Description of new species of oak leaf-miners (Lepidoptera: Nepticulidae), with notes on the species groups of Stigmella Schrank associated with Quercus as a host-plant

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Abstract

Stigmella acuta Diškus, Navickaitė & Remeikis, sp. nov., a new species of oak-feeding leaf-miner belonging to the S. hemargyrella group, and S. cornuta Rocienė & Stonis, sp. nov., belonging to the newly designated S. cornuta group, are described from Asia and, for the first time, the S. hemargyrella group is associated with Quercus as a host-plant. The new species are illustrated with photographs of the leaf mines, adults, and genitalia. Diagnostics and host-plant preferences of seven Stigmella species groups associated with oaks (the S. caesurifasciella, S. saginella, S. quercipulchella, S. ruficapitella, S. castanopsiella, S. hemargyrella and S. cornuta groups) are discussed.

Key words: Nepticulidae, new species, Quercus, species groups, host-plants, Stigmella

Introduction

Nepticulidae is a family containing the smallest known Lepidoptera, with plant-mining (predominantly leaf-mining) larvae. Among about 850 currently recognized Nepticulidae species worldwide, about 9% (i.e. 77 confirmed/reared species, excluding 16 species with expected mining on oaks) are already known as Quercus-feeders (see van Nieukerken & Liu 2000; Diškus & Puplesis 2003; van Nieukerken & Johansson 2003; van Nieukerken et al. 2010; Hirano 2010; Stonis et al. 2013a) and mostly belong to two genera: Stigmella Schrank and Ectoedemia Busck; only one species belongs to Glaucopleis Braun (see Wilkinson & Scole 1979).

The genus Quercus is one of the most important groups of woody angiosperms in the northern hemisphere in terms of species diversity, ecological dominance, and economic value (Nixon 2006). Oak occurs in vast territories above the equator (except Indonesia) in temperate forests of Europe and North America (Menickiy 1984; Nixon 2006; Torres-Miranda et al. 2011).

Because of the importance of the tremendous diversity of leaf-mining or other herbivorous insects feeding on oaks and difficulties associated with identification of Fagaceae-feeding Nepticulidae, the Quercus-feeding species of Stigmella Schrank have recently received special attention. The East Palearctic fauna (mostly Chinese) was treated by van Nieukerken & Liu (2000) and the West Palearctic fauna of Stigmella comprising 19 oak-feeding species was reviewed by van Nieukerken & Johansson (2003). This was followed by descriptions of three new Quercus-feeding Stigmella from Japan (Hirano 2010) and, most recently, by illustrations of male genitalia of Nepticulidae from continental East Asia, including many species of Stigmella trophically associated with oaks (Stonis & Rocienė 2013; Rocienė & Stonis 2013), and by the first discovery of seven oak-feeding Nepticulidae species in Central America (Guatemala) (Stonis et al. 2013a, b).

In this paper we describe Stigmella acuta Diškus, Navickaitė & Remeikis, sp. nov., a new Quercus-feeding species from the Himalaya belonging to the S. hemargyrella group, and S. cornuta Rocienė & Stonis, sp. nov., a
the unusual shape of the uncus with no lateral lobes, or the gnathos with a single caudal process separate the caesurifasciella group from all other groups of Stigmella trophically associated with Quercus (Fig. 46). The same applies to the strongly chitinized signa or X-shaped (or modified) juxta: each of these characters diagnoses the saginella group. The bulbous aedeagus with a coiled vesica immediately distinguishes the castanopsiella group, the enormously enlarged and markedly spiral (coiled) accessory sac – the quercipulchella group. Usually (with a few exceptions), it is possible to separate the ruficapitella group from all six remaining groups solely on the basis the broadly U-shaped gnathos (Fig. 46).

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