*Zootaxa* 3737 (3): 201–222
www.mapress.com/zootaxa/


**Article**

ISSN 1175-5326 (print edition)
**ZOOTAXA**
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3737.3.1
http://zoobank.org/urn:lsid:zoobank.org:pub:6193AEF5-30AB-4005-9412-C4D111153F26

# 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 *Glaucolepis* Braun (see Wilkinson & Scoble 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 Palaearctic fauna (mostly Chinese) was treated by van Nieukerken & Liu (2000) and the West Palaearctic 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

*Accepted by J.F. Landry: 1 Nov. 2013; published: 20 Nov. 2013*

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).


## Acknowledgements

Dr. Sergey Yu. Sinev (Zoological Institute of the Russian Academy of Sciences, St. Petersburg) and Dr. Erik J. van Nieukerken (Naturalis, Leiden) provided the initial stimulus for this project. We thank anonymous referees for reviewing this paper and their useful suggestions. We are grateful to Dr. Jack Schuster (Universidad del Valle de Guatemala), Dr. Jean-François Landry (Agriculture & Agri-Food Canada, Ottawa) and anonymous referees for their numerous corrections and suggestions. Andrius Remeikis thanks the Research Foundation of the Research Council of Lithuania for support (R12-77/SMT12P-155; R12-280/SMT12R-116).


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