



The assignment of Prodidactidae to Hyblaeoidea, with remarks on Thyridoidea (Lepidoptera)

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Abstract

We examine the systematic position of the lepidopteran family Prodidactidae Epstein and Brown, 2003, which includes the single species *Prodidactis mystica* (Meyrick). We provide details on a morphological trait of the adult male hindcoxa that appears to link Prodidactidae with Hyblaeidae. This putative relationship is consistent with molecular data derived from five genes. Based on morphological and molecular evidence, we place Prodidactidae in Hyblaeoidea. Moreover, the apex of the larval spinneret is similarly modified in these families and in Thyrididae. This modification is unknown in other Lepidoptera and may prove to be a synapomorphy linking Thyridoidea and Hyblaeoidea. As the latter is not fully congruent with published molecular studies, we refrain from suggesting sister group position for Thyridoidea and Hyblaeoidea.

Key words: Apoditrysia, Obtectomera, phylogeny, systematics

Introduction

Recent advances in the molecular systematics of Lepidoptera (e.g., Mutanen *et al.* 2010; Regier *et al.* 2013) have shed new light on the previous morphology- and tradition-based higher classification of Lepidoptera. However, much of the molecular evidence is controversial and preliminary. The “backbone” phylogeny of the order, i.e. the interrelationships of superfamilies of the Apoditrysia, the large clade of more advanced Lepidoptera, remains insufficiently resolved, either by traditional morphological (see Kristensen 1998) or molecular evidence. As a result of the recent attention focused on the phylogeny of Lepidoptera, several new patterns of relationships have been revealed, and some preliminary adjustments to the classification have been suggested. Some of the more compelling ones are incorporated in the latest classification of the Lepidoptera by Nieuwerkerken *et al.* (2011). Family- and superfamily-level studies based primarily on molecular evidence are now being published regularly, e.g., Bombycoidea (Zwick 2006, 2008, Zwick *et al.* 2011), Gracillariidae (Kawahara *et al.* 2011), Gelechioidea (Kaila *et al.* 2011), Gelechiidae (Karsholt *et al.* 2013), Geometridae (Sihvonen *et al.* 2011), Noctuoidea (Zahiri *et al.* 2011, 2012, 2013), butterflies (Wahlberg *et al.* 2005 and references therein, Heikkilä *et al.* 2012), Pyraloidea (Regier *et al.* 2012), Tortricoidea (Regier *et al.* 2012), and Yponomeutoidea (Sohn *et al.* 2013). Only rarely have morphological characters been incorporated into these DNA-based analyses, and even then they have been applied to resolve relationships of putatively close groups (e.g., Zwick 2006, Heikkilä *et al.* 2012, Simonsen *et al.* 2012, Zahiri *et al.* 2013). Other changes in the classification of the order based on molecular evidence, or its application together with morphological evidence, are the exclusion of Douglassiidae from Gracillarioidea and its placement in the more ‘advanced’ Apoditrysia, though *incertae sedis* (Mutanen *et al.* 2010, Kawahara *et al.* 2011); the transfer of Lypusidae from Tineoidea to Gelechioidea (Heikkilä & Kaila 2010, Kaila *et al.* 2011); and the separation of Millieriidae from Choreutidae and its transfer to Apoditrysia, *incertae sedis* (Rota 2011, Rota & Kristensen 2011).