

## Three new species and a new record of tenuipalpid mites (Acari: Tenuipalpidae) from Hungary

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### ABSTRACT

Three new tenuipalpid species are described and illustrated from Hungary: *Cenopalpus cumanicus* sp. nov., *Cenopalpus adventicius* sp. nov. and *Tenuipalpus budensis* sp. nov. (Acari: Tenuipalpidae). The authors give an account of one new record of *Cenopalpus spinosus* (Donnadieu, 1875) found on woody host plants, a species that has not previously been recorded in the Hungarian fauna. Additional species encountered during these surveys are: *Brevipalpus lewisi* (McGregor, 1949), *Cenopalpus pulcher* (Canestrini and Fanzago, 1876), *Pentamerismus oregonensis* McGregor, 1949, and *Pentamerismus taxi* (Haller, 1877).

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*Cenopalpus*; Hungarian mite fauna; new hosts; new taxa; *Tenuipalpus*

## Introduction

The flat mites (Acari: Tenuipalpidae) comprise over 1100 described species in 40 genera (Zhang et al. 2011; Beard et al. 2014; Castro et al. 2015). Members of this family are parasitic on vascular plants. Mite collections were made periodically by the second author between 1998 and 2013 on ornamental trees and shrubs and herbs, along streets and in parks, forests, botanical gardens and private gardens, in various localities of Hungary. This survey extends the knowledge of the hosts, distribution and habitats of tenuipalpid species in Hungary. These data are part of an ongoing faunal survey, the main aim of which is to obtain a general picture on a nationwide scale of the biodiversity of the mite fauna, and species frequency, distribution and hosts throughout Hungary. The importance of acarine pests in agriculture and horticulture has generated increased interest in the study of Acari in Hungary. Studies in the considerably rich Hungarian mite fauna living on vascular plants have revealed many new host plant and locality records, of which many were reported by Bozai (1969, 1970, 1971), Kerényiné Nemestóthy and Vály (1978), Komlószy (1980), Ripka (2000, 2010), Ripka and Szabó (2010, 2011), Ripka et al. (1999, 2002, 2005, 2013a, 2013b) and Tempfli et al. (2014). In this paper, three new tenuipalpid species are described and illustrated from Hungary: *Cenopalpus cumanicus* sp. nov., *Cenopalpus adventicius* sp. nov. and *Tenuipalpus budensis*

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<http://zoobank.org/urn:lsid:zoobank.org:pub:33F4E954-9161-4A21-85BF-C1A4D86AF9AC>

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**Table 1.** Tenuipalpid mite species collected from different plant species between the years 1998 and 2013 in Hungary.

|  |  |            |
|--|--|------------|
| <i>Brevipalpus lewisi</i> (McGregor, 1949)               |  |            |
| <i>Fontanesia phillyraeoides</i> ssp. <i>fortunei</i>    | Krisztinaváros, Budapest                   | 19/08/2008 |
| <i>Fontanesia phillyraeoides</i> ssp. <i>fortunei</i>    | Krisztinaváros, Budapest                   | 23/08/2010 |
| <i>Fontanesia phillyraeoides</i> ssp. <i>fortunei</i>    | Zugló, Budapest                            | 24/08/2010 |
| <i>Rosmarinus officinalis</i>                            | (imported plants from Italy)               | 17/04/2002 |
| <i>Cenopalpus pulcher</i> (Canestrini and Fanzago, 1876) |  |            |
| <i>Salix elaeagnos</i>                                   | Rákoskeresztúr, Budapest                   | 04/04/2000 |
| <i>Salix elaeagnos</i>                                   | Rákoskeresztúr, Budapest                   | 26/06/2003 |
| <i>Salix elaeagnos</i>                                   | Rákoskeresztúr, Budapest                   | 22/07/2007 |
| * <i>Cenopalpus spinosus</i> (Donnadieu, 1875)           |  |            |
| <i>Pyracantha coccinea</i>                               | Gellérthegy, Budapest                      | 24/07/2009 |
| <i>Sorbus torminalis</i>                                 | Vászoly (Veszprém county)                  | 26/07/2009 |
| <i>Sorbus torminalis</i>                                 | Vászoly (Veszprém county)                  | 23/05/2010 |
| <i>Sorbus torminalis</i>                                 | Vászoly (Veszprém county)                  | 21/08/2010 |
| * <i>Cenopalpus cumanicus</i> sp. n.                     |  |            |
| <i>Populus alba</i>                                      | Kecskemét (Bács-Kiskun county)             | 22/07/2010 |
| <i>Populus</i> × <i>canescens</i>                        | Óbuda, Budapest                            | 06/08/2011 |
| * <i>Cenopalpus adventicius</i> sp. n.                   |  |            |
| <i>Rosmarinus officinalis</i>                            | imported potted plant from Italy, Budapest | 17/04/2002 |
| <i>Pentamerismus oregonensis</i> McGregor, 1949          |  |            |
| <i>Calocedrus decurrens</i>                              | Balassagyarmat (Nógrád county)             | 27/03/2000 |
| <i>Juniperus scopulorum</i>                              | Balassagyarmat (Nógrád county)             | 27/03/2000 |
| <i>Pentamerismus taxi</i> (Haller, 1877)                 |  |            |
| <i>Taxus baccata</i>                                     | Tanakajd (Vas county)                      | 08/06/2000 |
| * <i>Tenuipalpus budensis</i> sp. n.                     |  |            |
| <i>Phyteuma orbiculare</i>                               | Kis-Szénás, Pilisszentiván (Pest county)   | 22/05/2011 |

\*= new species for the Hungarian fauna.

sp. nov. (Acari: Tenuipalpidae). *Cenopalpus spinosus* (Donnadieu 1875) is here recorded for the first time in Hungary. We also provide a list of additional tenuipalpids recorded during this study (Table 1).

### Materials and methods

During surveys carried out between 1998 and 2013, plant material (including leaves, petioles, stems, buds, flowers and bark) was collected and placed in plastic bags and examined under a stereo dissecting microscope (Zeiss Stemi 2000-C). The mites found were placed directly into lactic acid using a bent pin. After clearing the specimens in lactic acid for about 4–6 weeks at room temperature (to obtain the desired extent of clearing), the mites were placed into Keifer's F-medium with sorbitol on glass slides (Keifer 1975) and covered with coverslips. The slide preparations were dried for 4 weeks at room temperature, then sealed with commercial nail varnish (Upton 1991). Specimens were examined with the aid of a phase contrast compound microscope (Nikon Eclipse E 600).

The keys of Pritchard and Baker (1958), Baker and Tuttle (1964, 1987) and Meyer (1979) as well as several original species descriptions and other available reports were used for the identification of the mites. The generic concept and species identification of tenuipalpid mites was based mainly on Pritchard and Baker (1958) and Mesa et al. (2009) keys. The scientific name of host plants is used according to Király (2009), Király et al. (2011) and PLANTS Database (PLANTS Database... 2013).

Notations of the dorsal setae follow Grandjean (1939) and Lindquist (1985) and all measurements are in micrometres (µm). The first measurement is that of the holotype

followed by the range of the paratypes in brackets. Measurements were taken by means of a Zeiss Zen software imaging system. Length of the body was measured between setae *v2* and *h1* and the width between *sc2* and *sc2*. The width of body was also measured at the level of the *c*-row setae. Length of gnathosoma was measured from the tip of eupathidium on palp tarsus to base of gnathosoma, ventrally. Leg lengths were measured from the tip of the empodium to the posterior margin of the trochanter.

Type material will be deposited in the collections of the Department of Pest Management Development and Coordination, Directorate of Plant Protection, Soil Conservation and Agri-environment, National Food Chain Safety Office, Budapest, Hungary and the ARC-Plant Protection Research, Queenswood, Pretoria, South Africa.

## Results

### Family **TENUIPALPIDAE** Berlese Genus ***Brevipalpus*** Donnadieu, 1875

Type species: *Brevipalpus obovatus* Donnadieu, 1875

#### ***Brevipalpus lewisi*** (McGregor, 1949)

*Brevipalpus lewisi* (McGregor, 1949) was present in high population densities on Chinese false privet (*Fontanesia phillyraeoides* Labill. ssp. *fortunei* (Carr.) Yalt.) – an oleaceous ornamental shrub, in city parks (of Budapest, district I: Krisztinaváros, and district XIV: Zugló, Hungary). Adults, larvae and nymphs were collected from the upper and lower sides of the leaves, petioles, shoots and fruits of the shrub. The marginal part of the idiosoma is ochre, while the median part is orange red and brownish. This mite species was also collected on the shoots, twigs and from the underside of leaves of *Rosmarinus officinalis* Linnaeus. Bozai (1971) reported it on grapevines (*Vitis vinifera* L.) in Hungary.

### Genus ***Cenopalpus*** Pritchard and Baker, 1958

Type species: *Cenopalpus spinosus* (Donnadieu, 1875)

#### ***Cenopalpus spinosus*** (Donnadieu, 1875)

*Cenopalpus spinosus* (Donnadieu, 1875) is newly recorded in Hungary. The adults are carmine, the larvae are pink and the nymphs are red. They were collected from the underside of the leaves of two new rosaceous host-plants – *Pyracantha coccinea* M. Roem. and *Sorbus torminalis* (L.) Crantz. The *P. coccinea* was growing in an urban area of Budapest, district XI: Gellérthegy and *S. torminalis* was in a xerothermic limestone forest (near Vászoly, Veszprém county).

#### ***Cenopalpus pulcher*** (Canestrini and Fanzago, 1876)

*Cenopalpus pulcher* (Canestrini and Fanzago, 1876) is common in Hungary (Ripka 1998). All developmental stages of *C. pulcher* were present on *Salix elaeagnos* Scop. The adults

are orange-red with brown spots, and the nymphs are orange. They were found on the underside of leaves among the dense hairs. It was also collected from the underside of leaves among the hairs near the midrib of *Populus*  $\times$  *canescens* (Aiton) Sm., whereas the larvae and nymphs inhabited the pubescent shoots and petioles.

### Genus *Pentamerismus* McGregor

Type species: *Pentamerismus erythreus* (Ewing)

#### *Pentamerismus oregonensis* McGregor, 1949 and *Pentamerismus taxi* (Haller, 1877)

These two species infest common coniferous trees and *Taxus baccata* L., respectively (Bozai 1969; Komlowszky 1980; Ripka 1998; Ripka et al. 2002). *Pentamerismus taxi* was found together with *Cheletogenes ornatus* (Canestrini and Fanzago, 1876) (Acari: Cheyletidae), a predatory mite.

#### *Cenopalpus cumanicus* Ueckermann and Ripka sp. n. (Figure 1A–N)

#### Diagnosis

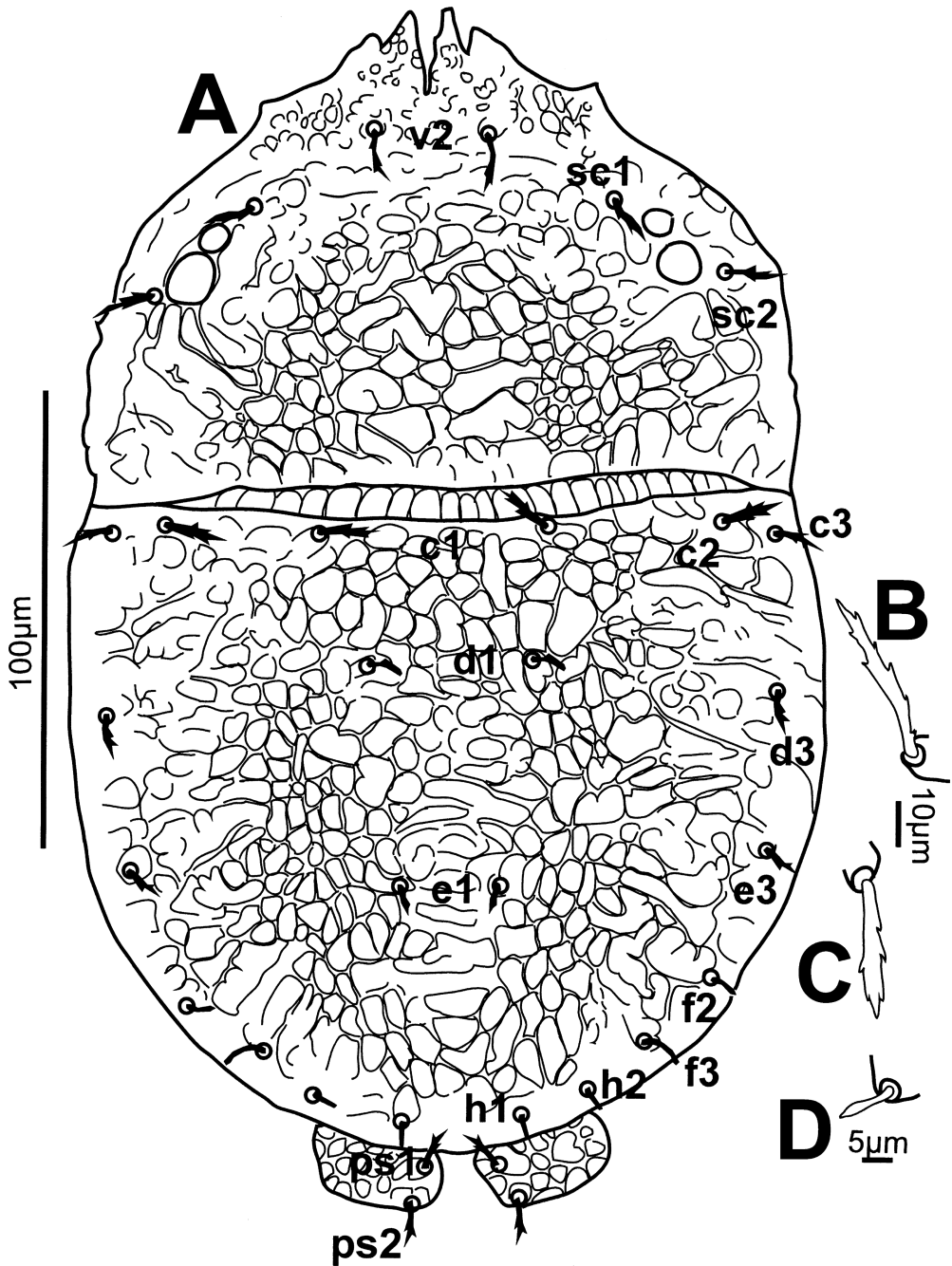
**Female.** Dorsum mainly reticulated. Dorsal body setae short and serrate to smooth. Venter smooth with reticulations between ventral shield and setae 4a. Ventral, genital and anal shields reticulate. These shields are flanked by three prominent lines and reticulations. Dorsal setae on genua I and II and femora I and II broadly lanceolate and serrate. Spermatheca a very long, slender tube terminating in a pumpkin-shaped knob. Deutonymph with dorsal setae broadly lanceolate and serrate, except for setae *d1*, *e1*, *f2*, *h1* and *h2*, which are very short and serrate to smooth.

**Female (n = 5).** (Figure 1A–J)

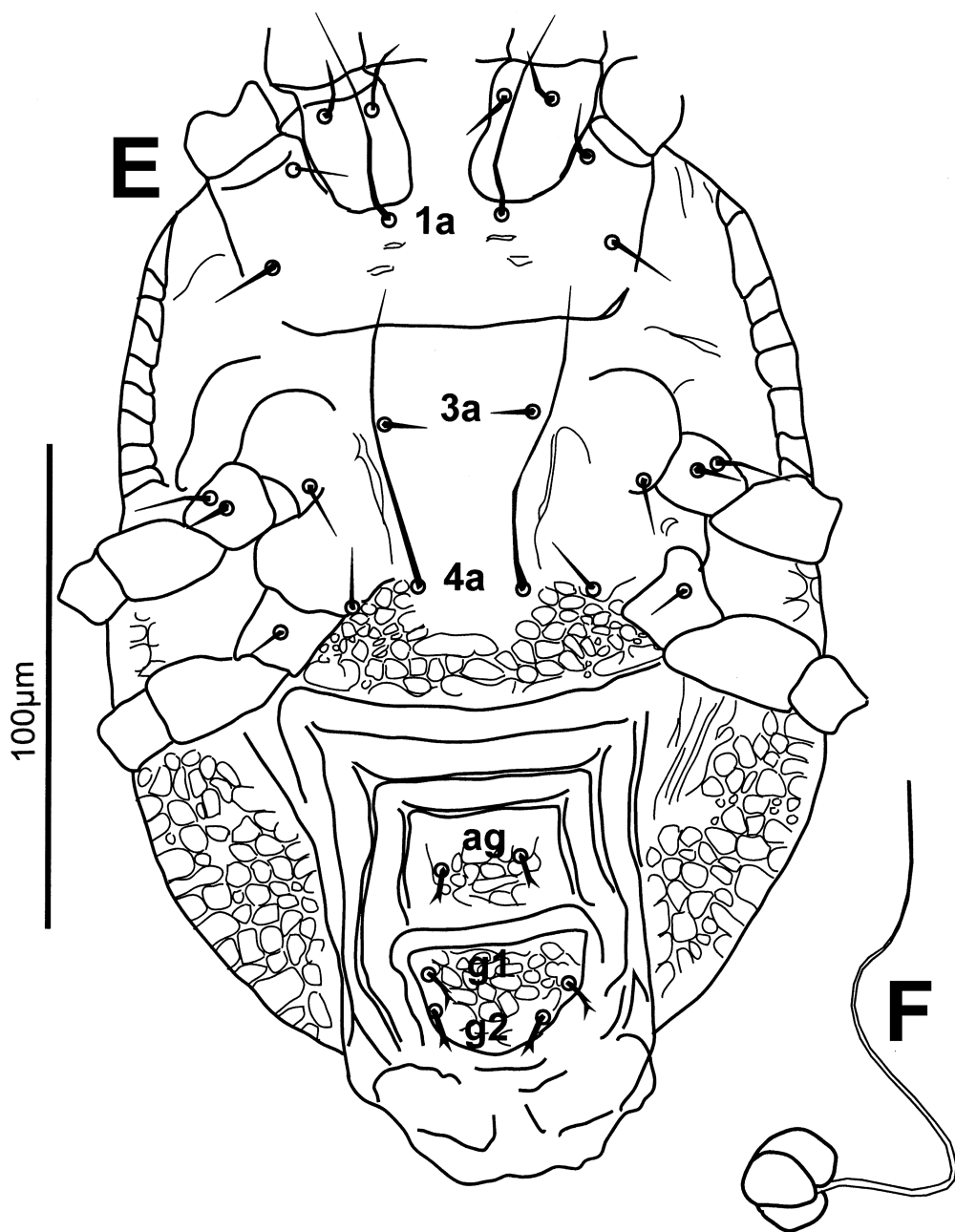
**Dimensions.** Length of body (*v2*–*h1*) 267(256–269); width (*sc2*–*sc2*) 154(137–144), length of gnathosoma 56(55–63); Legs: I 136(125–130); II 123(115–120); III 116(109–112); IV 129(117–122); setae: *v2* 17(16–17); *sc1* 15(17–20); *sc2* 16(16–19); *c1* 13(14–18); *c2* 18(16–18); *c3* 11(10–15); *d1* 8(7–13); *d3* 9(9–13); *e1* 6(6–7); *e3* 9(9–12); *f2* 6(6–8); *f3* 9(9–11); *h1* 7(6–7); *h2* 5(4–5).

**Dorsum (Figure 1A–D).** Body broadly oval with dorsum mainly reticulated (Figure 1A). Prodorsum and opisthosoma striate laterally. The dorsal body setae short and serrate to smooth (Figure 1B–D). Rostral shield deeply emarginated with two small submedian lobes in addition to two median lobes and two lateral lobes. Two pairs of eyes between setae *sc1* and *sc2*.

**Venter (Figure 1E, F).** Venter smooth except for reticulations between ventral shield and setae 4a. Setae 3a much shorter than the very long 4a (Figure 1E). Ventral, genital

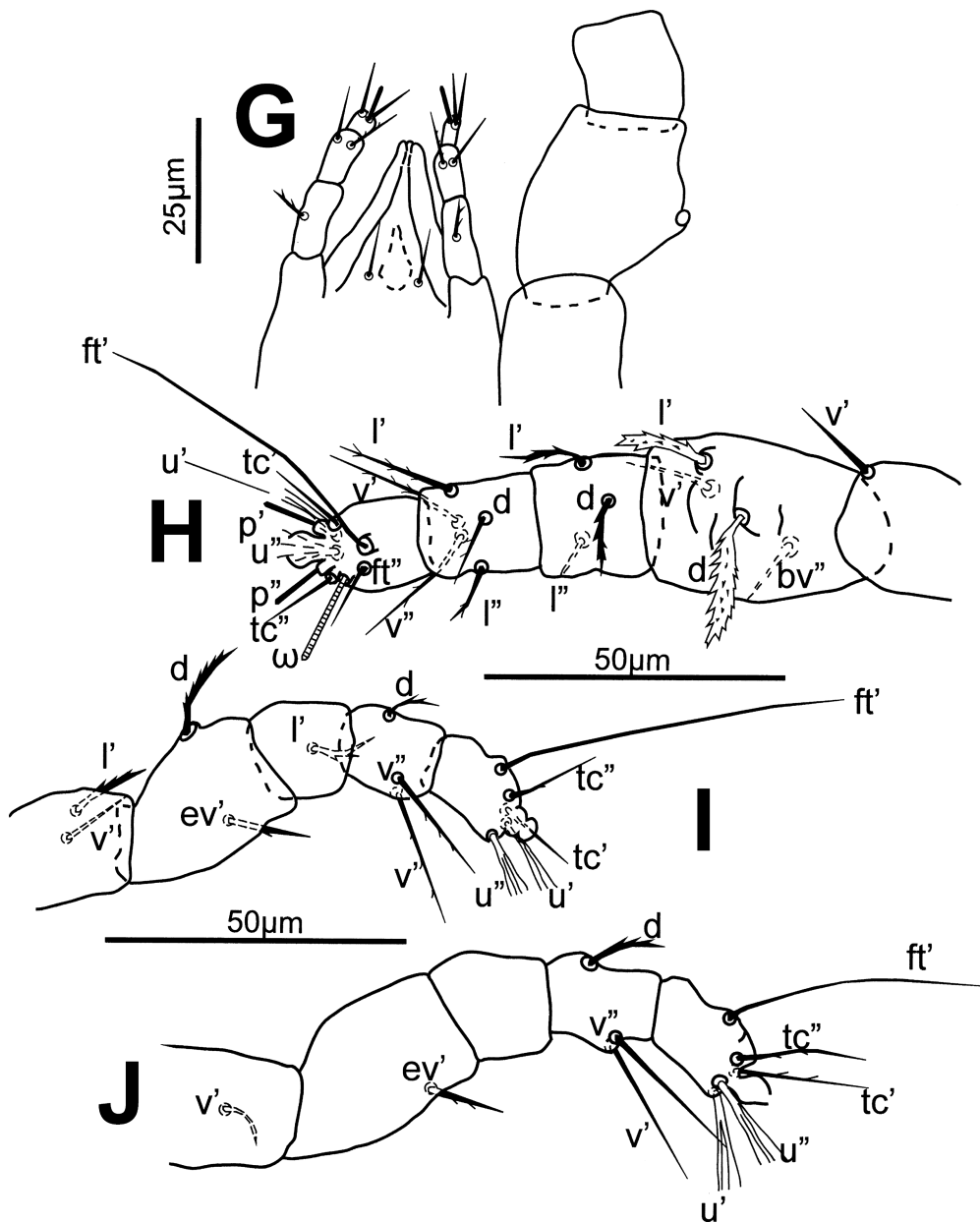


**Figure 1.** *Cenopalpus cumanicus* sp. nov. (A) Dorsal view – female. (B) Dorsal seta *sc2* – female. (C) Dorsal seta *c1* – female. (D) Dorsal seta *e1* – female. (E) Ventral view – female. (F) Spermatheca. (G) Gnathosoma – female. (H) Left leg I – female. (I) Right leg III – female. (J) Right leg IV – female. (K) Dorsal view – deutonymph. (L) Right leg I – deutonymph. (M) Right leg III – deutonymph. (N) Right leg IV – deutonymph.



**Figure 1.** (Continued).

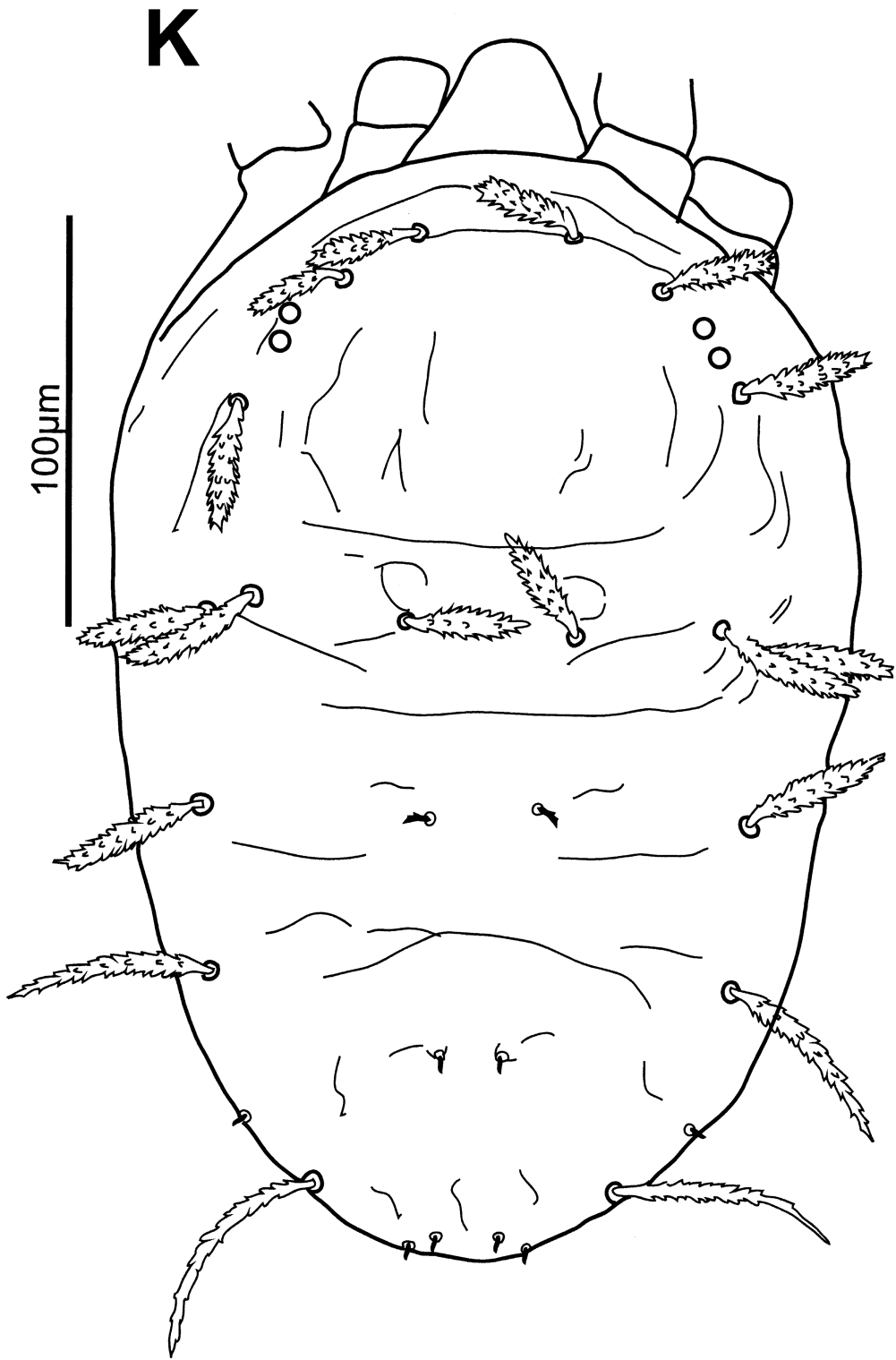
and anal shields reticulate. Ventral and genital shields flanked laterally by three prominent lines and reticulations. One pair of aggenital, two pairs of genital and two pairs of anal setae, all serrate. Outer pair of genital setae slightly anterior to inner pair. Spermatheca a very long tube terminating in a pumpkin-shaped knob (Figure 1F).



**Figure 1.** (Continued).

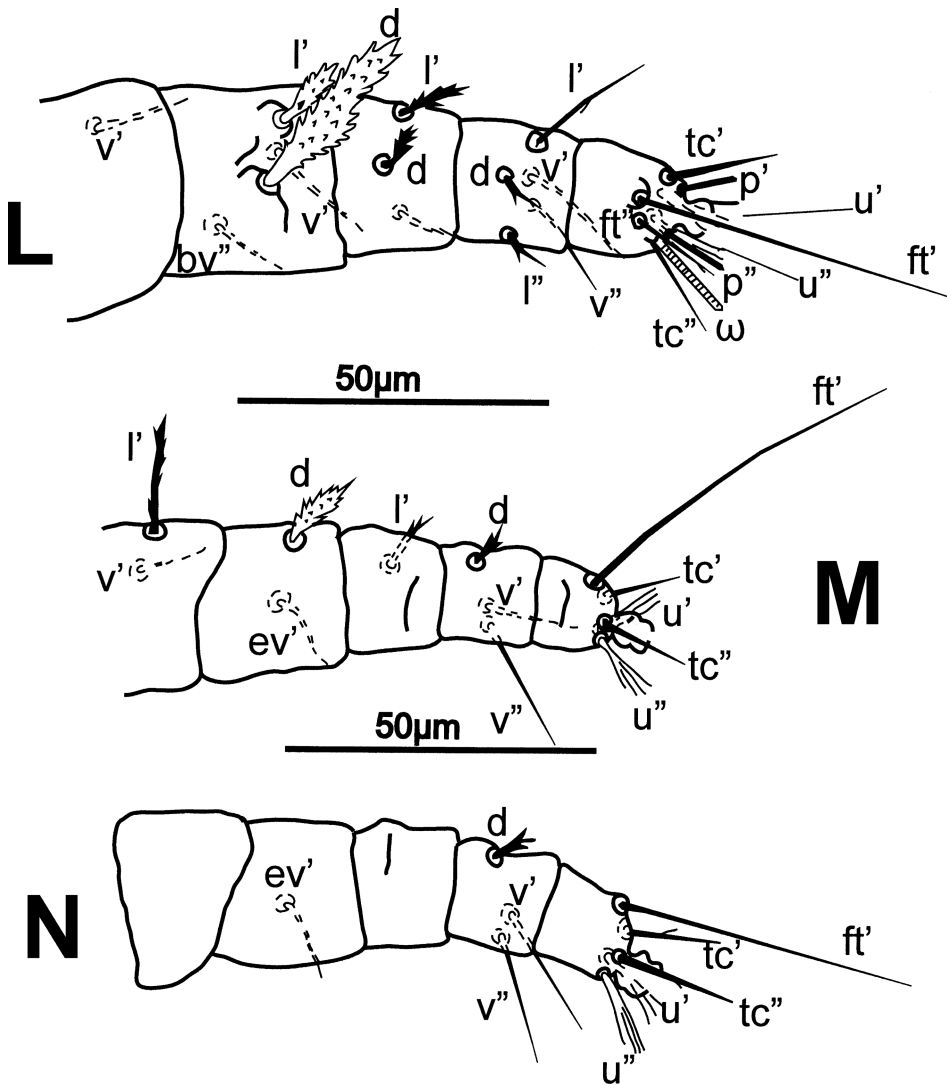
**Gnathosoma (Figure 1G).** Rostrum reaching to or almost to base of genu I. Palp four-segmented, tarsus with a eupathidium and two setae, tibia with two, femur-genu with one serrated seta and trochanter without setae.

**Legs (Figure 1H–J).** Counts of setae and solenidia (included in counts) on podomeres of legs I–IV: coxae 2-2-1-1, trochanters 1-1-2-1, femora 4-4-2-1, genua 3-3-1-0, tibiae 5-5-3-3, tarsi 9(ω)-9(ω)-5-5. Leg chaetotaxy as follows: trochanters I, II, IV  $v'$ ,



**Figure 1.** (Continued).





**Figure 1.** (Continued).

III  $v'$ ,  $l'$ ; femora I–II  $d$ ,  $v'$ ,  $bv''$ ,  $l'$ ; femur III  $d$ ,  $ev'$ ; femur IV  $ev'$ ; genua I–II  $l'$ ,  $d$ ,  $l''$ ; III  $l''$  IV nude; tibiae I–II  $d$ ,  $l'$ ,  $l''$ ,  $v'$ ,  $v''$ ; III–IV  $d$ ,  $v'$ ,  $v''$ ; tarsi I–II  $u'$ ,  $u''$ ,  $p'$ ,  $p''$ ,  $tc'$ ,  $tc''$ ,  $ft'$ ,  $ft''$ ,  $\omega$ ; III–IV  $u'$ ,  $u''$ ,  $tc'$ ,  $tc''$ ,  $ft'$ .

Dorsal setae on genua I–II and femora I–II strongly serrate with those on the femora broadly lanceolate, but shorter on femur II. Solenidion on tarsi I and II long and slender. Dorsal setae on tarsi I–IV with  $ft'$  very long. Tarsal claws unciniate. Tarsi I and II with  $lw$  17 and  $llw$  13.

### **Deutonymph ( $n = 3$ ) (Figure 1K–N)**

**Dimensions.** Length of body including gnathosoma 300–357; width 168–194, length of gnathosoma 44–51; Legs: I 93–101; II 81–90; III 74–82; IV 73–82. Setae:  $v_2$  30–31;  $sc_1$  30–37;  $sc_2$  28–36;  $c_1$  29–38;  $c_2$  26–39;  $c_3$  31–37;  $d_1$  5;  $d_3$  37–43;  $e_1$  3;  $e_3$  40–54;  $f_2$  3–4;  $f_3$  64–66;  $h_1$  2–3;  $h_2$  2–5.

**Dorsum (Figure 1K).** Covered with a few striae, all setae long and broadly lanceolate, except for *d1*, *e1*, *f2*, *h1* and *h2*, which are very short and serrate to smooth (Figure 1K). Venter completely covered with striae with one pair of setae *1a*, *3a* and *4a*, one pair of aggenital, one pair of genital and two pairs of anal setae, all slightly serrate.

**Gnathosoma.** Similar to that of female.

**Legs (Figure 1L–N).** The chaetotaxy only differs from that of the female in that trochanter IV is without setae. Dorsal setae on femora I and II broadly lanceolate and serrate (Figure 1L–N). Tarsi I and II with I $\omega$  12 and II $\omega$  10.

### **Relationship to host plant**

Females from the grey poplar were collected on the underside of the leaves, among the hairs near the midrib, while the larvae and nymphs inhabited the pubescence on the shoots and petioles. This flat mite was found together with phytoseiid, cheyletid, tydeid and tarsonemid mites, and *Phylloxera populi* (del Guercio) (Hemiptera: Phylloxeridae) (Ripka 2011; Ripka and Szabó 2011). The adults collected on white poplar were taken from the cauliflower-like woody bud galls and twig deformations caused by an eriophyid mite, *Aceria populi* (Nalepa). These specimens were found together with phytoseiid, acarid and tarsonemid mites, and *Phylloxera populi* (del Guercio) (Hemiptera: Phylloxeridae) (Ripka and Szabó 2011; Ripka et al. 2013b).

### **Localities**

Budapest III, Óbuda, 124 m elevation; 47°32'11.1"N, 19°02'43.1"E and Kecskemét (Bács-Kiskun county), Central Hungary, 121 m elevation; 46°54'26.8"N, 19°41'52.3"E.

### **Type material**

Holotype female, three paratype females and two paratype deutonymphs, collected from Grey poplar, *Populus × canescens* (Aiton) Sm. and white poplar, *Populus alba* L. (Fam. Salicaceae), slide # 1274, coll. G. Ripka, 6 August 2011; 13 paratype females and one paratype deutonymph, slide # 1237a, coll. Dr. J. Mikulás, 22 July 2010, deposited in the Department of Plant Protection Development and Coordination, Directorate of Plant Protection, Soil Conservation and Agri-environment, National Food Chain Safety Office, Budapest, Hungary. Three paratype females and one paratype deutonymph slide # 1237b deposited in the Arachnida Collection of the Agricultural Research Council, Plant Protection Research, Pretoria. South Africa

### **Etymology**

The species is named for Kuns, Latin *Cumanus*. Kuns (L. Cumanus) was a confederation of tribes in the middle age who came from Asia and settled in the Carpathian basin during the twelfth and thirteenth centuries. They lived among others in the Great Hungarian Plane, around Kecskemét, which is the county seat of Bács-Kiskun county. The gender is masculine.

## Remarks

This species was compared with all the species listed in Mesa et al. (2009) (60 species) and four recently described species (Khanjani et al. 2012), except for *Cenopalpus tamarixi* (Nassar and Kandeel) because the original description could not be found. This species belongs to the *spinosus*-group (Baker et al. 1975; Hatzinikolis et al. 1999). Female characters as well as spermathecae and dorsal setal patterns of nymphs (where available) were compared. This species comes very close to *Cenopalpus limbatus* Akbar and Chaudhri (1985), in having seta-like dorsal setae, dorsum reticulated and in the leg chaetotaxy. However, it differs from the latter in that the dorsum is not evenly reticulated, rostrum not reaching anterior margin of femur I, venter with a transverse band of reticulations posterior to setae 4a, but in *C. limbatus* it is interrupted medially and ventral and genital shields are reticulated instead of striated as in *C. limbatus*. According to the description of *C. limbatus*, setae 4a is also much shorter extending to 3a whereas it extends almost to coxae II in the new species. Unfortunately, the deutonymph for *C. limbatus* is unknown which, if available, would have confirmed the identity of the new species.

## *Cenopalpus adventicius* Ueckermann and Ripka sp. nov. (Figure 2A–P)

## Diagnosis

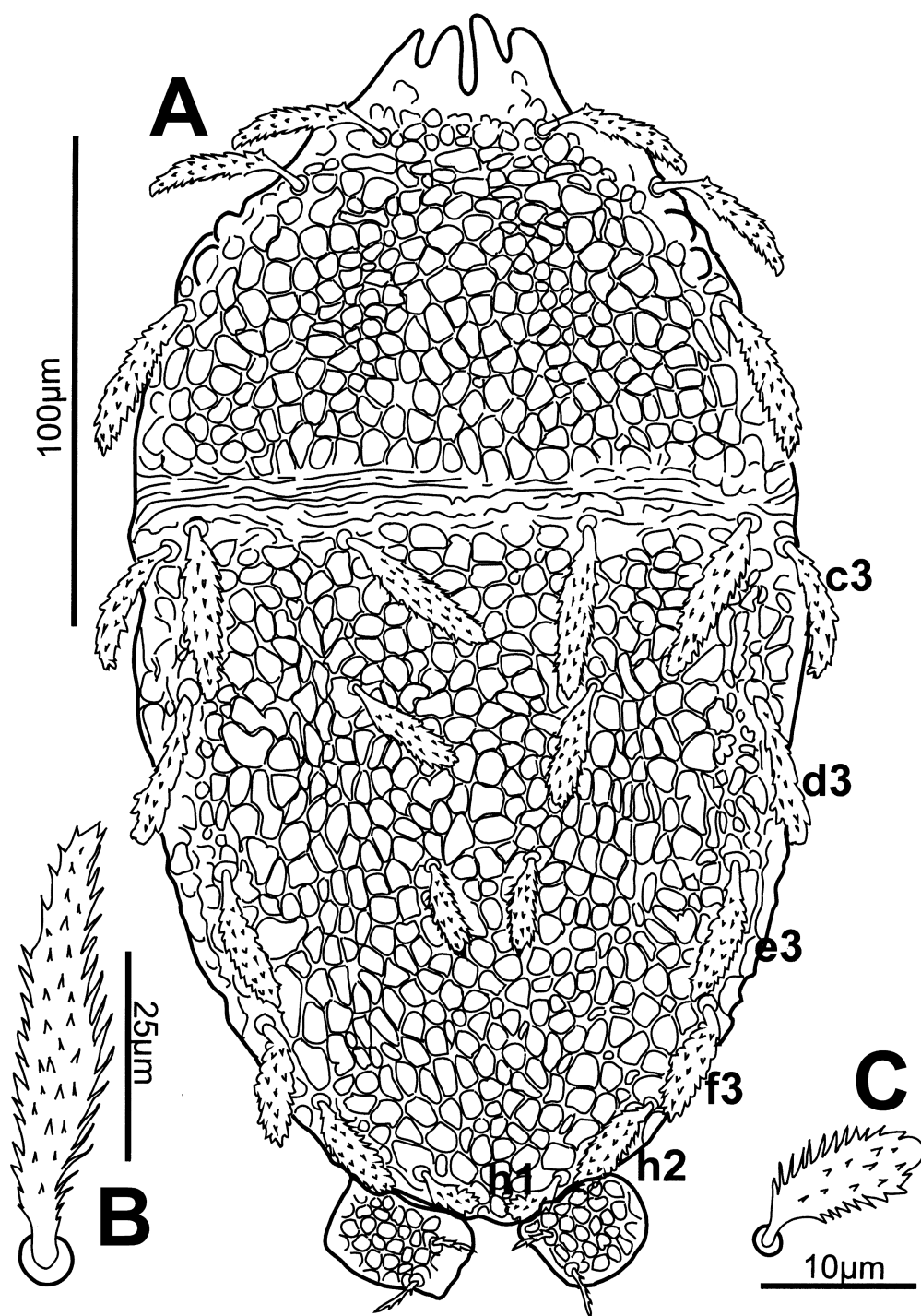
**Female.** Dorsum completely reticulate. The dorsal body setae broadly lanceolate, serrate. Setae *f2* absent. Venter smooth, reticulate anterior to coxae III, posterior to setae 4a and with a few reticulations lateral to coxae III and IV. Ventral, genital and anal shields reticulate. Ventral and genital shields are flanked by three prominent lines and reticulations. Dorsal setae on tibiae I–II, genua I–II and femora I–II broadly lanceolate and serrate. Spermatheca a very long, slender tube terminating into a lobed knob. Femur IV with two setae, *d* present. Deutonymph with most dorsal setae very long and serrate, except for setae *d*, *e1* and *h1*, which are minute. Dorsum with prodorsum and posterior half of opisthosoma smooth with striae posterior to *c*-setae.

## Female (*n* = 6) (Figure 2A–J)

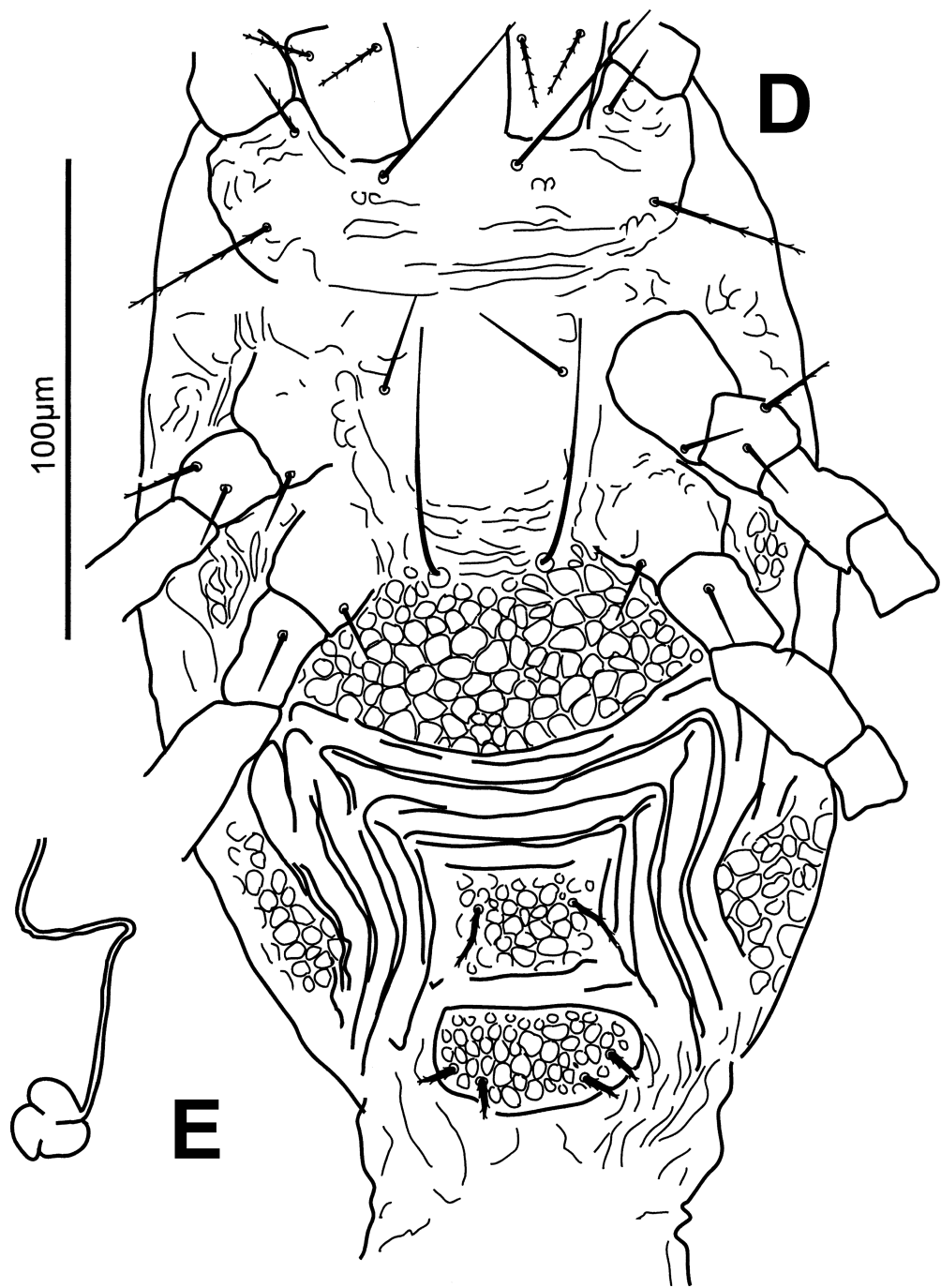
**Dimensions.** Length of body (*v2*–*h1*) 248(241–265); width (*sc2*–*sc2*) 128(126–137), length of gnathosoma 51(45–51); Legs: I 124(123–136); II 111(105–120); III 106(106–113); IV 112(112–122); setae: *v2* 38(38–55); *sc1* 41(43–51); *sc2* 41(36–48); *c1* 40(35–48); *c2* 40(36–41); *c3* 37(36–47); *d1* 28(33–40); *d3* 37(33–46); *e1* 22(22–29); *e3* 32(32–39); *f3* 29(27–33); *h1* 14(12–16); *h2* 24(24–32).

**Dorsum (Figure 2A–C).** Dorsum completely reticulate. Dorsal body setae broadly lanceolate and serrate, marginal setae almost, or as long as, distances to setae next behind. Setae *f2* absent. Rostrum deeply emarginated with two median lobes and two sub-median lobes. Two pairs of eyes between setae *sc1* and *sc2*.

**Venter (Figure 2D, E).** Venter smooth between setae 3a and 4a. Reticulate anterior to coxae III, posterior to setae 4a and a patch laterally between coxae III and IV. Seta 3a much shorter than very long 4a. Ventral, genital and anal shields reticulate. Ventral and



**Figure 2.** *Cenopalpus adventicius* sp. nov. (A) Dorsal view – female. (B) Dorsal seta *sc2* – female. (C) Dorsal seta *h1* – female. (D) Ventral view – female. (E) Spermatheca. (F) Gnathosoma – female. (G) Palp – female. (H) Right leg I – female. (I) Right leg III – female. (J) Right leg IV – female. (K) Dorsal view – male. (L) Ventral view – male. (M) Dorsal view – deutonymph. (N) Right leg I – deutonymph. (O) Right leg III – deutonymph. (P) Right leg IV – deutonymph.



**Figure 2.** (Continued).

genital shields flanked laterally by three prominent lines and reticulations. One pair of aggenital, two pairs of genital and two pairs of anal setae, all serrate. Outer pair of genital setae slightly anterior to inner pair. Spermatheca a very long tube terminating in a lobed knob.

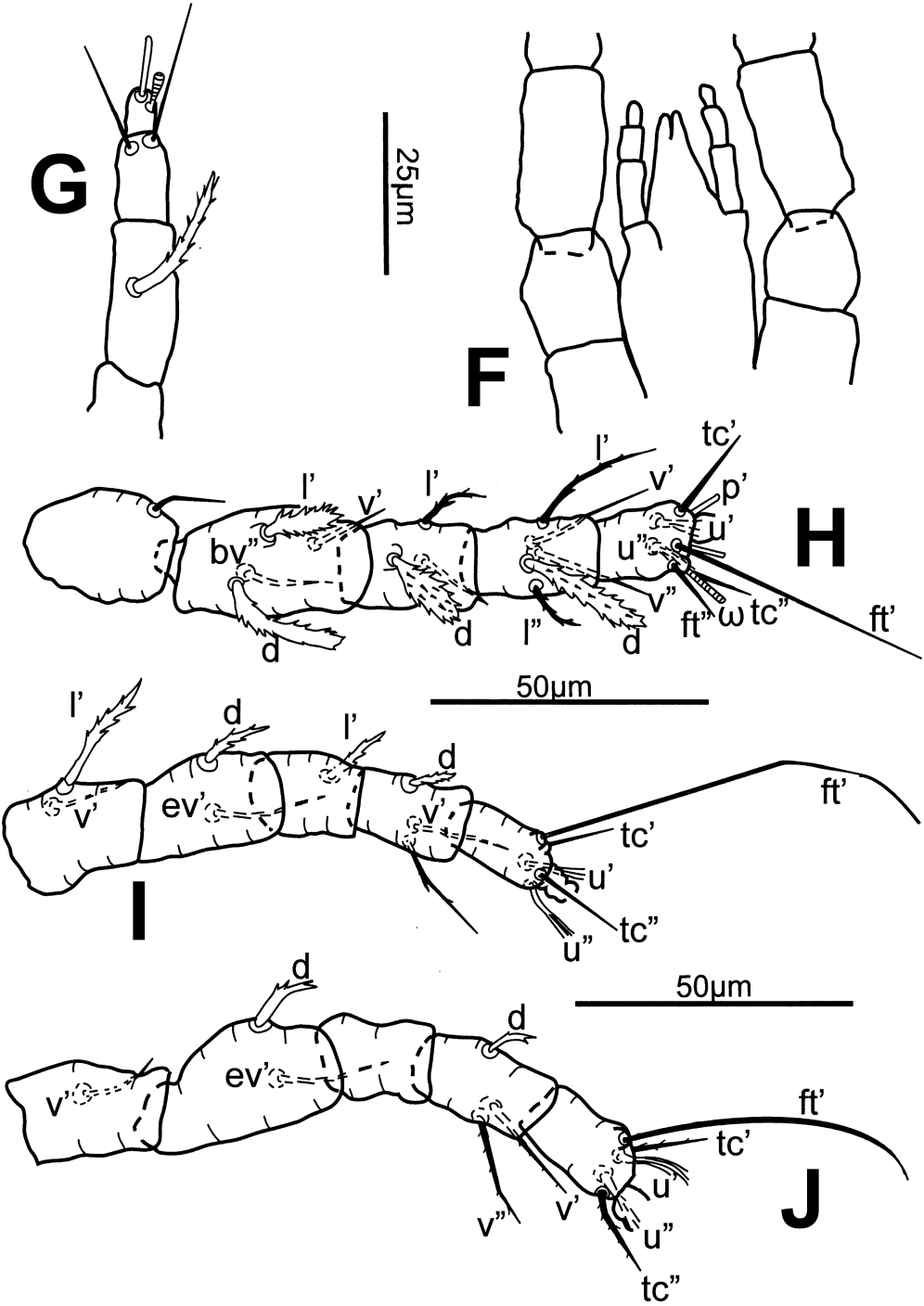


Figure 2. (Continued).

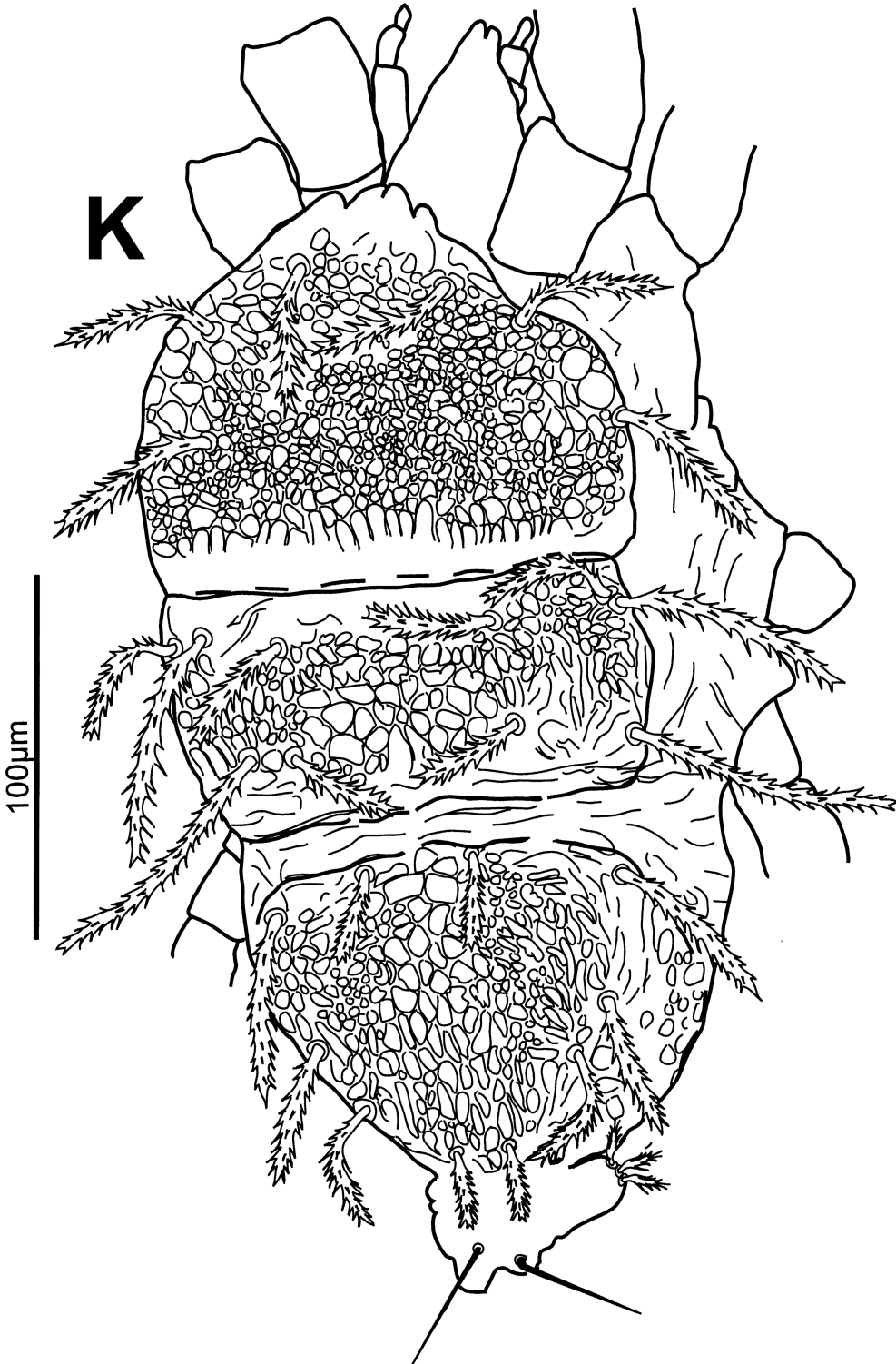


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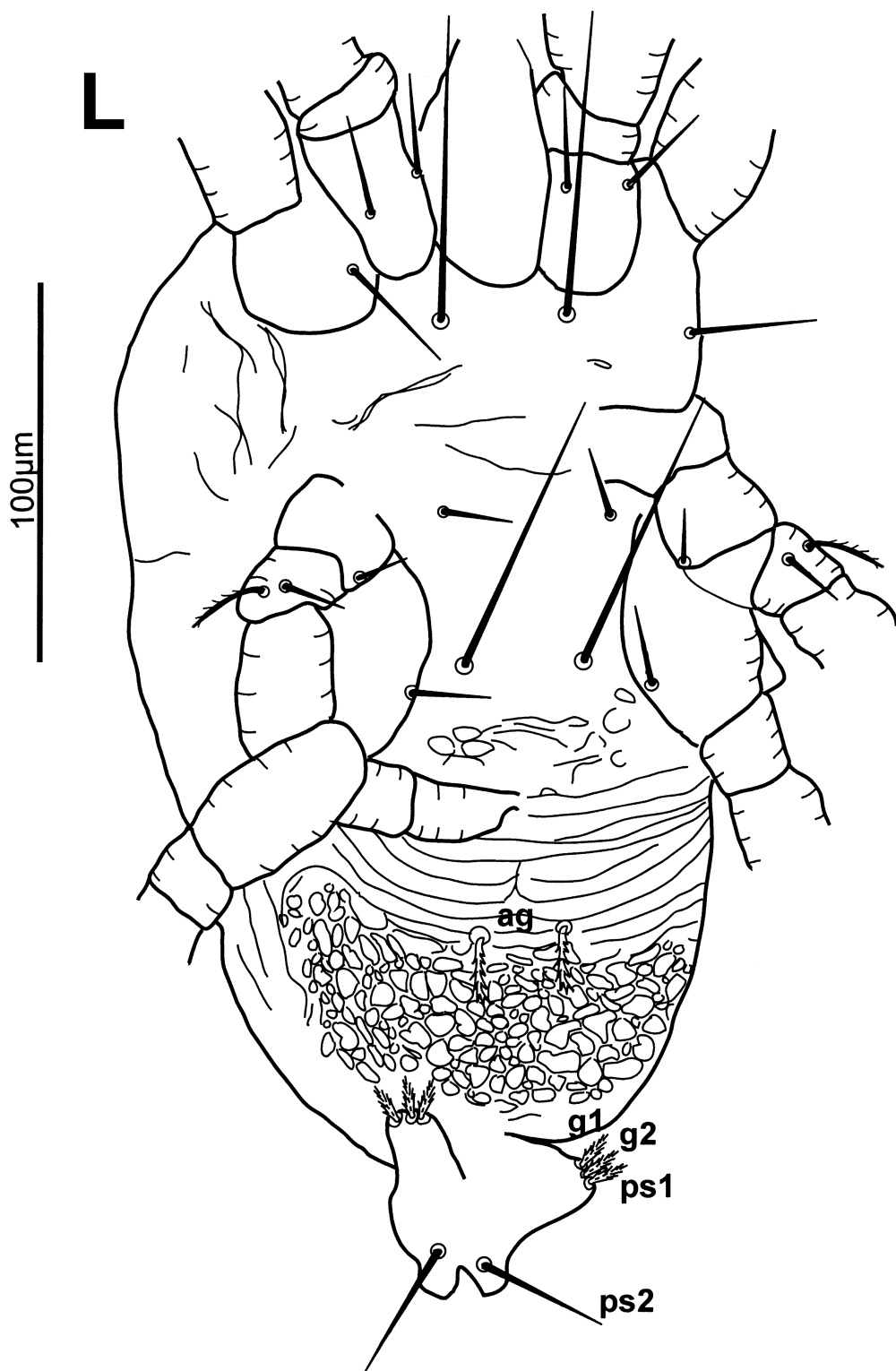


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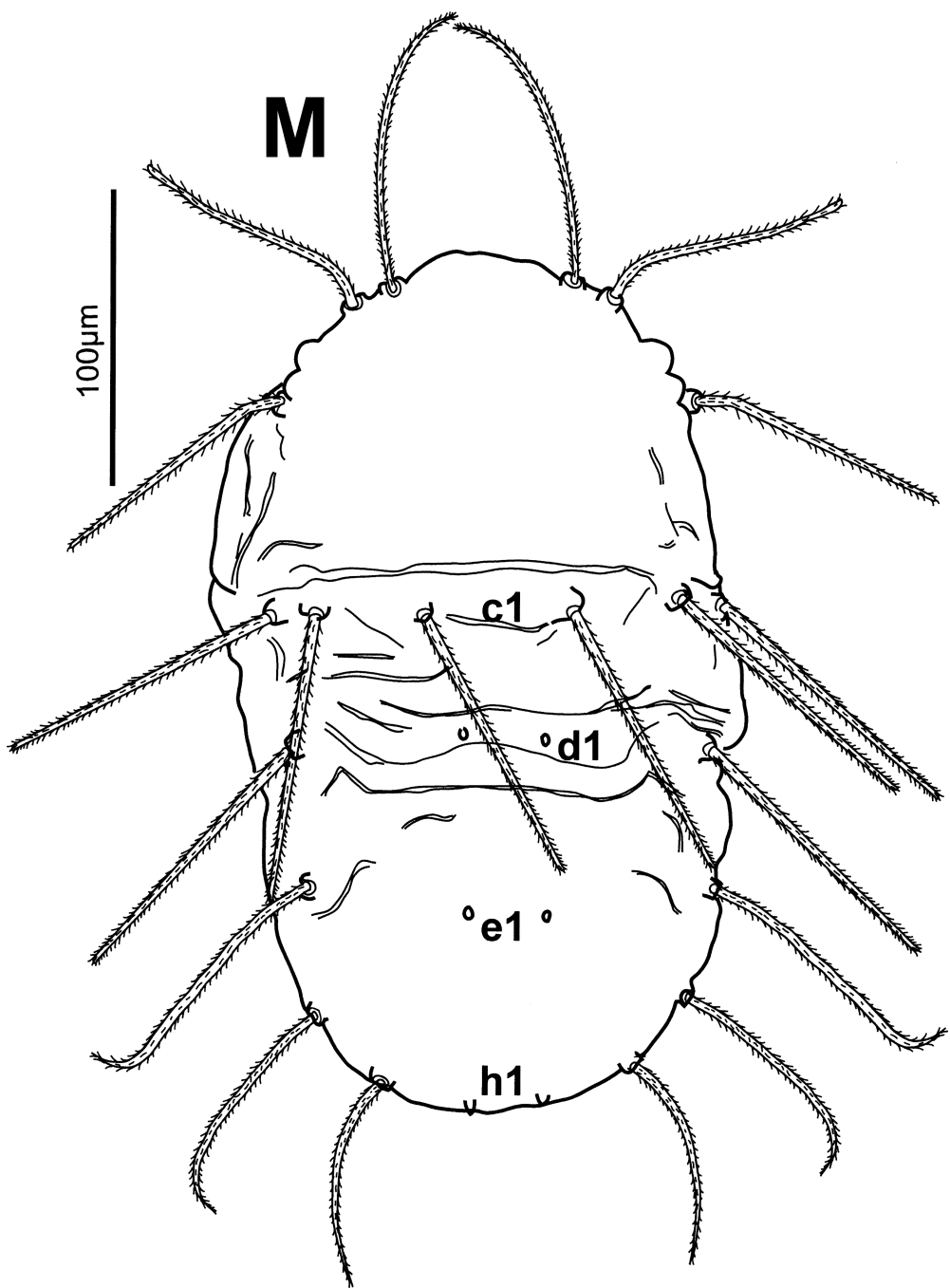


Figure 2. (Continued).

**Gnathosoma** (Figure 2F, G). Rostrum reaching to about middle of femur I. Palp four-segmented, tarsus with a eupathidium and a solenidion distally, tibia with two, femur, genu with one long serrated seta and trochanter without setae (Figure 2G).

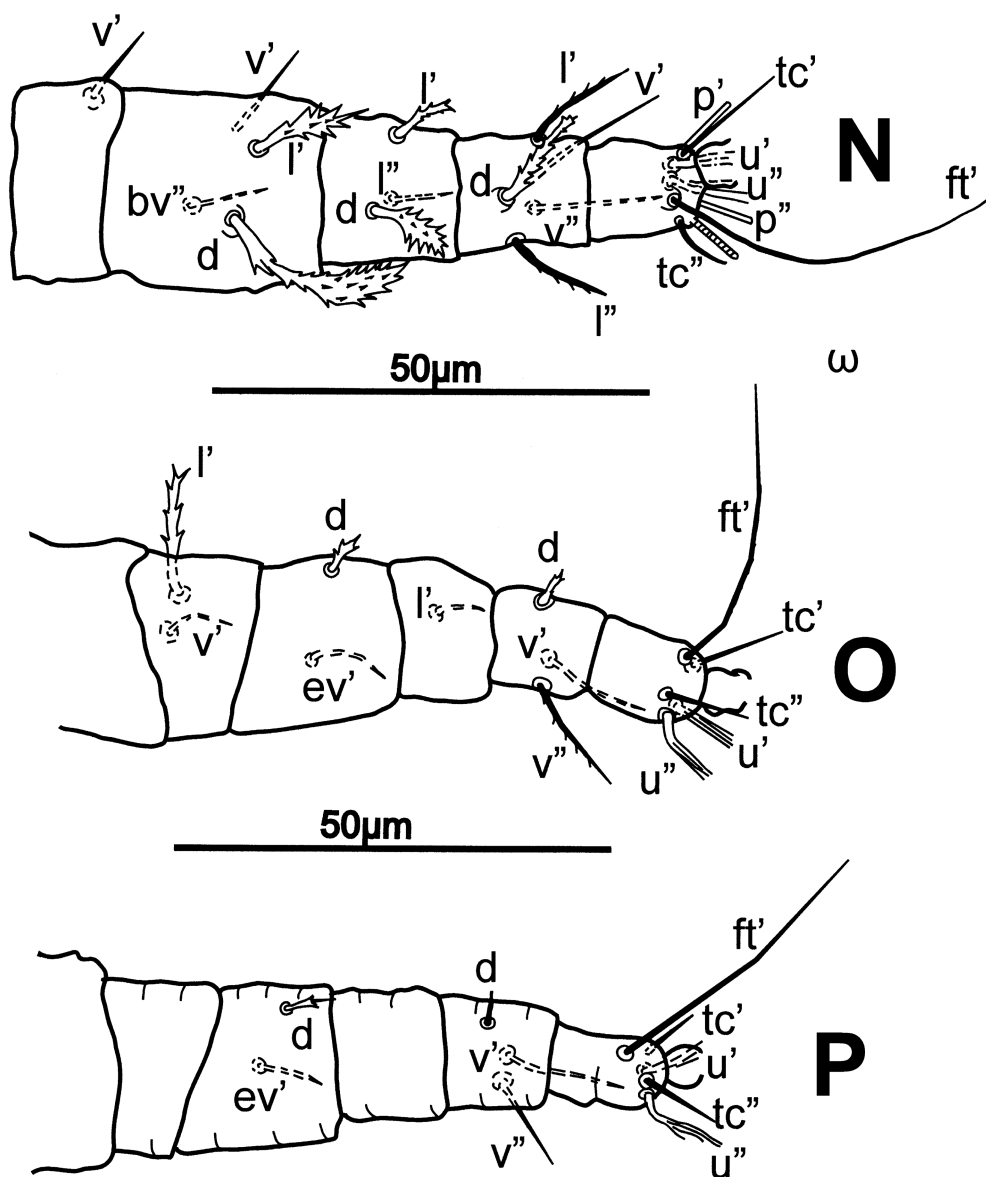


Figure 2. (Continued).

**Legs (Figure 2H–J).** Counts of setae and solenidia (included in counts) on podomeres of legs I–IV: coxae 2-2-1-1, trochanters 1-1-2-1, femora 4-4-2-2, genua 3-3-1-0, tibiae 5-5-3-3, tarsi 9( $ω$ )-9( $ω$ )-5-5. Leg chaetotaxy as follows: trochanters I, II, IV  $v'$ , III  $v'$ ,  $l'$ ; femora I–II  $d$ ,  $v'$ ,  $bv''$ ,  $l'$ ; femur III  $d$ ,  $ev'$ ; femur IV  $d$ ,  $ev'$ ; genua I–II  $l'$ ,  $d$ ,  $l''$ ; III  $l''$  IV nude; tibiae I–II  $d$ ,  $l'$ ,  $l''$ ,  $v'$ ,  $v''$ ; III–IV  $d$ ,  $v'$ ,  $v''$ ; tarsi I–II  $u'$ ,  $u''$ ,  $p'$ ,  $p''$ ,  $tc'$ ,  $tc''$ ,  $ft'$ ,  $ft''$ ,  $ω$ ; III–IV  $u'$ ,  $u''$ ,  $tc'$ ,  $tc''$ ,  $ft'$ .

Seta  $d$  on tibiae I–III, genua I–II and femora I–II strongly serrate and broadly lanceolate. Femora I–II with seta  $l'$  also strongly serrate. Solenidium on tarsi I and II longer than

half width of segment. Dorsal setae *ft'* on tarsi I–IV very long. Tarsal claws uncinata. Tarsi I and II with *lw* 10 and *llw* 9.

**Male (*n* = 2).** (Figure 2K, L)

**Dimensions.** Length of body including gnathosoma 270–283; width 134–135, length of gnathosoma 43–54; Legs: I 112–122; II 100–109; III 98; IV 102–105; setae: *ve* 34–37; *sci* 32–33; *sce* 38–43; *c1* 27–28; *c2* 47–50; *c3* 29–32; *d1* 23–24; *d3* 55–56; *e1* 22; *e3* 51–58; *f2* 33–40; *h1* 17–18; *h2* 29–31. Tarsi I and II with *lw* 16 and *llw* 13.

**Dorsum (Figure 2K).** Rostral shield comprising two median and two submedian lobes. Prodorsal shield entirely reticulated, metapodosoma and opisthosoma separated by transverse band of coarse striae. Opisthosoma without pores. All dorsal setae narrowly lanceolate and barbed with dorsocentral setae shorter than lateral setae. Setae *f2* absent.

**Venter (Figure 2L).** Area posterior to legs I and II and cuticle anterior to setae *4a* smooth, behind *4a* slightly reticulate and with coarse transverse striae. Reticulate posterior to aggenital setae (*ag*). Latter barbed and longer than genital setae (*g1*–*2*) and *ps1*, latter three setae also barbed. Setae *ps2* much longer than genital setae and *ps1* and smooth.

**Gnathosoma.** Rostrum extending almost to anterior margin of femur I. Palp as in female.

**Legs.** Similar to those of female. Tarsi I and II with *lw* 16 and *llw* 13.

**Deutonymph (*n* = 2) (Figure 2M–P).**

**Dimensions.** Length of body 206–235; width 102–120, length of gnathosoma 41–51; Legs: I 98–111; II 81–91; III 77–82; IV 82–94. Setae: *v2* 70–73; *sc1* 71–77; *sc2* 71–73; *c1* 80–82; *c2* 82–88; *c3* 70–76; *d1* 5; *d3* 83; *e1* 5; *e3* 81–83; *f3* 71–77; *h1* 76; *h2* minute.

**Dorsum (Figure 2M).** Smooth except for striae between *c*- and *e*-setae, all setae very long and spiculate except for *d1*, *e1* and *h1* which are minute.

**Venter.** Completely covered with striae, with one pair of setae *1a*, *3a* and *4a*, one pair of aggenital, one pair of genital and two pairs of anal setae, all slightly serrate.

**Gnathosoma.** Similar to that of female.

**Legs (Figure 2N–P).** The leg chaetotaxy only differs from that of female in that trochanter IV is without setae. Dorsal setae on tibiae, genua and femora I and II broadly lanceolate and serrate. Tarsi I and II with *lw* 7 and *llw* 6.

### Relationship to host plant

The carmine adults were collected from the shoots, twigs and leaf underside of the host plant.

### Locality

This species was intercepted at the quarantine station in Budapest, Hungary on imported potted plants from Italy.

### Type material

The holotype female is circled with black ink among 11 paratype females, two males and five deutonymphs, all collected from Rosemary, *Rosmarinus officinalis* L. (Fam. Lamiaceae), slide # 1103, coll. Mrs. Klára Reiderné Saly, 17 April 2002, and deposited in the Department of Plant Protection Development and Coordination, Directorate of Plant Protection, Soil Conservation and Agri-environment, National Food Chain Safety Office, Budapest, Hungary.

### Etymology

The specific designation is derived from the Latin word *adventicius* meaning *introduced*, referring to the introduced host plant (*Rosmarinus officinalis* of Mediterranean origin) and the introduced mite. The gender is masculine.

### Remarks

This species belongs to the *pterus*-group of species (Baker et al. 1975; Hatzinikolis et al. 1999), in which setae *f2* is absent. It includes: *Cenopalpus pterinus* Pritchard and Baker, 1958, *Cenopalpus arbuti* Hatzinikolis and Emmanouel, *Cenopalpus pistaciae* Papadoulis and Panou, *Cenopalpus officinalis* Papaioannou-Souliotis, 1986 and *Cenopalpus creticus* Hatzinikolis, Papadoulis and Panou. However, *Cenopalpus adventicius* sp. nov. differs mainly in the deutonymph having all dorsal setae very long, except for setae *d1*, *e1* and *h1*, which are minute. The females further differ in the shape of the spermatheca being lobed in the new species whereas in the other species it varies, being a large pear-shaped sac, kidney-shaped or small pear-shaped knobs. A spermatheca for *C. pterinus* is not known. The rostrum of the new species extends almost to anterior margin of femur I as in *C. arbuti* and *C. officinalis*, in the other species it extends beyond the anterior margin of femur I. The new species differs from *C. arbuti* and *C. pistaciae* in that trochanters III and IV bear two and one seta instead of one and no setae, respectively, while the trochanters' setal formula of *C. officinalis* is 1-1-1-1, and 1-1-2-1 in the new species. The femora setal formula of *C. creticus* is 4-3-2-0, as opposed to 4-4-2-2 in the new species and in *C. officinalis*. The chaetotaxy of the tarsi of *C. arbuti* and *C. creticus* are 6(2)-6(2)-5-5 and 7(1)-7(1)-5-5, whereas it is 9(1)-9(1)-5-5 in the new species. According to Hatzinikolis and Papadoulis (1987) tarsi I and II of *C. arbuti* each have two solenidia, but judging from the figure it seems as if they considered one of the *p* setae, as a solenidion.

The new species is most similar to *C. officinalis* and shares the same host. It differs from *C. officinalis* as mentioned above. The spermatheca of the female of *C. officinalis* is kidney-shaped whereas it is lobed in the new species; the rostral shield has two median and two submedian lobes in the new species, and two median, two submedian and two lateral lobes in *C. officinalis*. The male of the new species differs from that of *C. officinalis*

in that the reticulations of the dorsal shields are smaller, the rostrum extends almost to the anterior margin of femur I, instead of beyond, the rostral shield has four blunt median lobes, as opposed to only two long, median lobes, and setae  $v_2$  is slightly longer than distance  $v_2-v_2$  whereas it is twice as long as  $v_2-v_2$  in *C. officinalis*.

### Genus *Tenuipalpus* Donnadieu, 1875

Type species: *Tenuipalpus caudatus* (Duges)

#### *Tenuipalpus budensis* Ueckermann and Ripka sp. nov. (Figure 3A–G)

##### **Diagnosis**

**Female.** Dorsum irregularly striate-rugose with smooth patches, complete and incomplete reticulations in between. Dorsal body setae minute and smooth, except very long and flagellate setae  $h_2$ . Venter strongly striate-rugose. Ventral and genital shields also striate-rugose. Ventral and genital shields are flanked by three incomplete lines. Spermatheca with first half bulged followed by a constriction and second half flared.

##### **Female (n = 1)**

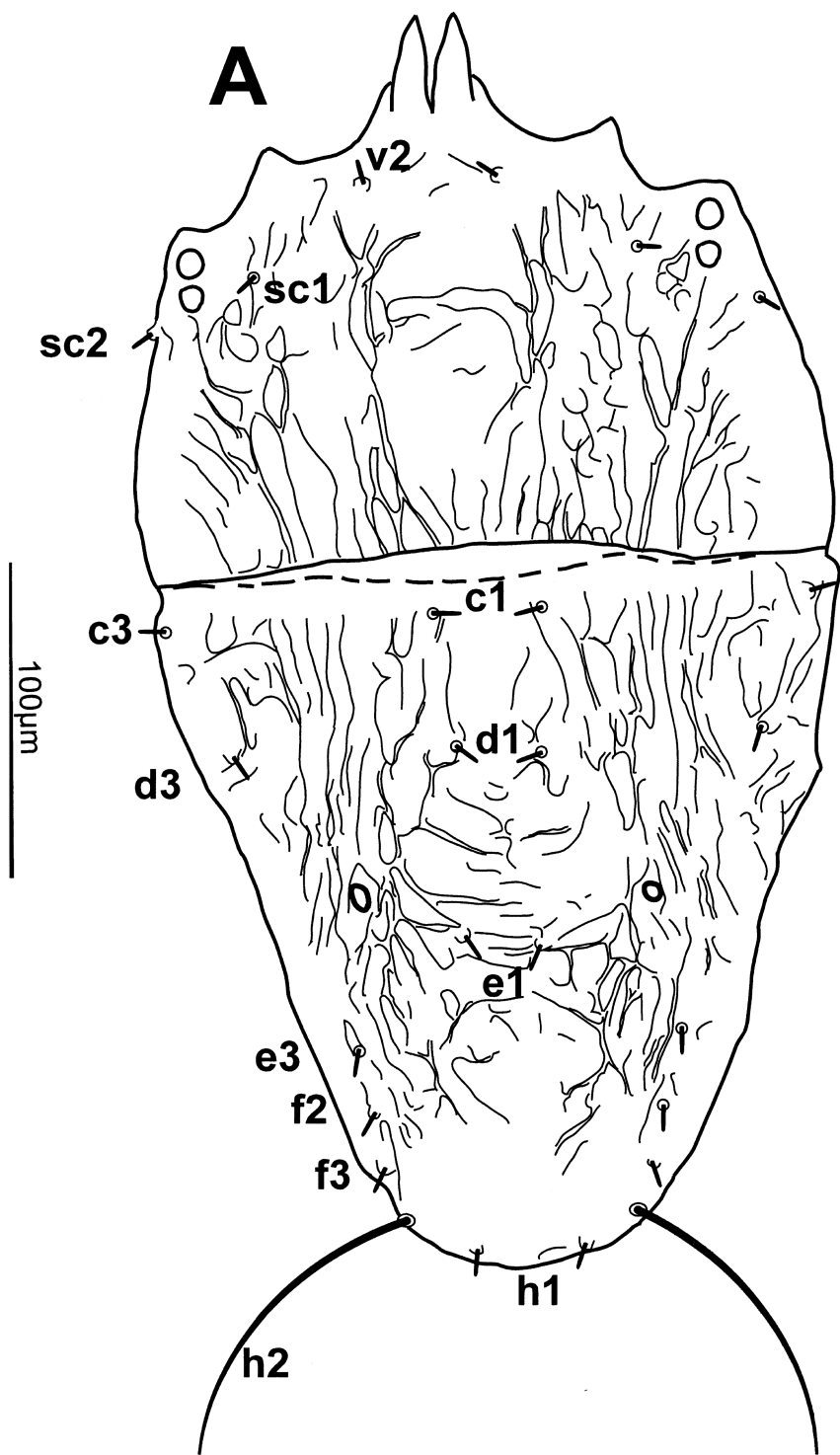
**Dimensions.** Length of body ( $v_2-h_1$ ) 345; width ( $sc_2-sc_2$ ) 171, length of gnathosoma 51; Legs: I 166; II 152; III 125; IV 134; setae:  $v_2$  5;  $sc_1$  5;  $sc_2$  6;  $c_1$  5;  $c_3$  4;  $d_1$  7;  $d_3$  5;  $e_1$  7;  $e_3$  5;  $f_2$  6;  $f_3$  6;  $h_1$  5;  $h_2$  115.

**Dorsum (Figure 3A).** Dorsum irregularly striate-rugose with smooth patches, complete and incomplete reticulations in between. The dorsal body setae are minute and smooth except for  $h_2$ , which is very long. Rostrum deeply emarginated with two median lobes and two sub-median lobes. Two pairs of eyes between setae  $sc_1$  and  $sc_2$ .

**Venter (Figure 3B, C).** Venter strongly striate-rugose. Seta pair  $3a$  much shorter than very long seta pair  $4a$ . Ventral and genital shields striate-rugose and anal shields irregularly striate. Ventral and genital shields flanked laterally by three incomplete lines. One pair of aggenital, two pairs of genital and two pairs of anal setae, all smooth, aggenital setae not reaching genital setae. Outer pair of genital setae slightly anterior to inner pair. First half of spermatheca bulged followed by a constriction and flared distally (Figure 3C).

**Gnathosoma (Figure 3D).** Rostrum reaching basal quarter of femur I. Palp three-segmented, third segment with only a long solenidion distally, second segment with one strongly serrate seta.

**Legs (Figure 3E–G).** Counts of setae and solenidia (included in counts) on podomeres of legs I–IV: coxae 2-2-1-1, trochanters 1-1-2-1, femora 4-4-2-1, genua 2-2-0-0, tibiae 5-5-3-3, tarsi 9( $\omega$ )-9( $\omega$ )-5-5. Leg chaetotaxy as follows: trochanters I, II, IV  $v'$ , III



**Figure 3.** *Tenuipalpus budensis* sp. nov. Female. (A) Dorsal view. (B) Ventral view. (C) Spermatheca. (D) Palp. (E) Right leg I. (F) Right leg III. (G) Right leg IV.

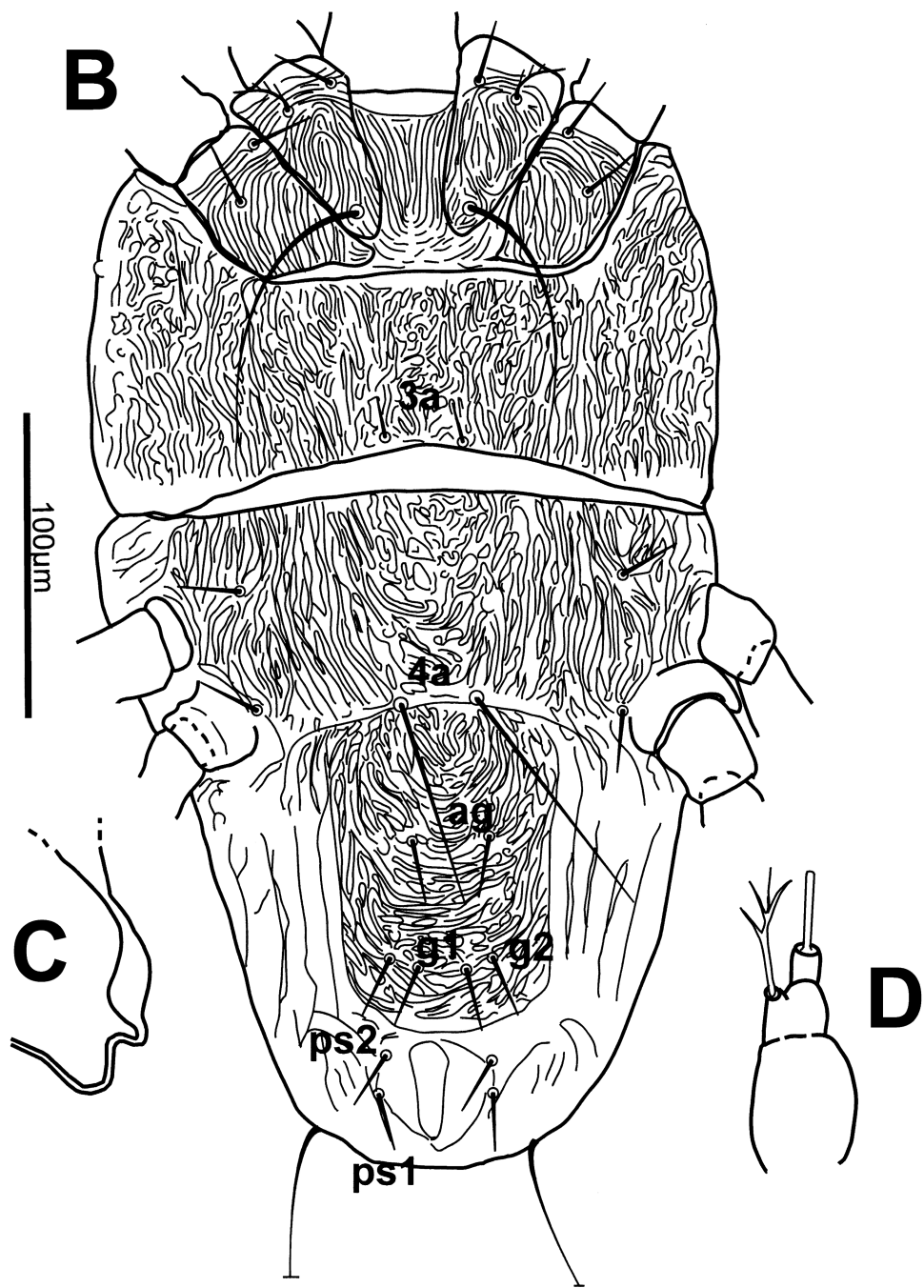
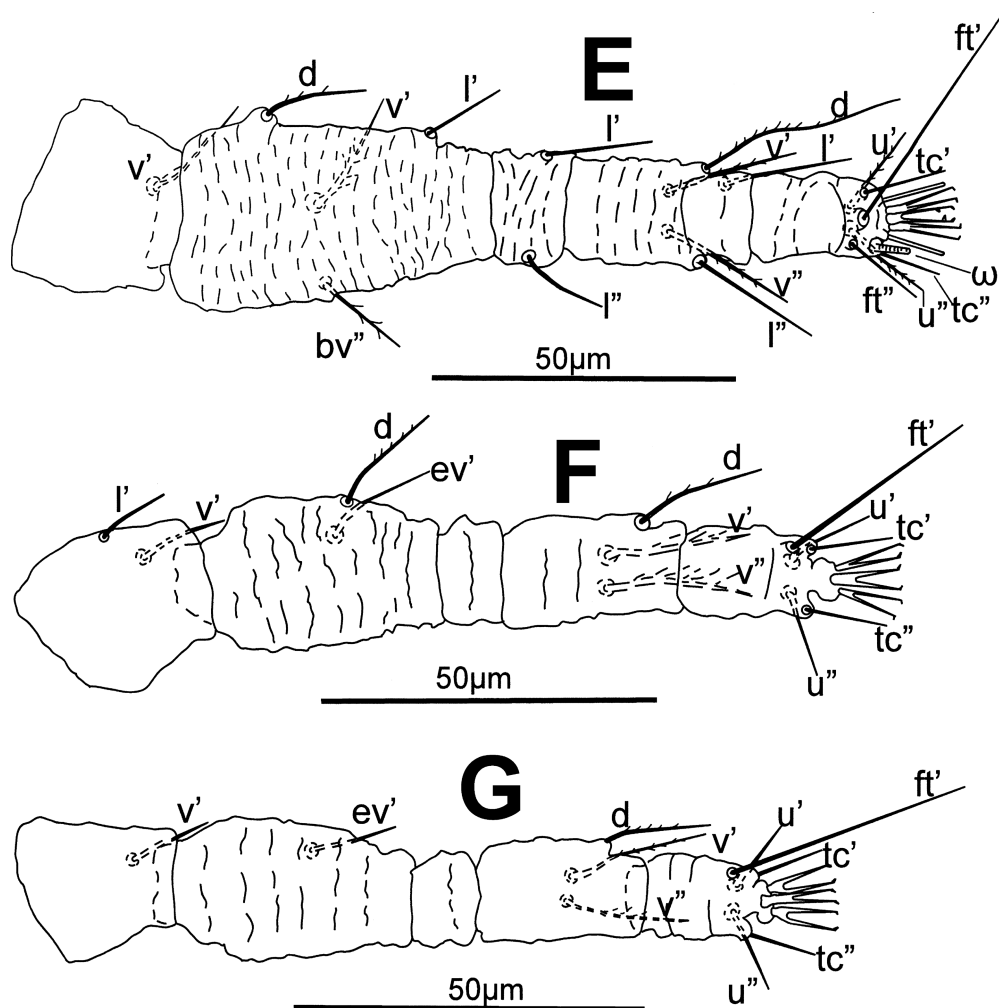


Figure 3. (Continued).

*v'*, *l'*; femora I–II *d*, *v'*, *bv''*, *l'*; femur III *d*, *ev'*; femur IV *ev'*; genua I–II *l'*, *l''*; III and IV nude; tibiae I–II *d*, *l'*, *l''*, *v'*, *v''*; III–IV *d*, *v'*, *v''*; tarsi I–II *u'*, *u''*, *p'*, *p''*, *tc'*, *tc''*, *ft'*, *ft''*, *ω*; III–IV *u'*, *u''*, *tc'*, *tc''*, *ft'*.



**Figure 3.** (Continued).

Seta *d* on tibiae I–IV and femora I–III slightly serrate but absent on genua I–II. Femora I–II with seta *l'* also faintly serrate. Solenidion on tarsi I and II less than half the width of segment. Dorsal setae on tarsi I–IV with *ft'* very long. Tarsal claws pad-like. Tarsi I and II with *lw* 6 and *llw* 6.

### **Relationship to host plant**

The female was collected from the inflorescence of the perennial host plant.

### **Locality**

Pilisszentiván, Buda Mountains, Kis-Szénás Hill, Szénás-hills European Diploma Holding Area, Pest county (Central Hungary), in magnesian limestone grassland, a dolomite grassland plant association (*Festuco pallenti-Brometum pannonici* Zólyomi) of the



submediterranean chalk-dolomite grassland plant community group (*Bromo-Festucion pallentis* Zólyomi) (Borhidi 2003), 431° m elevation, 47 36'09.0"N, 18°51'54.4"E.

### Type material

Holotype female, collected from Round-headed Rampion, *Phyteuma orbiculare* L. (Fam. Campanulaceae), slide # 1252, coll. Géza Ripka, 22 May 2011, deposited in the Department of Plant Protection Development and Coordination, Directorate of Plant Protection, Soil Conservation and Agri-environment, National Food Chain Safety Office, Budapest, Hungary.

### Etymology

The specific designation *budensis* refers to the Buda Mountains (Pest county), the type locality. The gender is masculine.

### Remarks

Several attempts during this study to collect more specimens were unsuccessful implying it to be a rare species. However, we carefully compared it with the descriptions of all the listed species (Mesa et al. 2009). Therefore, we still wish to publish it and if more specimens may be found in future we will revise it.

This species belongs to the *caudatus*-group, subgroup *anoplus*, of species which have one pair of 3a and one pair of 4a setae (Meyer 1993). *Tenuipalpus budensis* sp. nov. closely resembles *Tenuipalpus sanblasensis* De Leon, *Tenuipalpus. moraesii* Feres and Hernandez, *Tenuipalpus jianfengensis* Ma and Yuan, *Tenuipalpus hornotinus* Chaudhri, and *Tenuipalpus placitus* Chaudhri, in having all dorsal setae, except h2, very short. However, it differs from them all mainly in the dorsal and ventral ornamentations, namely irregular striate-rugose with smooth patches and complete and incomplete reticulations, and strongly striate-rugose, respectively. In most of the other species it is mainly striate, but the prodorsum of *T. sanblasensis* has distinct L-shaped ridges medially and *T. moraesii* has a wrinkled ornamentation dorsally, and is striate ventrally. The female further differs from *T. moraesii* and *T. placitus* in that the aggenital setae are shorter than the distance to the genital setae and the rostrum reaches only to the basal quarter of femur I whereas in *T. moraesii*, *T. jianfengensis*, *T. hornotinus* and *T. placitus* it reaches to at least half the length of femur I. Unfortunately, the spermatheca was not described for these species, which may be an additional distinguishing character.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

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