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**ADACTYLIDIUM DIGNUM SP. N., A NEW SPECIES OF ACAROPHENACIDAE
(ACARI, HETEROSTIGMATA) ASSOCIATED WITH ACANTHOTHIRIPS
NODICORNIS (THYSANOPTERA, PHLAEOTHIRIPIDAE)
FROM EUROPEAN RUSSIA**

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A new species, *Adactylidium dignum* sp. n. (Acari, Acarophenacidae), is described based on a phoretic female collected from the thorax of an adult *Acanthothrips nodicornis* (Thysanoptera, Phlaeothripidae) in European Russia. The new species differs from both *A. lindquisti* Jordana et Goldarazena 2001 and *A. moundi* Goldarazena, Jordana et Zhang 1997 by the presence of alveolar pits of setae *Ia*, the presence of an anterior projection on the appo, and the subequally long setae *c1* and *c2*.

Keywords: mite, systematics, morphology, thrips, phoresy, parasitoid

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The family Acarophenacidae includes parasitoids of eggs of various insects, including beetles from the families Cerambycidae, Erotylidae, Tenebrionidae, Nitidulidae, Dermestidae, Curculionidae, Mycetophagidae and thrips (Thysanoptera) (Goldarazena et al., 2001; Katlav et al., 2015; Arjomandi et al., 2017; Walter, Seeman, 2017; Khaustov, Abramov, 2018; Xu et al., 2018). At present, the family includes about 40 described species (including three fossil species) from eight genera (Khaustov et al., 2021). Khaustov et al. (2021) provided the latest key to the genera of Acarophenacidae. Currently seven species of acarophenacid mites have been recorded from Russia: *Aethiophenax ipidarius* (Redikortzev 1947), *Paracarophenax scolyti* Khaustov 1999 (both associated with bark beetles), *P. bambergensis* (Krczal 1959) (associated with Nitidulidae), *P. triplaxophilus* Khaustov and Abramov 2018 (associated with Erotylidae), *Paradactylidium pyemotoformis* Khaustov 2007, *Adactylidium absurdum* Khaustov 2007 (both from unknown hosts), and *Adactylidium europaeum* Khaustov and Abramov 2021 (associated with *Phlaeothrips* sp.) (Khaustov, 1999, 2007; Khaustov, Abramov, 2018, 2019, 2021).

The genus *Adactylidium* Cross 1965 comprises 17 described species distributed in Europe, North and South Americas, and northern Africa (Goldarazena et al., 2001; Antonatos et al., 2011; Khaustov, Abramov, 2021). All *Adactylidium* species are associated with various thrips (Thysanoptera) and have potential im-

portance in the biological control of thrips pests in agricultural systems (Antonatos et al., 2011). Khaustov and Abramov (2021) provided the latest key to world species of *Adactylidium*.

During the study of insect associated mites, a new species of *Adactylidium* associated with *Acanthothrips nodicornis* was revealed from the European Russia. The aim of this article is to describe this new species.

MATERIAL AND METHODS

The mite was mounted in Hoyer's medium. The terminology follows that of Lindquist (1986). All measurements are given in micrometers (µm). For leg chaetotaxy the number of solenidia is given in parentheses. Phase-contrast micrographs were taken using a Carl Zeiss Axio Imager A2 compound microscope and AxioCam ICc5 (Carl Zeiss, Germany) digital camera.

Abbreviations: ap1–ap5 – apodemes 1–5; appr – prosternal apodeme; appo – poststernal apodeme; apsej – sejugal apodeme; apgn – gnathosomal apodeme.

TAXONOMY

Family **Acarophenacidae** Cross 1965

Genus ***Adactylidium*** Cross 1965

Type species: *Adactylidium beeri* Cross 1965, by original designation

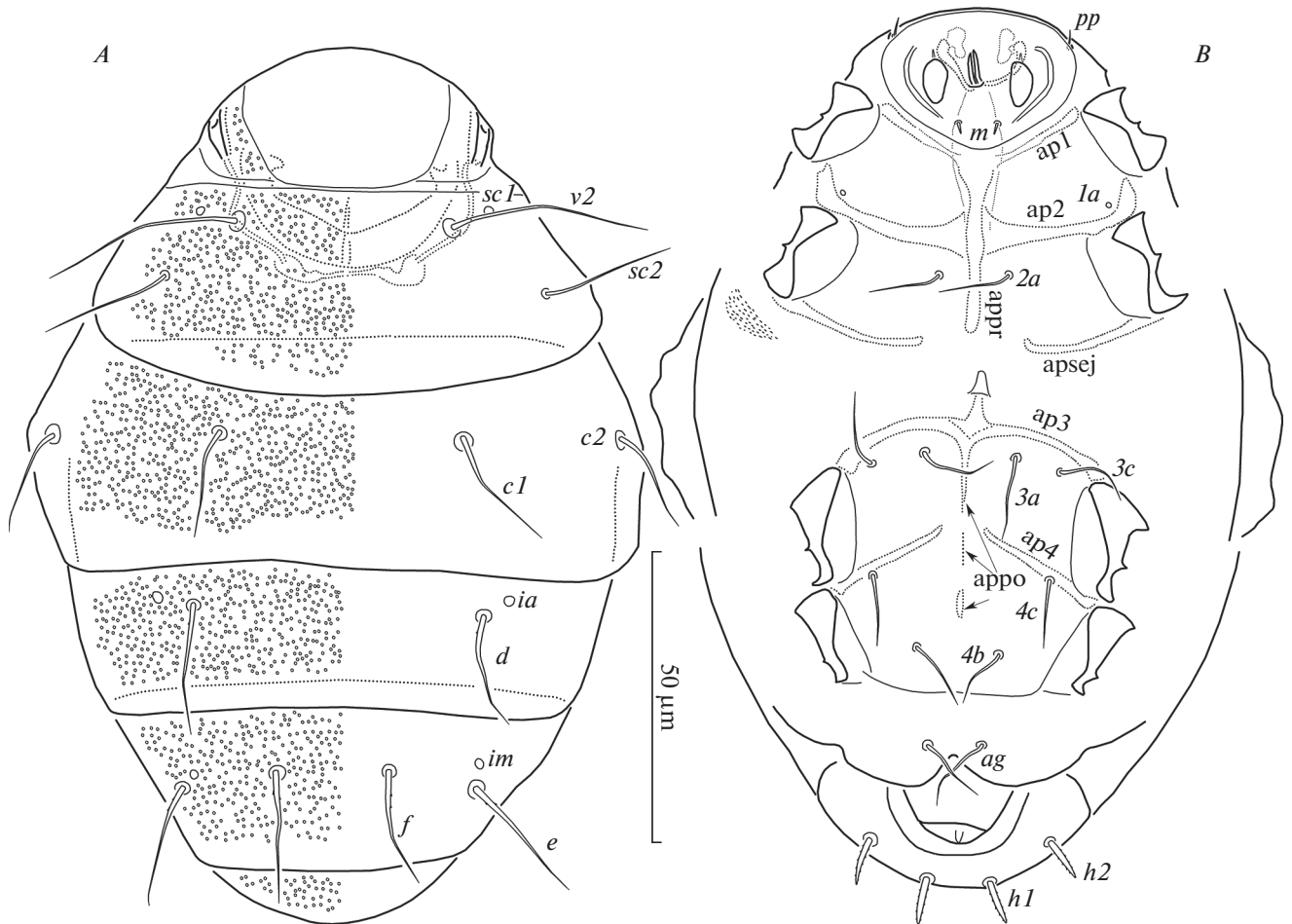


Fig. 1. *Adactylidium dignum* sp. n., female: A – dorsum of body, B – venter of body. Legs omitted.

***Adactylidium dignum* Khaustov et Abramov sp. n.**
(Figs 1–5)

Type material. Female holotype, slide ZISP T-Acaroph-002, Tula Region, vicinity of Suvorov town, 54°07' N, 36°30' E, 15 July 2021, on thorax

of adult of *Acanthothrips nodicornis* (Reuter 1880) on the bark of dead birch, collected by V.V. Abramov.

The holotype of the new species is deposited in the acarological collection of the Zoological Institute of Russian Academy of Science, St. Petersburg, Russia.

D i a g n o s i s. Apgn with median projections; tibiotarsus I with solenidion, tarsus III without solenidion, setae *4b* present, genu I with four setae, genu III with two setae, femur II with three setae, setae *e* and *f* subequal in length, tibiotarsus I without ventral subapical indentation; setae (*tc*) and (*ft*) of tibiotarsus I subequal in length; dorsal idiosomal setae similar in shape, elongate; apsej not fused with appr; alveolar pits of setae *1a* present.

D e s c r i p t i o n. *Female.* Length of idiosoma 150, width 105.

Idiosomal dorsum (Figs 1A, 5A). Ovate. Prodorsal shield delineated into primary plate and prodorsal projection, encapsulating gnathosoma. Stigmata on prodorsal projection; tracheal trunks long, with small atria located posteriad posterior margin of apgn (Fig. 2B). Prodorsal shield and plates C, D, EF, H dis-

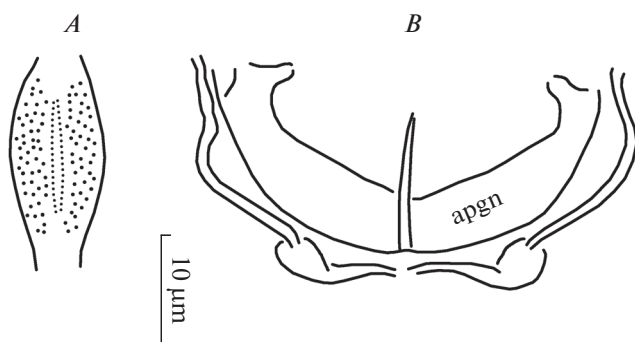


Fig. 2. *Adactylidium dignum* sp. n., female: A – pharynx, B – gnathosomal apodeme and trachea.

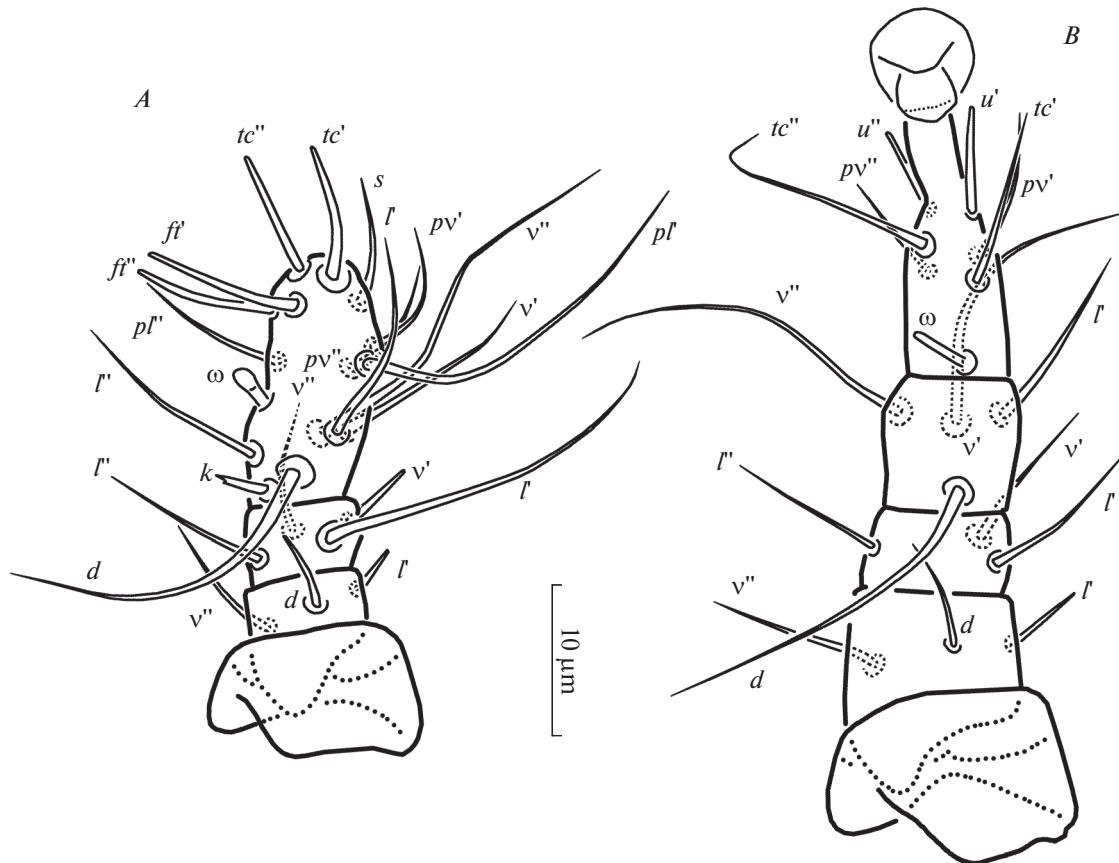


Fig. 3. *Adactylidium dignum* sp. n., female: A – left leg I, dorsal aspect; B – left leg II, dorsal aspect.

tinctly punctate. Alveolar pits *sc1* situated anterolaterad bases of setae *v2*. Setae *v2*, *sc2*, *c1* and *c2* thin, smooth and pointed; setae *d*, *e* and *f* with few weak barbs in basal half; setae *h1* and *h2* located ventrally, slightly thickened, blunt-tipped and weakly barbed. Cupuli *ia* small, round, located anterolaterad bases of setae *d*; cupuli *im* situated anteriorad or anteromesad bases of setae *e*; cupules *ih* not evident. Lengths of dorsal setae: *v2* 33, *sc2* 23, *c1* 20, *c2* 19, *d* 22, *e* 22, *f* 23 *h1* 8, *h2* 8. Distances between setae: *v2*–*v2* 37, *sc1*–*sc1* 49, *v2*–*sc2* 16, *sc2*–*sc2* 66, *c1*–*c1* 41, *c1*–*c2* 27, *d*–*d* 50, *e*–*f* 15, *f*–*f* 19, *e*–*e* 50, *h1*–*h1* 11, *h1*–*h2* 12, *h2*–*h2* 31.

Idiosomal venter (Figs 1B, 5B). Ventral plates smooth; small subtriangular areas posteriorad trochanters II with rough microsculpture. All ventral setae smooth and pointed; alveolar pits of setae *1a* present. Aggenital plate with deep incision posteriorly and weak incurvations laterally. Ap1 weakly sclerotized, fused with well sclerotized appr; ap2 well sclerotized and fused with appr; apsej well sclerotized but interrupted medially, not fused with appr; ap3 well developed, fused with anterior part of appo; appo with distinct anterior projection and divided into several weak sclerites in posterior half; ap4 well sclerotized, not

fused with appo; ap5 absent. Lengths of ventral setae: *2a* 14, *3a* 15, *3c* 13, *4b* 12, *4c* 12, *ag* 14.

Gnathosoma. Agn with distinct median projections (Fig. 2B). Gnathosoma concealed dorsally by prodorsum, ventrally indistinguishable from idiosoma; dorsum with one pair of setae anterolaterally, probably representing postpalpal seta *pp*; venter with mouth flanked by paired, semi-ovular, smooth membranous areas; one pair of rod-like ventral setae of unknown homology situated at anterior ends of membranous areas; one pair of blunt-tipped subcapitular setae *m* located posteriorad membranous areas. Pharynx large, slightly oval, thin-walled, distinctly punctate (Fig. 2A).

Legs (Figs 3, 4). Leg I (Fig. 3A): distinctly shorter than other legs; setation: Tr 0, Fe 3 (*d*, *l'*, *v''*), Ge 4 (*l'*, *l''*, *v'*, *v''*), TiTa 15(1) (*d*, *l'*, *l''*, *v'*, *v''*, *k*, *tc'*, *tc''*, *ft'*, *ft''*, *s*, *pl'*, *pl''*, *pv'*, *pv''*, ω); tibiotarsus without ventral subapical indentation; solenidion ω 3 clavate, situated in the middle of segment; seta *k* with subapical barb; eupathidia (*tc*) and (*ft*) subequal in length; all setae smooth; setae *d*, *l'* of femur, *v'* of genu and eupathidia (*tc*) and (*ft*) blunt-tipped, other leg setae pointed. Leg II (Fig. 3B) setation: Tr 0, Fe 3 (*d*, *l'*, *v''*), Ge 3 (*l'*, *l''*, *v'*), Ti 4 (*d*, *l'*, *v'*, *v''*), Ta 6(1) (*tc'*, *tc''*, *u'*, *u''*, *pv'*,

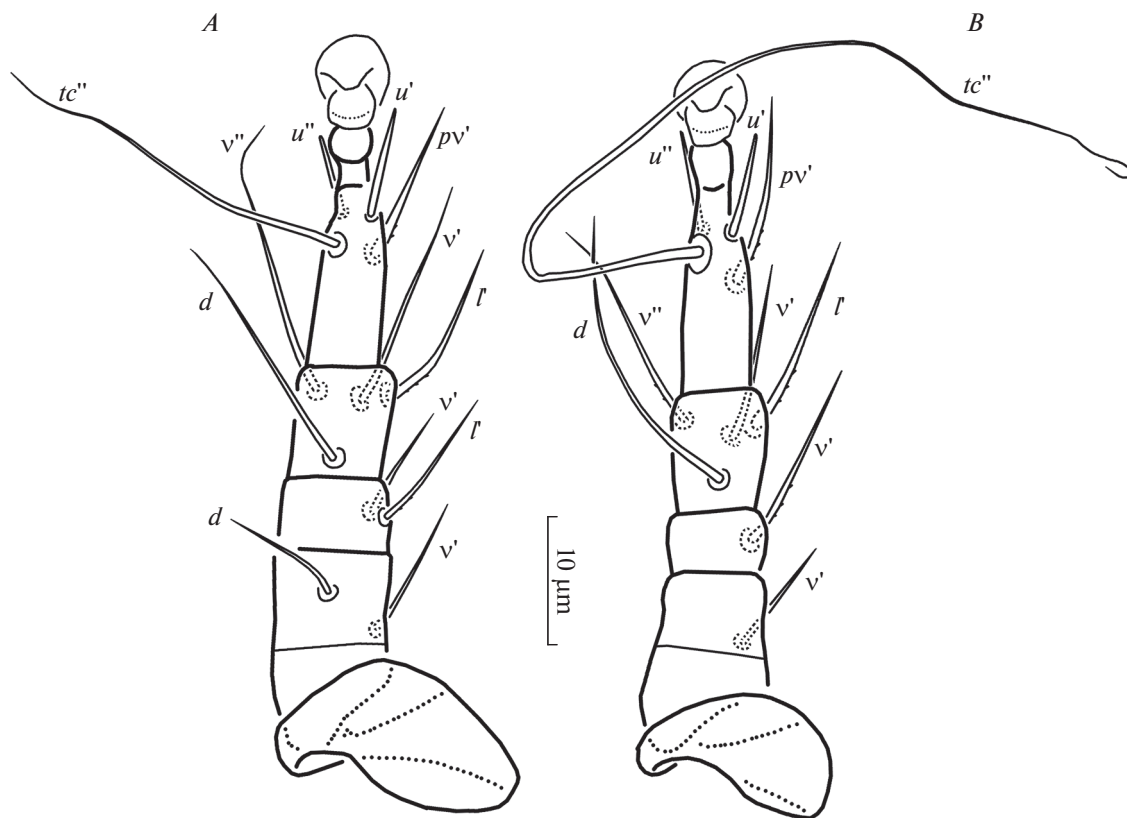


Fig. 4. *Adactylidium dignum* sp. n., female: A – left leg III, dorsal aspect; B – left leg IV, dorsal aspect.



Fig. 5. Phase-contrast micrographs of *Adactylidium dignum* sp. n., female: A – general view dorsally, B – general view ventrally.

pv'', ω); solenidion ω 4 digitiform; all setae smooth; setae *l'* of femur and (*u*) of tarsus blunt-ended, other leg setae pointed. Leg III (Fig. 4A) setation: Tr 0, Fe 2 (*d*, *v'*), Ge 2 (*l'*, *v'*), Ti 4 (*d*, *l'*, *v'*, *v''*), Ta 4 (*tc''*, *u'*, *u''*, *pv'*); setae (*u*) of tarsus blunt-ended, other leg setae pointed; at least setae *l'* of genu, *l'* of tibia and *pv'* of tarsus weakly barbed, other leg setae smooth. Leg IV (Fig. 4B) setation: Tr 0, Fe 1 (*v'*), Ge 1 (*v'*), Ti 4 (*d*, *l'*, *v'*, *v''*), Ta 4 (*tc''*, *u'*, *u''*, *pv'*); setae (*u*) of tarsus blunt-ended, other leg setae pointed; at least setae *v'* of genu, *l'*, *v''* of tibia and *pv'* of tarsus weakly barbed, other leg setae smooth; seta *tc''* of tarsus very long, whip-like.

Differential diagnosis. The female of the new species is most similar to *A. lindquisti* Jordana et Goldarazena 2001 and *A. moundi* Goldarazena, Jordana et Zhang 1997 sharing the following seven characteristics: tibiotalus I with solenidion, tarsus III without solenidion, setae *4b* present, genu I with four setae, genu III with two setae, femur II with three setae, setae *e* and *f* subequal in length. The new species differs from both of the other species by the presence of alveolar pits of setae *1a* (absent in *A. lindquisti* and *A. moundi*), by the presence of anterior projection of appo (absent in *A. lindquisti* and *A. moundi*), and by the subequal length of setae *c1* and *c2* (*c1* distinctly longer than *c2* in *A. lindquisti* and *A. moundi*). The new species differs from *A. moundi* by the presence of median projections on apgn (absent in *A. moundi*) and by seta *l'* of genu I much longer than *l''* and *v'* of genu I (seta *l'* of genu I subequal in length with *l''* and *v'* of genu I in *A. moundi*). The new species differs from *A. lindquisti* in having a punctate pharynx (transversely striated in *A. lindquisti*) and in having setae *e* situated posteriorly to *f* (*e* situated anteriorly to *f* in *A. lindquisti*).

Etymology. The name of the new species is derived from Latin *dignus* meaning *dignified*.

Remarks. The new species is described based on single specimen. All attempts to collect more specimens from the same locality were unsuccessful. However, the holotype is in good condition and all characters are clearly visible and suitable for the description of a new species. The host thrips *Acanthothrips nodicornis* is mycophagous and distributed throughout Holarctic.

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**ADACTYLIDIUM DIGNUM SP. N. – НОВЫЙ ВИД КЛЕЩЕЙ СЕМЕЙСТВА
ACAROPHENACIDAE (ACARI, HETEROSTIGMATA), СВЯЗАННЫЙ
С ТРИПСОМ *ACANTHOTHIRIPS NODICORNIS* (THYSANOPTERA,
PHLAEOTHIRIPIDAE) ИЗ ЕВРОПЕЙСКОЙ ЧАСТИ РОССИИ**

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Приводится описание форезирующей самки клеща *Adactylidium dignum* sp. n. (Acari, Acarophenacidae), собранного с груди взрослого трипса *Acanthothrips nodicornis* (Thysanoptera, Phlaeothripidae) из европейской части России. Новый вид отличается от *A. lindquisti* Jordana et Goldarazena 2001 и *A. mouni* Goldarazena, Jordana et Zhang 1997 наличием альвеол щетинок *Ia*, наличием переднего выроста на арро и равными по длине щетинками *c1* и *c2*.

Ключевые слова: клещ, систематика, морфология, трипс, форезия, паразитоид