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TRACHYTES KALISZEWSKII, N. SP. (ACARI: UROPODINA), FROM THE GREAT BASIN (UTAH, USA), WITH REMARKS ON THE HABITATS AND DISTRIBUTION OF THE MEMBERS OF THE GENUS TRACHYTES

Jerzy Błoszyk1 and Paweł Szymkowiak1

ABSTRACT.—Trachytes kaliszewskii, n. sp., is described from the Great Basin, Utah, USA. SEM photography illustrates morphological detail. An annotated list is included of currently recognized species of the genus Trachytes, with comments on their distribution and habitat characteristics.

Key words: mites, Trachytes kaliszewskii, Uropodina, Great Basin, Utah.

Mites of the genus Trachytes Michael, 1894, are a morphologically distinct entity of the Uropodina. The genus consists of 31 species known mainly from the Palearctic region of Europe and Japan. Wiśniewski and Hirschmann (1993) mention two species from the USA: T. aegrota (C. L. Koch, 1841) and T. traegardhi (Hirschmann and Zirngiebl-Nicol, 1969). Trachytes traegardhi is regarded as nomen nudum. The USA listing for T. aegrota is considered either a mistake in determination or an accidental introduction.

Taxonomic studies on mites of the genus Trachytes are found in Hirschmann and Zirngiebl-Nicol (1969), Hui (1983), and Pečina (1970). Information on their biology, ecology, and zoogeography is found in Athias-Binche (1978, 1979, 1980, 1981, 1985), Pečina (1980), Błoszyk (1980, 1982, 1984, 1985, 1990, 1991, 1992, 1993), Błoszyk and Athias-Binche (1985), Błoszyk and Miko (1990), Błoszyk and Olszanowski (1985a, 1985b, 1985c, 1986), and Błoszyk et al. (1984).

We found a new species of the genus Trachytes in soil collected from Rock Canyon near Provo, Utah, USA. It is most similar to those described by Hiramatsu (1979, 1980) from Japan: T. aoki and T. onishii. Morphological differences between our species, those mentioned from Japan, and Trachytes aegrota are shown in Table 1. Our new species is dedicated to the Polish acarologist, Dr. Marek Kaliszewski, who was a faculty member at Brigham Young University, Provo, Utah, USA, until 1993, when he died tragically in an automobile accident.

SYSTEMATIC STATUS OF THE GENUS TRACHYTES MICHAEL

SUPERFAMILY.—Polyaspidioidea sensu Athias-Binche & Evans, 1981

FAMILY.—Trachytidae Trägårdh, 1938

GENUS.—Trachytes Michael, 1894

TYPE SPECIES.—Celano aegrota C. L. Koch, 1841 (=Trachynotus pyriformis Kramer, 1876)

Mites of middle size, strongly sclerotized, dorsoventrally flattened. Idiosoma triangular, “vertex” distinct with smooth or slightly serrated edges. Corniculus simple, lacinia longer than corniculi. Hypostomatic setae: h1 very long, simple; h2 shorter than h1, simple; h3 very long, massive; h4 very short, serrated. Fixed digit of the chelicera longer than moveable digit, sharply pointed distally. Base of tritosternum wide, not covered by coxae I.

Trachytes kaliszewskii, n. sp.

DIAGNOSIS.—The form of the body is typical for the genus Trachytes Michael. Vertex with lamella. Dorsal shield with polygonal pattern and irregular cavities in central part (similar to T. aegrota). Marginal shield is not divided as in European species, without polygonal pattern. Dorsal setae long and massive. Small pygidial shield present in female. Epignyal shield trapezoidal with net pattern, front margin slightly convex and produced laterally into little corns. Sternal setae short. Operculum of male rounded, with a pair of long genital setae. Ventrional shield separated from sternal and metapodal shields by a wide zone of interscutal membrane.

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Ventral setae long. One pair of paranal setae. Postanal seta present.

**ADULT FEMALE.**—Length of idiosoma 900–907 μm, width 535–574 μm.

**Dorsum:** Lamellae with characteristic pattern. Marginal shield not divided posteriorly, with irregular cavities in posterior part. Dorsal shield with polygonal pattern laterally and irregular cavities in central and posterior parts (Figs. 1, 10, 11). Dorsal setae long and massive. Two pairs of setae on vertex; no unpaired medial dorsal setae. Marginal setae on small scutellae; 4 pairs of setae situated medially on marginal shields. Pygidial shield with pattern as on marginal shield.

**Ventrum:** Sternal shield (Fig. 2) fused to parapodals. Ventoanal shield separated from sternal and metapodal shields by a zone of interscutal membrane bearing 4 pairs of platelets (Fig. 13).

Sternal shield smooth, bearing 5 pairs of short sternal setae. Setae: st1 situated between coxae II at the level of their front margins; st2 and st3 placed above anterior edge of epigynium; st4 and st5 situated laterally of epigynium. Opisthogastric setae generally long, simple or delicately serrated, most anterior pair short, similar to sternal setae. First pair of opisthogastric setae situated below posterior margin of epigynium, 2nd pair on metapodal shields, with 4 pairs on interscutal membrane and 2 pairs on ventroanal shield. One pair of adanal setae; short and serrated. Postanal seta long. Expododal and metapodal shields with oval or irregular cavities. Ventoanal shield smooth anteriorly, with polygonal patterns in the posterior regions.

Epigynial shield trapezoidal, with front margin slightly convex and produced laterally into little corns; measurements: 175–199 μm length and 137–156 μm width (N = 3). Surface of epigynium with delicate polygonal net in anterior and central areas.

Peritrama simple, without poststigmatic section, extending from the level of the posterior border of the foramen pedale III (with stigma) to beyond coxae II.

**Gnathosoma:** Laciniae (internal mala) longer than corniculi, serrated. Hypostomatic setae (Fig. 4) smooth except for setae h4 which are delicately serrated; h1 very long, h2 shorter than h1, h3 long as h1 but more massive, h4 shorter than h2. Three transversal rows of hypognathal denticles between setae h3 and h4.

**Appendages:** Shape of chelicerae typical for *Trachytes*; fixed digit of the chelicera longer than moveable digit, shaped distally. Pedipalp ventral, setae of trochanter (v1, v2) massive and serrated (Fig. 5).

Shape of legs typical for family. Tarsi of legs II–IV with 4 long setae (3 times longer than

| Character                                      | *T. aegrota* | *T. aoki* | *T. onishii* | *T. kaliszewskii* |
|------------------------------------------------|-------------|-----------|--------------|-------------------|
| Sex                                            | parthenogenic | bisexual  | ?            | bisexual          |
| Lamella                                        | transverse  | transverse| transverse   | oblong            |
| Setae on interscutal membrane                  | absent      | present   | absent       | present           |
| Unpaired mediodorsal seta                      | present     | absent    | absent       | absent            |
| Body measurements (in μm)                      | 600 × 685   | 400 × 450 | 400 × 600    | 535–574 × 900–907 |
| Hypostomal seta h3                             | simple      | massive   | massive      | massive           |
| Setae on ventroanal shield                     | different   | equal     | equal        | equal             |
| Epigynium                                      | smooth      | smooth    | with polygonal net  |
| Ventral seta on metapodal shields              | long        | short     | short        | long              |
| Seta Pa                                        | short       | short     | short        | long              |
Fig. 1. Trachytes kaliszewskii, n. sp., dorsal view of female idiosoma.
Fig. 2. *Trachytes kaliszewskii*, n. sp., ventral view of female idiosoma.
Fig. 3. Trachytes kaliszewskii, n. sp., ventral view of male idiosoma.
Figs. 4-5. Trachytes kaliszewskii, n. sp., female: 4, gnathosoma, ventral view; 5, ventral setae of palpal trochanter.

others), small claws, and a very long distal seta. Shape of dorsal setae on tarsus, tibia, genu, and femur of legs I as in the genera Polyaspis and Polyaspinus. Chaetotaxy of legs I and IV is shown in detail in Figures 6 and 7.

Sexual dimorphism observed on femora II (Figs. 8, 9).

**ADULT MALE.**—Body measurements 830-862 µm × 538-540 µm.

**Dorsum:** Dorsum slightly changed in posterior part; pygidial shield absent (Fig. 12). Sculpture and dorsal chaetotaxy as in the female.

**Ventrum:** Sternal shield with numerous oval cavities and bearing 5 pairs of short sternal setae (Fig. 3). Genital operculum rounded (74-79 × 72 µm), located a little below coxae IV, with 1 pair of long genital setae. Opisthosoma separated by transverse suture with interscutal membrane. Seven pairs of long ventral setae on rounded platelets; 1st pair short, located below operculum. With 1 pair of delicately serrated anal setae and long unpaired postanal seta (Pa). Opisthosoma with polygonal sculpture on metapodal and anal shields and small oval cavities on central portion.

**DEUTONYMPH.**—Body measurements 624 × 396 µm.

**Ventrum:** Sternal shield smooth, elongate, with 4 pairs of simple sternal setae (Fig. 18). Four massive, serrated opisthogastric setae

**VENTRUM:** Ventrum with polygonal pattern (Fig. 16). Sternal shield elongated, with 5 pairs of short sternal setae; most posterior pair delicately serrated. Opisthogastric setae situated on interscutal membrane, delicately serrated, sitting on small platelets. Large ventroanal shield with 2 pairs of short anal setae (Ad), postanal seta (Pa) longer than Ad; both setae serrated.

**PROTONYMPH.**—Body measurement 528 × 295 µm.

**Dorsum:** Dorsum with polygonal pattern (Fig. 17). Podonotal shield trapezoidal. Mesonotal shields large, oval-triangular, without setae. Pygidial shield arched, with 2 strong, massive setae. Dorsal setae strong, massive. No setae on interscutal membrane. Marginal setae numerous, inserted on small platelets.

**Ventrum:** Sternal shield smooth, elongate, with 4 pairs of simple sternal setae (Fig. 18). Four massive, serrated opisthogastric setae
situated on intersutal membrane. Large ventroanal shield with 1 pair simple adanal setae and a long postanal seta.

**Material Examined.**—All specimens were collected from soil under a maple tree in Rock Canyon near Provo, Utah, 10 September 1992; leg J. Błoszyk (holotype and 5 paratype females, 7 paratype males, 7 deutonymphs, 5 protonymphs).

The holotype is deposited in the Canadian National Collection, Biosystematics Research Centre, Ottawa, Canada. Paratypes are deposited
Figs. 10–14. *Trachytes kalszewskei*, n. sp.: 10, dorsal polygonal pattern of female (550X); 11, female, general dorsal view (110X); 12, posterior part of male idiosoma (220X); 13, opisthosoma of female (200X); 14, marginal setae of female (750X).

in the Monte L. Bean Life Science Museum, Brigham Young University, Provo, Utah, USA; in CSIRO, Canberra, Australia; and in J. Błoszyk’s collection (Acarological Association, ul. Lisowskiego, 16/1, 61-606 Poznań, Poland).

**LIST OF THE TRACHYTES SPECIES WITH REMARKS ON DISTRIBUTION AND HABITAT PREFERENCES**

Hirshmann (1993) listed 31 species referable to the genus *Trachytes*. In view of the
above, we recognize 31 species in the genus Trachytes as follows:

Trachytes aegrota (C. L. Koch, 1841) is one of the most numerous Uropodine species in central Europe. This species is parthenogenetic and nonphoretic; males are rarely found (sex ratio is 1:10,000). This eurytopic species lives in all kinds of biotypes, but it prefers forest litter. It most often occurs below 500 m elevation but is considered a tychoalpine species (i.e., lives in the mountains as well as the lowlands). In Poland the spring–summer season is the best time to observe the larva.

\footnote{Some data from Poland originate from an unpublished investigation carried out by J. Hilszky in the thematic program Bank of Invertebrate Fauna; data on the distribution may be found in Hirschmann (1979, 1980), Hilszky (1970, 1985), Hirawatana (1979, 1980), and Albinz-Binski (1981).}
Trachytes aoki Hiramatsu, 1979. Japan. In litter.
Trachytes arcuatus Hirschmann and Zirngiebl-Nicol, 1969. Austria, Romania, Hungary. Habitat unknown.
Trachytes baloghi Hirschmann and Zirngiebl-Nicol, 1969. Romania, Hungary. Habitat unknown.
Trachytes decui Hufu, 1983. Romania. In litter.
Trachytes edleri Hufu, 1983. Sweden. In grass.
Trachytes elegans Hirshmann and Zirngiebl-Nicol, 1969. Spain, Austria. Edaphic species.
Trachytes eusistructura Hirshmann and Zirngiebl-Nicol, 1969. Spain and Austria. Associated with Fabaceae.

Trachytes hiramatsui Hufu, 1983. Romania. Habitat unknown.
Trachytes hirschmannii Hufu, 1973. Romania. In moss.
Trachytes hokkaidoensis Hiramatsu, 1983. Japan. Soil.
Trachytes inermis (Tragardh, 1910). Sweden. In litter, moss, lichens, and under bark.
Trachytes irenae Pečina, 1970. A submontane species, reported from Czech Republic, Slovakia, Romania, Austria, Poland, and Yugoslavia. This species shows a considerable preference for beech and beech-fir forest litter. Poland is the northern limit of its distribution.
Trachytes lamda Berlese, 1904. Rare European species. Parthenogenetic and nonphoretic species—males found very rarely (sex ratio...
1:400). Forest litter species typical of the beech forest and Quercus-Carpinetum forest. Not usually found above 500 m elevation.

*Trachytes micropunctata* Huțu, 1973. Romania. In litter

*Trachytes minima* Trägårds, 1910 sensu Pečina 1970. Czech Republic, Slovakia, Poland, and Ukraine. Reports of this species in Sweden and Great Britain most likely refer to *Trachytes pauperior*. Poland is the northern limit of its distribution. *T. minima* prefers multispecies litter: deciduous forests, beech and beech-fir forests, brush, rock, and on grasses of calcareous ground. It is most commonly found

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Fig. 17. *Trachytes kaliszewskii*, n. sp., dorsal view of protonymph idiosoma.
Trachytes kaliszewskii, n. sp., ventral view of protonymph idiosoma.

between 300 and 900 m elevation. It is not found in the Tatra or Babia Góra Mountains.

Trachytes montana Willmann, 1953. High mountains in Austria, Czech Republic, Poland. This is a typical mountain species that prefers cold rocks and grasses on noncalcareous ground, spruce forest, dwarf-pine, beech, and fir-beech forest. Its optimum occurrence is at elevations above 1000 m.

Trachytes mystacinus Berlese, 1910. Italy, Switzerland, and Austria. Habitat unknown.

Trachytes onishii Hiramatsu, 1980. Japan. In litter.

Trachytes oudemani Hirschmann and Zirngiebl-Nicol, 1969. Germany, Romania. In litter.

Trachytes pauperior (Berlese, 1914). Widely distributed European species but not as abundant as T. aegrota. T. pauperior is a parthenogenetic and nonphoretic species; males are rare as in the case of T. aegrota (sex ratio is 1:400). It appears in varied biotypes but most often in beech forest, multispecies deciduous
forests, on grass, and on decalcified rocks. A tychoalpine species. The best time to observe the larva is during the spring-summer season.

*Trachytes pecinaia* Huťu, 1983. Romania. In litter.

*Trachytes pi* Berlese, 1910. West and Central Europe. In litter.

*Trachytes romanica* Huťu, 1983. Romania. In litter.

*Trachytes stammeri* Hirschmann and Zintgrieb-Nicol, 1969. Locality and biotype unknown.

*Trachytes tesquorum* Pečina, 1980. Czech Republic. In grass.

*Trachytes traeghardi* Hirschmann and Zintgrieb-Nicol, 1969. Locality and biotype unknown.

*Trachytes tubifer* Berlese, 1914. Italy, Austria. In litter.

*Trachytes welbournia* Moraza, 1989. Spain. In litter.

*Trachytes wisniewski* Huťu, 1983. Romania. In litter.

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