

NOTES ON INDIAN SPECIES OF *PARERONIA* BINGHAM, 1907 (LEPIDOPTERA: PIERIDAE)

PETER SMETACEK^{1*}, ADAM M. COTTON² & YUTAKA INAYOSHI³

¹ Butterfly Research Centre, Bhimtal 263 136, Uttarakhand, India

² 86/2 Moo 5, Tambon Nong Kwai, Hang Dong, Chiang Mai, Thailand

³ Sritana Condominium 2, 96/173, Huay Kao Rd., T. Suthep, A. Muang, Chiang Mai, Thailand

*Corresponding author: petersmetacek@gmail.com

Reviewer: Zdenek F. Fric

ABSTRACT

The overlooked homonymy of *Papilio hippia* Fabricius, 1787 in Indian literature is discussed, and *Pareronia anais* Lesson, 1837 is confirmed as the valid name for the species. We point out that the Andaman Island taxon *naraka* (Moore, 1877) was shown to be conspecific with *Pareronia anais* by Yata (1981); and the infrasubspecific status of *Pareronia avatar* form *tarina* Fruhstorfer (1903) is confirmed.

The genus *Pareronia* Bingham, 1907 currently includes 13 species distributed from India and Sri Lanka eastwards to Papua New Guinea (D'Abrera, 1977; Yata, 1981). Regarding the three species reported from the Indian subcontinent, it appears that several taxonomic updates published in extra-Indian literature have been overlooked by recent Indian authors (Varshney & Smetacek, 2015; Smetacek, [2016]; Kehimkar 2016; Bhakare & Ogale, 2018) and therefore we re-iterate the following observations:

1. *Pareronia anais* (Lesson, 1837)

This taxon was treated as *P. valeria hippia* in Evans (1932); Wynter-Blyth (1957), Varshney & Smetacek (2015). Yata (1981) showed that *P. valeria* was, in fact, restricted to an area from southern Myanmar, through the Malay Peninsula, Singapore to Sumatra, Borneo, Java to Flores and Palawan plus nearby islands. The Indian subcontinent is home to a different species, with a distribution restricted to the Asian mainland from northern India eastwards to Hainan, Guangdong and the northern part of W. Malaysia; for this, the name *hippia* (Fabricius, 1787) was available and used by subsequent Indian authors (Kehimkar, 2016). However, Eliot (1978) recognized that *Papilio hippia* Fabricius, 1787 is a junior primary homonym of *Papilio hippia* Cramer, 1779, which is now placed in the genus *Pseudonympha* Wallengren, 1857 (Nymphalidae) and is, therefore, permanently unavailable. Therefore, the name *anais* Lesson, 1837 is the valid name for the species found on the Indian

subcontinent and the valid combination is *Pareronia anais* as pointed out by Eliot (1978).

Corbet (1941) drew attention to the primary homonymy of *Papilio philomela* Linnaeus, 1763 (now placed in *Ypthima* Hübner, 1818) and *Papilio philomela* Fabricius, 1793, a name given to the yellowish female form of *Pareronia* which mimics *Parantica aspasia* (Fabricius, 1787). Eliot (1978) proposed the name *lutea* for this female form, which he placed in *P. anais*; however, examination of the type of *Papilio philomela* in the Banks Collection (NHM, London) showed it belongs to *Pareronia valeria*, and so *lutea* Eliot, 1978 is the yellow form of that species. Fruhstorfer (1903a) described ♀ ab. *livilla* from Vietnam, misunderstanding that *philomela* is the yellow female form of the same species from India. Thus, the yellow form of the female of *Pareronia anais* can be referred to as form *livilla* Fruhstorfer, 1903.

2. Varshney & Smetacek (2015) followed older authors (Bingham, 1907; Evans, 1932; Talbot, 1939) in treating the Andaman Island taxon *naraka* (Moore, 1877) under *P. ceylanica* (C. Felder & R. Felder, 1865). However, Yata (1981) had shown that this taxon properly belongs under *Pareronia anais* based on male genitalia. *Pareronia anais naraka* is the valid combination for this taxon.

3. Fruhstorfer (1903b) described a rather distinct dry season form of *Pareronia avatar* and named it *tarina*. In his own words (translated from German):

‘The dry season form differs so considerably from typical *avatar* that I wish to bestow a name on it, for which the name *tarina* is proposed.

Tarina gives the impression of being a different species, especially considering its small size, the very faintly black outlined forewing and the absence of the black margin on the hindwing. The ♀ also differs considerably, but then it is quite the contrary of the wet season form. Then it is much darker than the wet season form and the veins of the forewing are more broadly marked with black.

The underside is very similar to *hippia*, especially on the hindwing, which has a brownish grey colour.

Sikkim. March-April 4 ♂♂ 1 ♀, Lower Burma.’

Kaur *et al.* (2023) raised *tarina* to species rank and noted the following points to distinguish *tarina* from *avatar*:

‘In *P. avatar* the uncus from the dorsal view is Y-shaped with median arm longer than lateral arms whereas in case of *P. tarina* the uncus from dorsal view is Y-shaped but the median arm is almost as long as the lateral arms. The apical process of valve is longer and stout in *P. tarina* whereas it is shorter and weakly sclerotized in *P. avatar*. The saccus is slightly small and broad in case of *P. avatar*.

In addition to these characters, the adult males also differ in wing maculation. The black markings on the dorsal side of *P. avatar* are broader than in *P. tarina*. In latter, the ventral side is bluish-white with yellow tinge and veins brownish yellow whereas in case of *P. avatar* the ventral side is silver blue and veins are brownish black.

In view of above strong differences, the form *tarina* is well separated from species *avatar* and hence raised to species level i.e. *Pareronia tarina*.'

Regarding the above, we note the following:

Fruhstorfer (1903b) noted the small size of *tarina* as one of the main distinctive features; he gave a forewing length of 40 mm for the five specimens examined by him, comprising four males and one female, while the forewing length of *avatar* varied from 53-54 mm measured off six specimens, four males and two females. Kaur *et al.* (2023) gave a wingspan of 60-70 mm for *tarina* (the specimen they illustrate on plate 3 has a forewing length of 35 mm) and 60-95 mm for 15 males and 3 females of *avatar* examined by them.

It is immediately evident from the above that size is not, in fact, a distinctive feature for *tarina* versus *avatar*, since even in a small series of *tarina*, there is a difference of a centimetre between specimens and the smallest *tarina* is the same size as the smallest *avatar*, if these two taxa have

been reliably separated by Kaur *et al.* (2023) and if the measurements for wingspan pertain only to specimens examined by them in the study. It appears that Kaur *et al.* (2023) have measured the wingspan as a direct line between the apices of the forewings rather than as the distance from the centre of the thorax to the forewing apex, doubled, as suggested by Evans (1932). This may explain the discrepancy between the 40 mm forewing length of *tarina* measured by Fruhstorfer (1903b) and the wingspan by Kaur *et al.* (2023), which is less than double the forewing length of Fruhstorfer's specimens. In this context, Evans (1932) gives a wingspan of 60-90 mm for *P. avatar* (including *tarina*), so he may have found specimens much smaller than the type series of *tarina* examined by Fruhstorfer (1903b). It is likely that Fruhstorfer measured forewing length from apex to base of wing rather than to centre of the thorax, and thus the various measurements may not be directly comparable.

Next, we come to the shape of the uncus viewed dorsally, as described by Kaur *et al.* (2023). We have cropped the images provided by them in their paper and placed them together to better enable comparison. Kaur *et al.* (2023) noted that in *P. avatar*, 'the uncus from dorsal view is Y-shaped with median arm longer than lateral arms whereas in case of *P. tarina* the uncus from dorsal view is Y-shaped but the median arm is almost as long as lateral arms.' We could not observe this difference in the figures provided by them when placed side by side (Figures 1 & 2 in this paper).

On the apical process of the valvae, Kaur *et al.* (2023) state, ‘the apical process of valve is longer and stout in *P. tarina* whereas it is shorter and weakly sclerotized in *P. avatar*.’ Again, we could not observe this difference in the figures provided by them when placed side by side (Figures 3 & 4 in this paper).

In addition, Kaur *et al.* (2023) stated, ‘the saccus is slightly small and broad in case of *P. avatar*.’ Again, we were unable to notice this difference in the figures provided by them when placed side by side (Figures 5 & 6 in this paper).

Regarding the wing pattern and coloration, Fruhstorfer (1903b) noted that the hindwing lacked a dark outer margin. However, the narrow dark margin on the upperside of the hindwing is visible in the specimen of *tarina* illustrated by Kaur *et al.* (2023) and is no less prominent than the same margin on the *P. avatar* illustrated in the same paper.

Indeed, the only reliable distinctive feature between females of *P. avatar* and *P. tarina* appears to be the hindwing underside, which Fruhstorfer (1903b) noted was similar to what is now *P. anais*, with a brownish-grey ground colour. However, based on distribution and stated characters, Fruhstorfer’s female from ‘Lower Burma’ probably belongs to another species, *Pareronia paravatar* Bingham, 1907, which is found in S. Myanmar and Indochina.

The name *tarina* Fruhstorfer, 1903 is unavailable for use at species group rank because it was clearly described as an infrasubspecific taxon as defined by ICZN

(1999) Code article 45.5. Under article 45.5.1 it ‘cannot be made available from its original publication by any subsequent action (such as “elevation in rank”) except by a ruling of the Commission’. In the event that future studies, including mtDNA analysis, confirm that ‘*tarina*’ warrants specific status, it would have to be described as new. We are currently of the opinion that *tarina* is just a seasonal form of the male of *Pareronia avatar*.

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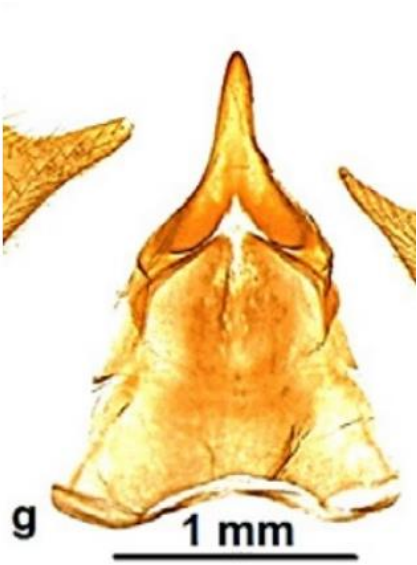
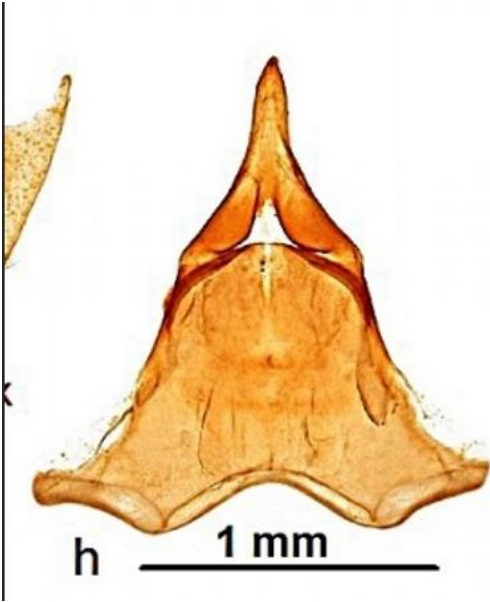


Fig 1: *avatar* uncus dorsal (Kaur *et al.*, 2023)

Fig 2: *tarina* uncus dorsal (Kaur *et al.*, 2023)

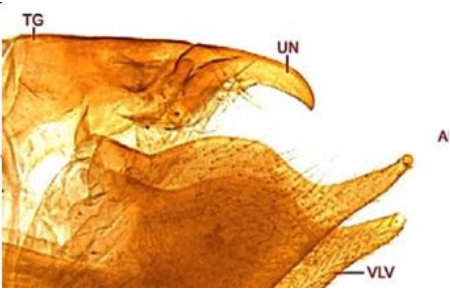
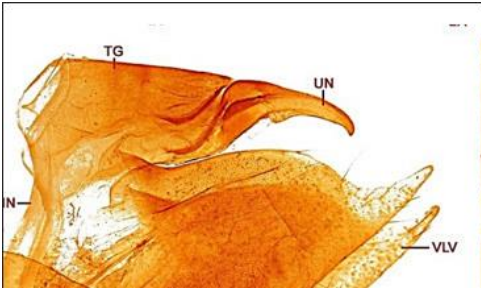


Fig 3: *avatar* apical valvae (Kaur *et al.*, 2023)

Fig 4: *tarina* apical valvae (Kaur *et al.*, 2023)

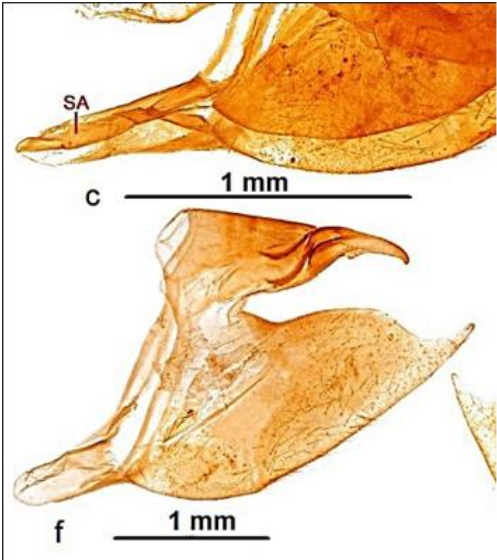


Fig 5: avatar saccus (SA) (Kaur et al., 2023)

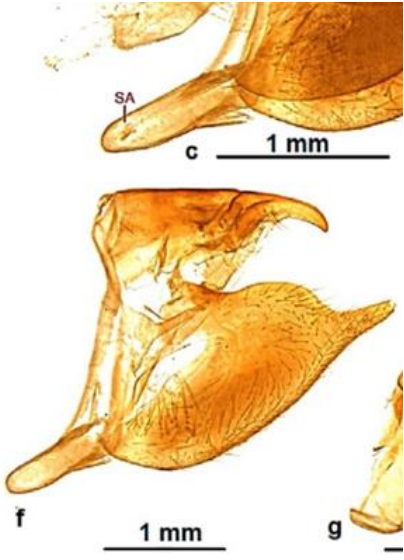


Fig 6: tarina saccus (Kaur et al., 2023)

OLDER LITERATURE	RECENT LITERATURE	VALID
<i>Pareronia valeria</i> (Cramer [1776]) (Evans, 1932; Varshney & Smetacek, 2015)	<i>Pareronia hippia</i> (Fabricius, 1787) (Kehimkar, 2016)	<i>Pareronia anais</i> ((Lesson, 1837) (Eliot, 1978)
<i>Pareronia valeria</i> ♀ form <i>philomela</i> (Fabricius, 1793) (Evans, 1932)	<i>Pareronia hippia</i> ♀ form <i>philomela</i> (Fabricius, 1793) (Kehimkar, 2016)	<i>Pareronia anais</i> ♀ form <i>livilla</i> Fruhstorfer, 1903
<i>Pareronia ceylanica</i> (C. & R. Felder, 1865) (Evans, 1932; Varshney & Smetacek, 2015)	<i>Pareronia ceylanica</i> (C. & R. Felder, 1865) (Varshney & Smetacek, 2015)	<i>Pareronia ceylanica</i> (C. & R. Felder, 1865)
<i>Pareronia ceylanica naraka</i> (Moore, 1877)	<i>Pareronia ceylanica naraka</i> (Moore, 1877)	<i>Pareronia anais naraka</i> (Moore, 1877)

(Evans, 1932)	(Varshney & Smetacek, 2015)	(Yata, 1981)
<i>Pareronia avatar</i> (Moore, [1858]) (Evans, 1932)	<i>Pareronia avatar</i> (Moore, [1858]) (Varshney & Smetacek, 2015)	<i>Pareronia avatar</i> (Moore, [1858])
<i>Pareronia avatar</i> Dry Season Form <i>tarina</i> Fruhstorfer, 1903b	<i>Pareronia tarina</i> Fruhstorfer, 1903 (Kaur <i>et al.</i> , 2023)	<i>Pareronia avatar</i> Dry Season Form <i>tarina</i> Fruhstorfer, 1903b