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FIVE NEW SPECIES OF PHYTOSEIID MITES (ACARINA: MESOSTIGMATA) FROM SOUTHWEST MADAGASCAR

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SOMMAIRE

Cinq espèces nouvelles de Phytoseiidae de Madagascar sont décrites. *Typhlodromus (Anthoseius) gutierrezii* n. sp. et *T. (A.) chazeaui* n. sp. sont proches des espèces africaines *T. paganus* et *T. vescus*. *Amblyseius (Amblyseius) bibens* n. sp. est voisin de *A. (A.) teke* du Zaïre et d'Afrique du Sud. *A. (A.) rotundus* n. sp. et *A. (A.) brevipes* n. sp. appartiennent au groupe d'*A. ovalis*.

INTRODUCTION

During screening activities for spider mite eating predator mites in Madagascar a number of new species was found. This paper concerns some of the species of the genera *Amblyseius* Berlese, 1914 and *Typhlodromus* Scheuten, 1857 subgenus *Anthoseius* De Leon, 1959, which were also chosen for a cytogenetic study (Blommers & Blommers, in prep.).

The nomenclature of the dorsal setae is that proposed by Lindquist & Evans (1965) and adapted for Phytoseiidae by Athias-Henriot (1966).

Holotypes and paratypes will be deposited in

the Institute of Taxonomic Zoology (Zoölogisch Museum) of the University of Amsterdam, paratypes also in the Muséum National d'Histoire Naturelle, Paris.

ACKNOWLEDGEMENTS

J'exprime ma gratitude à M. J.T. Gutierrez et M. J. Chazeau, qui ont bien voulu m'initier à l'étude des Phytoseiidae, et m'ont beaucoup aidé de leurs conseils. Je leur suis également reconnaissant d'avoir mis à ma disposition les moyens techniques de leur laboratoire.

Typhlodromus (Anthoseius) gutierrezii sp. n. (figs. 1-7)

Material studied: - Holotype ♀ (the author's serial no. B50. 1-3) and 10 paratypes (7 ♀♀ and 3 ♂♂) from *Ricinus communis* (Euphorbiaceae), Miary near Tuléar, 13.IV.1971 (L. Blommers).

Differential diagnosis.- *T. gutierrezii* resembles *T. paganus* Van der Merwe, 1968 and *T. vescus* Van der Merwe, 1968, both from South Africa. It differs from the first species in the form of the sperma-

theca and the size of the macrosetae on leg IV; and from the second also in the lack of a knobbed macroseta on leg III. Most of the dorsal setae of both African species are longer.

Description.- Female: Dorsal shield strongly imbricated, with pronounced sigilla (=imprints of muscle attachment) 330 μ long and 200 μ wide. At least 17 pairs of pores. 18 pairs of stout setae; length in microns: j1 22, j3 25, j4 15, j5 20, j6 22, J2 23, J5 11, z4 22, z5 21, Z4 30, Z5 45, s2 19, s3 22, s4 24, s6 24, S2 25, S4 25, S5 17. Z4 and Z5 serrated, the latter with blunt and hyaline tip; remaining setae smooth and pointed. r2 and R1, both 18 μ , on the interscutal membrane. Peritremes ending in front of setae j1.

Sternal and genital shield smooth. Ventri-anal shield 110 μ long and 90 μ wide, with four pairs of pre-anal setae. Surrounding membrane with four pairs of setae and six pairs of pores. Ventro-caudal pair (VL1) 31 μ long.

Leg IV with three macrosetae, all three distinctly capitate: on genu 13 μ long, on tibia 17 μ and on basitarsus 25 μ . Remaining legs without macrosetae.

Fixed digit of chelicera 24 μ long, with four subapical teeth. Movable digit 24 μ long, with three teeth.

Major duct of spermatheca very small (1-2 μ). Atrium bulbous, 7 μ long and 4 μ wide. Cervix bell-shaped, 9 μ wide.

Male: r2 and R1 on dorsal shield. Length of setae (in microns): j1 17, j3 20, j4 15, j5 15, j6 16, J2 17, J5 9, z4 18, z5 15, Z4 24, Z5 35, s2 15, s3 17, s4 19, s6 19, S2 20, S4 18, S5 10, r2 15, R1 15. Z4 and Z5 serrated, Z5 blunt, all remaining setae smooth.

Ventri-anal shield fused with peritremal shields, 100 μ long. Four pairs of pre-anals, six pairs of pores. Surrounding membrane with VL1 13 μ long and two pairs of pores.

Leg IV with three macrosetae: on genu 11 μ , on tibia 13 μ and on basitarsus 12 μ .

Fixed digit of chelicera 15 μ long, with three subapical teeth. Movable digit 14 μ long, with one tooth; spermatophoral process linear and 23 μ long, with pointed end 5 μ .

Typhlodromus (Anthoseius) chazeaui
sp. n. (figs. 8-11)

Material studied.- Holotype ♀ (author's serial no. B46-3) and 14 paratypes (13 ♀♀ and 1 ♂) from *Grewia* sp. (Tiliaceae), Ifaty near Tuléar, 9.VI. 1971 (L. Blommers).

Differential diagnosis.- *T. chazeaui* is similar to *T. gutierrezii*, but it differs from the latter in the size of the macroseta on genu IV, the form of the spermatheca and the spermatophoral process.

Description.- Female: Dorsal shield rather strongly imbricated: 300 μ long and 190 μ wide. Length of the setae (in microns): j1 19, j3 24, j4 18, j5 19, j6 22, J2 23, J5 10, z4 22, z5 20, Z4 34, Z5 47, s2 19, s3 21, s4 25, s6 25, S2 27, S4 27, S5 19, r2 20, R1 22. Z4 and Z5 faintly serrated, the latter with a blunt and hyaline tip; the remainder stout, smooth and pointed. Peritremes ending in front of setae j1.

Venter as with *T. gutierrezii* (fig. 5); ventri-anal shield 100 μ long and 80 μ wide. VL1 37 μ long.

Macrosetae on leg IV: length in microns: genu 7, tibia 17, basitarsus 28.

Fixed digit of chelicera 24 μ long, with four teeth; movable digit 25 μ , with three teeth.

Major duct of spermatheca not distinct from atrium, all together 5 μ long. Cervix vase-shaped, 11 μ long and 5 μ wide.

Male: r2 and R1 on dorsal shield. Length of setae (in microns): j1 15, j3 16, j4 14, j5 15, j6 14, J2 16, J5 10, z4 14, z5 14, Z4 25, Z5 37, s2 13, s3 17, s4 17, s6 16, S2 18, S4 16, S5 12, r2 14, R1 14. Z4 and Z5 serrated; Z5 blunt ending.

Venter as in *T. gutierrezii* (fig. 7); ventri-anal shield 100 μ long, VL1 17 μ .

Length of macrosetae on leg IV (in microns): genu 5, tibia 14, basitarsus 21.

Fixed digit of chelicera 16 μ long, with three teeth. Movable digit 17 μ long, with one tooth; spermatophoral process linear, 18 μ long, with narrow and knobbed end 3 μ long.

Remarks.- *T. gutierrezii* and *T. chazeaui* seem to be closely related to several species of the sub-

genus *Anthoseius* known from Africa and Asia; all have three knobbed macrosetae on leg IV, setae Z4 and Z5 serrated and the latter with a blunt end. But, since the descriptions of most of these species are rather superficial, we have restricted the differential diagnosis to the species extensively described by Van der Merwe (1968).

Amblyseius (Amblyseius) bibens
sp. n. (figs. 12-18)

Material studied.- Holotype ♀ (author's serial no. 39/28) and 8 paratypes (7 ♀♀ and 1 ♂) from *Carica papaya* (Caricaceae), Institut de Recherches pour le Coton et le Textile (I.R.C.T.) experimental station, Tuléar, 3.III.1971 (L. Blommers). Other paratypes: ♀ (B24/13) from *Hibiscus esculentus* (Malvaceae), 25.III.1971, ♀ (62/2) and ♂ (50/1) from *Conchorus trilocularis* (Tiliaceae), III.1971, and 2 ♀♀ and 3 ♂♂ (59/1..5) from unidentified plant, 9.III.1971, all in the Agricultural Garden in Tuléar (L. Blommers).

Differential diagnosis.- *A. bibens* resembles *A. teke* Pritchard & Baker, 1962 in many respects. Compared to the redescription of this African species by Van der Merwe (1968), practically all the dorsal setae of *A. bibens* are of inferior length, and faintly serrated (instead of smooth).

Description.- Female: Dorsal shield entirely imbricated, 340µ long and 200µ wide. With at least 20 pairs of pores. 17 pairs of setae on shield; length in microns: j1 20, j3 50, j4 30, j5 45, j6 54, J2 65, J5 10, z4 54, z5 25, Z1 55, Z4 66, Z5 76, s2 56, s4 66, S2 70, S4 50, S5 40. All setae except for j1 and J5 faintly serrated. (The serration is rather fine, and therefore not indicated in the figure). No setae of dorsal series reaching the base of consecutive one. Setae r2 and R1 on the interscutal membrane, 50 and 48µ long. Peritremal shield fused anteriorly with dorsal shield. Peritremes reaching base of setae j3.

Sternal and genital shield imbricated and normal. Ventri-anal shield also imbricated, 125µ long and 100µ wide. Three pairs of approximately equidistant pre-anal setae. Four pairs of setae and seven pairs of pores surrounding ventri-anal shield. VL1 serrated, 64µ long.

Only a macroseta on genu IV, 75µ long.

Fixed digit of chelicera 24µ long, with three

teeth; movable digit 26µ long, with two teeth.

Major duct of spermatheca thin walled and broad, 19µ long and 3µ wide. Bifid atrium 9µ long. Cervix 24µ long, with initial 7µ constricted; its maximal width 7µ.

Male: Length dorsal shield 260µ, width 170µ. r2 and R1 on dorsal shield. Length of setae (in microns): j1 15, j3 34, j4 18, j5 28, j6 30, J2 35, J5 9, z4 38, z5 15, Z1 37, Z4 42, Z5 50, s2 32, s4 45, S2 45, S4 27, S5 25, r2 30, R1 24. j1, J5 and z5 not serrated.

Ventri-anal shield not fused with peritremal shields, 115µ long; with three pairs of pre-anal setae and five pairs of pores. Surrounding membrane with VL1 33µ long and three pairs of pores.

Macroseta on genu IV 54µ long.

Fixed digit of chelicera 19µ long, with two teeth. Movable digit 19µ long, with one tooth; T-shaped spermatophoral process, major portion 12µ long, branches 15 + 7 µ.

Amblyseius (Amblyseius) rotundus
sp. n. (figs. 19-25)

Material studied.- Holotype ♀ (author's serial no. B50. 2-2) and 6 paratypes (4 ♀♀ and 2 ♂♂) from *Ricinus communis* (Euphorbiaceae), Miary near Tuléar, 13.VI.1971 (L. Blommers).

Differential diagnosis.- *A. rotundus* resembles *A. ovalis* (Evans, 1953), but it differs from the latter in the length of the macrosetae on leg IV, the shape of the ventri-anal shield and the form of the spermatheca in the ♀ (as determined and illustrated by Ehara, 1967).

Description.- Female: Dorsal shield feebly sclerotized, reticulate anterodorsally, with at least 19 pairs of pores; 350µ long and 250µ wide. 17 pairs of setae; length in microns: j1 34, j3 22, j4 8, j5 7, j6 8, J2 10, J5 7, z4 11, z5 8, Z1 10, Z4 12, Z5 43, s2 9, s4 15, S2 14, S4 15, S5 15. Z5 slightly serrated. Setae r2 and R1 on interscutal membrane, both 12µ long. Peritremes not reaching in front of setae j3.

Sternal shield not clearly visible in our specimens. Ventri-anal shield 100µ long and 75µ wide, with three pairs of pre-anal setae. Surrounding membrane with four pairs of pores and

four pairs of setae; VL1 30 μ long.

Length of legs (femur-tarsus): leg I 330 μ , leg II 260 μ , leg III 275 μ and leg IV 365 μ . Three macrosetae on leg IV: on genu 65 μ long, on tibia 45 μ and on the basitarsus 80 μ .

Fixed digit (length 23 μ) of chelicera with three subapical teeth. Movable digit (length 24 μ) with one small tooth.

Major duct of spermatheca hardly visible; atrium elongate, somewhat bent, 6 μ long. Cervix long and slender, 25 μ long, narrowing over last 3/5th of its length.

Male: Dorsal shield hardly reticulate. r2 and R1 on dorsal shield. Length of setae (in microns): j1 25, j3 30, j4 7, j5 6, j6 7, J2 9, J5 5, z4 10, z5 8, Z1 9, Z4 9, Z5 42, s2 8, s4 18, S2 13, S4 14, S5 17, r2 13, R1 10. Z5 slightly serrated.

Ventri-anal shield fused with peritremal shields, 100 μ long. Four pairs of pre-anals, four pairs of pores. Two pairs of pores in surrounding membrane; VL1 29 μ long.

Length of tarsi (including basitarsus): leg I 95 μ , leg II 85 μ , leg III 85 μ , leg IV 120 μ . Macrosetae on leg IV: on genu 45 μ , on tibia 38 μ , on basitarsus 60 μ .

Fixed digit of chelicera 20 μ long, with one pronounced subapical tooth. Movable digit 19 μ long, with one small tooth; spermatophoral process linear, terminally pointed, 25 μ long.

Amblyseius (Amblyseius) brevipes
sp. n. (figs. 26-28)

Material studied.- Holotype ♀ (author's serial no. 46/9) and 5 paratypes (3 ♀♀ and 2 ♂♂) from *Carica papaya* (Caricaceae), Tuléar, 13.IV.1970 (J. Gutierrez). Other paratypes: 8 ♀♀ from *Carica papaya*, Tuléar, 3.III.1971 (L. Blommers) and 2 ♀♀ from *Diospyros* sp. (Ebenaceae), Manombo, 50 km N. of Tuléar, 16.V.1971 (L. Blommers).

Differential diagnosis.- *A. brevipes* is similar to *A. rotundus* except for the length of some setae on leg IV and the dorsal shield, the length of the legs and the shape of the spermatheca and the spermatophoral process.

Description.- Female: Dorsal shield as in *A. rotundus* (fig. 23), 340 μ long and 220 μ wide.

Length of setae (in microns): j1 34, j3 25, j4 9, j5 8, j6 10, J2 11, J5 6, z4 13, z5 10, Z1 10, Z4 13, Z5 47, s2 12, s4 24, S2 14, S4 14, S5 15, r2 17, R1 10.

Sternal shield not clearly visible; genital shield normal. Ventri-anal shield 100 μ long and 75 μ wide. Pores and setae as in *A. rotundus* (fig. 20). VL1 32 μ long.

Length of legs: leg I 270 μ , leg II 215 μ , leg III 225 μ and leg IV 310 μ . Three macrosetae on leg IV: on genu 45 μ long, on tibia 42 μ , on basitarsus 72 μ .

Fixed digit of chelicera (length 22 μ) with three teeth; movable digit (length 24 μ) with one.

Major duct of spermatheca not visible; atrium 6 μ long. Cervix slender, 26 μ long, from 8-18 μ constricted.

Male: Dorsal shield reticulate laterally; r2 and R1 on it. Length of setae (in microns): j1 25, j3 28, j4 8, j5 8, j6 9, J2 10, J5 6, z4 15, z5 7, Z1 11, Z4 11, Z5 40, s2 12, s4 22, S2 11, S4 14, S5 15, r2 15, R1 10. Z5 somewhat serrated.

Ventri-anal shield fused with peritremal shields, 100 μ long. Four pairs of pre-anals, four pairs of pores. Two pairs of pores in surrounding membrane; VL1 25 μ .

Length of tarsi: leg I 80 μ , leg II 75 μ , leg III 75 μ , leg IV 110 μ . Macrosetae on leg IV: on genu 32 μ , on tibia 36 μ and on basitarsus 62 μ .

Fixed digit of chelicera 19 μ long, with one tooth. Movable digit 19 μ long, with one tooth; spermatophoral process linear, knobbed at end, 22 μ long.

Remarks.- Both *A. rotundus* and *A. brevipes* agree with the original, but superficial description of *A. ovalis* from Indonesia. Several workers have mentioned the occurrence of this species over great parts of south-eastern Asia, but only Ehara (1967) has described his specimens in sufficient detail. Since our specimens do not compare with the *A. ovalis* of Okinawa Island, we prefer to describe them as new, while our discovery of two so closely related forms seems to indicate that *A. ovalis* in South East Asia may stand for more than one species.

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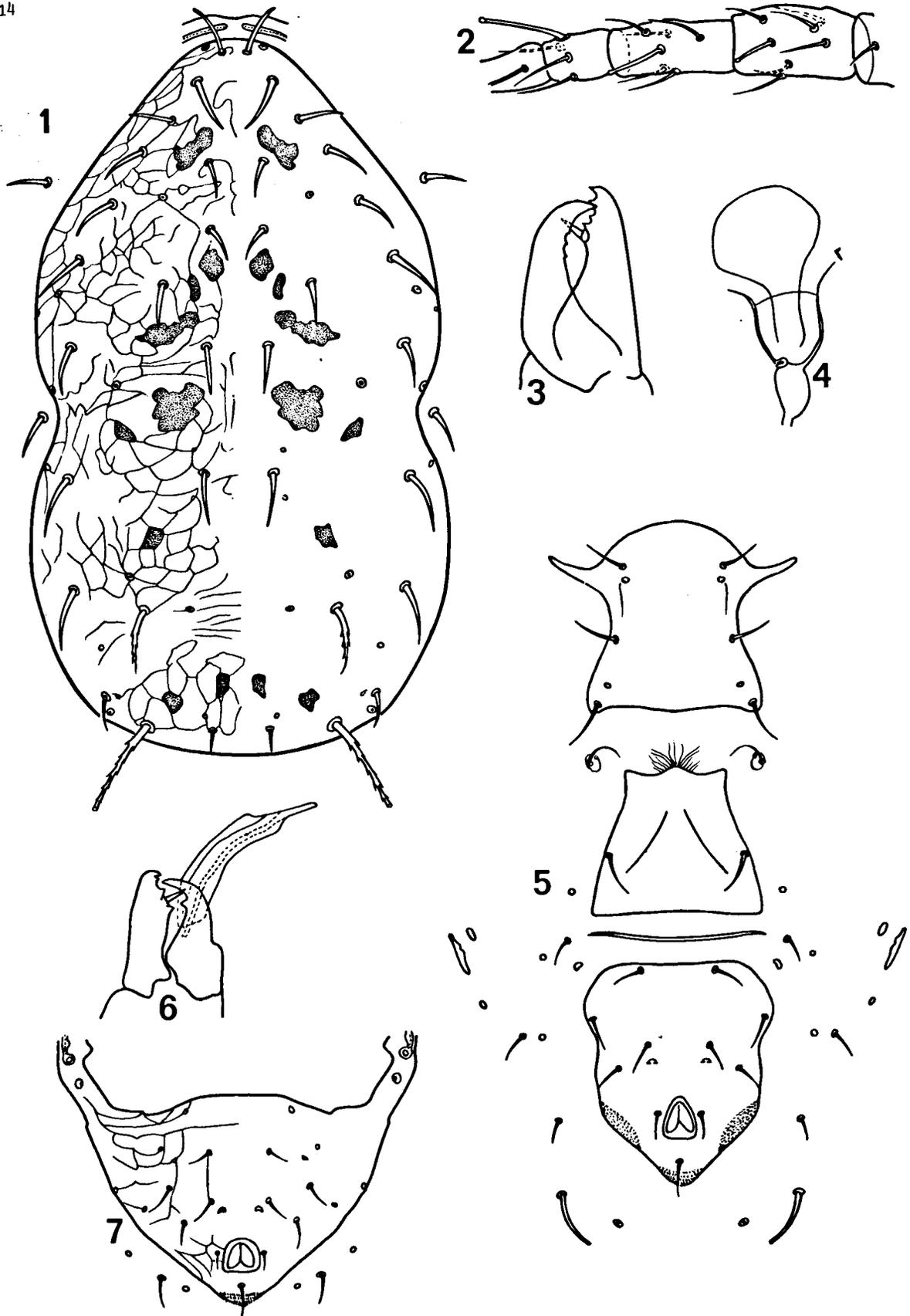
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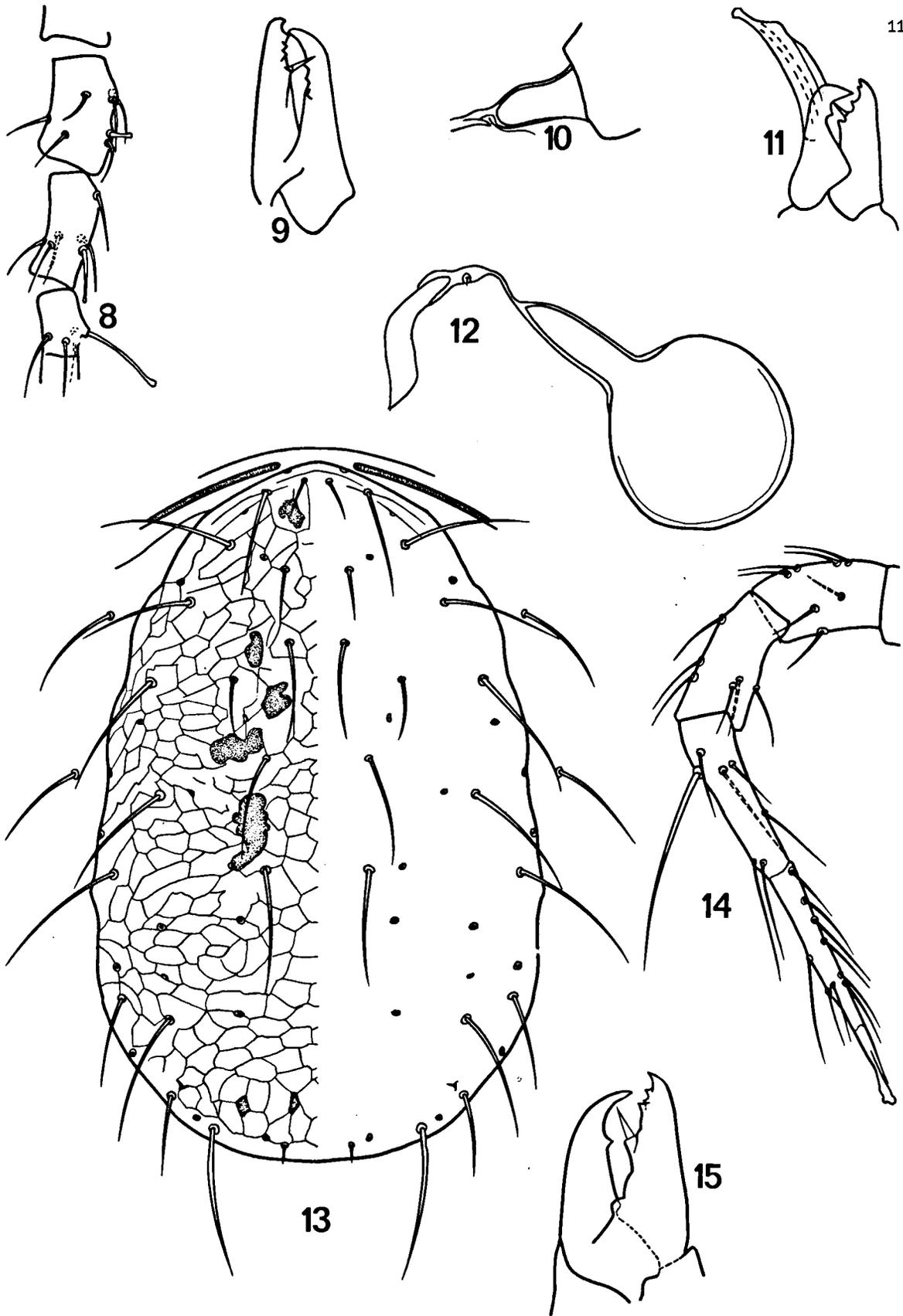
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Figs. 1-7 *Typhlodromus gutierrezii* sp. n. 1-5: ♀. 1, dorsum; 2, leg IV; 3, chelicera; 4, spermatheca; 5, venter.

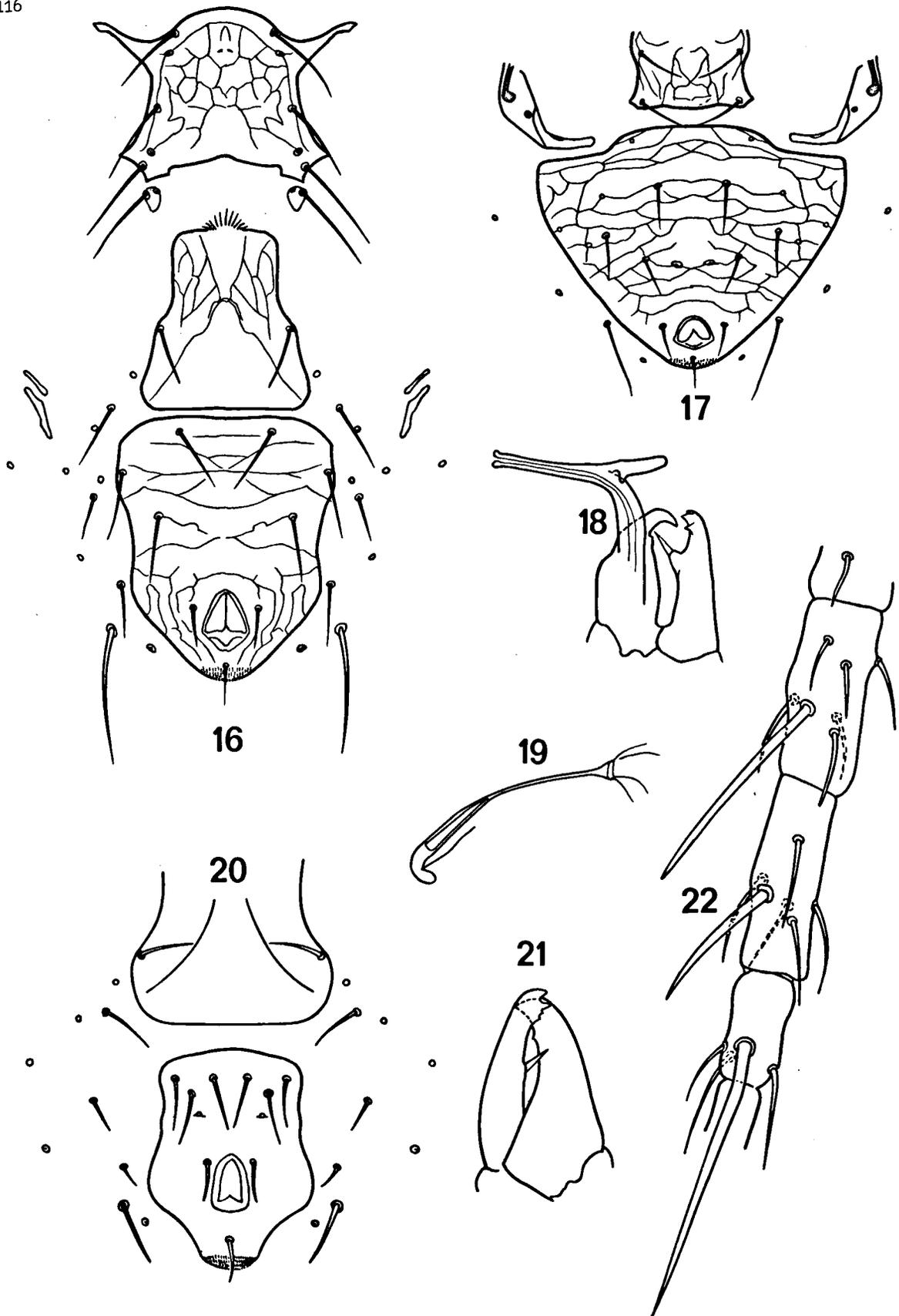
6-7: ♂. 6, chelicera; 7, ventri-anal shield.



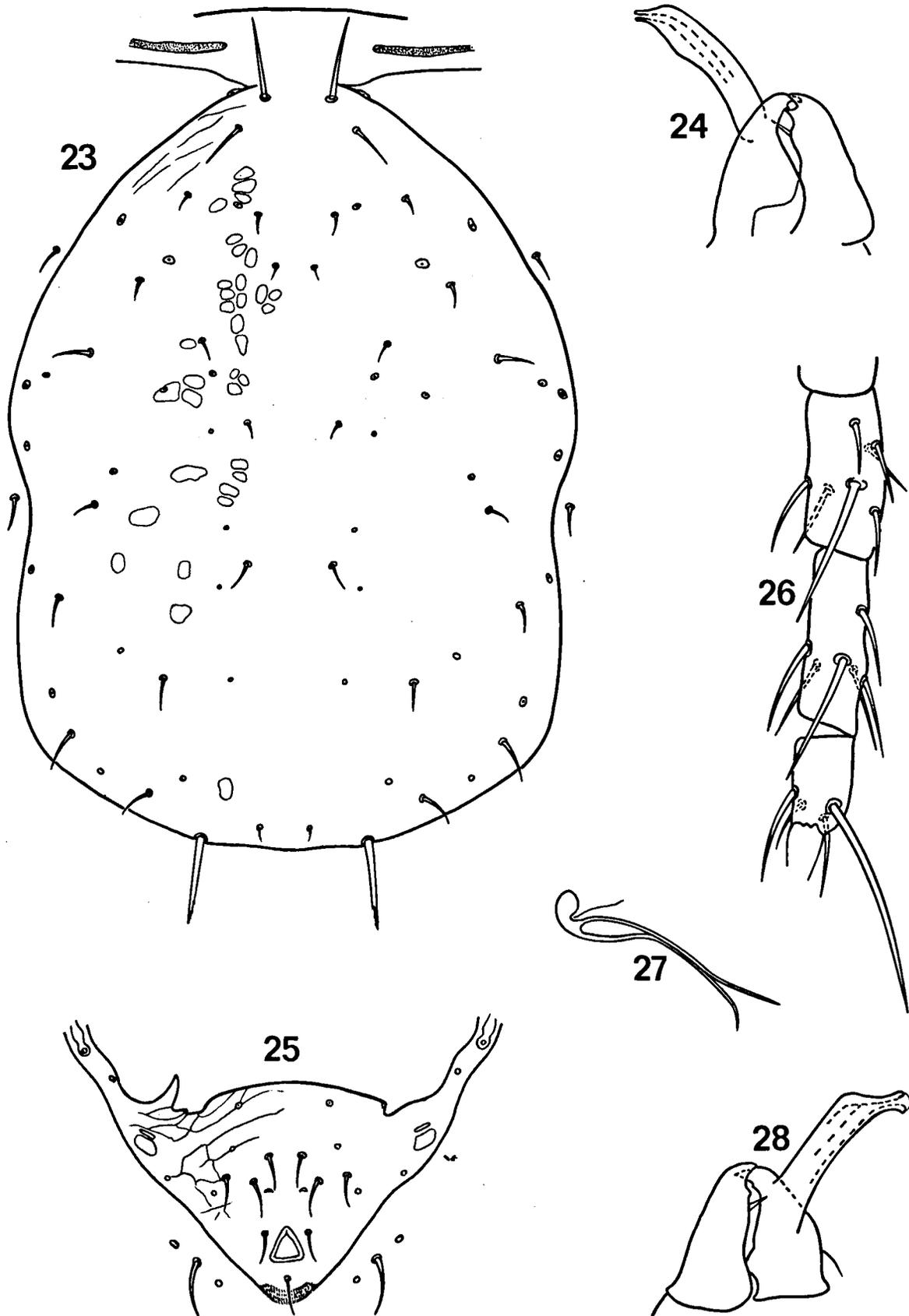
Figs. 8-11 *Typhlodromus chazeaui* sp. n. 8-10: ♀. 8, leg IV; 9, chelicera; 10, spermatheca.

11: ♂. chelicera,

Figs. 12-15 *Amblyseius bibens* sp. n. ♀. 12, spermatheca; 13, dorsum; 14, leg IV; 15, chelicera.



Figs. 16-18 *Amblyseius bibens* sp. n. 16, venter; ♀. 17, ventri-anal shield, ♂; 18, chelicera, ♂.
 Figs. 19-22 *Amblyseius rotundus* sp. n., ♀. 19, spermatheca; 20, venter; 21, chelicera; 22, leg IV.



Figs. 23-25 *Amblyseius rotundus* sp. n. 23, dorsum, ♀; 24, chelicera, ♂; 25, ventri-anal shield, ♂.
 Figs. 26-28 *Amblyseius brevipes* sp. n. 26, leg IV, ♀; 27, spermatheca, ♀; 28, chelicera, ♂.