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Three new *Pygmephorus* Kramer (Acari: Pygmephoridae) species from Turkey

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Summary

This paper deals with three new species of ***Pygmephorus*** mites on mushrooms in Turkey. They are as namely as: ***P. turkiensis*** n. sp., ***P. madanlarae*** n. sp. and ***P. urlaensis*** n. sp. which are described with adequate figures.

Key words: ***Pygmephorus*** spp., new species, mushroom
Anahtar sözcükler: ***Pygmephorus*** spp., yeni türler, kültür mantarı

Introduction

Numbers of modern mushroom growing farms are increasing in Turkey year by year. Mushroom production was 2467.6 tons in the areas of 183655 m^2 in 1994 (Bora et al., 1996). This crop is attacked by a wide range of mites, flies and nematodes. In the course of the study of Önder et al. (1995) regarding the mushroom pests in İzmir province of Turkey, some harmful and beneficial mite species were determined. From these harmful mites, four species of the genus ***Pygmephorus*** Kramer (Acari: Pygmephoridae) have been encountered. They are ***P. sellnicki*** Krczal, ***P. turkiensis*** n.sp., ***P. madanlarae*** n.sp. and ***P. urlaensis*** n. sp.

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There are few reports of mites belong to this genus on mushrooms in England and USA (Hussey et al., 1969; Smiley, 1978). The species of ***Pygmephorus*** cause a severe loss to the mushroom industry even though these mites do not feed on mushrooms, they pierce mushroom caps and cause discoloration. The mite infestation may also produce brown patches on the external surface of the caps and cause allergic irritations in humans. Smiley (1978) presents an overview of ***Pygmephorus*** species collected from North and South America with the identification key for females of the Western Hemisphere. He also provides keys and redescriptions to aid in the proper identification of ***Pygmephorus*** spp. described from the Western Hemisphere (Mahunka, 1973; 1974; 1975; Rack, 1975). According to Smiley (1978) the pygmephorids in mushroom houses apparently feed on weed moulds that develop on improperly prepared compost. The presence of pygmephorid mites in mushroom houses may be an indication of improperly prepared compost which are favourable for the development of weed moulds.

Earlier reports suggest that ***P. sellnicki*** breeds only on a species of fungus in the genus ***Trichoderma*** (Hussey et al., 1969) and ***P. murphy*** (Smiley, 1978) has been found to feed on ***Iodophanus sarcobius*** (Baub.). The other pygmephorid mites reported in mushroom houses are ***P. athiasae, P. flechtmanni, P. kneeboni*** (Wicht, 1970), ***P. mesembrinae*** (Canestrini, 1881) and ***P. quadratus*** (Krczal, 1959). Even though, only two reports are available on pygmephorid mites in Turkey (Toros ve Çobanoğlu, 1985; Önder et al., 1995), not much work has been done on the mites associated with mushrooms. ***P. sellnicki*** and ***P. allmanni*** Krczal were determined in the province of Ankara by Toros ve Çobanoğlu (1985).

Material and Methods

Specimens were collected from mushroom growing houses in İzmir province during 1993-1994. In order to obtain the mites, compost, casing soil and mushroom samples were taken. Whenever the mites were found, they were collected, cleared and mounted in Hoyer's medium for study.

The type slide and the paratype slides are deposited in Ege University, Faculty of Agriculture, Plant Protection Department, İzmir, Turkey.

All measurements given in the descriptions are in micrometers. The terminology of Rack (1975) was used to describe idiosomal characters.

Results

Pygmephorus turkiensis n.sp.

(Figures 1-3)

Description

Female

Pale, white coloured mite elongate oval body; idiosoma poorly sclerotized 270 µm long, 135 µm wide; dorsum divided into propodosomal and hysterosomal shields, 81 µm and 189 µm long, respectively, without integumental punctations and markings.

Propodosoma dorsum: Propodosomal plate small subrectangular, not heavily sclerotized with a heavy transverse apodeme limiting the hind margin; posterior portion of propodosomal dorsum arcuate, overlapping with first hysterosomal segment; peritreme large, drop shaped more contiguously placed, with three pairs of spiculate dorsal setae; posterior pseudostigmatals or setae pi 54 µm long; anterior pseudostigmatals or setae pml long, about 27 µm; distance between pml and pi greater than that between pml and pr (stigmatals).

Propodosoma venter: Anterior ventral plate with six pairs (1a, 1b, 1c, 2a, 2b and 2c) of small, thin, nude simple subequal setae, 14 µm long. Setae 1a, 1c and 2a almost on the same line.

Hysterosoma dorsum: Setae of first four segments spiculate; setae laterals I (pc_2) longest subequal to pi; dorsals I (pc_1) longer (38 µm) than other dorsals; dorsals II (pd_1), III (pe_1) and IV (pf_1) almost subequal about 40 µm; dorsolateral setae pe_2 about 1/4 as long as pe_1; and pf_2 slightly longer than pf_1. Only two pairs of simple caudal setae arising ventrally; the inner pair (ph_1) smaller than the outer (ph_2).

Hysterosoma venter: All posterior ventral plate setae thin, nude, flagellate; with six pairs (3a, 3b, 3c, 4a, 4b and 4c) of setae 10-16 µm long; setae 4b 1/3 longer than 4a and 4c.

Gnathosoma: Oval, lenght 30; width 27 µm with two pairs of widely separated gnathosomal dorsals, internals arising anterior to the

externals. Palp with a pair of ventral setae and a small clavate solenidion.

Legs: Leg I 95, leg II 95, leg III 102 and leg IV 135 µm long; coxal setal formula: 3-3-3-2. Legs I distally with a strong curved claw. Setation on femur, genu and tibiotarsus of leg I including eupathidia: 3+1 rodlike seta with spatulate tip-4-17+5 solenidia; leg II, femur, genu, tibia and tarsus: 3-3-4+1 solenidion -6+1 solenidion; leg III, 2-2-4+1 solenidion -6; leg IV, 3-1-4-6.

Dimensions of important body characters of new ***Pygmephorus*** spp. are shown in Table 1.

Table 1. Dimension of important body characters of new ***Pygmephorus*** spp. (in micrometers)

Characters	*Pygmephorus turkiensis*	*Pygmephorus madanlarae*	*Pygmephorus urlaensis*
Idiosoma lenght	270	245	297
Idiosoma width	135	135	165
Propodosoma lenght	81	68	80
Propodosoma width	189	178	223
Setae pi	54	43	59
Setae pc_2	54	43	59
Setae pc_1	38	27	38
Setae pd_1	36	27	38
Setae pe_1	40	27	38
Setae pf_1	38	28	40
Setae pf_2	48	17	20
Setae pe_2	11	17	27
Numbers of solenidia on tibio-tarsus I	5	3	2
Number of solenidion on tarsus II	1	1	1

Types: The holotype female marked on slide, Turkey, İzmir (Torbalı), 6.IV.1993 ex. Mushroom compost; Coll. Nilgün Madanlar (No. 13A). Six paratype slides with adult female and collection data same as holotype.

Diagnosis

The adult females of this new species differs ***Pygmephorus americanus*** Banks by having small simple dorsolateral setae (pe_2) on the third tergite. In addition, pe_2 about 1/4 as long as pe_1 and pf_2 slightly larger than pf_1. It is also distinguished from ***P. smithi*** Smiley by the presence of pf_2 setae; with only two pairs of caudals and the form and arrangement of solenidia and claw on tibio-tarsus I. The dorsal propodosomal setae of ***P. turkiensis*** n.sp. are spiculate in contrast to spiculate and simple in ***P. kneeboni*** Wicht (Smiley, 1978).

Pygmephorus madanlarae n. sp.

(Figures 4-6)

Description

Female

Pale, white coloured mite, body elongate oval; idiosoma poorly sclerotized 245 µm long, 135 µm wide; dorsum divided into propodosomal and hysterosomal shields, 68 and 178 µm long, respectively.

Propodosoma dorsum: Propodosomal shield subrectangular, longer than wide with one pair of spiculate setae (pi) and one pair of simple setae (pml); anterior pair about one-third lenght of the posterior pair. Pseudostigmatic organ globelike and without spicules; peritremes large drop shaped distinctly separated; a thick line of transverse apodeme separate the propodosomal shield from hysterosoma; posterior portion of propodosomal shield overlapping with anterior portion of hysterosomal shield.

Propodosoma venter: Anterior ventral plate with four pairs of elongate flagellate setae. Setae 1b and 2a are absent. Setae 1a and 2b almost subequal 54 µm long and longer than 1c and 2c 27 µm long.

Hysterosoma dorsum: Hysterosoma with lightly spiculate setae. First tergite largest; with a pair of lateral (pc_2) and medial setae (pc_1). Setae pc_2 longer than other hsyterosomal setae but subequal to pi. Second tergite with a pair of simple lateral (pd_1). Third tergite with a pair of simple lateral (pe_2) and medial (pe_1) spiculate setae. Setae pe_2 about 2/3 lenght of pe_1. Fourth tergite with a pair of simple lateral (pf_2) and medial spiculate (pf_1) setae. Setae pf_2 about 2/3 lenght of pf_1. Setae pf_2 and pf_1 widely separated than pe_1 and pe_2. Three pairs of caudal setae are present; ph_3 longer than ph_1 and ph_2.

Hysterosoma venter: All ventral setae are thin, nude, long and flagellate; setae 4b longer than others.

Gnathosoma: Lenght 27, width 24 µm; dorsum with two pairs of setae; ventrally solenidion 1 prominent.

Legs: Leg I 108, leg II 94, leg III 92 and leg IV 121 µm long. Coxal setal formula: 2-2-3-2. Leg I long stout distally with a strong claw setation on femur, genu and tibio-tarsus of leg I including eupathidia: 2+1 rodlike setae -4-16+2 solenidia; leg II, femur, genu, tibia and

tarsus: 3-2-4+1 solenidion -6+1 solenidion; leg III, 2-2-4+1 solenidion -6; leg IV, 2-1-4-6.

Type: The holotype female marked on the slide, Turkey, İzmir (Bornova: Belkahve), 5.X.1993 ex. Mushroom compost, Nilgün Madanlar (No.12). This species is named for Dr.N. Madanlar, collector of this species.

Diagnosis

This new species ***Pygmephorus madanlarae*** n.sp. resembles ***P. (P.) bennetti*** (Cross and Moser,1971) and ***P. (P.) karafiati*** (Krczal,1959) in all general characters but can be differentiated by the absence of solenidion 3 and 4 on tibio-tarsus I. It is also distinguished from ***P. (P.) brachycerus*** (Cross and Moser, 1971) by the from and arrangement of dorsal setae and the number of solenidia on tibio-tarsus I. ***P. madanlarae*** n.sp. also differs from ***P. (P.) ceratophyi*** (Krczal, 1959) by the absence of 5 or 6 spiniform setae each on legs III and IV and from ***P. urlaensis*** n.sp. by the shape of tibio-tarsus I.

Pygmephorus urlaensis n.sp.

(Figures 7-9)

Description

Female

Body lenght 297, width 165; oval, pale in colour, integument well sclerotized in the apodemes, dorsum divided into propodosomal and hysterosomal shields, 80 and 223 µm long, respectively.

Propodosoma dorsum: Propodosomal shield subrectangular; longer than wide, with two pairs of setae; anterior pair short and simple, posterior pair longer (59 µm); a thick line of transverse apodeme separates the propodosomal shield from hysterosoma. Peritremes drop shaped; pseudostigmatic organ narrowly ellipsoidal.

Propodosoma venter: Apodeme I, short and strong flanked with a strongly sclerotized coxal plate. Apodeme II longer than apodeme I; anterior ventral plate with four pairs of long thin simple setae 32 µm in lenght.

Hysterosoma dorsum: Hysterosoma with stout spiculate setae. First tergite largest with a pair of medial pc_1 and lateral pc_2 spiculate setae 38 and 59 µm long. Second tergite with a single pair of spiculate

setae (pd_1). Third tergite with a medial (pe_1) and lateral spiculate (pe_2) setae; pe_1 and pe_2 almost subequal; fourth tergite with a medial (pf_1) and lateral (pf_2) spiculate setae; pf_2 about 1/2 the lenght of pf_1.

Hysterosoma venter: Coxae III and IV with six pairs of strong simple setae; setae 4b longer than others; these pairs of caudals thin, bristle like arising ventrally ph_1 and ph_2 contiguous, ph_3 widely separated from ph_2.

Gnathosoma: Gnathosoma oval, wider than long; dorsally with two pairs of simple setae.

Legs: Coxal setal formula: 2-2-3-2. Leg I stout with a long claw: setation femur, genu and tibio-tarsus of leg I including eupathidia: 3+1 rod like seta -4-15+2 solenidia; leg II, femur, genu, tibia and tarsus: 3-2-4+1 solenidion -5+1 solenidion; leg III, 2-2-4+1 solenidion -5; leg IV, 2-1-4-5. All claws uncinate and normal.

Types: The holotype female marked on the slide, Turkey, İzmir (Urla), 1.X.1993, ex. Mushroom compost. Coll. Nilgün Madanlar (No. 12A). Five paratype slides with adult females and collection data same as holotype.

This species is named for the type-locality Urla, Turkey.

Diagnosis

This species closely related to many other ***Pygmephorus*** species, but it can be differentiated by the presence of three caudal setae; a strong claw arising distally from the elongate projection of tibio-tarsus I and the form/shape of tibio-tarsus I.

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Özet

Türkiye'den üç yeni *Pygmephorus* Kramer (Acari: Pygmephoridae) türü

Bu çalışmada, İzmir'de 1993-1994 yılları arasında kültür mantarlarında bulunan zararlıların saptanması sırasında rastlanan ***Pygmephorus*** cinsine bağlı üç yeni türün (***P. turkiensis*** n. sp., ***P. madanlarae*** n. sp. ve ***P. urlaensis*** n. sp.) orijinal tanıtımı yapılmıştır.

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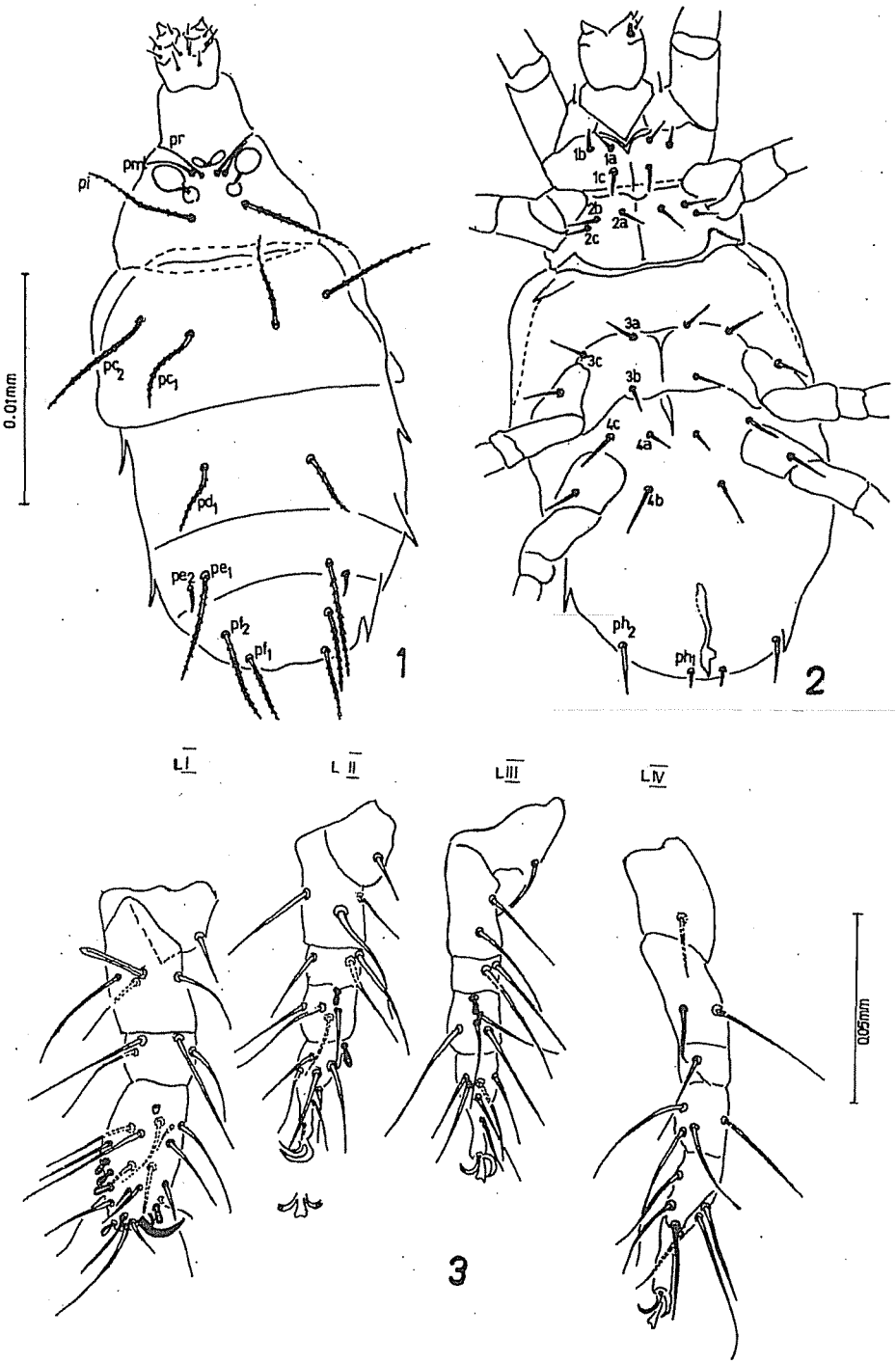
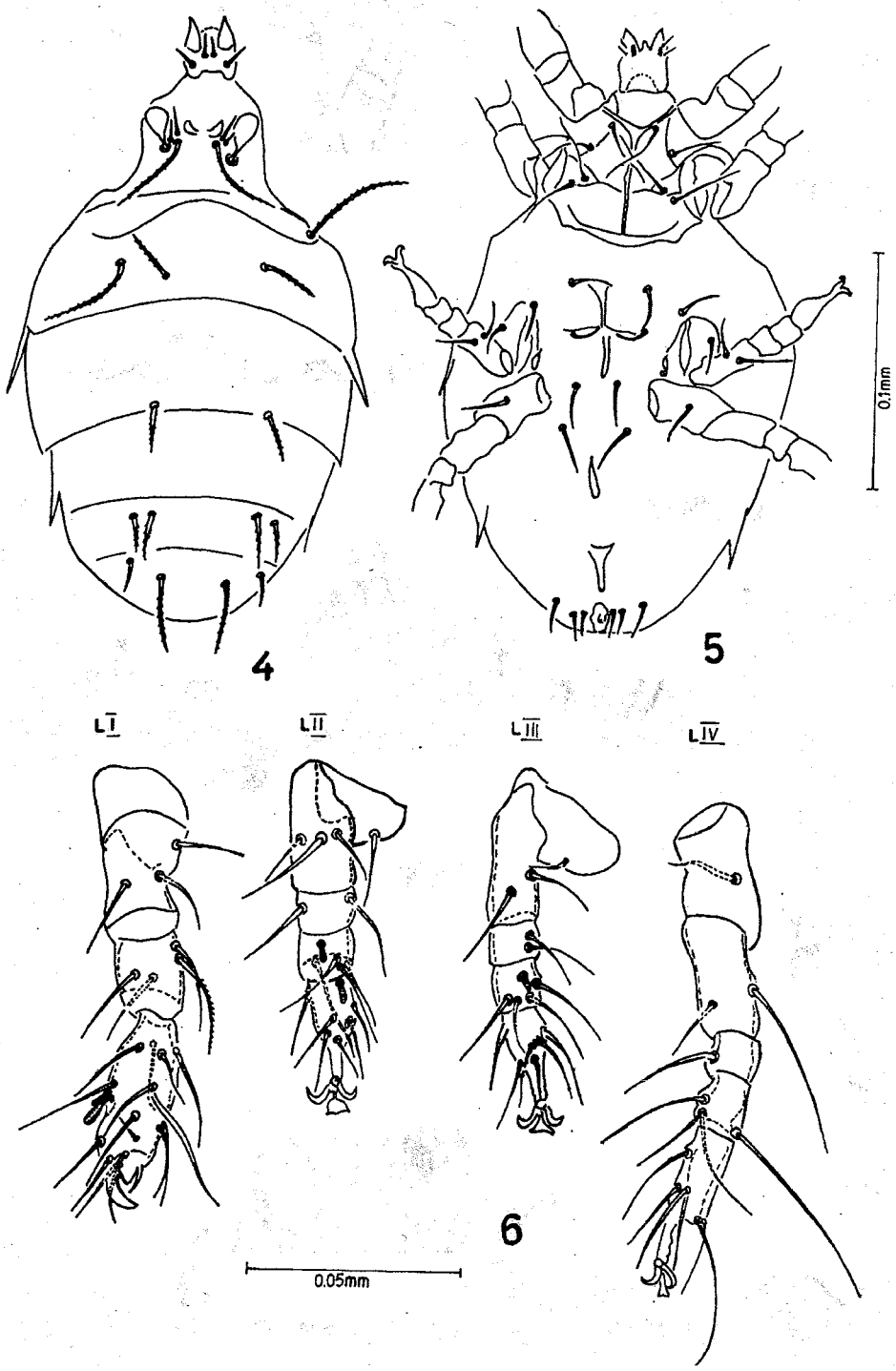
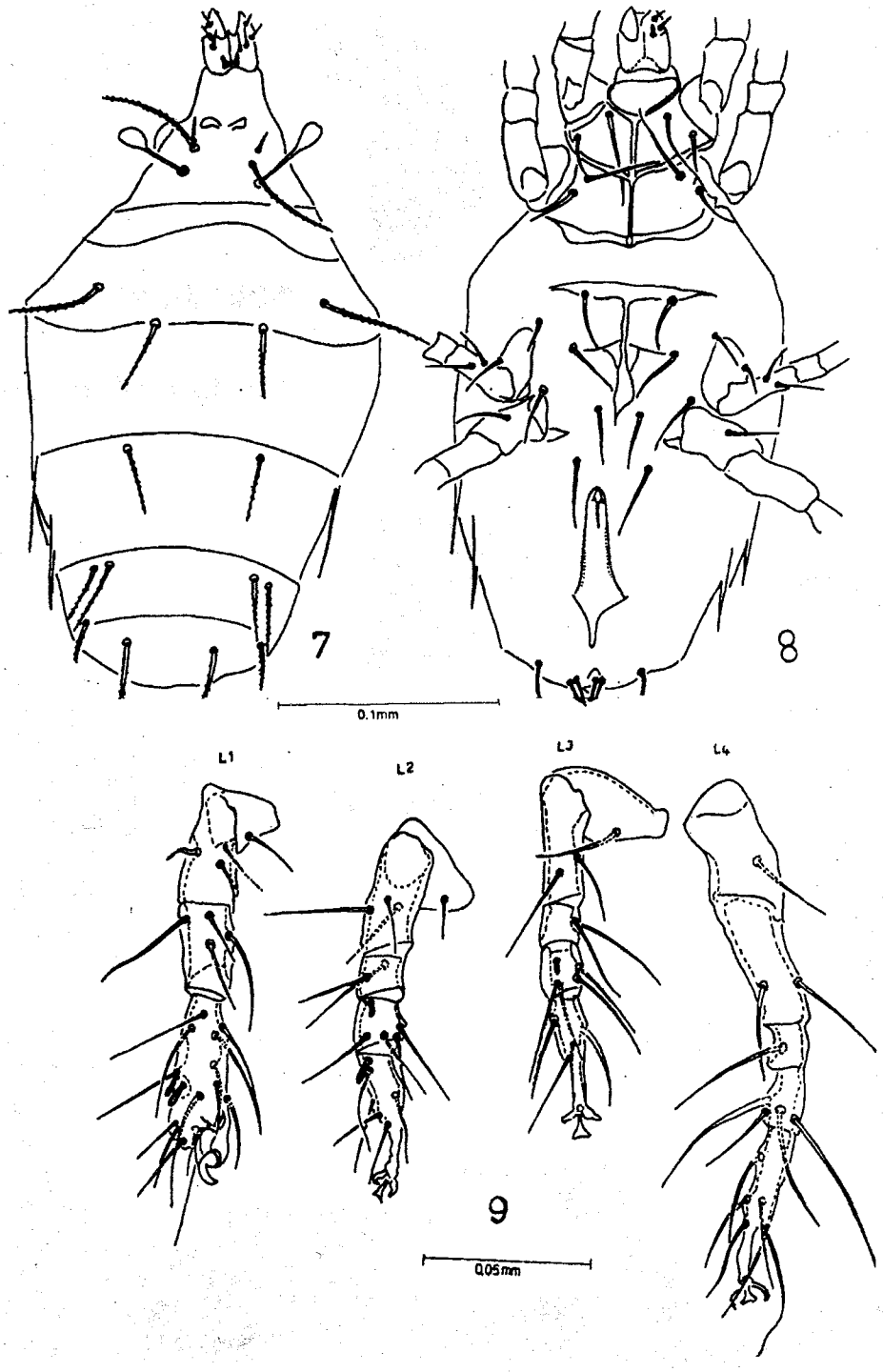


Figures 1 - 3. ***Pygmephorus turkiensis*** n. sp.female,
1. Dorsal view, 2. Ventral view, 3. Legs I-IV.



Figures 4 - 6. ***Pygmephorus madanlarae*** n. sp.female,
4. Dorsal view, 5. Ventral view, 6. Legs I-IV.



Figures 7 - 9. ***Pygmephorus urlaensis*** n. sp.female,
7. Dorsal view, 8. Ventral view, 9. Legs I-IV.