

## Three new *Trachytes* Michael, 1894 species from the east Mediterranean region (Acari: Mesostigmata: Trachytidae)

JENŐ KONTSCHÁN\*, BALÁZS KISS & ISTVÁN TÓBIÁS

Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, H-1525 Budapest, P.O. Box 102, Hungary.

\*E-mail: kontschan.jeno@agrar.mta.hu

### Abstract

Three new species of the genus *Trachytes* are described, named and illustrated from the east Mediterranean region. *T. kozari* **sp. nov.** is from Rhodes and Karpathos, *T. jenseri* **sp. nov.** from Cyprus and *T. kissi* **sp. nov.** from Eastern part of Greece.

**Key words:** Acari, Uropodina, new species, East-Mediterranean region

### Introduction

The genus *Trachytes* was established by Michael (1894). The type species of this genus was very confused for long time, but Camin (1953) gave exact answer for the question of the type species of the *Trachytes* genus (see Halliday 2015). Since the description of the genus, more than 45 *Trachytes* species have been discovered and named from the Northern temperate regions. The majority of the species were discovered in Europe, but 10 species are also known from North-America (Kontschán & Starý 2012) and eight species are recorded from Asia (Kontschán & Starý 2011) as well. In Asia, the distribution of the genus has its southern limit in the mountainous region of Vietnam (Kontschán & Starý 2011). From the east Mediterranean region (mostly the Balkan Peninsula) 12 *Trachytes* species are listed and four of them seem to be endemic in this region (Kontschán 2013a). However, only one of them, *T. parnonensis* Kontschán, 2010, can be considered as a typical east Mediterranean species which occurs only in Peloponnesus Peninsula (Kontschán 2010).

In the last years numerous collection trips were organized to the Greek islands to study the role of these islands in the connection between the Balkan Peninsula and Anatolia. The present paper contains the first results of this project describing three new species of the genus *Trachytes* from this area.

### Material and methods

The specimens from Crete, Rhodes, Karpathos and Greece were collected by the first author in 2012 and 2013. The specimens from Cyprus were collected earlier and were deposited in 70% ethanol in the last seven years in the Collection of the Soil Zoology of Hungarian Natural History Museum (Budapest, Hungary). For the investigations, the specimens were cleared in lactic acid and observed in cavity slides. The type specimens of the new species are stored in alcohol and deposited in the Soil Zoology Collection of the Hungarian Natural History Museum (HNHM) and in the Natural History

Museum, Geneva (NHMG). Illustrations were made with the aid of a drawing tube. Leg chaetotaxy of the found species are same in *Trachytes* species presented by Evans (1972). Measurements are given in micrometers ( $\mu\text{m}$ ), width of idiosoma was taken at the level of coxae IV.

### Description of new species

#### *Trachytes. kozari* sp. nov.

(Figs 1–12)

#### *Material examined*

*Holotype* (HNHM). Female. Greece, South Aegean, Karpathos regional unit, Lefkos, pine forest south of the village, 135 m, from pine litter, 12.IX.2012, leg. J. Kontschán, D. Murányi. *Paratypes*: three females, locality same as in holotype (NHMG). Four females and five males (HNHM), Greece, South Aegean, Rhodes regional unit, Aghios Nektarios, pine forest E of the monastery, pine leaf litter, 145m, N36°15.943' E28°04.822', 14.IX.2012, leg. J. Kontschán, D. Murányi.

#### *Description*

*Female*. Length of idiosoma 610–620, width 390–400 (n=6). Shape of idiosoma pear-like. Color yellow.

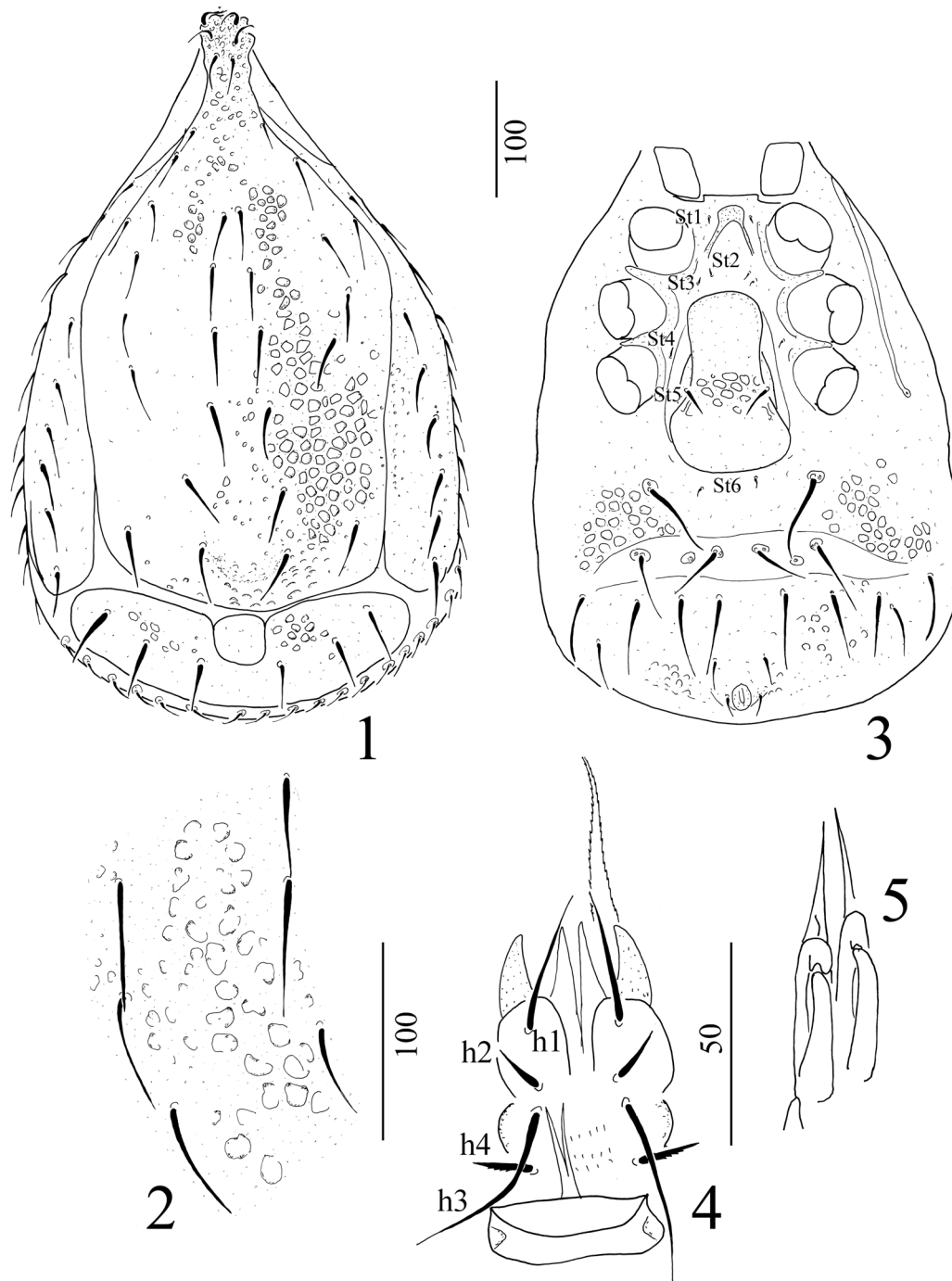
*Dorsal idiosoma* (Fig. 1). Wide and ribbed lateral sections on vertex absent. Marginal and dorsal shields completely separated. Pygidial shield small (45–47 × 48–50) and rounded, placed between the posterior margin of dorsal shield and the anterior margin of postdorsal shield. All setae on dorsal and postdorsal shields smooth, needle-like and ca 42–47 long. Setae on marginal shield, smooth, needle-like and ca 36–38 long. Surface of dorsal shield covered by deep, irregular pits (Fig. 2). Postdorsal shield bean-like (ca 81–83 long and ca 310–320 wide) with same sculptural pattern than dorsal shield. Marginal shield with small oval pits, surface of pygidial shield smooth.

*Ventral idiosoma* (Fig. 3). First four and last sternal setae (St1–St4 and St6) short (ca 6–7), St5 long (ca 23–25). All sternal setae smooth and needle-like. St1 situated at level of anterior margin of coxae I. St2 and St3 placed near the anterior margin of genital shield, St4 at level of central area of coxae IV, St5 on adgenital platelets, St6 placed near basal margin of genital shield. Surface of sternal shield without sculptural pattern, only a strongly sclerotized U-shaped line situated between coxae II. Sternal- and inguinal shields fused. Fused sternal and inguinal shields separated by membranous cuticle from ventrianal shield. Inguinal area covered by irregular pits, remainder of the fused shield with smooth surface. One pair of long (ca 66–68) and needle like setae can be seen on inguinal area. The membranous cuticle bearing two pairs of needle-like and smooth setae (ca 58–60) inserted on small platelets. One additional pair of platelets without setae present between platelets with setae. Surface of ventrianal shield covered by oval pits. Five pairs of setae situated on ventral shield similar in shape and length to setae on inguinal shield. Two pairs of adanal setae needle-like short (ca 21–23) and situated near anal opening.

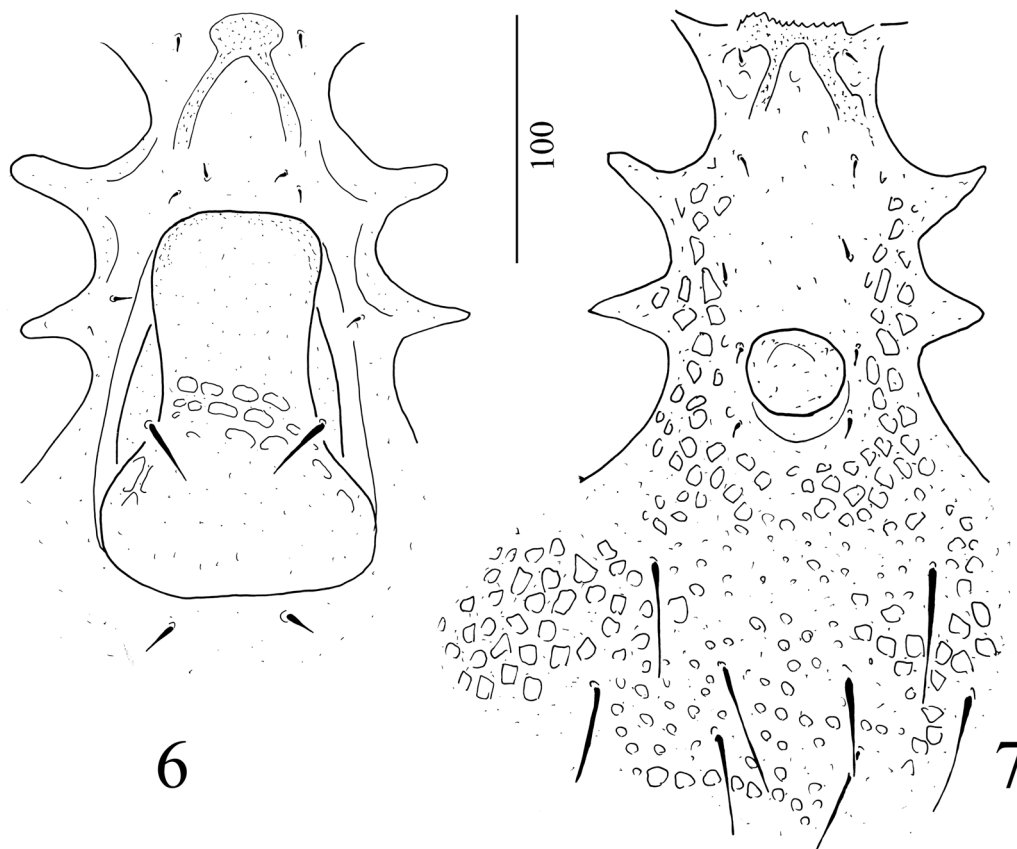
Genital shield ax-like (ca 160–170 long and ca 64–70 wide at level of St5), with rounded anterior margin, its surface covered by irregular pits at level of setae St5. Adgenital platelets present without processes on their outer margins. Genital shield situated between coxae III and IV (Fig. 6). Peritremes long and straight, stigmata situated between coxae II and III. Tritosternum (Fig. 4) with wide base, tritosternal laciniae divided into two long branches.

*Gnathosoma* (Fig. 4). Corniculi horn-like, internal malae as long as corniculi and smooth. Hypostomal setae h1 long (ca 30–32) and smooth, h2 short (ca 10–13) and smooth, h3 similar to h1 in shape, but ca 42–45 long, h4 marginally serrate and ca 15–17 long. Chelicerae with long and

pointed apical process on fixed digit, movable digit shorter than fixed digit (Fig. 5). Epistome marginally serrate. Palp with one smooth and one serrate ventral setae on trochanter, other setae on palp smooth (Fig. 8).



**Figures 1–5.** *Trachytes kozari* sp. nov., female, holotype. 1. Dorsal view of body. 2. Dorsal setae and ornamentation. 3. Ventral view of body. 4. Ventral view of tritosternum, gnathosoma and epistome. 5. Ventral view of chelicerae.



**FIGURES 6–7.** *Trachytes kozari* sp. nov., female, holotype. 6. Intercoxal area. 7. Intercoxal and ventral areas of male paratype.

*Legs.* Leg I with small ambulacral claws (Fig. 9) and with smooth and needle-like setae; other legs bearing smooth and serrate, pilose setae (Figs. 10–12), femora of legs I–IV with three-four rounded ventral processes.

*Male.* Length of idiosoma 610–630  $\mu\text{m}$ , width 370–390  $\mu\text{m}$  (n=5).

*Dorsal idiosoma.* Shape and dorsal aspect of idiosoma as in female, except the caudal area of dorsal idiosoma: pygidial shield absent, postdorsal shield narrow and covered by irregular pits, setae on postdorsal shield as in female.

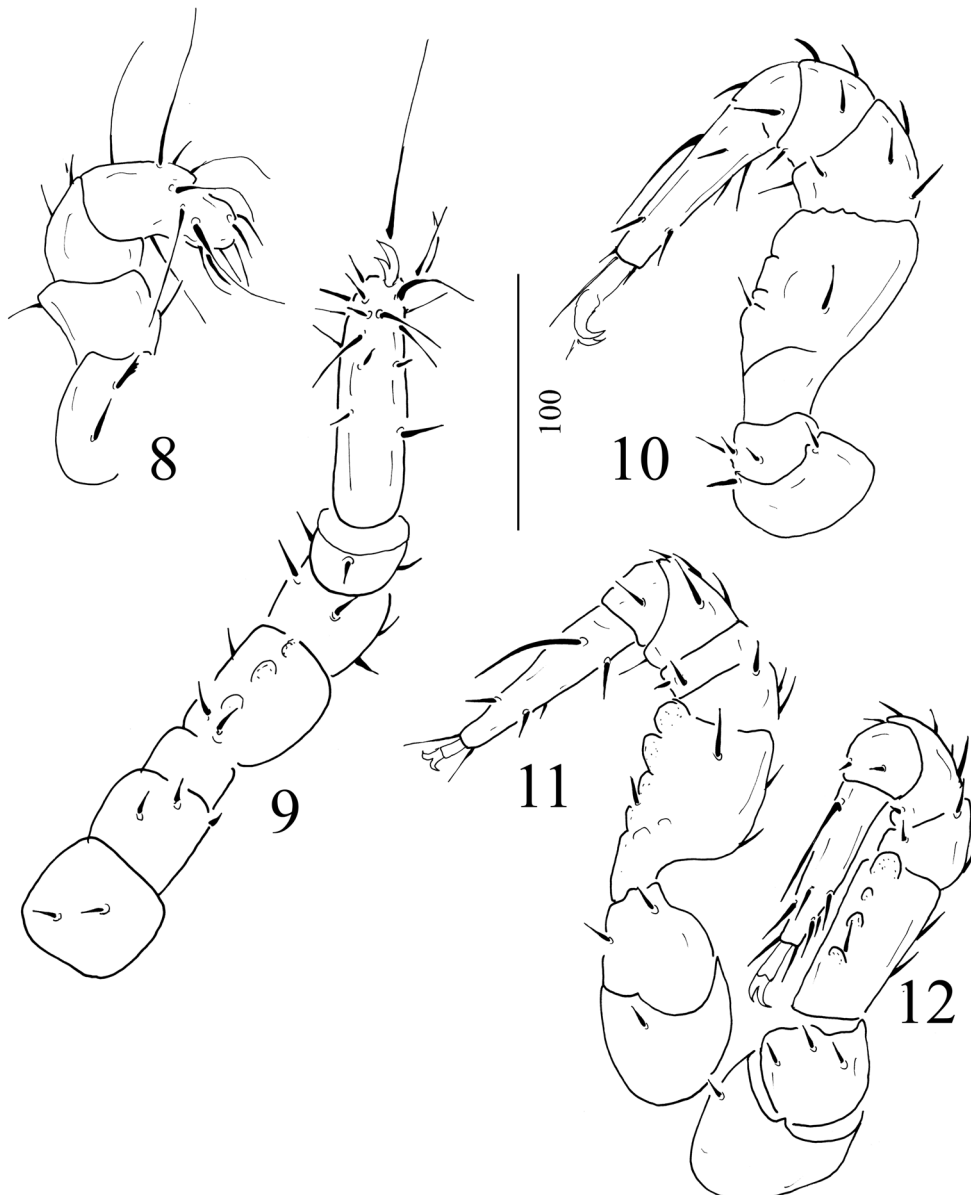
*Ventral idiosoma* (Fig. 7). Surface of sternal shield with some irregular pits on marginal areas. Five pairs of smooth, short (ca 6–8  $\mu\text{m}$ ) and needle-like sternal setae present. Anterior margin of sternal shield serrate. St1 situated close to anterior margin of sternal shield, St2 at level of posterior margin of coxae II, St3 at level of posterior margin of coxae III, St4 at level of anterior margin of genital shield, St5 near posterior margin of genital shield. Inguinal, sternal and ventrianal shields fused. Position and shape of ventral setae and ornamentation of ventral shield as in female. Genital shield circular, without sculptural pattern and without euanal setae. It situated between coxae IV. Nymphs and larvae unknown.

*Etymology*

We dedicate the new species to the memory of our dear colleague and friend, the excellent scale insect specialist Ferenc Kozár (1943–2013).

*Remarks*

Currently only two species are known with long setae on the adgenital plates; the Romanian endemic species, *Trachytes romanicus* Huţu, 1983 (Kontschán 2013b) and the widely distributed European species, *Trachytes lamda* Berlese, 1904. The most important differences between these three species are summarized in Table 1.



**FIGURES 8–12.** *Trachytes kozari* sp. nov., female, holotype. 8. Ventral view of palp. 9. Ventral view of leg I. 10. Ventral view of leg II. 11. Ventral view of leg III. 12. Ventral view of leg IV.

**TABLE 1.** Distinguishing characters among the females of *T. kozari* n. sp., *T. romanicus* Huřu, 1983 and *T. lamda* Berlese, 1904.

	<i>T. kozari</i>	<i>T. romanicus</i>	<i>T. lamda</i>
Inguinal shield	fused to sternal shield	not fused to sternal shield	fused to sternal shield
Setae on adgenital shield	shorter, not reaching to basal line of genital shield	longer, reaching to basal line of genital shield	shorter, not reaching to basal line of genital shield
Surface of genital shield	with irregular pits and situated at level of St5	with reticulate sculptural pattern and situated near basal line	with reticulate sculptural pattern
Apical margin of female genital shield	narrower than basal margin	narrower than basal margin	as wide as basal margin
Surface of pygidial shield	smooth	with small oval pits	with oval pits
Surface of postdorsal shield	with irregular pits	with small oval pits	with irregular pits

***Trachytes jenseri* sp. nov.**

(Figs 13–22)

*Material examined.*

*Holotype.* Female (HNHM). Cyprus, Troodos Mts. leaving Kakopetria toward Lemessos, 900 m, leaf litter, 06.VI.2007, leg. Csuzdi Cs. *Paratype:* one female, locality same as in holotype (NHMG).

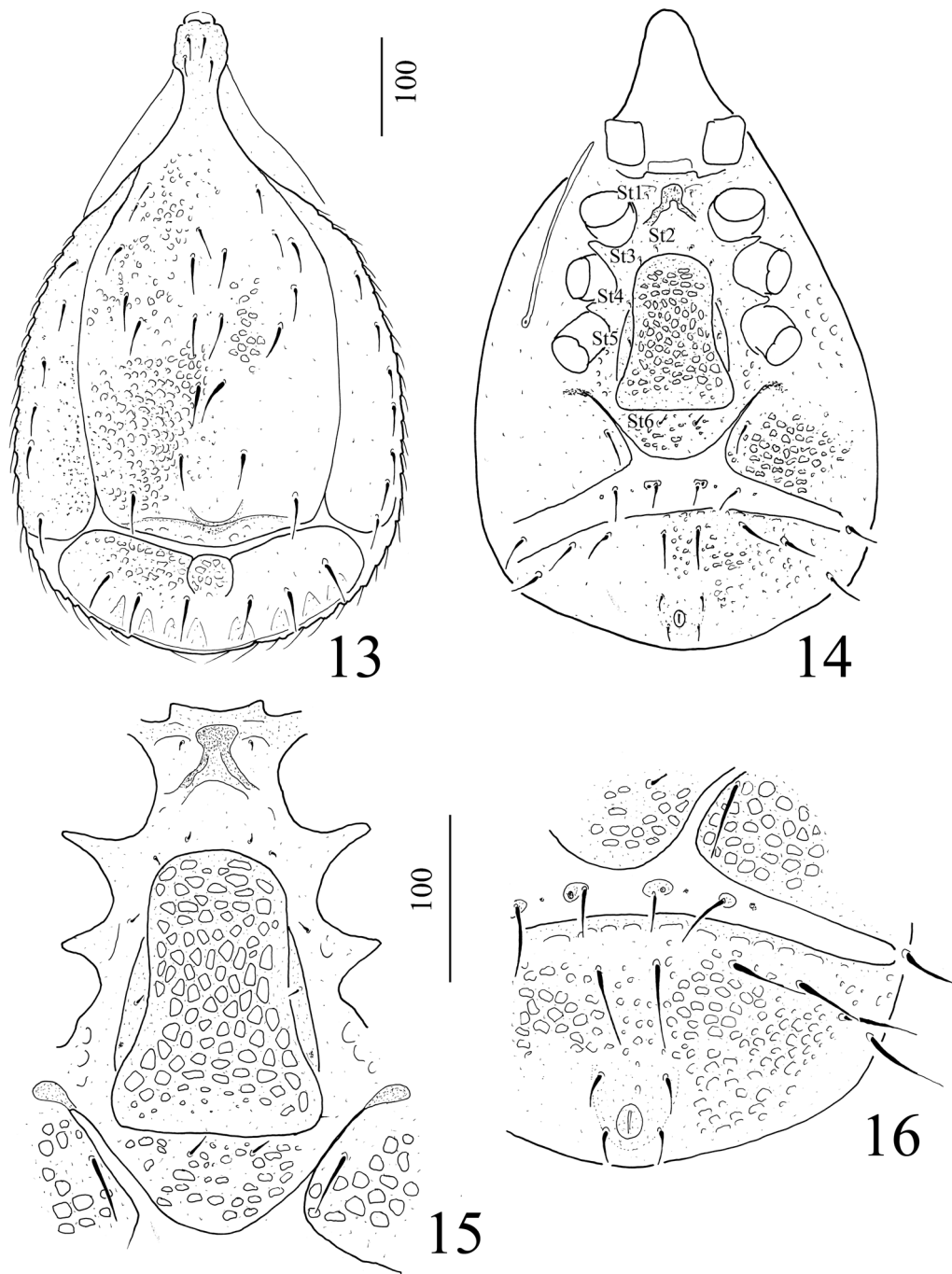
*Description.*

*Female.* Length of idiosoma 610–660, width 350–410 (n=2). Shape of idiosoma pear-like. Color yellow.

*Dorsal idiosoma* (Fig. 13). Wide and ribbed lateral sections on vertex absent. Marginal and dorsal shields completely separated. Pygidial shield small (45×50–52) and rounded, fused to postdorsal shield and placed between the posterior margin of dorsal shield and the anterior margin of postdorsal shield, postdorsal shield bean-like (ca 80–82 long and ca 300–310 wide). All setae on dorsal and postdorsal shields smooth, needle-like and ca 30–37 long. Setae on marginal shield needle-like and ca 30–35. Surface of dorsal shield covered by deep, irregular pits, postdorsal and pygidial shields with same sculptural pattern, marginal shield covered by small oval pits.

*Ventral idiosoma* (Fig. 14). All sternal setae short (ca 5–7 µm), smooth and needle-like. St1 situated close to anterior margin of sternal setae. St2 and St3 situated near the anterior margin of genital shield, St4 at level of central area of coxae III, St5 on adgenital platelets, St6 placed near basal margin of genital shield. Surface of sternal shield without sculptural pattern, only a strongly sclerotized U-shaped line situated between coxae II and some irregular pits present near posterior area. Peritrematal- and inguinal shields fused close coxae IV (Fig. 15). Inguinal shields separated by membranous cuticle from ventrianal shield. Inguinal shield covered by irregular pits and bearing one pair of long setae (ca 36–42). Membranous cuticle bearing two pairs of needle-like and smooth setae (ca 28–32) inserted on small platelets. Surface of ventrianal shield covered by irregular pits. Six pairs of setae situated on ventral shield similar in shape and length to setae on inguinal shield. Two pairs of adanal setae needle-like short (ca 15–19) and situated near anal opening (Fig. 16).

Genital shield ax-like (155–160 long and 82–88 wide at level of St5), with rounded anterior margin, its whole surface covered by irregular pits. Adgenital platelets present without processes on their outer margins. Genital shield situated between coxae III and IV (Fig. 15). Peritremes long and straight, stigmata situated between coxae II and III. Tritosternum (Fig. 17) with wide base, tritosternal laciniae divided into two long branches.



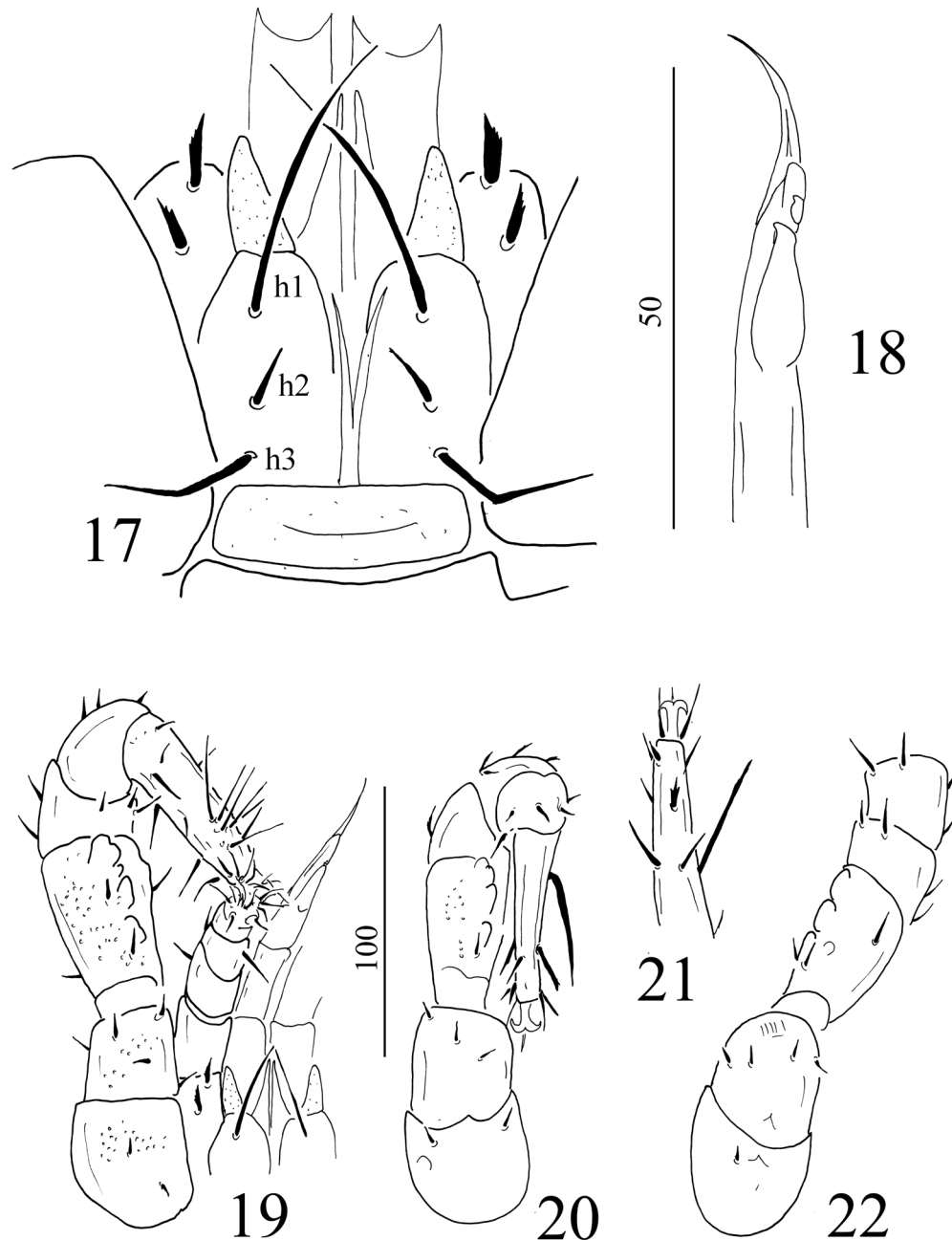
**FIGURES 13–16.** *Trachytes jenseri* sp. nov., female, holotype. 13. Dorsal view of body. 14. Ventral view of body. 15. Intercoxal area. 16. Anal region.

*Gnathosoma* (Fig. 17). Corniculi horn-like, internal malae longer than corniculi and smooth. Hypostomal setae h1 long (ca 30–31) and smooth, h2 short (ca 8–9) and smooth, h3 similar to h1 in shape, but ca 18–20 long, h4 marginally serrate and ca 14–16 long. Chelicerae with long and sharpened apical process on fixed digit, movable digit shorter than fixed digit (Fig. 18). Epistome

marginally serrate. Palp with two serrate ventral setae on trochanter, other setae on palp smooth (Fig. 19).

*Legs.* Leg I with small ambulacral claws (Fig. 19) and with smooth and needle-like setae; other legs bearing smooth and serrate, pilose setae (Figs 20–22), femora of legs I–IV with three-four rounded ventral processes. Leg I covered by small oval pits.

Male, nymphs and larvae unknown.



**FIGURES 17–22.** *Trachytes jenseri* sp. nov., female, holotype. 17. Ventral view of tritosternum and gnathosoma. 18. Ventral view of chelicerae. 19. Ventral view of leg I and palp. 20. Ventral view of leg II. 21. Ventral view of apical part of leg III. 22. Ventral view of basal part of leg IV.



### Etymology

We dedicate the new species to the memory of our dear colleague and friend, Dr. Gábor Jenser (1931–2015), the noted thrips specialist and plant protection expert.

### Remarks

The fusion of the inguinal and peritrematal shield can be seen on some species of the genus *Trachytes*. Complete fusion of these shields is an unusual phenomenon within the members of this genus (present in the other two species described here), but some species show an incomplete fusion of these shields, when a smaller or larger incision can be visible between these two shields. The new species has an incomplete fusion of the shields, which was previously reported for only two species *Trachytes baloghi* Hirschmann & Zirngiebl-Nicol, 1969 and *Trachytes adrianae* Huřu, 2000. Both species occur in Central Europe, *T. adrianae* is a Romanian endemic species, *T. baloghi* can be found in several Central and South European countries as well. The new species differs from the previously described ones in the sculptural pattern of genital shield in females, which was not observed earlier in the genus *Trachytes* Michael, 1894.

### ***Trachytes kissi* sp. nov.**

(Figs. 23–33)

### Material examined

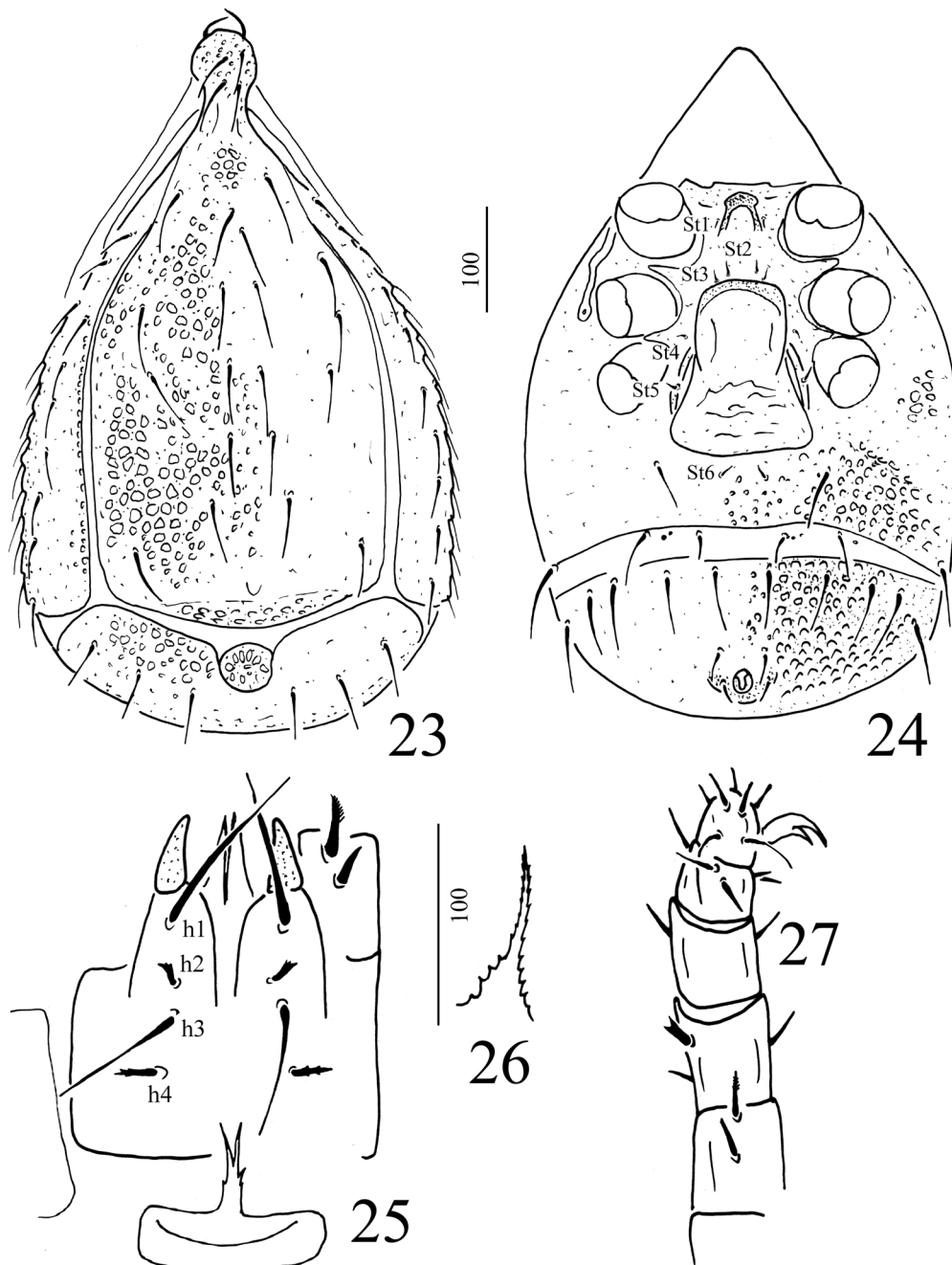
*Holotype*. Female. Greece, Thessaly, Magnesia regional unit, Pelio Mts, Hania, beech forest torrent in the settlement, beech litter, 1150m, 30.III.2013. Leg. J. Kontschán, D. Murányi & T. Szederjesi (HNHM). *Paratypes*: one female (NHMG) and four males (two in NHMG, two in HNHM), locality same as in holotype.

### Description.

*Female*. Length of idiosoma 650–660, width 380–410 (n=2). Shape of idiosoma pear-like. Color yellow.

*Dorsal idiosoma* (Fig. 23). Wide and ribbed lateral sections on vertex absent. Marginal and dorsal shields fused on anterior region. Pygidial shield small (ca 55–57 × 60–61) and rounded and placed between the posterior margin of dorsal shield and the anterior margin of postdorsal shield, postdorsal shield bean-like (ca 88–90 long and ca 330–335 wide). All setae on dorsal and postdorsal shields smooth, needle-like and ca 57–60 long. Setae on marginal shield needle-like and ca 35–37 long. Surface of dorsal shield covered by deep, irregular pits, postdorsal and pygidial shields with same sculptural pattern, marginal shield with oval pits.

*Ventral idiosoma* (Fig. 24). All sternal setae short (ca 10–12), smooth and needle-like. St1 situated at level of central area of coxae II. St2 and St3 situated near the anterior margin of genital shield, St4 absent, St5 on adgenital platelets, St6 placed near basal margin of genital shield. Surface of sternal shield without sculptural pattern, only a strongly sclerotized U-shaped line situated between coxae II. Peritrematal, sternal and inguinal shields fused completely. Inguinal shield and sternal shield close to setae St6 covered by irregular pits and bearing one pair of long setae (ca 38–45). The membranous cuticle bearing one pairs of short (ca 23–25) needle-like and smooth central setae and two pairs of long and needle-like setae on central and lateral areas. Surface of ventrianal shield covered by irregular pits. Five pairs of setae situated on ventral shield similar in shape and length to setae on inguinal shield. Two pairs of adanal setae needle-like short (ca 20–25) and situated near anal opening (Fig. 24).



**FIGURES 23–27.** *Trachytes kissi* sp. nov., female, holotype. 23. Dorsal view of body. 24. Ventral view of body. 25. Ventral view of tritosternum and gnathosoma. 26. Epistome. 27. Ventral view of palp.

Genital shield ax-like (165–170 long and 98–105 wide at level of St5), with rounded anterior margin, its central surface covered by reticulate sculptural pattern. Adgenital platelets present without processes on their outer margins. Genital shield situated between coxae III and IV. Peritremes long and straight, stigmata situated at level of coxae II. Tritosternum (Fig. 25) with wide base, tritosternal laciniae basally with spines and apically divided into two long branches.

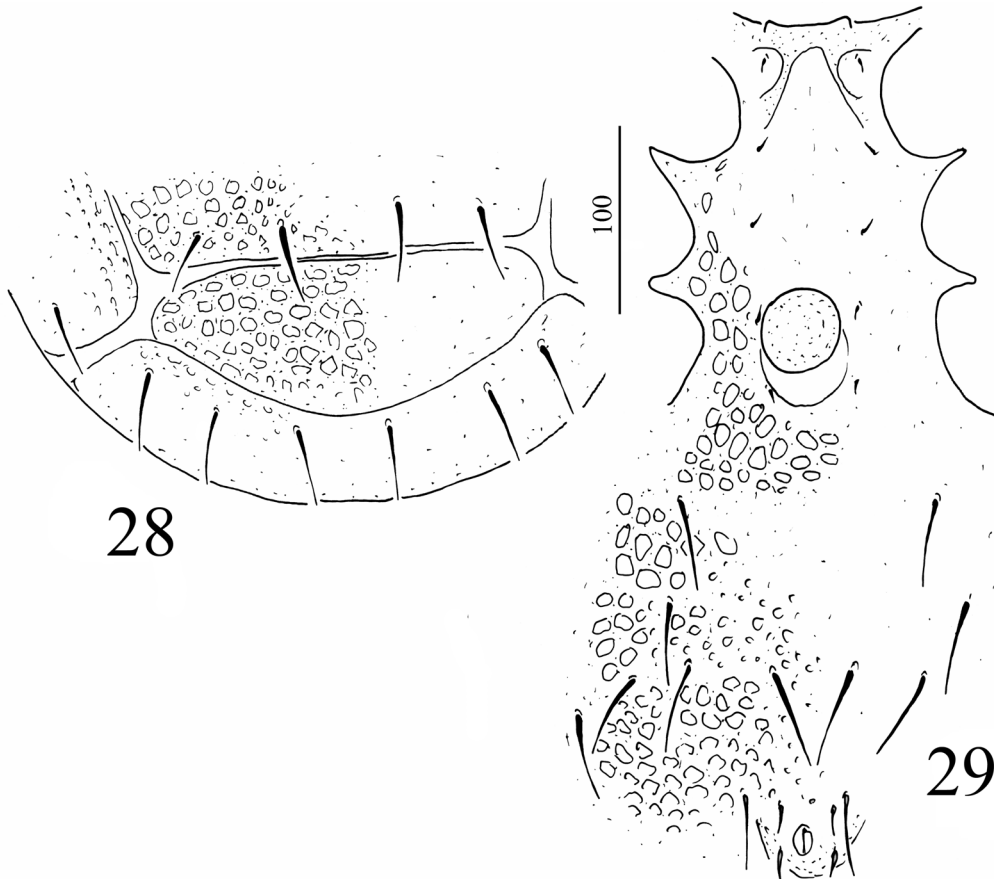
*Gnathosoma* (Fig. 25). Corniculi horn-like, internal malae smooth and as long as corniculi. Hypostomal setae h1 long (ca 92–95) and smooth, h2 short (ca 14–15) and apically serrate, h3 similar to h1 in shape, but ca 65–67 long, h4 marginally serrate and ca 20–22 long. Chelicerae with long and sharpened apical process on fixed digit, movable digit shorter than fixed digit. Epistome marginally serrate (Fig. 26). Palp with a serrate ventral and a bifurcate lateral seta, other setae on palp smooth (Fig. 27).

*Legs*. Leg I with small ambulacral claws (Fig. 30) and with smooth and needle-like setae; other legs bearing smooth and serrate, pilose setae (Figs 31–33), femora of legs I–IV with three–four rounded ventral processes.

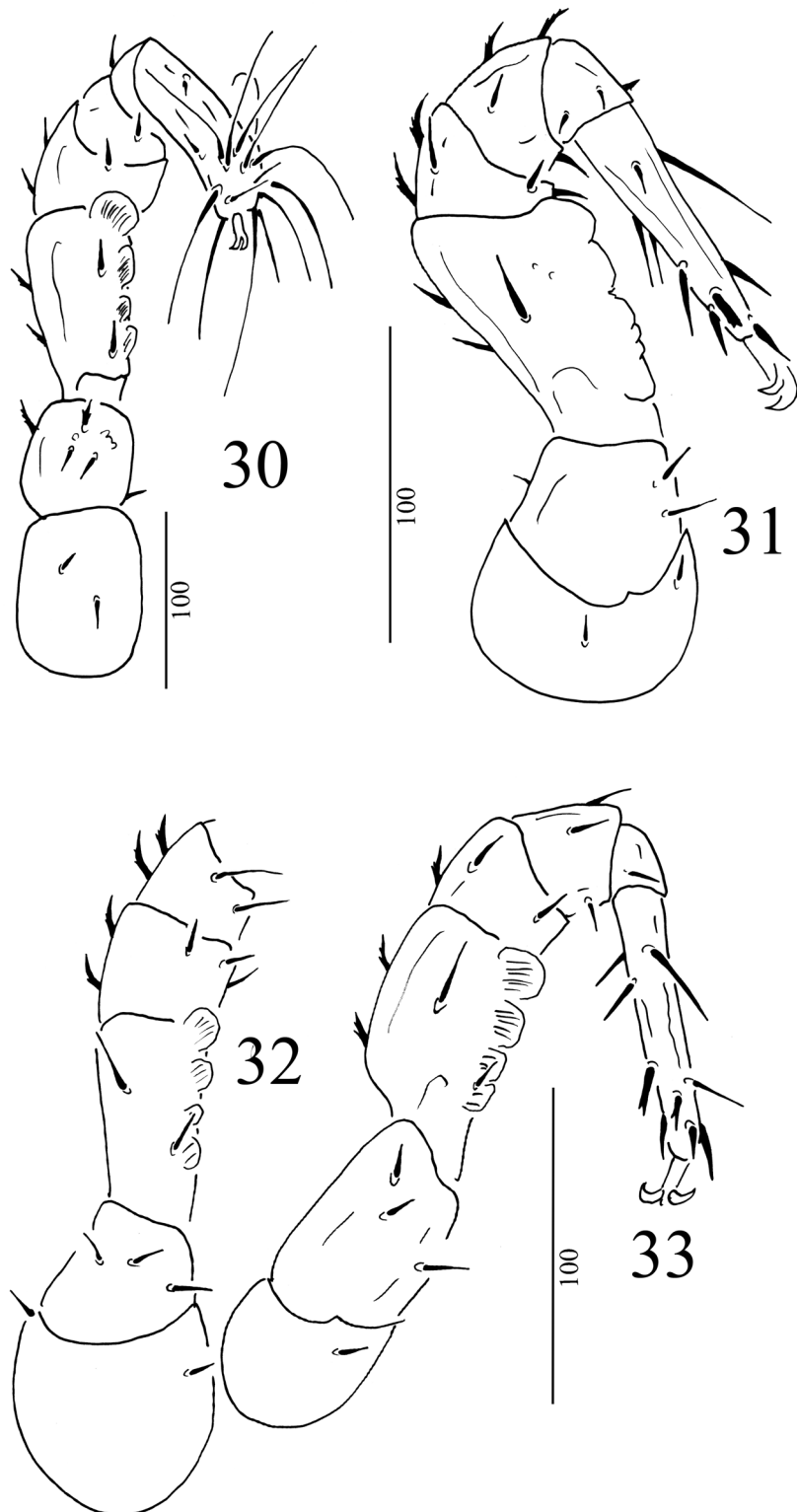
#### Male

Length of idiosoma 630–640  $\mu\text{m}$ , width 360–390  $\mu\text{m}$  (n=4).

*Dorsal idiosoma*. Shape and dorsal aspect of idiosoma as in female, except the caudal area of dorsal idiosoma: pygidial shield absent, postdorsal shield wide, pentagonal and covered by irregular pits (Fig. 28), shape and length of setae on postdorsal shield as in female.



**FIGURES 28–29.** *Trachytes kissi* sp. nov., male, paratype. 28. Caudal area of dorsal body. 29. Intercoxal and ventral areas.



**FIGURES 30–33.** *Trachytes kissi* sp. nov., female, holotype. 30. Ventral view of leg I. 31. Ventral view of leg II. 32. Ventral view of apical part of leg III. 33. Ventral view of basal part of leg IV.

*Ventral idiosoma* (Fig. 29). Surface of sternal shield with some irregular pits on marginal areas. Five pairs of smooth, short (ca 9–10 µm) and needle-like sternal setae present. Anterior margin of sternal shield smooth. St1 situated close to anterior margin of sternal shield, St2 at level of posterior margin of coxae II, St3 at level of central area of coxae III, St4 at level of anterior margin of genital shield, St5 near posterior margin of genital shield. Inguinal, sternal and ventrianal shields fused. Position and shape of ventral setae and ornamentation of ventral shield as in female. Genital shield circular, without sculptural pattern and without eugenital setae. Situated between coxae IV. Nymphs and larvae unknown.

#### Etymology

We dedicate the new species to our dear colleague and friend, Dr. Levente Kiss, the former director of the Plant Protection Institute of Centre for Agricultural Researches of Hungarian Academy of Sciences.

#### Remarks

Recently only three species possess fused sternal, inguinal and peritrematal shields which are separated from the ventrianal shield. Apart from *Trachytes kissi* **sp. nov.**, this character combination occurs also in *Trachytes parnonensis* Kontschán, 2010 and *Trachytes kozari* **sp. nov.** The distinguishing differences among these three species are summarized in Table 2.

**TABLE 2.** Most important differences among females of *Trachytes parnonensis* Kontschán, 2010 and the *Trachytes kozari* n. sp. and *Trachytes kissi* n. sp.

	<i>T. parnonensis</i>	<i>T. kozari</i>	<i>T. kissi</i>
Incision on dorsal shield	present	absent	absent
Surface of pygidial shield	with pits	smooth	with pits
Anterior margin of genital shield	with peaked anterior edges	rounded	rounded
Surface of genital shield	with oval pits	with irregular pits	with reticulate sculptural pattern
Setae on adgenital shield	longer than other sternal setae	as long as other sternal setae	as long as other sternal setae
Platelets on membranous cuticle between ventrianal and the fused shields	present	present	absent
Ornamentation near setae St6	present	absent	present
Setae h2	smooth	smooth	serrate

#### Acknowledgements

We thank to Dr. Csaba Csuzdi for the comments and notes to the earlier draft of the manuscript. This research was supported by the Hungarian Scientific Research Fund (OTKA 72744, 100369, 108663).

#### References

- Berlese, A. (1904) Acari nuovi. *Redia*, 1, 258–280.  
 Camin, J.H. (1953) A revision of the cohort Trachytina Trägårdh, 1938, with the description of *Dyscritaspis whartoni*, a new genus and species of polyaspid mite from tree holes. *Bulletin of the Chicago Academy of Sciences*, 9(17), 355–385.  
 Evans, G.O. (1972) Leg chaetotaxy and the classification of the Uropodina (Acari: Mesostigmata). *Journal of*

- Zoology*, 67(2), 193–206.  
<https://doi.org/10.1111/j.1469-7998.1972.tb01729.x>
- Halliday, R.B. (2015) Catalogue of genera and their type species in the mite Suborder Uropodina (Acari: Mesostigmata). *Zootaxa*, 3972(2), 101–147.  
<https://doi.org/10.11646/zootaxa.3972.2.1>
- Hirschmann, W. & Zirngiebl-Nicol, I. (1969) Gangsystematik der Parasitiformes. Teil 37–73. Uropodiden: Geschichte der Systeme. *Acarologie. Schriftenreihe für Vergleichende Milbenkunde*, 12, 1–32.
- Huțu, M. (1983) Gangsystematik der Parasitiformes. Teil 428. Teilgänge, Studien von 6 neuen *Trachytes*-Arten aus Rumänien und Schweden (Uropodini, Uropodinae). *Acarologie. Schriftenreihe für Vergleichende Milbenkunde*, 30, 51–66.
- Huțu, M. (2000) Zwei neue *Trachytes*-Arten (Uropodina: Trachytidae) aus Rumänien. *Abhandlungen und Berichte des Naturkundemuseums Görlitz*, 72(2), 239–252.
- Kontschán, J. (2010) Taxonomical and faunistical studies on the Uropodina mites of Greece (Acari: Mesostigmata). *Opuscula zoologica Budapest*, 41(1), 29–38.
- Kontschán, J. (2013a) Uropodina mites of the Balkan Peninsula (Acari: Mesostigmata). *Opuscula zoologica Budapest*, 44(suppl. 1.), 97–131.
- Kontschán, J. (2013b) Species of the genus *Trachytes* Michael, 1894 (Acari: Uropodina: Trachytidae) of Romania. *Acta Zoologica Academiae Scientiarum Hungaricae*, 59(4), 321–336.
- Kontschán, J. & Starý, J. (2011) Uropodina mites from Vietnam (Acari: Mesostigmata). *Zootaxa*, 2807, 1–28
- Kontschán, J. & Starý, J. (2012) New Uropodina (Acari: Mesostigmata) from California, USA. *Zootaxa*, 3210, 26–38.
- Michael, A.D. (1894) Notes on the Uropodinae. *Journal of Royal Microscopical Society*, 1984, 289–319.  
<https://doi.org/10.1111/j.1365-2818.1894.tb00029.x>

*Submitted: 18 Nov. 2016; accepted by Hans Klompen: 18 Oct. 2017; published: 14 Dec. 2017*