



CALLEREBIA DIBANGENSIS (LEPIDOPTERA: NYMPHALIDAE: SATYRINAE), A NEW BUTTERFLY SPECIES FROM THE EASTERN HIMALAYA, INDIA

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Abstract: A new species of butterfly in the genus *Callerebia* (Butler, 1867) is described from the Upper Dibang Valley district, Arunachal Pradesh, India. A combination of very distinctive characters: large size; highly rounded wings; striking under hindwing white scales; distinctive under hindwing tornal ocelli; large round forewing orange apical spot and a dark brown under ground colour distinguishes this butterfly from any other *Callerebia* species.

Keywords: Arunachal Pradesh, *Callerebia opima*, *C. scanda*, *C. orixa*, *C. annada*, *C. suroia*, Dibang Valley, Mithun River.

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Author Details: PURNENDU ROY is a naturalist with a particular interest in the eastern Himalaya where he has recorded several new Indian butterfly records. He is currently working as a volunteer with foundbutterflies.org developing the database and source code and is committed to open access resources for naturalists.

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INTRODUCTION

Callerebia (Butler, 1867) is a genus of approximately 11 species and 20 subspecies (Appendix 1), almost entirely confined to the Sino-Himalayan region. The genus is composed of medium to large butterflies with small bodies in relation to their broad, rounded wings. The hindwing in many species is produced at the tornus to form a slight lobe. The antennae are thin, only slightly thickening towards the tip. The markings, though very variable follow a fairly constant arrangement: the upper ground colour is dark brown to blackish; the forewing with a bi-pupilled apical ocellus; the upper hindwing with or without one tornal spot; the under hindwings are often covered by whitish scales of different densities, tones and patterns, with or without one or two tornal ocelli; in addition, some species have a set of up to four post-discal white dots on the under hindwing. All species may also have additional ocelli as part of their variation. Older literature on Indian butterflies (Talbot

1947; Wynter-Blyth 1957) places *Callerebia* under *Erebia*. Bruna et al. (2000) treat these species as being under *Callerebia*, *Hemadara* and *Paralasa*. Huang (2003) described a new species of *Callerebia* - *C. ulfi* from northwestern Yunnan and did a revision of *C. polyphemus* and its subspecies and had a note on the status of *C. suroia*. Bruna et al. (2000) comments on the taxonomic uncertainty of this genus, the remarkable variation in wing pattern and genitalia morphology. It is certainly the case that the variation in pattern that exists between different populations has made the use of key-based identification very difficult and has led to confusion over the status and identity of certain species and forms. Several of the eastern Himalayan species are characterised by their large orange-ringed forewing apical ocellus contrasting prominently against a dark brown, blackish upper ground colour. The under hindwings are covered with prominent white striations. Though many of the species appear confusingly similar, this new species is visually very distinct and is a beautiful

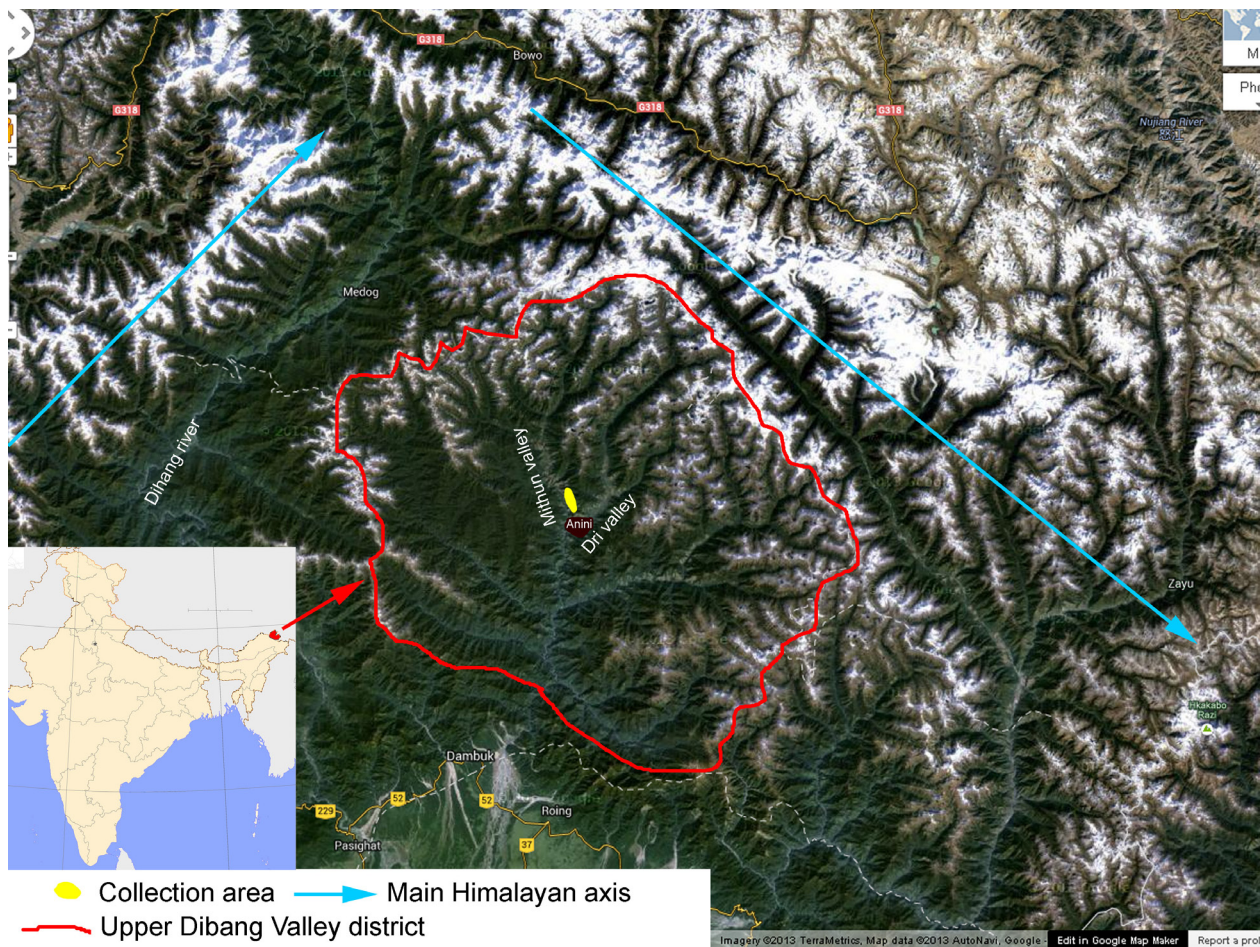


Figure 1. Satellite picture of Upper Dibang Valley District

and striking addition to the eastern Himalayan fauna.

The Upper Dibang Valley District (Fig. 1) lies between 95°15'–96°35'E & 28°22'–29°27'N. It is further north than Bhutan, Sikkim and eastern Nepal. It is situated in a very complex and active geological zone where the main Himalayan axis turns abruptly north-west to south-east forming a ridge of moderately high mountains to the north and east, between 4000–5400 m, which separate the Dibang Valley from the Pemako region of Tibet to the north and Chayu county of Tibet to the east. A western ridge largely above 3600m separates the Dihang and Dibang valleys. The district capital Anini (1,968m) is situated on a plateau between the confluence of the Dri and Mithun rivers and its annual rainfall (2003) was 3,281.33mm (Upper Dibang Valley official website 2012). The predominant natural vegetation around 1800m is sub-tropical hill forest and temperate forest. However, there are quite large areas of grasslands in the Dri and Mithun valleys probably formed principally by human activity. The district is sometimes regarded as India's remotest, on account that the road connection is frequently closed by landslides from April to October. 72.32% of the district is recorded as forested (Department of Environment and Forests, Government of Arunachal 2012) and has the lowest population density of any district in India (<1km²) (Upper Dibang Valley official website 2012) (Fig. 1 – Satellite Image of Upper Dibang Valley District).

METHOD AND MATERIALS

The majority of the sites visited were in the Dri and Mithun valleys within a day's return walk from Anini

(c. 2,000m) from the period of 17 July to 13 August 1987. 14 to 16 August 1987 were spent travelling to the Ithun Valley on the southern edge of the Upper Dibang Valley District. The Dibang Valley government provided a guide and assistance, which was invaluable. Only species considered of interest and which could not be determined in the field were collected. These are deposited in the Natural History Museum, London, U.K.

Previous to the visit to the Upper Dibang Valley, the author had undertaken numerous visits to Nagaland, Manipur and Arunachal Pradesh and so was familiar with many of the butterfly species that commonly occur in northeastern India.

Callerebia dibangensis sp. nov.

(Image 1)

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Material examined

Holotype: # 982926, 24.vii.1987, male, 28.88°N & 95.85°E, ±10km, c.1,830m, Mithun Valley, Upper Dibang Valley District, Arunachal Pradesh, India, coll. Purnendu Roy, The Natural History Museum, London.

Diagnosis

There does not appear to be any other species of *Callerebia* like this species in the Natural History Museum collection.

The following is a list of characteristics that are unique to this specimen and/or rarely expressed by other *Callerebia* species. Reference can also be made to images 2–4 which feature the other Indian Eastern Himalayan species *C. scanda opima*, *C. suroia*, *C. scanda scanda*, *C. orixa* and *C. annada annada*. A Chinese species, *C.*



Image 1. *Callerebia dibangensis* sp. nov., male (holotype # 982926) left dorsal view and right ventral view. c. 1,830m, 24.vii.1987, Mithun Valley, Upper Dibang Valley, Arunachal Pradesh, India. © Trustees of the Natural History Museum, London, used with permission



Image 2. *Callerebia* species from northeastern India - male dorsal view

1. *C. dibangensis* sp. nov., (holotype # 982926) c.1,830m, 24.vii.1987, Mithun Valley, Upper Dibang Valley, Arunachal Pradesh, India; 2. *C. scanda opima*, 2,438–4,877 m, Lachin Lachoong, Sikkim, India; 3. *C. suroria*, 2,590m, Suroifui, Manipur, India; 4. *C. scanda scanda*, Darjeeling, West Bengal, India; 5. *C. orixa*, 03.x.1910, 1219m, Kohima, Nagaland, India; 6. *C. annada annada*, Bhutan
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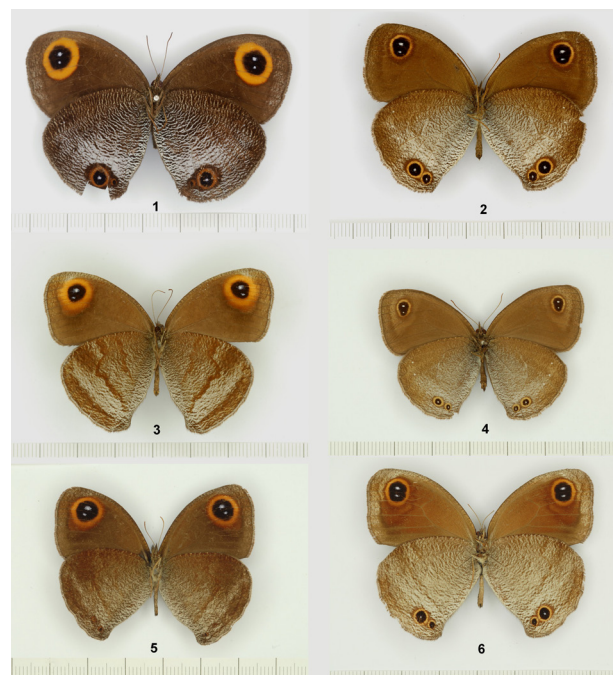


Image 3. *Callerebia* species from northeastern India - male ventral view

1. *C. dibangensis* sp. nov., (holotype # 982926) c.1,830m, 24.vii.1987, Mithun Valley, Upper Dibang Valley, Arunachal Pradesh, India; 2. *C. scanda opima*, 2,438–4,877 m, Lachin Lachoong, Sikkim, India; 3. *C. suroria*, 2,590m, Suroifui, Manipur, India; 4. *C. scanda scanda*, Darjeeling, West Bengal, India; 5. *C. orixa*, 03.x.1910, 1219m, Kohima, Nagaland, India; 6. *C. annada annada*, Bhutan
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polyphemus, is similar to *C. suroia*, but is usually not so well marked on the under hindwing. Comparison has only been made against male specimens. Females are usually larger, upper ground colour paler, underside markings more pronounced and the apical ocellus rounder.

(i) Size: One of the largest male *Callerebia* specimens (Table 3); only large forms of *C. polyphemus* and *C. scanda opima* are of comparable size. Within the NHM collection, *C. dibangensis* sp. nov. is noticeably larger than other male specimens.

(ii) Wing shape: The forewings are very large and broad, the costa convex and forming a smooth curve all around the apex to the termen. The hindwing tornus is barely produced and rather round. Only specimens of *C. scanda opima* from eastern Bhutan express a similar forewing shape, but their hindwing tornus tends to be noticeably produced.

(iii) Underside hindwing pattern: The under hindwing patterns of *Callerebia* (Image 4) are complex and difficult to describe. In several species the scales on the hindwing are arranged as short little white lines

called striae. In the new species the white striae on the basal half of the wing are very well separated, regular and straight. They contrast prominently with the dark brown ground colour. Apart from the costal margin and apex the striae are always white with no evidence of variegation or bands in the hindwing pattern. The tone of the white scales is slightly violaceous.

(iv) Underside hindwing tornal ocelli: The ocellus in space 2 is larger than is typical for *Callerebia* and the ocellus in 1c tiny and blind. It is the only species where the ring colour is orange rather than yellow-fulvous. When ocelli are expressed in other species this combination of a large ocellus in space 2, with a tiny blind ocellus in 1c, does not appear typical.

(v) Forewing apical ocellus: The ocellus is very large, rather round and has a wide and fairly regular orange ring of a uniform colour. *C. suroia* and *C. polyphemus* also have a large ocellus, but it is very different from the new species: when large the ring is constrained distally; far more irregular; elongated posteriorly and with a greater amount of red suffusion. The ocellus of *C. orixa* is the most similar in terms of appearance and

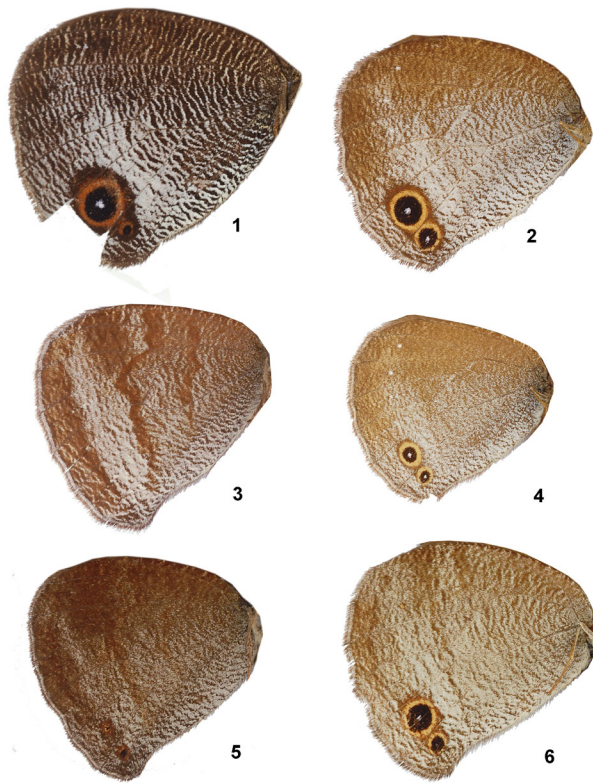


Image 4. *Callerebia* species from northeastern India - male hindwing ventral view

1. *C. dibangensis* sp. nov., (holotype # 982926) c.1,830m, 24.vii.1987, Mithun Valley, Upper Dibang Valley, Arunachal Pradesh, India.
2. *C. scanda opima*, 2,438–4,877 m, Lachin Lachoong, Sikkim, India
3. *C. suroria*, 2,590m, Suroifui, Manipur, India
4. *C. scanda scanda*, Darjeeling, West Bengal, India
5. *C. orixa*, 03.x.1910, 1219m, Kohima, Nagaland, India
6. *C. annada annada*, Bhutan

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roundness, but the orange ring is never as wide as the new species in relation to ocellus size.

(vi) **Under ground colour:** Dark chocolate brown, much darker and plainer than *C. scanda*, *C. orixa*, *C. suroia* and *C. annada*.

The closest species appears to be *C. scanda opima* (Images 2–4, Fig. 2). Fourteen males of *C. scanda opima* in the NHM collection were compared with *C. dibangensis* sp. nov. and the key external features are summarised in Table 1.

Table 2 is a list of all *Callerebia* species with their key characteristics. It has been highlighted where they differ from *C. dibangensis* sp. nov. either as a group or individually.

Species names and genera were referenced in LepIndex (Beccaloni et al. 2003) and Savela (2012) to ensure that I have compared the new species with all

possible species of *Callerebia*. There was no comparable species in the allied genera of *Hemadara*, *Loxerebia*, *Argestina* and *Paralasa* which are comprehensively covered by Bruna et al. (2000). The plates of d'Abrera (1985, 1990, 1992) covering *Satyrinae* in the Holarctic and Oriental regions were also referred to and there appears to be no other genera this species may belong to.

On the basis of the unique combination of these characteristics mentioned above I propose this as a new species.

Description

Holotype: # 982926, 24.vii.1987, male (Image 1). Forewing length 34mm. 28.88°N & 95.85°E ±10km, c.1,830m, Mithun Valley, Upper Dibang Valley District, Arunachal Pradesh, India, coll. Purnendu Roy, the Natural History Museum, London.

Upperside: Ground colour dark chocolate brown, slightly blackish, paler towards margins. Very large round orange-ringed apical ocellus (11mm), black inner with two white pupils. Edges of ring distinct and regular. Hindwing single ternal ocellus in space 2. Narrow reddish ring, black inner and white pupil.

Underside: Ground colour dark chocolate. Forewing apical ocellus large as on upperside, but with an additional thin reddish outer ring. Forewing termen margin covered with a thin scattering of white scales tapering towards tornus. Hindwing white scales forming prominent small lines (striae) with slight violet tones covering the whole wing apart from a narrow area around the ternal ocelli. Striae become darker towards the costa and apex giving a fading effect. In the basal half they are more separate and alternate with the dark brown ground colour producing a distinctive snow-drift like appearance. They are densest towards the discal region in spaces 1, 2 and 3 where they merge with one another. Hindwing two ternal ocelli, ocellus in space 2 much larger than 1c which is blind. Both ocelli orange-ringed with a black centre. Ocellus in space 2 with a white pupil.

Etymology

Named after the Dibang Valley District in Arunachal Pradesh, India.

Location

Only one specimen was observed and collected on the 27 July 1987 and is the holotype. The species was collected along the track that leads from Anini to Mipi between the altitude of 1600–1800 m approximately

Table 1. Comparison of *Callerebia dibangensis* sp. nov and *C. scanda opima*

	<i>Callerebia dibangensis</i> sp. nov., male (Images 2–4, fig. 1)	<i>C. scanda opima</i> , male (Images 2–4)
f/w length (mm)	34	29
wing shape	f/w costa, apex and termen rounded producing a very broad and round wing. Ratio of height to width approx.0.76.	Less rounded. Termen more inwardly facing. Wing less broad. Ratio of height to width approx.0.67.
Upperside		
f/w ground colour	Dark chocolate brown. Blackish. Paler on whole termen margin and apical region. Lacks the alternating contrasting area distal to apical ocellus that is typical in <i>opima</i> . Obscure dark submarginal band.	Usually paler. Paler on termen margin between v1 to v7. Pale triangular region around apical ocellus from costa tapering posteriorly. Obscure dark submarginal band formed from these contrasting regions.
f/w apical ocellus	Very prominent and large. Ring orange and wide (2.4mm) and colour pretty constant around whole ring. Ratio to inner black ocellus approximately 0.42. Shape more round than oval.	Not as prominent ring narrow fulvous-yellow to fulvous-orange. (1.1–1.5 mm). Colour often more obscure posteriorly. Ratio to inner black ocellus approximately 0.24. Shape more oval, posteriorly more produced.
h/w tornal ocelli	1 ocellus in space 2. Thin reddish-ring. Black centre and central white ocellus.	1 ocellus in space 2. Wide reddish-ring approximately half the width of black centre. Central white pupil.
h/w termen cilia	A mixture of dark brown and white appears indistinct.	White and brown tipped appears fairly prominently as a white line.
Underside		
ground colour	Dark chocolate brown.	Lighter brown with more reddish and complex tones in f/w especially around apical ocellus.
h/w white striae (Image 4, figs. 1–2)	Less dense forming drifts like patterns emphasised by dark brown scales. Violet tones to white striae.	Dense and more irregular. Less contrast between white striae. More yellow tones to white striae.
apical ring	Outer reddish-red ring much narrower than orange ring.	Outer reddish-ring wider than inner fulvous-yellow ring.
h/w ocelli 2 and 1c	Ocellus in 2 appearing 3x the size of ocellus in 1c. 1c blind. Ring reddish-orange.	Ocellus in 2 appearing 2x the size as 1c. Both ocelli with white pupils. Ring fulvous-yellow.
white post-discal ocelli h/w	Appear to be absent, but possibly present extremely minutely in space 6.	Usually present if only minutely, but can be absent.

Table 2. Key identification features of male *Callerebia* species.

<p>Eastern Himalayan (roughly east of Eastern Nepal) species with a large to very large ocellus that substantially occupies the apical region of the upper f/w. Ring colour usually orange fulvous but may be also be yellowish-orange to reddish. Ocellus outer rings often irregular especially when ocellus ring is wide. Under h/w with prominent white striations overlaid with strong to weak bands and/or variegation. Often large butterflies.</p> <p>These species differ significantly in wing shape from <i>C. dibangensis</i> sp. nov.: f/w less rounded and more produced; h/w produced and with lobe; under h/w overlaid with bands and variegation.</p>		
	Key identification features	Notes
<p><i>C. polyphemus</i> <i>C. p. annadina</i> <i>C. p. confusa</i> <i>C. p. ricketti</i></p>	<ol style="list-style-type: none"> 1. under h/w with basal, discal and submarginal bands, but variable. Basal often absent and in ssp. <i>annadina</i> discal band also faint. 2. upper f/w apical ocellus reddish in <i>C. p. annadina</i> and <i>C. p. ricketti</i> otherwise orange fulvous. Variable in size. If ring is wide then distally distorted. 3. under h/w tornal ocelli variable and may be absent. Always absent in ssp. <i>confusa</i> and ssp. <i>ricketti</i>. 4. underside white striae clearer and less dense than in <i>C. suroia</i>. 	<p>A very variable butterfly. For identification of the subspecies refer to Huang (2003). This is the most eastern <i>Callerebia</i> species extending to central China. The western limit appears to be eastern Tibet. Bruna et al. (2000) treat <i>C. suroia</i> as a western subspecies and ssp. <i>annadina</i> as a distinct species. <i>C. suroia</i> may overlap in northwestern Yunnan with ssp. <i>annadina</i>.</p>
<p><i>C. suroia</i> (Image 2-4, fig.3)</p>	<ol style="list-style-type: none"> 1. h/w basal, discal and submarginal bands very defined. 2. white striation dense. 3. upper h/w tornal ocellus usually absent. 4. upper f/w ocellus large irregular and straight to distal margin. 	<p>The sharply defined h/w bands and the irregular f/w ocellus are very distinctive features that separate this species from all other <i>Callerebia</i> species. Tytler (1914) remarks specimens in July fresh and in August worn. Anecdotally described as woodland butterfly in northwestern Yunnan.</p>
<p><i>C. ulfi</i></p>	<ol style="list-style-type: none"> 1. white scales on upper f/w margins. 2. no tornal ocelli on under h/w 3. discal band faint. 4. size smaller than <i>C. suroia</i> in China. 	<p>Refer to Huang (2003) for plate, description and diagnosis. White scales on upper f/w margins seem particularly diagnostic.</p>
<p><i>C. orixa</i> (Image 2-4, fig.5) <i>C. watsoni</i></p>	<ol style="list-style-type: none"> 1. under h/w with two tiny tornal ocelli both blind. Scales fine, bands faint, but variegation strong. Ground colour reddish brown. 2. upper f/w apical ocellus orange ring round and more regular than <i>C. suroia</i>. <p><i>C. watsoni</i> similar, smaller and under h/w markings more distinct.</p>	<p>Tytler (1911) ‘fairly common on grass slopes 6000-7000ft Sep-Oct.’ Distribution and flight period July–October overlaps with <i>C. suroia</i> in Manipur and Nagaland.</p>

<p>Eastern Himalayan species. Under h/w with post-discal white dots (may be obscured if white striae is very heavy) and two tornal spots. Upper f/w apical ocellus large but never occupying as much space as species above. Under h/w pattern looks less banded. White striae fading or absent in upper submarginal and discal areas.</p>		
<p><i>C. scanda opima</i> (Image 2-4, fig.2)</p>	<p>1. upper f/w apical ocellus ring yellow/fulvous to orange. 2. under h/w with dense white striae. 3. under h/w lack bands and variegation. 4. white cilia prominent.</p>	<p>Much larger and more richly coloured than its nominotypical form. A comparison of <i>C. scanda opima</i> and <i>C. dibangensis</i> sp. nov. is presented in Table 1.</p>
<p><i>C. hybrida?</i></p>	<p>See western Himalayan species for note.</p>	
<p>East Himalayan species with upper f/w apical ocelli medium to small. Ocellus not appearing to occupy a large proportion of the f/w apical area. <i>C. dibangensis</i> sp. nov. differs from these species by the size of the f/w apical ocellus; under h/w pattern and wing shape. <i>C. baileyi</i> and <i>C. tsirava</i> do not closely resemble any other eastern Himalayan <i>Callerebia</i> species.</p>		
<p><i>C. annada annada</i> (Image 2-4, fig.6)</p>	<p>1. upper f/w apical ocellus not large but still fairly prominent, almost like two separate ocelli merged together with a narrow orange-fulvous ring. Hence oval shaped. 2. under f/w ground colour earthy brown and reddish tones. 3. under h/w white striations quite similar to <i>C. scanda opima</i> but less white in colour. Vague discal and submarginal bands. Two tornal spots with pupils.</p>	<p>The nominotypical form is very rare and only from Bhutan. Under h/w ground colour paler and much less richly coloured than <i>C. orixa</i> and upper f/w ocellus much smaller. Wing shape quite unlike <i>C. dibangensis</i> sp. nov. with termen very straight and at acute angle to the costa. H/w produced and with lobe.</p>
<p><i>C. baileyi</i></p>	<p>1. upper marginal area of both wings clouded with white scales. 2. upper f/w apical ocellus not large or prominent, appearing as two touching black ocelli with white pupils. Virtually no outer rings to ocelli. Lower ocellus variable in size sometimes missing. 3. under h/w with dense white scales making the wing appear mainly white with some fine striations and quite unlike any other <i>Callerebia</i>.</p>	<p>The chalky white under h/w, white upper margin and rather small and indistinct upper apical f/w ocellus makes this species unmistakable. Very restricted distribution: Chayu County, Tibet to border of Anjaw District, Arunachal Pradesh, 1828–3048 m. Recorded from 26 June–8 July.</p>
<p><i>C. tsirava</i></p>	<p>1. under f/w reddish; apical ocellus small and round (in plate lower pupil very small). 2. under h/w dorsal and termen margins broadly covered with closely-set white scales, leaving only a broad rectangular dark-brown costal area. Thin wavy discal line.</p>	<p>Evans (1914) states 'Closely allied to, if not a race of <i>C. annada</i>.' Very restricted distribution: Po Chu Valley, Pemako Chung on Tsang Po, 2280–2740 m. Recorded from 30 June–7 August.</p>
<p>Western Himalayan species. Except for <i>C. annada caeca</i> these are not large species. Under h/w white striations much weaker than the eastern Himalayan species. Upper f/w apical ocellus ring narrow and never as prominent as the E. Himalayan species. No similar species to <i>C. dibangensis</i> sp. nov.</p>		
<p><i>C. annada caeca</i></p>	<p>1. under h/w two tornal spots blind. 2. under f/w earth-brown slightly reddish. 3. under h/w covered in white scales which are densest between the post-discal and submarginal bands. 4. larger than the other western Himalayan species.</p>	<p>Bruna et al. (2000) often sympatric with <i>C. hybrida</i> and <i>C. scanda</i></p>
<p><i>C. hybrida</i></p>	<p>1. under h/w a series of up to four white post-discal dots. 2. discal and submarginal lines usually well marked but may be obsolete though some indication usually appears to remain. 3. white striations not so well marked and usually of very fine scales (may vary according to season and region). 4. under h/w tornal ocelli usually two with or without pupils yellow/fulvous ringed.</p>	<p>van der Poel & Wangchuk (2007) have listed this species in Bhutan. There is a photograph of the underside. H/w white striae are denser and the f/w apical ocellus more orange than typical.</p>
<p><i>C. scanda scanda</i> (Image 2-4, fig.4)</p>	<p>1. under h/w a series of up to four white post-discal dots. 2. under h/w dorsal half with dense fine and white scales. Scales less white and dense towards costa and apex hence giving a fading effect. 3. under h/w white scales with bluish tone.</p>	<p>Ground colour much paler than <i>C. scanda opima</i>. It is difficult to determine where <i>C. scanda scanda</i> ends in Nepal/Sikkim and <i>C. scanda opima</i> begins. Specimen figured from Darjeeling, West Bengal is probably the eastern limit of the nominotypical sp.</p>
<p><i>C. n. nirmala</i> <i>C. n. materta</i> <i>C. n. daksha</i> <i>C. n. kala</i> <i>C. n. scandina</i></p>	<p>1. upper ground colour dark brown not fading distally. 2. under h/w 1-6 post-discal ocelli and/or white dots. 3. under h/w with/without faint discal line. 4. under f/w ocellus round and large. 5. brownish-cinereous dusting variable depending on subspecies.</p>	<p>Very variable with many regional subspecies.</p>

5–10 km from Anini. The surrounding vegetation was mixed sub-tropical broad-leaf forest. There was no GPS available and there was no nearby habitation or named place.

DISCUSSION

This very distinctive butterfly was collected in 1987. It is possible this butterfly was overlooked for the following reasons:

Table 3. Approximate expanse of *Callerebia* species

	NHM collection (males only)	Huang (2003) Length forewing x 2	Talbots (1947) (male and female)
<i>C. polyphemus confusa</i>		70-61	
<i>C. dibangensis</i> sp. nov.	68		
<i>C. polyphemus</i>		65	
<i>C. polyphemus ricketti</i>		64	
<i>C. polyphemus annadina</i>		62	
<i>C. scanda opima</i>	62-51		76-68
<i>C. annada annada</i>	59-49		70-60
<i>C. suroia</i>	57-52	65-60	65-60
<i>C. orixa</i>	56-45		60-58
<i>C. ulfi</i>		58	
<i>C. baileyi</i>	56-45		67-60
<i>C. scanda</i>	48-39		60-50
<i>C. hybrida</i>			60-50
<i>C. tsirava</i>	Evans (1914) states size similar to <i>C. orixa</i>		
<i>C. watsoni</i>			56-52
<i>C. nirmala</i>			55-45

(i) There appear to have been very few butterfly surveys of the Dibang Valley. Evans (1914) lists the butterflies collected by F.M. Bailey during his tour of southeastern Tibet. He started his trip from the Mithun Valley in mid May 1913, but does not appear to have recorded any butterflies from the region. Borang et al. (2008) conducted a survey of the Dihang-Dibang Biosphere Reserve during November 2006 and October 2007 and recorded 134 species/subspecies, but this covered many places outside of the Dibang Valley and the survey dates were probably rather late for higher elevations and they did not record any *Callerebia* species. Endemicity is not a feature of Himalayan butterflies, but as outlined in the introduction the Dibang Valley is in a very unique geographical zone. Two *Callerebia* species from neighbouring regions of Tibet - *C. tsirava* and *C. baileyi* appear to have very restricted distributions.

(ii) The specimen was collected at the end of July in Upper Dibang Valley. Many places such as Eaglenest (West Kameng District) have access problems in the monsoon and are consequently poorly surveyed in the months of July and August which also appears to be the main flight period for *C. scanda opima* according to the NHM collection labels.

(iii) The most surveyed areas in Arunachal Pradesh appear to be Eaglenest (West Kameng District) and Namdapha (Changlang District). Both these areas are on

the outer ranges and are not an interior location where this species was collected.

C. orixa, *C. annada*, *C. suroia*, *C. scanda scanda* and *C. scanda opima* are the present known *Callerebia* species from northeastern India (Images 2–4). In addition an allied species *Hemadara narasingha* has been recorded from Sikkim, Arunachal Pradesh (Abor Hills) and the Lower Tsang Po. This species is smaller, with narrow forewings and the hindwing angled on the termen and produced at the tornus. A description may be found in Talbot (1947). I cannot find much literature regarding recent records of *Callerebia* in Arunachal Pradesh. Betts (1950) records *C. orixa* from West Kameng 'Rupa, 5000ft. Sept. Common in grassland in sheltered valleys in the temperate Momba country.' Older literature records two more possible Indian species. South (1914) records a specimen of *C. polyphemus* collected by F.M. Bailey at Tawang, Arunachal Pradesh. It should be noted that *C. polyphemus* has not been recorded so far west and *C. suroia* was only described in 1914 so the identification of this record needs to be confirmed. South (1913) also records that F.M. Bailey collected a specimen of *C. baileyi* from Dichu (6000ft, 1829m). The Dichu River, Anjaw District, Arunachal Pradesh is just before the border with Tibet. The majority of the specimens were from Drowa Gompa, Tibet (3,048m) to the north of the Mishmi Hills. I have not seen any contemporary records for this species in India.

Rather speculatively I think the new species is closely allied to *C. scanda opima* on the basis of wing shape and the under hindwing pattern. There also appear to be minute white dots in space 6 of the under hindwing. These white dots do not appear to occur in *C. polyphemus*, *C. suroia*, *C. annada* and *C. orixa*. Bruna et al. (2000) comment that most *Callerebia* species are allopatric. However, the distributions of *C. suroia* and *C. orixa* overlap in Manipur and Nagaland, though it is not known if they fly together in the same habitat. It will be interesting to have contemporary field data and phylogenetic studies to clarify the relationships of the different forms and species.

Conclusions

Callerebia dibangensis sp. nov. is a new species of Satyrine butterfly from the Dibang Valley in the eastern Himalayan region of India possibly allied to *Callerebia scanda opima*. I propose that this common name is determined by the people of the Dibang Valley, since this butterfly appears to be endemic to that valley.

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- Appendix 1. List of Callerebia species and subspecies. (based on Bruna et al. (2000), Huang (2003) and Savela (2012).**
- Callerebia annada* (Moore, 1858)
 - C. a. annada* (Moore, 1858) Bhutan
 - C. a. caeca* (Watkins, 1925) Kashmir to Nepal.
 - Callerebia baileyi* (South, 1913)
 - C. b. baileyi* (South, 1913) Chayu county, E. Tibet, Anjaw District, Arunachal Pradesh?
 - Callerebia hybrida* (Butler, 1880)
 - C. h. hybrida* (Butler, 1880), Himachal Pradesh – Nepal, Bhutan?
 - Callerebia nirmala* (Moore, 1865)
 - C. n. nirmala* (Moore, 1865) Kangra District, Himachal Pradesh to W. Nepal
 - C. n. materta* (Fruhstorfer, 1916) Chitral
 - C. n. daksha* (Moore, 1874) Kashmir
 - C. n. kala* (Evans, 1924) Muree, Pakistan
 - C. n. scandina* (Fruhstorfer, 1916) Kinnaur district, Himachal Pradesh (Bashahr and Kunawur)
 - Callerebia orixa* (Moore, 1872)
 - C. o. orixa* (Moore, 1872) Meghalaya, Manipur, Nagaland, N. Thailand? Laos?
 - Callerebia polyphemus* (Oberthür, 1877)
 - C. p. polyphemus* (Oberthür, 1877) S. Gansu, S. Ghanxi, W. Sichuan
 - C. p. annadina* (Watkins, 1927) N.W. Yunnan
 - C. p. confusa* (Watkins, 1925) Hubei, Hunan
 - C. p. ricketti* (Watkins, 1925) Fujian S.W. China
 - Callerebia scanda* (Kollar, 1844)
 - C. s. scanda* (Kollar, 1844) Kashmir to S. Sikkim, Darjeeling, West Bengal
 - C. s. opima* (Watkins, 1927) Eastern Nepal N. Sikkim, E. Bhutan
 - Callerebia suroia* (Tytler, 1914)
 - C. s. suroia* (Tytler, 1914) Manipur, Nagaland, N. Myanmar, N. Yunnan, Sichuan, N. Vietnam
 - Callerebia tsirava* (Evans, 1915)
 - C. tsirava* (Evans, 1915) S.E. Tibet (Po Chu Valley, Pemako Chung on Tsang Po)
 - Note publication dates seems to be 1914.
 - Callerebia ulfi* (Huang, 2003)
 - C. ulfi* (Huang, 2003) N.W. Yunnan
 - Callerebia watsoni* (Watkins, 1925)
 - C. watsoni* (Watkins, 1925) Chin Hills, Myanmar

