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## The Neotropical genus *Ginungagapus* gen. nov. (Hesperiidae, Hesperinae, Moncini): phylogenetic position and taxonomic review

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### Abstract

A taxonomic and phylogenetic study based on morphological characters revealed the type species of the genus *Lucida* Evans, 1955, *Lucida lucia* (Capronnier, 1874) to be paraphyletic to other species of the genus. As a result, a new genus, *Ginungagapus* gen. nov., is erected including four species previously placed in *Lucida*: *Ginungagapus schmithi* (Bell, 1930) comb. nov., *Ginungagapus bocus* (Bell, 1947) comb. nov., *Ginungagapus ranesus* (Schaus, 1902) comb. nov., and *Ginungagapus rogan* (Evans, 1955) comb. nov.; and four new species are added: *Ginungagapus awarreni*, sp. nov., *Ginungagapus tangerinii*, sp. nov., *Ginungagapus fiedleri*, sp. nov. and *Ginungagapus brasilica*, sp. nov. The new genus is taxonomically revised, genitalia are illustrated, except of the female of *G. rogan* (Evans, 1955) and of the male of *G. brasilica*, sp. nov., which are still unknown. An identification key is provided.

**Key words:** skipper systematics, new species, identification key, cladistics

### Introduction

Moncini is one of the most poorly known groups of butterflies gathering 82 genera of small brown skippers, (Warren *et al.* 2009). Although established by molecular characters, Moncini lacks morphological putative synapomorphies and so far its phylogenetic relationship is basically unknown (Warren *et al.* 2008, 2009). The same scenario is expected to most of its genera, as their monophyly were never formally tested beyond taxonomical arrangement (Evans 1955). Therefore, systematic studies of Moncini often starts as a step in the dark, as similar species may be misplaced in different genera, and several genera actually represent polyphyletic groups (Burns 1990). Additionally, new genera have been described to include single species (Austin 1997; Turland *et al.* 2012).

In this study, *Lucida* Evans, 1955 species were investigated taxonomically and phylogenetically. *Lucida* was proposed as a grouping of four known plus one new species based on the antennae length (compared to wing costa), nudum segments exclusive on apiculus, presence of few long spines on mid tibiae and broad-ended uncus (Evans 1955). Formerly, some species placed by Evans (1955) in *Lucida*, were originally combined to different genera, e.g. *Carystus* Hübner, [1819], *Pamphila* Fabricius, 1807, *Megistias* Godman, 1900, *Eutocus* Godman, 1901 (Mielke 2005), probably because of the lack of wing color markings, which has historically been applied in skippers or butterflies systematics as a whole. Because not only *Lucida*, but also several of the Moncini genera have homogeneous brown wings, taxonomy and systematics of these skippers still lack detailed descriptions, especially regarding genera diagnoses.

*Lucida schmithi* and *Lucida bocus* were described in *Eutocus* Godman, 1901, while *Lucida ranesus* was described in *Megistias* (Schaus, 1902), a synonym of *Cybaenes* Scudder, 1872. All those species were thereafter transferred by Evans (1955) to *Lucida* together with the description of *Lucida rogan* and the description of the proper genus. All other authors mention *Lucida* species only in geographical distribution studies and catalogues. After Evans (1955), no other systematical or taxonomical study has been made to elucidate the monophyly of *Lucida* or the phylogenetic relationships between their species. Therefore, the monophyly of *Lucida* was here tested using morphological characters. Given its non-monophyly, a new genus is here described for four *Lucida* species and the description of four new species from Brazil is added.

*Virga*) can be more related to its projection beyond second segment clothing than to the length itself. This is not the first time that this character showed to be problematic, as it also may vary between species in other Moncini genera (Lindsey 1921; Warren *et al.* 2009). In the present study the long length of the third segment of the palpus showed to be homoplastic, thus not corroborating the monophyly of neither *Apaustus* subgroup of Evans nor all other subgroups of *Apaustus* group.

The present study did not attempt to elucidate phylogenetic relationships between other groups besides *Ginungagapus*, *Lucida* and its closest allies. However, a few results obtained from out-group relationships deserve minor observations, as systematic hypotheses of these genera are basically unknown. Genitalia morphology in Hesperiiidae is usually considered fundamental for distinguishing taxa at the generic level in Hesperinae (Lindsey 1921; Burns 1994, 1996). Therefore, as long as the genitalia pattern of new taxa fits the pattern found in a particular, described genus, or to Evans (Evans 1955) catalogue key, the new taxa are placed in this genus. However, if these features are not congruent, new genera are described, even to include a single species (Austin 1997; Steinhauser 2008; Turland *et al.* 2012), which adds little systematic information to the group. The arbitrariness thus remains in determining what a genitalia pattern is or which characters define a general appearance to a taxonomist.

The Phanes subgroup of Evans (1955) is filled with monotypic genera (e.g. *Gallio*, *Methion*, *Saniba*), plus other genera with only two species (*Venas*, *Repens*, *Thargella*). This classification is justified, as observed in the present study, since genitalia of males and females of monotypic genera are remarkably unique. Accordingly, the monophyly of the two species genera tested was recovered, even in suboptimal trees (not published), as genitalia of species in these genera are much more alike, sharing most of the characters coded. The relationships between the genera therefore, require more detailed studies.

The Phanes subgroup of Evans is not monophyletic. Instead, it is formed by a miscellaneous group of genera, whose phylogenetic origin could be more closely related to a variety of other Moncini that were not sampled in the present study. The presence, for example, of a brand parallel to CuA and/or 2A veins in *Sabina*, *Repens* and *Thargella* is shared with very distinct genera of Moncini, such as *Adlerodea*, *Callimormus*, *Mnasicles*, *Morys*. Additionally, the cleft between ampulla and harpe and the shape of both structures in valva of male genitalia, as stated as diagnostic characters of Anhoptini (Warren *et al.* 2009), is found in *Pamba*, *Thargella* and *Saniba*. As our results are not conclusive about the relationships between these genera and Anhoptini, future studies are required to identify their phylogenetic origin and possible misplacing of genera on Hesperinae tribes.

While facing much incongruence in genus-species combination, Burns (1994) claimed that skipper genera “are a mess”. Unfortunately, since then little progress has been made in Hesperinae systematics at genus level, despite the current development of phylogenetic systematic methods. The use of this methodology is crucial for better understanding the relationships of Moncini, redefine its 81 genera, and test whether each of them actually belongs to the tribe.

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