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## **Systematic revision and review of the extant and fossil snout butterflies (Lepidoptera: Nymphalidae: Libytheinae)**

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## Abstract

Extant and fossil genera and species in the Libytheinae (Nymphalidae) are revised and reviewed. The Libytheinae includes two genera: *Libythea* Fabricius and *Libytheana* Michener. Fifteen species and an additional 24 subspecies are recognized and 41 names are synonymized. Species recognized are: *Libythea celtis* (Laicharting), *L. collenettei* Riley, *L. cinyras* Trimen **revised status**, *L. geoffroyi* Godart, *L. labdaca* Westwood, *L. laius* Trimen, *L. lepita* Moore, *L. myrrha* Godart, *L. narina* Godart, *Libytheana carinenta* (Cramer), *L. florissanti* (Scudder), *L. fulvescens* (Lathy), *L. motya* (Hübner), *L. terena* (Godart), and *L. vagabunda* (Scudder). New synonymies that are established for *Libythea celtis* (Laicharting [1782]) include: *Libythea (Libythea) celtis* f. *obscura* Millière 1879 **syn. nov.**; *Libythea celtis* f. *denudata* Dannehl 1925 **syn. nov.**; *Libythea celtis* f. *separata* Dannehl 1925 **syn. nov.**; *Libythea celtis livida* Saggara 1926 **syn. nov.**; *Libythea (Libythea) celtis* f. *albionervulata* Verity 1950 **syn. nov.**; *Libythea (Libythea) celtis* f. *latefulva* Verity 1950 **syn. nov.**; *Libythea (Libythea) celtis* f. *obscuronervulata* Verity 1950 **syn. nov.**; *Libythea (Libythea) celtis* f. *pallida* Verity 1950 **syn. nov.**; *Libythea (Libythea) celtis* f. *pygmaea* Verity 1950 **syn. nov.**; *Libythea (Libythea) celtis* f. *rubescens* Verity 1950 **syn. nov.**; *Libythea (Libythea) celtis* f. *subochracea* Verity 1950 **syn. nov.**; *Libythea (Libythea) celtis* f. *violacea* Verity 1950 **syn. nov.**; and *Libythea celtis platooni* Korb 2005 **syn. nov.** Synonyms of *Libythea geoffroyi geoffroyi* Godart 1822 include: *Libythea antipoda* Boisduval, 1859 **syn. nov.**; *Libythea orientalis* Godman and Salvin, 1888 **syn. nov.**; *Libythea hauxwelli* Moore, 1901 **syn. nov.**; *Libythea (Libythea) geoffroy* var. *sumbensis* Pagenstecher, 1901 **syn. nov.**; *Libythea geoffroy diminuta* Fruhstorfer, 1909 **syn. nov.**; and *Libythea geoffroy maenia* Fruhstorfer, 1909 **syn. nov.** *Libythea batchiana* Wallace 1869 **syn. nov.** is a synonym of *Libythea geoffroyi ceramensis* Wallace 1869. Synonyms of *Libythea geoffroyi philippina* Staudinger 1889 include: *Libythea geoffroyi* var. *celebensis* Staudinger 1889 **syn. nov.**; and *Libythea geoffroyi bardas* Fruhstorfer 1914 **syn. nov.** *Libythea labdaca subintegra* Aurivillius 1921 **syn. nov.** is a synonym of *Libythea labdaca ancoata* Grose-Smith 1891. Synonyms of *Libythea lepita lepita* Moore [1858] include: *Libythea celtis celtoides* Fruhstorfer 1909 **syn. nov.**; *Libythea celtis chinensis* Fruhstorfer 1909 **syn. nov.**; and *Libythea celtis sophene* Fruhstorfer 1914 **syn. nov.** *Libythea celtis yayeyamana* Fujioka, 1975 **syn. nov.** is a synonym of *Libythea lepita amamiana* Shirôzu 1956. *Libythea myrrha myrrhina* Fruhstorfer 1909 **syn. nov.** and *Libythea myrrha yawa* Fruhstorfer 1914 **syn. nov.** are synonyms of *Libythea myrrha myrrha* Godart 1819. *Libythea myrrha borneensis* Fruhstorfer 1914 **syn. nov.** and *Libythea myrrha iwanagai* Hayashi 1976 **syn. nov.** are synonyms of *Libythea myrrha hecura* Fruhstorfer 1914. *Libythea myrrha carma* Fruhstorfer 1914 **syn. nov.** is a synonym of *Libythea myrrha rama* Moore 1872. *Libythea myrrha thira* Fruhstorfer 1914 **syn. nov.** is a synonym of *Libythea myrrha sanguinalis* Fruhstorfer 1898. Subspecies of *L. narina* Godart 1819 have been synonymized with the nominal species as there are no diagnostic characters that can be used to separate subspecies. Synonyms of *Libythea narina* include: *Libythea rohini* Marshall 1880 **syn. nov.** *Libythea luzonica* Moore 1901 **syn. nov.** *Libythea narina canuleia* Fruhstorfer, 1909 **syn. nov.**; *Libythea narina neratia* Fruhstorfer 1909 **syn. nov.**; *Libythea narina sangha* Fruhstorfer 1914 **syn. nov.**; *Libythea narina sumbawana* Fruhstorfer 1914 **syn. nov.** The status of the North American taxon has been confused in the literature, and it is here treated as *Libytheana carinenta bachmanii* (Kirtland 1851) **revised status**. The fossil *Oligodonta florissantensis* Brown, 1976 (Pieridae) is a **new synonym** of *Libytheana florissanti* (Scudder 1892). Keys to genera, species, and subspecies are included along with a discussion of the taxonomic history of the subfamily. Diagnostic characters are also presented along with brief comments on the distribution and biology of each species.

**Key words:** Classification, *Libythea*, *Libytheana*, nomenclature, snout butterfly, systematics, taxonomy, tree-nettle butterfly

## Introduction

Species in the nymphalid subfamily Libytheinae are unique in having exceptionally long labial palpi and modified ventral wings that closely resemble dead leaves. The subfamily has an unusual distribution and it contains both very widespread and local species, including several island endemics. The delimitation of libytheine species has been debated by taxonomists for nearly a century. Pagenstecher (1901, 1902, 1911) and Mengel (1905) published the most recent global revisions. Shields (1984a) and Okano (1987) subsequently published global checklists, but they did not include explanations on how to delimit taxa.

The lack of a recent formal revision has led to a debate concerning the delimitation of the number of snout butterfly taxa. Pagenstecher (1901, 1902, 1911) recognized ten species, Mengel (1905) proposed 21, Shields (1984a) and Okano (1987) listed twelve, while the number of subspecies has ranged from zero to 58 (Table 1). Authors have recognized different numbers of taxa, primarily because several species are difficult to separate consistently, and because phenotypically intermediate populations exist between named taxa. Several notable examples of complex taxonomic pairs include *Libythea celtis* (Laicharting) and *L. lepita* Moore in Asia, *Libythea labdaca* Westwood and *Libythea laius* Trimen in Africa, and subspecies of *Libytheana carinenta* (Cramer) in North America.