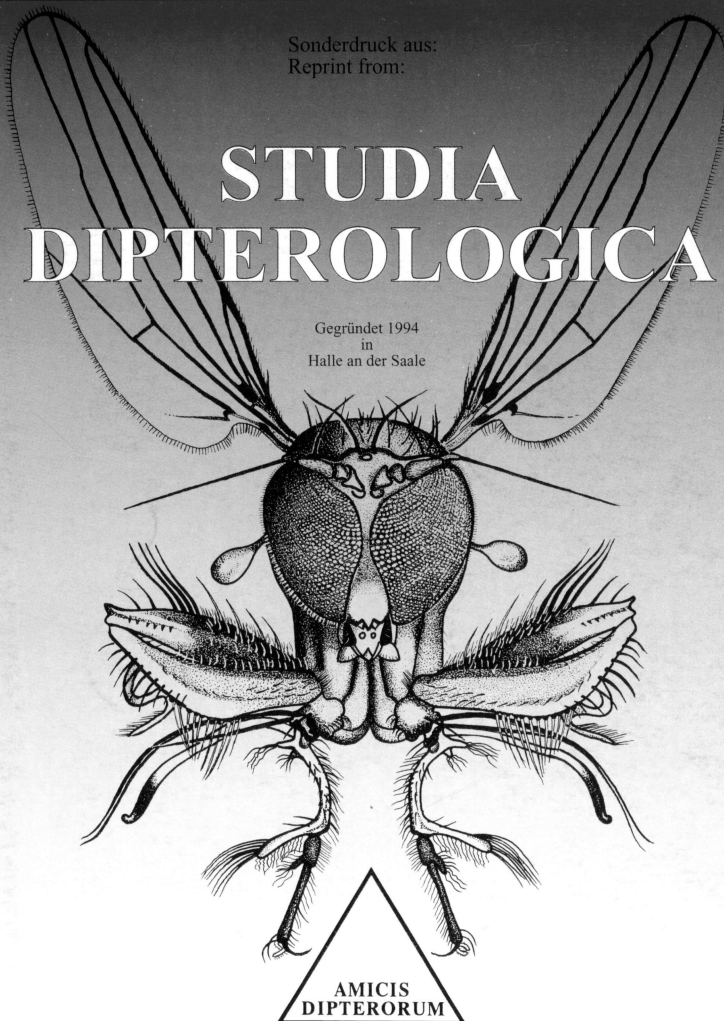


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## A fossil *Hypocera* species (Diptera: Phoridae) and its phylogenetic implications

[Eine fossile *Hypocera*-Art (Diptera: Phoridae) und ihre  
phylogenetischen Beziehungen]

by

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**Abstract** A new species of phorid fly, *Hypocera oschini* spec. nov., is described from Baltic amber from Kaliningrad, Russia. The two female specimens represent the first known fossils of this genus. *Hypocera oschini* spec. nov. differs from other species of *Hypocera* by setation characters of the legs and wings. It is most closely related to extant species found in the New World.

**Key words** Phoridae, *Hypocera*, new species, Baltic amber, fossil

**Zusammenfassung** Mit *Hypocera oschini* spec. nov. wird eine neue Phoridenart aus dem Baltischen Bernstein der Kaliningrader Region (Russland) beschrieben. Die zwei weiblichen Tiere representieren die ersten Fossilien dieser Gattung. *Hypocera oschini* spec. nov. unterscheidet sich von anderen Vertretern der Gattung durch die Merkmale in der Beborstung der Flügel und Beine. Die Art weist die nächsten Verwandtschaftsbeziehungen mit rezenten Vertretern der Gattung in der Neuen Welt auf.

**Stichwörter** Phoridae, *Hypocera*, neue Art, Baltischer Bernstein, Fossilien

### Introduction

The genus *Hypocera* LIOY (Diptera: Phoridae: Hypocerinae) is a small group of phorid flies that contains some of the largest phorids known, with body lengths of up to 6 mm. The extant species were revised recently by BROWN & BUCK (1998), who recognized five species and proposed a phylogeny for the group.

Fossil species of *Hypocera* were unknown up to this point (BROWN 1999), but I have recently found two specimens of this genus in European Baltic amber (late Eocene - early Oligocene age). These are described as a new species, below, and their phylogenetic ramifications are examined.

### Systematic account

#### *Hypocera oschini* spec. nov.

(Fig. 1)

**Material examined:** Holotype: ♀. **Russia:** Kaliningrad. Baltic amber (catalog number LACM IP 12785).  
Paratype: 1 ♀, same as holotype (catalog number LACM IP 12786).

**Species recognition:** This species differs from the other described *Hypocera* by the following characters: fore tibia lacking extremely long anterodorsal seta; wing vein  $R_s$  with setulae along entire length; hind tibia with row of large, posterodorsal setae; tarsomere 1 of hind leg with long, ventral seta at midlength. In the key of BROWN & BUCK (1998), it keys to couplet 3 but differs from both species in this couplet by the presence of posterior acrostichal setae and by having only one long, ventral spur on the mid tibia and two on the hind tibia (rather than two and three, respectively).

## Description

**Female:** Body color apparently black, but this is difficult to establish with certainty in amber specimens. **Head.** One pair of supra-antennal setae present; other frontal setae 4-4-4. Palpus dark-colored, with well-developed setae. **Thorax.** Anepisternum setulose, with one long seta. Posterior acrostichal setae well-developed. Scutellum with four well-developed setae. **Legs.** Fore tibia with row of short, anterodorsal setae, the basalmost of which is slightly larger than the others. Mid tibia (basally) and hind tibia with dorsal, transverse rows of small, dense setae (= ctenidia; as in BROWN 1992, fig. 12A; DISNEY 1983, fig. 75). Mid tibia with basal pair of setae, one anteroapical seta, and one long, ventral spur. Hind tibia with row of long, posterodorsal setae and two ventral spurs. Tarsomere 1 of hind leg with large, ventral seta at mid length. **Wing** vein  $R_s$  setulose along entire length. Vein  $M_1$  not basally curved (similar to BROWN & BUCK 1998, fig. 9). **Abdominal** tergites dark-colored, decreasing in size posteriorly.

**Derivation of species name:** This species is dedicated to Mr Michael OSCHIN, in gratitude for his support of my work on fossil phorids.

## Phylogenetic relationships

The new species possesses a combination of character states whose explanation potentially differs from that given by BROWN & BUCK (1998). Examining each of the synapomorphies



Fig. 1: *Hypocera oschini* spec. nov. Holotype female.

(ten from BROWN & BUCK, one newly presented herein), we find the following character states in *H. oschini*:

- 1 - (shape of tergite 1 in female): This cannot be observed in the specimens available.
- 2 - (anepisternum with seta): seta present in *H. oschini*.
- 3 - (ctenidia present): ctenidia present in *H. oschini*.
- 4 - (anterobasal seta of hind tibia absent): seta absent in *H. oschini*.
- 5 - (base of  $M_1$  straight): straight in *H. oschini*.
- 6 - (hind tibia with three long, ventral spurs): two present in *H. oschini*.
- 7 - (mid tibia with two long, ventral spurs): one present in *H. oschini*.
- 8 - (posterior acrostichal setae present): setae present in *H. oschini*.
- 9 - (left side of epandrium extended below cerci): this male-only character cannot be observed in the two female specimens.
- 10 - (body color yellow): body color black in *H. oschini*.
- 11 - (epandrium elongate): this male-only character cannot be observed in the two female specimens.

These characters were scored in a data matrix (Table 1), along with those for the other species of *Hypocera*, and were analyzed using Hennig-86 (FARRIS 1989). There are three equally parsimonious explanations for this distribution of characters (Figs 2-4), one of which is equivalent to the consensus tree for the group (Fig. 2). The tree in Fig. 3 is equivalent to that given by BROWN & BUCK (1998).

**Table 1:** Data matrix for *Hypocera* species

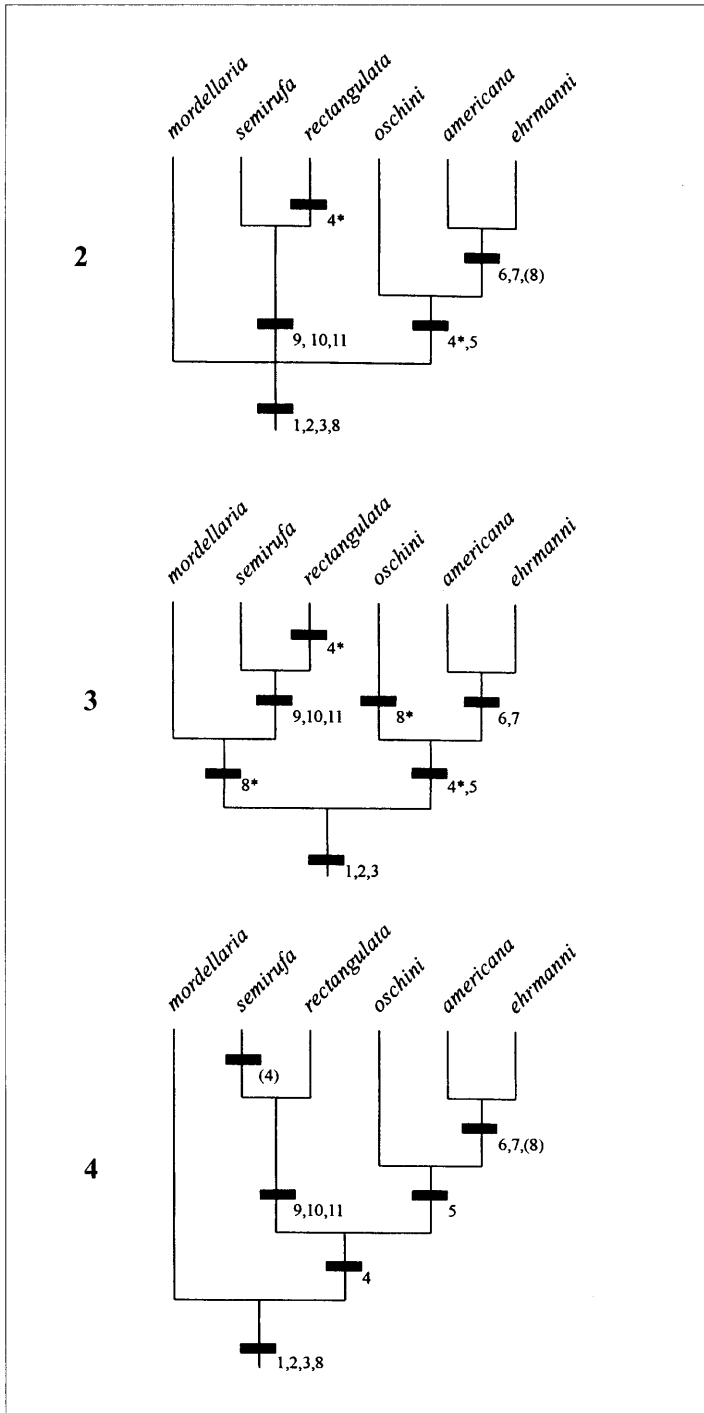
character	1	2	3	4	5	6	7	8	9	10	11
outgroup	0	0	0	0	0	0	0	0	0	0	0
<i>americana</i>	1	1	1	1	1	1	1	0	0	0	0
<i>ehrmanni</i>	1	1	1	1	1	1	1	0	0	0	0
<i>mordellaria</i>	1	1	1	0	0	0	0	1	0	0	0
<i>semirufa</i>	1	1	1	0	0	0	0	1	1	1	1
<i>rectangulata</i>	1	1	1	1	0	0	0	1	1	1	1
<i>oschini</i>	?	1	1	1	1	0	0	1	?	0	?

Based on character 5, *H. oschini* belongs in a monophyletic group with *H. americana* BORGMEIER, 1962 and *H. ehrmanni* ALDRICH (in BRUES 1904), both of which are New World species. Because the New World species further share characters 6 and 7, they form a sister-group pair, with *H. oschini* being the immediate outgroup.

Character 8, presence of posterior acrostichal setae, was previously considered an uncontested synapomorphy of *H. mordellaria* (FALLÉN, 1823), *H. semirufa* BEYER, 1958 and *H. rectangulata* MALLOCH, 1912 (together considered the Old World species), but it is found also in *H. oschini*. It is equally parsimonious to consider this state to have evolved twice (Fig. 3) or have evolved once, but have been lost in the New World species (Figs 2, 4).

Character 4, loss of the anterobasal seta of the hind tibia, is found in *H. oschini*, *H. rectangulata* and the New World species. Based on this analysis, it either was lost twice (Figs 2, 3) or was lost once and was subsequently regained in *H. semirufa* (Fig. 4).





**Figs 2-4:** Three most parsimonious cladograms from data matrix in Table 1. Tree length 13, consistency index 84, retention index 81.

Progress on resolving this phylogeny will be made only by discovering new characters that can be analyzed along with those currently in use. Until new characters are available, I am unable to unambiguously support the monophyletic Old World group of species proposed previously (BROWN & BUCK 1998).

### Evolutionary implications

The presence of the relatively derived species *H. oschini* in Baltic amber indicates that much of the evolution within *Hypocera* occurred before the Baltic amber period (35-55 million years ago). At least the basal divergence that gave rise to the Old World species predates this time. Few other fossil representatives of the subfamily Hypocerinae are known. Only *Godavaria* BROWN, recorded from Baltic amber, and *Borophaga* ENDERLEIN and *Abaristophora* SCHMITZ from much younger Dominican amber have been recorded (BROWN in press). All of these taxa are relatively more derived than *Hypocera*, which is the most primitive hypocerine genus yet found as a fossil.

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**Announcement to the subscribers of the journal *Studia dipterologica***

The editors and editorial board of *Studia dipterologica* would like to take this opportunity to wish all subscribers to the journal a healthy and successful New Year.

Unfortunately the year 2000 has not had a particularly happy opening for our journal. Our suppliers have announced a further increase of 10 % in the price of printing paper, with effect from 1 January of this year. This follows an increase in prices by the same amount in the last quarter of 1999. These developments have compelled Ampyx Publishers to raise the price of subscriptions to the journal *Studia dipterologica* as follows, beginning with volume 7 (2000):

**Annual subscription for customers in Germany: 85.00 DM (including postage).**

**Annual subscription for customers outside Germany: 90.00 DM (including postage).**

Terms governing the *Supplement* series remain unaltered.

If you do not wish to renew your subscription for the year 2000, please inform the editors **before the end of March 2000**. Cancellations of volume 7 received after this date will not be accepted.

As it is our hope and intention to continue with the expansion of our journal, we would naturally prefer to find additional subscribers to the journal rather than to lose subscribers.

With thanks for your understanding, and with best wishes,

A. Stark and F. Menzel

Editors of *Studia dipterologica*