

## Taxonomical and faunistical studies on the Uropodina mites of Greece (Acari: Mesostigmata)

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**Abstract.** Elaboration of a rich “Berlese” material from Greece yielded twelve Uropodina species from different parts of the country. Six of them, namely *Trachytes aegrota* (C. L. Koch, 1841); *Urodiaspis pannonica* Willmann, 1951; *Uroobovella fracta* (Berlese, 1916); *Neodiscopoma splendida* Kramer, 1882; *Uropoda mazzalaciae* Kontschán, 2005 and *Uropoda minima* Kramer, 1882, are new to the fauna of Greece. Three species, *Trachytes parnonensis* sp. nov., *Uroobovella graeca* sp. nov. and *Cilliba vellas* sp. nov. proved to be new to science. With 24 figures.

In the last decade, several expeditions were organized to the Balkan Peninsula by the researchers of the Hungarian Natural History Museum to collect snails, water insects, and soil animals (mites, springtails, nematodes, and earthworms). Till now several mite groups from this materials have been elaborated, e.g. Oribatida and Uropodina mites were published from Albania (Kontschán, 2003a; Mahunka, 2008), Gamasina (Zerconidae) and Uropodina mites were listed from Croatia (Kontschán, 2005, 2006, 2007a; Ujvári, 2008) and Slovenia (Kontschán, 2009; Ujvári, 2009), and furthermore several records of the Uropodina mites were mentioned from Bulgaria as well (Kontschán, 2004, 2007b).

Uropodina mites is a widely distributed group of the soil mesofauna. Recently more than two thousand species are known from all over the world, but only cca. 350 species are listed from Europe (Błoszyk, 1999). Notwithstanding that the Uropodina fauna of Central Europe is well investigated, we have only a few data on uropodids of the large, well-separated region, the Balkan Peninsula (Kontschán, 2003a, b, 2004, 2005, 2007a, b, 2008). Especially few data are present from Greece which is the largest country in the Balkan. From here only eight Uropodina species are listed so far (Kontschán, 2003b).

The present paper contains another six new records and descriptions of three new species of Uropodina mites from our three last expeditions to Greece (2006 to Pindos Mts, 2007 to Thrakia and 2008 to Peloponnesus).

### MATERIALS AND METHODS

Specimens were cleared in lactic acid and later stored in alcohol. Drawings were made with the aid of a drawing tube. Specimens examined are deposited in the Collections of Soil Zoology of the Hungarian Natural History Museum (HNHM) and Natural History Museum Geneva (NHMG). Abbreviations used: h1–h4, hypostomal setae, St1–St5, sternal setae. Measurements are given in micrometres (µm), width of idiosoma was taken at the level of the coxae IV.

All specimens were collected in 2006 and 2009 by László Dányi, Jenő Kontschán and Dávid Murányi, in 2007 by László Dányi, Zoltán Eröss, Zoltán Fehér, Jenő Kontschán and Dávid Murányi.

### RESULTS

#### Trachytidae

##### *Trachytes aegrota* (C. L. Koch, 1841)

(Fig. 1)

*Material examined.* E-1994. Greece, Kastoria, Visina, stream with alder forest, 15.V.2006 N40°36'31.9" E21°18'13.5", 851 m, alder forest, from leaf litter and soil.

*Distribution.* Europe.

*Remark.* This is the first record from Greece.

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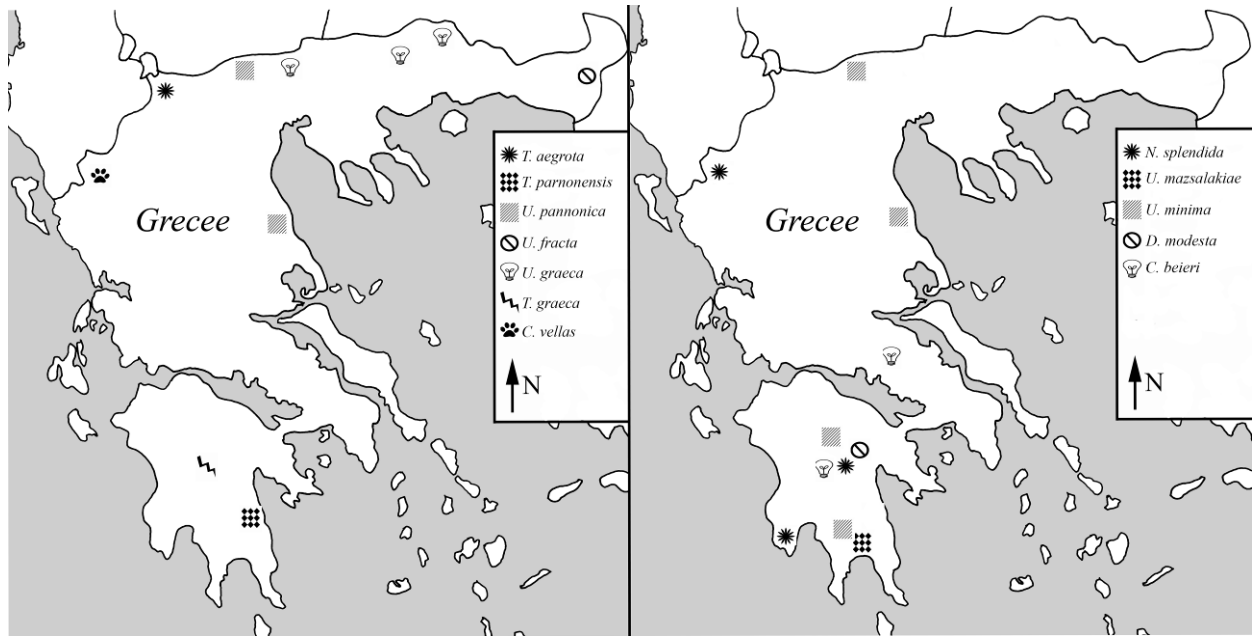


Figure 1. Occurrences of the recorded Uropodina species in Greece

***Trachytes parnonensis* sp. nov.**

(Figs. 1–6)

*Material examined.* Female holotype, E-2570. Greece, Arkadia County, Parnon Mts, Mesorahi, chestnut and oak mixed forest, south of the village, 900 m, N37°22.222' E22°32.121', 02.IV. 2009. Paratypes: four females and one male, same data as for holotype. Holotype, two female and one male paratypes deposited in HNHM, two female paratypes deposited in NHMG.

*Diagnosis.* Genital shield of female axe-like. Ventral and inguinal shields fused laterally. Pygidial shield of female rounded and deep incision can be found on caudal region of dorsal shield, contrary incision absent and pygidial shield large and oval in male. Whole surface of idiosoma covered by oval pits. Strongly sclerotised Y-shaped line can be found near anterior margin of sternal shield.

*Female.* Length of idiosoma 630–650 µm, width 340–410 µm (n = 4). Shape of idiosoma pear-like.

*Dorsal idiosoma* (Fig. 2). Marginal and dorsal shields anteriorly fused. Deep lateral incision present on dorsal shield. Pygidial shield small and rounded placed between the posterior margin of dorsal shield and the anterior margin of postdorsal shield. All setae on dorsal, marginal, and postdorsal shields smooth and needle-like. Surface of dorsal idiosoma covered by oval pits.

*Ventral idiosoma* (Fig. 3). Sternal setae short, smooth, and needle-like. St1 and St2 situated near the anterior margin of genital shield, St3 on the level of posterior margin of coxae III, St4 situated on adgenital platelets, St5 can be found near the basal margin of genital shield. Sternal shield without ornamentation, but bears a strongly sclerotised Y-shaped line near the anterior margin. Ventral and inguinal shields fused laterally, covered by oval pits and bear long and needle-like setae. Setae X5 and X4 with small platelets which situated on membranous cuticle. Adanal setae and postanal setae similar in shape to ventral setae, ad1 as long as ventral setae, but ad2 and postanal seta two times shorter than ad1.

*Genital shield* axe-shaped, without process, with adgenital platelets and oval pits. Genital

shield situated between coxae III and IV. Peritremes long and straight situated near coxae III.

*Tritosternum* (Fig. 4) with wide basis, tritosternal laciniae subdivided into four branches.

*Gnathosoma* (Fig. 4). Corniculi horn-like, internal malae apically serrate. Hypostomal setae h1 long and smooth, h2 four times shorter than h1 and their shape similar to that of h1, h3 similar to h1 in shape and size, h4 as long as h2, but their margin serrate. Chelicerae not clearly visible. Tibia of palps bear two serrate setae in ventral part. Epistome basally serrate and apically pilose.

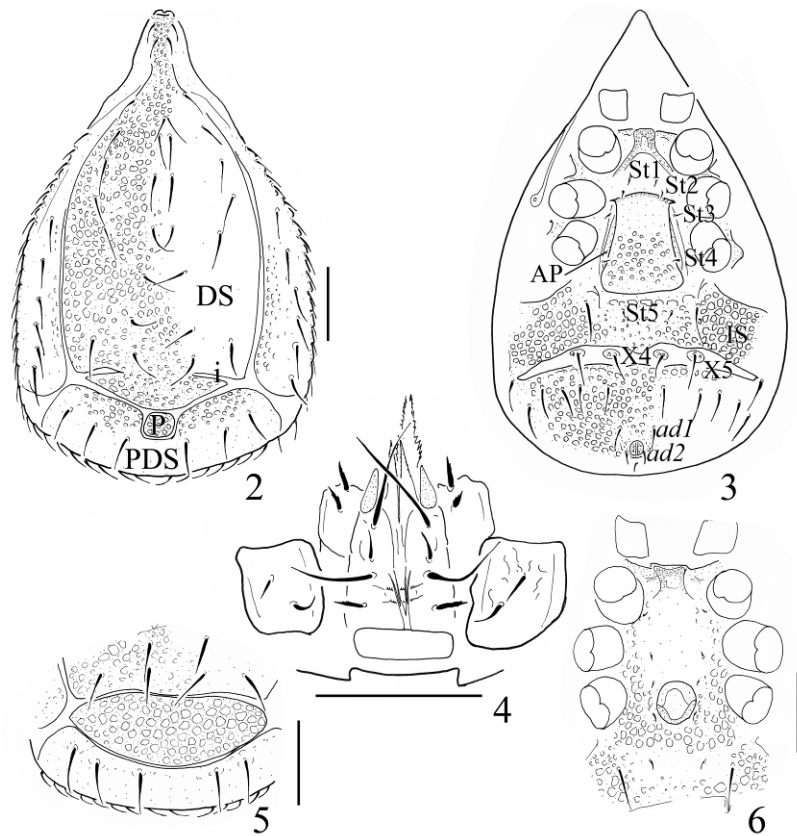
*Male*. Length of idiosoma 590  $\mu\text{m}$ , width 350  $\mu\text{m}$  ( $n = 1$ ). Shape of idiosoma, ornamentation, and chaetotaxy of the dorsal part as in female. Dorsal incision absent, pygidial shield large, oval, and covered by oval pits (Fig. 5). Sternal setae

and needle-like, ornamentation on sternal shield alveolar. Genital shield oval and placed between coxae IV. (Fig. 6). Ventral setae and ornamentation similar to those of female.

Larva and nymphs unknown.

*Etymology*. The name of the new species refers to the mountain where it was collected.

*Remarks*. Fusion of the inguinal and ventral shields only in *Trachytes minima* Trägårdh, 1910, *Trachytes minimasimilis* Mašán, 1999, *Trachytes irinae* Pecina, 1970 and *Trachytes splendida* Hutu, 1973 can be observed, however in these species the setae X4 and X5 are placed in the fused shields. These setae in the new species are situated on small platelets on membranous cuticle and furthermore the incisions on dorsal shield are unique in the genus *Trachytes*.



**Figures 2–6.** *T. parnonensis* sp. nov. 2 = dorsal view, 3 = ventral view, 4 = ventral view of gnathosoma (female), 5 = caudal region of dorsum, 6 = intercoxal region (male) (Scale bar: 100  $\mu\text{m}$ ). (abbreviations: DS: dorsal shield, PDS: postdorsal shield, P: pygidial shield, AP: adgenital platelets, IS: inguinal shield, St1-St5 sternal setae, ad1-2: adanal setae)

## Trematuridae

### *Trichouropoda graeca* Kontschán, 2003

(Fig. 1)

*Material examined.* E-2563. Greece, Arkadia County, Tetrazi Mts, Ag. Theodora, rocky maple forest, 490m, N37°21.269' E21°58.782', 05.IV.2009.

*Distribution.* Greece.

## Urodinychidae

### *Urodiaspis pannonica* Willmann, 1951

(Fig. 1)

*Material examined.* E-2571. Greece, Larisa County, Ossa Mts, beech forest, 1115 , N39°47.865' E22°45.298', 09.IV.2009.04.09.; E-2182. Greece, Serres County, Vrondous Mts, pine forest at the Lailias mountain hut, 1500m, N41°15.310' E23°35.286' from pine leaf litter, 30.III.2007.

*Distribution.* Central- and Southern-Europe.

*Remarks.* This is the first record from Greece.

### *Uroobovella fracta* (Berlese, 1916)

(Fig. 1)

*Material examined.* E-2190. Greece, Rodopi County, Sapka Mts, torrent in an oak forest 14 m east of Nea Sanda, 651m, N41°07.672' E25°53.223' from decayed tree, 04.IV.2007.

*Distribution.* Central- and Southern-Europe.

*Remarks.* This is the first record from Greece.

### *Uroobovella graeca* sp. nov.

(Figs. 1 and 7–14)

*Material examined.* Female holotype, E-2160, Greece, Drama County, Falakro Mts, beech forest beneath the sky centre, 1186 , N41°17.582' E24°00.422', beech leaf litter, 31.III.2007. Paratypes: one male and one female, E-2167, Greece, Serres County, Orvilos Mts, rocky forest 8 km east of

Angistrou, 661 , N41°23.936' E23°30.321', from soil, 30.III.2007 (Holotype and these two paratypes deposited in HHNM); one female, E-2174, Greece, Drama County, Dit-Rodopi Mts, forest stream S of Mikromilia, 430m, N41° 23.326' E24°10.078', from leaf litter, 31.III.2007 (deposited in NHMG).

*Diagnosis.* Whole idiosoma covered by oval pits except sternal shield which is smooth. Dorsal, ventral, and marginal setae serrate, except setae i1, which robust and pilose, sternal setae short and smooth. Genital shield of female scutiform.

*Female.* Length of idiosoma 440–460 µm, width 290–310 µm (n=3). Shape of idiosoma oval.

*Dorsal idiosoma* (Fig. 7). Marginal and dorsal shields completely separated. All dorsal setae serrate (Fig. 9), except i1 which robust and pilose (Fig. 8). Marginal setae similar in shape and length to dorsal setae (Fig. 10). Dorsal and marginal shields bear alveolar ornamentation.

*Ventral idiosoma* (Fig. 11). Sternal setae short, smooth, and needle-like. St1 placed near anterior margin of genital shield, St2 on the level of central region of coxae II, St3 on the level of central region of coxae III and St4 situated on the level of anterior margin of coxae IV. Sternal shield covered by some alveolar pits. Ventral shield with alveolar ornamentation, all ventral setae serrate, except two pairs setae on central region which are needle-like and smooth. Adanal setae smooth and two times shorter than ventral setae, postanal setae similar in shape to ventral setae, but two times shorter. Genital shield scutiform, without processes and with oval pits. Genital shield placed between coxae I and IV. Peritreme and stigmata not clearly visible.

*Tritosternum* (Fig. 12) with narrow basis, tritosternal lacinae subdivided into three branches, central one long, serrate, and other two laterals short and smooth.

*Gnathosoma* (Fig. 12). Corniculi horn-like, internal malae smooth, epistome apically serrate.

Hypostomal setae h1 long and smooth, h2 four times shorter than h1 and their margins smooth, h3 two times longer than h1, their margins smooth, h4 as long as h2 their margin serrate. Chelicerae not clearly visible. Tibia of palps bear one smooth and one serrate setae in ventral part. Epistome illustrated in Fig. 13.

*Legs.* First leg with ambulacral prolongation, all setae of legs smooth and simple.

*Male.* Length of idiosoma 440  $\mu\text{m}$ , width 310  $\mu\text{m}$  (n=1). Shape of idiosoma, ornamentation, and chaetotaxy of the dorsal part as in female. Sternal setae on anterior region of genital shield (St1–St4)

short and smooth, but St5 two times longer than other sternal setae. Sternal shield covered by oval pits. Genital shield oval and placed between coxae IV (Fig. 14). Ventral setae and ornamentation similar to those of female.

*Etymology.* The name of the new species refers to the country where this species was collected.

*Remarks.* The new species belongs to the *pulchella*-group (Hirschmann, 1989). Only one species is known from this group in Europe, the others occur in Chile, Sri-Lanka, and Japan. The most important differences between the new species and the only European species *U. pulchella* (Berlese, 1904) are summarized in Table 1.

Table 1. Distinguishing characters between *U. pulchella* and *U. graeca*

	<i>U. pulchella</i>	<i>U. graeca</i>
Setae i1	similar to other dorsal setae	more robust than other dorsal setae and bear pilose margins
Ornamentation on dorsal shield	irregular	oval
Genital shield of female	shape linguliform and its anterior margin with wide process	scutiform and without process
Preanal line	present	absent
Dorsal and marginal shields	separated	fused

## Uropodidae

### *Cilliba vellas* sp. nov.

(Figs. 1 and 15–24)

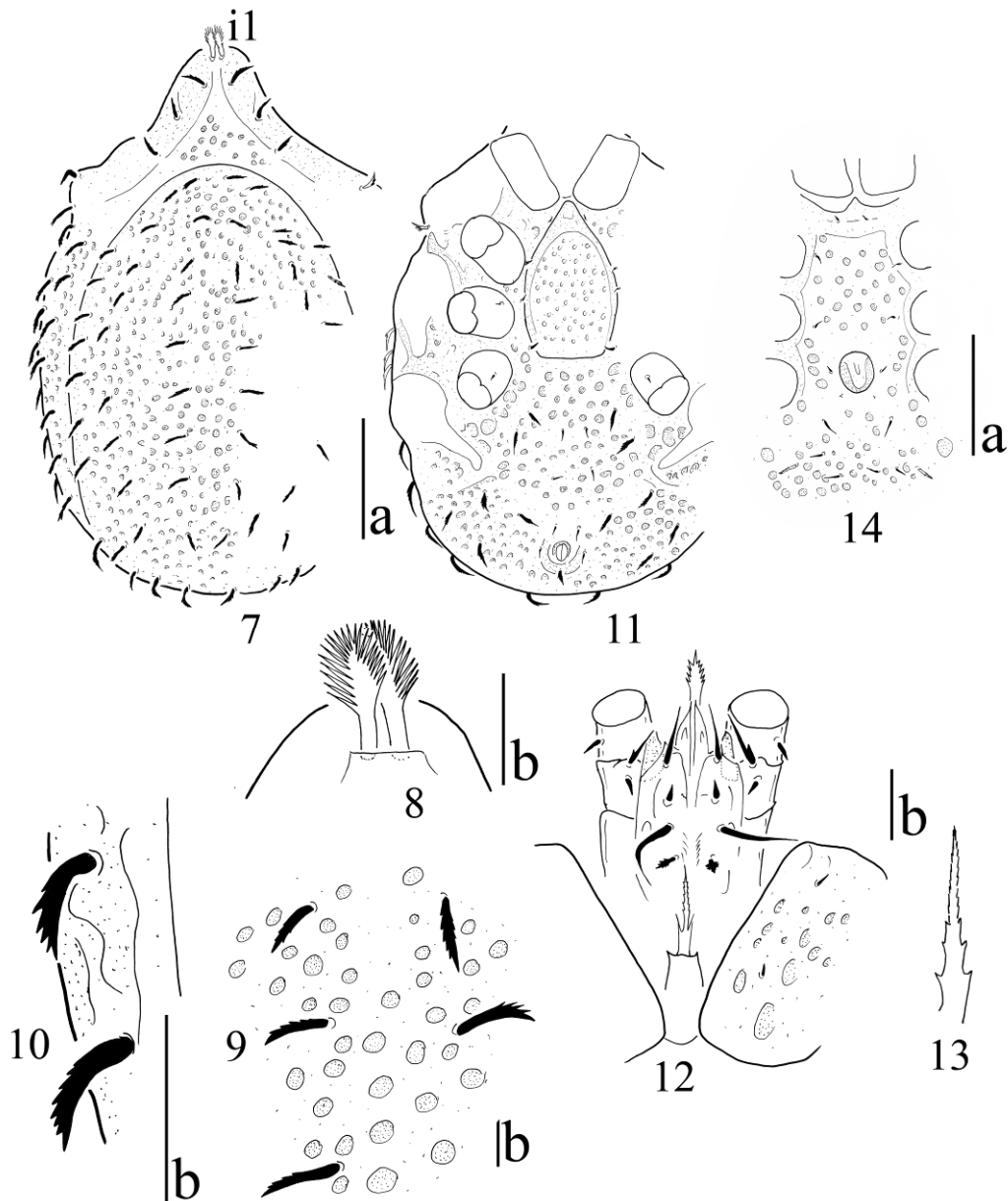
*Material examined.* Female holotype, E-1986, Greece, Ioannina County, Kalpaki, Vellas Monastery, karstic spring, 12.05.2006 N39°51'57.0" E20°37'26.1", 419 m a.s.l., 12.V.2006. Paratypes: two females and one male same data as for holotype. Holotype and male paratype deposited in HNHM, two female paratypes deposited in NHMG.

*Diagnosis.* Whole idiosoma covered by small alveolar ornamentation. Dorsal, ventral, and sternal setae smooth and needle-like, except i1 which have pilose margins apically. Dorsal shield bearing an m-shaped well-sclerotised region near caudal margin. Peritremes L-shaped.

*Female.* Length of idiosoma 950–980  $\mu\text{m}$ , width 780–810  $\mu\text{m}$  (n = 3). Shape of idiosoma oval.

*Dorsal idiosoma* (Fig. 15). Marginal and dorsal shields completely separated. All dorsal setae smooth and needle-like, except i1 which have pilose margins (Fig. 16). Marginal setae similar in shape to dorsal setae, but two times shorter (Fig. 17). Dorsal shield bearing an m-shaped well-sclerotised region near the caudal margin (Fig.18). Ornamentation of dorsal and marginal shields alveolar.

*Ventral idiosoma* (Fig. 19). Sternal setae short, smooth, and needle-like. St1 placed on the level of anterior margins of coxae II, St2 on the level of posterior margin of coxae II, St3 on the level of central region of coxae III and St4 situated on the level of anterior margins of coxae IV. St5 placed in posterior corners of the genital shield. Sternal



**Figures 7–14.** *U. graeca* sp. nov. 7 = dorsal view, 8 = il setae, 9 = dorsal setae and ornamentation, 10 = marginal setae, 11 = ventral view, 12 = ventral view of gnathosoma, 13 = epistome (female), 14 = intercoxal region (male)  
(Scale bars: a: 100  $\mu$ m, b: 20  $\mu$ m)

shield covered by alveolar pits. Ventral shield with alveolar ornamentation, all ventral setae smooth and needle-like, their shape and position are illustrated on Fig. 19. Adanal setae and post-anal setae smooth and needle-like, ad1 two times shorter than ad2 and postanal seta.

Genital shield linguliform, without process, covered by oval pits, and placed between coxae II and IV.

*Stigmata* situated near coxae II, peritreme L-shaped.

*Tritosternum* (Fig. 20) with wide basis, trito-sternal laciniae subdivided into six branches.

*Gnathosoma* (Fig. 20). Corniculi horn-like, internal malae long and smooth. Hypostomal setae h1 long and smooth, h2 and h3 five times shorter than h1 and their shape similar to that of h1, h4 as long as h2, but their margin serrate. Epistome basally serrate and apically pilose (Fig. 21). Fixed digit of chelicerae longer than movable digit (Fig. 22). Tibia of palps bearing one big V-form seta and one serrate seta in ventral part.

*Male*. Length of idiosoma 980 µm, width 810 µm (n = 1). Shape of idiosoma, ornamentation, and chaetotaxy of the dorsal part as in female. All sternal setae short and needle-like. Genital shield oval and placed between coxae IV (Fig. 23). Ventral setae and ornamentation similar to those of female. Tibia of palps bearing two serrate setae (Fig. 24).

*Etymology*. The name of the new species refers to the monastery where this species was collected.

*Remarks*. The m-shaped well-sclerotised region near the caudal margin of dorsal shield hitherto has not been observed in the genus *Cilliba* v. Hayden, 1826.

***Neodiscopoma splendida* Kramer, 1882**

(Fig. 1)

*Material examined*. E-2579. Greece, Messinia County, Haravgi, Polilimnio, gorge south of the village, 290 m, N36°58.916' E21°51.036', 05.IV.2009; E-2574. Greece, Arkadia County, Vitina, stream and its gallery, woody pasture southwest of the city, 960m, N37°39.031' E22°10.156', 06.IV.2009; E-1986. Greece, Ioannina County, Kalpaki, Vellas Monastery, karstic spring, N39°51' 57.0" E20°37'26.1", 419m, from moss, 12.V.2006.

*Distribution*. Europe.

*Remark*. This is the first record of *N. splendida* from Greece.

***Uropoda mazsalakiae* Kontschán, 2005**

(Fig. 1)

*Material examined*. E-2584, Greece, Lakonia County, Trinisa, seashore and mouth section of a stream near the village, N36°48.251' E22°37.086', 03.IV.2009.

*Distribution*. Croatia and Greece.

*Remark*. This is the first record of *U. mazsalakiae* from Greece.

***Uropoda minima* Kramer, 1882**

(Fig. 1)

*Material examined*. E-2583. Greece, Arkadia County, Aroania Mts, Planitero, Platanus gallery of Aroanios (Ladon) Stream west of the village, 600 m, N37°55.985', E22°09.503', 07.IV.2009; E-2571. Greece, Larisa County, Ossa Mts, beech forest, 1115 m, N39°47.865', E22°45.298', 09.IV.2009; E-2576. Greece, Lakonia County, Taigetos Mts, Poliana (Krioneri), mixed gallery of Varbaras Stream above the village, 985m, N36°57.952', E22°22.884', 03.IV.2009; E-2182. Greece, Serres County, Vrontous Mts, pine forest at the Lailias mountain hut, 1500 m, N41°15.310', E23°35.286', from pine leaf litter, 30.III.2007.

*Distribution*. Europe.

*Remark*. This is the first record of *U. minima* from Greece.

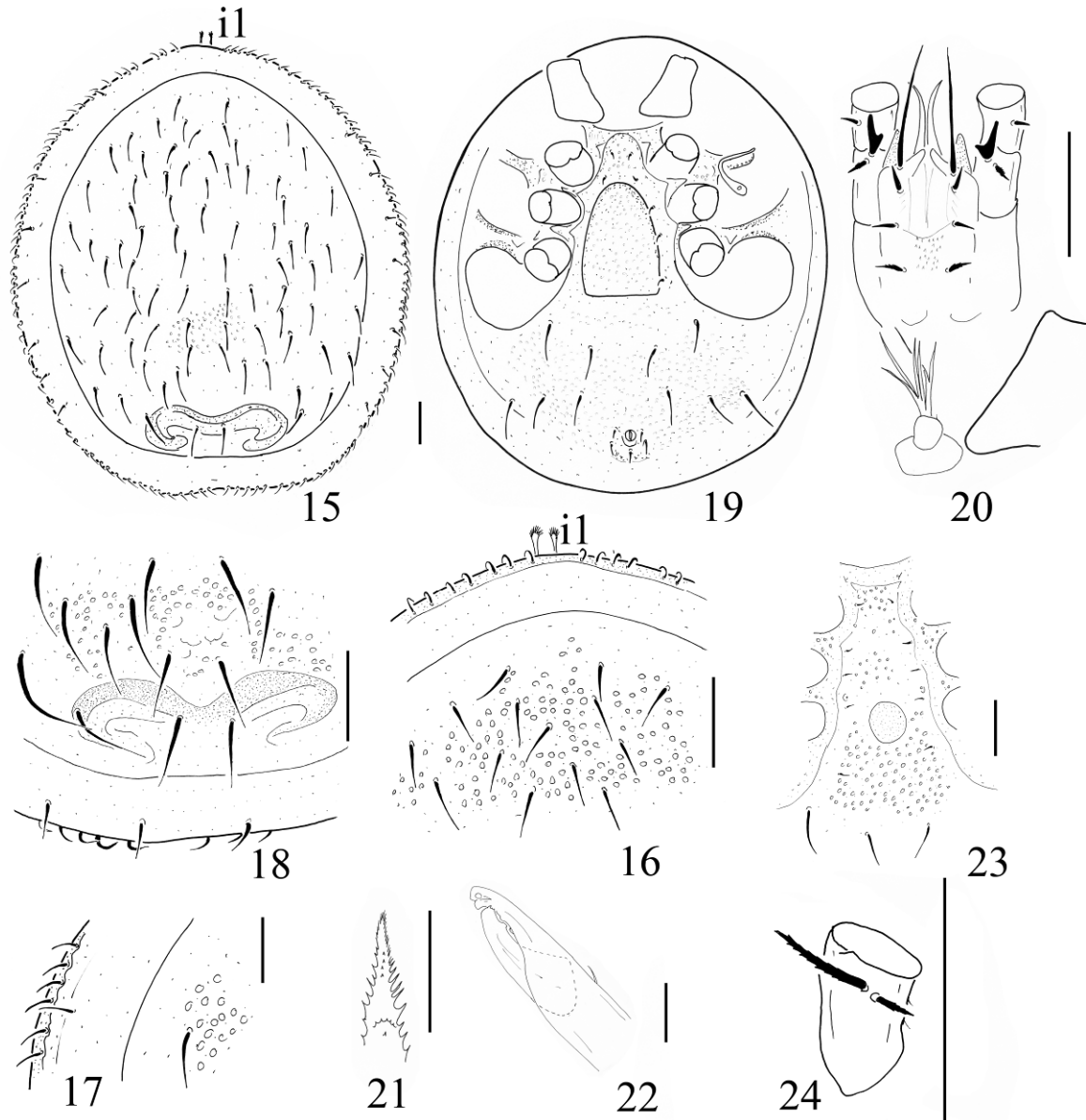
**Discourellidae Baker & Wharton, 1952**

***Discourella modesta* (Leonardi, 1899)**

(Fig. 1)

*Material examined*. E- 2574. Greece, Arkadia county, Vitina, stream and its gallery, woody pasture southwest of the city, 960 m, N37°39.031' E22°10.156', 06.IV.2009.

*Distribution*. Europe.



Figures 15–24. *C. vellas* sp. nov. 15 = dorsal view, 16 = *il* setae and anterior region of dorsum, 17 = marginal setae, 18 = caudal region of dorsum, 19 = ventral view, 20 = ventral view of gnathosoma, 21 = epistome, 22 = chelicera (female) 23 = intercoxal region, 24 = Setae on tibia of balp (male) (Scale bar: 100  $\mu$ m)

***Crinitodiscus beieri* Sellnick, 1931**

(Fig. 1)

*Material examined.* E-2573. Greece, Phocis County, Parnassos Mts, Eptolofos, streamshore Platanus trees in the village, 860 m, N38°35.565',

E22°29.236', 08.IV.2009.; E-2563. Greece, Arkadia County, Tetrazi Mts, Ag. Theodora, rocky maple forest, 490 m, N37°21.269' E21°58.782', 05.IV.2009.

*Distribution.* Greece.



## DISCUSSION

Three of the already known species found possess a typical Mediterranean distribution. *Trichourpoda graeca* is so far recorded only from Greece and missing from the fauna of the neighbouring countries in the Balkan Peninsula. The same phenomenon is observed for the species *Crinitodiscus beieri* (Sellnick, 1931) as well. This species was described from Greece and so far has not been found elsewhere (Athias-Binche & Błoszyk, 1985).

The genus *Crinitodiscus* Sellnick, 1931 shows a typical East-Mediterranean distribution; several of its species are known from Crete, Iran (Athias-Binche & Błoszyk 1985), Turkey (Athias-Binche & Błoszyk, 1985; Bal, 2006), and Albania (Kontschán, 2003). This distribution type is not unknown among the members of the soil fauna. Similar East-Mediterranean distribution can be found also in earthworms (Pavlíček *et al.*, 2003, 2006), moss mites (Mahunka, 1979) and Gamasina mites (especially in the members of the family Zerconidae (Ujvári, 2008).

Until the lower Miocene, a continental bridge existed between Asia Minor and the Balkan Peninsula which aided the colonization and distribution of the soil animals between Asia Minor and the Balkan. At the end of the Miocene, this bridge ceased to exist and Asia Minor, the Balkan Peninsula and the Aegean islands separated from each other (Simaiakis *et al.*, 2004). The East-Mediterranean distribution type observed in the above mentioned soil fauna groups well corresponds with this geological phenomenon.

*Uropoda mazsalakiae* was described from Croatia (Kontschán, 2005) from decayed seagrass. According to my assumption this species has a salt tolerance hence it can be found in the sea-shore regions similarly to several other Uropodina species with littoral occurrences (Coineau & Travé, 1964; Kontschán, 2007).

The other already described species found (*Trachytes aegrota*, *Urodiaspis pannonica*, *Uroobovella fraca*, *Neodiscopoma splendida*, *Uropoda minima*, *Discourella modesta*) are widely di-

stributed in Europe, they can be found in central and southern part of the continent.

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