Baltic amber pseudoscorpions (Arachnida, Chelonethi): a new species of *Neobisium* (Neobisiidae) and the status of *Obisium rathkii* Koch & Berendt

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ABSTRACT
Neobisium henderickxi n. sp. is described from a Baltic amber (upper Eocene) fossil. It is very similar to the Recent species *N. kobachidzei* Beier, 1962 and *N. speleophilum* Krumpál, 1986 from the Caucasus. The fossil species *Obisium rathkii* Koch & Berendt, 1854 and *Pycnochelifer kleemanni* (Koch & Berendt, 1854) are synonymized and the latter name is given precedence. *Neobisium rathkii* (*non* Koch & Berendt) *sensu* Menge 1855 and Beier 1937 represents a different species, whose identity remains uncertain. It is compared to *Microcreagris koellnerorum* Schawaller, 1978 (nom. emend. pro *Microcreagris koellneri*) and to a poorly preserved neobisiid fossil in the Baltic amber collection of the Zoological Museum, Copenhagen University.

KEY WORDS
Pseudoscorpion,
Neobisium henderickxi n. sp.,
Baltic amber,
Eocene,
fossil,
new species.

RÉSUMÉ
Pseudoscorpions (Arachnida, Chelonethi) de l'ambre baltique : une nouvelle espèce de Neobisium *(Neobisiidae) et le statut d'*Obisium rathkii *Koch & Berendt.*
Neobisium henderickxi n. sp. est décrit à partir d'un fossile de l'ambre baltique (Éocène supérieur). Il est très semblable aux espèces actuelles *N. kobachidzei* Beier, 1962 et *N. speleophilum* Krumpál, 1986 du Caucase. *Obisium rathkii* Koch & Berendt, 1854 est mis en synonymie avec *Pycnochelifer kleemanni* (Koch & Berendt, 1854), nom auquel est accordée la préséance. *Neobisium rathkii* (*non* Koch & Berendt) *sensu* Menge 1855 et Beier 1937 représente une espèce différente dont l'identité est douteuse. Elle est comparée à *Microcreagris koellnerorum* Schawaller, 1978 (nom émend. pro *Microcreagris koellneri*) et à un fossile mal conservé de la collection d'ambre baltique du Zoological Museum, Copenhagen University.

MOTS CLÉS
Pseudoscorpion,
Neobisium henderickxi n. sp.,
ambre de la Baltique,
Éocène,
fossile,
nouvelle espèce.

INTRODUCTION

With over 200 species, *Neobisium* Chamberlin, 1930 is the largest genus of Recent pseudoscorpions and dominates the western Palaearctic fauna. Most species are litter-dwelling or subterranean, so it is not surprising that fossils of this genus are comparatively rare. Two species from Baltic amber are currently assigned to *Neobisium*, but one of these, "*Neobisium*" *rathkii* (Koch & Berendt, 1854), belongs elsewhere (see below). The other, *Neobisium exstinctum* Beier, 1955, is probably a true *Neobisium*, but information is lacking about the diagnostically important trichobothria. An additional problem is that the characters used to separate *Neobisium* from the North American genus *Novobisium* Muchmore, 1967 – notably the form of the flagellum and the chaetotaxy of the genital region (Muchmore 1967) – are not usually visible in Baltic amber fossils. However, there can be little doubt that the new fossil species described here belongs in *Neobisium* because of its similarity to the Recent species *N. kobachidzei* Beier, 1962 and *N. speleophilum* Krumpál, 1986.

MATERIAL AND METHODS

The material studied here is deposited in the Muséum national d'Histoire naturelle, Paris (MNHN) and the Zoological Museum, Copenhagen University (ZMUC).

The amber containing the holotype of *Neobisium henderickxi* n. sp. was prepared by grinding and polishing a flat surface parallel to the dorsal plane of the pseudoscorpion. Observations and drawings were made with a Leitz Dialux 20 compound microscope, with attached drawing tube, using different combinations of transmitted and reflected light. Measurements of the palps follow Beier (1963); the lengths of inclined parts were calculated by trigonometry (Schlee & Glöckner 1978). Where parts of the cuticle have retracted, the measurements and figures are based on the cast left in the amber.

The neobisiid specimen in ZMUC was examined with a Leica MZ APO stereomicroscope, using reflected light, and drawn using an attached drawing tube.

SYSTEMATICS

Superfamily NEOBISIOIDEA Chamberlin, 1930
Family NEOBISIIDAE Chamberlin, 1930
Genus *Neobisium* Chamberlin, 1930

Neobisium henderickxi n. sp.
(Figs 1; 2)

TYPE MATERIAL. — Holotype, adult (♂?) in a clear, pale-yellow piece of Baltic amber, deposited in the palaeontology collections of the MNHN (reg. No. MNHN-LP-R.11188). Ventral parts of pseudoscorpion clouded by a milky emulsion ("*Schimmel*"). Also present in the piece are a worker ant of the genus *Aphaenogaster* Mayr, 1853 and a small mite (Cheyletoidea?). The fossil was purchased by Hans Henderickx from an amber dealer who stated that it came from Denmark, but it seems more likely that it would have come from one of the southern Baltic states.

ETYMOLOGY. — Patronym in honour of Hans Henderickx.

DESCRIPTION

Medium-sized, dark and normally-sclerotized species of *Neobisium* (Fig. 1). Carapace (Fig. 2B) with setal formula approximately 4-6(24); epistome short and blunt; eyes well developed, anterior pair distinctly larger than posterior pair. Tergal setae 8?-8?-8?-8-8-8-8?-8-8-8?-6-2. Pleural membrane papillostriate. Chelicera (Fig. 2A) with six setae on hand; fixed finger with six small teeth; movable finger with three large basal teeth and about five small apical teeth; spinneret tubercle broad and low. Palps (Fig. 2C) without granulation; a single, small tubercle (raised lyrifissure) present on femur, near middle of posterior margin; patellar notch reaching about half length of inner (paraxial) margin (Chamberlin 1962), x/y ratio (Gabbutt & Vachon 1965) about 0.90; both fingers homodentate, teeth contiguous; *ist* slightly distad of middle of finger, nearer to *it* than to *ib*; *it* slightly more distal than *et*. Legs I and II with sparse, sharp granules on anterior face of femur.

FIG. 1. — *Neobisium henderickxi* n. sp., dorsal view of holotype. Body length: 1.95 mm.

TABLE 1. — Measurements (in mm) and ratios of palp for *Neobisium kobachidzei* Beier, 1962 (from Beier 1962), *N. speleophilum* Krumpál, 1986 male (from Krumpál 1986) and *N. henderickxi* n. sp.

Segment	*kobachidzei*	*speleophilum*	*henderickxi*
Femur	0.78 × 0.19	0.87 × 0.22	0.91 × 0.23
(l/b)	(4.1)	(4.0)	(3.9)
Patella	0.60 × 0.22	0.64 × 0.24	0.63 × 0.23
(l/b)	(2.7)	(2.6)	(2.6)
Hand	0.59 × 0.39	0.66 × 0.44	0.67 × 0.42
(l/b)	(1.5)	(1.5)	(1.6)
Chela	1.5 × 0.39	1.71 × 0.44	1.58 × 0.42
(l/b)	(3.8)	(4.1)	(3.7)
Finger	0.94	1.05	1.01
(l/hand l)	(1.6)	(1.6)	(1.5)

Measurements (in mm)
Body length (contracted) 1.95. Carapace 0.72 × *c.* 0.65 (ocular breadth). Chelicera 0.62 × 0.44. Palp: see Table 1.

REMARKS
As noted in the introduction, *N. henderickxi* n. sp. is very similar to *N. kobachidzei*, which is known from the Caucasus and neighbouring territories, and to *N. speleophilum*, also from the Caucasus. The differences between *N. kobachidzei* and *N. speleophilum* are slight, so it is possible that they are synonymous (Dashdamirov & Schawaller 1993). Characters shared by these species and the fossil include the form and dimensions of the palps (particularly the relatively long fingers), the similar number of setae on the carapace and chelicera, the general arrangement of the trichobothria, and the absence of a dense group of enlarged setae on the paraxial face of the chelal hand. The similarities in the measurements of the palps (Table 1) are striking, but it should be borne in mind that the sex of the specimen is uncertain and that *Neobisium* species show sexual dimorphism of the palps. Judson (1998) suggested that the dimensions of amber pseudoscorpions might be slightly reduced from those of the living animal, but such differences, if they exist, are likely to be small. The new species can be separated from *N. kobachidzei* and *N. speleophilum* by the more basal position of trichobothria *isb* and *est*; in the fossil *est* is about half way between *ist* and *et* and *ist*, whereas in the Recent species *est* is clearly nearer to *et*. *N. henderickxi* n. sp. might also be separated from the Recent species by its more obtuse epistome, but this character can show intraspecific variation (Mahnert 1988).
Neobisium henderickxi n. sp. is readily separated from the other Baltic amber species, *N. exstinctum*, by its longer chelal fingers (shorter than hand in *N. exstinctum*) and the lower number of tergal setae (12 on middle tergites of *N. exstinctum*).

TAXONOMIC STATUS OF *OBISIUM RATHKII* KOCH & BERENDT, 1854

Koch & Berendt (1854) described *rathkii* as a species of *Obisium* Leach, 1817, even though they were not able to determine the number of eyes (at that time the main character used to separate *Obisium* from *Chelifer* Geoffroy, 1762) in the type. Menge (1855), who was the last person to have studied their material, stated that it did not belong in *Obisium* and suggested that it was probably an immature of *Chelifer kleemanni* Koch & Berendt, 1854. This assessment is supported by Koch & Berendt's figure, which shows characteristics consistent with the Cheliferoidea: leg tarsi undivided; femur of the anterior legs much shorter than the patella; small chelicerae; carapace broadened posteriorly and

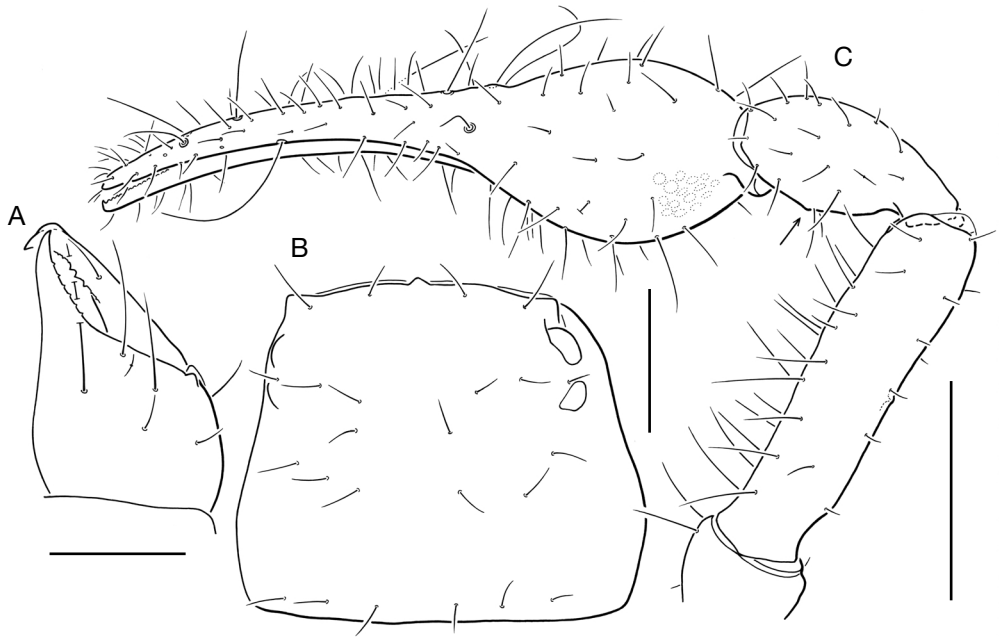

FIG. 2. — *Neobisium henderickxi* n. sp., holotype; **A**, right chelicera, dorsolateral view; **B**, carapace, dorsal (slightly oblique) view (left eyes poorly visible); **C**, right palp (composite: parts of femur and trichobothriotaxy based on left palp; hand and patella moderately foreshortened; arrow indicates limit of articular notch of patella; muscle sigilla partially shown at base of hand). Scale bars: A, 0.2 mm; B, 0.3 mm; C, 0.5 mm.

with a weak furrow. Nevertheless, Menge (1855) proceeded to describe a neobisiid specimen from his own collection under the name *Obisium rathkii*. Although he was aware that this changed the concept of the species, Menge did not wish to change the name because of the services rendered by M. H. Rathke (1793-1860) to zoology. "*Obisium rathkii*" *sensu* Menge (1855) is therefore not the species described by Koch & Berendt (1854). Beier (1937) was mistaken in considering the specimen in Menge's collection as the type. The true type ought to be in the Berendt collection, but it cannot be found in the Museum für Naturkunde der Humboldt-Universität, Berlin (J. A. Dunlop and C. Neumann *in litt*.) and is presumably lost. Because *O. rathkii* cannot be identified from the original description, it seems better to accept the synonymy suggested by Menge than to leave it indefinitely as a *nomen dubium*. *Obisium rathkii* is therefore synonymized with *Pycnochelifer kleemanni* (Koch & Berendt, 1854) (new synonymy) and precedence is given to the latter name.

The identity of "*Obisium rathkii*" *sensu* Menge (1855) (= "*Neobisium rathkii*" *sensu* Beier 1937) remains uncertain. According to Beier (1937), trichobothrium *ist* is situated in the basal half of the finger, which led him to suggest that this species might belong in *Parobisium* Chamberlin, 1930 (then a subgenus of *Neobisium*). However, no species of *Parobisium* has such robust palps and it is possible that Beier (1937) erred in the identification of *ist*. It is sometimes difficult to recognize all the trichobothria in fossils and Beier noted that the palps were very poorly orientated. In this context it is interesting to note that there is a specimen in the ZMUC amber collection (labelled "C. V. Henningsen, 22-11 1961" and identified as "Neobisiiden larve?" by Beier) that has similar palps to those of Menge's specimen (Table 2), but which has *ist* slight distad of the middle of the finger (Fig. 3). Unfortunately, this specimen is very difficult to study, being almost

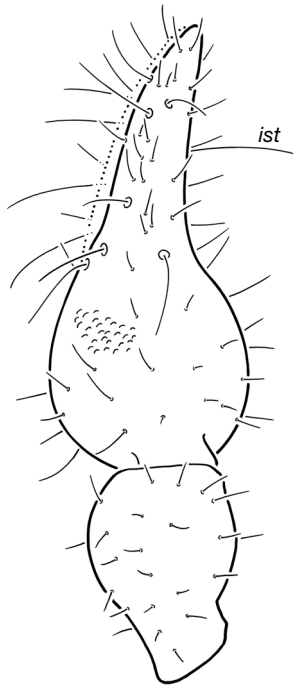

FIG. 3. — Fossil neobisiid from Baltic amber (ZMUC), dorsal view of patella and chela of left palp (granulation only partly shown on hand). Abbreviation: ***ist***, trichobothrium *ist*. Scale bar: 0.4 mm.

entirely covered by a dense layer of cloudy amber that prevents observation of the chelicerae and eyes. Apart from the position of *ist*, the only obvious difference in the form of the palps is that the hand of the chela is much broader, but this might not be as important as it seems, given the difficulties of measuring the dimensions of amber fossils (particularly the breadths of segments) and the existence of sexual dimorphism in neobisiids.

There is, however, a second neobisiid in the Baltic amber fauna that can be compared with Menge's specimen. "*Microcreagris*" *koellnerorum* Schawaller, 1978 (nom. emend. pro *Microcreagris koellneri* Schawaller: named after Thea and Walter Köllner) is almost identical in size (Table 2) and *does* have *ist* slightly proximad of the middle of the finger. This species is described as having the spinneret in the form of a "long conical tooth", which would exclude it from *Neobisium* and contrasts with the "small and flat"

TABLE 2. — Measurements (in mm) and ratios of chela for "*Neobisium rathkii*" *sensu* Menge (from Beier 1937; length of chela obtained by adding hand and finger lengths), "*Microcreagris*" *koellnerorum* Schawaller, 1978 (from Schawaller 1978) and the ZMUC fossil.

Segment	*"rathkii"*	*koellnerorum*	ZMUC
Chela	*c.* 0.95	0.98 × 0.33	1.00 × 0.44
(l/b)	(*c.* 2.9)	(3.0)	(2.3)
Hand l	0.50	0.48	0. 54
(l/b)	(1.5)	(1.5)	(1.2)
Fixed finger	0.45	0.51	0.54
(l/hand l)	(0.9)	(1.05)	(1.0)

spinneret described for Menge's specimen by Beier (1937). However, according to Schawaller, the spinneret of "*M.*" *koellnerorum* was obscured by silk fibres that prevented the observation of details. If the spinneret of "*M.*" *koellnerorum* were found to be the same as that of Menge's specimen, there would be nothing to prevent them being identified as the same species. It should be noted that the ZMUC specimen resembles "*M.*" *koellnerorum* in having the hand covered by granulation, which would be unusual for a *Neobisium*. Even if the ZMUC specimen does not prove to be conspecific, it is probably closely related to "*M.*" *koellnerorum*. It is to be hoped that future studies will shed more light on the generic and specific affinities of these three fossils.

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