BEREZATAX, NEW SUBGENUS (ACARI: UNIONICOLIDAE: UNIONICOLINAE: *UNIONICOLA*), IN SUBTROPICAL AND TROPICAL NORTH AMERICA, WITH A RE-EVALUATION OF THE HIGHER TAXONOMIC GROUPS OF RELATED AMERICAN UNIONICOLINE MITES

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ABSTRACT—***Unionicola (Berezatax) berezai*** n. sp., ***U. (B.) acylindrotarsa*** n. sp. and ***U. (B.) latipalpa*** n. sp. are described for the first time and placed in ***Berezatax***, a new subgenus. *Berezatax* is intermediate in character states between the genera *Unionicola* and *Atacella*. Thus, *Atacella* is reduced in rank to a subgenus in the genus *Unionicola*, and the subgenera of *Atacella* are abandoned. ***Australatax***, new subgenus, is erected as a sister group to *Berezatax* and *Atacella* and contains South American and Australian mites with many synapomorphies. The subgenus *Unionicolides* (in *Unionicola*) is redefined in order to include the subgenus *Unionicolella* (in *Unionicola*), which is abandoned. *Berezatax, Atacella, Australatax* and *Unionicolides* diverged from a *Pentatax*-like ancestor and form a holophyletic group displaying evolutionary adaptive radiation within the genus *Unionicola*. These apparently obligate, mussel (Unionoida) parasites are known only from the Americas, with the exception of *Australatax*, which also occurs in Australia.

INTRODUCTION

The current classification of the mites within Unionicolinae does not represent the holophyletic nature of the group (Vidrine 1980a). Major inconsistencies in character states that are used to define genera and subgenera (eg. acetabular plate number, acetabula number, and presence or absence of sexually dimorphic legs) are mentioned in Cook (1974), Vidrine (1980a) and Vidrine and Bereza (1980). Vidrine (1984) proposed the use of the female genital field structure as a primary subgeneric criterion and leg and pedipalpal structure as secondary subgeneric criteria in an effort to reconcile the classification with a more probable evolutionary history of the group.

This paper deals specifically with a major group of mites that parasitize fresh-water mussels (Unionoida) in North and South America and Australia. Heretofore, these mites have been placed in several taxa: subgenera *Pentatax* Thor, *Unionicolella* Lundblad and *Unionicolides* Lundblad in the genus *Unionicola* Haldeman; and subgenera *Atacella* Lundblad, *Atacellides* Lundblad and *Polyatacides* Lundblad in the genus *Atacella* Lundblad (see Cook 1974, Viets 1980). Three new species are described for the first time. These three species are placed in a new subgenus and occur in subtropical and tropical North America. The new subgenus is clearly intermediate in character states between the genera *Atacella* and *Unionicola*. This discovery unveils heretofore masked lineages and permits a re-evaluation of the aforenamed taxa.

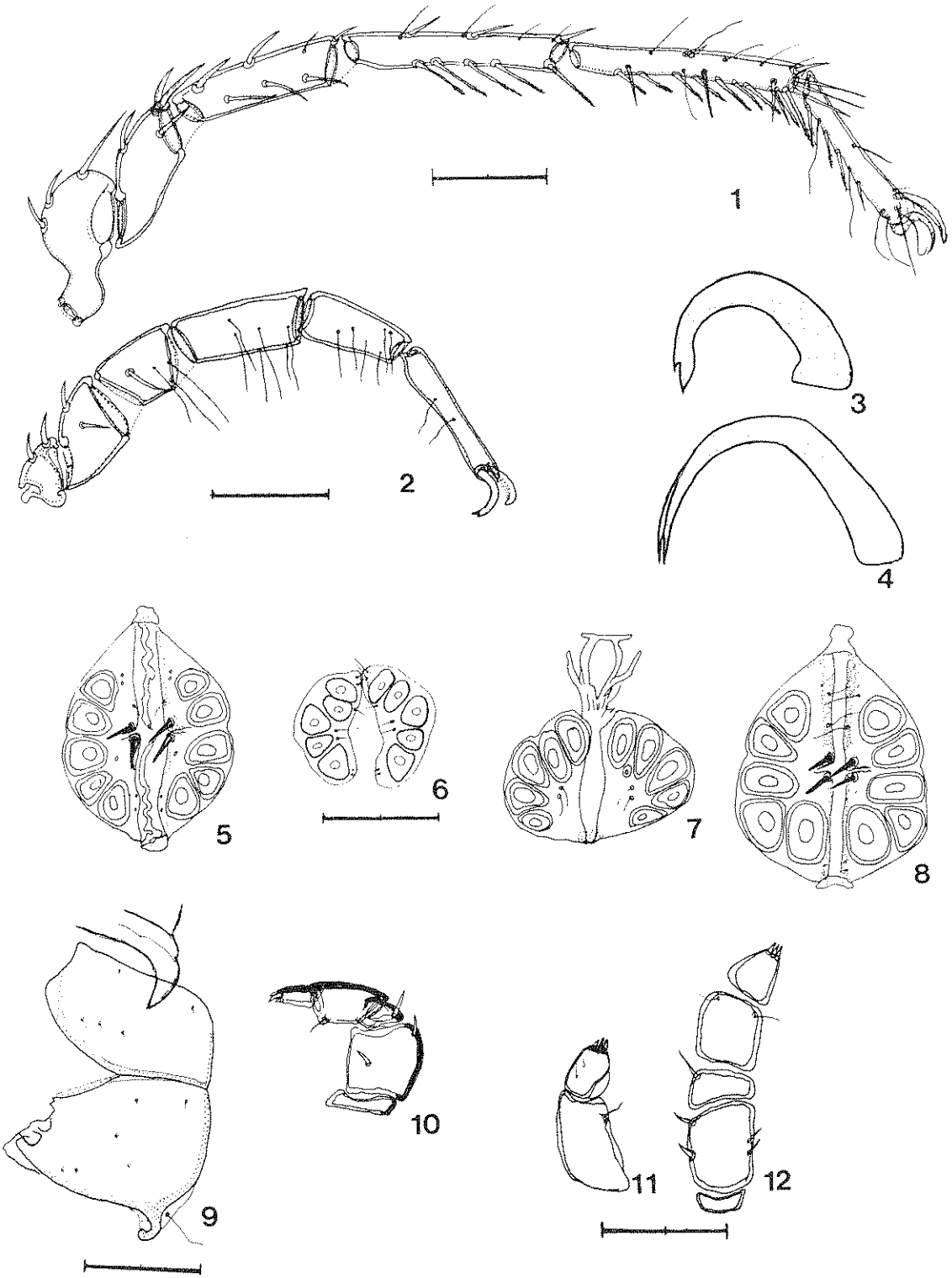
Holotypes and representative paratypes are deposited in the Canadian National Collections and Biosystematics Institute, Ottawa. Additional paratypes are retained in the author's collection.

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

Genus *Unionicola*, new combination

DIAGNOSIS — Character states of Unionicolinae (see Cook 1974); body typically soft but secondary sclerotization present in some species; gonopore of male terminal or subterminal, never opening in the middle of the dorsum; tarsus of fourth walking leg never exhibiting pronounced sexual dimorphism.



Figs. 1-12. ***Unionicola (Berezatax) berezai*** n. sp.: 1. male fourth walking leg; 2. female first walking leg; 3. claw of first walking leg; 4. claw of fourth walking leg; 5. female genital field; 6. male genital field; 7. male genital field; 8. female genital field; 9. female coxal plates III and IV; 10. male pedipalp; *U. (B.) acylindrotarsa* n. sp.: 11. female pedipalp tibia and tarsus; 12. female pedipalp.

REMARKS — Three other genera are retained in Unionicolinae: *Vietsatax* Uchida and Imamura, *Heteratax* Lundblad and *Unionicolopsis* Viets. These three genera are separated from *Unionicola* based upon one or two apormorphic characters, and I strongly suspect that the entire group is holophyletic and should be congeneric (Vidrine 1980a). Further study is necessary in order to clarify these differences versus the many synapomorphic and synplesiomorphic character states within the Unionicolinae as a whole.

Berezatax, new subgenus

DIAGNOSIS — Character states of *Unionicola*; secondary sclerotization forming a dorsal shield with two thickened anterio-posterior linear apodemes (figs. 15, 16 and 20); dorsal and ventral secondary sclerotization partially reticulate; distinct posterior apodemes on coxal plates I, II and IV, and a complete suture between coxal plates III and IV (figs. 9, 14, 17 and 24); female genital field ovate in outline and longer than wide, and composed of a single pair of acetabular plates, each bearing 5 (sometimes 6) acetabula arranged in a peripheral row and a relative stout seta on each of two small triangular flaps near the center of the genital field giving the appearance of 4 relatively stout setae in the center of the field (figs. 5, 8, 17 and 25); male genital field similar to female but lacking stout setae and small triangular flaps (figs. 6, 7 and 26); pedipalp dorsoventrally flattened (appearing wide) and thinly sclerotized ventrally, pedipalp Ta with small clawlets distally, and pedipalp Ti with a small distal, ventral tubercle with a hairlike seta (figs. 10, 11, 12, 13, 18 and 19); male and female legs similar; legs short relative to body size and bearing few to many hairlike setae; claws of legs bifid at tip (figs. 3, 4, 27, 28 and 29); Ta of legs with a distal, dorsal, expanded, spoonlike seta over claws (figs. 1, 2, 21, 22, 23, 20 and 31).

Unionicola (Berezatax) berezai new species
(Figs. 1-10, 13-15)

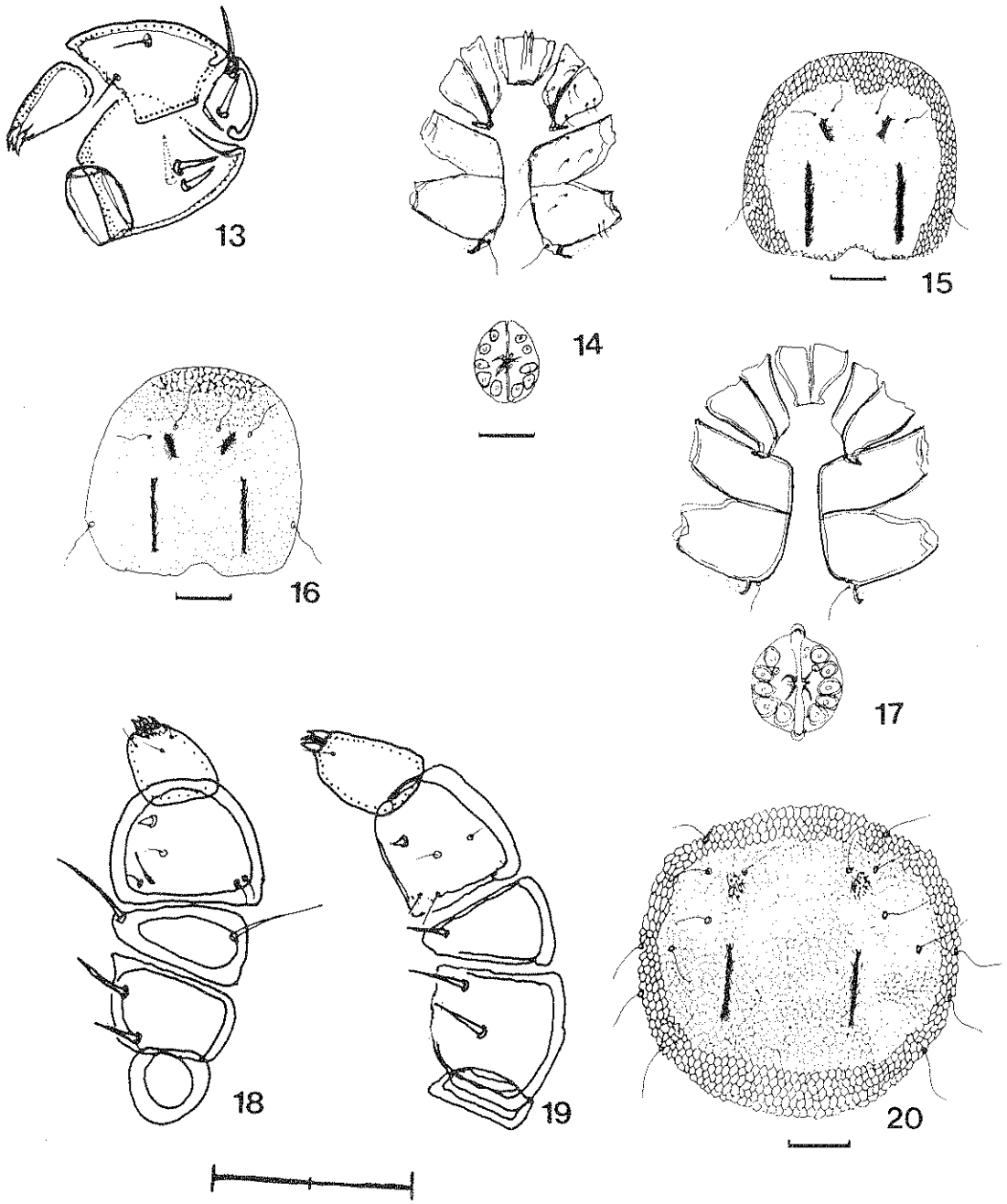
DESCRIPTION — Character states of subgenus; pedipalp Ta with 3 distal clawlets (fig. 13); first walking leg with few setae, especially the Ge, Ti and Ta with several, small, hairlike setae (fig. 2); fourth walking leg more densely setigerous (fig. 1); Ta of first walking leg cylindrical and longer than Ti (fig. 2); claw of first walking leg with a small, dorsal prong giving the claw tip a reverse uncinate shape (fig. 3); claws of posterior walking leg pairs finely bifid at the tip and appearing simple — the prongs appear to be lateral to one another (fig. 4).

MALE (4 specimens): Length including capitulum 656 (600-700); dorsal shield 410 (400-420) long, 418 (400-425) wide; length of posterior coxal group 244 (225-260); genital field 118 (100-135) long, 139 (107-180) wide; dorsal lengths of pedipalp segments: Ge 35 (30-40); Ti 74 (70-80); Ta 42 (40-45); dorsal lengths of leg segments: leg I: TFe 77 (70-81); Ge 109 (100-120); Ti 100 (95-110); Ta 125 (115-134); leg IV: TFe 126 (107-140); Ge 173 (150-187); Ti 183 (165-195); Ta 151 (133-170).

FEMALE (5 specimens): Length including capitulum 863 (700-950); dorsal shield 400 (350-425) long, 450 wide; length of posterior coxal group 243 (210-265); genital field 233 (180-250) long, 185 (140-200) wide; dorsal lengths of pedipalp segments: Fe 73; Ge 35; Ti 69 (62-80); Ta 45 (44-45); dorsal lengths of leg segments: leg I: TFe 79 (78-80); Ge 114 (110-120), Ti 104 (94-108); Ta 130 (128-132); leg IV: TFe 137 (130-145); Ge 190 (172-200); Ti 195 (172-210); Ta 159 (150-165).

NOTES — Holotype (male) (CNC type number 18687) from Devil's River (Rio Grande drainage) ca. 0.7 km below Baker's Crossing, Val Verde County, Texas, collected on 5 June 1976 by Samuel L.H. Fuller and Daniel J. Bereza. The mussel host was *Popenaias popei* (Lea). Usually one or 2 mites infested each host, and eggs were in the ventral edge of the outer pair of host demibranchs (gills). This mite was collected from *Nephronaias sp.* in the Rio Panuco drainage in eastern Mexico and from a number of other mussel genera in the eastern Mexican Gulf drainages, including the Rio Papaloapan system and Laguna Catemaco in southern Mexico. Additional paratypes studied and measured are from: Rio Huichihyayan (Montezuma River system in the Rio Panuco drainage) at road to Xilitla off Rte. Mexico 85, San Luis Potosi, Mexico, 30 January 1982 (D. J. Bereza, S. V. Hensley, M. F. Vidrine); Rio San Juan (Rio Papaloapan drainage) ca. 29.0 km south of Santiago Tuxtla (junction of Rte. Mexico 25 and 180) on Rte. Mexico 25 and ca. 23.0 km from the junction of Rte. Mexico 25 and 145, Vera Cruz Province, Mexico, 15 February 1982 (D. J. Bereza, S. V. Hensley, R. T. Hensley and M. F. Vidrine).

REMARKS — The southern range of this species is unknown, but intensive search has not produced a single specimen north or east of southern Texas. The host taxa are currently being studied by D.J. Bereza. *U. berezai* is similar to *U. tupara* Mitchell and Wilson, and it has been discussed by Vidrine (1980a) and Vidrine and Bereza (1980) under the manuscript name: *Atacella (Atacella)* sp. nov. type I.



Figs. 13-20 ***(Unionicola (Berezatax) berezai*** n. sp.: 13. male pedipalp; 14. female venter; 15. female dorsal shield; *U. (B.) acylindrotarsa* n. sp.: 16. female dorsal shield; *U. (B.) latipalpa* n. sp.: 17. female venter; 18. female pedipalp (ventral view); 10. female pedipalp (lateral view); 20. female dorsal shield.

Unionicola (Berezatax) acylindrotarsa new species
(Figs. 11-12, 16, 21-27)

DESCRIPTION — Character states of subgenus; pedipalp Ta with 3 distal clawlets (figs. 11 and 12); first walking leg with few setae, especially the Ge, Ti and Ta with several, small, hairlike setae (figs. 21 and 22); fourth walking leg more densely setigerous; Ta of first walking leg swollen proximally and acylindrical and longer than Ti (fig. 22); claw of first walking leg bifid at tip with strongly divergent prongs (fig. 27); claws of posterior pairs of walking legs bifid at tip and appearing simple — the prongs appear lateral to one another.

MALE (3 specimens): Length including capitulum 658 (550-725); dorsal shield 300 long; length of posterior coxal group 203 (200-210); genital field 100 long, 133 (130-140) wide; dorsal lengths of pedipalp segments: Ge 35; Ti 61; Ta 41 (40-42); dorsal lengths of leg segments: leg I: TFe 68 (65-70); Ge 100 (90-110); Ti 77 (75-80); Ta 102 (95-110); leg IV: TFe 107 (100-110); Ge 148 (135-160); Ti 152 (140-160); Ta 122 (115-130).

FEMALE (3 specimens): Length including capitulum 733 (700-800); dorsal shield 300 long; length of posterior coxal group 218 (210-225); genital field 190 (180-210) long, 140 (130-160) wide; dorsal lengths of pedipalp segments: Ti 75; Ta 40; dorsal lengths of leg segments: leg I: TFe 71 (65-75); Ge 98 (95-100); Ti 80; Ta 107 (105-110); leg IV: TFe 109 (107-110); Ge 157 (155-160); Ti 155 (150-160); Ta 120.

NOTES — Holotype (male) (CNC type number 18688) from a small river (locally called Arroyo los Gatos) (Panuco River system) at Rte. Mexico 80 in Nuevo Morelos, ca. 1.0 km from the sign on the west end of town and ca. 17.0 km along Rte. Mexico 80 west of Antiguo Morelos, Tamaulipas, Mexico, collected 13 November 1978 by D. J. Bereza. The host mussel was *Popenaias* sp. Usually one or two specimens were collected in a single host, although parasite incidence was usually less than 10.0%. The mite is known from a number of localities in the Panuco system and from single localities in the Rio Tuxpan and Rio Carrizal systems. Of 40 specimens, only one has been found in a host other than *Popenaias sp.* This specimen was collected from *Nephronaias sp.* Additional paratypes studied and measured are from *Popenaias sp.* from: (1) a small river (locally called Rio Vallejares) draining into Rio Ganina at bridge of Estacion Rascon-Damian Carmona Road ca. 1.3 km north of railroad crossing in Estacion Rascon, San Luis Potosi, Mexico, 4 November 1978 (D. J. Bereza), (2) an arroyo (locally called Rio Estero) at Rte. Mexico 110 ca. 25.0 km east of intersection of Rte. Mexico 110 and 85 in Ciudad Vallez, San Luis Potosi, Mexico, 2 February 1982 (D. J. Bereza, S. V. Hensley, M. F. Vidrine), (3) Rio Carrizal at Rte. Mexico 180, north of Adlama, Tamaulipas, Mexico, 27 January 1982 (D. J. Bereza, S. V. Hensley, M. F. Vidrine), and (4) Rio Pantepec at Alamo (due west of Tuxpan) (Rio Tuxpan system) (mussels collected ca. 300 to 500 m upstream), 23 February 1982 (D. J. Bereza, S. V. Hensley, R. T. Hensley, M. F. Vidrine).

REMARKS — *U. acylindrotarsa* resembles *U. berezai,* but the claw and shape of the tarsus of the first walking leg are diagnostic. *U. acylindrotarsa* is only known from small tributaries. It has been previously discussed by Vidrine (1980a) and Vidrine and Bereza (1980) under the manuscript name: *Atacella (Atacella)* sp. nov. type II.

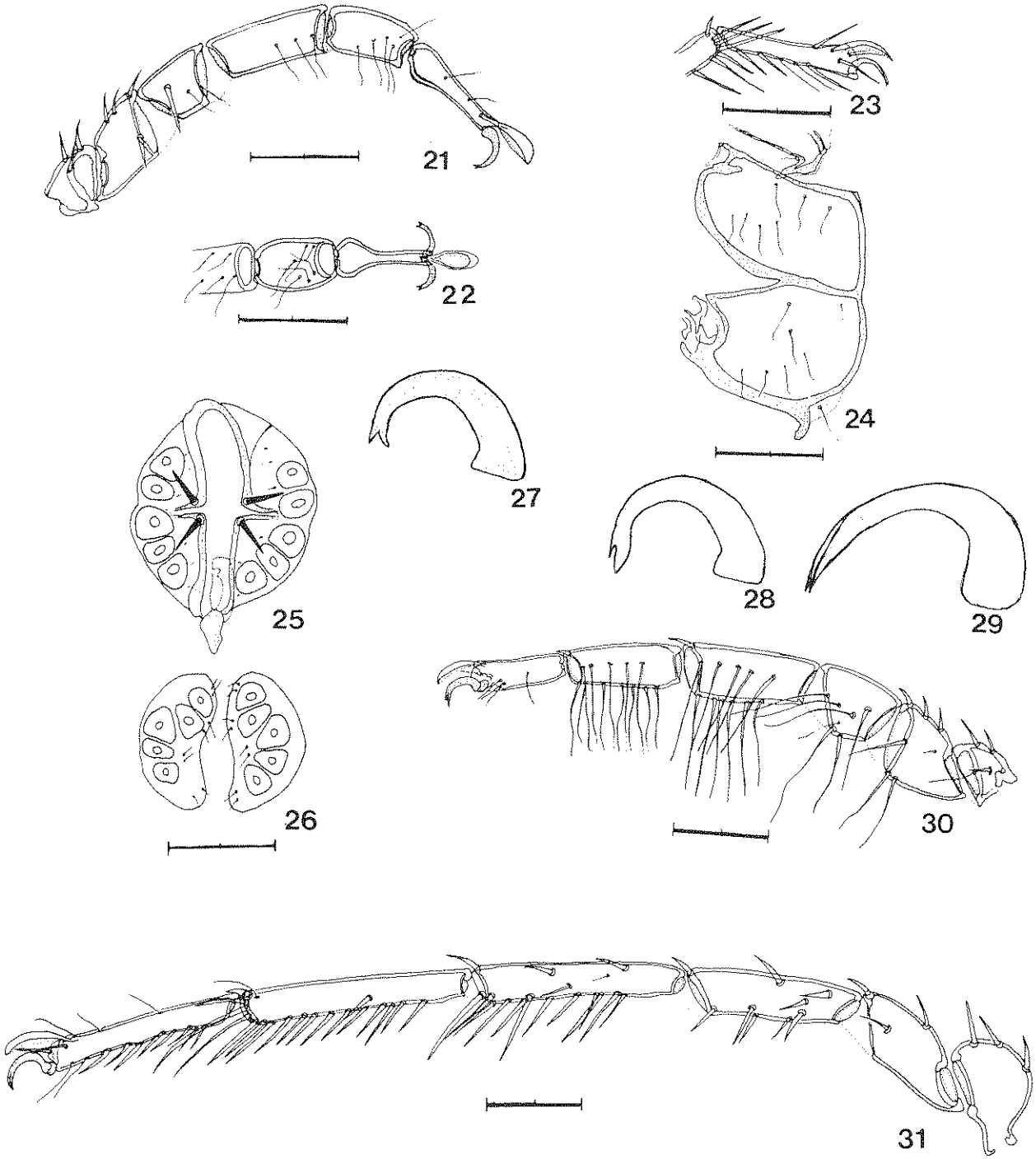
Unionicola (Berezatax) latipalpa new species
(Figs. 17-20, 28-31)

DESCRIPTION — Character states of subgenus; pedipalp Ta with 4 clawlets (figs. 18 and 19); first walking legs with 2 rows of hairlike setae, and Ti longer than Ta (fig. 30); posterior pairs of legs with more spinelike setae (fig. 31); claw of first walking leg with a small, dorsal prong giving the bifid tip a reverse uncinate shape (fig. 28); claws of posterior legs finely bifid at the tip and appearing simple — the prongs appear to be lateral to one another (fig. 29).

MALE (3 specimens): Length including capitulum 900 (800-1100); dorsal shield 600 long; length of posterior coxal group 292 (250-325); genital field 130 (125-140) long, 155 (140-165) wide; dorsal lengths of pedipalp segments: Ge 45; Ti 85; Ta 54 (47-60); dorsal lengths of leg segments: leg I: TFe 87 (82-95); Ge 131 (120-145); Ti 108 (105-115); Ta 98 (85-107); leg IV: TFe 163 (160-165); Ge 208 (200-220); Ti 216 (207-230); Ta 192 (180-205).

FEMALE (3 specimens): Length including capitulum 1063 (990-1200); dorsal shield 550 long, 490 wide; length of posterior coxal group 308 (265-335); genital field 215 (200-225) long, 168 (160-180) wide; dorsal lengths of pedipalp segments: Ge 45 (40-50); Ti 75 (65-85); Ta 49 (47-50); dorsal lengths of leg segments: leg I: TFe 92 (82-100); Ge 145 (130-160); Ti 115 (105-125); Ta 101 (92-110); leg IV: TFe 168 (154-185); Ge 218 (205-235); Ti 224 (210-235); Ta 204 (190-215).

NOTES — Holotype (male) (CNC type number 18689) from Ochlockonee River at Rte. 263, Gadsden and Leon County border, Florida, collected on 17 July 1977 by Marc Imlay, D. J. Bereza and M. F. Vidrine. The host mussel was *Carunculina parva* (Barnes), and it is the only known host for this mite. Usually one or two (seldom 3) mites were found in each infested host. Eggs are found in the ventral edge of the host's demi-



Figs. 21-31 *(Unionicola (Berezatax) acylindrotarsa* n. sp.: 21. female first walking leg; 22. female first walking leg (ventral view of distal segments); 23. tarsus of female fourth walking leg; 24. female coxal plates III and IV; 25. female genital field; 26. male genital field; 27. claw of first walking leg; *U. (B.) latipalpa* n. sp.: 28. claw of first walking leg; 29. claw of fourth walking leg; 30. male first walking leg; 31. male fourth walking leg.

branchs. Additional paratypes studied and measured are from: (1) Burnt Corn Creek at Rte. U.S. 84, ca. 7.0 km east of Repton, Conecuh County, Alabama, 21 July 1977 (D. J. Bereza, M. F. Vidrine), (2) a rice irrigation canal at China on Rte. U.S. 90, Jefferson County, Texas, 24 August 1978 (M. F. Vidrine), (3) Nestor Ranch Tanks, D'Harris, Uvalde County, Texas, 1978 (Alan Neumann).

REMARKS — *U. latipalpa* resembles *U. berezai* and *U. acylindrotarsa,* but it is much larger and more setigerous, with the tarsus of the first walking leg shorter than the tibia. The species is only known from Texas, Florida and Alabama, and I have vigorously searched the host in nearly a hundred localities between these two areas and have not found an infestation. Texas specimens are larger than the eastern specimens, and the larger numbers presented in the ranges of measurements represent the Texas specimens. This species has been studied under several manuscript names: *Unionicola latipalpa* by Dobson (1966), *Unionicola* sp. III by Calnan (1976) and *Atacella (Atacella)* sp. nov. type III by Vidrine (1980a) and Vidrine and Bereza (1980).

Subgenus *Atacella,* new combination

DIAGNOSIS — Character states of *Unionicola*; dorsum variable, but many species with secondary sclerotization forming a dorsal shield and/or two thickened, anterio-posterior linear apodemes; dorsal and ventral secondary sclerotization reticulate in some species; distinct posterior apodemes on coxal plates in many species; female genital field ovate in outline, and composed of one or 2 pairs of acetabular plates; female genital fields wider than long; genital field with 5-10 pairs of acetabula; female genital field with 4 stout setae placed posterior to the center of the field, sometimes on elongate flaps; male genital field with a single pair of plates lacking stout setae and flaps; complete suture between coxal plates III and IV; pedipalp dorsoventrally flattened and thinly sclerotized ventrally; pedipalp Ta with small clawlets distally, Ti lacking ventral tubercle; male and female legs similar; legs short relative to body size and bearing few to many hairlike setae; claws of legs may be bifid or simple; Ta of legs usually with a distal, dorsal, expanded, spoonlike seta over claws.

REMARKS — The three previous subgenera, *Atacella, Atacellides* and *Polyatacides,* are abandoned. All of the species appear to represent an evolutionary adaptive radiation about a generalized body form.

SPECIES INCLUDED — *U. granadosi* Hoffman and Cramer 1979, *U. clathrata* (Lundblad 1937), *U. perforata* (Koenike 1890), *U. rugosa* (Koenike 1890), *U. schubarti* (Viets 1954), *U. gigantea* (Caches and Mane-Garzon 1973), *U. subrecta* (Caches and Mane-Garzon 1973), *U. prominens* Koenike 1914, *U. fissipes* (Koenike 1891), and *U. entrerrianensis* (Rosso de Ferradas 1976). I also have nine new species from Mexico and the Amazon River (Vidrine, unpublished data).

Subgenus *Unionicolides*, new combination

DIAGNOSIS — Character states of *Unionicola*; dorsum variable, but many species with secondary sclerotization forming a dorsal shield and/or two thickened, anterio-posterior linear apodemes; dorsal and ventral secondary sclerotization reticulate in some species; distinct posterior apodemes on coxal plates in many species; female genital field ovate in outline, but longer than wide, and composed of a single pair of acetabular plates, each bearing 5 or 6 acetabula arranged in a peripheral row and a relatively stout seta on each of two small triangular flaps near the center of the genital field giving the appearance of 4 relatively stout setae in the center of the field; male genital field similar to female but lacking stout setae and small triangular flaps; pedipalps subcylindrical in shape; pedipalp Ta with small clawlets distally, Ti with prominent tubercles distally on ventral surfaces; male and female legs similar; legs short relative to body size and bearing hairlike and spinelike setae; claws of legs usually bifid at tip; Ta of legs with a distal, dorsal, expanded, spoonlike setae over claws.

REMARKS — The subgenus *Unionicolella*, previously separated from *Unionicolides* based on number of acetabula, is consubgeneric and hereafter abandoned. Vidrine (1980a, b) includes a large complex of North American mites into this group. All of the species in this subgenus appear to represent an evolutionary adaptive radiation about a generalized body form.

SPECIES INCLUDED — *U. sica* Lundblad 1937, *U. bonariensis* Mauri and Alzuet 1972, *U. pachyscelus* Lundblad 1941, *U. fossulata* (Koenike 1895), *U. stricta* (Wolcott 1898), *U. sakantaka* Mitchell and Wilson 1965, *U. vikitra* Mitchell and Wilson 1965, *U. vamana* Mitchell and Wilson 1965, *U. tupara* Mitchell and Wilson 1965 and *U. amandita* Mitchell and Wilson 1965. I have 7 new species in this group from North America and the Amazon River (Vidrine, unpublished data).

Australatax, new subgenus

DIAGNOSIS — Character states of *Unionicola*;

secondary sclerotization forming a dorsal shield and/or two thickened, anterior-posterior linear apodemes; distinct posterior apodemes on coxal plates; female genital field with 2 pairs of plates, anterior plates bearing 2 acetabula each and a pair of enlarged setae on an elongate flap, posterior plates bearing 3 acetabula each and a single enlarged setae on a posterior flap; enlarged setae posterior to the center of the female genital field; male genital field with a single pair of acetabular plates, each bearing 5 acetabula; pedipalp Ta with distal clawlets; pedipalps subcylindrical in shape; pedipalp Ti with small, ventral tubercle; male and female legs similar; legs short relative to body size; Ta of legs with a distal, dorsal, expanded, spoonlike seta over claws.

REMARKS — These mites have been placed in the subgenus *Pentatax* Thor, but they are distinctive in the structure of the female genital field, which closely resembles some members of the subgenus *Atacella*. As a group, *Australatax* share a number of synapomorphic characters with *Berezatax, Atacella* and *Unionicolides* including: (1) acetabula number and plate structure, (2) coxal plate strucure, (3) 2-4 small clawlets on pedipalp Ta, (4) walking leg structure and setization, (5) leg claw types, (6) dorsal plate and apodeme structure, (7) complete suture between coxal plates III and IV, (8) distal, dorsal, inflated, spoonlike seta over claws of walking legs, and (9) obligate parasitic nature with freshwater mussels.

SPECIES INCLUDED — *U. sinuata* Lundblad 1938, *U. procursa* Viets 1980, *U. assimilis* Viets 1980, *U. conjunctella* Viets 1980, *U. ligulifera* Viets 1980 and *U. scutata* Viets 1980.

Subgenus *Pentatax* Thor

DIAGNOSIS — Character states of *Unionicola*; five pairs of genital acetabula; two pairs of distinct acetabular plates in female genital field; acetabular plates held close together and provided with heavy medial setae, anterior plates with 2 acetabula each and 2 heavy setae, posterior plates with 3 acetabula each and one heavy seta; male genital field with 2 acetabula plates lacking heavy setae; male and female legs similar (after Cook 1974).

REMARKS — *Pentatax* represents a polyphyletic group of species and contains species that are considered to be similar to the ancestral *Unionicola* (Mitchell 1955). These mite species include free-swimming and parasitic forms from every continent except Antartica. Several species resemble the subgenera *Berezatax, Atacella, Unionicolides* and *Australatax* including *U. procurvipes* (Koenike 1890), *U. walkeri* Viets 1980, and *U. brasiliensis* (Lundblad 1936).

DISCUSSION

The four subgenera in this study (*Berezatax, Unionicolides, Atacella* and *Australatax*) represent evolutionary adaptive radiation from a generalized *Pentatax* body form. The subgenera are readily separable using the structure of the female genital fields and pedipalps. In each of the subgenera, further radiation has occurred, and the more generalized, smaller, lightly sclerotized species in each subgenus are *U. berezai, U. tupara, U. perforata* and *U. sinuata*. More specialized, larger, heavily sclerotized species (*U. latipalpa, U. fossulata, U. fissipes* and *U. scutata*) are divergent and mask lineages, whereas the former more generalized species illustrate much similarity.

Although much of the proposed area involved in zoogeographic studies of the subgenera has not been searched for *Unionicola,* generalizations can be made. *Berezatax* is known from several rivers among the Gulf of Mexico drainages in the United States and Mexico. *Atacella* is known from Mexico to southern South America (Vidrine and Bereza 1980). *Unionicolides* is known from Canada to southern South America. *Australatax* is known from southern South America and Australia. The overlap of these distributions is a further indication of the holophyletic nature of these subgenera as a group within *Unionicola*. These obligate mussel parasites also illustrate coevolution with their mussel hosts (Vidrine 1980a).

Although the classification of the Unionicolinae remains poor, the re-evaluation of *Pentatax*-derived taxa in North America and South America reconciles classification with a more probable evolutionary history of the group. Further study of the remaining members of the Unionicolinae are ongoing and will provide a basis to more extensive re-evaluation of the entire subfamily.

KEY TO THE FEMALES OF THESE SUBGENERA

1. With one or two pairs of acetabular plates in genital field; setae located centrally in genital field and not on elongate flaps 2
— With one or two pairs of acetabular plates in genital field; setae located posterior to the center of the genital field or located on elongate flaps 4
2. With two pairs of acetabular plates . . . . . *Pentatax*
— With one pair of acetabular plates 3
3. Pedipalps dorsoventrally flattened . . . . . *Berezatax*
— Pedipalps subcylindrical . . . . . *Unionicolides*
4. Pedipalps dorsoventrally flattened . . . . . *Atacella*
— Pedipalps subcylindrical . . . . . *Australatax*

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