

Character Support for Clades of the Arctiidae

Below we discuss character support for the monophyly of Arctiidae, the three subfamilies, the six arctiine tribes, and some of the more inclusive arctiid clades. We illustrate character support on a selected tree (Figs. 102–105) and note various possible state transformations for multistate characters when appropriate.

Monophyly of Arctiidae (Fig. 102). Five characters support the monophyly of Arctiidae, including the presence of the female dorsal gland (character 61/62) (Holloway 1988). Although heteroideous crochets traditionally have been considered diagnostic of Arctiidae, it was more parsimonious to hypothesize their independent derivation within Lithosiinae and at the base of Arctiinae. Arctiids also have been defined by the condition of pupal labial palps (visible as a small triangle). Small triangular labial palps (character 27) occur in *Renia* (Herminiinae, Noctuidae) and *Panthea* (Pantheidae), and the trait is a synapomorphy for clade 2 (Pantheidae + Herminiinae + Arctiidae; Fig. 102). The palpal condition then reverses at the base of Phaegopterini s.s. (Fig. 105). Another traditional arctiid character, prothoracic glands (character 44, state 3), is derived independently at least three times within Arctiidae, but is not found in basal lineages. This state is discussed further below.

The following are character state changes in the common ancestor of the Arctiidae (Fig. 102):

Character 0(1). Mandible: Indentation in Dorsal Tooth. A right-triangular indentation is formed either de novo (from state 0) or from an elongate ovoid indentation (state 3) found in *Renia* as well as in the two Lymantriidae. This indentation is lost in the Lithosiinae (Fig. 103), is modified into a small ovoid indentation in *Automolis* (Syntominiinae; Fig. 103), and is modified into an elongate triangle at the base of clade 7 (Fig. 104). The right triangle is rederived in *Nyctemera* (Callimorphini; Fig. 104).

Character 11(0). Larval Ventral Eversible Gland. This gland is lost in the arctiid ancestor and at the base of clade 1 (*Asota* + Lymantriidae; Fig. 102). *Character 48(1). Metepisternal Tymbal Organ.* Tymbal organs are complex structures that are unique to Arctiidae, making it probable that they were derived only once. It is equally parsimonious for tymbal organs to have been derived independently two or three times within the Arctiidae. Given a single