



## Neotropical *Blepolenis* butterflies: wing pattern elements, phylogeny, and Pleistocene diversification (Lepidoptera, Nymphalidae)

CARLA M. PENZ<sup>1</sup>, NEDA MOHAMMADI<sup>1</sup> & NIKLAS WAHLBERG<sup>2</sup>

<sup>1</sup>Department of Biological Sciences, University of New Orleans, 2000 Lakeshore Dr., New Orleans 70148, USA

<sup>2</sup>Department of Biology, University of Turku, 20014 Turku, Finland

### Abstract

This study re-describes and provides a phylogeny for the Brassolini genus *Blepolenis*, which includes three species from the Brazilian Atlantic forest. A diagnosis and illustrations of habitus and genitalia are given for each species. We compare variation in wing color pattern among the genera *Blepolenis*, *Opsiphanes*, *Orobrassolis* and *Mielkella*, and discuss the repeated loss of male wing androconial organs within *Blepolenis*. DNA sequence (nuclear and mitochondrial genes) provided the strongest signal for phylogeny reconstruction, given that *Blepolenis* species are morphologically homogeneous. Estimated time of divergence between *Blepolenis* and *Opsiphanes* dates from the Mid Miocene (ca. 15 million years ago), and was followed by an apparent period of stasis. Extant *Blepolenis* species seem to have diverged in the Pleistocene (ca. 2.5 mya).

**Key words:** Satyrinae, Brassolini, *Opsiphanes*, *batea*, DNA sequence

### Introduction

Considering that Neotropical *Blepolenis* butterflies are quite distinctive, the taxonomic history of the genus is somewhat unusual. Röber (1906) described *Blepolenis* to accommodate four species that he considered divergent from *Opsiphanes*, but subsequent workers such as Stichel (1909, 1932) and Fruhstorfer (1912) did not adopt this proposal. Instead, Stichel (1909, 1932) assembled *B. batea* (Hübner, 1821), *B. didymaon* (C. Felder & R. Felder, 1867), *B. catharinae* (Stichel, 1902) and *B. bassus* (C. Felder & R. Felder, 1867) under the ‘group bateiformes’ within *Opsiphanes*. Fruhstorfer’s (1912) classification was even more inclusive, and in his arrangement the genus *Opsiphanes* comprised the ‘groups *Opoptera*, *Opsiphanes*, *Catoblepia* and *Selenophanes*’, but no subgroups were assigned within them. As a matter of taxonomic housekeeping, Hemming (1943) subsequently designated *Caligo batea* Hübner as the type species of *Blepolenis*, but noted that “Though available nomenclatorially, the name *Blepolenis* Rober [sic] is not required, since *Caligo batea* Hübner is congeneric with *Opsiphanes sallei* Doubleday, [1849], the type of *Opsiphanes* Doubleday, [1849]” (*verbatim* from p 25). *Blepolenis batea* figured prominently in Röber’s original description, which justified Hemming’s type species selection (see also *Blepolensis* [sic] in Hemming 1967:79). However, it is not surprising that the name *Blepolenis* vanished from the literature given that H. Stichel led the way for the early brassoline classification, and in view of the fact that A.F. Hemming did not consider it necessary. Thus, *Blepolenis* was not included in the first modern brassoline classification (Casagrande 1995), but it was reinstated by Casagrande (2004) to include *B. batea*, *B. catharinae* and *B. bassus* (Fig. 1 and 2). Following Fruhstorfer (1912), Casagrande (2004) listed *B. didymaon* as a subspecies of *B. batea*. A fundamental question has been nonetheless neglected for a century; i.e., is *Blepolenis* a natural group and what characters define this genus?

The phylogenetic analysis by Penz (2007) suggested that *Blepolenis* is a monophyletic sister genus to *Opsiphanes* – a result that could be predicted given the placement of *B. batea*, *B. catharinae* and *B. bassus* within *Opsiphanes* by previous authors (Stichel 1909, 1932, Fruhstorfer 1912, Casagrande 1995). However, Penz (2007) did not examine the original defining characters of *Blepolenis* listed by Röber (1906), which focused mostly on a compari-