

# A REVIEW OF SYMMOCINAE (LEPIDOPTERA: AUTOSTICHIDAE) IN NORTH AMERICA WITH THE DESCRIPTION OF A NEW SPECIES AND NEW GENUS

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## INTRODUCTION

The Symmocinae (Gelechioidea: Autostichidae) includes 170 species in 42 genera, with greatest diversity in xeric areas of the Palearctic Region (Gozmany, 1963, 1964, 1975). Larvae are known to feed on decaying plant vegetation (Gozmany, 1963). Three species have been reported from North America: *Scptea aequapulvella* (Figs. 1, 5) *Oegoconia quadripuncta* (Figs. 2, 6), and *Symmoca signatella* (Figs. 3, 7), with the latter two species introduced (Hodges, 1983; Powell 1960, 1992). A new species, initially collected in Mississippi, was identified by R.W. Hodges during the 1990's as "Symmocidae new genus" (Figs. 4, 8-11).

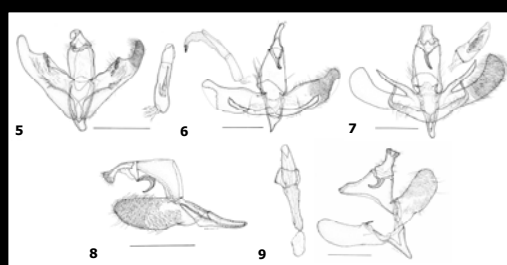
The classification and phylogenetic position of *Symmoca* and related genera have been unstable. In recent years Symmocinae has been treated as a family (Gozmany, 1963), a subfamily of Blastobasidae that also included *Glyphidocera* (Hodges, 1983), and a subfamily of Autostichidae. Hodges (1999) considered the Autostichidae to be allied with the Gelechioidea group of families (Fig. 12) and to be defined by homoplasious characters of an articulated gnathos (Fig. 8) and presence of spiniform setae on abdominal terga (Fig. 14). Kaila (2004) used characters of the larvae, pupae, and endoskeleton of the adult to propose an alternative phylogeny that included Autostichidae in the Oecophoridae lineage (Fig. 13). However, Kaila's clades are based on a combination of plesiomorphic characters and homoplasious characters that do not agree with species examined with this study. For example, the dorsomedial margins of the epinotum are separated in the Oecophoridae lineage (and in Symmocinae gen. nov.) (Fig. 23) but are joined to form a medial ridge in the gelechid lineage (but also in *Autosticha kyotensis*).

Hodges (1999) defined Symmocinae by homoplasious characters of a forewing with CuP absent (Fig. 11A), female with retinaculum composed of a series of anteriorly directed scales between CuA and R (Fig. 15), and the gnathos forming a mesial hook (Fig. 8).

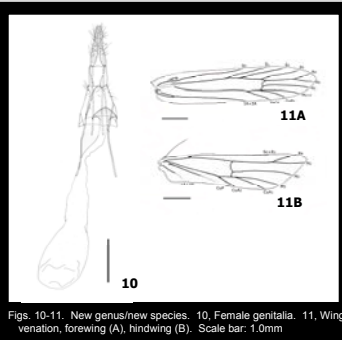
The purpose of this study is to review and illustrate North American species of Symmocinae and describe novel morphological characters of a new genus and species that may be valuable for resolving the phylogenetic relationships of gelechid taxa.

## METHODS

Published figures of 139 species representing 41 genera, including male genitalia of 37 type species, were examined. Material examined from the Mississippi Entomological Museum and U.S. National Museum of Natural History is given in Table 1. Adult specimens and slide preparations were examined with a Leica MZ 125 Stereo-Microscope and Olympus Compound Microscope. Whole body mounts were made following methodology given at <http://www.msstate.edu/org/mississippiemuseum/ResearchTaxapages/GelechioideaHome.html>. Images were made with a Leica TCS NT confocal laser scanning microscope, LEO S360 scanning electron microscope, and a Leica stereoscope with Image Pro Plus 5.1 program for autoframing.



Figs. 5-9. Male genitalia. 5, *Scptea aequapulvella* (Cham.), 6, *Oegoconia quadripuncta* (Haw.), 7, *Symmoca signatella* (H.-S.). 8-9, New genus/new species. Scale bar: 0.5mm



Figs. 10-11. New genus/new species. 10, Female genitalia. 11, Wing venation, forewing (A), hindwing (B). Scale bar: 1.0mm

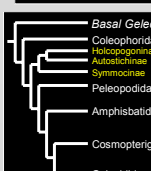


Fig. 12. Phylogeny of Hodges (1999)

Table 1. Characters states of new genus. Non-examined characters are marked as "--".

| Taxon           | 1                                  | 2 | 3 | 4 | 5 | 6 |
|-----------------|------------------------------------|---|---|---|---|---|
| Family          | Species                            | 0 | 0 | 0 | 2 | 1 |
| Amphisbatidae   | <i>Eurapria hospita</i>            | 0 | 0 | 0 | 2 | 1 |
|                 | <i>Machimia benfordella</i>        | 0 | 0 | 0 | 1 | 1 |
| Autostichidae   |                                    | 0 | 0 | 0 | 1 | 0 |
| Symmocinae      |                                    | 0 | 0 | 0 | 1 | 0 |
|                 | <i>Amrasina zaydella</i>           | 0 | 0 | 0 | 1 | 0 |
|                 | <i>Agromita designatella</i>       | 0 | 0 | 0 | 1 | 0 |
|                 | gen. nov. sp. nov.                 | 1 | 1 | 1 | 2 | 1 |
|                 | <i>Nestorella meyeri</i>           | 0 | 0 | 0 | 1 | 1 |
|                 | <i>Oegoconia quadripuncta</i>      | 0 | 0 | 0 | 0 | 0 |
|                 | <i>Scptea aequapulvella</i>        | 0 | 0 | 0 | 0 | 1 |
|                 | <i>Symmoca signella</i>            | 0 | 0 | 0 | 0 | 0 |
| Autostichinae   | <i>Autosticha kyotensis</i>        | 0 | 0 | 0 | 2 | 0 |
| Holcoppogoninae | <i>Holcoppogon helveticus</i>      | 0 | 0 | 0 | 1 | 0 |
| Coleophoridae   |                                    | 0 | 0 | 0 | 0 | 0 |
| Blastobasinae   | <i>Blastobasis glandulella</i>     | 0 | 1 | 0 | 0 | 0 |
|                 | <i>Calocima lepidophaga</i>        | 0 | 1 | 0 | 0 | 0 |
| Coleophorinae   | <i>Coleophora crispipennis</i>     | 0 | 0 | 0 | 0 | 0 |
|                 | <i>Coleophora spasiornis</i>       | 0 | 0 | 0 | 0 | 0 |
| Gelechioidea    | <i>Arctostella roseosuffusella</i> | 0 | 0 | 2 | 0 | 0 |
|                 | <i>Arga consociella</i>            | 0 | 0 | 2 | 0 | 0 |
| Glyphidocerinae | <i>Glyphidocera demoracra</i>      | 0 | 0 | 0 | 0 | 0 |
|                 | <i>Glyphidocera juniperella</i>    | 0 | 0 | 0 | 0 | 0 |
| Oecophoridae    | <i>Callima argenticinctella</i>    | 0 | 0 | 0 | 2 | 0 |
|                 | <i>Inga sparsicinctella</i>        | 0 | 0 | 2 | 0 | 0 |
|                 | <i>Durrantia piperatella</i>       | 0 | 0 | 2 | 0 | 0 |
| Peleopodidae    | <i>Pseudestha chlorella</i>        | 0 | 0 | 2 | 0 | 0 |

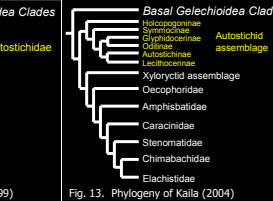


Fig. 13. Phylogeny of Kaila (2004)

## RESULTS

The assignment of the new genus to Autostichidae and Symmocinae is validated by presence of an articulated gnathos, presence of spines on the abdominal tergites, form of the female forewing retinaculum, absence of forewing vein CuP, and mesial hook of the gnathos. The form of the uncus, which is strongly bent basally and widened apically, and the form of the female genitalia (Fig. 10) are similar to those of species in many other genera of Symmocinae.

The new genus is defined by the following autapomorphies: 1) metatibia with group of spines on dorsobasal surface with spines having much larger sockets than adjacent scales (Figs. 16, 20, 22); 2) male antennal scales truncate (Fig. 18), instead of dentate (Fig. 19). The absence of sacular or costal projections of valva is an apomorphy shared with *Scptea* and *Exorgana*. The apomorphic clustering of scale sockets on the metatibia (Fig. 20B) is a parallelism with Blastobasinae, whereas other examined gelechioidea have scattered sockets (Fig. 21). The apomorphic metascutellum with anterior width greater than length at middle (Fig. 23), instead of narrowly rounded (Fig. 24) is a parallelism shared with Autostichinae, and the terminal taxa of Peleopodidae, Amphisbatidae, and Gelechioidea in the phylogeny of Hodges (1999).

## DISCUSSION

The new species is the second known endemic species of Symmocinae in North America. Fifty-one specimens (47 males, 4 females) have been collected during April – October in the midsouthern states and Kansas (Map 1). Most specimens have been collected in a variety of dry forests, but 18 specimens have been collected in prairies, cedar glades, inland dunes, and old fields. One specimen was collected visiting flowers of *Asclepias syriaca* at night in Konza Prairie, KS.

Although feeding habits are unknown, the presence of fungal spores imbedded between longitudinal ridges of the tibial spines (Fig. 17) and on other parts of the body may indicate its association with decaying plant materials. Similar spores were detected on the antenna of *Scptea aequapulvella*, recently borrowed from the U.S. National Museum. These spores have not been seen on bodies of a large number of phytophagous species examined previously.

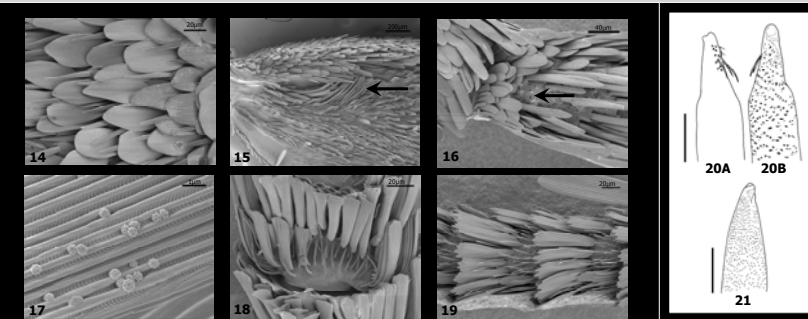
Characters of the new genus suggest a relationship with Autostichidae as well as Blastobasinae (Coleophoridae). The use of molecular data, currently being obtained for selected Gelechioidea, may provide additional resolution of phylogenetic relationships of higher taxa.

## REFERENCES

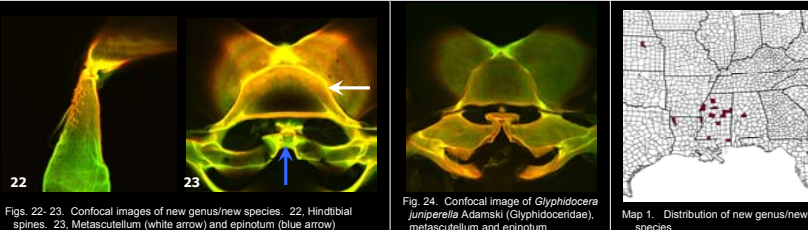
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Figs. 14 - 18. SEM images of new genus/new species. 14, Abdominal spines. 15, Female forewing retinaculum (arrow). 16, Hindtibial spines with enlarged sockets (arrow). 17, Hindtibial spine with fungal spores. 18, antennal scales, ventral. Fig. 19. SEM image of *Scptea aequapulvella*, antennal scales, ventral view.



Figs. 22-23. Confocal images of new genus/new species. 22, Hindtibial spines. 23, Metascutellum (white arrow) and epinotum (blue arrow)

Fig. 24. Confocal image of *Glyphidocera juniperella* Adamski (Glyphidocerinae), metascutellum and epinotum

Map 1. Distribution of new genus/new species