

NINE NEW SPECIES IN THE SUBGENUS *ATACELLA* (ACARI: UNIONICOLIDAE: *UNIONICOLA*) FROM MEXICO AND BRAZIL

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ABSTRACT—Nine new species (*Unionicola (Atacella) neoperforata*, *petita*, *recta*, *crassiparma*, *parmaphora*, *nelsoni*, *quadriplaca*, *rosewateri* and *redfordi*) are described for the first time. The first two species are from Mexico, and the latter seven are from a single collection in Brazil. All species are mussel parasites and exhibit unique features which expand the current concept of *Atacella* and exemplify evolutionary adaptive radiation. *U. (A.) entrerrianensis* (Rosso de Ferradas) and *U. (A.) fissipes* (Koenike) are reported from Mexico and Honduras, respectively.

INTRODUCTION

The subgenus *Atacella* in the genus *Unionicola* has been redefined (Vidrine 1985). These mites are parasites of fresh-water mussels (Unionoida) in Mexico and South America (Vidrine and Bereza 1980). In the winter of 1982, the author examined the mussel holdings of the United States National Museum (Smithsonian Institution). The mussels were preserved in alcohol, and the mites were preserved in situ. Seven new species were encountered and are described here. A single lot of *U. fissipes* was also found and is reported here. Two additional new species and *U. entrerrianensis* were collected in Mexico and are also reported. This paper revises the subgenus *Atacella* in order to accommodate these new species.

Holotypes and representative paratypes are deposited in the Canadian National Collections and Biosystematics Institute, Ottawa. Additional paratypes are retained in the author's collection.

Terminology for adult structures follows that used by Simmons and Smith (1984). Measurements are expressed in microns and in the format, mean (range). All bars on figures equal 100 microns (0.1 mm).

RESULTS

1. *Unionicola (Atacella) fissipes* (Koenike 1891)
(Figs. 4-16)

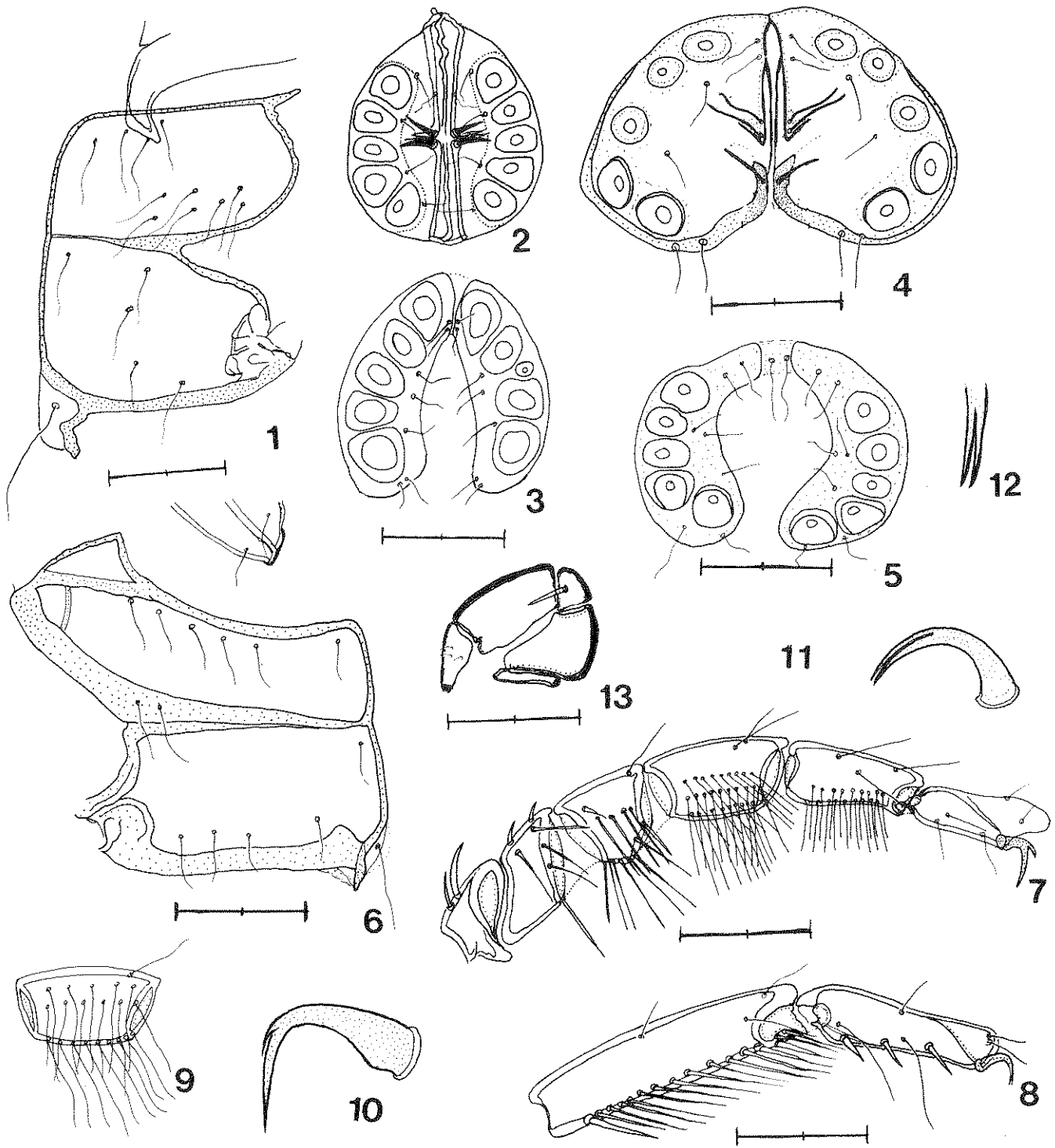
DIAGNOSIS — Character states of the subgenus; dorsum with three dorsal plates (fig. 16); coxal plates

III and IV nearly equal in size, well-sclerotized, and without distinct posterior projections (figs. 6, 14-15); female genital field with a single pair of acetabular plates, each bearing 5 acetabula and three slightly thickened setae on the inner margin (fig. 4); male genital field with a pair of acetabular plates, each bearing 5 acetabula (fig. 5); 3 small tarsal claws on pedipalps (fig. 13); tarsal claw of the first walking leg bifid, with the dorsal prong shorter than the ventral prong (fig. 10); tarsal claw of the fourth walking leg bifid, with lateral prongs near equal (figs. 11-12); first walking leg highly setigerous (fig. 7); fourth walking leg with distinct row of ventral setae (fig. 8).

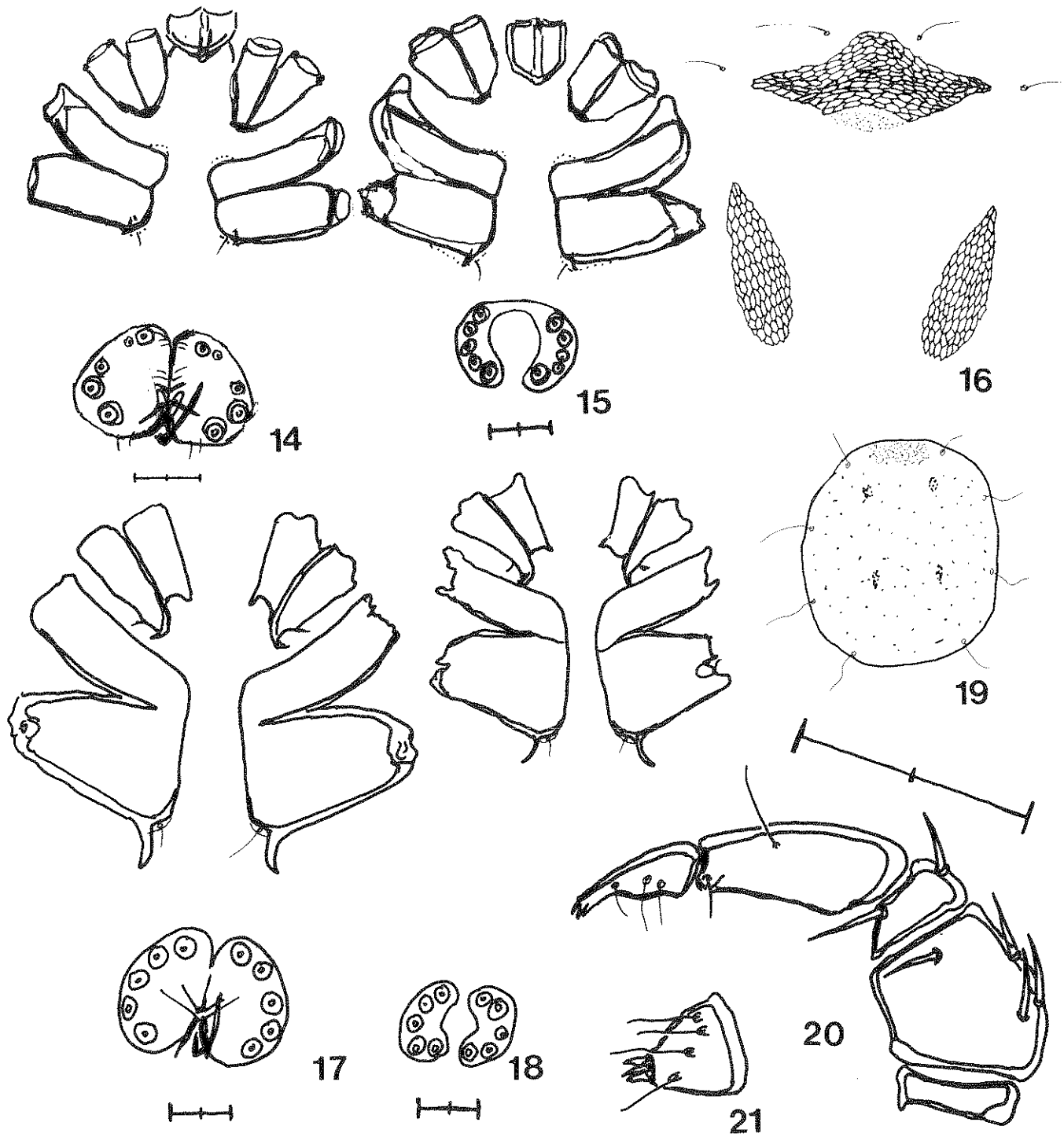
MALE (3 specimens) — Length including capitulum 800; anterior dorsal plate 100 long, 250 wide; length of posterior coxal group 200 (185-210); genital field 164 (150-175) long, 216 (210-220) wide; dorsal length of pedipalp segment: Ta 80; dorsal lengths of leg segments: leg I: TFe 77 (70-80); Ge 110 (105-115); Ti 103 (100-105); Ta 100; leg IV: TFe 190 (175-200); Ge 208 (200-215); Ti 203 (200-205); Ta 150 (140-160).

FEMALE (3 specimens) — Length including capitulum 817 (800-850); anterior dorsal plate 80 long, 200 wide; length of posterior coxal group 160 (150-175); genital field 187 (180-200) long, 320 (280-360) wide; dorsal length of pedipalp segment: Ta 50; dorsal lengths of leg segments: leg I: TFe 70 (65-75); Ge 96 (95-100); Ti 93 (90-100); Ta 96 (95-100); leg IV: TFe 163 (155-170); Ge 184 (175-200); Ti 170 (160-180); Ta 133 (125-140).

REMARKS — The specimens measured are from Chamelecon River, 0.2 km downstream from Chamel-



Figs. 1-13. *Unionicola latipalpa* Vidrine: 1. female posterior coxal group; 2. female genital field; 3. male genital field; *Unionicola fissipes* (Koenike): 4. female genital field; 5. male genital field, 6. male posterior coxal group, 7. male first walking leg, 8. male Ti and Ta of fourth walking leg; 9. male Ge of first walking leg; 10. claw of first walking leg; 11. claw of fourth walking leg, lateral view; 12. tip of claw of fourth walking leg, dorsal view; 13. female pedipalp.



Figs. 14-21. *Unionicola fissipes* (Koenike): 14. female venter; 15. male venter; 16. male dorsal shield; *Unionicola entrerrianensis* (Rosso de Ferradas): 17. female venter; 18. male venter; 19. male dorsal shield; 20. female pedipalp; 21. ventral view of pedipalp Ta.

econ, Honduras, collected 16 January 1980 by A. H. Clarke. The host mussel was *Anodontoides* sp. (mussel lot USNM 803120). The 3 mussels contained approximately 5 specimens between each pair of gills. *U. fissipes* is also known from Brazil, Paraguay, Argentina and western Mexico (Vidrine and Bereza 1980). These specimens are morphologically similar to those from other areas. *U. fissipes* also resembles *U. (Berezatax) latipalpa* Vidrine 1985 (figs. 1-3) but differs in the structure of the genital fields and coxal plates. This report constitutes the first record of an *Atacella* from Central America.

2. *Unionicola (Atacella) entrerrianensis*
(Rosso de Ferradas 1976)
(Figs. 17-29)

DIAGNOSIS — Character states of the subgenus; dorsum with a lightly sclerotized plate (fig. 19); coxal plates well-sclerotized and with posterior projections (figs. 17-18, 22); coxal plate I with an inner, sclerotized projection (fig. 22); female genital field with a pair of acetabular plates, each bearing 5 acetabula and 2, large, inner spines (figs. 27-28); male genital field with a pair of acetabular plates, each bearing 5 acetabula (fig. 29); 4 tarsal claws on pedipalp (figs. 20-21); tarsal claw of first walking leg bifid, with dorsal prong shorter than ventral prong (fig. 24); tarsal claw of fourth walking leg bifid, with equal, lateral prongs (fig. 26); Ge of first walking leg with distinct rows of setae (fig. 23); distal, large setae on the Ge and Ti of the fourth walking leg (fig. 25); pectinate setae on legs.

MALE (4 specimens) — Length including capitulum 888 (800-1000); dorsal plate 506 (450-600) long; length of posterior coxal group 250 (225-275); genital field 156 (140-175) long, 195 (170-220) wide; dorsal lengths of pedipalp segments: Ge 22; Ti 70; Ta 48 (40-60); dorsal lengths of leg segments: leg I: TFe 80 (72-90); Ge 109 (100-120); Ti 90 (85-100); Ta 93 (90-100); leg IV: TFe 159 (145-180); Ge 185 (170-200); Ti 148 (130-165); Ta 115 (105-130).

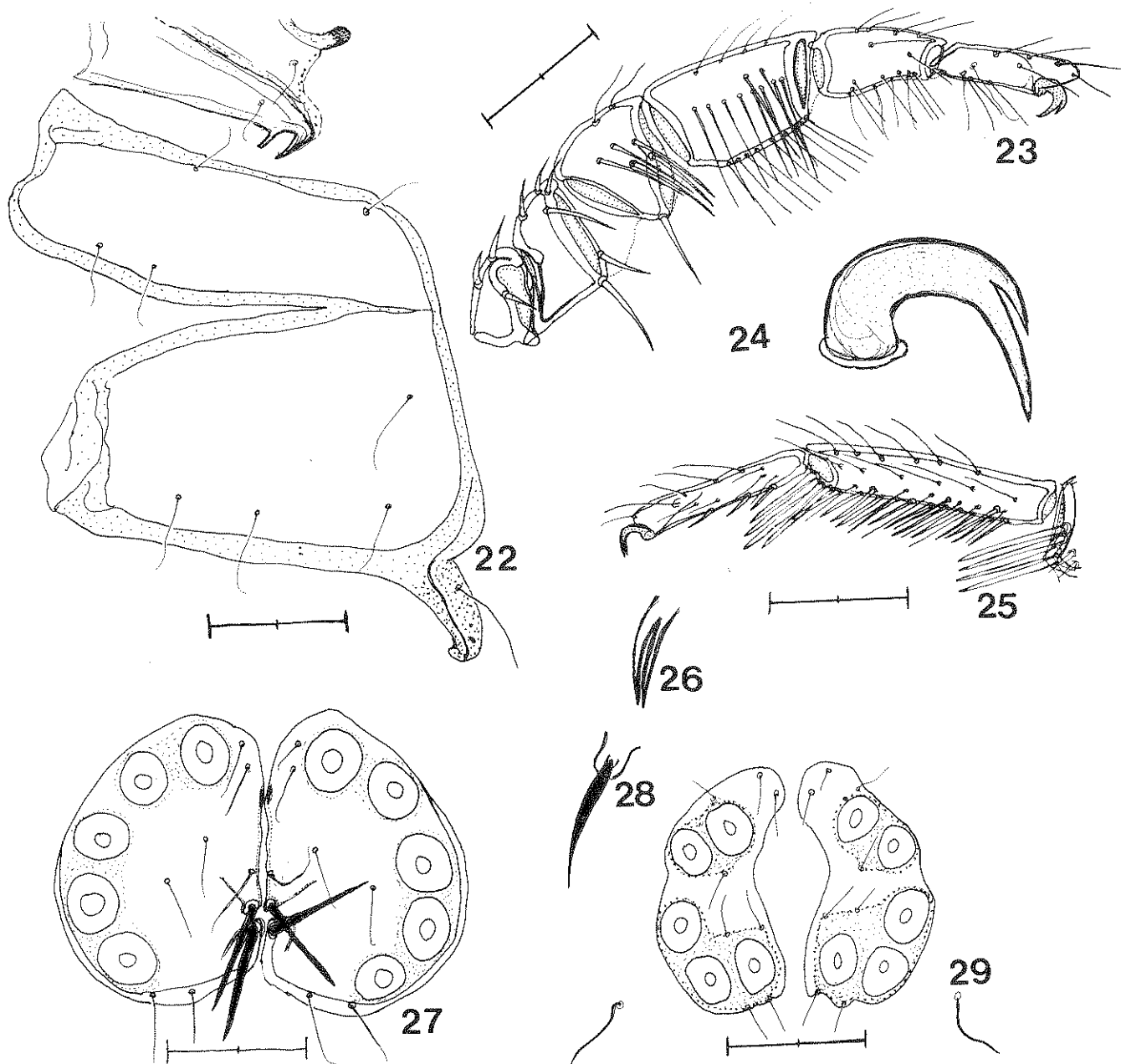
FEMALE (4 specimens) — Length including capitulum 1088 (900-1300); dorsal plate 638 (600-700) long; length of posterior coxal group 304 (290-325); genital field 197 (180-220) long, 277 (260-300) wide; dorsal lengths of pedipalp segments: Ge 30; Ti 86 (84-90); Ta 49 (40-55); dorsal lengths of leg segments: leg I: TFe 95 (90-100); Ge 119 (110-125); Ti 101 (100-105); Ta 99 (95-100); leg IV: TFe 198 (190-205); Ge 219 (215-220); Ti 172 (160-180); Ta 129 (120-135).

REMARKS — The specimens measured are from 5 localities in eastern Mexico: 1. small river (locally called Arroyo los Gatos) (? Casas River System — Panuco River System) at Rte. Mexico 80 in Nuevo

Morelos, ca. 1.0 km from the west end of town, and ca. 18.0 km along Rte. Mexico 80 west of Antiguo Morelos, Tamaulipas Province, Mexico, collected on 5 and 13 November 1978 by D. J. Bereza; 2. small river (locally called Arroyo de Oxitipa) at paved road ca. 3.0 km east of Aquismon, San Luis Potosi Province, Mexico, collected on 9 November 1978 by D.J. Bereza; 3. Rio Cotaxtla (upper Rio Atoyac) at Rte. Veracruz 149 in Cotaxtla (turn-off to road to Cotaxtla from Rte. Mexico 140 is ca. 41.7 km southwest of divergence of Rte. Mexico 150 and Rte. Mexico 140 south of Veracruz city), Veracruz Province, Mexico, collected on 12 February 1982 by D. J. Bereza, S. V. Hensley, R. T. Hensley and M. F. Vidrine; 4. spillway pool off left side of Rio Papaloapan along Rte. Mexico 175 in Cosamaloapan, Veracruz Province, Mexico, collected on 17 February 1982 by D. J. Bereza, S. V. Hensley, R. T. Hensley and M. F. Vidrine; 5. creek reached by turning west at north end of bridge at Rte. Mexico 130 (ca. 1.5 km north of intersection of Rte. Mexico 130 and Rte. Mexico 180 in Poza Rica), and going west for 1.1 km and turning south for 0.8 km, Veracruz Province, Mexico, collected on 22 February 1982 by D. J. Bereza, S. V. Hensley, R. T. Hensley and M. F. Vidrine. All of the specimens were found in the freshwater mussel, *Anodontites trapesialis glaucus* (Valenciennes). Usually one or 2 mites were found in each infested host. *U. entrerrianensis* is known from Argentina and eastern Mexico (Vidrine and Bereza 1980). It most closely resembles *U. granadosi* Hoffman and Cramer 1979 from Columbia. However, *U. granadosi* lacks a dorsal plate and has distinctive coxal plates. *U. entrerrianensis* also resembles *U. gigantea* (Caches and Mane-Garzon 1973) from Uruguay. *U. granadosi*, *U. entrerrianensis* and *U. gigantea* are apparently sibling species. *U. entrerrianensis* from Mexico closely match the original description made from Argentine specimens.

3. *Unionicola (Atacella) neoperforata* new species
(Figs. 30-39)

DIAGNOSIS — Character states of the subgenus; dorsum with thick, reticulate dorsal plate (fig. 31); coxal plate III with inner margin not well-sclerotized, coxal plate IV well-sclerotized (fig. 32 and 37); coxal plate IV with posterior projection; female genital field with a pair of acetabular plates, each bearing 5 acetabula and 2, large, inner spines (fig. 34); male genital field with a pair of lightly sclerotized acetabular plates, each bearing 5 acetabula (fig. 33); 4 tarsal claws on pedipalp (fig. 30); tarsal claw of first walking leg bifid, with a small dorsal prong (fig. 35); tarsal claw of fourth walking leg simple (fig. 36); first walking leg



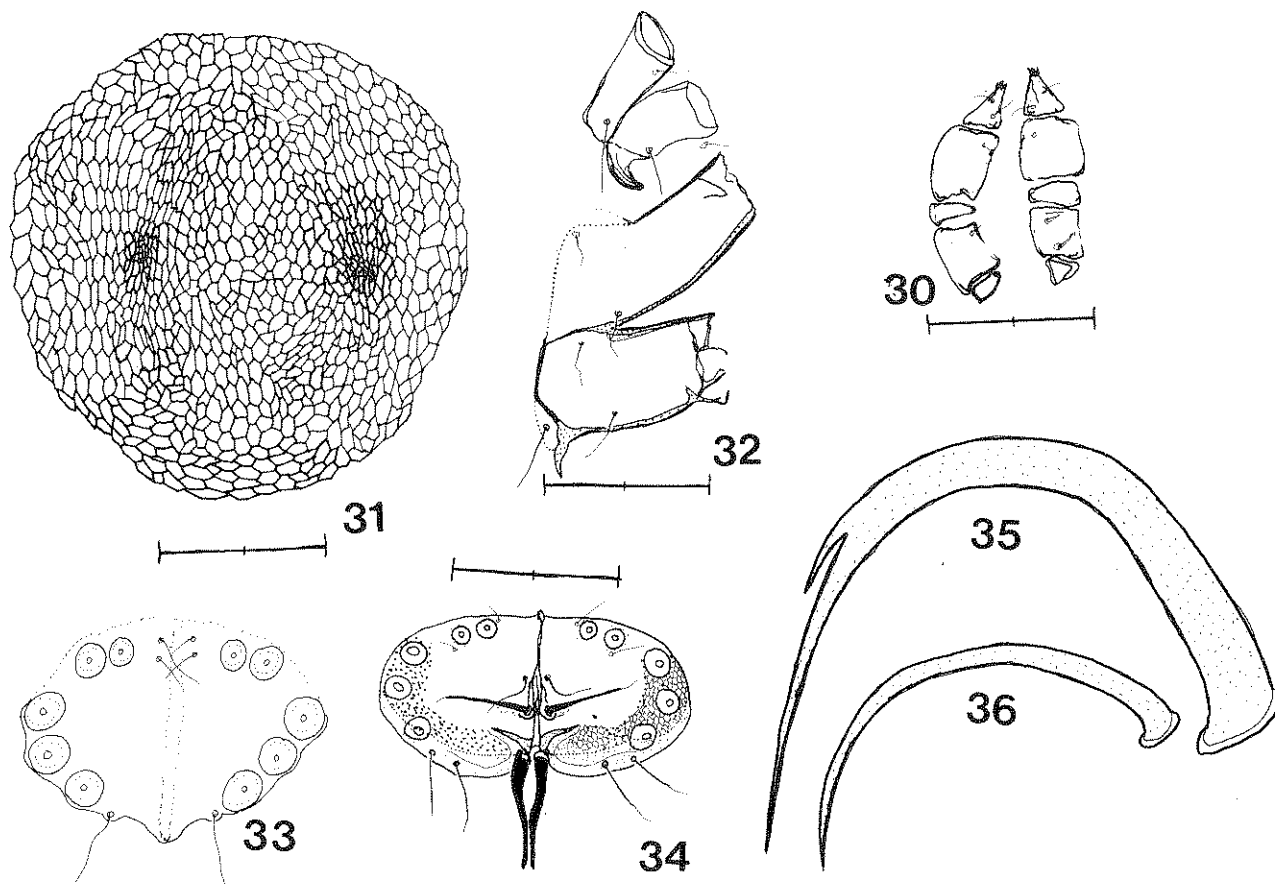
Figs. 22-29. *Unionicola entreerrianensis* (Rosso de Ferradas): 22. female coxal plates; 23. male first walking leg; 24. claw of first walking leg; 25. Ti and Ta of female fourth walking leg; 26. tip of claw of fourth walking leg; 27. female genital field; 28. proximal posterior flap of female genital plate; 29. male genital field.

with few setae (fig. 38); fourth walking leg with tarsal claw on a ventral projection (fig. 39).

MALE (2 specimens) — Length including capitulum 475; dorsal plate 278 (275-280); length of posterior coxal group 123 (120-125); genital field 80 (75-85) long, 125 (120-130) wide; dorsal lengths of pedipalp segments: Ti 45; Ta 34 (32-35); dorsal lengths of leg

segments: leg I: TFe 43 (40-45); Ge 53 (50-56); Ti 48 (45-50); Ta 50 (47-52); leg IV: TFe 91 (88-94); Ge 97 (95-98); Ti 83 (80-85); Ta 63 (60-65).

FEMALE (3 specimens) — Length including capitulum 558 (550-575); dorsal plate 293 (290-300) long; length of posterior coxal group 125; genital field 103 (100-110) long, 197 (190-200) wide; dorsal lengths of



Figs. 30-36. *Unionicola neoperforata* n. sp.: 30. two ventral views of female palps; 31. female dorsal shield; 32. female coxal plates; 33. male genital field; 34. female genital field; 35. claw of first walking leg; 36. claw of fourth walking leg.

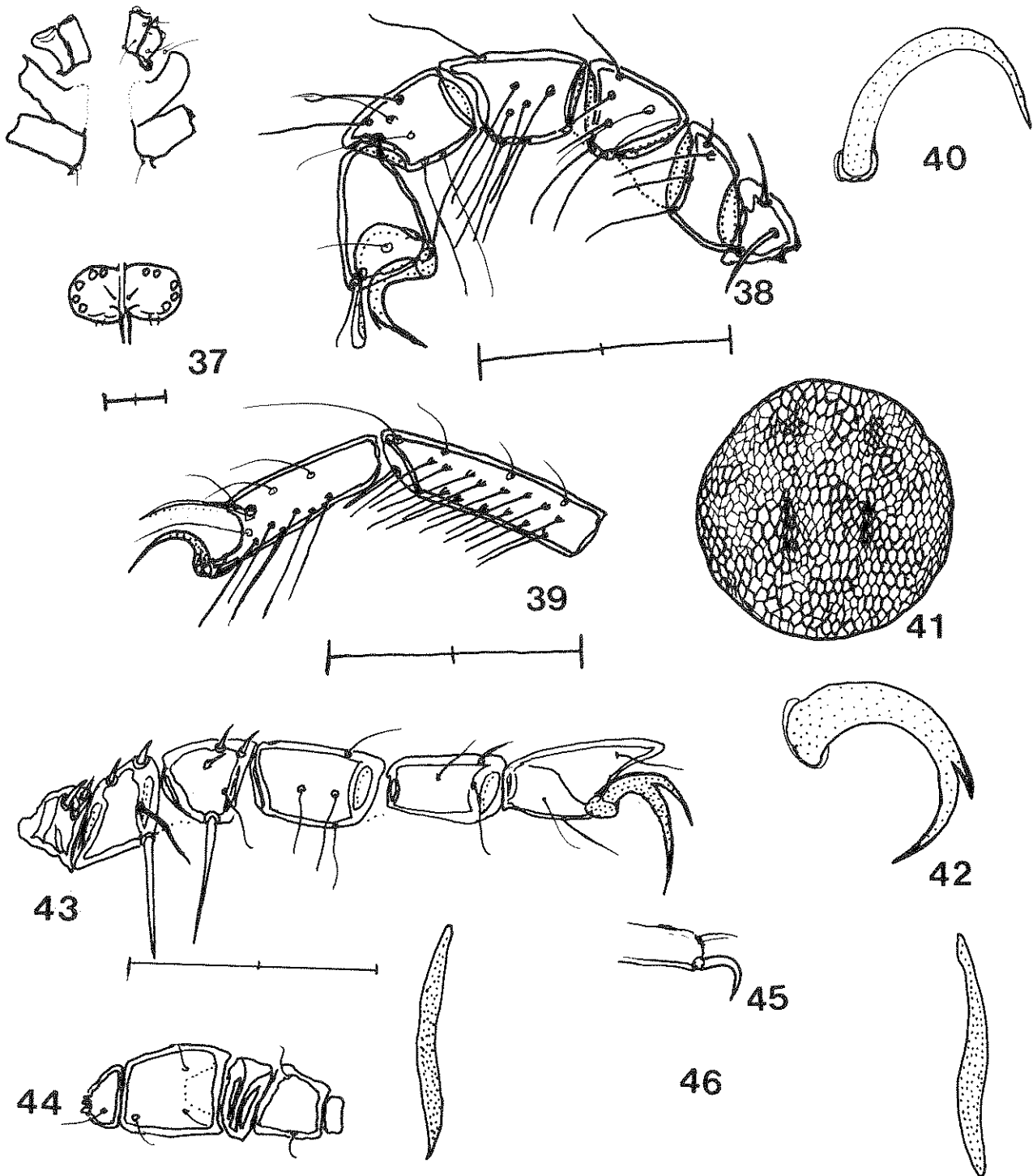
pedipalp segments: Ti 40; Ta 28 (25-30); dorsal lengths of leg segments: leg I: TFe 43 (42-45); Ge 53 (50-55); Ti 46 (45-46); Ta 52 (50-54); leg IV: TFe 90 (88-91); Ge 100 (100-101); Ti 88 (85-89); Ta 65.

NOTES — Holotype (male) (CNC type number 18826) from small river (locally called Arroyo los Gatos) (? Casas River System — Panuco River System) at Rte. Mexico 80 in Nuevo Morelos, ca. 1.0 km from the west end of town, and ca. 18.0 km along Rte. Mexico 80 west of Antiguo Morelos, Tamaulipas Province, Mexico, collected on 5 November 1978 by D.J. Bereza. Additional paratypes include specimens from a medium-sized creek at Rte. Mexico 85, ca. 0.5 km south of Palmira (Panuco River System), and ca. 33.0 km south of junction of Rte. Mexico 85 and Rte. Mexico 70 in Ciudad Vallez, San Luis Potosi Province, Mexico, collected on 8 and 9 November 1978 by D. J. Bereza. All the specimens were found in the host mussel *A. trapesialis glaucus*. One or two individuals were found in each infested host. This species has been discussed in Vidrine and Bereza (1980) and Vidrine (1980) under the name: *Atacella perforata* (Koenike 1890).

REMARKS — *U. neoperforata* resembles *U. perforata*, but it is a larger mite with a smaller dorsal plate. *U. neoperforata* uniquely possesses the tarsal claws of the second, third and fourth walking legs on ventral projections of the tarsi.

4. *Unionicola (Atacella) petita* new species (Figs. 43-45 and 68)

DIAGNOSIS — Character states of subgenus; dorsum with a lightly sclerotized dorsal plate and lacks obvious dorsal apodemes; inner borders of coxal plate III and IV not well-sclerotized (fig. 68); coxal plates without posterior projections; female genital field with a pair of acetabular plates, each bearing 5 acetabula and three, large spines on the inner margin (fig. 68); 3 tarsal claws on pedipalp (fig. 44); first walking leg with few setae and a large, bifid tarsal claw, with the dorsal prong nearly one-half as long as the ventral prong (fig. 43); fourth walking leg with a small, simple tarsal claw that is not borne on a projection (fig. 45).



Figs. 37-46. *Unionicola neoperforata* n. sp.: 37. female venter; 38. female first walking leg; 39. Ti and Ta of female fourth walking leg; *Unionicola crassiparma* n. sp.: 40. claw of fourth walking leg; 41. female dorsal shield; 42. claw of first walking leg; *Unionicola petita* n. sp.: 43. female first walking leg; 44. female pedipalp; 45. distal end of Ta of female fourth walking leg; *Unionicola rosewateri* n. sp.: 46. dorsal apodemes.

FEMALE (holotype) — Length including capitulum 450; length of posterior coxal group 130; genital field 125 long, 200 wide; dorsal lengths of pedipalp segments: Ti 45; Ta 25; dorsal lengths of leg segments: leg I: TFe 40; Ge 55; Ti 50; Ta 60; leg IV: TFe 85; Ge 110; Ti 91; Ta 100.

NOTES — Holotype (female) (CNC type number 18827) from Rio Cotaxtla (upper Rio Atoyac) at Rte. Veracruz 149 in Cotaxtla (turn-off to road to Cotaxtla from Rte. Mexico 140 is ca 41.7 km southwest of divergence of Rte. Mexico 150 and Rte. Mexico 140 south of the city of Veracruz) (N18°50'20": W96°23'30"), Veracruz Province, Mexico, collected on 12 February 1982 by D. J. Bereza, S. V. Hensley, R. T. Hensley and M. F. Vidrine. The host mussel was *A. trapesialis glaucus*. Only a single female was found.

REMARKS — *U. petita* resembles *U. neoperforata* and *U. perforata* but possesses unique coxal plate morphology and distinctive tarsal morphology on the fourth walking leg.

5. *Unionicola (Atacella) recta* new species (Figs. 47-51)

DIAGNOSIS — Character states of subgenus; dorsum with a lightly sclerotized plate with two long apodemes (fig. 51); coxal plates III and IV nearly equal in size and well-sclerotized (fig. 47); coxal plate I with large, inner protrubance; male genital field with a pair of lightly sclerotized plates, each bearing 5 acetabula (fig. 47); 4 tarsal claws on pedipalp; tarsal claw of first walking leg bifid, with small dorsal prong (fig. 50); first walking leg with few setae (fig. 48); tarsal claw of fourth walking leg bifid, with a small prong (fig. 49).

MALE (holotype) — Length including capitulum 735; dorsal plate 500 long; dorsal apodeme 380 long; length of posterior coxal group 300; genital field 110 long, 160 wide; dorsal length of pedipalp segment: Ta 37; dorsal lengths of leg segments: leg I: TFe 72; Ge 77; Ti 60; Ta 65; leg IV: TFe 140; Ge 160; Ti 120; Ta 110.

NOTES — Holotype (male) (CNC type number 18828) from the entrance to a small, clear, feeder stream into Rio Jutai ca. 4.0 km upstream from the mouth of Rio Jutai (into Rio Solimoes of the Amazon Drainage), Municipio de Jutai, Amazonas Province, Brazil (the station is ca. 1000 km due south of Caracas, Venezuela), collected on 6 November 1982 by Bruce Nelson and Kent Redford. A single male was found in the mussel, *Prisodon obliquus* (Schumacher) (USNM 804421).

REMARKS — *U. recta* closely resembles *U. subrecta* (Caches and Mane-Garzon 1973), which is also

only known from male specimens from Uruguay. *U. recta* is distinctive in that it possesses a dorsal plate, inner protrubances on coxal plate I, and 4 tarsal claws on the pedipalps, whereas *U. subrecta* lacks the dorsal plate and the coxal projection, and has only 2 tarsal claws on the pedipalps.

6. *Unionicola (Atacella) crassiparma* new species (Figs. 40-42, 58-60)

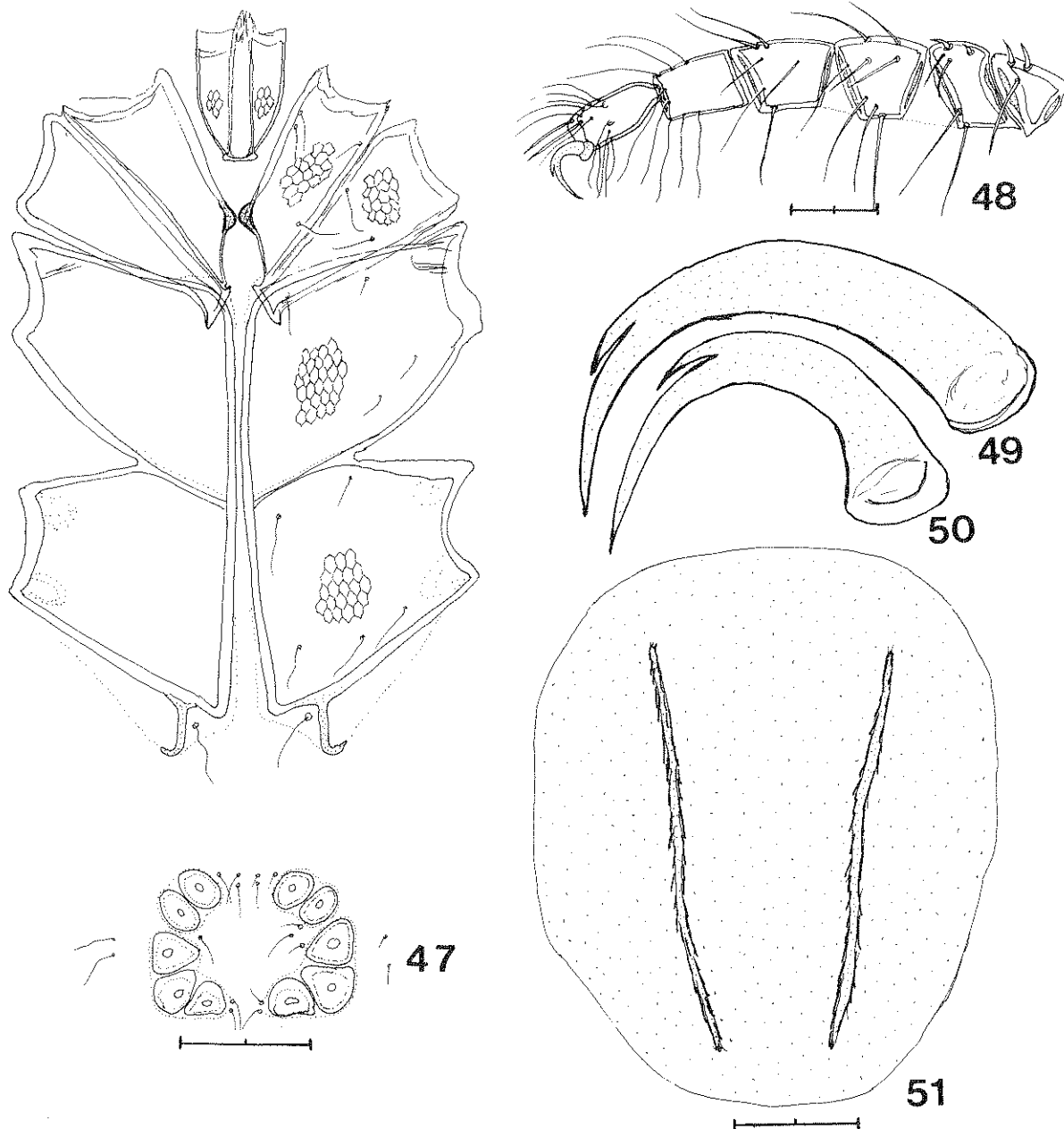
DIAGNOSIS — Character states of subgenus; dorsum with a heavily sclerotized, reticulate dorsal plate (fig. 41); inner border of coxal plate III not well-sclerotized, and broad, chitinous band posterior to the coxal plate IV (fig. 58); female genital field with a pair of acetabular plates, each appearing as two plates partially attached by secondary sclerotization and bearing 5 or 6 acetabula and 2, large spines on the inner margin (fig. 60); male genital field with a pair of acetabular plates, each bearing 5 or 6 acetabula (fig. 58); male and female genital fields with secondary sclerotization appearing as hexagonal ultrastructure; 3 tarsal claws on pedipalp; tarsal claw of first walking leg bifid, with small dorsal prong (fig. 42); first walking leg moderately setigerous (fig. 59); tarsal claw of fourth walking leg appears simple (fig. 40); Ta of fourth walking leg appears slightly arched.

MALE (2 specimens) — Length including capitulum 553 (550-555); dorsal plate 500 long; length of posterior coxal group 200; genital field 100 long, 143 (140-145) wide; dorsal length of pedipalp segment: Ta 25; dorsal lengths of leg segments: leg I: TFe 52 (50-53); Ge 63 (60-65); Ti 60; Ta 63 (60-65); leg IV: TFe 128 (125-130); Ge 164 (162-165); Ti 128 (125-130); Ta 97 (95-98).

FEMALE (3 specimens) — Length including capitulum 575 (550-600); dorsal plate 475 (450-500) long; length of posterior coxal group 182 (170-200); genital field 112 (110-115) long, 202 (185-220) wide; dorsal lengths of leg segments: leg I: TFe 45 (44-46); Ge 56 (53-60); Ti 57 (55-58); Ta 62 (60-64); leg IV: TFe 108 (105-110); Ge 135 (130-140); Ti 112 (110-115); Ta 88 (85-90).

NOTES — Holotype (male) CNC type number 18829) from the entrance to a small, clear, feeder stream into Rio Jutai, ca. 4.0 km upstream from the mouth of Rio Jutai (into Rio Solimoes of the Amazon drainage), Municipio de Jutai, Amazonas Province, Brazil, collected on 6 November 1982 by B. Nelson and K. Redford. Two host mussels, "*Monocondylaea*" sp. (USNM 804422), had 3 and 12 mites each on their gills.

REMARKS — *U. crassiparma* possesses coxal plates almost identical to *U. perforata*, but *U. crassi-*

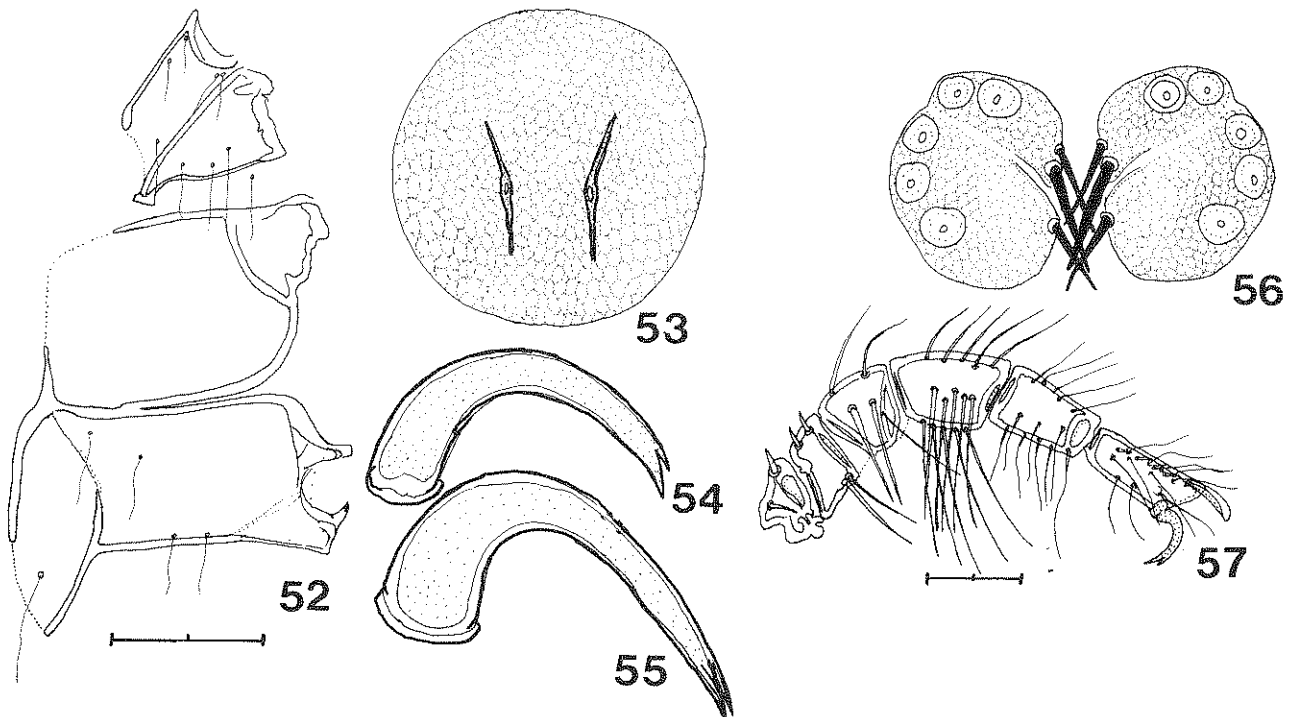


Figs. 47-51. *Unionicola recta* n. sp.: 47. male venter; 48. male first walking leg; 49. claw of male fourth walking leg; 50. claw of first walking leg; 51. male dorsal shield;

parma is more heavily sclerotized, especially in the genital field regions, than *U. perforata*. *U. crassiparma* also closely resembles *U. neoperforata*, but lacks ventral projections on the tarsi of the posterior walking legs that are attached to the tarsal claws. The general dorsal plate, leg and coxal plate morphology of these three species indicates that they are probably sibling species.

7. *Unionicola (Atacella) parmaphora* new species
(Figs. 52-57)

DIAGNOSIS — Character states of subgenus; dorsum with dorsal plate and two, conspicuous, long apodemes (fig. 53); inner margin of coxal plate III lightly sclerotized, posterior-inner margin of coxal plate IV septate (fig. 52); female genital field with a



Figs. 52-57. *Unionicola parmaphora* n. sp.: 52. female coxal plates; 53. female dorsal shield; 54. claw of first walking leg; 55. claw of fourth walking leg; 56. female genital field; 57. female first walking leg.

pair of acetabular plates, each bearing 5 acetabula and appearing to be composed of two subplates joined by secondary sclerotization and bearing 3, large spines on the inner margin (fig. 56); 4 tarsal claws on pedipalp; tarsal claws of walking legs bifid at tip (figs. 54-55); first walking leg moderately setigerous (fig. 57).

FEMALE (holotype) — Length including capitulum 800; dorsal plate 600 long; dorsal apodeme 230 long; length of posterior coxal group 225; genital field 130 long, 200 wide; dorsal length of pedipalp segment: Ta 35; dorsal lengths of leg segments: leg I: TFe 54; Ge 80; Ti 70; Ta 70; Leg IV: TFe 125; Ge 180; Ti 155; Ta 120.

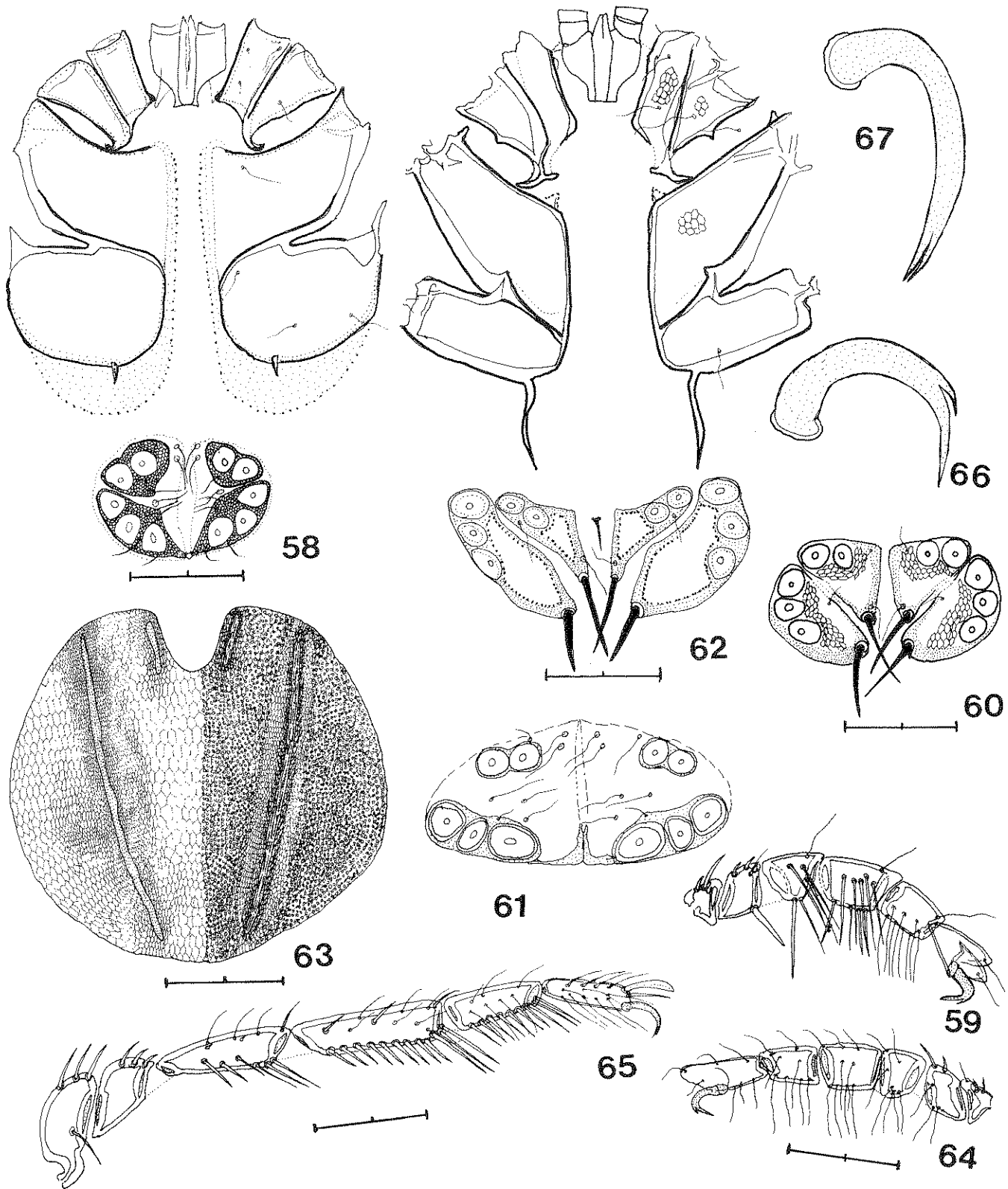
NOTES — Holotype (female) (CNC type number 18834) from the entrance to a small, clear, feeder stream into Rio Jutai, ca. 4.0 km upstream from the mouth of Rio Jutai (into Rio Solimoes of the Amazon drainage), Municipio de Jutai, Amazonas Province, Brazil, collected on 6 November 1982 by B. Nelson and K. Redford. A single female was found in the host mussel, *Castalia ambigua* (Lamarck) (USNM 804420).

REMARKS — *U. parmaphora* has distinctive dorsal plate and coxal plate morphology. It is apparently closely related to *U. petita*.

8. *Unionicola (Atacella) nelsoni* new species (Figs. 61-67)

DIAGNOSIS — Character states of subgenus; dorsum with reticulate, shield-like plate with a short and a long pair of apodemes (fig. 63); coxal plates well-sclerotized and bearing prominent posterior apodemes (fig. 62); female genital field with 2 pairs of acetabular plates, the anterior plates each bearing 2 acetabula and a large spine on the inner margin, the posterior plates each bearing 3 acetabula and a large spine on the inner margin (fig. 62); male genital field with a pair of lightly sclerotized acetabular plates with secondary sclerotization around acetabula, and each plate bearing 5 acetabula (fig. 61); 4 tarsal claws on pedipalp; tarsal claw of first walking leg bifid, with small, dorsal prong (fig. 66); tarsal claw of fourth walking leg bifid, with equal, lateral prongs (fig. 67); first walking leg moderately setigerous (fig. 64); fourth walking leg with distinct row of ventral setae (fig. 65).

MALE (holotype) — Length including capitulum 525; dorsal plate 250 long; length of posterior group of coxal plates 160; genital field 65 long, 145 wide; dorsal lengths of leg segments: leg IV: TFe 105; Ge 115; Ti



Figs. 58-67. *Unionicola crassiparma* n. sp.: 58. male venter; 59. male first walking leg; 60. female genital field; *Unionicola nelsoni* n. sp.: 61. male genital field; 62. female venter; 63. female dorsal shield; 64. female first walking leg; 65. female fourth walking leg; 66. claw of first walking leg; 67. claw of fourth walking leg.

70; Ta 68.

FEMALE (allotype) — Length including capitulum 650; dorsal plate 300 long; length of posterior coxal group 170; genital field 125 long, 290 wide; dorsal length of pedipalp segment: Ta 27; dorsal lengths of leg segments: leg I: TFe 40; Ge 55; Ti 54; Ta 70; leg IV: TFe 115; Ge 130; Ti 82; Ta 80.

NOTES — Holotype (male) (CNC type number 18830) from the entrance to a small, clear, feeder stream into Rio Jutai, ca. 4.0 km upstream from the mouth of Rio Jutai (into Rio Solimoes of the Amazon drainage), Municipio de Jutai, Amazonas Province, Brazil, collected on 6 November 1982 by B. Nelson and K. Redford. A single male and female were found in the host mussel, *Prisodon obliquus* (USNM 804421 — the longer specimen of the two in the lot). *U. recta* also occurred in this mussel host.

REMARKS — *U. nelsoni* has distinctive dorsal plate and coxal plate morphology.

9. *Unionicola (Atacella) quadriplaca* new species
(Figs. 75-82)

DIAGNOSIS — Character states of subgenus; dorsum with 4 plates, the anterior pair are smaller and circular, the posterior pair are elongate, and each has a linear apodeme (fig. 76); coxal plates with distinct posterior projections (fig. 75); male genital field with a pair of acetabular plates, each with 5 acetabula (fig. 77); 4 tarsal claws on pedipalp (fig. 80); tarsal claw of first walking leg bifid (fig. 78); first walking leg moderately setigerous (fig. 79); tarsal claw of fourth walking leg bifid at tip (fig. 82); fourth walking leg highly setigerous (fig. 81).

MALE (2 specimens) — Length including capitulum 1568 (1485-1650); anterior dorsal plate 125 (120-130) in diameter; posterior dorsal plate 525 (500-550) long; length of posterior coxal group 505 (500-510); genital field 263 (250-275) long, 368 (335-400) wide; dorsal length of pedipalp segment: Ta 62 (60-63); dorsal lengths of leg segments: leg I: TFe 165 (160-170); Ge 210 (205-215); Ti 158 (150-165); Ta 130 (125-135); leg IV: TFe 260; Ge 403 (400-405); Ti 365 (360-370); Ta 330 (310-350).

NOTES — Holotype (male) (CNC type number 18831) from the entrance to a small, clear, feeder stream into Rio Jutai, ca. 4.0 km upstream from the mouth of Rio Jutai (into Rio Solimoes of the Amazon drainage), Municipio de Jutai, Amazonas Province, Brazil, collected on 6 November 1982 by B. Nelson and K. Redford. One male was found in each of two host mussels, *Hyria corrugata* (Lamarck) (USNM 804424).

REMARKS — *U. quadriplaca* has a unique dorsum that vaguely resembles that of *U. schubarti* (Viets 1954).

10. *Unionicola (Atacella) rosewateri* new species
(Figs. 46, 69-74)

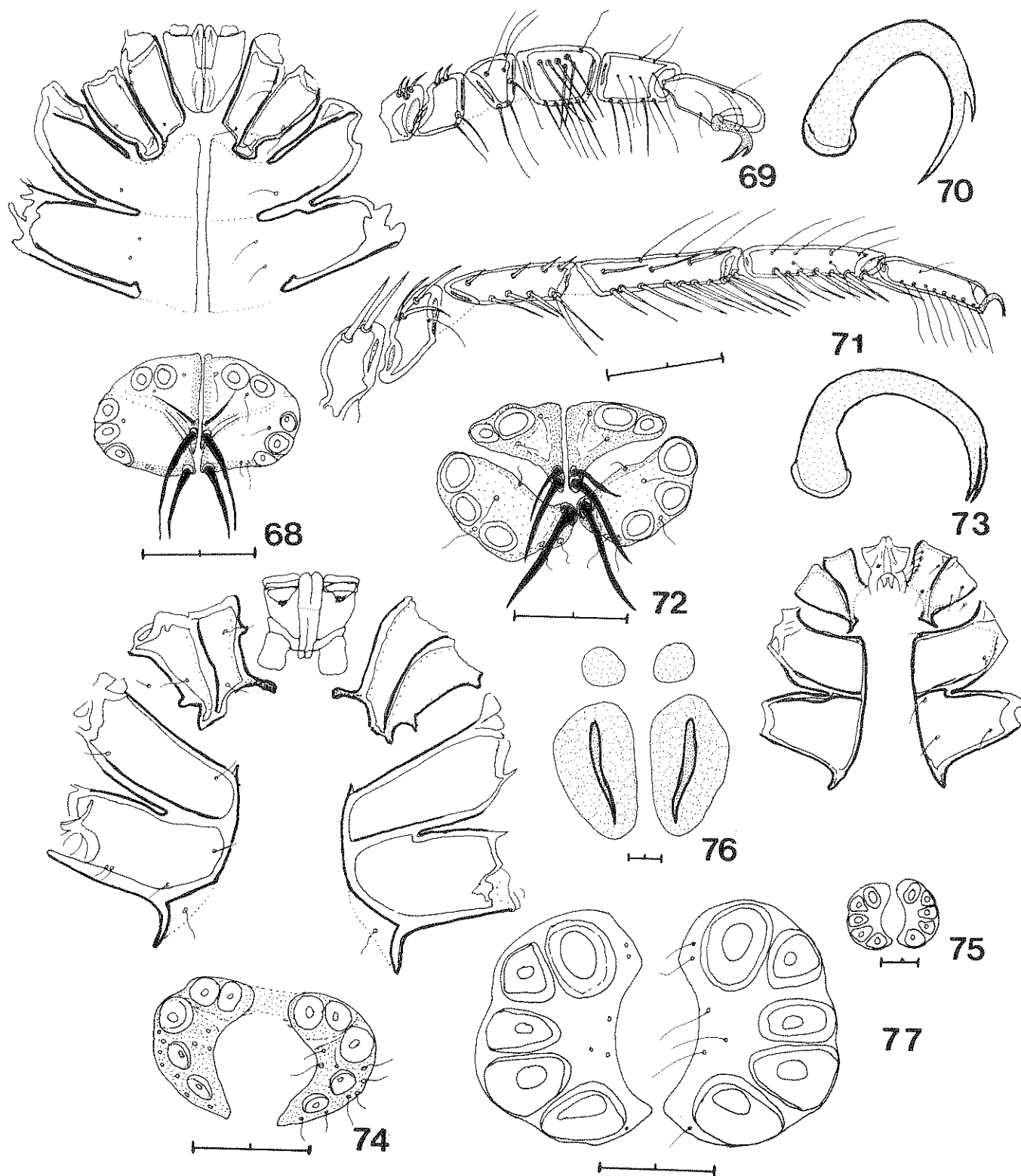
DIAGNOSIS — Character states of subgenus; dorsum with 2, widely separated, linear apodemes (fig. 46); coxal plates well-sclerotized; posterior coxal group with distinct, posterior projection; coxal plate I with an elongate, inner projection (fig. 74); female genital field with 2 pairs of acetabular plates, the anterior plates each with 2 acetabula and 2, large spines on the inner margin, posterior plates each with 3 acetabula and a large spine on the inner margin (fig. 72); male genital field with a pair of acetabular plates, each with 5 acetabula (fig. 74); 2 tarsal claws on pedipalp; tarsal claw of first walking leg bifid with a small, dorsal prong (fig. 70); first walking leg moderately setigerous (fig. 69); tarsal claw of fourth walking leg bifid at tip (fig. 73); fourth walking leg highly setigerous (fig. 71).

MALE (2 specimens) — Length including capitulum 700 (650-750); dorsal apodeme 110 long; length of posterior coxal group 133 (135-140); genital field 145 (140-150) long, 213 (210-215) wide; dorsal length of pedipalp segment: Ta 40; dorsal length of leg segments: leg I: TFe 49 (45-52); Ge 69 (65-72); Ti 65; Ta 79 (78-80); leg IV: TFe 110; Ge 139 (138-140); Ti 118 (115-120); Ta 108 (105-110).

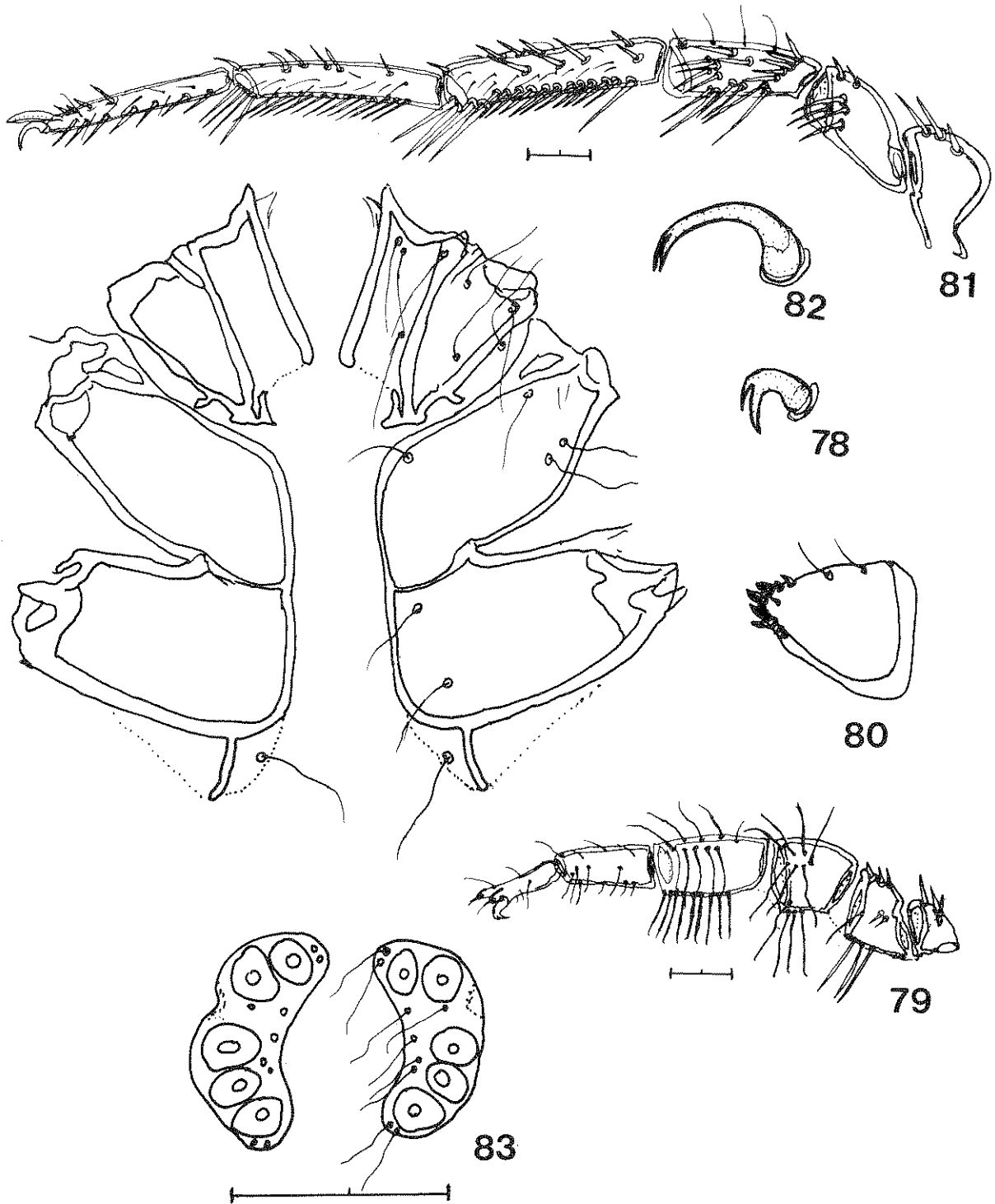
FEMALE (3 specimens) — Length including capitulum 662 (610-750); dorsal apodeme 98 (95-100) long; length of posterior coxal group 138 (135-140); genital field 142 (135-150) long, 242 (235-250) wide; dorsal lengths of leg segments: leg I: TFe 51 (50-52); Ge 69 (65-75); Ti 66 (65-67); Ta 79 (78-80); leg IV: TFe 118 (115-120); Ge 144 (140-146); Ti 113 (100-125); Ta 110 (100-115).

NOTES — Holotype (male) (CNC type number 18832) from the entrance to a small, clear feeder stream into Rio Jutai, ca. 4.0 km upstream from the mouth of Rio Jutai (into Rio Solimoes of the Amazon drainage), Municipio de Jutai, Amazonas Province, Brazil, collected on 6 November 1982 by B. Nelson and K. Redford. Ten to 20 specimens were found between each pair of gills of a single host mussel, *Mycetopoda* sp. (USNM 804423).

REMARKS — *U. rosewateri* has unique dorsal and coxal plate morphology. The female genital field resembles that of *U. nelsoni*, but the anterior plates possess each two, large spines rather than one.



Figs. 68-77. *Unionicola petita* n. sp.: 68. female venter; *Unionicola rosewateri*, n. sp.: 69. male first walking leg; 70. claw of first walking leg; 71. male fourth walking leg; 72. female genital field; 73. claw of fourth walking leg; 74. male venter; *Unionicola quadriplaca* n. sp.: 75. male venter; 76. male dorsal shield; 77. male genital field.



Figs. 78-83. *Unionicola quadriplaca* n. sp.: 78. claw of first walking leg; 79. male first walking leg; 80. male pedipalp Ta; 81. male fourth walking leg; 82. claw of fourth walking leg; *Unionicola redfordi* n. sp.: 83. male venter.

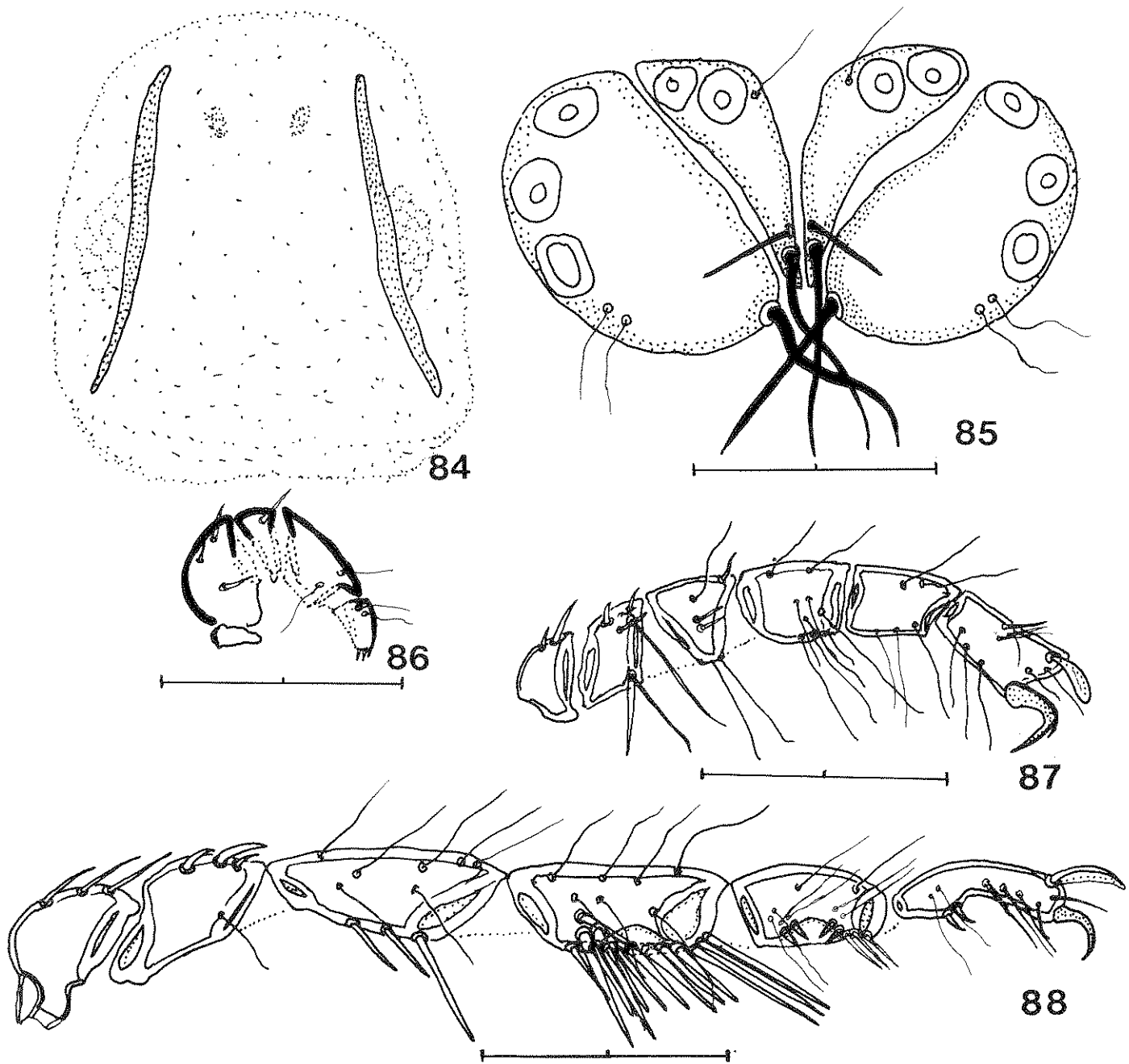


Fig. 84-88. *Unionicola redfordi* n. sp.: 84. male dorsal shield; 85. female genital field; 86. female pedipalp; 87. male first walking leg; 88. male fourth walking leg.

11. *Unionicola (Atacella) redfordi* new species
(Figs. 83-88)

DIAGNOSIS — Character states of subgenus, but the fourth walking legs of the male are sexually dimorphic; dorsum with very lightly sclerotized plate with 2, linear apodemes (fig. 84); coxal plates well sclerotized,

posterior coxal group with distinct posterior projection (fig. 83); female genital field with 2 pairs of acetabular plates, anterior plates each with 2 acetabula and 2, large spines on the inner margin, posterior plates each with 3 acetabula and a single, large spine on the inner margin (fig. 85); male genital field with a pair of acetabular plates, each bearing 5 acetabula (fig.

83); 3 tarsal claws on pedipalp (fig. 86); tarsal claw of first walking leg bifid, with small, dorsal prong; first walking leg lightly setigerous (fig. 87); tarsal claw of fourth walking leg bifid at tip; fourth walking leg of male sexually dimorphic with the Ge, Ti and Ta distinctly notched ventrally and slightly arched dorsally (fig. 88); fourth walking leg of female with straight segments that taper distally.

MALE (2 specimens) — Length including capitulum 505 (500-510); dorsal plate 140 long; dorsal apodeme 128 (125-130) long; length of posterior coxal group 120; genital field 80 long, 130 wide; dorsal length of pedipalp segment: Ta 30; dorsal lengths of leg segments: leg I: TFe 39 (37-40); Ge 51 (50-51); Ti 48 (46-50); Ta 54 (52-56); leg IV: TFe 102 (100-103); Ge 86 (84-87); Ti 65 (64-65); Ta 71 (70-71).

FEMALE (5 specimens) — Length including capitulum 665 (610-700); dorsal apodeme 158 (150-170) long; length of posterior coxal group 124 (115-130); genital field 125 (120-130) long, 230 (220-250) wide; dorsal lengths of leg segments: leg I: TFe 42 (40-44); Ge 53 (50-56); Ti 50 (47-53); Ta 60 (56-63); leg IV: TFe 103 (98-107); Ge 98 (91-102); Ti 79 (76-81); Ta 78 (75-81).

NOTES — Holotype (male) (CNC type number 18833) from entrance to small, clear, feeder stream into Rio Jutai, ca. 4.0 km upstream from the mouth of Rio Jutai (into Rio Solimoes of the Amazon drainage), Municipio de Jutai, Amazonas Province, Brazil, collected on 6 November 1982 by B. Nelson and K. Redford. Seven specimens of this mite were found between the gills of two specimens of *Hyria corrugata* (USNM 804421), which also contained *U. quadriplaca*.

REMARKS — *U. redfordi* has distinct dorsal and leg morphology. It is the only *Atacella* known to possess obvious sexually dimorphic fourth walking legs. The female genital field structure with 4 distinct acetabular plates is also known in *U. rosewateri*, *U. nelsoni* and *U. prominens* Koenike 1914. *U. redfordi*, *U. nelsoni* and *U. rosewateri* are apparently closely related.

DISCUSSION

The description of *Atacella* is amended in order to include species, eg. *U. redfordi* with sexually dimorphic fourth walking legs. Furthermore, the description of the genus *Unionicola* is also amended in order to include this species that possesses sexual dimorphism in the tarsus of the fourth walking leg of the males.

Atacella now contains 19 species from Mexico and South America. These species illustrate evolutionary adaptive radiation about a generalized body form. The discovery of 7 new species from a single collection of 8

mussel host specimens belonging to 5 genera in the Amazon River drainage illustrates the potential diversity in the subgenus. The vast, unexplored portions of Mexico and South America, not to mention the potentials of Africa, are in dire need of exploration and search for unionicoline mites.

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