

NEW TERRESTRIAL ISOPODS OF THE GENUS
MIKTONISCUS FROM EASTERN UNITED STATES
(CRUSTACEA: ISOPODA: ONISCOIDEA)

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The isopod genus *Miktoniscus* has heretofore been known in the United States from six described forms, namely:

M. halophilus Blake, 1931, from the south coast of Massachusetts.

M. racovitzai Vandel, 1950, from Luray Caverns, Page County, Virginia.

M. grayi Schultz, 1962, from Durham County, North Carolina.

M. linearis (Patience), 1908, from Shelta Cave, Huntsville, Madison County, Alabama.

M. humus (Mulaik), 1942, from Eunice, St. Landry Parish, Louisiana.

M. medcofi (Van Name), 1940, from greenhouses in Urbana and Chicago, Illinois, and in Rochester, New York.

Recently a large amount of additional material pertaining to this genus has been collected, principally from caves in the southeastern part of the country, by L. Hubricht, R. L. Hoffman, T. C. Barr, Jr., and J. R. Holsinger.

The present paper describes two new species from Ohio and Kentucky, renames as a new species the form from Shelta Cave in Alabama, and comments briefly on two other species. The remainder of the new material will be treated at a later time by Professor A. Vandel of Toulouse, France.

For study, specimens were dissected and mounted in Turtox CMC-S mountant, which stains differentially and permits the demonstration of many features otherwise easily overlooked, such as the small scales and setae on legs and pleopods.

Types will be deposited in the collection of the American Museum of Natural History, New York, New York.

Family Trichoniscidae Sars

Subfamily Trichoniscinae Verhoeff

Genus *Miktoniscus* Kesselyak, 1930

The generic characters have been reviewed recently by Vandel (1960). It is, therefore, only necessary here to point out that the genus is similar to and apparently intermediate between the common genera *Trichoniscus* and *Haplophthalmus*, except that specimens of *Miktoniscus* characteristically bear prominent tubercles on the dorsal surfaces of head, pereion, and pleon, arranged more or less in transverse rows in the latter two regions.

***Miktoniscus ohioensis* sp. n.**

Material: The type series, consisting of 24 males, 29 females (6 with eggs) and 19 young of various stages, was collected by the author at Cincinnati, Hamilton County, Ohio, on August 6, 1956. The animals were taken from beneath a rotting log at the edge of Congress Run in an area of deciduous woods at the northern edge of the city.

Description: This species is generally similar to other epigean members of the genus. It ranges from 3.5 to 4.6 mm in length and is 0.9 to 1.4 mm in width, the length/width ratio being about 3.5-4.0 to 1. Body color of living individuals variable—usually dark purple-gray, but ranging to almost white in teneral individuals; antennae, telson and uropods similar in color to body; legs and all underparts nearly devoid of pigment. All the pigment fades considerably upon preservation in alcohol, but the body color remains as a dull brownish-gray. Dorsal surfaces of the body bearing conspicuous tubercles, which are randomly placed on the head, in four transverse rows on the pereion segments, and in a single row on pleon segments 1-3 (occasionally two rows on segment 3); the last two pleon segments and the telson being without tubercles.

Antennules and antennae of usual facies; antennules bearing 6 aesthetascs; flagellum of antenna with four articles, the second and third each bearing a pair of aesthetascs. Mouthparts typical. Each eye composed of a single prominent, dark ocellus.

Shape of body segments as in other members of the genus. Telson with median extension

rather long and narrow (fig. 1), the posterior corners angular and the posterior margin slightly convex; two spines near the margin.

Legs and pleopods, except the following, apparently similar to those of other members of the genus.

Secondary sexual characters of male:

Leg I (fig. 2) with a row of hyaline scales along the sternal margin of propodus and carpus and with a few such scales irregularly disposed on the margin of the merus.

Leg II with a row of hyaline scales along the sternal margin of propodus and carpus and two parallel rows of such scales along the margin of the merus.

Leg III—as leg II.

Leg IV with a row of hyaline scales on the propodus along the distal two-thirds of the sternal margin and two parallel rows of such scales along the margins of both carpus and merus.

Leg V with 3 to 4 hyaline scales in the distal one-third of the sternal margin of the propodus and with two groups (one proximal, one distal) of heavy scales on the sternal side of the merus.

Leg VI with no special features.

Leg VII as shown in figure 3. Notable are the small, but distinct, distal lobe and the shallow basal depression of the internal face of the carpus, the expanded merus, and the group of heavy scales at the distal end of the sternal border of the ischium.

First pleopod as shown in figure 4. Proximal end of exopodite with distinct angular projections both laterally and medially; distal end cylindrically convex as the result of the slight dorsal extension of the lateral edge (giving an impression in mounted specimens of a thickening of this edge). Proximal segment of endopodite distinctly longer than distal segment in a ratio of about 5 to 4. Distal segment of endopodite without setae, but apparently with a thin, finely striated membrane bordering the lower two thirds; also (fig. 5) with a series of prominent scales forming a U-shaped row down the medial and up the lateral side of the tip, the medial limb of the U being nearly twice as long as the lateral limb, and the most proximal scale on the medial side being a relatively large triangular plate.

Second pleopod as shown in figure 6. Exopodite longer than broad in a ratio of about 7 to 5; with a conspicuous seta about midway along the lateral border of the narrow posterior extension, and with a row of widely-spaced, fine scales along the medial edge. Distal segment of endopodite narrowing just past the middle of the segment and with the narrow end curving gently toward the midline; terminating in a short very delicate filament.

Remarks: This species is similar to *M. medcofi* in many respects, but differs in the following:

1. shape of the exopodite of pleopod 1, which has conspicuous lobes at the proximal end and a narrower distal end.
2. proportions of proximal and distal segments of the endopodite of pleopod 1.
3. details of the U-shaped row of scales at the tip of endopodite 1.
4. relatively longer posterior extension of the exopodite of pleopod 2.
5. pattern of scales on the legs.

***Miktoniscus mammothensis* sp. n.**

Material: The type series consists of four specimens collected by Leslie Hubricht in Mammoth Cave National Park, Edmonson County, Kentucky. One male was taken from Cedar Sink on June 9, 1957, while a male and two females were found in White Cave on July 20, 1957.

Description: Generally similar to other epigeal members of the genus. Body length ranges from 4.4 to 4.7 mm, the length/width ratio being about 3.9 to 1. Body color of the alcohol preserved specimens is a rather dark brownish-gray, the telson with similar coloration; antennae and uropods much lighter in color; legs and underparts virtually without pigment. Dorsal surfaces of the head, pereon and pleon with many conspicuous tubercles as characteristic of the genus, the tubercles being scattered on the head, in four transverse rows on the pereon segments, and in a single row on pleon segments 1-3, with none on segments 4 or 5 or on the telson.

Antennules and antennae typical; antennule bearing six aesthetascs; flagellum of antenna with four articles, the second and third each bearing two aesthetascs. Mouthparts typical. Each eye composed of a single, prominent, dark ocellus.

Shape of body segments similar to those of other members of the genus. Telson with median extension trapezoidal, with the posterior corners smoothly rounded and the posterior margin barely concave; two spines near the margin, (fig. 7).

Legs and pleopods, except the following, apparently typical.

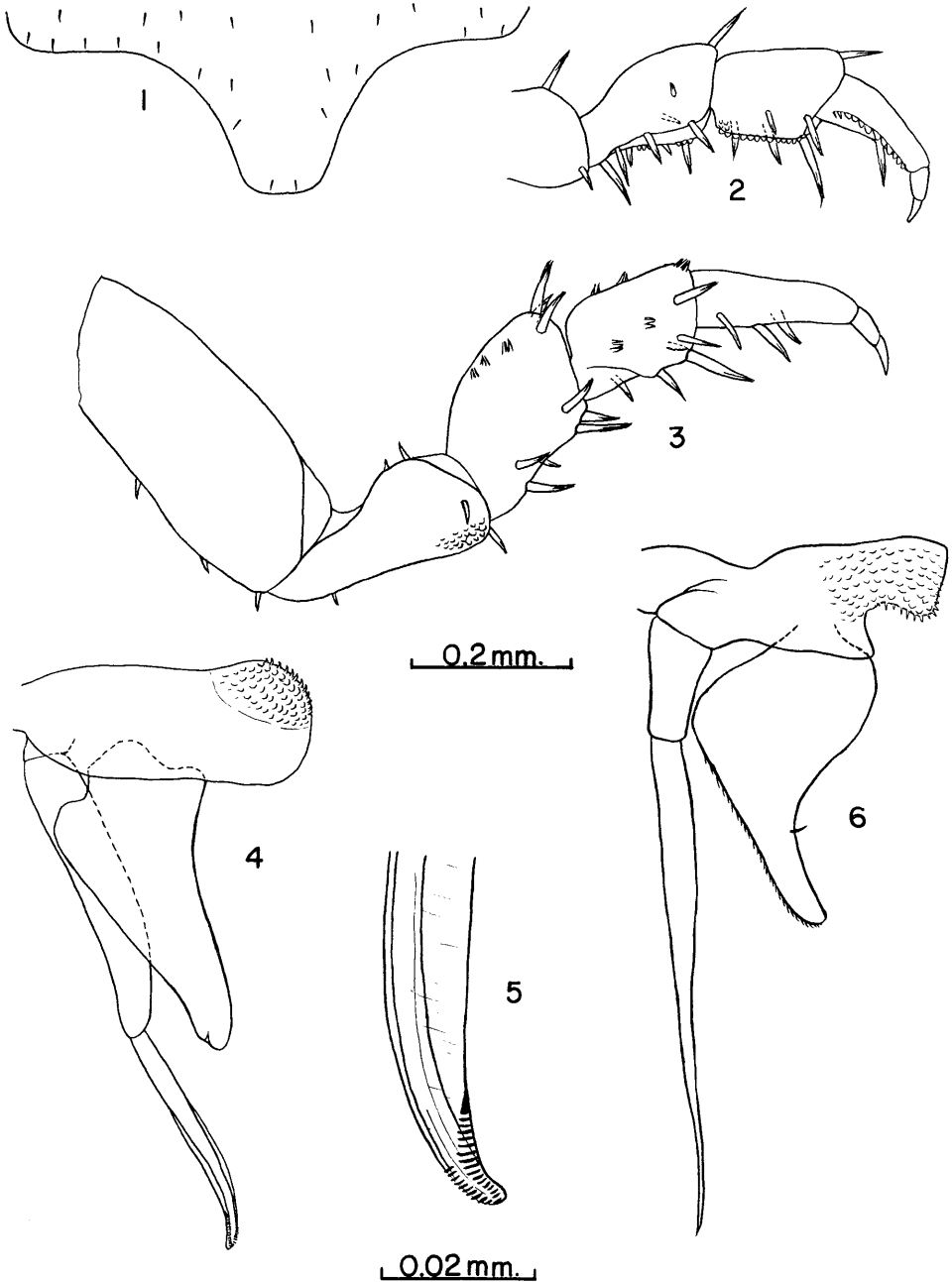
Secondary sexual characters of male:

Leg I with a row of hyaline scales along the sternal margin of propodus and carpus and with 2 to 3 parallel rows of similar scales along the border of the merus.

Leg II—similar to leg I but with only 2 rows of scales on the merus.

Leg III—as leg II.

Leg IV—as leg II but row of scales on propodus only along distal two-thirds of margin.



FIGURES 1-6. *Miktoniscus ohioensis* sp. n.

FIGURE 1. Telson, dorsal surface.

FIGURE 2. Leg I of male, posterior view.

FIGURE 3. Leg VII of male, posterior view

FIGURE 4. Pleopod 1 of male, ventral view.

FIGURE 5. Distal end of endopodite of pleopod 1 of male, ventral view.

FIGURE 6. Pleopod 2 of male, ventral view.

The 0.2mm scale serves for all but figure 5, which is to be measured by the 0.02 mm scale.

Leg V with no hyaline scales but with two isolated groups (one distal, one proximal) of heavy scales on the merus.

Leg VI with no special features.

Leg VII as shown in figure 8. No evidence of a distal lobe or basal depression on the carpus; a group of prominent scales at the distal end of the sternal border of the merus; no special scales apparent on the ischium.

Pleopod 1 as shown in figure 9. Proximal end of exopodite with a large, rounded lobe medially, but only a broad triangular expansion laterally; distal end distinctly cylindrically convex due to the strong dorsal curvature of the lateral margin (giving the impression in mounted material of a great thickening of this edge); tip of the exopodite pointed and directed slightly toward the midline. Proximal and distal segments of the endopodite of equal length; distal segment without setae, but apparently with a thin, finely striated membrane along the distal two-thirds of the medial border; also (fig. 10) with a U-shaped row of heavy scales down the medial and up the lateral side of the tip, the medial limb of the U being $1\frac{1}{2}$ times as long as the lateral limb, and the most proximal scale on the medial side being heavier than the others and semicircular in outline.

Second pleopod as shown in figure 11. Exopodite slightly broader than long due to the shortness of the posterior extension; with a conspicuous seta on the lateral margin at the angle where the posterior extension meets the main portion, and with fine setae on both lateral and medial borders of the distal end. Distal segment of the endopodite narrowing rather abruptly just past the middle of the segment and with the tip nearly straight; terminating in a short, very delicate filament.

Remarks: While the type specimens of this species were found in cave situations, it is evident that they have been introduced to the subterranean conditions only recently. They show none of the adaptations to cavernicolous life exhibited by *M. racovitzai*, such as loss of eyes, loss of pigment, and reduction in the number of dorsal tubercles.

M. mammothensis can be distinguished readily from other American species of the genus by the shape and proportions of the male pleopods and by the patch of scales on the merus of leg. VII.

Miktoniscus racovitzai Vandel

M. racovitzai Vandel, 1950. Arch. Zool. Exp. Gén. 87: 197-200. Figs. 16-20.

A large series of topotypic material was collected in Luray Caverns, Page Co., Virginia on August 22, 1958, by T. C. Barr, Jr. These conform in most details to the description given by Vandel. However, the nature of the row of scales at the tip of the endopodite of pleopod 1 is not clearly shown in Vandel's paper (fig. 19, p. 199). In order to facilitate future comparison of this feature with the similar structures in other species, the tip of this appendage from a topotypic male is shown in figure 12. As in the other species studied this is actually a U-shaped row, with the medial limb of the U a little more than twice as long as the lateral limb, and with the most proximal scale of the medial limb similar in shape to the others of the row, i.e., not in the form of a semicircular or triangular plate.

It is also important to note that the secondary sexual differentiation of the legs of males is more extensive than indicated by Vandel as follows:

Leg I with a row of hyaline scales along the sternal borders of propodus, carpus and merus.

Leg II—as leg I.

Leg III—as leg I.

Leg IV with a row of scales along the distal two-thirds of the margin of the propodus, an interrupted row on the carpus, and a complete row on the merus.

Leg V with no special features.

Leg VI—as leg V.

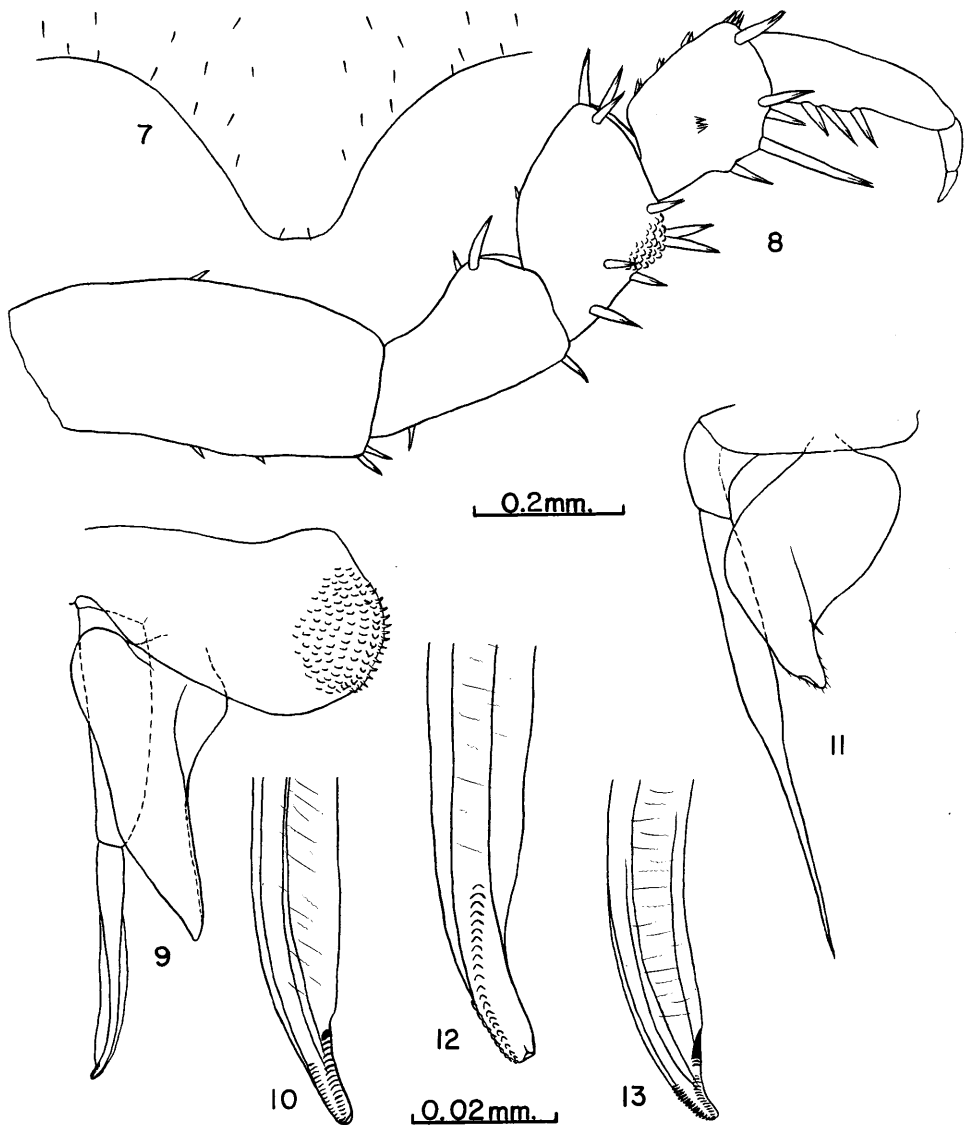
Leg VII—as figured by Vandel (fig. 18, p. 198), and with a group of prominent scales at the distal end of the sternal border of the ischium.

Miktoniscus medcofi (Van Name)

Trichoniscus (*Miktoniscus*) *medcofi* Van Name, 1940. Amer. Mus. Nat. Hist. Bull. 77: 111-112. Fig. 2.

As I previously reported (1957), extensive collections were made in the greenhouse of the University of Rochester, Rochester, New York, of specimens tentatively identified as *Miktoniscus medcofi*. Subsequent study has convinced me that these do indeed belong to this species. The very slight differences which appear to exist between our specimens and those described by Van Name are probably only individual differences or are the result of different handling during study.

Details of the first and second pleopods of males from Rochester are virtually the same as those figured by Van Name. The apparent lack of a clear membrane along the edge of the distal end of the endopodite of pleopod 1 in *M. medcofi*, as noted by Vandel (1950: 193), is probably due simply to insufficient detail in Van Name's drawing. Such a clear area is present in most of the other species of the genus and is well developed in our specimens. On the other hand, the basal end of exopodite 1 is correctly figured by Van Name, i.e., no large lobe is present on the lateral side.



FIGURES 7-11. *Miktoniscus mammothensis* sp. n.

FIGURE 7. Telson, dorsal surface.

FIGURE 8. Leg VII of male, posterior view.

FIGURE 9. Pleopod 1 of male, ventral view.

FIGURE 10. Distal end of endopodite of pleopod 1 of male, ventral view.

FIGURE 11. Pleopod 2 of male, ventral view.

FIGURE 12. *Miktoniscus racovitzae* Vandel. Distal end of endopodite of pleopod 1 of male, ventral view.

FIGURE 13. *Miktoniscus medcoffi* (Van Name). Distal end of endopodite of pleopod 1 of male, ventral view.

The 0.2 mm. scale serves for all figures except 10, 12 and 13, which are to be measured by the 0.02 mm scale.

The following additions can be made to the description of the species given by Van Name.

1. The antennule bears 9 aesthetascs at its tip.
2. Legs of males show sexual differentiation as follows:

Leg I with a row of hyaline scales along the sternal margin of propodus, carpus, and merus.

Leg II—as leg I.

Leg III—as leg I except that the row of scales on the propodus covers only the distal two-thirds of the margin.

Leg IV with a row of hyaline scales on carpus and merus.

Leg V having no hyaline scales but with two groups (one distal, one proximal) of heavy scales on the sternal border of the merus.

Leg VI—as leg V.

Leg VII with the merus expanded (as mentioned by Van Name, 1940: 112) and with a group of prominent scales at the distal end of the sternal border of the ischium.

3. The true nature of the tip of the endopodite of the first male pleopod is not shown by Van Name's figure. As in other members of the genus studied, the "file-like area" is in reality a U-shaped row of scales as shown in figure 13. In this species the scales are relatively small and thin; the medial limb of the U is twice as long as the lateral limb, but is composed of much weaker scales and appears to be interrupted near its proximal end; and the most proximal scale on the medial side is very long and flattened against the appendage.

4. Furthermore, there is a large seta near the middle of the lateral margin of the narrow posterior extension of the exopodite of pleopod 2. This seta often lies down against the surface of the exopodite and parallel to the margin, so that it is easily overlooked.

5. There are actually two setae near the posterior margin of the telson.

As mentioned below, *M. medcofi* is very similar to the specimens discussed by Kesselyak under the name of *M. linearis*.

It is appropriate to note that *M. medcofi* has disappeared from the greenhouse at the University of Rochester, apparently as a result of continued, heavy applications of modern pesticides.

***Miktoniscus alabamensis* sp. n.**

Miktoniscus linearis (Patience): Vandel, 1950, Arch. Zool. Exp. Gén. 87: 192-197, figs. 10-15; *non* Patience, 1908, Ann. Mag. Nat. Hist. Ser. 8. 1: 280-282, pl. XI; *non* Kesselyak, 1930, Zool. Anz. 91: 50-52.

The specimens collected by Henrot in Shelta Cave, near Huntsville, Alabama, and described by Vandel as belonging to *M. linearis* (Patience) obviously represent a new species. They are here so designated and the species named for the state in which they were found.

Miktoniscus alabamensis can be seen to differ from *M. linearis* in the following respects:

1. Patience (pl. XI) shows three transverse rows of tubercules on pereion segments I-VI and two rows on segment VII, while Vandel (p. 194) mentions 4-5 rows on segment I and 3 rows on segment VII, apparently implying the presence of more than 3 rows on the segments anterior to the seventh.

2. Patience states (p. 281) that the exopodite of pleopod 1 is more broadly expanded in its proximal part than the similar appendage of *Trichomiscus pygmaeus*, and in plate XI he figures this exopodite as very broad and smoothly rounded proximally. The exopodite of pleopod 1 figured by Vandel (fig. 13) is quite different from this, being rather narrow proximally and having a sharply demarcated lateral lobe.

3. The length of the specimens examined by Patience was only about 3 mm, while those from Shelta Cave measured 5 mm in length.

4. The coloration of *M. linearis* is stated to be "white, semipellucid, the male exhibiting slight ramifications of minium-red across the segments. No trace of pigment discernible on the dorsal face of the female" (Patience, p. 280-281). On the other hand Vandel says (p. 193) that his specimens were well pigmented, including antennae and uropods.

From what is known about the differences among species of *Miktoniscus* and the constancy of characters within a given species, it is reasonable to conclude that we are indeed dealing with two separate species. Furthermore, since it is now apparent that the genus *Miktoniscus* includes a considerable number of species indigenous to the eastern United States, there is no reason to attempt to link these animals to some European form. We do not, therefore, hesitate to consider this form from Alabama a distinct species.

M. alabamensis is rather similar to *M. ohioensis*, but differs in the more strongly developed lateral lobe of the exopodite of pleopod 1; in the possession of bristles on the middle of the distal segment of the endopodite of pleopod 1; in the proportions of the proximal and distal segments of this endopodite; in the details of the seventh leg; and in the possession of only one pair of aesthetascs on the flagellum of the antenna.

It is worthwhile to note here that Kesselyak (1930) has pointed out several important differences between the specimens described by Patience from Kew Gardens and those he himself examined from the Botanic Gardens in Dahlem and which he identified as *M. linearis*. At that time Kesselyak surmised that the specimens examined by Patience were probably young individuals and concluded that the differences he noted did not warrant separation of the two

forms. It is now evident, however, that such differences, particularly in the shape and proportions of the male pleopods are diagnostic among the species of *Miktoniscus*. Therefore, it seems probable that the specimens found in Dahlem belong to a species different from *M. linearis*; indeed from Kesselyak's description and figures, they appear to be closer to *M. medcoffi* than to any other known species, as Van Name himself pointed out. An exact description of *M. linearis* (Patience) and comparison with other species of the genus must await restudy of the types or topotypic material.

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