

NEW AND KNOWN PARAIULID MILLIPEDS FROM VARIOUS PARTS OF THE UNITED STATES¹

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ABSTRACT

Descriptions and illustrations are given for *Apacheiulus pinalensis* n. gen. and sp., from Arizona; *Okluiulus foliatus* n. sp., from Louisiana; *Oriulus grandiceps* n. sp., from Kansas; *Gyniulus domesticus* and *G. lacustrinus* n. spp., from Florida. Additional records are given for three previously known species of the family.

This paper describes a new genus of millipeds from Arizona having several characters never noted in other genera of the family. Two new species also are added to the South Florida genus *Gyniulus*, bringing to seven the number of species in the family reported for the state. One of these novelties and another from Louisiana were found among specimens, from different parts of the United States, sent me many years ago for identification by the U. S. Bureau of Entomology and Plant Quarantine, designated as BEPQ in the following text. In this miscellaneous lot of millipeds also were two previously known paraiulids whose present records extend their known ranges. In addition, *Oriulus grandiceps* is the first species to be described from Kansas, apparently the only record of the family from there.

Holotype specimens of the new species and second paratype specimens, where present, have been deposited in the U. S. National Museum Myriapod Collection. Remaining paratypes and other specimens have been deposited in the Florida State Collection of Arthropods, in Gainesville.

Apacheiulus, new genus

Genotype: *Apacheiulus pinalensis*, new species

DIAGNOSIS: The curious gonopod-clasping lobe of the pleurum each side of segment 7 of males, several features of the gonopods themselves, and the separation of, at least, the distal portions of the gynaspis (a new name proposed for the shield that precedes the cyphopods in paraiulids) are unusual characters and make the systematic position of the genus doubtful at this time.

DESCRIPTION: Body of male a little constricted in front of segments 6 and 7; interzonal suture of segments bowed forward in front of pores except on several caudal segments; last segment not mucronate or projecting.

Males with a very large pleural lobe curving very strongly mesad and ventrad on each side of segment 7, its distal portion wrapping half way around the adjacent gonopod. Anterior gonopods directed laterally at base for a considerable distance from midbody and then abruptly turned ventrad, the outer portions thus being widely separated. Each posterior gonopod

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with principal element ending in three branches and having a long subbasal spine; base extending laterad and then ventrad in a broadly spoon-like lobe with inner surface concave, the outer convex surface lying against lower margin of prozonite of segment 7, in front of pleural lobe. Sternum of tenth legs not produced forward but margined with a broad, low, and thick ridge.

Females with segments 2 and 3 extending well below 1 and 4. First legs heavier but little shorter than third and succeeding ones. Second legs lacking but a large sternum present in front of the gynaspis which is unusual in being widely divided, above the sternum, into two distinct parts.

Apacheiulus pinalensis, new species

Fig. 1 - 5

Broken holotype male and 2 females collected in the Pinal Mts., between Miami and Superior, Arizona, 1 Mar. 1925, by E. M. and H. F. Loomis.

DESCRIPTION: Diameter of male 1.5 mm; 54 segments; largest female 28 mm long, 1.8 mm wide; both females with 53 segments.

Second antennal joint longest, followed by joints 3 and 4, and subequal joints 5 and 6. Ocelli 39 in male, 46 and 47 in females, all in seven rows. Mandibular stipes of male (Fig. 1) and female finely rimmed above.

Segment 1 of both sexes with anterior rim barely reaching lower corner of eye. Segments 2 and 3 of females extending below segments 1 and 4, third with metazonite ending ventrally as a narrowing, apically sharply rounded lobe along front of which the narrowed prozonite is present as a prominent marginal ridge. Seventh male segment with each pleurum produced into a large lobe (Fig. 2), its apical half surrounding adjacent gonopod. Transverse sulcus of segments deeply impressed and strongly bowed in front of pores on front of body but decreasingly so thereafter; pores at caudal end of body removed from sulcus by twice or more their own diameter. Surface of metazonites moderately and very finely short-aciculated, shining. Last segment not produced beyond valves; apex broadly angular.

Gonopods as in Fig. 3 and 4. First male legs with the two outer joints more thickened than in most genera. Anterior margin of eighth sternum broadly, shallowly concave, and raised into a low thick ridge slightly rolled caudad at midbody.

Females lacking second legs but a large, transversely subrectangular sternum, half as wide as one side of the gynaspis, is present, its median margin produced into a small conic lobe reaching opposite the mesal limits of the widely separated halves of the gynaspis, as shown in Fig. 5, which also shows a cyphopod.

Gosiulus conformatus Chamberlin

1940. Bull. Univ. Utah, 30, (11), p. 10, illus.

Fig. 6 - 7

Male, 2 immature females collected in Bexar Co., Texas, by W. F. Turner, W. H. Anderson, and J. B. Gross, T-1998; sent me under BEPQ No. 37-5408.

The very slight projection of the last segment forms nearly a right angle. Anterior gonopods have a large, subtriangular sternal plate as

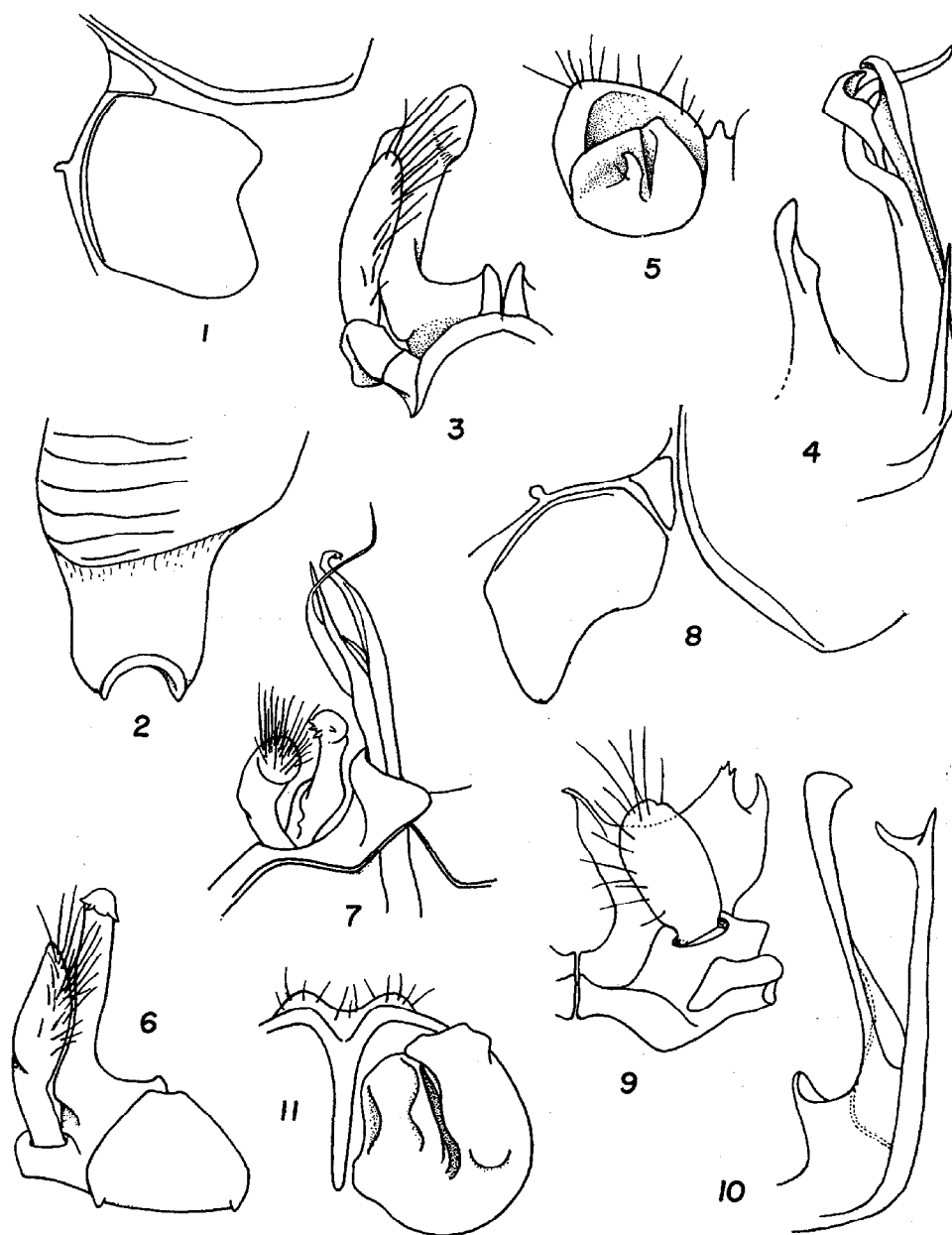


Fig. 1-5, *Apacheiulus pinalensis*, new species. 1. Mandibular stipes and edge of segment 1 of male. 2. Lower right side of male segment 7 in ventrolateral view. 3. Left anterior gonopod, anterior view. 4. Right posterior gonopod, posterior view. 5. Right division of gynaspis, cyphopod, and midlobe of second sternum, posterior view.

Fig. 6-7, *Gosiulus conformatus* Chamberlin. 6. Left anterior gonopod and sternum, anterior view. 7. Right gonopods and lobe of segment 7, posterior view.

Fig. 8-11, *Gyniulus domesticus*, new species. 8. Mandibular stipes and edge of segment 1 of male. 9. Right anterior gonopod, anterior view. 10. Right posterior gonopod, posterior view. 11. Gynaspis and left cyphopod, posterior view.

shown in Fig. 6. Posterior gonopods (Fig. 7) closed behind, some distance above base, by the overlapping, mesoventrally produced pleural lobes of segment 7, the lobes also shielding them ectally. Anterior sternum of segment 8 not raised or produced, its anterior midmargin broadly concave.

In the original description of this species one collection locality was given as "Brooks Co., 17 miles north of Alice", but this locality is nearly 50 miles north of Brooks Co., in Jim Wells Co.

Gyniulus domesticus, new species

Fig. 8 - 11

Broken holotype male, 14 Dec. 1966, and 2 females, 15 Jan. and 23 Feb. 1967, found dead by author's wife, in home at 5355 SW 92 St., Miami, Florida. Collecting, before and after above dates, in surrounding property and elsewhere in region yielded no other specimens.

DIAGNOSIS: Apparently somewhat larger than *G. myakkensis* Loomis, to which it is closely related, but males with more slender stipes, longer first segment, and differences of the gonopods.

DESCRIPTION: Holotype approximately 22 mm long, 1.3 mm wide; largest female 28 mm long, 1.8 mm wide; all with 49 segments. Color medium brown with conspicuous black spot in front of and below each pore. Body of male constricted at segment 5, widest at segment 7.

Head of male with five distinct and uniform labral teeth, probably an abnormality; females with three teeth. Ocelli 42 - 44, in seven rows. Antennae of male missing; joints 2 and 3 of females subequal and longest, followed by subequal joints 4, 5, and 6. Mandibulatory stipes of male more slender than in genotype (Fig. 8), the figure also shows longer first segment with straighter lower margin.

Anterior gonopods (Fig. 9) with each coxal lobe very broad, transverse, and with three acute terminal angulations of which the median has several tiny teeth; outer angulation strongly produced laterally to ventral margin of segment 7 and then caudally. Posterior gonopods (Fig. 10) with basal lobe, in front of the seminal branch, broad and high, its width foreshortened in figure. Sternum of tenth male legs raised into a high vertical lobe less than a third as wide as entire margin and narrower at base than apex, its front face quite concave at middle.

Females with segment 2 extending well below 1 and 3. First legs shorter and decidedly thicker than third and those following. Second legs very small, hidden deep within body, only the tips visible in vertical view, and reaching less than half way up gynaspis. Female organs as shown in Fig. 11.

Gyniulus lacustrinus, new species

Fig. 12 - 15

Over a dozen specimens, including holotype male, collected at Haney Farm, Belle Glade, near Lake Okeechobee, Florida, by J. W. Wilson, 30 Oct. 1940, received under BEPQ No. 40-24416.

DIAGNOSIS: Most closely related to *G. myakkensis* Loomis, on basis of gonopods, but easily separated from it by the triangular lobe of the tenth male sternum.

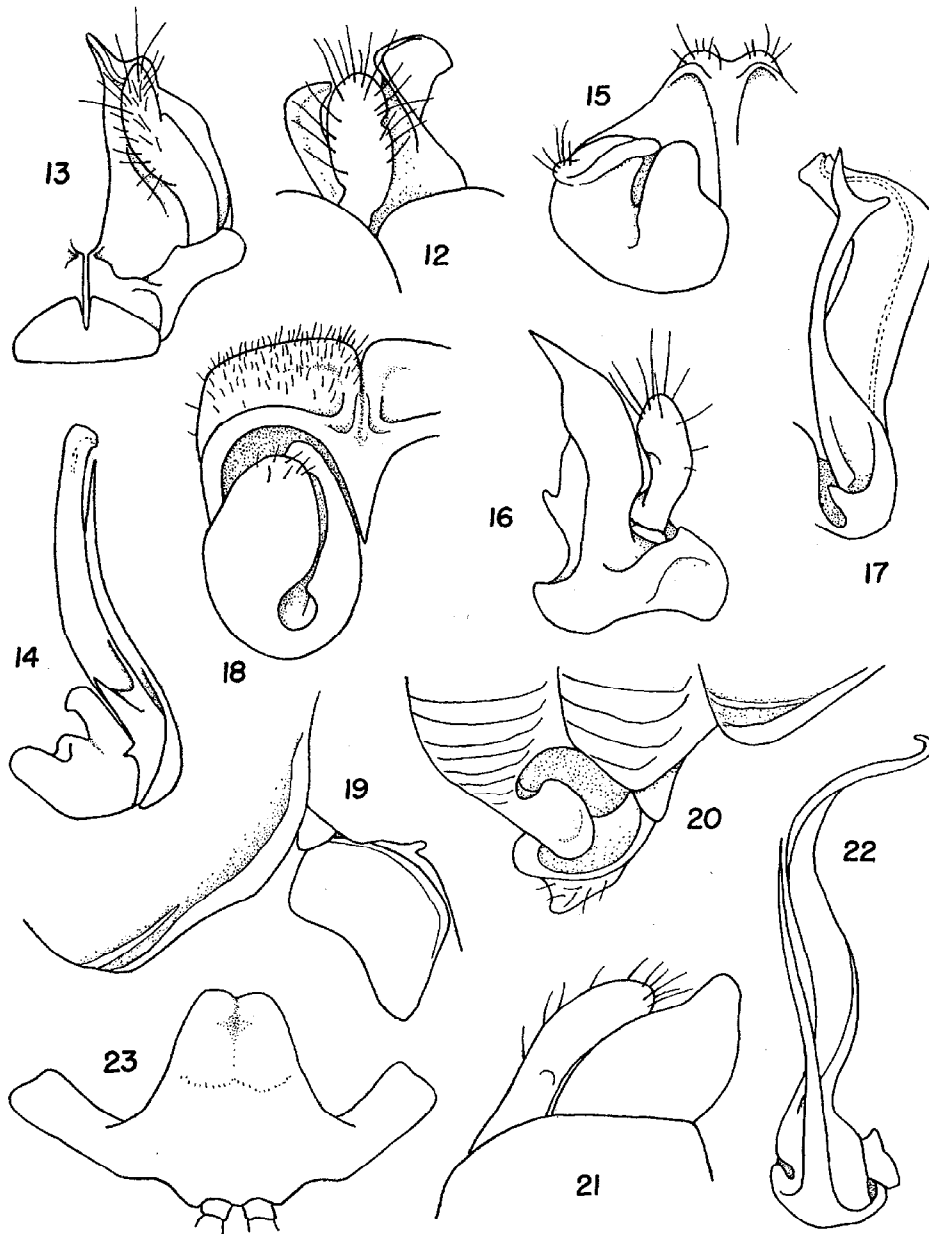


Fig. 12-15, *Gyniulus lacustrinus*, new species. 12. Right gonopods beyond segments 6 and 7. 13. Right anterior gonopod and sternum, anterior view. 14. Right posterior gonopod, laterocaudal view. 15. Gynaspis and right cyphopod, posterior view.

Fig. 16-18, *Oktiulus foliatus*, new species. 16. Left anterior gonopod, ectocaudal view. 17. Right posterior gonopod, lateral view. 18. Gynaspis and right cyphopod, posterior view.

Fig. 19-23, *Oriulus grandiceps*, new species. 19. Mandibular stipes and edge of segment 1 of male. 20. Lower right side of female segments 1-3 and gynaspis, lateroventral view. 21. Right anterior gonopod beyond segment 7, lateral view. 22. Right posterior gonopod, posterior view, the outer basal lobe not shown. 23. Anterior sternum of male tenth legs.

DESCRIPTION: Largest female 26 mm long, 1.9 mm wide; males shorter and relatively more slender; 45 - 52 segments.

Head with 42-46 ocelli in seven or eight rows; antennal joint 2 longest, followed by joints 3 and 4, with subequal joints 5 and 6 still shorter. Mandibular stipes of male much as shown for *domesticus*, but a little shorter and broader.

Lower rim of segment 1 heavy in male, but less so in female, usually single, reaching well above lower corner of eye. Succeeding segments with transverse sulcus sharply defined, strongly bowed in front of pores except on last few segments. Pores small, encircled by a distinct rim, removed from sulcus by twice the diameter of pore area on caudal segments. Metazonites in both sexes noticeably convex and quite coarsely aciculated. Last segment with a short projecting mucro.

Gonopods as shown in Fig. 12-14. Tenth sternum elevated in front into a thick, triangular lobe sloping somewhat caudad, its anterior face convex and with a sharp median vertical ridge.

Female metazonites of segments 2 and 3 considerably enlarged; pleurum on either side of segment 2 extending cephalomesad as a triangular lobe; segment 3 lacking pleurae, terminating ventrally at lower margin of metazonite. Sex organs as shown in Fig. 15. First legs somewhat thickened; second legs small, slender, barely extending to apex of gynaspis.

Gyniulus myakkensis Loomis

1963. Fla. Entomol., 46:193-195, illus.

Male and many young found at topotype locality, Myakka State Park, Florida, 22 Feb. 1967, by E. M. and H. F. Loomis.

Male 22 mm long and with 47 segments. Subequal antennal joints 2 and 3 are longest, followed in descending length by joints 4, 6, and 5.

Okliulus foliatus, new species

Fig. 16 - 18

Male holotype and female found in Bossier Parish, Louisiana, 19 Oct. 1936, by W. F. Turner, W. H. Anderson, and J. B. Gross, T-1721; received under BEPQ No. 37-5408.

DIAGNOSIS: The foliar expansion of the outer coxal portion of anterior gonopod readily separates this species from the two already known.

DESCRIPTION: Female 33 mm long, 2.3 mm wide, 53 segments; male smaller, more slender, with 54 segments.

Antennal joint 2 longest, joints 3, 4, 5, and 6 gradually shorter. Ocelli in seven or eight definite rows- 10, 9, 8, 7, 6, then 4, 2, or 5, 4, 3. Stipes of male much as in *O. carpenteri* Causey, but anterior portion a little more attenuated.

Segment 1 of male with lower margin long, straight, and with narrow rim barely reaching lower corner of eye; female with three short striae in posterior corner above narrow rim.

Segment 2 of female with large pleural extension on each side, its anterior margin directed mesad, surface behind it sharply raised against the broad gynaspis.

Segment 3 of female continued ventromesad each side as a long, narrow, apically subacute, pleural lobe almost reaching midbody, its anterior margin elevated behind female organs.

Segment 7 of male with lower margin each side long, straight, and without a pleural lobe.

Repugnatorial pores small, surrounded by a broad, flat rim close to the bowed transverse suture on anterior segments but removed from the straight suture by over twice the width of pore area on caudal ones. Mucro of last segment long, very slightly deflexed in male but not in female.

Gonopods shown in Fig. 16 and 17, the outer coxal portion of anterior gonopods quite leaf-like in lateral view, hiding a mesal extension such as is present in other two species. First legs appearing slightly more crassate than shown for *O. carpenteri*, but this possibly due to angle of observation. Tenth sternum short but broad, its entire anterior margin strongly and evenly concave, the elevated lateral limits thus much farther forward than the low middle.

Female second legs greatly reduced in size, appearing to be 5-jointed, reaching only three-fourths of way to apex of the very broad gynaspis which is much thickened and much exceeding the vertically oval cyphopods, as shown in Fig. 18.

Oriulus grandiceps, new species

Fig. 19 - 23

Holotype, consisting of head and next ten segments of male, and 9 females, only one unbroken, from Ellis Co., Kansas, 10 Nov. 1949, and 2 females from Finney Co., Kansas, 24 Oct. 1949, F. D. Butcher Coll.

DIAGNOSIS: The anterior segments of females more greatly enlarged than in any species with which I am familiar. The gonopods most closely associate the species with *O. medianus* Chamberlin but differences are evident in comparing the figures.

DESCRIPTION: Unbroken female 34 mm long, 2 mm wide, with 52 segments and appearing as large as any broken specimen; male 1.7 mm wide at segment 10.

Ocelli in eight or nine rows- 10, 9, 8, 7, 6, 5, 4, 3, 1, in male, 9, 9, 8, 7, 6, 5, 3, 2, in whole female. Antennal joint 2 longest, 3 shorter, subequal joints 4-6 still shorter. Male mandibulatory stipes as in Fig. 19.

Segment 1 of male elongate as usual, with a marginal rim and a smaller, inner, posterior crest, a distinct channel above each; females with similar ridges. Male segments 2 and 3 a little swollen as are 6 and 7. First three segments of females more swollen than in males; metazonites of segments 2 and 3 long and together equalling segments 4-6 in dorsal length; segments 2 and 3 with pleural lobes produced below segments 1 and 4 as shown in Fig. 20. Interzonal sulcus strongly impressed, almost straight throughout body in most specimens but bowed a little in some on anterior segments at adjacent pore; on posterior segments pores not more than their diameter behind sulcus. Last segment with a short projecting mucro.

Gonopods as shown in Fig. 21-22, except that each posterior gonopod has a large, broad, and very thin basal lobe curving laterodistad, well

within the body cavity, its apex rounded and almost touching segment 7 about opposite middle of secondary branch of gonopod. Anterior sternum of segment 8 shown in Fig. 23.

Second female legs rudimentary, extending half way up anterior face of gynaspis, hidden within body.

Oriulus venustus (Wood)

Julus venustus Wood, 1864, Proc. Acad. Nat. Sci. Philadelphia, p. 10.

Paraiulus venustus Bollman, 1889, Proc. U. S. Nat. Mus., 11:344.

Oriulus venustus Causey, 1952, Proc. Arkansas Acad. Sci., 5:19.

Two males, female, from York, Pennsylvania, 9 Oct. 1936, received under BEPQ No. 36-33052; male, female, from Elk Mts., Saratoga, Wyoming, June-Oct. 1937, "Hopk. U. S. 31508", received under BEPQ No. 38-11119; male, female, from Grand Forks, North Dakota, X1-1933, Prof. G. C. Wheeler, Univ. of North Dakota, USNM NO. 158495, received under BEPQ No. 40-25241.

Paraiulid sp.

Intermixed with specimens of *O. grandiceps* from both localities listed were several females of indeterminate genus.

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