

NEW SPECIES FOR THE GENUS *FAVOGNATHUS* LUXTON
(ACARI: CRYPTOGNATHIDAE)
FROM IRAN

BY M. KHANJANI¹ & E.A. UECKERMANN²

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CRYPTOGNATHIDAE
FAVOGNATHUS
IRAN
ACARI

SUMMARY: *Favognathus mirazii* n. sp. is described from Iran. This is the first report of the family Cryptognathidae from Iran. *Favognathus cordylus*, *F. gersoni* and *F. barrasi* are redescribed. A key to the species of the world is given.

RÉSUMÉ : *Favognathus mirazii* n. sp. est décrit d'Iran. Il s'agit de la première mention de la famille des Cryptognathidae d'Iran. *Favognathus cordylus*, *F. gersoni* et *F. barrasi* sont redécrits. Une clé des espèces au niveau mondial est fournie.

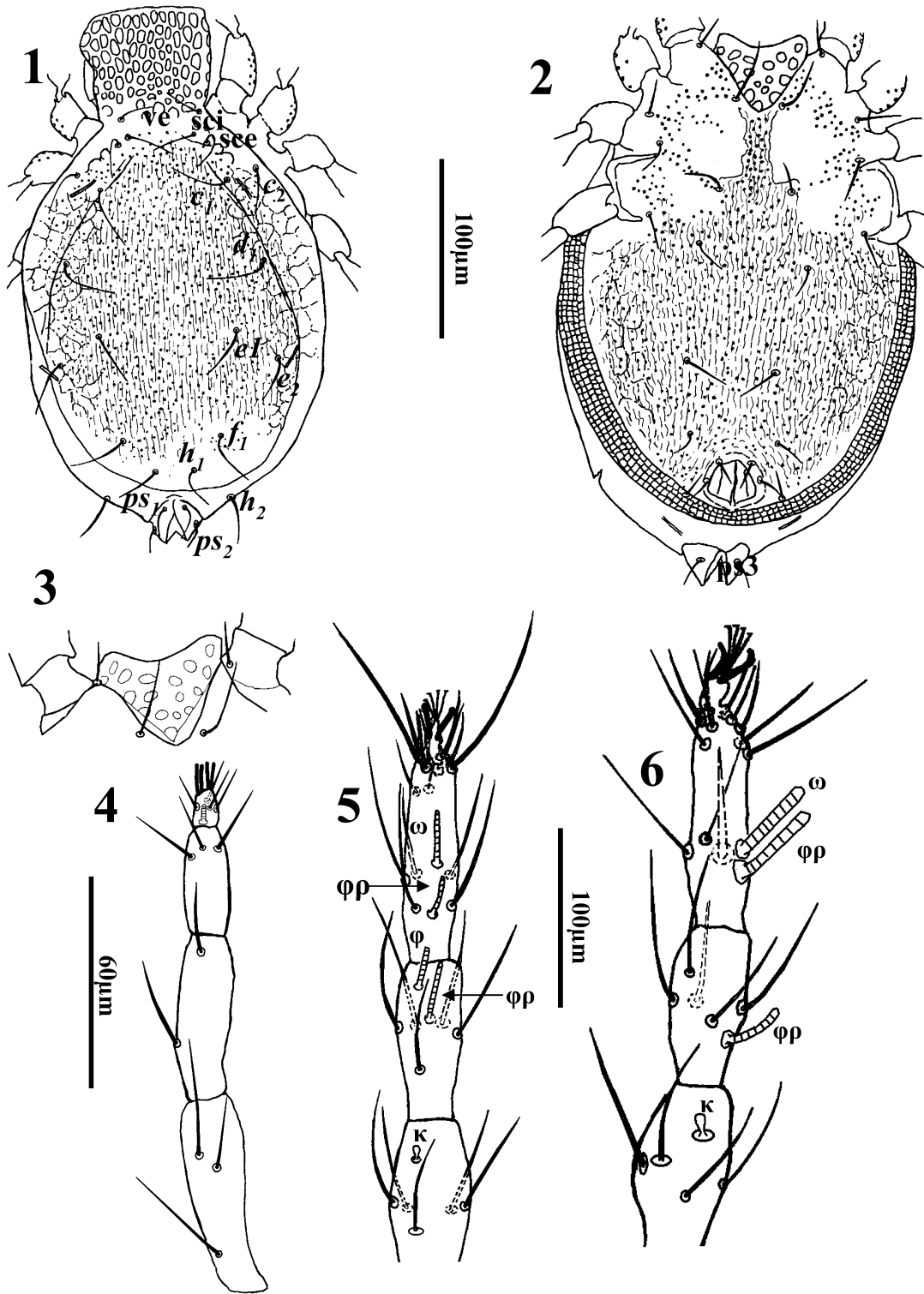
SUMMERS & CHAUDHRI (1965) recognized two morphologically distinct species-groups (*Imbricatus* and *Favus*) in the family Cryptognathidae. LUXTON (1973) established two new subgenera, viz. *Favognathus* for *Favus* and *Cryptognathus* for *Imbricatus*. Later LUXTON (1987) decided to elevate these two subgenera to generic status placing 13 species in *Favognathus*. However, *F. texasensis* and *F. dakotaensis* (McDaniel & Bolen) (1979) from South Dakota and Texas were overlooked by LUXTON (1987). FLECHTMANN (1971) described *Favognathus agapictus* (as *Ctyptognathus agapictus*) in his Ph.D. thesis; however, as it is not yet published, we excluded it here (International Code of Nomenclature, Article 9 [11], 1985). MEYER & UECKERMANN (1989) added two new species from South Africa, LUXTON (1993) two from Israel, SWIFT (1996) three from Hawaii and KOÇ & AYYILDIZ (1999) and KOÇ & AKYOL

(2003) three from Turkey. We decided to agree with LUXTON (1987) and also consider *F. orbiculatus* (Livshitz) (in KUZNETZOV & LIVSHITZ, 1974) a synonym of *F. curcubita* (Berlese) till the type specimens of both species can be compared. KOÇ & AYYILDIZ (1999) disagreed with this based on LIVSHITZ describing the dorsal and ventral shields only as punctate. However, in his drawings reticulations are indicated thus may have observed reticulations and only accidentally referred to it as absent in his description. This synonymy thus brings the number of species to 25.

MEYER & UECKERMANN (1989) based their description of *F. pongolensis* on two females. However, a re-examination of these two specimens showed that it actually is a male and a female, therefore the figures of the leg segments are those of the male and the rest of the female.

1. Department of Plant Protection, College of Agriculture, Bu-Ali Sina University, Hamedan, Iran. E-mail: khanjani@basu.ac.ir

2. ARC-Plant Protection Research Institute, Private Bag X134, Queenswood, Pretoria, 0121 South Africa. E-mail: UeckermannE@arc.agric.za



FIGS. 1-6. — *Favognathus mirazii* n. sp. Female. 1. — Dorsal view. 2. — Ventral view. 3. — Prosternal apron. 4. — Palpus. 5. — Leg I. — 6. — Leg II.

According to KUZNETZOV & LIVSHITZ (1974) the setal formulae of all leg segments, except tarsi, are similar for all four the new species they described, however, in the drawing of *F. distortus* (Kuznetsov), the only one drawn with its legs intact, femur I is drawn with four setae.

KOÇ & AYYILDIZ (1999) compiled a key to all the known species of *Favognathus* to include their two new species. We also compile a key to all the species here, but must admit that it was a strenuous task and we wish to compliment the previous authors on their brave attempt. Important details are lacking in descriptions and a revision of the genus is needed, and therefore that *Favognathus gersoni* Luxton, *F. cordylus* Luxton and *F. barrasi* (Smiley & Moser) are redescribed here.

MATERIAL AND METHODS

Mites, sampled in humus and soil, were taken from pear orchards in the vicinity of Baneh, Kurdistan Province, Iran. The samples were extracted in BERLESE funnels using 40 watt bulbs. Mites were preserved in 80% ethanol, cleared in a lactophenol solution (KRANTZ, 1978) and mounted on microscope slides in HOYER's medium (EVANS, 1992).

All measurements are given in micrometer (µm). Body length includes hood and anal covers. Legs were measured from base of coxae to tip of pretarsi; length of idiosoma includes the gnathosoma and the width was measured at the level of setae *d*. Dorsal setal notations follow KETHLEY (1990).

Holotype specimen is deposited in the National Collection of Arachnida of ARC- Plant Protection Research Institute, Pretoria, South Africa. Paratype female is deposited in the Arthropod Collection of the Bu-Ali Sina University, Hamadan, Iran

Genus *Favognathus* Luxton, 1973

Cryptognathus (*Favognathus*) Luxton, 1973: 57

Favognathus Luxton, 1987: 113;

MEYER & UECKERMAN, 1989: 2; SWIFT, 1996: 86.

Type-species: *Cryptognathus cucurbita* Berlese, 1916.

This genus can be identified by the wedge-shaped prosternal apron at base of gnathosoma which is

ornamented with dimples and the presence of two pairs of aggenital setae. However, SWIFT (1996) described two species with only one pair of aggenital setae.

Favognathus mirazii n. sp. (FIGS. 1-6)

FEMALE. Dimension (n=2): holotype (measurements of paratype): body length: 298 (300), breadth 185 (185), leg I 263 (278), leg II 200 (200), leg III 200 (238), leg IV 220 (208).

Gnathosoma (FIGS. 3-4): Hypostome narrow, ventrally with one pair of long setae *m* and two pairs of adoral setae (*or*₁₋₂); palp 91 long, palp tarsus with four eupathidia, 4 setae and 1 solenidion, tibia with 3, genu with 2 and femur with 3 setae.

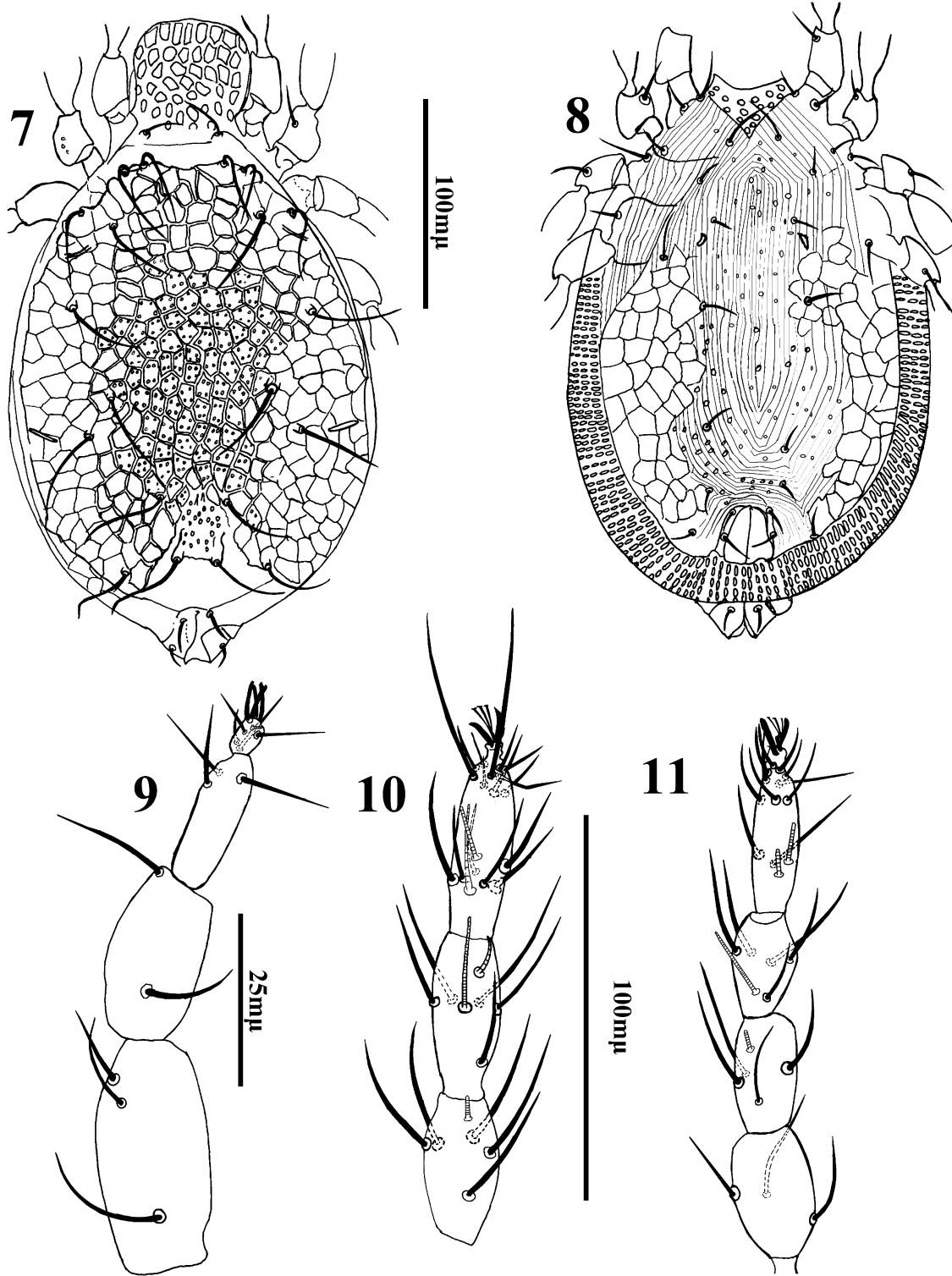
Dorsum (FIG. 1): Hood with 6-7 foveolae per longitudinal row, foveolae round to polygonal, anterior margin smooth; dorsum ornamented with evenly spaced pores and vague reticulations laterally, with 11 pairs of long, simple setae; two pairs of eyes and 2 pairs of slit-like cupules (*ai*, *am*) anal opening terminally with 3 pairs of anal setae (*ps*₁ 19(12), *ps*₂ 13(17), *ps*₃ 14(16); length of dorsal setae as follows: *ve* 17(20), *sci* 27(23), *sce* 26(27), *c*₁ 36(35), *c*₂ 34(31), *d* 33(35), *e*₁ 34(33), *e*₂ 33(35), *f* 32(29), *h*₁ 32(20), *h*₂ 21(22).

Venter (FIG. 2): Prosternal apron wedge shaped, with 17 foveolae; ventral pattern similar to dorsum, ventro-lateral reticulations are faint and with pores; venter with 4 pairs of ventral setae, genital opening with 2 pairs of genital setae (*g*₁₋₂) (14) and two pairs of aggenital setae, *ag*₁₋₂ (12-14); one pair of slit-like cupules posterior to genital opening pores (*ih*).

Legs (FIGS. 5-7): Leg I longest; setal formulae of leg segments (solenidia in parentheses and not included in setal counts) as follows: coxae 2-1-2-1; trochanters 1-1-2-1; femora 4-3-2-2; genua 5(*k*) – 4(*k*)-2-3; tibiae 5(*q*₀, *q*)-5(*q*₀)-4(*q*₀)-3; tarsi 15 (*q*₀, *ω*)-12(*q*₀, *ω*)-9(*ω*)-9(*ω*). Addorsals on tarsus II dissimilar. Trochanters I-II with large large punctuations.

MALE: Unknown

TYPE MATERIAL: Female holotype from soil under pear tree, Baneh Kurdistan Province, western Iran, near border between Iran-Iraq; 28 October 2003, coll. M. KHANJANI; paratype female from soil in strawberry field, Baneh, 24 January 2004, coll. M. KHANJANI.



FIGS. 7-11. — *Favognathus gersoni* Luxton. Female. 1. — Dorsal view. 2. — Ventral view. 3. — Palpus. 4. — Leg I. 5. — Leg II.

ETYMOLOGY: The species is named for Prof. NASER MIRAZI, zoologist in the Department of Biology, Faculty of Science, Bu-Ali Sina University, Hamedan, Iran.

DIFFERENTIAL DIAGNOSIS: This species is closely related to *F. cucurbita* (Berlese), but differs from the latter in that the dorsal shield is only covered laterally with vague reticulations, instead of lateral and anterior reticulation; the nonporous areas on sternocoxal region are medially separated by a broad band of striae instead of a single row of pores; ventral setae are much longer, setae *1a* extend to or slightly pass anterior margin of prosternal apron, much shorter in *F. cucurbita*.

Favognathus gersoni Luxton (FIGS. 7-11)

Favognathus gersoni Luxton, 1993: 1213
(New description)

FEMALE. Dimension (n=2): Paratypes: length of body 301-315, breadth 173-180, leg I 217-221, leg II 167-173, leg III 176-183, leg IV 217-221.

Gnathosoma (FIG. 9): Hypostome narrow, ventrally with one pair of long setae *m* and two pairs of adoral setae (*or*₁₋₂); palp tarsus with four eupathidia, 4 setae and 1 solenidion, tibia with 3, genu with 2 and femur with 3 setae.

Dorsum (FIG. 7): Hood with 6-7 foveolae per longitudinal row, foveolae round to polygonal, anterior margin smooth; dorsum completely reticulated with evenly spaced spores, with 11 pairs of long, simple setae; two pairs of eyes and 2 pairs of slit-like cupules (*ai*, *am*) anal opening terminally with 3 pairs of anal setae (*ps*₁-*ps*₃), 13-16; length of dorsal setae as follows: *ve* 16-19, *sci* 34-38, *sce* 34-38, *c*₁ 41-44, *c*₂ 41-44, *d* 44, *e*₁ 41-44, *e*₂ 44, *f* 41, *h*₁ 38, *h*₂ 34-38.

Venter (FIG. 8): Prosternal apron wedge shaped, with 16 foveolae; venter with reticulations laterally and pores and striations medially; venter with 4 pairs of ventral setae, genital opening with 2 pairs of genital setae (*g*₁₋₂) and two pairs of aggenital setae, *ag*₁₋₂ (13-16).

Legs (FIGS. 10-11): Legs I and II equally long; setal formulae of leg segments (solenidia in parentheses and not included in setal counts) as follows: coxae 2-1-2-1; trochanters 1-1-2-1; femora 4-3-2-2;

genua 5(*k*)-4(*k*)-2-3; tibiae 5(*q*,*q*₀)-5(*q*₀)-4(*q*₀)-3; tarsi 15 (*q*₀,*ω*)-11(*q*₀,*ω*)-9(*ω*)-9(*ω*). Addorsals on tarsus II similar.

MATERIAL EXAMINED: Two female paratypes from mosses, Rami, Israel, 31 March 1970, coll. U. GERSON.

DIFFERENTIAL DIAGNOSIS: The absence of clusters of closely set punctuations near setae *c*₁ and *d*, venter with conspicuous ventral setae and setal formulae of tarsi, 15-11-9-9 and femora, 4-3-2-2, distinguish this species from the closely related *F. observabilis* (Kuznetsov, 1974).

Favognathus cordylus Luxton (FIGS. 12-16)

Favognathus cordylus Luxton, 1993: 1215
(New description)

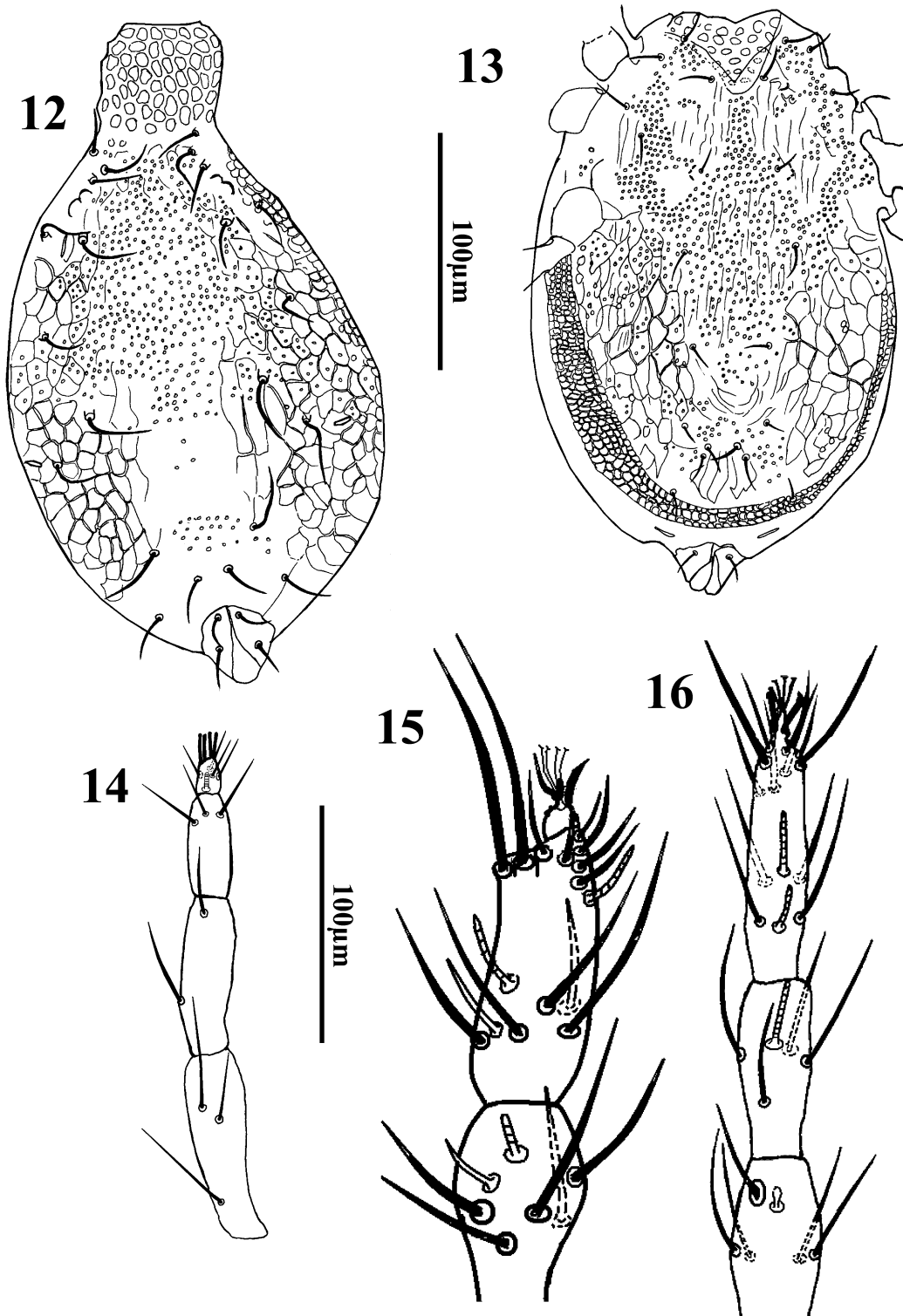
FEMALE. Dimension (n=1): Paratype: length of body (including hood and anal covers) 324, breadth 176, leg I 230, leg II 176, leg III 170, leg IV 198

Gnathosoma (FIG. 14): Hypostome narrow, ventrally with one pair of long setae *m* and two pairs of adoral setae (*or*₁₋₂); palp tarsus with four eupathidia, 4 setae and 1 solenidion, tibia with 3, genu with 2 and femur with 3 setae.

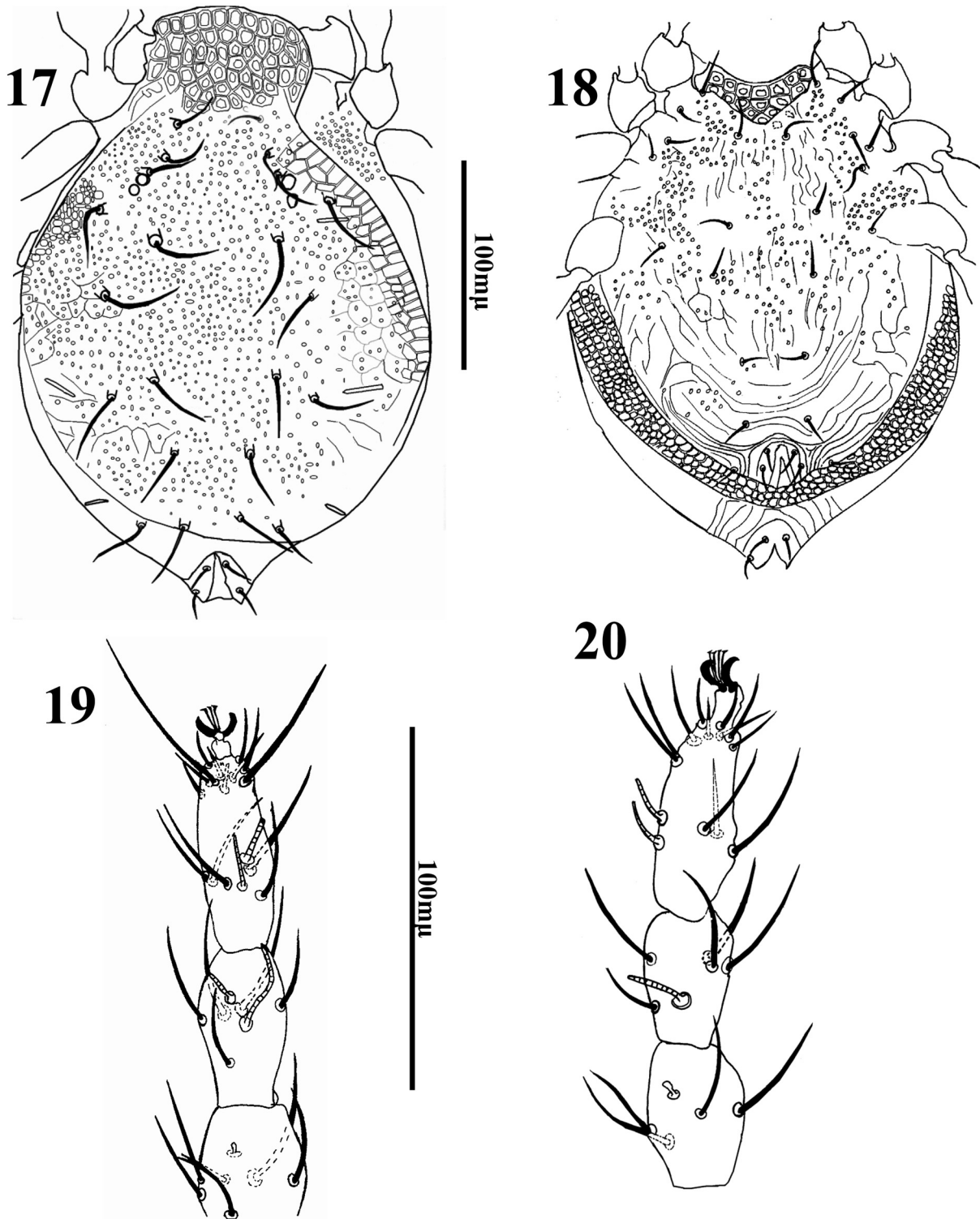
Dorsum (FIG. 12): Hood with 6-7 foveolae per longitudinal row, foveolae round to polygonal, anterior margin smooth; dorsum ornamented with evenly spaced pores and reticulations laterally, with 11 pairs of long, simple setae; two pairs of eyes and 2 pairs of slit-like cupules (*ai*, *am*) anal opening terminally with 3 pairs of anal setae (*ps*₁-*ps*₃); length of dorsal setae as follows: *ve* 22, *sci* 34, *sce* 32, *c*₁ 35, *c*₂ ?, *d* 34, *e*₁ 35, *e*₂ 31, *f* 32, *h*₁ 25, *h*₂ 25.

Venter (FIG. 13): Prosternal apron wedge shaped, with 25 foveolae; ventral pattern similar to dorsum, ventro-lateral reticulations with pores; venter with 4 pairs of ventral setae, genital opening with 2 pairs of genital setae (*g*₁₋₂) and two pairs of aggenital setae, *ag*₁₋₂; one pair of slit-like cupules posterior to genital opening pores (*ih*).

Legs (FIGS. 15-16): Leg I longest; setal formulae of leg segments (solenidia in parentheses and not included in setal counts) as follows: coxae 2-1-2-1; trochanters 1-1-2-1; femora 4-3-2-2; genua 5(*k*)



FIGS. 12-16. — *Favognathus cordylus* Luxton. Female. 1. — Dorsal view. 2. — Ventral view. 3. — Palpus. 4. — Leg I. 5. — Leg II.



FIGS. 17-20. — *Favognathus barrasi* (Smiley and Moser). Female. 1. — Dorsal view. 2. — Ventral view. 3. — Leg I. 4. — Leg II.

-4(*k*)-2-3; tibiae 5(*q*₀, *q*)-5(*q*₀)-4(*q*₀)-3; tarsi 12 (2 *q*₀, *ω*)-12(*q*₀, *ω*)-9(*ω*)-9(*ω*). Addorsals on tarsus II similar.

MATERIAL EXAMINED: Female paratype from pine litter, Rehovot, Israel, 22 February 1966, coll. U. GERSON.

REMARKS: The presence of a pair of angular condyles associated with second pair of ventral setae distinguishes this species.

Favognathus barrasi (Smiley & Moser) (FIGS. 17-20)

Cryptognathus barrasi, 1968: 313.

Favognathus barrasi (Smiley & Moser);

Luxton, 1987: 113

(New description)

FEMALE (FIGS. 17-20). Dimension (n=1): Paratype: length of body 284, breadth 189, leg I 198, leg II 158, leg III 164, leg IV 183.

Gnathosoma: Hypostome narrow, ventrally with one pair of long setae *m* and two pairs of adoral setae (*or*₁₋₂); palp tarsus with four eupathidia, 4 setae and 1 solenidion, tibia with 3, genu with 2 and femur with 3 setae.

Dorsum (FIG. 17): Hood wider than long with 5-6 foveolae per longitudinal row, foveolae polygonal, anterior margin smooth; dorsum covered with punctuations with vague reticulations laterally bearing 11 pairs of long, simple setae; two pairs of eyes and 2 pairs of slit-like cupules (*ai*, *am*) anal opening terminally with 3 pairs of anal setae (*ps*₁-*ps*₃), 9-13; length of dorsal setae as follows: *ve* 19, *sci* 25, *sce* 25, *c*₁ 32, *c*₂ 32, *d* 35, *e*₁ 32, *e*₂ 35, *f* 32, *h*₁ 25, *h*₂ 25.

Venter (FIG. 18): Prosternal apron wedge shaped, with about 17 polygonal foveolae; venter with pores and striations reticulations indistinct or absent; venter with 4 pairs of ventral setae, genital opening with 2 pairs of genital setae (*g*₁₋₂) and two pairs of aggenital setae, *ag*₁₋₂.

Legs (FIGS. 19-20): Legs I and II subequal in length; setal formulae of leg segments (solenidia in parentheses and not included in setal counts) as follows: coxae 2-1-2-1; trochanters 1-1-2-1; femora 3-3-2-2; genua 5(*k*)-4(*k*)-2-3; tibiae 5(*q*₀, *q*)-5(*q*₀)-4(*q*₀)-3; tarsi 15(*q*₀, *ω*)-12(*q*₀, *ω*)-9(*ω*)-9(*ω*). Addorsals on tarsus II similar.

MATERIAL EXAMINED: One female paratype found under bark scales of *Pinus taeda* L., Elizabeth, Louisiana, U.S.A., 9 November 1965, coll. R.L. Smiley.

REMARKS: This species is distinguished by the hood being wider than long.

KEY TO SPECIES OF *FAVOGNATHUS* LUXTON (FEMALES)

1. Prosternal apron with foveolae 2
1. Prosternal apron without foveolae
..... *F. affyonensis* Koç & Akyol
2. Genu II without famulus *k* 3
2. Genu II with *k* 6
3. Reticulations of dorsal shield confined to lateral margins 4
3. Dorsal shield completely reticulated 5
4. Members of *c*₁ 60 im apart; tarsus II with 12 setae, excluding two solenidia
..... *F. cucurbitellus* (Meyer & Ryke)
4. Members of *c*₁ 33 im apart; tarsus II with 11 setae
..... *F. latibarrus* Meyer & Ueckermann
5. Sternocoxal region with nonporous areas rest of venter covered with evenly distributed pores
..... *F. texasensis* (McDaniel & Bolen)
5. Sternocoxal region finely striated with few punctuations, reticulations posterior to coxae IV
..... *F. luxtoni* Koç & Ayyildiz
6. Anterior margin of hood denticulated 7
6. Anterior margin of hood smooth 12
7. Addorsal setae *tc* similar 8
7. Addorsal setae *tc* dissimilar 9
8. Dorsal shield striate with faint reticulations; sternocoxal area evenly porous without striae
..... *F. favus* (Summers & Chaudhri)
8. Dorsal shield without reticulations, porous; venter completely striate with some scattered punctuations over coxal fields
..... *F. denticulatus* (Luxton)
9. Large, idiosoma 429 im long; dorsum without reticulations, with some striae between elongated pores; striae more evident between pores on venter; prosternal apron with 25 foveolae; femora, genua and tibiae with ridges distally
..... *F. magnus* (Luxton)
9. Smaller, idiosoma less than 350 im long; dorsum with or without reticulations; prosternal apron with 13-18 foveolae 10

10. Dorsum and venter without reticulations, dorsum without striae. . . *F. ochraceus* (Summers & Chaudhri)
10. Dorsum and venter with reticulations, dorsum with very fine striations 11
11. Dorsal shield reticulated laterally *F. goffi* Swift
11. Dorsal shield completely reticulated *F. gersoni* Luxton
12. Sternocoxal region without angular condyles 13
12. Sternocoxal region with a pair of angular condyles *F. cordylus* Luxton
13. Three pairs of nonporous, non-reticulated circular areas on dorsum posterior to setae c_1 , lateral to e_1 and lateral to f ; sternocoxal region with evenly distributed pores; seta ag_2 absent *F. distinctus* Swift
13. Nonporous areas on dorsal shield absent; sternocoxal region with nonporous areas; seta ag_2 present. 14
14. Cluster of closely set punctuations near setae d *F. insularis* Luxton
14. No closely set punctuations near setae d 15
15. Dorsum with punctuations closely associated in groups of three to five, resembling spots of a leopard, gradually fading laterally. *F. leopardus* (Luxton)
15. Punctuations not arranged like this on dorsum. 16
16. Setal formula of femora 4-3-2-2 or 3-3-2-2 17
16. Setal formula of femora 4-2-2-2 *F. turcicus* Koç & Ayyildiz
17. Setal formula of femora 3-3-2-2 23
17. Setal formula of femora 4-3-2-2 18
18. Two pairs of aggenital setae 19
18. One pair of aggenital setae *F. variabilis* Swift
19. Setal formula of tarsi 16-14-12-8 *F. pictus* (Summers & Chaudhri)
19. Setal formula of tarsi 15-12-9-9 20
20. Dorsal shield completely reticulated *F. distortus* (Kuznetsov)
20. Dorsal shield only reticulated laterally 21
21. Two pairs of clusters of closely set punctuations associated with setae c_1 and d ; single longitudinal row of pores separate nonporous areas of sternocoxal region. *F. pongolensis* Meyer & Ueckermann
21. Clusters of closely set punctuations on dorsum absent; broad band of pores separating nonporous areas of sternocoxal region. *F. mirazii* sp. n.
22. Hood wider than long. . . *F. barrasi* (Smiley & Moser)
22. Hood longer than wide. 23
23. Dorsum completely reticulated. 24
23. Dorsum without reticulations or only laterally reticulated 25

24. Clusters of closely set punctuations near setae c_1 and d ; setal formula of tarsi 17-14-10-10. *F. observabilis* (Kuznetsov)
24. Dorsum without clusters of closely set punctuations; setal formula of tarsi 17-13-10-10. *F. rugosus* (Livshitz)
25. Dorsum without reticulations, only covered with punctuations. *F. dakotaensis* (McDaniel & Bolen)
25. Dorsum reticulated laterally . . *F. cucurbita* (Berlese)

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