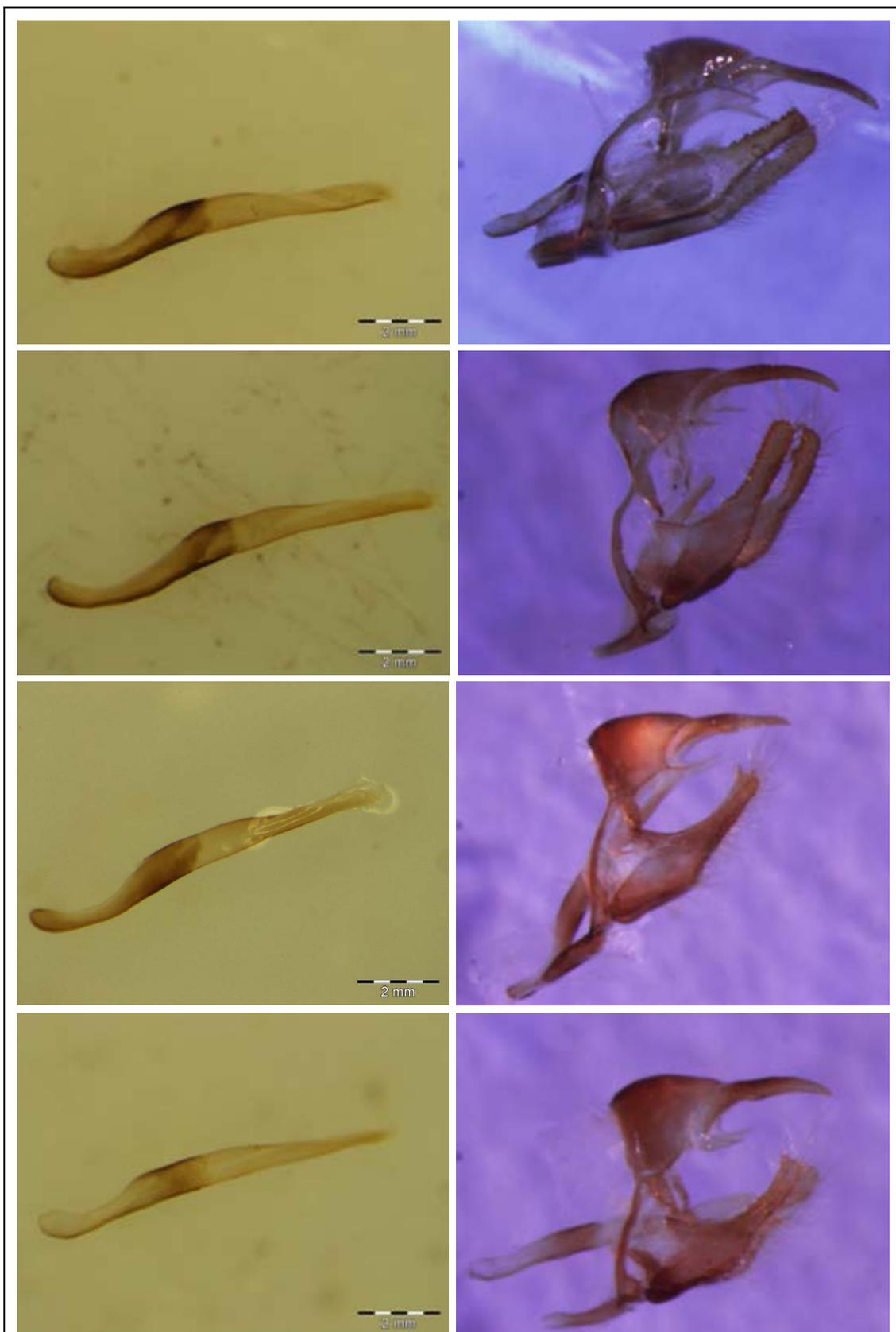


Figures 7 & 8 – *C. perissinottoi* male recto & verso (Cape Aghulas)



Figures 9 & 10 – *C. perissinottoi* female recto & verso (Cape Aghulas)

PLATE 1



Aedeagus of *Cassionympha* species:

Figure 11 – *C. cassius* (Cape Town)

Figure 12 – *C. perissinottoi* (Cape Aghulas)

Figure 13 – *C. detecta* (Witsand)

Figure 14 – *C. camdeboo* (Camdeboo Mountains)

Male genitalia of *Cassionympha* species:

Figure 15 – *C. cassius* (Cape Town)

Figure 16 – *C. perissinottoi* (Cape Aghulas)

Figure 17 – *C. detecta* (Witsand)

Figure 18 – *C. camdeboo* (Camdeboo Mountains)

PLATE 2