

NEW SPECIES OF WATER MITES (UNIONICOLA) FROM
TENNESSEE UNIONID MUSSELS*

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It was expected that new species of *Unionicola* would be found in the fresh water mussels that make up the richly diversified Cumberland fauna; the established mite taxonomy led us to expect that a few well-marked, divergent species might be found in several different hosts, as Wolcott (1899) indicated this to be characteristic of other North American *Unionicola* species. These assumptions were erroneous. The species, though easily distinguished, are characterized by a series of relatively minor chaetotactic features and give evidence of extreme host specificity.

These species are well removed from known species, and the kinds of chaetotaxy differences essential for species discrimination in this case are at a level not often considered in current species definitions, thus, some older *Unionicola* species definitions may include several separable species. The skeletal anatomy is rather uniform and the species differences lie in the finer details of chaetotaxy of the first leg. Illustrations are required for adequate portrayal and the descriptions need only point up significant general features. The first description is quite detailed and the following descriptions deal only with differences found in the species under consideration. All leg measurements are in Tables 1 and 2.

All material came from a single collection that contained five species of unionid mussels. Each host was parasitized by a single mite species. The mites are all assigned to the subgenus *Pentatax*. The collection was made on 25 August 1956 in 1-3 feet of water in the Duck River (35.35 N/86.47 W) Marshall Co., Tennessee. Types will be deposited in the Chicago Natural History Museum.

Unionicola tupara n.sp. (Figs. 1-3)

Diagnosis: Parasitizes *Megaloniais gigantea* (Barnes). Relatively small bodied, chaetotaxy quite reduced and without prominent modifications of leg I chaetotaxy, genital field with small weakly sclerotized plates.

Description: Integument thin and delicate with two pairs of more or less anteriorly-placed weakly-sclerotized small dorsal muscle attachments. Coxae I-II fused, with distinct marginal apodemes except on the meso-posterior margin of coxa I; coxal setae number 3-3-4-5 (anterior to posterior). A broad internal apodeme formed by the adjacent lateral margins of coxae I-II

projects internally over coxae III. Coxae III-IV broad and fused, opposite mesal margins parallel, posterior margin coxa IV with an expanded projection.

Palps: Segments (Fig. 3) 1-3 unmodified, segments 2-3 with a long seta distally placed on both mesal and lateral surfaces. Segment 4 .08 mm long by .02 mm wide with two distal cylindrical stigerous projections. The lateral projection is simple but the mesal projection is broad and bears a seta in a notch and a sharp tooth-like terminal projection. Palp segment 5 elongate, curved and terminating 3 fine teeth.

Legs: Leg I with one dorsally-placed seta on the distal end of each segment (segment 3 with two additional dorsal setae). Setae of the 3 basal segments simple and limited to 1 or 2 setae on the mesal and ventral surfaces. Segment 4 with a pair of long simple setae on the anterior surface and a pair on the ventral surface. Arrangement of the 8 obscure simple setae on the

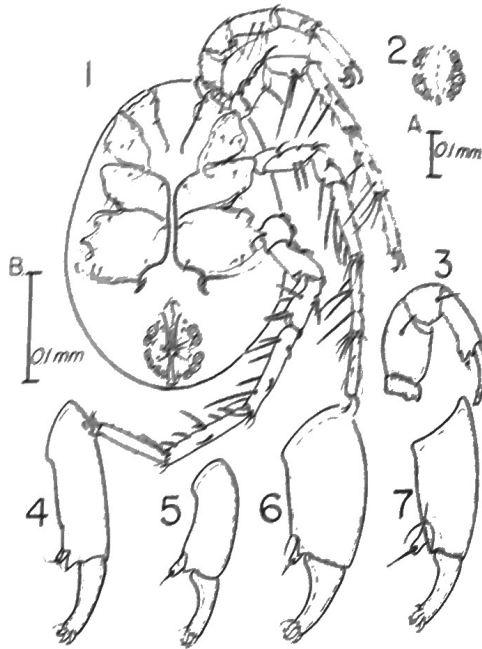


Plate I. Fig. 1. Female *U. tupara*; ventral aspect, right legs and capitulum removed. Fig. 2. Male *U. tupara*; genital field. Fig. 3. Female *U. tupara*; mesal aspect palp. Figs. 4-7. Mesal aspects of palp segments 4-5 (4. *U. amandita*, 5. *U. vamana*, 6. *U. vikitra*, 7. *U. sakantaka*). Scale A applies to Figs. 1-2; Scale B applies to Figs. 3-7.

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Table 1
Average length-width in millimeters of the segments of leg I in the male.

| | Segment 3 | Segment 4 | Segment 5 | Segment 6 |
|---------------------------|-----------|-----------|-----------|-----------|
| <i>U. tupara</i> (n=2) | .07-.06 | .12-.04 | .09-.04 | .10-.03 |
| <i>U. amandita</i> (n=12) | .15-.10 | .22-.08 | .16-.05 | .15-.03 |
| <i>U. vamana</i> (n=1) | .14-.09 | .19-.07 | .15-.06 | .14-.03 |
| <i>U. vikitra</i> (n=1) | .16-.13 | .21-.11 | .16-.06 | .13-.04 |
| <i>U. sakantaka</i> (n=2) | .16-.10 | .18-.08 | .16-.06 | .12-.04 |

Table 2
Average length-width in millimeters of the segments of leg I in the female.

| | Segment 3 | Segment 4 | Segment 5 | Segment 6 |
|---------------------------|-----------|-----------|-----------|-----------|
| <i>U. tupara</i> (n=4) | .08-.06 | .14-.06 | .10-.04 | .12-.03 |
| <i>U. amandita</i> (n=10) | .16-.10 | .24-.08 | .18-.06 | .15-.03 |
| <i>U. vamana</i> (n=2) | .14-.09 | .20-.07 | .16-.06 | .14-.03 |
| <i>U. vikitra</i> (n=3) | .18-.15 | .24-.12 | .19-.07 | .14-.04 |
| <i>U. sakantaka</i> (n=2) | .18-.13 | .24-.10 | .20-.07 | .14-.04 |

mesal and ventral surface of segment 5 shown in Fig. 1. Tarsal claws finely bifid and proportionally very large. Ventrally placed setae of segments 2-5 pectinate, distribution of setae illustrated in Fig. 1.

Genital Field: Lightly sclerotized and with five setae. Acetabulae weakly sclerotized; two groups of 2 acetabulae anteriorly and two groups of three posteriorly. Female (Fig. 1) with four genital plates margined by heavy apodemes centrally and bearing a heavy seta at the inner angle. Male (Fig. 2) with two ill-defined genital plates.

Remarks: As the species with the fewest modifications in chaetotaxy this entity seems to deserve the name "tupara," Sanskrit for unhorned.

Specimens: Two males, four females.

Unionicola amandita n.sp. (Figs. 4, 8, 9, 16)

Diagnosis: Parasitizes *Amblema costata* (Raf.). The reduced chaetotaxy resembles *U. tupara* but the mite is much larger. Segment 4, leg I with only a few short setae, palp elongate, and the genital field elliptical with the posterior three acetabulae crowded and occupying the broader posterior end.

Palps: Large and slender; segment 4 (Fig. 4) bearing three separate distal projections, the lateral one blunt and bearing a short heavy seta, the 2 mesal projections on a swollen part of the palp—the proximal one bears a relatively long seta, the distal one a short heavy blunt cone-shaped seta. Length by width of segment 4; ♀ .15 x .05 mm, ♂ .13 x .04 mm.

Legs: Segments 4-5 bearing a few more pectinate setae than *U. tupara*. Tarsal claws broadly curved. Leg I segment 4 with a few setae, a pair distally placed on the mesal surface and a row of 2-5 setae on the distal

half of the ventral surface (2-4 setae in male, 3-5 setae in female), 3 small setae dorsally placed; segment 5 with a very constant distribution of 12 obscure setae on the mesal aspect (Fig. 8); segment 6 with no prominent setae; tarsal claws coarse and heavy.

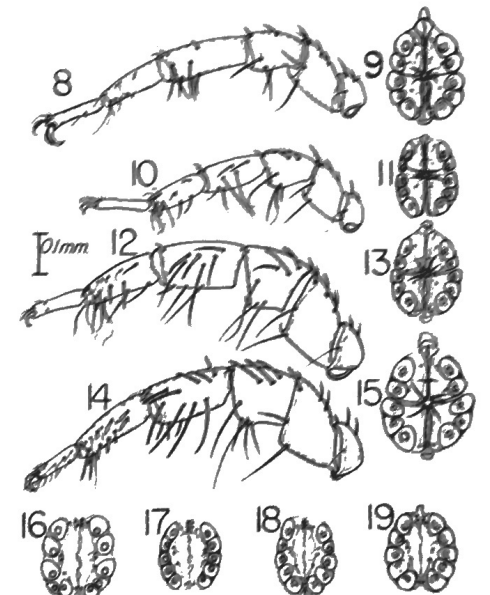


Plate II. Figs. 8-9. Female *U. amandita*, anterior surface, leg I and genital field. Figs. 10-11. Female *U. vamana*, anterior surface, leg I and genital field. Figs. 12-13. Female *U. vikitra*, anterior surface, leg I and genital field. Figs. 14-15. Female *U. sakantaka*, anterior surface, leg I and genital field. Figs. 16-19. Male genital fields (16. *U. amandita*, 17. *U. vamana*, 18. *U. vikitra*, 19. *U. sakantaka*).

Genital Field: Female (Fig. 9); elliptical field broadest posteriorly with the posterior 3 acetabulae often crowded; sclerites and apodemes well developed. Male (Fig. 16); similar in form to the female but with the sclerotizations of the plates so weak as to be barely distinguishable.

Remarks: This is one of the largest species and has a very sparse complement of setae, thus, the Sanskrit word for unadorned "amandita" is appropriate.

Specimens: 16 males, 10 females.

Unionicola vamana n.sp. (Figs. 5, 10, 11, 17)

Diagnosis: Parasitic in *Tritogonia verrucosa* (Raf.). A smaller species with more heavy setae than *U. tapara*. Appendages very small, especially the palp, the chaetotaxy reduced on segment 5, leg I.

Palp: Relatively small (Fig. 5) with segments 4-5 slender, lateral projection of segment 5 proportionally large. Length by width of segment 4: ♀ .10 x .04 mm, ♂ .12 x .05 mm.

Legs: Segments 4-5, legs III-IV with 2 to 3 times the number of setae found in *U. tapara*; pectinations not observed on any setae. Claws distinctly angulate. Leg I similar in both sexes (Fig. 10); segment 4 with 3 pairs of setae centrally situated on the mesal surface; segment 5 bearing one pair of heavy long setae distally on the mesal surface, other setae usually coarse but not long; segment 6 bearing a few fine setae.

Genital Field: Female (Fig. 11); general shape oval, sclerites relatively light, central part of genital field lightly sclerotized and little differentiated. Male (Fig. 17); oval shape, with hardly any sclerotization except for the genital acetabulae. Genital acetabulae lined in a row along a fairly precisely aligned margin.

Remarks: The Sanskrit word meaning dwarfish or small, "dramana," suitably indicates the distinctive feature of this animal.

Specimens: One male, two females.

Unionicola vikitra n.sp. (Figs. 6, 12, 13, 18)

Diagnosis: Parasitizes *Quadrula pustulosa* (Lea.). Abundant heavy long setae on the dorsal surfaces of segments 3-5, all appendages very heavy, and chaetotaxy of segment 5, leg I distinct.

Palps: Very large and thick (Fig. 6), lateral projection normal; segment 4 with a broad high median ridge bearing a large setigerous projection distally and terminating in a projection tipped by an obscure blunt seta; segment 5 basally very broad. Length by width of segment 4: ♀ .15 x .07 mm, ♂ .14 x .07 mm.

Legs: In the female segments 4-5, legs II-IV densely covered by heavy setae anteriorly and heavy dorsal setae more abundant than the longer thinner ventral setae. Setae of legs II-IV very weakly pectinate. Male with leg chaetotaxy less dense than female. Leg I segment 4 of both sexes with numerous heavy setae on

the mesal surface as in Fig. 12; segment 5 as illustrated but with much variation in location of the dorsal row of five setae, the three proximal setae may be fine, coarse, or spatulate; segment 6 with few setae.

Genital Field: Female (Fig. 13); elliptical broadest posteriorly, apodemes and plates heavily sclerotized. Male (Fig. 18); sclerites not heavy but with distinct margins.

Remarks: Great variations are shown in the abundance of setae on legs II-IV as well as in shape of setae on leg I and this makes the Sanskrit word "vikitra"—diverse—seem especially suitable.

Specimens: One male, six females.

Unionicola sakantaka n.sp. (Figs. 7, 14, 15, 19)

Diagnosis: Parasitizes *Cyclonaias tuberculata* (Raf.). A large setigerous species most easily recognized by the large number of heavy setae on segments 4-5, leg I.

Palp: Segments proportionally short and heavy (Fig. 7) with the usual projections. Length by width of segment 4: ♀ .15 x .06 mm, ♂ .13 x .06 mm.

Legs: Segments 3-5, legs II-IV with a dense covering of coarse heavy setae similar to that of *U. vikitra*. Leg I (Fig. 14) exhibits sexual differences especially on segments 4-5. **Female:** Anterior surface, segment 4 with eight heavy setae; mesal surface segment 5 with 8 to 9 variably shaped broad setae, 4 heavier setae on the posterior surface. **Male:** Anterior surface, segment 4 with 3 heavy dorsally-placed setae, and 2 more elongate narrow setae ventral to these; mesal surface, segment 5, with a line of 6 or 7 setae varying in position and shape, the proximal one spatulate, the next seta distally either filiform or spatulate, the second or third seta from the distal end short and broadly spatulate, and the remaining setae filiform.

Genital Field: Broad and heavily sclerotized in both sexes (Figs. 15, 19). Elliptical, widest posteriorly and with very heavy well developed acetabulae.

Remarks: Sakantaka is Sanskrit meaning "with hair erect" and this large species is most conspicuous for its prominent erect setae. It is notable that in both *U. sakantaka* and *U. vikitra* the very elaborate leg I chaetotaxy is inconstant in number, shape, and location and, in the former species, sexually differentiated. Inconstancy, sexual differentiation, and elaborateness of chaetotaxy are characters that are found together.

Specimens: Three individuals of each sex.

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