

SYNONYMIC NOTES ON SOME ORIENTAL SPECIES OF CALOPTERYGIDAE, EUPHAEIDAE AND CHLOROCYPHIDAE (ZYGOPTERA)

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Abstract – The following new synonymies are presented: *Echo margarita tripartita* Selys, 1879 (Calopterygidae) is synonym of *E. margarita* Selys, 1853; *Heterophaea ruficollis* (Ris, 1930) (Euphaeidae) is a junior synonym of *H. barbata* (Martin, 1902); *Rhinocypha cognata* Kimmins, 1936 (Chlorocyphidae) is a junior synonym of *R. stygia* Förster, 1897. The lectotype of *E. margarita tripartita* is designated.

Introduction

During recent visits to Muséum des Sciences naturelles in Brussels (IRSN) in February 2012 and to Muséum national d'Histoire naturelle in Paris (MNHN) in October 2012, I was able to study the type specimens of some species described by Edmond de Selys Longchamps and René Martin and compare them with other material available to me. The comparison convinced me to establish here two synonymies, which I had already anticipated. In addition, the synonymy of *Rhinocypha cognata* Kimmins, 1936 with *R. stygia* Förster, 1897, which was preliminarily discussed already by HÄMÄLÄINEN (2009), is formally published here.

***Echo margarita* versus *E. margarita tripartita* (Calopterygidae)**

SELYS LONGCHAMPS (1853) and SELYS LONGCHAMPS & HAGEN (1854) described *Echo margarita* Selys, 1853 on the basis of a single female specimen (Fig. 1). The collecting data was given as “La Chine (?) D’après un exemplaire communiqué par M. le capitaine [W.W.] Saunders”. However, China was considered to be a doubtful provenance for this species by Selys, and furthermore the label attached to the holotype specimen (IRSN, Brussels) lacks locality data. Later SELYS LONGCHAMPS (1879) described a male specimen of *E. margarita*, collected in “Cherra Punji (Bengale), en octobre, par M. Atkinson”. In the same connection Selys wrote: “La femelle, par M. Saunders. (Coll. Selys.)”, no longer mentioning ‘China’. Later, the provenance of the type specimen of *E. margarita* was considered to be ‘India’ (KIRBY, 1890) and ‘Assam’ (LAIDLAW, 1917). FRASER (1934) postulated that the type specimen probably came from Cherrapunji (in what is now Meghalaya), where the first male specimen had also been found.

Under the species caption '*Echo margarita*', SELYS LONGCHAMPS (1879) described 'Race? *tripartita*' based on two male and two female specimens collected in "Khasiya Hills, en octobre, par M. Atkinson". The syntype series is at IRSN (Brussels). During my visit to this museum in 2008, I selected one of the males as lectotype (Fig. 2). On the attached label, this specimen is marked as '*Echo margarita* var. *tripartita* S.'. No locality data are given. I have added a label indicating its status as the lectotype. This lectotype designation is published here.

In the original description, *tripartita* was stated to differ from the nominate form by having more extensive apical darkening of the wing, the opaque area occupying about 1/3rd of the wing length. The opaque area starts halfway between the nodus and pterostigma. In the holotype of *margarita* the apical opaque area covers a little more than 1/5th of the length of the wing (cf. Figs 1 and 2).

FRASER (1929, 1934) presented *margarita* and *tripartita* as subspecies and this practice has been followed in subsequent literature up to the present. Fraser assumed that Shillong was the probable type locality of ssp. *tripartita* and Cherrapunji the probable type locality of ssp. *margarita*. FRASER (1929) wrote as follows: "A distance of some 30 miles separates the localities of the two forms and it is possible that the future may reveal specimens from intervening localities connecting up to the two, but until this has become an accomplished fact, it is preferable to regard them as two distinct subspecies or races. It is to be noted that the climatic conditions of the two localities differ widely, that of Shillong being comparatively dry, whilst Cherrapunji is credited with being the wettest spot on earth".

Besides the type material of both taxa, I have also studied other specimens collected later, both from 'Khasi Hills' and 'Shillong'. The material studied includes:

- a long series (both pinned and papered specimens) of *E. m. margarita* in the former Cowley collection at BMNH (London) labelled "Khasi Hills, Assam / N.N. Dunnai vd." In these specimens the opaque area covers about 1/5th of the wing length. In the labels

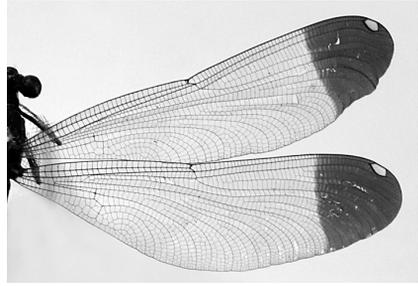


Fig. 1. Wings of the female holotype of *Echo margarita*.

of the pinned specimens from 'Khasi Hills', John Cowley had added 'Shillong?' in brackets. However, Shillong appears to be an unlikely locality for this series, since other specimens known with certainty to be collected from Shillong all have a longer apical opaque patch.

- a pair (ex Coll. D.A.L. Davies) from "Assam, Khasi Hills, Summer 1968". In these specimens the opaque area in wing tips covers 1/5th of the wing length.
- a male specimen of *E. margarita tripartita* at BMNH, labelled as having been collected in Shillong on 20 June 1938 by D.G. Sevastopulo. In this specimen the opaque area covers 1/3rd of the wing length.
- two female specimens (ex coll. Trevor Graves), labelled as having been collected in Shillong on 15 March 1969. In these specimens the apical opaque area is intermediate between the types of the two forms, covering 1/4th of the wing length.

In more recent literature the following records have been published: LAHIRI (1987) listed a long series of *E. margarita tripartita* from the Khasia Hills region (Mawpat, Mawrapat, Mawsynram, Umsning and Shillong), the longest series coming from Mawpat (37 specimens) and Shillong (37 specimens). Lahiri wrote that the extent of the opaque area on the wing tips covers 1/4th to 1/3rd of the wing length. SUBRAMANIAN (2009, p. 134) provided a field photo of *E. margarita* female taken by Mr Krushnamegh Kunte in Pakhui Tiger Reserve, Arunachal Pradesh, India. The same photo is presented also in YU & HÄMÄLÄI-

NEN (2012) and HÄMÄLÄINEN (2013). In this specimen the opaque area is less than $1/4^{\text{th}}$, but more than $1/5^{\text{th}}$ of the wing length. MITRA (1996, 2002) and MITRA et al. (2002) recorded *E. m. margarita* from Arunachal Pradesh (Tirap; 2 females), Manipur (Morch; 3 females) and Nagaland (Zunhebeto; 1 male). SCHMIDT (1964) recorded *E. m. margarita* from 'Sadon [Satone, Kachin state], Burma' at an altitude of 1200 m. This locality is east from Myitkyina on way to Kambaiti Pass on the Chinese border. YU & HÄMÄLÄINEN (2012) listed a male specimen *E. m. margarita* collected in Ruili (near the Burmese border) in Yunnan, China. Moreover, TSUDA (2000) listed *E. m. margarita* also from Bangladesh, but no further details were provided. Since both Schmidt and Mitra had identified their specimens as belonging to the nominate form, I presume that the apical opaque portion in these specimens is around $1/5^{\text{th}}$ of the wing length. Therefore it is evident that within most of the range of *E. marginata* the opaque area on wing tips is rather narrow, around $1/5^{\text{th}}$ of the wing length. However, in a rather small area within the same mountain range in Khasia Hills region, there occur populations in which specimens have opaque wing tips of variable size, ranging from $1/5^{\text{th}}$ to $1/3^{\text{rd}}$ of the wing length. Although I have no evidence that the extremes can be found in the same populations, the populations in Khasia Hills region can hardly be split into two distinct subspecies. Obviously the variability in the wing pattern of *E. margarita* from the Khasia Hills region, observed between specimens from different locations, may reflect environmental effects resulting from the different climatic regimes experienced during their development. Populations of the *tripartita* form have been recorded both west and northeast of Cherrapunji, the supposed type locality of the nominate form *margarita*. The nearest known *tripartita* site (Mawsynran) is only 6 km from Cherrapunji.

YU & HÄMÄLÄINEN (2012) pointed out that the structure of the penis of *Echo perornata* Yu & Hämäläinen, 2012 (from southeastern Tibet) is strikingly different from that of *E. m. margarita*, although superficially these species resemble each other, except in the wing colour

pattern. YU & HÄMÄLÄINEN (2012) omitted a discussion on the mutual taxonomic status of *E. m. margarita* and *E. margarita tripartita*, because the drawings of the penis of *tripartita* provided by LAHIRI (1987, p. 305) did not match sufficiently well with the penis of *margarita* specimens studied by them, and because at that time the penis structure of the lectotype of *E. margarita tripartita* had not been studied. During my last visit to IRSN in February 2012, I was able to study the penis structure of the lectotype. It proved to be identical with that of *E. m. margarita*. Therefore, I no longer hesitate to present the following synonymy:

Echo margarita Selys, 1853

= *Echo margarita tripartita* Selys, 1879, **syn. nov.**

To summarize, *E. margarita* is known to occur in a rather limited area in NE India and adjacent areas in Burma and Yunnan. In India it has been found from Meghalaya, Arunachal Pradesh, Manipur and Nagaland. The single known localities in Burma and China are in Kachin State and in the westernmost corner of Yunnan, respectively. For the distribution map, see YU & HÄMÄLÄINEN (2012); the unspecified, published record from Bangladesh is not included in this map. Since most of this area is poorly studied for dragonflies, most likely *E. margarita* is not as local and rare as presently

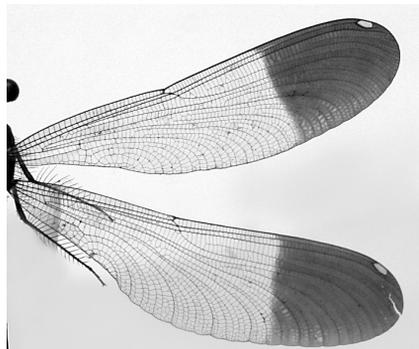


Fig. 2. Wings of the male lectotype of *Echo margarita tripartita*. A mirror image showing the left pair of wings (right wings have partly broken tips).

known. For the etymology of the specific epithet *margarita*, see HÄMÄLÄINEN (2013).

***Heterophaea barbata* versus *H. ruficollis* (Euphaeidae)**

MARTIN (1902) described a new euphaeid genus and species *Paraphaea barbata* based on a single male specimen from Manila, the Philippines. COWLEY (1934) replaced the preoccupied genus-group name *Paraphaea* with *Heterophaea*. Meanwhile, RIS (1930) had named another new *Paraphaea* species, *P. ruficollis*, based on a single male specimen from “Inuyan, Luzon” (probably from Imugan in Nueva Vizcaya province). Ris pointed out that *ruficollis* resembles quite closely the description of *barbata*, but there were some colour differences in head and prothorax. However, the main reason for Ris to keep *ruficollis* and *barbata* distinct was the fact that in *ruficollis* the middorsal keel on the 10th abdominal segment did not seem to fit MARTIN’S (1902) characterization “*le dixième segment portant un énorme mamelon noir, élevé, comme fendu en deux et formant par suite une échancrure droite élevée*”.

I have studied tens of *Heterophaea* specimens from Aurora and Quirino provinces in Luzon, collected by Roland A. Müller and his coworkers in 1990-1997. They all seem to represent a single species. At Senckenberg Museum (SMF) in October 1994, I compared some of these specimens with the holotype of *H. ruficollis* and found them to match perfectly. During a recent visit at MNHN (Paris) the same specimens were compared with the holotype of *H. barbata*. Unfortunately, at present the holotype lacks abdominal segments 9-10 and the appendages. Also the pterothorax of the specimens is badly crushed (obviously being eaten by dermestid larvae). However, the colour pattern of the body and wings match perfectly with the specimens available to me. The original descriptions of both *barbata* and *ruficollis* were based on a study of a single male specimen only. I presume that the differences in the description of the structure of 10th segments by the two authors are just subjective interpretations. Therefore, and because there is no further evidence of occurrence of two distinct species in this genus, I conclude that *barbata* and *ruficollis* represent

the same species and present the following synonymy:

Heterophaea barbata (Martin, 1902)
= *Heterophaea ruficollis* (Ris, 1930), **syn. nov.**

This synonymy was already anticipated by HÄMÄLÄINEN & MÜLLER (1997). Obviously *H. barbata* is endemic in Luzon, where it has been recorded in the central and northern parts of the island. A redescription of the male sex and the first description of female sex as well as the exuviae of *H. barbata* will be published in another connection.

***Rhinocypha stygia* versus *R. cognata* (Chlorocyphidae)**

HÄMÄLÄINEN (2009) discussed in detail the complex taxonomical history involved in the three Bornean chlorocyphid species *Rhinocypha stygia* Förster, 1897, *R. moultoni* Laidlaw, 1915 and *R. cognata* Kimmins, 1936 and provided relevant illustrations. He pointed out that the two female specimens of ‘*moultoni*’ described by LAIDLAW (1915) in fact belong to *stygia*. Since a male specimen of *R. moultoni* was selected as lectotype by KIMMINS (1969), the discovery of Laidlaw’s confusion has no taxonomic consequences. The immature females of *moultoni* described by LAIDLAW (1920) are conspecific with the lectotype male.

However, it turned out that *R. stygia* and *R. cognata* represent the same species and should be synonymized. HÄMÄLÄINEN’S (2009) article was published in an online newsletter, a forum, which according to the present International Code of Zoological Nomenclature (ICZN, 1999) is not available for the purposes of zoological nomenclature. Therefore, in that article no formal taxonomic decision of this synonymy was presented. The synonymy is briefly published here without repeating all the details presented in the referred article.

Rhinocypha stygia Förster, 1897
= *Rhinocypha cognata* Kimmins, 1936, **syn. nov.**

R. stygia was described by FÖRSTER (1897) on the basis of a male and a female specimen from Mt Kinabalu in northern Borneo. *R. cog-*

nata was described by KIMMINS (1936) based on two male specimens from Mt Dulit. The syntype female of *stygia* is preserved in UMMZ, Ann Arbor (GARRISON et al., 2003), but the syntype male is lost. However, a colour painting of this specimen is available in the Selysian archives at IRSN, Brussels. The lectotype of *R. cognata* is kept at BMNH, London (KIMMINS, 1969). The known range of *Rhinocypha stygia* covers north-eastern Sarawak, Brunei and Sabah. The southern- and westernmost records are from the southern end and eastern slopes of Mt Dulit.

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