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Annotated review and discussion of phylogenetically important characters for families and subfamilies of Gelechioidea (Insecta: Lepidoptera)

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Abstract

Gelechioidea is a large, diverse superfamily of microlepidoptera that is difficult to characterize due to its species richness. The main working taxonomic unit for Gelechioidea seems to be the subfamily level, although many researchers use the taxonomy of family and subfamily interchangeably. Some researchers believe the superfamily should be split into several superfamilies to better diagnose lineages. Only recently have there been attempts at comprehensive treatments that aim to address world fauna of the entire superfamily rather than focusing on a few local families. This work reviews the revisional history of Gelechioidea, focusing on major taxonomic publications. It also addresses character state delineation and terminology for many taxa in some cases establishing equivalence across authors for the first time. Finally, it reviews major trends in phylogenetics and classification of the megadiverse lineage Gelechioidea.

Key words: Systematics, phylogenetics, character analysis, classification, taxonomy, morphology

Introduction

Gelechioidea is a large, worldwide, poorly understood superfamily of Lepidoptera, composed of approximately 1,425 genera and 16,250 species (Hodges 1998). Hodges (1998) estimates that only 25% of the species diversity of Gelechioidea has been described. It is difficult to characterize Gelechioidea cohesively due to extensive diversification in morphology, behaviour and ecology. Within Gelechioidea the main working taxonomic unit seems to be the subfamily level, although many researchers use the taxonomy of family and subfamily interchangeably. Even the position of Gelechioidea within the order Lepidoptera remains uncertain. To date, no comprehensive phylogenetic treatment of the order is available. Treatments based on Hennigian argumentation (where derived character states define relationship, but without numerical analysis of a matrix) or supertree phylogenies loosely pieced together are available. In an influential work by Minet in 1991, Gelechioidea are considered to be a lineage within Ditrysia. Most notable of the characteristics that unite Gelechioidea with the Ditrysia are females having a copulatory opening separate from the ovipore with an internal duct system connecting the sperm-receiving organ to the oviduct. Based on Minet's 1991 study, Kristensen and Skalski (1998) placed Gelechioidea as part of a derived unresolved polytomy. In either scenario, Gelechioidea are possibly a sister-group of the Apoditrysia; however, other possibilities include Yponomeutoidea and Gracillarioidea.

This work reviews the revisional history of Gelechioidea, focusing on major taxonomic publications. It also addresses character state delineation and terminology for many taxa, in some cases establishing equivalence across authors for the first time. Finally, it reviews major trends in phylogenetics of the megadiverse lineage Gelechioidea.

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