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A CONTRIBUTION TO RIODINID SYSTEMATICS

(LEPIDOPTERA: RIODINIDAE)

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A REVIEW OF THE GENUS *SAROTA* (LEPIDOPTERA: RIODINIDAE)

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ABSTRACT.– A review of the genus *Sarota* Westwood, 1851, is presented which includes a brief overview of the biology, biogeography and taxonomic history of its component species, a key to the identification of adults, illustrations of all known species and subspecies (including many type specimens) with accompanying taxonomic notes and the descriptions of five new species and two new subspecies: *Sarota chloropunctata* **n. sp.**, *Sarota chocoensis* **n. sp.**, *Sarota completa* **n. sp.**, *Sarota harveyi* **n. sp.**, *Sarota willmotti* **n. sp.**, *Sarota estrada sabanilla* **n. ssp.**, and *Sarota gamelia alba* **n. ssp.**. Twenty species are recognised. Neotypes are designated for *Sarota acantus* (Stoll, 1782) and *Sarota gyas* (Cramer, 1775). The tribe Sarotini (= Charitini Auctt.) is synonymised with the tribe Helicopini (**n. syn.**), and a cladogram based on a small character matrix is used to illustrate generic relationships within the more inclusive, newly conceived tribe.

KEY WORDS: Amazon, *Anteros*, Araceae, Argentina, behavior, biogeography, Bolivia, Brazil, *Callistium*, Central America, *Charis*, Charitini, *Charmona*, Chocó, cladistics, Colombia, *Comphotis*, Costa Rica, Ecuador, *Emesis*, Fabaceae, French Guiana, Guatemala, Guyana, Helicopini, *Helicopis*, Honduras, hostplants, *Hypochrysops*, Lejuniaceae, Lycaenidae, Mexico, Neotropical, *Nymphidium*, *Ourocnemis*, Panama, Peru, *Phaenochitonia*, pheromones, ***Sarota chloropunctata*** n. sp., ***Sarota chocoensis*** n. sp., ***Sarota completa*** n. sp., ***Sarota harveyi*** n. sp., ***Sarota willmotti*** n. sp., ***Sarota estrada sabanilla*** n. ssp., ***Sarota gamelia alba*** n. ssp., Sarotini, South America, Sterculiaceae, Surinam, taxonomy, *Theope*, Tiliaceae, Trinidad, Venezuela.

The bejewelled ventral wing patterns of *Sarota* species are spectacularly distinctive and rather reminiscent of those of the Oriental lycaenid genus *Hypochrysops* C. & R. Felder, 1860. The genus *Sarota* contains a well defined, relatively homogeneous, monophyletic group of species whose close phylogenetic relationship to the genera *Anteros* Hübner, [1819], and *Ourocnemis* Bethune-Baker, 1887, is well known (Stichel, 1911, 1930; Harvey, 1987). However, while the systematic position of the genus is reasonably well established, its alpha level taxonomy has remained poorly understood, no doubt because of the great phenotypic similarities between its species and their diminutive size, and previous authors have grossly underestimated its species diversity. Seitz (1916-18) figured a mere 6 species and both Stichel (1930) and Bridges (1994) list only 10 species, no significant additions being made to our taxonomic knowledge of the genus during that intervening period. D'Abrera (1994) also misleadingly illustrates only a fraction of the diversity in *Sarota* with 6 species. For these reasons, coupled with the perpetual misidentification of species in published photographs and popular literature (see appendix) and the discovery of several new *Sarota* taxa in Ecuador during a comprehensive survey of the papilionoid fauna of that country, I decided to review the entire genus with a view to ending the aforementioned confusion and providing an illustrative benchmark against which potentially new taxa can be compared. To this end, the *Sarota* collections of the following institutions, whose acronyms are used throughout the text, were examined:

AME	Allyn Museum of Entomology, Florida Museum of Natural History, Sarasota, FL, USA
AMNH	American Museum of Natural History, New York, NY, USA
BMNH	Natural History Museum, London, England
FSCA	Florida State Collection of Arthropods, Division of Plant Industry, Gainesville, FL, USA
GWB	George W. Busby collection, Boston, MA, USA
JHKW	Jason P. W. Hall and Keith R. Willmott collection, Gainesville, FL, USA
MNHN	Musée Nationale d'Histore Naturelle, Paris, France
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA
PJD	Philip J. DeVries collection, Dept. of Biology, University of Oregon, Eugene, OR, USA
RCB	Robert C. Busby collection, Boston, MA, USA
USNM	National Museum of Natural History, Smithsonian Institution, Washington, DC, USA
ZMHU	Zoologische Museum, Humboldt Universität, Berlin, Germany

Characteristics of *Sarota*

All species in *Sarota* are essentially sexually monomorphic, typically small, often possess hindwing tails, and while usually having dull brown dorsal surfaces, have characteristic ventral surfaces. The ventral surface is predominantly shades of orange-brown with yellowish margins and all species have a double row of silver lines around the submargins of both wings, although the innermost forewing line is often broken into or inclusive of one or more proximally directed silver streaks; the basal portion of the wings consists of alternating transverse lines of small black spots and silver markings. Despite the remarkable resemblance of some *Sarota* species to certain *Anteros* species, most notably those of the "*carausius* Westwood, 1851, group" (see Hall and Willmott, 1998), the *Sarota* species can be distinguished by their less robust thoraces, typically more rounded or tailed hindwings and different genitalic structures. The male genitalia of *Sarota* are far more homogeneous than in *Anteros*, barely differing even between species groups; all species have a small serrate aedeagal cornutus that is not present in those *Anteros* species dissected and the valvae always consist of a long upper portion and typically a bluntly triangular lower portion, with a prominent basal lateral bulge, whereas in *Anteros* the lower portion is often as long as or longer than the upper portion. The upper valva arms in *Sarota* are also connected dorsally in a "V" shape by membraneous tissue toward the tips whereas in *Anteros* they are joined towards the base, often by sclerotised rods that almost enclose the aedeagus.

The slight interspecific differences in wing pattern between many sympatric species, combined with the often significant intraspecific geographic or altitudinal variation and the seemingly endless combinations of the same basic ventral markings involved, can make identifications difficult, but the genus is at least readily separated into three distinct and roughly evenly sized groups on the basis of wing shape (see Fig. 1), as partially proposed by Stichel (1930). Members of the "*chrysus* group" are considerably larger than most species of the other groups, they have distinctive hindwing tails with a pointed tornus and two long tail elements at veins M_3 and Cu_2 either side of a shorter central one and typically white or cream spots on the dorsal forewing; with few exceptions, these species are also the only ones to have orange-brown tipped antennal clubs. Species identification characters include forewing shape, the pattern of spots on the dorsal forewing, the tone of the ventral orange-brown coloration, and the ventral silver