Genus	Vol. 11 (4): 619-626	Wrocław, 26 XII 2000

Aclerogamasus stenocornis sp. n., a fossil mite from the Baltic amber (*Acari*: *Gamasida*: *Parasitidae*)

WOJCIECH WITALIŃSKI
Institute of Zoology, Jagiellonian University, Ingardena 6, PL-30060 Kraków, Poland

ABSTRACT. *Aclerogamasus stenocornis* sp. n., the eigth fossil anactinotrichid mite and the first fossil mite of *Parasitidae*, is described. The mite is embedded in Baltic amber and shows conspicuous shape of corniculi, palp apothele and tectum prongs. Specific and generic features are discussed in relation to extant species.

Key words: taxonomy, fossil mite, Baltic amber, new species, *Aclerogamasus*, *Acari*, *Parasitidae.*

INTRODUCTION

Mites in fossil records are represented starting from the Middle Lower Devonian deposits (HIRST 1923, NORTON et al. 1988). Despite some controversial opinions on their family appurtenence (DUBININ 1962, NORTON et al. 1989), all early Devonian species were certainly classified as members of the superorder *Actino-trichida*.

Many other actinotrichid mites were recorded from both Palaeozoic and Mesozoic deposits (EWING 1937, SIVHED & WALLWORK 1978, KRIVOLUTSKY 1979, ZACHARDA & KRIVOLUTSKY 1985, KRIVOLUTSKY & DRUK 1986, MAGOWSKI 1995). Including more recent, Tertiary records (TÜRK 1963, WOOLLEY 1969, BAKER & WIGHTON 1984, ZACHARDA & KRIVOLUTSKY 1985, KRIVOLUTSKY & DRUK 1986) ca. 136 fossil species are known (BERNINI 1991), mainly *Actinedida* and *Oribatida*.

In contrast to actinotrichid mites, the superorder *Anactinotrichida* is extremely scarce in the fossil material. The oldest findings are known from Tertiary

amber. To date there are 3 extinct species of fossil ticks known from that period. *Ixodes tertiarius* SCUDDER, 1885 and *Ixodes succineus* WEIDNER, 1964 were described from Oligocene amber (Green River, Wyoming, U.S.A.) and Baltic amber, respectively. The age of the Baltic amber is controversial, but most recent data suggest its origin in the Upper Eocene (35-40 mya).The third species, *Amblyomma* sp., was found in Dominican amber from the Upper Eocene - Oligocene (LANE & POINAR 1986). A more recent subfossil tick, indistinguishable from modern *Dermacentor reticulatus* (FABRICIUS), was found in the auditory canal of Pliocene woolly rhinoceros, *Tichorhinus antiquitatis* (BLUMENBACH) (SCHILLE 1916, ref. in WEIDNER 1964).

The fossil gamasid mites are represented probably by 3 species: *Sejus viduus* KOCH and *Hypoaspis* sp. (KOCH & BERENDT 1854, ref. in DUBININ 1962) from Baltic amber, as well as *Dendrolaelaps fossilis* HIRSCHMANN, 1971 from Mexican amber (Oligocene-Lower Miocene) (HIRSCHMANN 1971). In certain amber collections, the gamasid mite inclusions were reported (SELLNICK 1931, WOOLLEY 1969, BERNINI 1991) but they are still waiting to be examined in detail.

The genus *Aclerogamasus* comprises 7 species of predatory, soil- or litter-inhabiting mites of Palaearctic distribution (ATHIAS-HENRIOT 1967, 1971, JUVARA-BALS 1977). The females are characterised by well sclerotized, brown idiosoma, pyriform in outline and evidently convex dorsally, therefore similar to those of the genus *Holoparasitus* and subgenus *Holoparasitus* s. str. The holodorsal shield, however, is totally separated from opisthogaster and peritrematal shields are free. Such characters distinguish genus *Aclerogamasus* from the subgenus *Heteroparasitus* s.str. in the genus *Holoparasitus*. The other well visible *Aclerogamasus* feature is a shape of presternal plates: they are coalescent medially to form evidently narrow, continuous band. In the subgenus *Heteroparasitus*, presternal plates are separated and situated far from each other.

The aim of this paper is to describe one female of anactinotrichid mite, *A. stenocornis* sp. n., entombed in Baltic amber. This is the first known fossil species of the *Parasitidae*, one of the largest families in the order *Gamasida*.

***Aclerogamasus stenocornis* n. sp.**

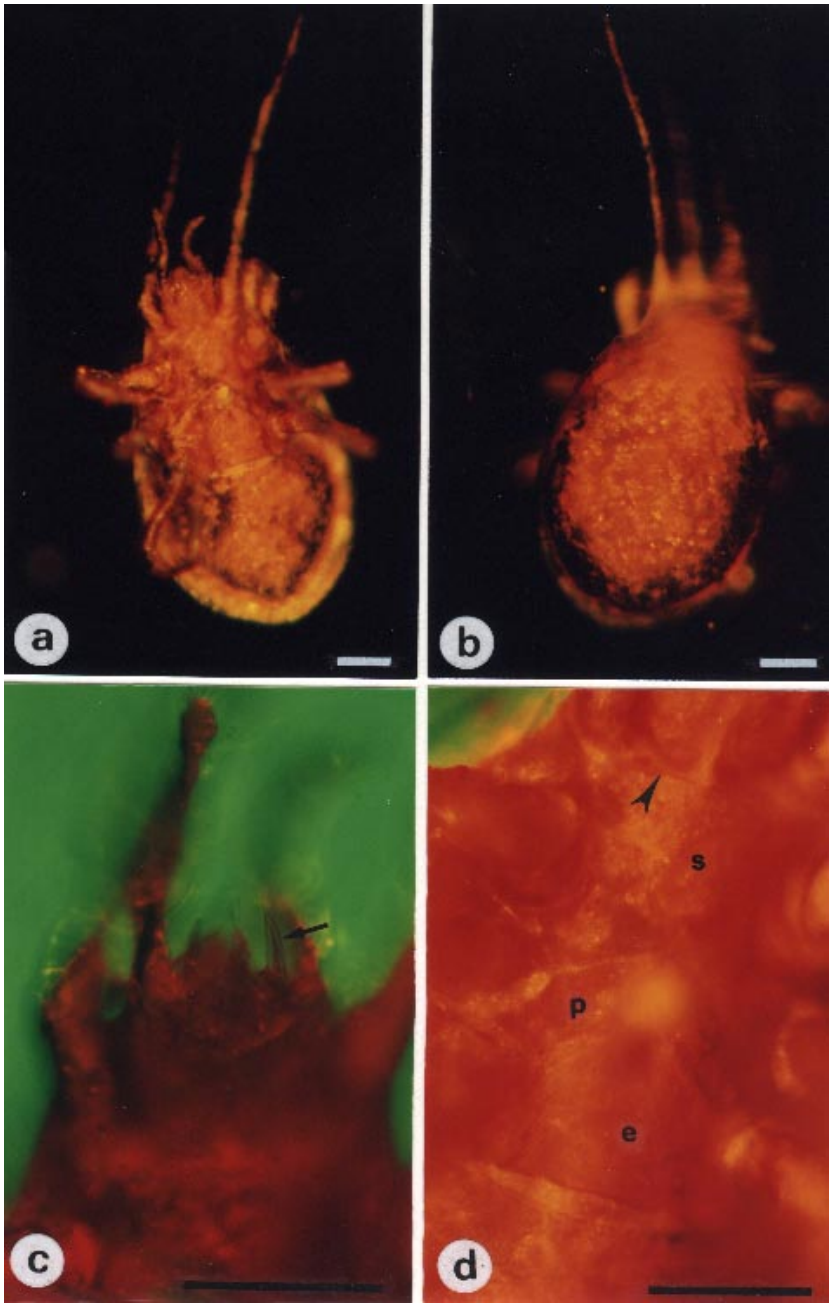
(figs 1-10)

ETYMOLOGY

The name *stenocornis* alludes to the appearance of corniculi in this species, which are very narrow (Greek: *stenos* narrow + Latin: *cornu* horn).

DIAGNOSIS

A. stenocornis differs from modern species (*A. bicalliger* (ATHIAS-HENRIOT, 1967), *A. bocalliger* (ATHIAS-HENRIOT, 1967) s. JUVARA-BALS, 1977, *A. decipiens* (BERLESE, 1903), *A. mendaciosus* (ATHIAS-HENRIOT, 1967), *A. motasi* JUVARA-BALS, 1977, *A. ologamasoides* (HOLZMANN, 1969), *A. similis* (WILLMANN, 1953) s.

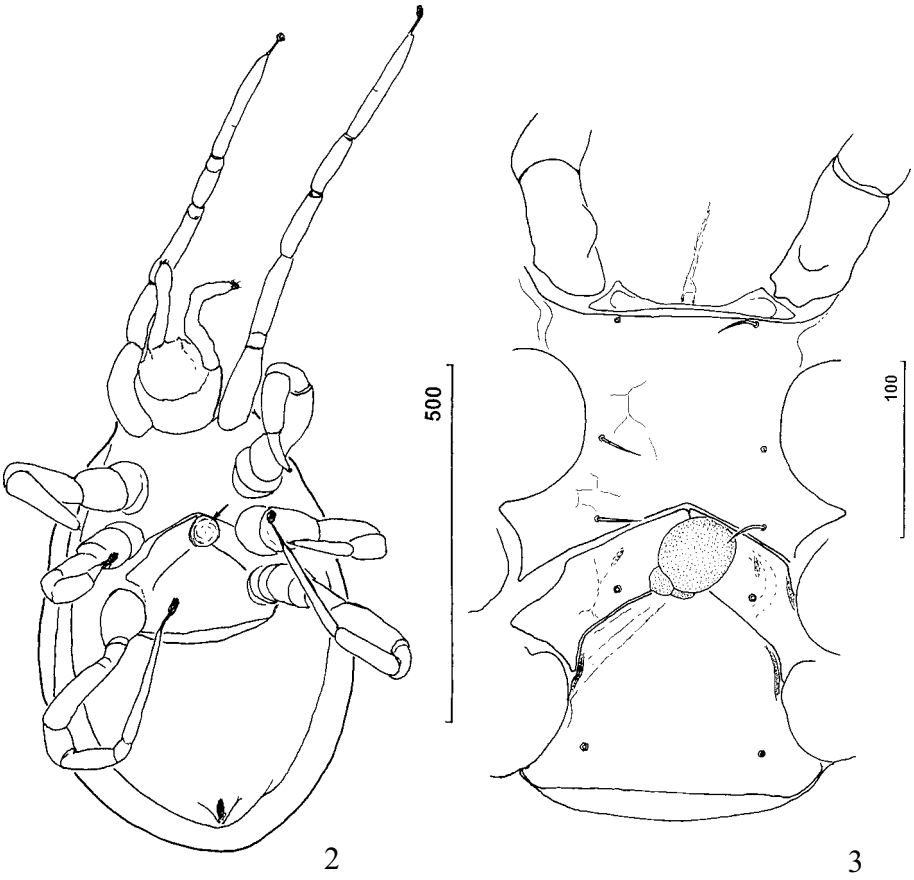


1. *A. stenocornis* sp. n. in Baltic amber. General view from ventral (a) and dorsal (b) side, as well as (c) anterior part of gnathosoma with corniculi (arrow) and (d) ventral side with sternogenital region. Plates: arrowhead - presternal, e - epigynial, p - paragynial, s - sternal. Bar represents 100 µm

ATHIAS-HENRIOT, 1967), in having very narrow, tined corniculi, which in extant species are wider and conical. The tectum, trispinate in all *Aclerogamasus* mites, in extant species is evidently produced and ends with three roughly triangular, large prongs located side by side. In *A. stenocornis*, the tectum is moderately produced and its prongs are triangular, but very short and located far from each other. The palp apotele is tripartite with the parts quite different in shape, whereas in extant species their shape is similar.

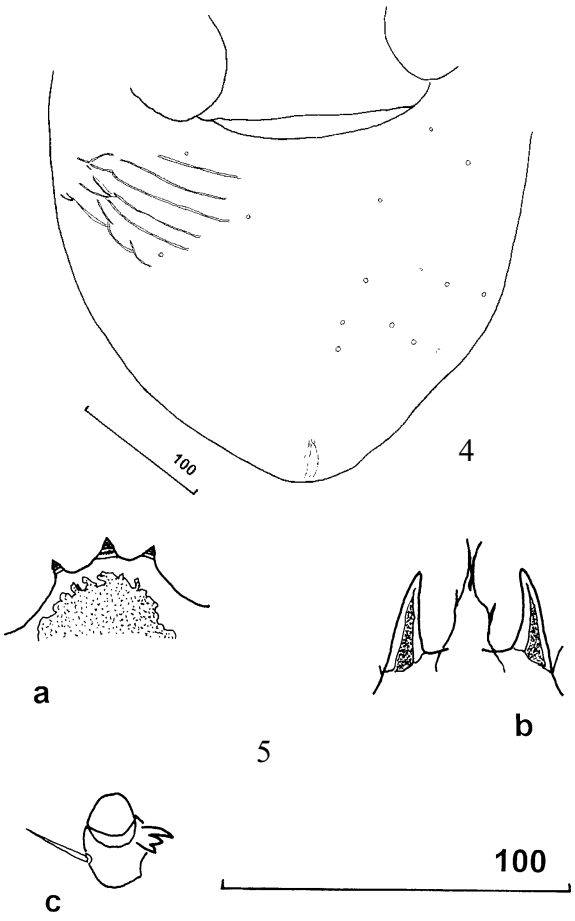
DESCRIPTION

The mite is a complete female of *A. stenocornis*, relatively well visible from dorsal and ventral side (Fig. 1 a-d, 2). The details located laterally, however, are largely obscured.



2-3. *A. stenocornis* sp. n. - ventral aspect: 2 - arrow indicates spherical inclusion possibly originating from reproductive tract (vagina); 3 - ventral side showing genital region with epigynium and paragynial plates, sternal shield, presternal plates and coxae I

The idiosoma, 430 x 645 µm, is brown, pear-shaped and well sclerotized. The dorsal shield is evidently convex and its structure does not differ from that found in other *Aclerogamasus* females. Setae and pores, however, are not discernible. Peritrematal shields are free posteriorly but indistinctly visible due to overlapped legs. The ventral side has a shield pattern typical for the family *Parasitidae* and the genus *Aclerogamasus* (Fig. 2). In particular, presternal plates are accreted medially to form a narrow cuticular band, parallel to the anterior sternal margin (Fig. 3). Sternum not remarkable; its scale-like reticulation poorly visible. Genital plates (Fig. 3): paragynial and epigynial plates of Parasitidae-type. Paragynium with evident margin concavity for coxa III. Epigynium pentagonal, with anterior, medial apex relatively short and partially obscured by a roundish inclusion (Figs



4-5. *A. stenocornis* sp. n.: 4 - opisthogaster with partially visible reticulation and pore-like structures, probably pores and setae sockets; 5 - tectum (a), corniculi (b), palp tarsus with apothele and one seta visible (c)

2, 3). Location of the inclusion and its milky appearance suggest a hydrated material expelled from the genital opening during embedding of mite in the liquid resin. Metagynial sclerites located under epigynial apex not visible. Endogynium not visible. Opisthogastric plate (Fig. 4): cuticle reticulation only partially visible as elongated, horizontal „cells" on lateral regions of the opisthogastric plate. Gland openings hardly discernible and distribution of opisthogastric setae visible only in part. Anal region: unremarkable.

Gnathosoma: tectum moderately produced, with three conspicuous short and triangular prongs, which seem to be separated from tectum main plate by bands of thin cuticle (Fig. 5 a). Corniculi relatively long and narrow, ending at the level of distal palptrochanter seta (Fig. 5 b). Other features of hypostome not discernible. Chelicerae: taxonomic features not visible. Pedipalps of normal appearance. Pedipalp anterolateral setae: on trochanter al 1 pilose, al 2 simple, al seta on femur serrated, setae al 1 and al 2 on genu spatulate. Palp apothele with characteristic shape (Fig. 5 c).

Legs with setation, as far as visible, unremarkable. Trochanter I with convexity on ventral surface. Tr IV without tubercle. Size of leg segments as in table 1.

Table 1. Length of leg segments (when more or less properly oriented for measurement)

Co	Tr	Fe	Ge	Ti	Ta
I 86	70	103	100	103	156
II 32	71	93	?	81	?
III35	56	95	?	60	111
IV22	29	128	56	86	203

TYPE MATERIAL

Holotype male: the mite is embedded in a piece of Baltic amber, dated as Upper Eocene. The sample was obtained from and deposited at the Museum of the Earth, Polish Academy of Sciences, Warsaw (catalogue no. 5895).

The piece of amber was polished with abrasive paper to obtain thin plate with mite oriented parallelly to the surfaces. Later, the sample was mounted between two cover slips in Canada balsam on microscopic slide with central hole, which allowed a two-sided observation. The mite was examined under conventional microscope fitted with additional light source for reflected light. The type specimen is deposited in the Museum of Earth, Polish Academy of Sciences, Warsaw.

DISCUSSION

The described *A. stenocornis* is the eigth fossil anactinotrichid mite known to date. Preservation of the mite is quite good. Embedding in Baltic amber allows a relatively detailed examination from the dorsal and ventral sides. However, the lateral view is not available and, therefore, the structure of chelicerae and details

of peritrematal shield region remain unknown. Likewise, it is impossible to observe the internal structures due to filling of the whole inclusion with gas. Therefore, the most important specific characters used in female taxonomy of parasitid mites (structure of endogynium, shape of thickenings under apex of epigynial shield and under paragynial shields) are invisible.

Suprisingly, both superorders forming the subclass *Acari* (i.e., *Anactinotrichida* and *Actinotrichida*) show a large gap in oldest fossil records. Actinotrichid mites are known from the Devonian, whereas earlier anactinotrichid mites come from the Tertiary. The described species does not shift our knowledge on anactinotrichid mites into the past, but indicates that the main family and generic features were present in the Eocene mites. It is in accordance with results of many authors (WOOLLEY 1969, SOUTHCOTT & LANGE 1971, ZACHARDA & KRIVOLUTSKY 1985, KRIVOLUTSKY & DRUK 1986). They were easily able to assign the described Tertiary *Acari* to extant families and genera, thus supporting the general opinion on a very low evolution rate in mites (BERNINI 1991).

Some features of *A. stenocornis* are, however, exceptional. Corniculi in this species are relatively narrow compared with extant parasitid mites. In recent species, according to the author's best knowledge, they are more conical (i.e. triangular in outline). The only exception is the genus *Cornigamasus* (*Parasitinae*), in which corniculi are extremely slender and long, extending beyond the palp trochanter-femur joint, thus much longer than in *A. stenocornis*. The second, even more conspicuous feature in the fossil mite is tectum. In the recent species, here is a wide range of tectum forms with 1, 2, 3 or 5 prongs, but prongs separated at the base by a band of seemingly thinner cuticle have never been described. Such a structure, however, should be treated carefully as a possible artifact resulting from the fossilisation process.

ACKNOWLEDGEMENTS

The material was kindly supplied by Museum of the Earth, Polish Academy of Sciences, Warsaw.

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