

The genus *Typhochrestus* SIMON 1884 in North Africa (Araneae : Linyphiidae : Erigoninae).

Studies on North African Linyphiidae V.

by Robert BOSMANS & Ourida ABROUS

Summary

Seven new species of the genus *Typhochrestus* SIMON are described from North Africa: *T. bogarti* sp. n., *T. mauretanicus* sp. n., *T. numidicus* sp. n., *T. spatulatus* sp. n., *T. splendidus* sp. n., *T. ultimus* sp. n., and *T. virilis* sp. n. The male of *T. bifurcatus* SIMON is redescribed, and its females is described for the first time. *Diplocephalus curvicervix* DENIS is transferred to the genus *Typhochrestus*, and *Tapinocyba jacksoni* DENIS 1936 is considered a junior synonym of *Typhochrestus digitatus* (O.P. CAMBRIDGE 1872).

Keywords: Araneae, *Typhochrestus*, revision.

Résumé

Sept nouvelles espèces du genre *Typhochrestus* SIMON sont décrites de l'Afrique du Nord: *T. bogarti* sp. n., *T. mauretanicus* sp. n., *T. numidicus* sp. n., *T. spatulatus* sp. n., *T. splendidus* sp. n., *T. ultimus* sp. n., et *T. virilis* sp. n. Le mâle de *T. bifurcatus* SIMON est redécrit, et la femelle est décrite pour la première fois. *Diplocephalus curvicervix* DENIS est transféré au genre *Typhochrestus*, et *Tapinocyba jacksoni* DENIS 1936 est considéré comme un synonyme de *Typhochrestus digitatus* (O.P. CAMBRIDGE 1872).

Mots-clés: Araneae, *Typhochrestus*, revision.

Introduction

North African linyphiid spiders are very poorly known, except for some genera treated in our previous papers: *Troglohyphantes*, *Lepthyphantes* (BOSMANS 1985a), *Oedothorax* (BOSMANS 1985b), and *Centromerus* (BOSMANS 1986). However, the distribution of the species remains to be precised, and no doubt further new species will be discovered.

Spiders of the genus *Typhochrestus* are among the smallest erigonid spiders. Several species have been assigned to this genus, but only after HOLM's (1943) redefinition, the exact delimitation of the genus is fully understood. The diagnostic characters are:

for both sexes:

- metatarsus IV without trichobothrium.
- tibiae I-III with two spines. Tibia IV with one spine; all spines shorter than the tibia's diameter.

for the males:

- cephalothorax elevated behind the eye region, with postocular sulci;

- palpal tibia with small rounded tip, mostly with two lateral teeth; they can be considered as retrolateral, median and prolateral teeth or apophyses;
- embolus long, threadlike and spirally coiled;
- at its base with an apophysis (embolar apophysis), directed to the tip of the embolus;
- tegular apophysis developed into a membranous conductor;

for the females:

- epigyne posteriorly provided with a plate of variable form ("posteromedian plate"), preceded by a depression or pit ("anchoring hole");
- vulva with long entrance ducts.

The species actually included in the genus are:

Genus *Typhochrestus* SIMON 1884

- alticola* DENIS, 1953: Pyrénées (2790 m), Corsica;
- digitatus* (O.P.-CAMBRIDGE, 1872): Central Europe, Norway;
- fortunatus* THALER, 1984: La Gomera (1200 m);
- hesperius* THALER, 1984: Tenerife (1600-2100 m);
- jeniseicus* ESKOV, 1961: Siberia;
- inflatus* THALER, 1980: Tirol, Trentino (600-2100 m);
- latithorax* (STRAND, 1905): Greenland;
- montanus* WUNDERLICH, 1987: La Palma (2000 m);
- paradorensis* WUNDERLICH, 1987: Gran Canaria (altitude ?);
- parvus* KULCZYNSKI, 1926: Kamschatka;
- pygmaeus* (SØRENSEN, 1898): Greenland;
- simoni* LESSERT, 1907: Central Europe;
- tenuis* HOLM, 1943: Scandinavia.

According to THALER (1984), the status of five more species is uncertain: *bifurcatus* SIMON, 1884 (Algeria), *brucei* TULLGREN, 1955 (Sweden), *cyrenanius* DENIS, 1964 (Lybia), *dubius* DENIS, 1949 (France) and *sylviae* HAUGE, 1968 (Norway).

Thus, only doubtful species are known from North Africa: *bifurcatus* and *cyrenanius*. DENIS (1964) claimed to have a yet undescribed female from Morocco in his collection, but its description was never published.

Description of species

The following abbreviations are used in the text :

Fe, Pa, Ti, Mt, Ta : femur, patella, tibia, metatarsus, tarsus.

Tm : position of the metatarsal trichobothrium.

AE, PE, AME, ALE, PME, PLE : anterior, posterior, anterior median, anterior lateral, posterior median and posterior lateral eyes.

M.F. : Maison forestière.

MNHNP : Muséum national d'Histoire naturelle de Paris.

IRSNB : Institut royal des Sciences naturelles de Belgique.

W : Wilaya.

The left male palp and parts of the left palp are illustrated in the figures. Measurements are in mm.

Typhochrestus bifurcatus SIMON (Figs. 1-7)

Typhochrestus bifurcatus SIMON 1884 : 584 (Descr. ♂).

Diagnosis :

T. bifurcatus can be distinguished from related species by the sharp, laterally directed median tooth on the palpal tibia, by the well-developed, nearly straight embolar apophysis (in the male), and by the strongly developed, narrow entrance ducts in the female vulva.

Description :

Male holotype :

Length 1.34. Cephalothorax 0.62×0.49 . Sternum 0.37×0.33 .

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tm
I	0.48	0.15	0.35	0.27	0.22	1.47	0.38
II	0.42	0.15	0.28	0.27	0.24	1.36	0.35
III	0.34	0.14	0.26	0.22	0.18	1.14	0.33
IV	0.46	0.14	0.38	0.30	0.25	1.53	—

Colour : Yellowish orange; a triangular spot before the fovea and margin greyish; sulci darkened; legs and sternum yellowish orange, the latter suffused with grey; abdomen grey to dark grey. Cephalothorax (figs. 1-2) : High behind the eye region, with a small boss; sulci long and slitlike. PME separated by their diameter, from the PLE by $1.5 \times$ their diameter. Chelicerae with about 15 well-developed stridulating files.

Palp (figs. 3-4) : Tibial teeth with narrow base, strongly widening, with rounded retrolateral tooth, sharp, laterally directed median tooth and anteriorly directed prolateral tooth.

Scaphium rounded at its base. Embolus circular (fig. 5), describing 1.5 circle, terminally pointed in anterior direction; embolar apophysis linear, nearly straight. Embolar conductor membranous, strongly developed.

Female :

Length 1.94. Cephalothorax 0.71×0.52 . Sternum 0.42×0.39 .

Legs	Fe	Pt	Ti	Mt	Ta	Total	Tm
I	0.57	0.18	0.49	0.36	0.35	1.95	0.37
II	0.48	0.18	0.43	0.35	0.31	1.85	0.34
III	0.48	0.14	0.33	0.32	0.28	1.55	0.31
IV	0.57	0.18	0.56	0.43	0.32	1.96	—

Colour as in the male. PME separated by their diameter, from the PLE by $4/3$ their diameter.

Epigyne (fig. 6) : Posteromedian plate triangular; anchoring hole long and rounded, far from the posteromedian plate; entrance ducts in most cases visible in transparency. Vulva (fig. 7) : Spermathecae separated by their diameter; entrance ducts strongly developed, nearly $3x$ as long as the diameter of the spermathecae.

Material examined :

ALGERIA : W. Tlemcen : Tlemcen, holotype male (MNHNP, examined). W. Sidi Bel Abbes : 20 km W. Merine, 1 male 14 females in litter, 30.I.1977 (A.P.B. DEELEMEN leg.).

W. Saida : Tifrit, 925 m, 1 male 2 females in litter of mixed *Quercus ilex* and *Juniperus* forest, 4.V.1984.

MOROCCO : 10 km S. Tetouan, 125 m, 1 female in pitfall in young *Eucalyptus* plantation, 15.IV.1984; E. Khenifra, Lake Azigza, 1575 m, 2 females in litter of mixed forest of *Cedrus* and *Quercus faginea*, 13.V.1984; E. Khenifra, Oum El Rbia, 1450 m, 1 male among stones along a rivulet, 13.V.1984; 16 km W. Ketama, 1750 m, 13 males in pitfall in *Cedrus* forest, 15.V.1984.

Distribution :

N.W. Algeria, N. Morocco (map 1).

Typhochrestus bogarti BOSMANS sp. n. (Figs. 8-12)

Diagnosis :

The species is closely related to *T. hesperius* THALER from Tenerife regarding the three teeth in the palpal tibia, but differs distinctly by the twisted form of the embolar apophysis.

Description :

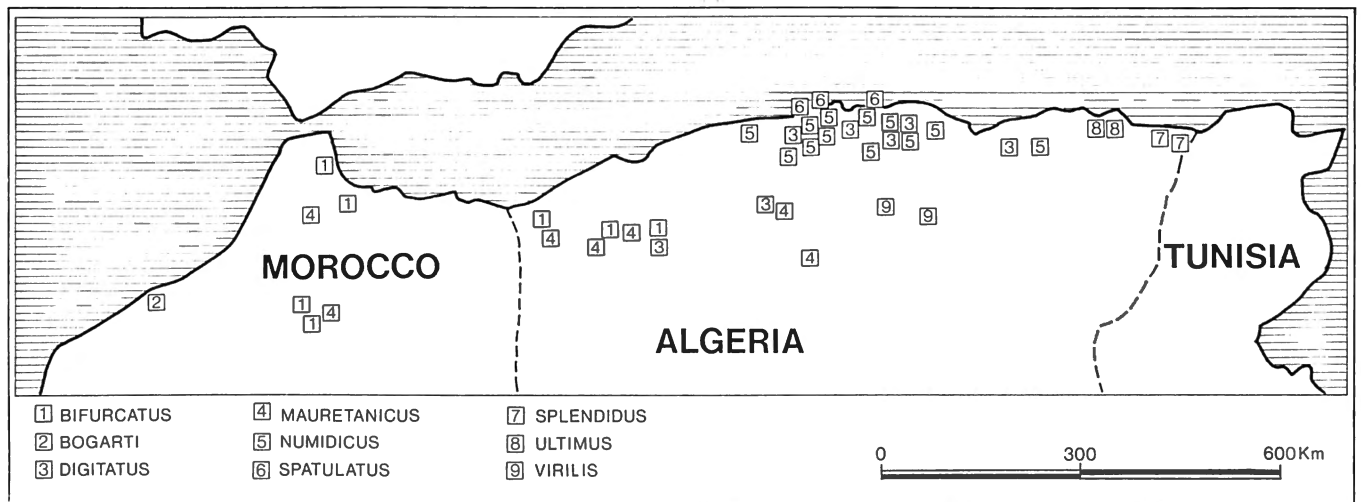
Male holotype (female unknown) :

Length 1.48. Cephalothorax 0.67×0.50 . Sternum 0.51×0.47 . Legs :

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tm
I	0.50	0.17	0.48	0.32	0.28	1.75	0.44
II	0.47	0.16	0.39	0.29	0.27	1.58	0.41
III	0.42	0.14	0.28	0.31	0.25	1.40	0.39
IV	0.56	0.14	0.50	0.39	0.28	1.87	—



Figures 1-7. *Typhochrestus bifurcatus* SIMON. 1. Male cephalothorax, lateral view; 2. *Idem*, dorsal view; 3. Male palp, lateral view; 4. Male palpal tibia, dorsal view; 5. Embolus, anteroventral view; 6. Epigyne; 7. Vulva. Scale line : 0.5 mm (1-2); 0.2 mm (3-7).



Map 1. Distribution of ten *Typhochrestus* species in North Africa. 1. *bifurcatus* SIMON; 2. *bogarti* sp. n.; 3. *digitatus* (O.P. CAMBRIDGE); 4. *mauretanicus* sp. n.; 5. *numidicus* sp. n.; 6. *spatulatus* sp. n.; 7. *splendidus* sp. n.; 8. *ultimus* sp. n.; 9. *virilis* sp. n.; 10. *curvicervix* (DENIS).

Colour : Cephalothorax brown, eye region, margin and interior margin of sulci dark grey; legs yellowish orange, Pa and Ta pale yellowish; sternum dark brown; abdomen dark grey.

Cephalothorax (figs. 8-9) : Rather strongly elevated behind the PME, with some scattered hairs; postocular sulci well-developed, gently curved. PME separated by their diameter, from the PLE by 1.5 their diameter. Chelicerae with poorly developed stridulating organ composed of 12 ridges.

Palp (fig. 10-12) : Tibia obliquely truncated, the three apical teeth of about equal size, the prolateral one more rounded. Scaphium rather elongated with rounded base. Embolus describing 1.5 circle (fig. 13), terminally simply rounded, with a small inner tooth; embolar apophysis conspicuous, twisted; embolar conductor membranous, well developed.

Type material :

MOROCCO : Casablanca, holotype male, in pitfall, deposited in IRSNB.

Distribution :

Only known from the type locality in Morocco.

Etymology :

The species is dedicated to the actor Humphrey BOGART, especially to his performance in the film Casablanca, the type locality of this species.

Typhochrestus digittatus (O.P.-CAMBRIDGE) (Figs. 13-19)

Typhochrestus digittatus; DENIS 1967 : 159.

Tapinocyba jacksoni DENIS 1936 : 1042 (N. SYN.).

Diagnosis :

In fresh specimens, this species is at once distinguished by its dark colour. Males are furthermore easily recognized by the highly elevated cephalon and by the truncated tibial apophysis on the palp; females by the rectangular posterior median plate in the epigyne.

Description :

Male :

Colour : Cephalothorax brown, ocular region, fovea, striae and margin dark grey; chelicerae and sternum grey brown; legs brownish; abdomen dark grey.

Cephalothorax (fig. 13-14) with marked cephalic lobe. PME separated by their diameter, from the PLE by 1.5 × their diameter.

Palp (fig. 15-16) : Tibia obliquely truncated in dorsal view, with small retrolateral lobe, distinct, crestlike median tooth and blunt prolateral tooth. Embolus threadlike (fig. 17), thicker as in other species, describing a small circle; embolar apophysis semi-circular, with median mesal tooth.

Female :

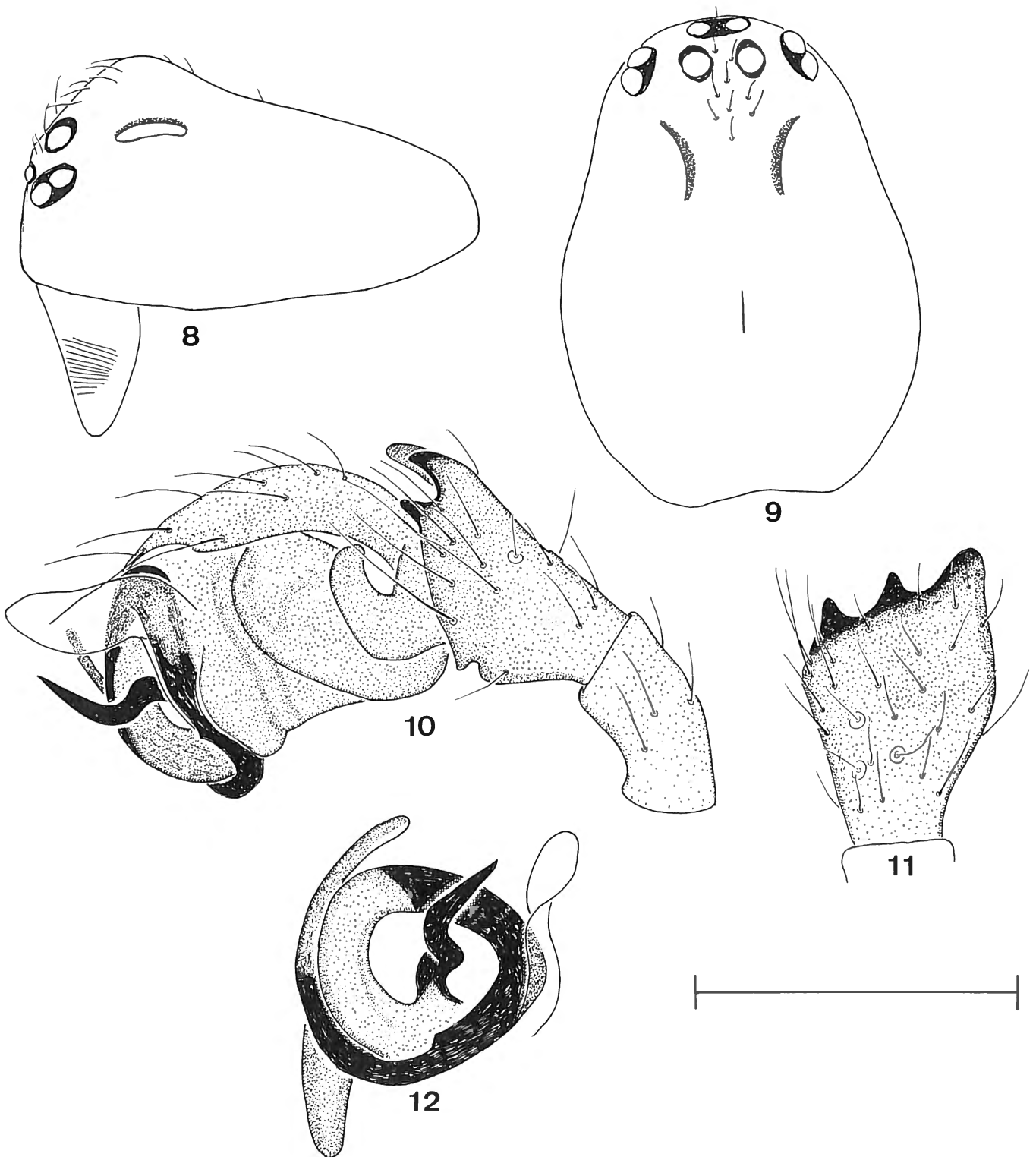
Colour as in the male. PE separated by their diameter.

Epigyne (fig. 18) : With median rectangular plate, strongly depressed in front. Anchoring hole indistinct, entrance ducts not or hardly visible in transparency.

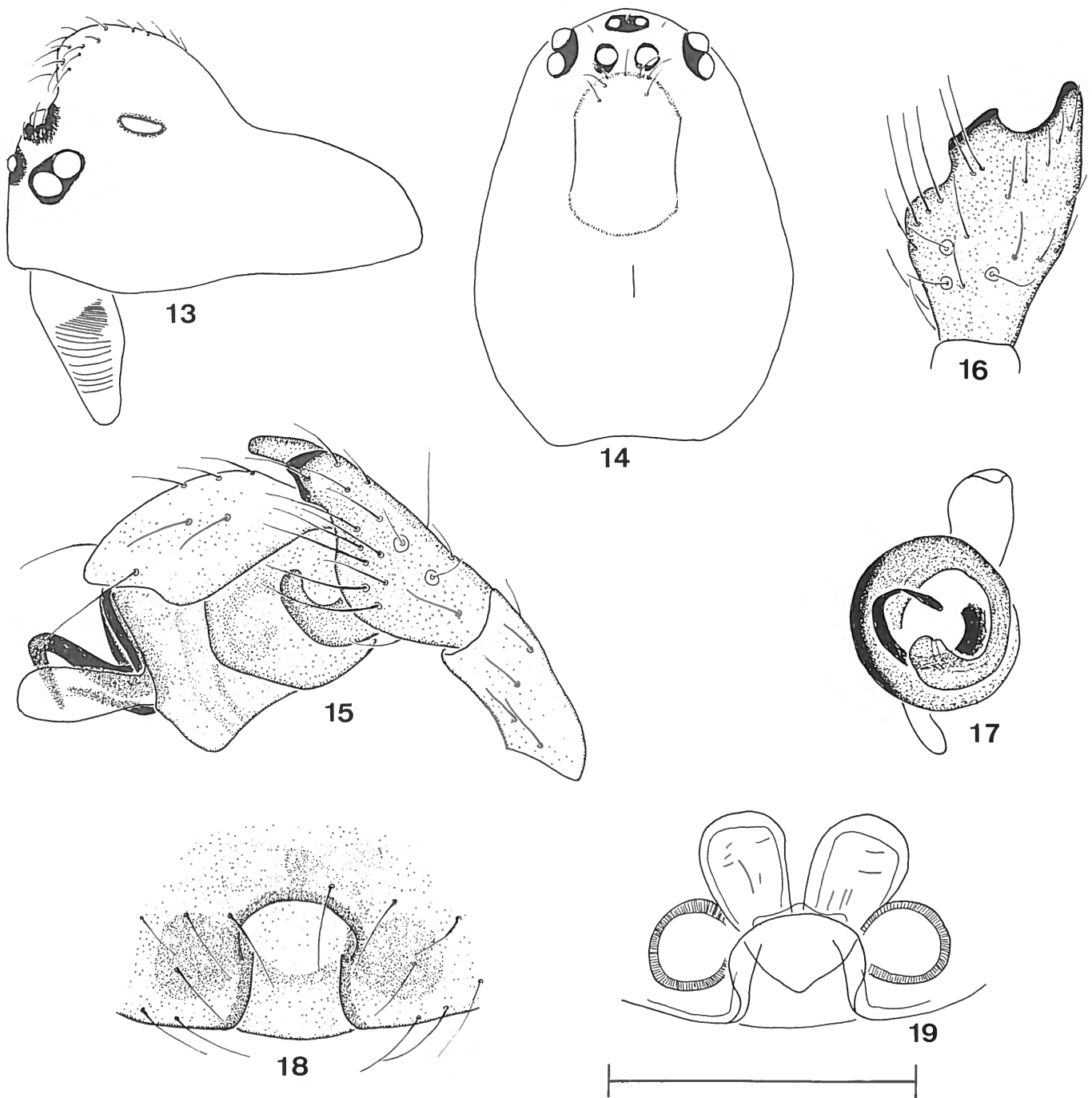
Vulva (fig. 19) : Receptacula separated by 1.5 times their diameter. Entrance ducts relatively short, rounded, not much wider than the receptacula.

Material examined :

ALGERIA : W. Blida : Atlas de Blida, Chrea, 1550 m, 2 females among stones in montane grassland, 15.II.1987; idem, Meurdja, 900 m, 1 female in grassland, 10.IV.1986; idem, 950 m, 1 female in *Cedrus* plantation, 1.IV.1982; idem, 1 female in pitfall in *Cedrus* plantation, 25.IV.1982; idem, Col des Deux Bassins, 920 m, 1 male, 1 female, in



Figures 8-12. *Typhochrestus bogarti* sp. n. 8. Male cephalothorax, lateral view; 9. *Idem*, dorsal view; 10. Male palp, lateral view; 11. Male palpal tibia, dorsal view; 12. Embolus, anteroventral view. Scale line : 0.5 mm (8-9); 0.2 mm (10-12).



Figures 13-19. *Typhochrestus digittatus* (O.P.-CAMBRIDGE). 13. Male cephalothorax, lateral view; 14. *Idem*, dorsal view; 15. Male palp, lateral view; 16. Male palpal tibia, dorsal view; 17. Embolus, anteroventral view; 18. Epigyne; 19. Vulva. Scale line : 0.5 mm (13-14); 0.2 mm (15-19).

pitfalls in *Cedrus* plantation, 18.II.1989. W. Bouira : Massif du Djurdjura, Col de Tizi 'n Kouillal, 1600 m, 1 female in montane grassland, 15.IV.1982.

W. Saida : 40 km SE Saida, M.F. de Oum Djerane, 1300 m, 1 female among stones in *Quercus ilex*-maquis, 1.X.1981.

W. Setif : Djebel Babor, SE slope, 1650 m, 4 females in pitfalls in *Cedrus* forest, 19.V.1982; *idem*, N. slope, 1650 m, 2 females in pitfalls in *Cedrus* forest, 21.IV.1982; *idem*, 1850 m, 1 male, 2 females, pitfalls in mixed *Cedrus*, *Abies*

and *Quercus faginea* forest, 3.XI.1986; 1850 m, 2 male, 4 females in montane grassland, 1.XI.1986.

W. Tissemsilt : Theniet-el-Had, Massif de l'Ouarsenis, Djebel Meddad, 1500 m, 2 males, 9 females in litter of *Cedrus* forest, 18.II.1988.

W. Tizi Ouzou : Massif du Djurdjura, Tala Guilef, 1400 m, 3 females in montane grassland, 23.IV.1984; *idem*, 1600m, 1 female in montane grassland. E. Yakouren, 850 m, 1 male, 1 female in *Erica arborea* litter, 4.XII.1986.

MOROCCO : Casablanca (DENIS 1967).

Synonymie :

Tapinocyba jacksoni DENIS 1936 was described from the Zouagha forest, "Petite Kabylie", in Algeria. The single female was not available for study and is probably lost. "Petite Kabylie" occupies the Wilaya's of Sétif and Bejaia, where two species of *Typhochrestus* (having the same chaetotaxy as *Tapinocyba*) occur: *T. digittatus*, and *T. numidicus* sp. n., described further in this paper. The darker colour of the cephalothorax and DENIS' picture of the epigyne agrees very well with *digittatus*. *Tapinocyba jacksoni* is therefore considered a junior synonym of *Typhochrestus digittatus*.

Distribution :

Europe and North Africa. In Algeria, *Typhochrestus digittatus* only occurs in montane forests or grasslands; it was collected from 900 up to 1850 m. In view of this, DENIS citation of 1967 from Casablanca, nearly at sea level, seems doubtful, and could very well concern *T. bogarti* sp. n. Most probably, *T. digittatus* occurs in the Moroccan Atlas.

***Typhochrestus mauretanicus* BOSMANS sp. n.**
(Figs. 20-26)

Diagnosis :

T. mauretanicus sp. n. is diagnosed by genital characters only: the shape of the tibial teeth and the linear embolar apophysis in the male palp; the transverse, rectangular posteromedian plate in the female epigyne.

Description :

Male holotype :

Length 1.68; cephalothorax 0.71 × 0.50; sternum 0.40 × 0.38.

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tm
I	0.50	0.14	0.42	0.32	0.29	1.67	0.40
II	0.46	0.13	0.36	0.31	0.28	1.54	0.37
III	0.39	0.13	0.28	0.26	0.24	1.30	0.33
IV	0.64	0.14	0.45	0.34	0.28	1.84	—

Colour: Cephalothorax yellowish orange, cephalic part somewhat darker, margin and sulci narrowly bordered with grey; chelicerae orange brown; sternum yellowish orange; legs yellowish orange, patellae and tarsi paler; abdomen grey.

Cephalothorax (figs. 20-21): With rounded elevation behind the eye region, and rather short and narrow sulci. PME separated by their diameter, from the PLE by 1.5 × their diameter. Chelicerae with 14-15 well-developed striulating ridges.

Palp (Figs. 22-24): Tibia strongly widening from its base, with rounded pro- and retrolateral teeth and bluntly pointed median tooth. Embolus threadlike, describing 1.5 circle, without supplementary teeth, apically rounded; embolar

apophysis narrow, linear, joining tip of embolus with a strong concavity.

Female paratype :

Length 1.65 mm; cephalothorax 0.67 × 0.46; sternum 0.35 × 0.32.

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tm
I	0.45	0.13	0.32	0.25	0.22	1.37	0.40
II	0.42	0.14	0.27	0.24	0.23	1.30	0.38
III	0.36	0.14	0.22	0.21	0.20	1.13	0.30
IV	0.50	0.15	0.36	0.29	0.26	1.56	—

Colour as in the male. PME separated by their diameter, from the PLE by 1.5 their diameter.

Epigyne (fig. 25): With rectangular, slightly depressed posteromedian plate, and triangular anchoring hole preceding it; entrance ducts clearly visible in transparency.

Vulva (fig. 26): Spermathecae separated by 4/3 their diameter. Entrance ducts long, U-shaped.

Type material and other material examined :

ALGERIA: W. Tissemsilt: Theniet-el-Had, Massif de l'Ouarsenis, Djebel Meddad, 1500 m, 1 male (holotype) in pitfall in mixed *Cedrus* and *Q. ilex* forest, 3.V.1984; idem, 2 males, 1 female in mixed *Cedrus* and *Q. faginea* forest, 18.II.1988 (all paratypes).

W. Djelfa: Djebel Senalba, 1450 m, 3 males, pitfall in *Pinus halepensis* forest, 11.III.1989; 1 male, 4.VI.1984.

W. Saida: Monts de Daia, M. F. de Merdja, 750m, 1 female in litter of *Populus alba* forest, 4.VI.1984.

W. Sidi-bel-Abbes: 20 km W. Merin, 3 males, 1 female in litter and among stones (together with *T. bifurcatus*), 30.I.1977 (A.P.B. DEELEMANN leg.).

W. Tlemcen: S. Tlemcen, Col d'Hafir, 900 m, 1 female, flooded orchard along the Oued Tafna, 5.V.1984; Col de Tal Terny, S. slope, 1300 m, 3 males in pitfall in *Q. ilex* forest, 6.V.1984.

MOROCCO: 10 km E. Ouezzane, 1 male 6 females in litter, 2.II.1977 (A.P.B. DEELEMANN leg.); E. Kenifra, Lac Azigza, 1575 m, 1 female in mixed *Cedrus* - *Q. ilex*-forest, 13.V.1984.

Distribution :

N.W. Algeria, N.E. Morocco.

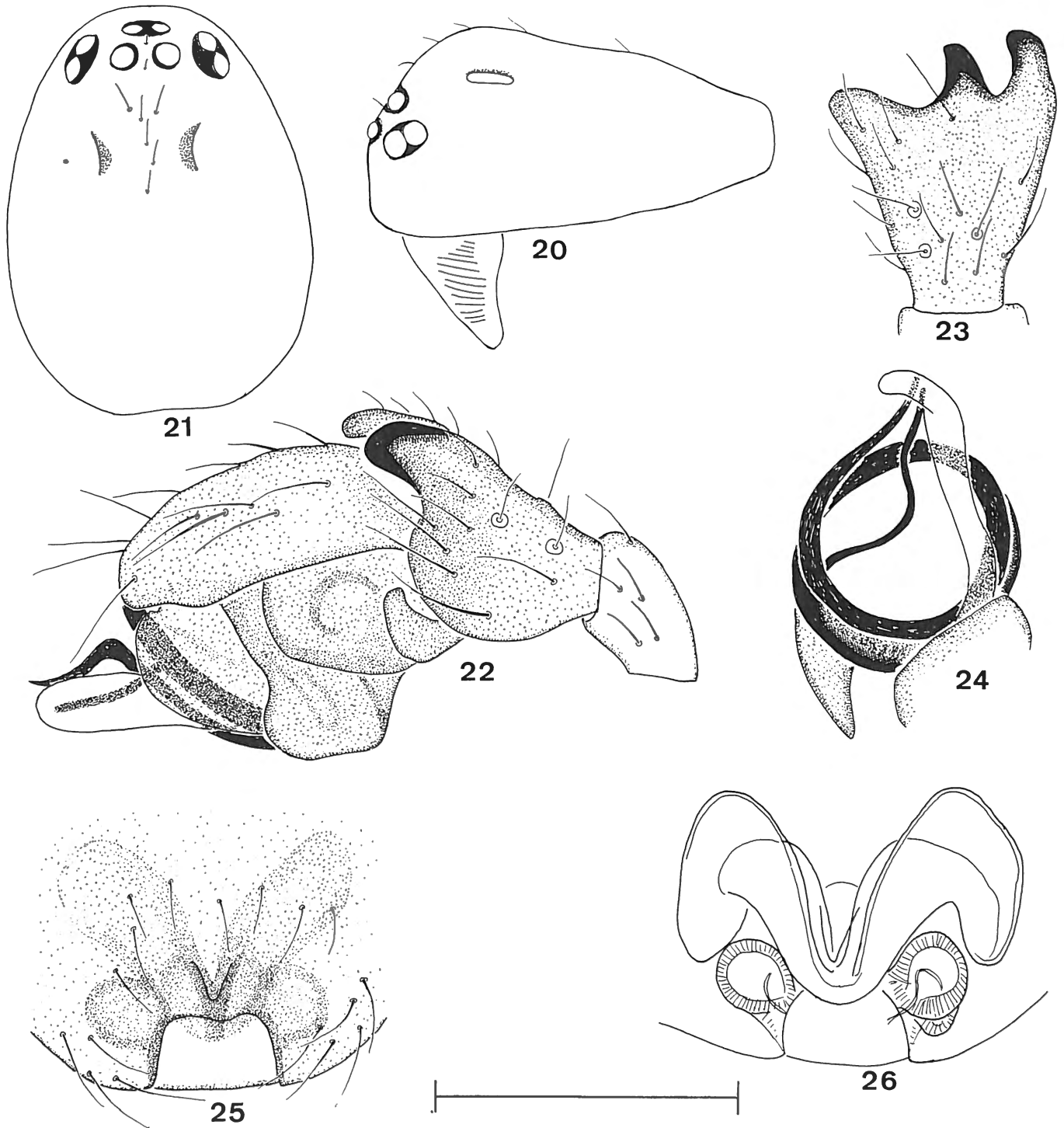
Etymology :

The distribution of this new species agrees more or less with the ancient Roman province Mauretania.

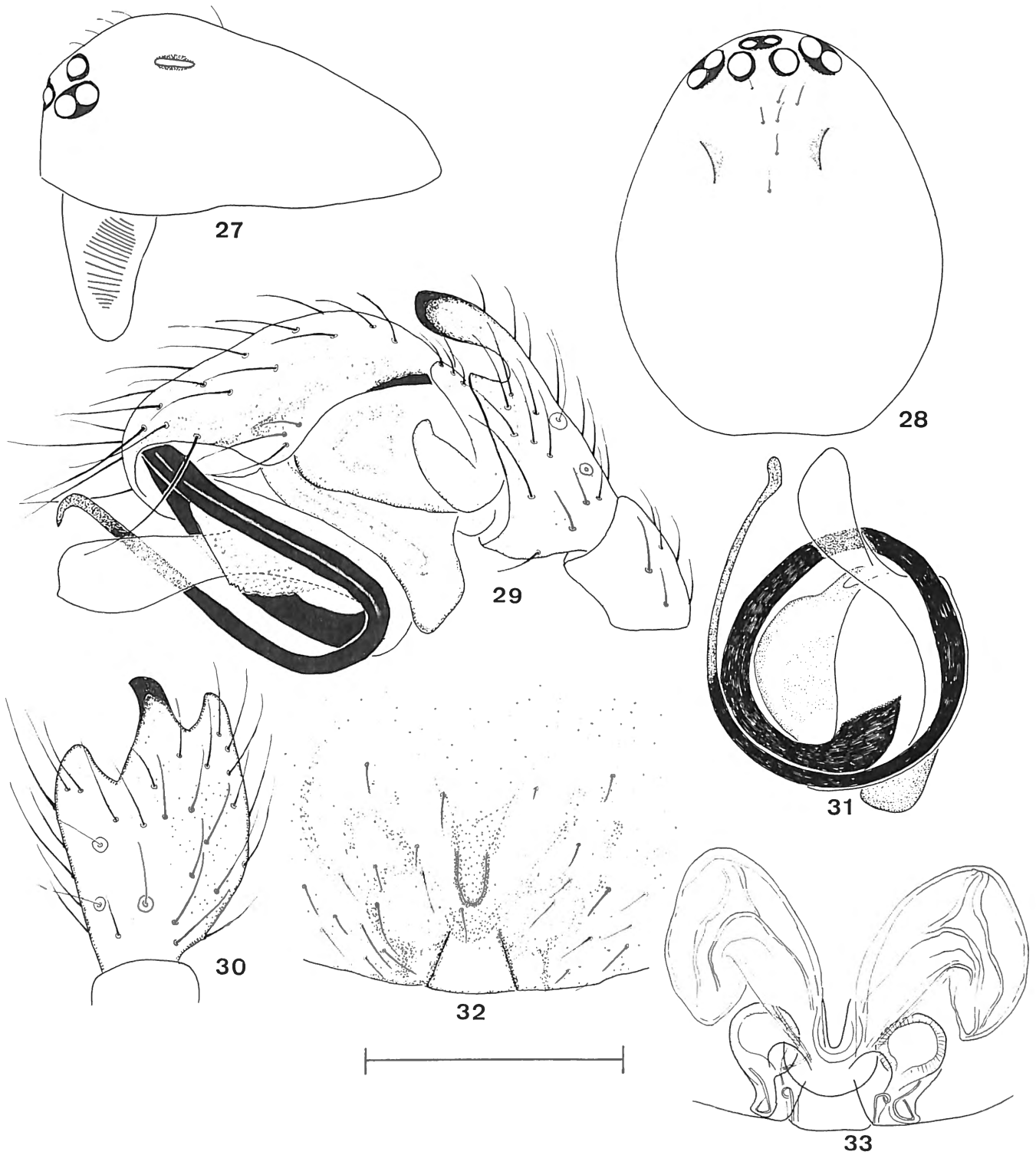
***Typhochrestus numidicus* BOSMANS sp. n.**
(Figs. 27-33)

Diagnosis :

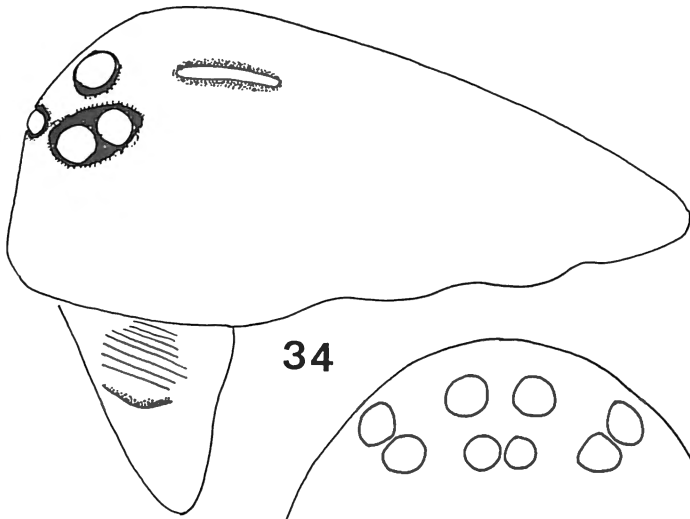
The male of *Typhochrestus numidicus* n. sp. is easily



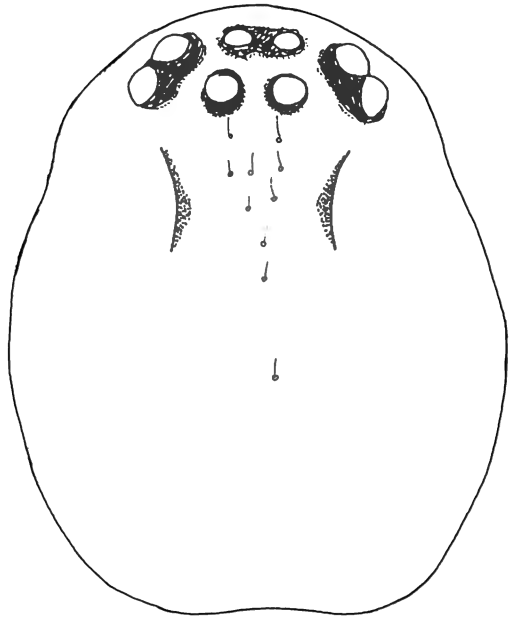
Figures 20-26. *Typhochrestus mauretanicus* sp. n. 20. Male cephalothorax, lateral view; 21. Idem, dorsal view; 22. Male palp, lateral view; 23. Male palpal tibia, dorsal view; 24. Embolus, anteroventral view; 25. Epigyne; 26. Vulva. Scale line : 20-21 : 0.5 mm; 22-26 : 0.2 mm.



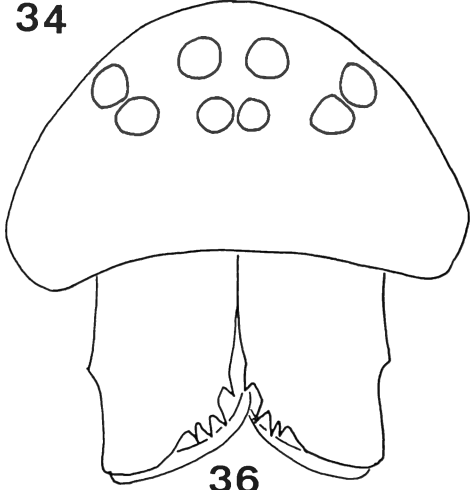
Figures 27-33. *Typhochrestus numidicus* sp. n. 27. Male cephalothorax, lateral view; 28. Idem, dorsal view; 29. Male palp, lateral view; 30. Male palpal tibia, dorsal view; 31. Embolus, anteroventral view; 32. Epigyne; 33. Vulva. Scale line : 27-28 : 0.5 mm; 29-33 : 0.2 mm.



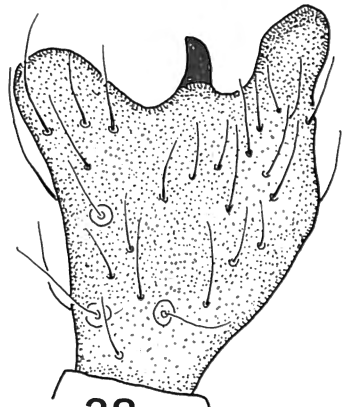
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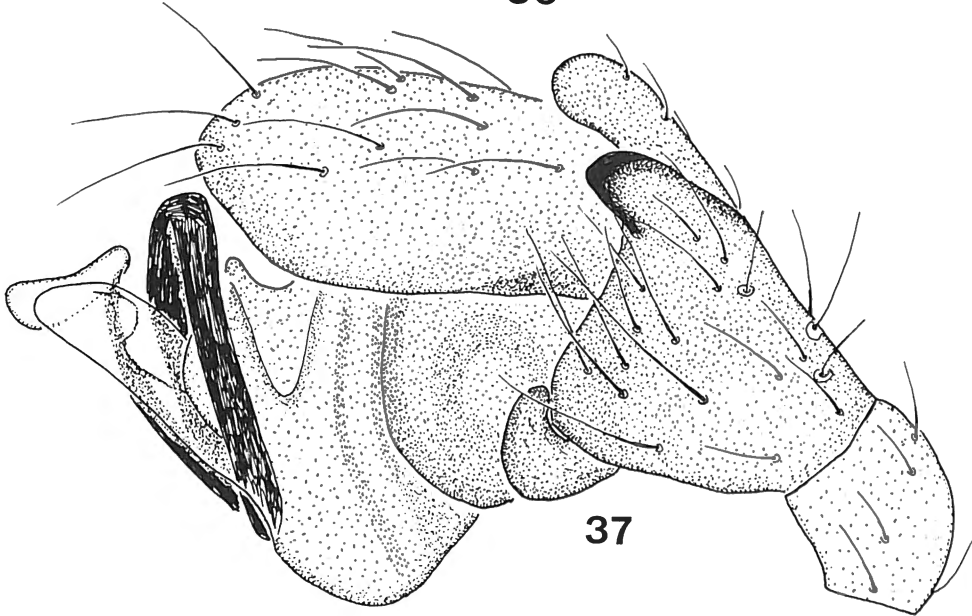
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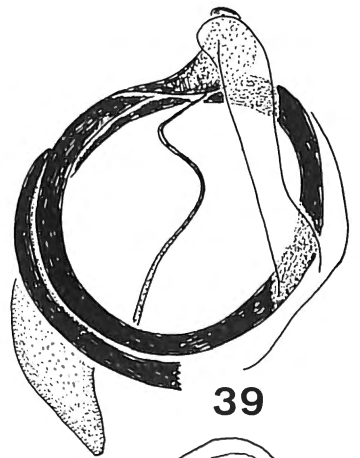
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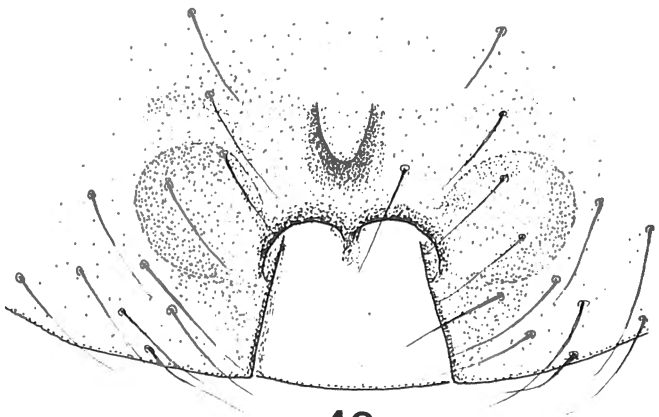
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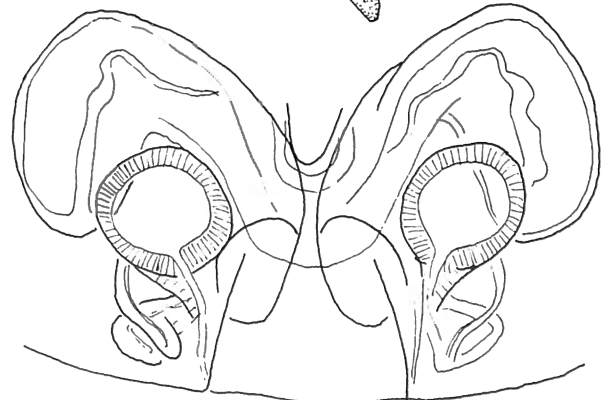
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recognized by the large median teeth on the palpal tibia, by the very wide embolar circle, and by the absence of an embolar apophysis; the female by the trapeziumlike posteromedian plate and the strongly developed U-shaped entrance ducts.

Description :

Male holotype :

Length 1.40. Cephalothorax 0.71×0.52 . Sternum 0.41×0.36 .

Legs	Fe	Pa	Tb	Mt	Ta	Total	Tm
I	0.46	0.14	0.45	0.31	0.28	1.64	0.41
II	0.44	0.14	0.36	0.27	0.22	1.43	0.39
III	0.37	0.14	0.36	0.25	0.23	1.35	0.31
IV	0.50	0.15	0.43	0.33	0.24	1.65	—

Colour : Cephalothorax yellowish orange, sulci bordered with grey; chelicerae orange brown; sternum and legs yellowish orange; abdomen grey.

Cephalothorax (figs. 27-28) : Gently rounded behind the eye region; postocular sulci rather short. PME separated by their diameter, from the PLE by 1.5 their diameter. Chelicerae with 17-18 stridulating ridges.

Palp (figs. 29-31) : Median tooth of tibia the longest, pointed; prolateral tooth somewhat shorter, bluntly pointed; retrolateral one the shortest, rounded. Protegulum angular ventrally. Scaphium rounded at tip. Embolus linear, describing a very wide circle, as wide as the length of the cymbium; no embolar apophysis, but strongly developed conductor.

Female paratype :

Length 1.49; cephalothorax 0.57×0.49 ; sternum 0.39×0.34 .

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tb
I	0.43	0.13	0.33	0.24	0.21	1.34	0.38
II	0.39	0.14	0.30	0.24	0.22	1.29	0.32
III	0.35	0.14	0.25	0.22	0.21	1.17	0.30
IV	0.48	0.14	0.38	0.25	0.20	1.45	—

Colour as in the male.

Epigyne (fig. 32) : With small trapezium-shaped posteromedian plate, preceded by a large, rounded anchoring hole, and very strongly developed entrance ducts.

Vulva (Fig. 33) : Spermathecae small, separated by slightly more than their diameter. Entrance ducts U-shaped.

Type material and other material examined :

ALGERIA : W. Blida : Atlas de Blida, Chrea, Hakou Feraoun, 830 m, 4 males 1 female (paratypes) in pitfalls in *Pinus halepensis* forest, 23.III-23.V.1988; 1045 m, 10 males (1 holotype and 9 paratypes) in pitfalls in *Quercus ilex* forest, 23.III-12.IV.1988; 1290 m, 38 males 2 females, pitfalls in open *Cedrus* forest, 15.II- 12.IV.1988; 1350 m, 6 males, 1 female in pitfalls in *Cedrus* forest, 13.III-9.V.1988; 1450 m, 5 males in *Cedrus* litter, 9.V.1988; 1520 m, 1 female in *Cedrus* litter, 23.IV.1982 (all paratypes). Meurdja, 950 m : 4 males, 1 female, pitfall in *Pinus* plantation, 15.IV.1982; idem, 8 males in *Cedrus* plantation, 15.IV.1982 and 11 males, 18.III-24.IV.1983; idem, pitfall in *Quercus ilex* forest, 10 males, 18.III-24.IV.1983; idem, 700 m, 3 males in *Olea-Pistacia* maquis, 15.III.1985. Arbatache, Djebel Bou Zegza, N. slope, 750 m, 2 females in litter of *Quercus ilex-Q. faginea* forest, 16.IV.1982. Oued Djer, 220 m, 1 male in pitfall in *Pistacia* shrubs, 23.III.1988.

W. Aïn Defla : Zeboudj, Col Kandek, 600 m, 1 male in pitfall in *Olea* shrub, 23.III.1988.

W. Alger : Bainem, 300 m, 7 females by sieving of litter in mixed *Pinus canariensis - Cupressus sempervirens* plantation, 30.IV.1984; idem, 1 female in litter of *Q. faginea*, 24.III.1985.

W. Bouira : Djurdjura Massif, Tikjda, 1450 m, 3 males in pitfalls in grassland with *Ampelodesma*, 24.IV.1982.

W. Boumerdes : Reghaia, 25 m, 7 males 1 females in pitfalls in *Quercus suber* forest, 20.II.1983; idem, 5 males, 5 females by sieving litter, 20.II.1983. Zemmouri, 5 m, 1 male, 3 females in litter of *Pinus halepensis* forest in dunes, 13.IV.1982.

W. Ech Cheleff : Damous, 100 m, 1 male in pitfall in *Pinus halepensis* forest, 11.IV.1989. Tacheta, 850 m, 3 males in pitfalls in *Quercus faginea* forest, 11.IV.1989.

W. Medea : El Azizia, 550 m, 1 female in litter of *Pinus halepensis* and *Pistacia lentisca*, 10.IV.1988.

W. Sétif : Djebel Babor, 1800 m, pitfalls in mixed *Cedrus*, *Abies* and *Quercus* forest, 35 males, 9 females, 23.IV-20.V.1982; idem, 1 female by sieving *Cedrus* litter, 21.X.1988; idem, 1 female by sieving *Cedrus* and *Quercus* litter, 21.X.1988.

W. Tipasa : Sidi Fredj, 25 m, 1 male in pitfalls among *Olea* shrubs, 15.II.1987; idem, 13 females in litter of *Pinus halepensis* forest, 26.II.1984 : Douaouda, 50 m, 4 males, pitfalls among *Olea* shrubs, 24.I-12.II.1987.

W. Tizi Ouzou : forêt d'Akfadou, near Lake Agoulmin Abernane, 1250 m, 1 male in litter of *Q. faginea* forest, 22.IV.1982. Djurdjura Massif, Tala Guilef, 1400 m, 2 males in pitfalls in *Quercus suber* forest, 12.IV.1987; Taguemount-Azouz, 780 m, 1 male in pitfall in *Olea* orchard, 23.I.1989. Mizrana, 100 m, 1 male one female in pitfall in *Quercus suber* forest, 27.IV.1990.

Distribution :

N. Algeria, from Ech Chlef in the West to Sétif in the East.

Etymology :

The distribution of this species coincides more or less with the ancient Roman Province Numidia.

Typhochrestus spatulatus BOSMANS sp. n.
(Figs. 34-40)

Diagnosis :

This species is easily distinguished by the shape of the male palpal tibia, by the threadlike embolar apophysis, and by the quadrangular posteromedian plate in the epigyne.

Description :

Male holotype :

Length 1.40. Cephalothorax 0.63×0.53 . Sternum 0.41×0.34 .

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tm
I	0.39	0.14	0.35	0.28	0.21	1.37	0.44
II	0.39	0.12	0.31	0.21	0.22	1.25	0.39
III	0.36	0.11	0.28	0.27	0.22	1.24	0.34
IV	0.47	0.12	0.41	0.32	0.27	1.59	—

Colour : Cephalothorax brown, thoracic region more yellowish, sulci, margin and eye region darkened; chelicerae and sternum greyish brown; legs yellowish brown, patellae and metatarsi paler; abdomen dark grey.

Cephalothorax (figs. 34-35) : Rounded behind the PME; sulci elongated. PME separated by their diameter, from the PLE by 1.5 their diameter. Chelicerae with distinct lateral boss (fig. 36).

Palp (figs. 37-39) : Tibia with rounded retro- and prolateral apophyses, and shorter, pointed median one. Scaphium bluntly pointed. Embolus describing 1.5 circle, at its tip flattened and membranous, curved in anterior direction and distinctly widened; with threadlike embolar apophysis and rather narrow conductor.

Female paratype :

Length 1.37. Cephalothorax 0.63×0.48 . Sternum 0.38×0.34 .

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tm
I	0.43	0.13	0.33	0.24	0.21	1.34	0.45
II	0.39	0.14	0.30	0.24	0.22	1.29	0.40
III	0.35	0.14	0.25	0.22	0.21	1.17	0.33
IV	0.48	0.14	0.38	0.25	0.20	1.45	—

Colour as in the male. PME separated by slightly less than their diameter.

Epigyne (fig. 40) : With nearly quadrangular posteromedian plate, anteriorly depressed with semi-circular openings of entrance ducts; anchoring hole rounded; entrance ducts hardly visible in transparency.

Vulva (fig. 41) : Spermathecae separated by slightly more than their diameter. Entrance ducts U-shaped, much smaller than in the preceding species.

Type material and other material examined :

ALGERIA : W. Tipasa : Zeralda, 1 male (holotype), 2 females (paratypes) by sieving litter in *Quercus coccifera* forest in dunes, 24.II.1989. Sidi Fredj, 25 m, 8 females in litter of *P. halepensis* forest, 26.II.1984. Bouchaoui, 1 female by beating *Q. coccifera* shrubs, 5.I.1987.

W. Boumerdes : Zemmouri, 10 m, 2 females in litter of *Pinus halepensis* forest, 27.IV.1989.

Distribution :

Only known from the coastal area around Algiers.

Etymology :

The name is an allusion to the widened tip of the male embolus.

Typhochrestus splendidus BOSMANS sp. n.
(Figs. 42-46)

Diagnosis :

Closely related to *Typhochrestus numidicus* sp. n., but at once distinguishable by the stronger median tooth on the palpal tibia.

Description :

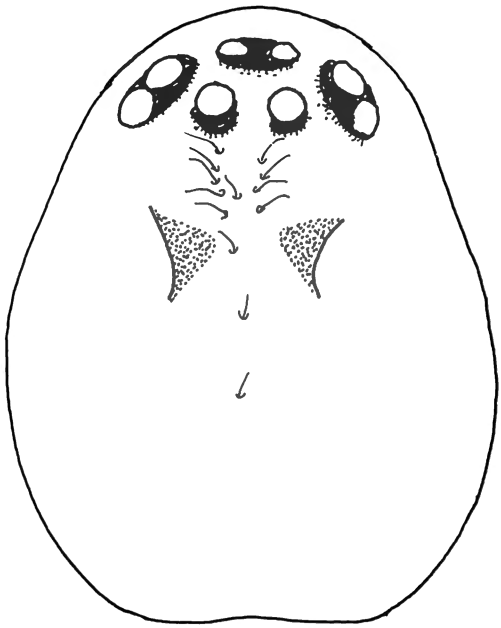
Male holotype (female unknown) :

Length 1.42; cephalothorax 0.72×0.58 ; sternum 0.38×0.36 .

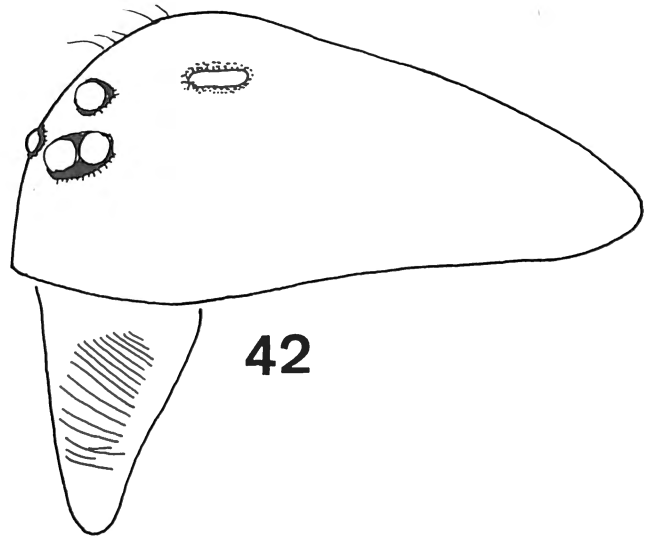
Legs	Fe	Pa	Ti	Mt	Ta	Total	Tm
I	0.55	0.16	0.45	0.36	0.30	1.82	0.34
II	0.50	0.16	—	—	—	—	0.35 (paratype)
III	0.44	0.14	0.33	0.30	0.25	1.46	0.29
IV	0.58	0.16	0.52	0.38	0.27	1.91	—

Colour : Cephalothorax yellowish brown, sulci bordered with dark brown; chelicerae orange brown; sternum yellowish brown; legs yellowish orange, patellae paler; abdomen dark grey.

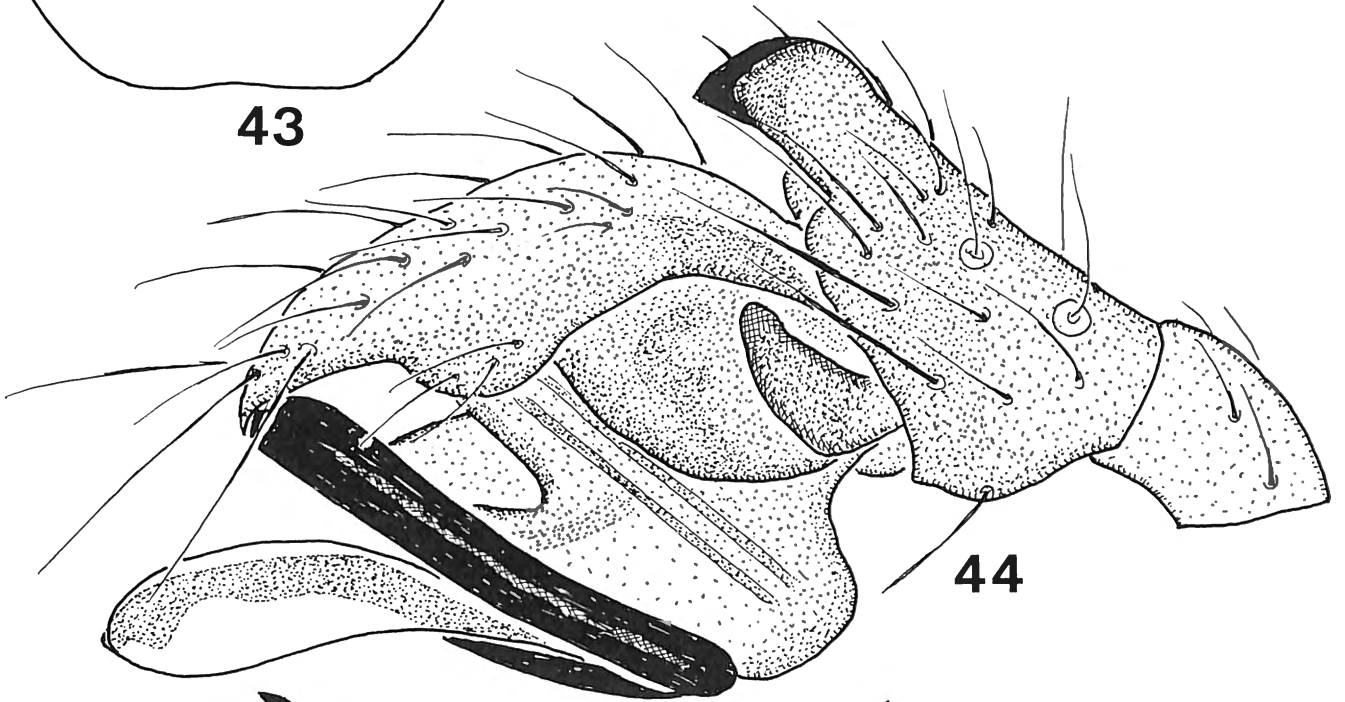
Cephalothorax (figs. 42-43) : Elevated and gently rounded behind the eye region; striae elongated. PME separated



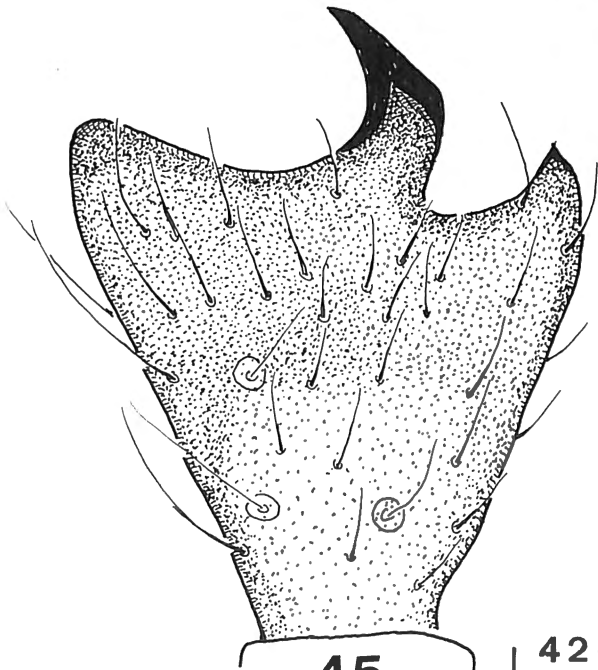
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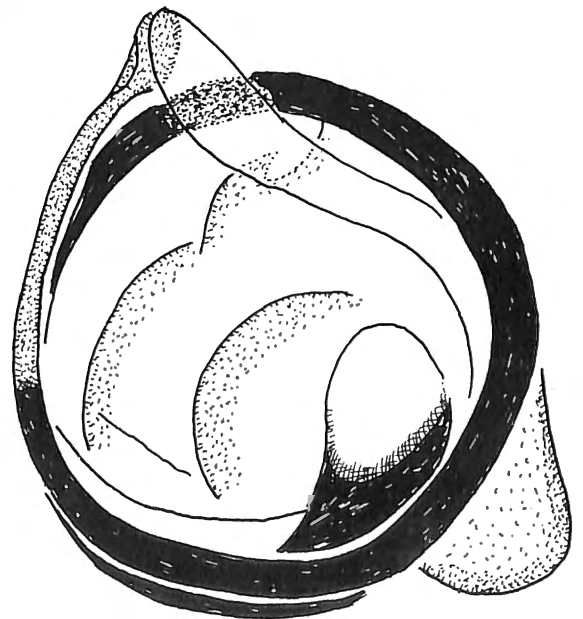
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by their diameter, from the PLE by 1.5 x their diameter. Chelicerae with 16 stridulating ridges.

Palp (figs. 44-46): Tibia with narrow base, strongly widened; retrolateral tooth rounded; median tooth very prominent, curved in anterolateral direction, strongly pointed; prolateral tooth much smaller, pointed. Protegulum distinctly widened. Embolus describing a large circle, linear, widened at tip; embolar apophysis absent; embolar membrane very prominent.

Type material and other material examined :

ALGERIA : W. El Tarf : El Kala, E. Lac Tonga, 25 m, 2 males (holotype and paratype) in pitfalls in *Quercus suber* forest, 1.III.90. N. Ben Mehidi, Oued el Kebir, 25 m, 1 male in pitfall in *Olea maquis*, 2.III.90.

Distribution :

The north-east of Algeria (map 1); most probably present in Tunisia.

Etymology :

The name is an allusion to the splendid tooth on the palpal tibia.

Typhochrestus ultimus BOSMANS sp. n.
(Figs. 47-53)

Diagnosis :

Males of this species are diagnosed by the closely set retrolateral and median teeth of the palpal tibia, and by the shape of the embolar apophysis; females by the large entrance ducts and their semi-circular openings in the epigyne.

Description :

Male holotype :

Length 1.31; cephalothorax 0.61 × 0.50; sternum 0.42 × 0.36.

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tm
I	0.50	0.14	0.38	0.30	0.26	1.58	0.42
II	0.47	0.14	0.38	0.27	0.25	1.51	0.38
III	0.38	0.14	0.27	0.27	0.23	1.29	0.38
IV	0.53	0.14	0.47	0.33	0.26	1.73	—

Colour : Cephalothorax yellowish brown suffused with grey, sulci bordered with dark grey; chelicerae and sternum yellowish brown; legs yellowish orange, patellae paler; abdomen grey.

Cephalothorax (figs. 47-48) : Elevated and gently rounded behind the eye region, sulci rather short. Eyes relatively

small, PME separated by their diameter, from the PLE by twice their diameter. Chelicerae with 15 stridulating ridges. Palp (figs. 49-51) : Retrolateral and median teeth closely set, slightly pointed; prolateral tooth much longer, pointed. Embolus describing one circle, gradually narrowing with pointed tip; embolar apophysis with twisted base, then gradually pointed.

Female paratype :

Length 1.63; cephalothorax 0.58 × 0.47; sternum 0.40 × 0.33.

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tm
I	0.42	0.14	0.36	0.25	0.20	1.37	0.34
II	0.38	0.14	0.30	0.25	0.22	1.29	0.37
III	0.33	0.14	0.25	0.22	0.22	1.16	0.35
IV	0.50	0.16	0.42	0.30	0.25	1.63	—

Colour as in the male. PME separated by slightly less than their diameter, from the PLE by 3/4 their diameter.

Epigyne (fig. 52) : Posterior median plate rectangular, upper margin with median incision; openings of entrance ducts semi-circular, clearly recognizable posterolaterally of the anchoring hole; entrance ducts strongly developed. Vulva (fig. 53) : Spermathecae separated by slightly more than their diameter; entrance ducts strongly developed.

Type material :

ALGERIA : W. Annaba : Edough Massif, between Seraidi and Ain Barbar, 850 m, 1 male (holotype), among stone in *Q. faginea* forest, 23.XI.1989. Idem, 1 female (paratype), pitfall in *Q. faginea* forest, 2.III.1990.

Distribution :

Until now only known from the Edough Massif in Algeria (map 1).

Etymology :

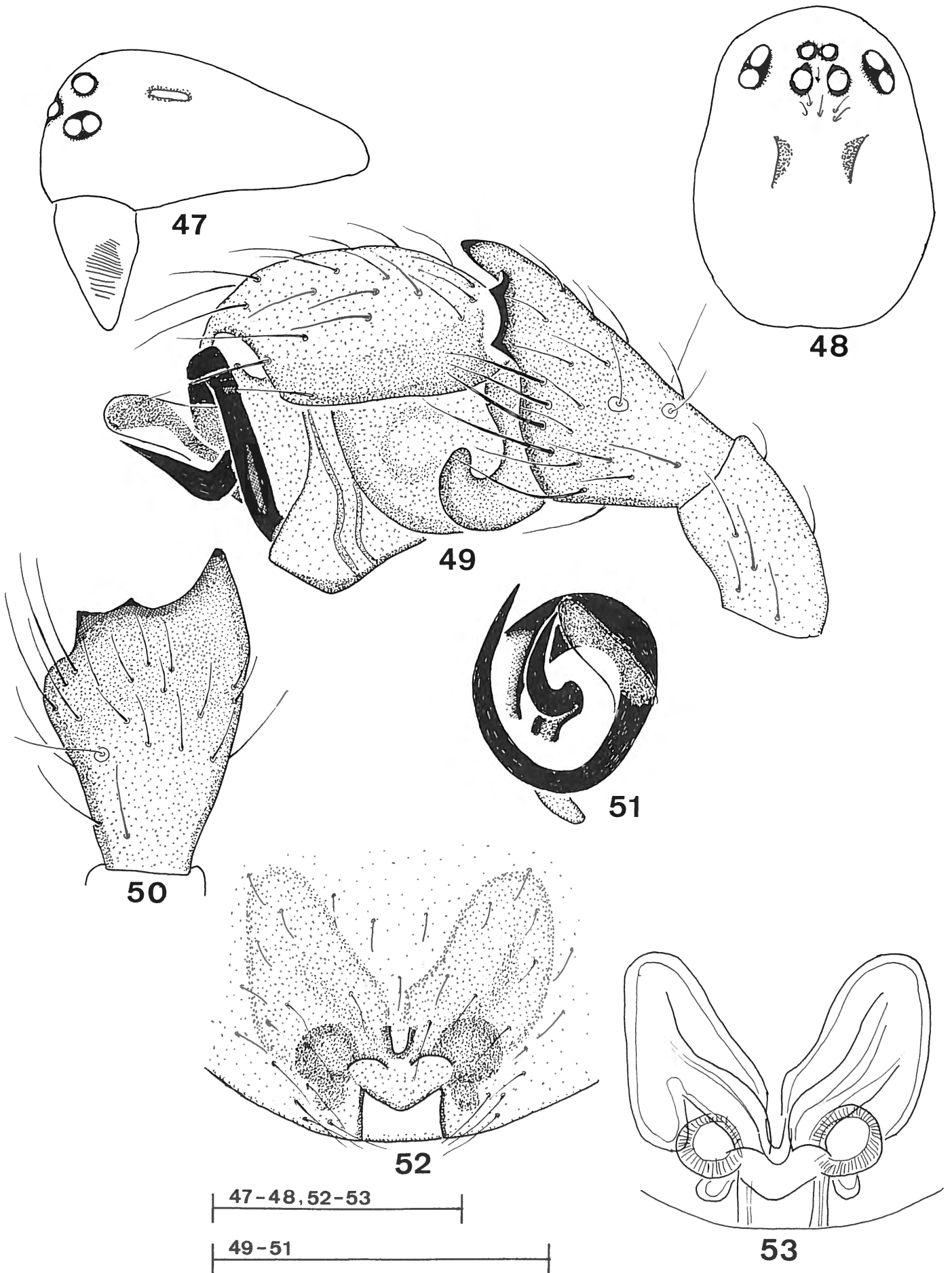
This species is named *ultimus*, because it was the last one to be discovered.

Typhochrestus virilis BOSMANS sp. n.
(Figs. 54-60)

Diagnosis :

The smallest species. The male is diagnosed by the shape of the tibial teeth, and by the peculiar bifurcate embolar apophysis; the female by the anterior position of the anchoring hole. Embolic division and vulva are closely related to the ones of *T. digittatus*; this species has however a cephalothorax of a totally different shape.

Figures 47-53. *Typhochrestus ultimus* sp. n. 47. Male cephalothorax, lateral view; 48. Idem, dorsal view; 49. Male palp, lateral view; 50. Male palpal tibia, dorsal view; 51. Embolus, anteroventral view; 52. Epigyne; 53. Vulva. Scale line : 47-48 : 0.5 mm; 49-53 : 0.2 mm.



Description :

Male holotype :

Length 1.19; cephalothorax 0.61 × 0.47, sternum 0.31 × 0.27.

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tm
I	0.47	0.16	0.38	0.26	0.25	1.52	0.42
II	0.38	0.14	0.30	0.26	0.25	1.33	0.42
III	0.36	—	—	—	—	—	—
IV	0.51	—	—	—	—	—	—

Colour : Cephalothorax yellowish brown, sulci and margin bordered with grey; chelicerae yellowish grey; sternum pale yellow; legs yellowish, patellae whitish; abdomen grey.

Cephalothorax (figs. 54-55) : Slightly elevated and gently rounded behind the eye region. PME separated by their diameter, from the PLE by 4/3 their diameter. Chelicerae with 15 stridulating ridges.

Palp (figs. 56-58) : Tibia with narrow base, gradually widened; pro- and retrolateral tooth bluntly pointed, median tooth sharply pointed. Embolus wide, describing a small circle, terminally rounded; embolar apophysis well-developed, curved in the middle, terminally bifid.

Female paratype :

Length 1.61; cephalothorax 0.63 × 0.46; sternum 0.42 × 0.33.

Legs	Fe	Pa	Ti	Mt	Ta	Total	Tb
I	0.47	0.14	0.38	0.30	0.27	1.56	0.44
II	0.42	0.14	0.30	0.27	0.25	1.38	0.39
III	0.36	0.14	0.25	0.25	0.23	1.23	0.37
IV	0.52	0.16	0.44	0.30	0.25	1.67	—

Colour as in the male. PE separated by their diameter.

Epigyne (Fig. 59) : With wide median trapezium-like plate, anchoring hole in the anterior part of the epigyne, not preceded by the entrance ducts.

Vulva (fig. 60) : Receptacula oval, separated by their diameter. Entrance ducts relatively short and narrow.

Type material and other material examined :

ALGERIA : W. Setif, Monts du Hodna, Djebel Bouthaleb, 1450 m, 1 male (holotype), pitfall in mixed forest of *Cedrus atlantica* and *Quercus ilex*, 9.III.1990; idem, 15 females (paratypes), by sieving litter, 14.IV.1990.

W. M'sila : Djebel Maadid, 1500 m, 1 female (accidentally lost), sieving of litter in degraded *Quercus ilex* maquis, 29.IV.1988.

Distribution :

Hodna mountains : Djebel Bouthaleb, Djebel Maadid (fig. 1).

Etymology :

Only one male was found, and 15 females, hence the name *virilis*.

Typhochrestus curvicervix (DENIS) comb. n.

Diplocephalus curvicervix DENIS 1964 : 384 (Descr. ♀).

Already DENIS (1964) doubted the correct generic position of this species. The single female could not be traced. The shape of the cephalothorax, the position of the trichobothria and the shape of the epigyne agree well with *Typhochrestus*. The absence of a second spine on TiIII is contradictory, but this could have been lost.

The species was described from Gammart, gouvernorat de Tunis, Tunisia.

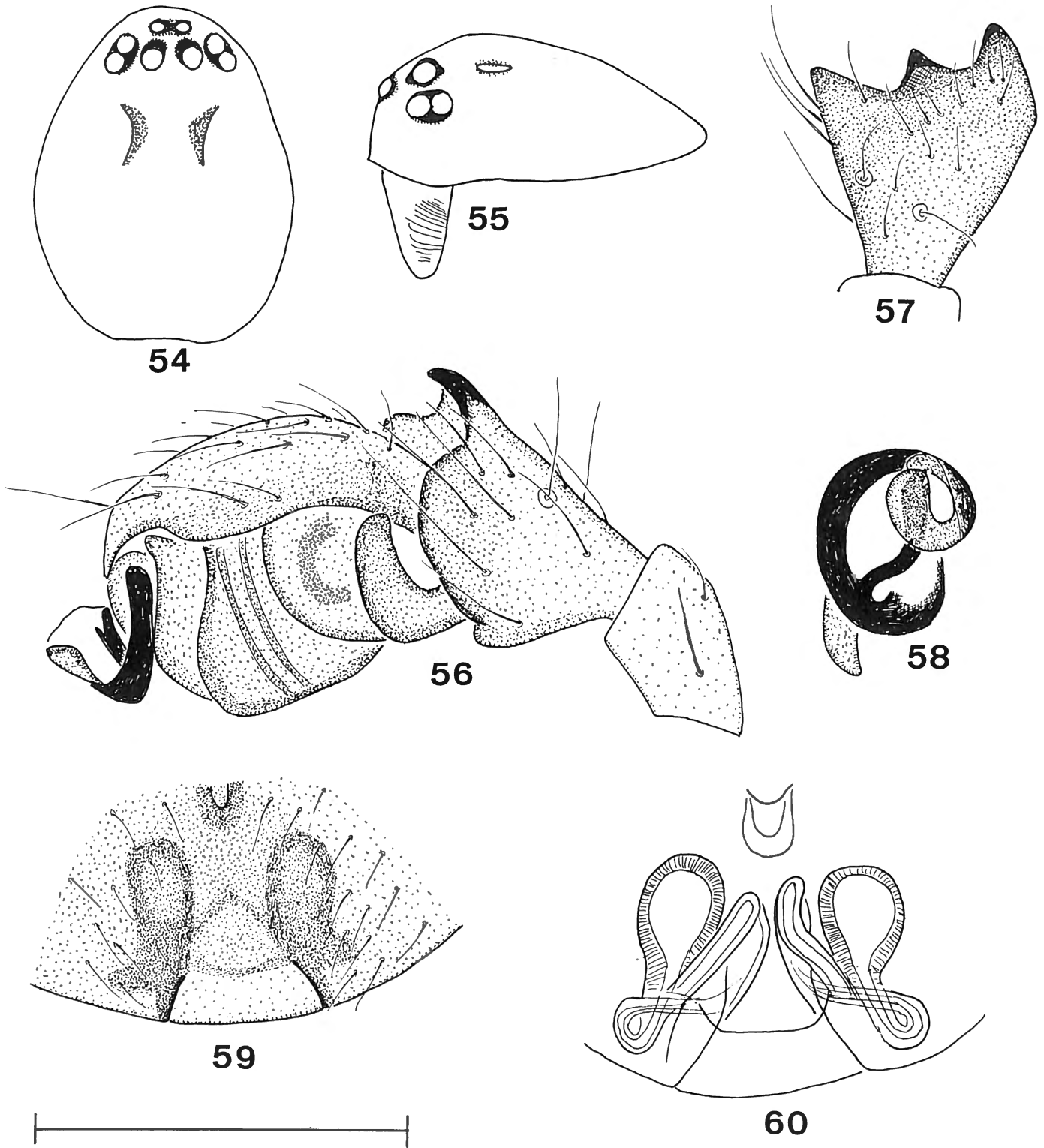
Typhochrestus cyrenanius DENIS

Typhochrestus cyrenanius DENIS 1964 : 388 (Descr. ♀).

This species was described from Libya, Djebel Akhdar. The single female collected could not be traced in any museum, and could therefore not be compared with our material. According to DENIS' picture of the epigyne, it is not likely that it concerns one of our newly described species.

Key to the Typhochrestus species of northern Africa (cyrenanius and curvicervix not included) :**Males**

1. - Cephalothorax in lateral view concave above the eyes (fig. 13) *digitatus*
- Cephalothorax gently rounded above the eyes (figs. 1, 8, 20, 27, 34, 42, 47, 54) 2
2. - Chelicerae with distinct lateral boss (fig. 36) *spatulatus*
- Chelicerae without lateral boss 3
3. - Circle described by embolus much wider than the diameter of the palpal tibia. Protegulum strongly protruding (fig. 29, 44) 4
- Circle described by embolus at most as wide as the diameter of the palpal tibia. Protegulum not protruding (figs. 3, 10, 22, 49, 56) 5
4. - Median tooth of palpal tibia very strong, curved in anterolateral direction (fig. 45) . . . *splendidus*
- Median tooth of palpal tibia smaller, straight (fig. 30) *numidicus*
5. - Median tooth of palpal tibia truncate (fig. 50) *ultimus*
- Median tooth of palpal tibia pointed (figs. 4, 11, 23, 57). 6
6. - Median apophysis of palpal tibia pointed in lateral direction (fig. 4) *bifurcatus*



Figures 54-60. *Typhochrestus virilis* sp. n. 54. Male cephalothorax, lateral view; 55. *Idem*, dorsal view; 56. Male palp, lateral view; 57. Male palpal tibia, dorsal view; 58. Embolus, anteroventral view; 59. Epigyne; 60. Vulva. Scale line : 53-54 : 0.5 mm; 55-59 : 0.2 mm.

- Median apophysis of palpal tibia in anterior direction (figs. 11, 23, 56) 7
- 7. - Embolus with rounded tip. Embolar apophysis with bifurcate tip (fig. 56, 58) *virilis*
 - Embolus and embolar apophysis both with pointed tip (figs. 12, 24) 8
- 8. - Embolar apophysis relatively wide, twisted and tapering (fig. 12). All apophysis of palpal tibia relatively small (fig. 11) *bogarti*
 - Embolar apophysis relatively narrow, linear (fig. 24). Apophysis of palpal tibia relatively larger (fig. 23) *mauretanicus*

Females

(females of *bogarti* and *splendidus* unknown)

1. - Posteromedian plate of epigyne small, triangular (fig. 6) *bifurcatus*
 - Posteromedian plate of epigyne square, rectangular or trapeziumshaped (figs. 18, 25, 32, 40, 52, 59) 2
2. - Entrance ducts in transparency 3-4 × as high as the diameter of the posteromedian plate (fig. 32, 52) 3
 - Posteromedian plate at the most half as high as the entrance ducts (figs. 18, 25, 40, 59) 4
3. - Posterior median plate as wide as high (fig. 32) *numidicus*
 - Posterior median plate much wider than high (fig. 52) *ultimus*
4. - Anchoring hole situated far before entrance ducts and spermathecae (figs. 59, 60) *virilis*
 - Anchoring hole preceded by the entrance ducts (figs. 18, 25, 40) 5
5. - Entrance ducts with semicircular openings, situated at the anterior margin of the posteromedian plate (fig. 40) *spatulatus*
 - Openings of entrance ducts not semicircular (figs. 18, 25) 6
6. - Posteromedian plate of epigyne wider than long (fig. 25) *mauretanicus*
 - Posteromedian plate longer or as long as wide (fig. 18) *digitatus*

Discussion

As pointed out in the introduction, 18 species were classified in the genus *Typhochrestus* until now. Five of them are unsufficiently known (THALER, 1984). In this paper, seven more species are described, *T. bifurcatus* is redesc-

cribed, removing it from the doubtful species, and *Diplocephalus curvicervix* DENIS is transferred to *Typhochrestus*. Thus the genus actually contains 26 species, of which 11 occur in North Africa.

Only one of the 11 occurs out of Africa: *Typhochrestus digitatus*, a well-known and common species in central Europe. It appears to be a common species in Algerian mountains with humid and sub-humid climats. It goes as far south as the Ouarsenis Massif.

The 10 other species are all endemic to North Africa. Some of them have large distribution areas, others very small ones. All species occur in the humid, sub-humid or semi-arid climate zones, as can be seen on map 1.

Typhochrestus bogarti sp. n. is only known from Casablanca. It could occur all over the W and NW of Morocco, as this region was not yet prospected by us.

Typhochrestus bifurcatus was previously only known from Tlemcen in Algeria, but it appears to occur from Tetouan (N. Morocco) in the west, to Saida (NW. Algeria) in the East.

Its distribution area partly overlaps with the one of *Typhochrestus mauretanicus* sp. n. This species was observed from Ketama in Morocco to Djelfa in Algeria. It is also the species with the southernmost distribution, going as far south as Djelfa. Nearly all its localities are situated in the semi-arid climate zone.

In the central part of N. Algeria, *T. mauretanicus* sp. n. is replaced by *T. numidicus* sp. n. The two species were never found together. Probably they have different climatological preferences, as all localities of *numidicus* are situated in humid or sub-humid climate zones.

In the region of Algiers, and only at low altitude, *T. spatulatus* sp. n. was discovered. In all its localities, it cohabited with *T. numidicus*.

T. virilis occurs only in the Hodna Mountains, in the semi-arid climate zone. It is expected in the Aures Massif.

More to the east, *T. ultimus* lives in the Edough Massif, and *T. splendidus* in the easternmost part of Algeria. This region was not so well sampled, and the distribution of these species remains to be precised. They both could occur in Tunisia, where *T. curvicervix* is the only observed species for now.

All species are adult in winter, as can be seen from the collecting data.

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