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A NEW XYSTODESMID MILLIPED GENUS AND FIVE NEW SPECIES FROM THE COASTAL PLAIN OF ALABAMA (POLYDESMIDA)

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ABSTRACT

The new milliped genus *Gonoessa* (Xystodesmidae: Rhysodesmini) is proposed for 5 new species—*clavata, aciculata, cingulata, dentata,* and *furcata*—in the Coastal Plain of Alabama. It is characterized by a variably elongate prefemoral process, which may also be absent, and a long, slender telopodite, which overlaps 2 pregonopodal segments. Specific differences involve the distal configuration of the acropodite and the length of the prefemoral process if present. Like *Caralinda, Gonoessa* appears to be cold

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adapted and most abundant in winter and early spring. Phylogenetic affinity is with *Parvulodesmus* in South Carolina, and *Gonoessa* seems divisible into 2 lineages based on the presence or absence of the prefemoral process.

RESUMEN

El nuevo género *Gonoesa* (Xystodesmidae: Rhysodesmini) es propuesto para 5 nueve especies de la costa llanera de Alabama: *clavata, aciculata, cingulata, dentata,* y *furcata.* Es caracterizado por un proceso prefemoral variablemente elongado, que también pudiera estar ausente, y una "telepodite" larga y fina que sobrepasa los 2 segmentos pregonodales. Diferencias específicas envuelven la configuración distal del "acropodite" y el largo del proceso prefemoral si está presente. Como *Caralinda, Gonoessa* parece estar adaptado al frío y es más abundante en el invierno y temprano en la primavera. Afinidad fitogenética es con *Parvulodesmus* en Carolina del Sur, y *Gonoessa* parece ser divisible en 2 linajes basados en la presencia o ausencia del proceso prefemoral.

The milliped fauna of Alabama is not as diverse as those of its northern and eastern neighbors, but nevertheless contains unique elements. *Choctella hubrichti* Hoffman, *Euryurus cingulatus* Hoffman, and *Dicellarius sternolobus* Loomis are known only from the state (Hoffman 1965; Shelley 1982, 1984), and in the opinion of this writer are true Alabama endemics. These species occur in inner physiographic regions of the Piedmont and Appalachian Plateaus and Ridge and Valley Provinces. The Coastal Plain is also inhabited by species known only from Alabama, but these taxa are undescribed and comprise a new genus in the family Xystodesmidae. I learned of this group several years ago from Richard L. Hoffman, who loaned me the 4 samples in his collection, and I have since collected 9 more, 1 in May 1980 and 8 in April 1983. These 13 samples, all taken in spring in the Black Belt and Transitional Zone subregions (see Mount 1975), are all the available material, since I have not encountered any in museum or other private collections. I reported the existence of this genus in my paper on *Parvulodesmus* (Shelley 1983a), since the 2 seem closely related.

Although much remains to be learned, I believe the time has come to formally propose names for these taxa. Consequently, I establish the genus *Gonoessa* for small bodied xystodesmids in the Coastal Plain of Alabama, in which the gonopodal telopodites are long and slender, overlapping 2 segments anterior to the aperture. Of the 5 known species, the 1 with the most available material, characterized by a clavate acropodite and hence named *clavata,* is designated type species. *Gonoessa* is assigned to the tribe Rhysodesmini because of the small size of its species, the sternal remnants between their gonopodal coxae, the 90° articulation of the coxae and telopodites, and the setose postgonopodal sterna.

Unless otherwise indicated in the species accounts, collections are by the author and an assistant and are deposited in the invertebrate research collection of the North Carolina State Museum of Natural History, the catalog numbers of which are indicated in parentheses. I express my gratitude to Dr. Hoffman, for lending me his material (indicated by RLH) and to the National Science Foundation, for supporting this research through grants DEB 7702596 and 8200556.

Gonoessa, NEW GENUS

Type Species: *Gonoessa clavata*, new species.

Description: A genus of small rhysodesmine xystodesmids with the following characteristics:

Body composed of head and 20 segments in both sexes; size varying from around 20-29 mm in length and 4.5-7 mm in width; W/L ratio similarly varying from about 19-25%. Body appearing generally parallel sided, widest in anterior third, tapering gradually to segment 15 and more sharply posteriorly.

Color in life relatively constant; most forms with dull olive-brown base color and lighter narrow stripes along caudal margins of metaterga.

Head of normal appearance, smooth, polished; epicranial suture distinct, not bifid; genae not margined laterally, with or without varying central impressions, ends broadly rounded and projecting slightly beyond adjacent cranial margins. Antennae moderately slender and relatively constant in length, becoming progressively more hirsute distally, with 4 conical sensory cones on ultimate article. Facial setae with constant epicranial (2-2), subantennal (1-1), and frontal (1-1) series; genal, clypeal, and labral series variable; interantennal setae absent.

Terga smooth, polished, not noticeably coriaceous. Collum broad, ends not extending beyond those of following tergite. Paranota depressed, more so on females, anteriolateral corners rounded on all segments, caudolateral corners usually blunt in anterior half of body, becoming progressively more acute caudally; scapulorae distinctly concave. Peritremata moderately thick and conspicuous, slightly elevated above paranotal surface, ozopores located caudal to midlength, opening laterad.

Caudal segments normal for family.

Sides of metazonites generally smooth, without grooves or impressions. Pregonopodal sterna of males flat and depressed, with scattered fine setae; postgonopodal sterna of males and all sterna of females with variable cruciform or longitudinal impressions, without lobes along caudal margins, with variable linear clusters of setae near bases of both pairs of leg coxae. Gonapophyses of males short and apically expanded. Coxae without ventrodistal spines or tubercles; prefemoral spines beginning on midbody segments, becoming progressively longer and more acute caudally; tarsal claws hooked on all legs, tips variable.

Gonopodal aperture ovoid to elliptical, indented and slightly narrower anteriolaterad. Gonopods with long, slender, generally sublinear telopodites, usually well separated and parallel to one another, diverging slightly distad, extending anteriad over sterna and leg coxae of segments 6 and 5, terminating near level of 4th legs. Coxae small to moderate in size, without apophyses, either recessed within or elevated above apertures, connected by small, lightly sclerotized sternal remnants. Prefemora moderately slender, linear, shorter than acropodites, with or without acicular or spiniform prefemoral processes arising distad on dorsal sides. Acropodites appearing generally linear but usually with slight overall ventral curvature, bisinuate distad, continuous with prefemur; distal configurations variable, with or without cingula, ridges and grooves, and variable teeth or subterminal spurs. Prostatic grooves arising in pits on medial sides of prefemora, running generally along medial sides of acropodites to terminal openings.

Cyphopodal apertures narrow, encircling 2nd legs. Cyphopods small, with conical receptacles located on medial sides of valves; latter subequal in size, with or without elevated margins. Opercula minute, located on lateral sides of valves.

Distribution: The Coastal Plain of Alabama from near the Chattahoochee River in the east to west of the Tombigbee River in the west. In terms of physiographic subdivisions (see Mount 1975), forms have been taken in the Lower Coastal Plain, the Black Belt, and the Transitional Zone between the latter and the Red Hills. None have been found in the Red Hills, but they probably occur there in uninvestigated habitats. *Gonoessa* should be expected in parts of southeastern Mississippi and possibly also southwestern Georgia that are adjacent to known areas of occurrence in Alabama. However, the habitat in the southern tier of counties and the adjacent Florida panhandle is more xeric and consists mostly of pine forests. I did not find *Gonoessa* here and doubt if it occurs in Florida.

Species: Five, distinguished by criteria in the following diagnoses. Other species probably exist in southern Alabama and southeastern Mississippi. *Gonoessa* thus has the largest known species composition of any rhysodesmine genus in the eastern United States.

Gonoessa clavata, New Species
Fig. 1-3

Type specimens: Male holotype (A3123) and 4 ♂ and 10 ♀ paratypes collected by R. M. Shelley and M. S. Morgan, 22 May 1980, from Wilcox Co., AL, 7.2 mi. NE Camden, along AL Highway 41, 2.5 mi. S of the Dallas County line. Male and female paratypes deposited in the Florida State Collection of Arthropods (FSCA).

Diagnosis: Gonopod with short, spiniform prefemoral process extending slightly beyond distal extremity of prefemur; acropodite clavate, terminating in small, uncinate solenomerite, directed mediad.

Holotype: Length 25.1 mm, maximum width 6.2 mm, W/L ratio 24.7%, depth/width ratio 61.2%.

Head capsule smooth, polished; epicranial suture thin but distinct, terminating in interantennal region, not bifid. Width across genal apices 3.3 mm; interantennal isthmus 0.9 mm. Antennae moderately long and slender, reaching back to middle of 4th tergite, becoming progressively more hirsute distally, with 4 apical sensory cones, no other sensory structures apparent; first antennomere subglobose, 2-6 clavate, 7 short and truncate; relative lengths of antennomeres 3 4 2=5=6 1 7. Genae not margined laterally, without impressions, ends broadly rounded and projecting slightly beyond adjacent cranial margins. Facial setae as follows: epicranial 2-2, interantennal absent, subantennal 1-1, frontal 1-1, genal 2-2, clypeal about 8-8, labral about 12-12, merging with clypeal series and continuing for short distance along genal margins, about 4 setae per side.

Terga smooth, polished. Collum broad, ends not produced beyond those of following tergite. Paranota depressed, angling sharply ventrad and continuing slope of dorsum; anterior corners rounded, caudolateral corners blunt on first 6 segments, slightly produced on segments 7-15, becoming progressively more acute caudally; scapulorae deeply concave in anterior

half of body, becoming progressively shallower caudally. Peritremata moderately thick and conspicuous, slightly elevated above metazonal surfaces; ozopores located in caudal halves of peritremata, opening laterad.

Sides of metazonites finely granular, without noticeable grooves or impressions; strictures sharp and distinct. Gonapophyses short, only slightly elevated above coxae of 2nd legs. Pregonopodal sterna depressed and flattened, with a few randomly scattered setae. Postgonopodal sterna with cruciform impressions on segments 8-9, flat on 10-11, and with wide, shallow, central impressions between posterior legs on remaining segments; without caudal lobes; with 2 or 3 evenly spaced setae subtending anterior coxae, arranged linearly; posterior margins of 7th-14th sterna with 4-7 evenly spaced setae on each side, arranged linearly, setae clumped on remaining sterna. Coxae without projections; prefemora without ventrodistal spines on first 8 segments, spines short and blunt on segments 9-10, becoming progressively longer and more acute posteriorly; tarsal claws hooked on all legs, tips blunt in anterior half of body, acute in caudal half. Hypoproct broadly rounded; paraprocts with margins slightly thickened.

Gonopodal aperture elliptical, indented slightly anteriolaterad, caudolateral margins flared and elevated slightly above metazonal surface. Gonopods *in situ* with coxae raised above aperture, articulating with telopodites at right angles, latter widely separated and parallel, extending anteriad over coxae of legs 4-7 and lateral edges of sterna of segments 5-6, diverging distad. Gonopod structure as follows (Fig. 1-3): Coxae and prefemur moderate, latter with short, spiniform process arising on dorsal side, angling away from stem of telopodite and extending slightly beyond distal extremity of prefemur. Acropodite with slight ventral curve but generally linear and clavate in medial and lateral views, demarcated from prefemur by slight constriction, sides parallel to midlength, expanded thereafter with broadly rounded apex, with ridges arising at midlength on medial, ventral, and dorsal surfaces, continuing to just proximal to tip; solenomerite a short and uncinate projection arising centrally on tip of acropodite, curving mediad. Prostatic groove passing behind ridge on medial surface and curving onto outer margin of solenomerite.

Male Paratypes: Except for minor variation in the facial setal count apparently caused by breakage, the male paratypes agree closely with the holotype.

FEMALE PARATYPE: Lenth 22.7 mm, maximum width 4.4 mm, W/L ratio 19.4%, depth/width ratio 86.4%. Agreeing closely with males in somatic features, except paranota more strongly depressed, giving appearance of more highly arched body. Cyphopods *in situ* with openings of valves visible in aperture; surface of valves finely granulate, margins raised creating central depression. Receptacle small and triangular, finely granulate, located mediad to valves.

Variation: The gonopods of *clavata* are uniform throughout the known range. In all males the coxae are raised above the aperture instead of being partly recessed as in most other eastern xystodesmids.

Ecology: The type specimens were collected in a moist deciduous forest on a hillside above a shallow creek. They were found 20-50 feet from the water embedded in muddy soil under loose leaf layers. Localities in Lowndes and Clarke counties were also wet, the former being the edge of a swamp

and the latter a ravine in a deciduous forest. In Washington County, however, *clavata* was found under dry beech litter on hard substrate.

My impression is that *clavata* is more of a soil burrower than its congeners and most eastern xystodesmids in general. Moist environments facilitate this activity and are therefore preferred. Breakage of facial setae would be expected on a burrowing animal, and a few individuals also had broken antennae.

Distribution: All specimens have been collected in the Transitional Zone and Lower Coastal Plain of southwestern Alabama. The known range spans both the Alabama and Tombigbee Rivers, and *clavata* should be expected in Wayne and Green counties, Mississippi, where are adjacent to Washington County. Specimens were examined as follows:

Lowndes Co., 12 mi. SW Hayneville, along AL Hwy. 21 at Cedar Cr., ♂, ♀, 21 April 1983 (A4036). *Wilcox Co.*, in cedar woods 5 mi. W Snow Hill, 3 ♂, 2 ♀, 10 April 1960, L. Hubricht (RLH); and 7.2 mi. NE Camden, along AL Hwy. 41, 2.5 mi. S Dallas Co. line, 5 ♂, 10 ♀, 22 May 1980, (A3123) TYPE LOCALITY. *Clarke Co.*, 8 mi. NW Jackson, along AL Hwy. 69 at Jackson Cr., 3♂, 4 ♀, 23 April 1983 (A4052). *Washington Co.*, 3 mi. E Leroy, along US Hwy. 43 at Tombigbee R., 5 ♂, 2 ♀, 22 April 1983 (A4049).

Remarks: The gonopods of *clavata* were heavily encrusted with soil, and a residue remained after washing. A fine insect pin therefore had to be used to clean the surface of the acropodites. Care should be taken to remove all residue before examining these structures, as the grooves will otherwise be obscured. Debris also accumulates in the concave scapulorae, which must also be cleaned with a pin to expose the surface.

Gonoessa aciculata, NEW SPECIES
Fig. 4-5

Type specimens: Male holotype (A4035) and 2 ♂ and 2 ♀ paratypes collected by R. M. Shelley and P. B. Nader, 21 April 1983, from Lowndes Co., AL, 6.8 mi E Hayneville, along AL Highway 26 at Steep Creek. Male and female paratypes deposited in FSCA.

Diagnosis: Gonopod with long, acicular prefemoral process extending well beyond distal extremity of prefemur to midlength of acropodite; acropodite widest at midlength, bent abruptly ventrad apically; solenomerite a short spur located subterminally on ventral surface.

Holotype: Length 22.0 mm, maximum width 5.9 mm, W/L ratio 26.8%, depth/width ratio 57.6%.

Somatic features similar to those of *clavata*, with following exceptions:

Width across genal apices 3.1 mm, interantennal isthmus 1.1 mm. Relative lengths of antennomeres 2 3 4 5=6 1 7.

Ends of collum and 2nd tergite projecting slightly beyond those of following tergite. Caudolateral corners of paranota blunt through segment 10, becoming progressively more acute caudally; scapulorae deeply concave throughout body.

Gonopodal aperture ovoid, indented slightly anteriolaterad, lateral margins elevated above metazonal surface. Gonopods *in situ* with coxae raised above aperture, telopodites widely separated and parallel, extending anteriad over coxae of legs 4-7 and lateral edges of sterna of segments 5-6.

Gonopod structure as follows (Fig. 4-5): Prefemur with long, acicular process arising on dorsal side, approximately half the length of telopodite, extending to midlength of acropodite, tip directed apically. Acropodite with slight bisinuate curve, continuous with prefemur, expanded at midlength, bent abruptly ventrad apically and terminating in thin rounded lamella; solenomerite a short, acute spur arising subterminally at apical bend on ventral surface.

Male paratypes: The male paratypes agree with the holotype in all particulars.

Female paratype: Length 21.2 mm, maximum width 4.8 mm, W/L ratio 22.6%, depth/width ratio 77.1%. Agreeing essentially with males in somatic features except first 2 tergites not produced and paranota more strongly depressed, creating appearance of more highly arched body. Cyphopods

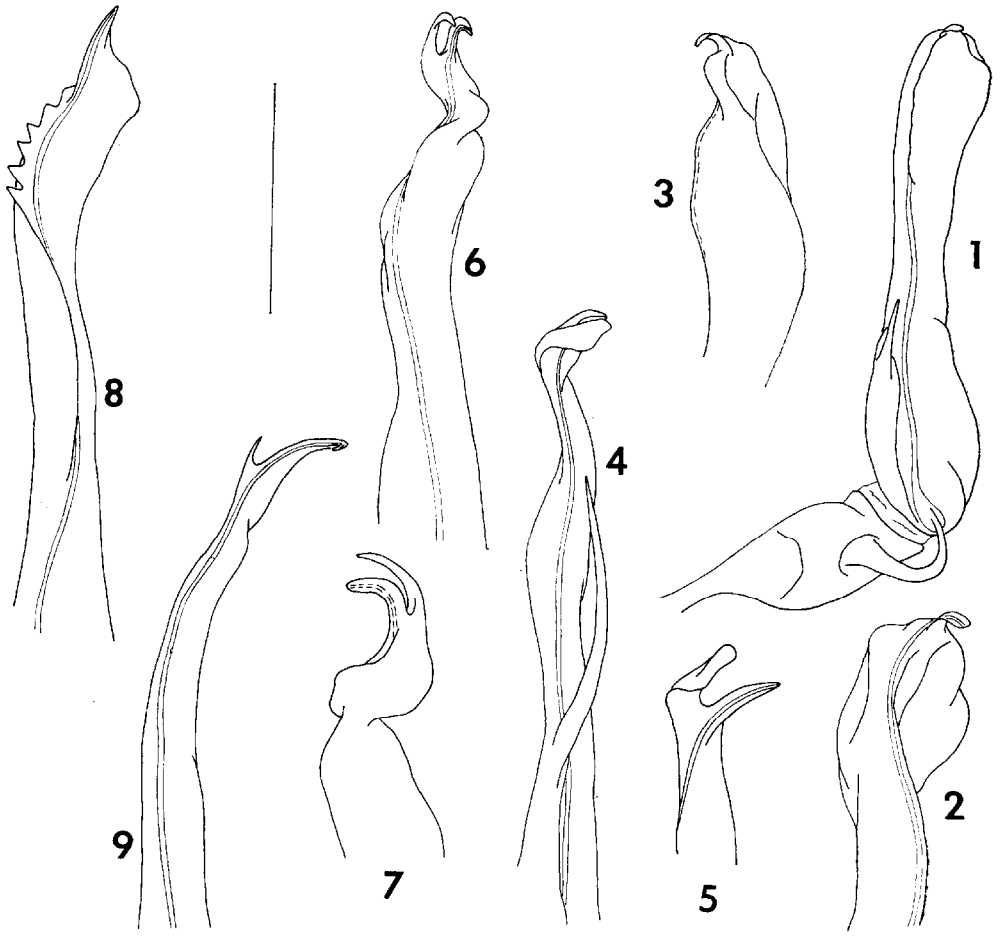

Fig. 1-9. *Gonoessa* spp., setation omitted. 1-3, *G. clavata*, holotype. 1) left gonopod, medial view. 2) apex of telopodite of the same, dorsal view. 3) the same, ventral view. 4-5, *G. aciculata*, holotype. 4) telopodite of left gonopod, medial view. 5) apex of the same, ventromedial view. 6-7, *G. cingulata*, holotype. 6) telopodite of left gonopod, submedial view. 7) the same, sublateral view. 8) *G. dentata*, telopodite of left gonopod of holotype, medial view. 9) *G. furcata*, telopodite of left gonopod of holotype, medial view. Scale line = 1.50 mm for 1; 1.00 mm for 4; 0.86 mm for 6, 8, and 9; and 0.60 mm for 2, 3, 5, and 7.

in situ with corners of receptacles visible in apertures, valves directed ventrolaterad. Receptacle conical, cupped around medial end of valves, surface rugulose. Valves small and subequal, surfaces finely granulate, margins not raised.

Distribution: Known only from the type locality.

Gonoessa cingulata, NEW SPECIES
Fig. 6-7

Type specimens: Male holotype and 1 ♂ paratype (RLH) collected by L. Hubricht, 16 April 1960, from Montgomery Co., AL, 7 mi. SW Montgomery near Dry Creek.

Diagnosis: Prefemoral process absent; acropodite not expanded, with distinct cingulum and torsion at 2/3 length, terminating in 2 nearly equal, medially directed, uncinate projections, the more ventral being the solenomerite.

Holotype: Length 22.1 mm, maximum width 5.1 mm, W/L ratio 23.1%, depth/width ratio 62.7%.

Somatic features similar to those of *clavata*, with following exceptions:

Width across genal apices 2.4 mm, interantennal isthmus 0.9 mm. Relative lengths of antennomeres 2 3=4=5=6 1 7. Facial setae as in *clavata* except clypeal about 6-6 and labral about 10-10.

Caudolateral corners of paranota blunt through anterior half of body, becoming progressively more acute posteriorly; scapulorae deeply concave throughout body.

Sternum of segment 5 with two lowly rounded paramedial knobs between 4th legs.

Gonopodal aperture ovoid, indented anteriolaterad, sides elevated above metazonal surface. Gonopods *in situ* with coxae recessed within aperture, telopodites moderately separated and parallel, extending anteriad over 6th sternum to between caudal legs of segment 5. Gonopod structure as follows (Fig. 6-7): Prefemoral process absent. Acropodite bowed ventrad and slightly bisinuate, continuous with prefemur, expanded noticeably at mid-length; with torsion, cingulum, and small, curved, medial lamella at 2/3 length; distal portion curved mediad, divided at mid-length into 2 terminal uncinate projections, solenomerite slightly smaller and located on ventral side. Prostatic groove crossing to dorsal side at level of torsion, curving onto solenomerite and opening terminally.

Male paratype: The ♂ paratype agrees with the holotype in all details.

Distribution: Known only from the type locality.

Remarks: The 2 terminal acropodal projections curve directly mediad, and the gonopod drawings were therefore prepared from slightly dorsomedial and dorsolateral perspectives to show profiles of the structures.

In an effort to secure more material of *cingulata* I investigated several localities on the southern fringe of Montgomery. Approximately 4 miles from the heart of the city I found a male that turned out to be a different undescribed form, described below. *Gonoessa cingulata* is thus sympatric with *dentata* just south of Montgomery.

Gonoessa dentata, NEW SPECIES
Fig. 8

Type specimens: Male holotype (A4066) collected by R. M. Shelley and P. B. Nader, 29 April 1983, from Barbour Co., AL, 2.7 mi. S Eufaula, along US Highway 431, 0.5 mi. S of the junction with AL Highway 30. Male paratype (A4031) taken by same collectors, 19 April 1983, from Montgomery Co., 4 mi. S Montgomery, along US Highway 331A at Catoma Creek.

Diagnosis: Prefemoral process absent; acropodite with sides parallel except apically, with a row of 6 teeth arising at 2/3 length from ridge on medial surface.

Holotype: Length 20.1 mm, maximum width 4.5 mm, W/L ratio 22.4%, depth/width ratio 62.2%.

Somatic features similar to those of *clavata*, with following exceptions: Width across genal apices 2.6 mm, interantennal isthmus 1.0 mm. Genae with distinct central impressions. Facial setae as in *clavata*, except genal 4-4 and without merged clypeal/labral row along genal margin.

Caudolateral corners of paranota blunt through segment 10, becoming progressively more hirsute caudally; scapulorae relatively shallow throughout body.

Gonopodal aperture ovoid, indented anteriolaterad, sides raised above metazonal surface, caudal edge flared. Gonopods *in situ* with coxae recessed within aperture, telopodites narrowly separated and parallel, extending anteriad over sterna of segments 5-6. Gonopod structure as follows (Fig. 8): Prefemoral process absent. Acropodite linear basally, curved ventrad near half length and produced into sharply acute tip on dorsal corner, continuous with prefemur, with bisinuate ridge arising basally on medial side and developing into a row of 6 teeth at level of curve, proximal teeth sharply acute, distal ones lower and more rounded. Prostatic groove running along ridge at base of teeth, curving onto produced tip of acropodite.

Male paratype: The male paratype is considerably larger than the holotype (length 28.8 mm, maximum width 7.0 mm, W/L ratio 24.3%, depth/width ratio 60.0%), but agrees otherwise in somatic details. On the gonopods the tip of the acropodite is elongated, and the 6 teeth are larger and more conical.

Ecology: The holotype was discovered on level ground under dry oak-cedar-pine litter, well removed from the nearest water source. The paratype was found under mixed hardwood litter on a levee along Catoma Creek.

Distribution: Known only from the type and paratype localities.

Gonoessa furcata, NEW SPECIES
Fig. 9

Type specimens: Male holotype and 2 ♂ and 3 ♀ paratypes (A4026) collected by R. M. Shelley and P. B. Nader, 19 April 1983, from Montgomery Co., AL, 13.1 mi. SSW Montgomery, along US Highway 31 just S of Pintlalla Township. Male paratype (RLH) collected by L. Hubricht, 9 April 1960, from 1 mi. S Pintalalla. Male and female paratypes deposited in FSCA.

Diagnosis: Prefemoral process absent; acropodite tapering smoothly to acuminate tip, constricted on ventral surface at 2/3 length, with a subterminal spur on dorsal surface.

Holotype: Length 24.3 mm, maximum width 5.6 mm, W/L ratio 23.0%, depth/width ratio 62.5%.

Somatic features similar to those of *clavata*, with following exceptions: Width across genal apices 3.0 mm, interantennal isthmus 1.0 mm. Genae with slight central impressions. Facial setae as in *clavata*, except clypeal about 10-10 and labral about 14-14.

Caudolateral corners of paranota blunt through segment 11, becoming progressively more acute caudally; scapulorae deeply concave throughout body.

Gonopodal aperture ovoid, indented anteriolaterad, sides elevated above metazonal surface. Gonopods *in situ* with coxae raised above aperture, telopodites widely separated and diverging, extending anteriad over lateral edges of sterna of segments 5-6. Gonopod structure as follows (Fig. 9): Prefemoral process absent. Acropodite curved broadly ventrad, slightly bisinuate distad, continuous with prefemur, constricted on ventral surface at 2/3 length, thereafter curving and tapering smoothly to acuminate tip, latter bent abruptly anteriad; with a short acuminate spur distal to indentation on dorsal margin.

Male paratypes: The male paratypes agree closely with the holotype, and the only noticeable variation involves the size of the spur, which is smaller on 2 individuals and larger on the other.

Female paratype: Length 22.5 mm, maximum width 4.9 mm, W/L ratio 21.8%, depth/width ratio 77.6%. Agreeing essentially with males in somatic details, except paranota more strongly depressed, creating appearance of more highly arched body. Cyphopods *in situ* with openings of valves visible in apertures; valves subequal, surfaces finely granulate. Receptacle conical, cupped around medial corner of valves, surface finely granulate.

Ecology: The type specimens were found on damp substrate in depressions in a mixed pine-hardwood forest. There was no water source in the vicinity.

Distribution: In addition to the type specimens from southwestern Montgomery County, I also tentatively assign 2 females from the adjacent part of Lowndes County to *furcata*, since their localities are only about 5 miles from Pintlalla. Males could prove them to be another species, however, as sympatry is already known between *cingulata* and *dentata*. Data for these 2 females are as follows:

Lowndes Co., 8.4 mi. NE Ft. Deposit, along US Hwy. 31 at Sandy Ridge, ♀, 19 April 1983 (A4027); and 2.5 mi. NE Sandy Ridge, ♀, 9 April 1960, L. Hubricht (RLH).

Remarks: *Gonoessa furcata* is closely related to *cingulata*. Both have an apical projection on the dorsal side of the acropodite, and both have a constriction at 2/3 length. I think they are reproductively isolated, however, because *cingulata* has torsion, and the constriction is developed into a distinct cingulum that encircles the acropodite.

Ecology

Because of the dates of Hubricht's prior collections, I spent 2 weeks in southern Alabama in April 1983. *Gonoessa* was not very common, however, and it was only encountered at 8 sites. This suggests to me that April might

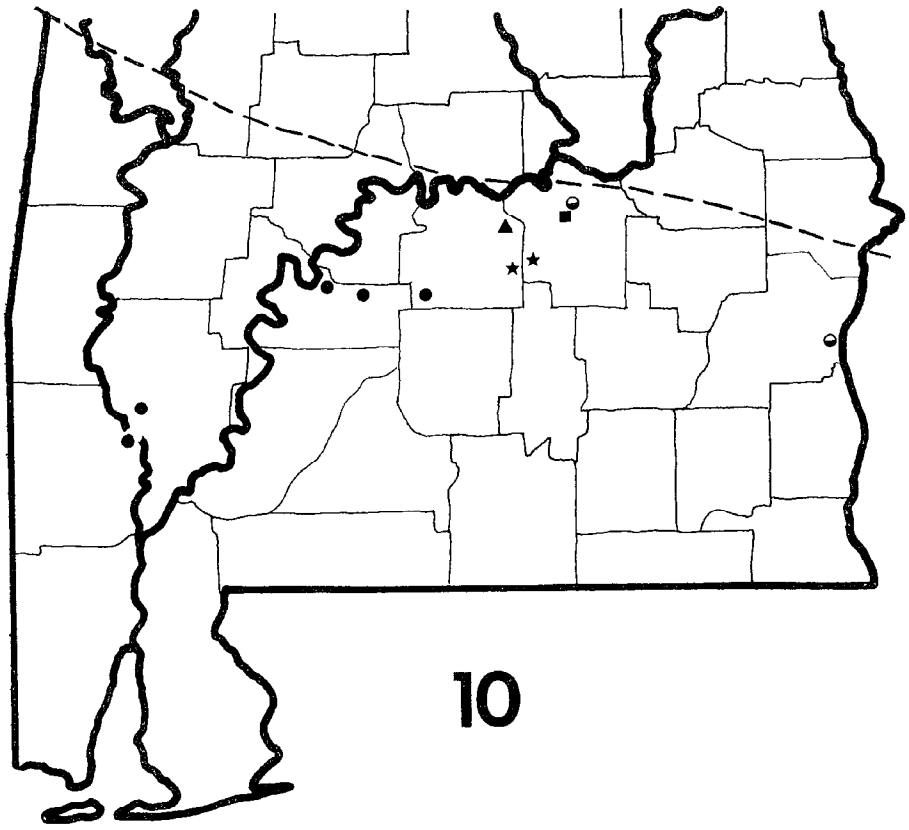

Fig. 10. Distribution of *Gonoessa*. The dashed line marks the approximate location of the Fall Line. Dots, *clavata;* triangle, *aciculata;* square, *cingulata;* half shaded dots, *dentata;* stars, *furcata.*

be near the end of the season of activity and that field work earlier in the year might be more productive. The species of *Caralinda* are active on the surface primarily during the winter months (Shelley 1983b), and I suggested (1983a) that the same might hold for *Parvulodesmus*. Perhaps the species of *Gonoessa* are also most abundant from December to April. If true, the southeast would be inhabited by a winter assemblage of small rhysodesmine xystodesmids. Since few field collectors are active at this time of year, it is not surprising that these taxa are poorly known.

Except for the type series of *clavata*, none of my collections of *Gonoessa* came from the predominantly hardwood environments where I typically find xystodesmids in the Atlantic lowlands. My assistant in 1983 actually discovered more specimens than I since he did not share my biases on preferred habitat and looked in situations that I avoided. *Gonoessa clavata, furcata,* and *dentata* were found in dry predominantly pine litter, and *clavata* was also encountered in mud on the edges of swamps and in wet and dry beech litter. I was particularly impressed by the last discoveries, as I have rarely found diplopods of any kind in beech leaves and have learned over the years not to spend much time searching through them. Hubricht's

notation, "in cedar woods," with his sample of *clavata* from Wilcox County is probably significant, since *Gonoessa* occurs in rather unusual environments for xystodesmids. Collection of *Gonoessa* therefore requires different timing and field techniques from those used for xystodesmids in the Atlantic lowland provinces.

Relationships

Little can now be said about relationships in *Gonoessa* because of the paucity of material of the known species and the high probability that additional ones remain to be discovered. However, the long slender telopodites that extend anteriad over 2 or more pregonopodal segments point to close affinity between *Gonoessa* and *Parvuulodesmus*, occurring in Piedmont South Carolina (Shelley 1983a). This hypothesis can be tested by more collections of the latter from intervening areas, and winter field work is needed in South Carolina and piedmont Georgia for this purpose. *Gonoessa* shares few common features with the geographically proximal genus *Caralinda*, and the 2 seem to represent different phylogenetic branches of the Rhysodesmini.

At the species level, 2 main lineages of *Gonoessa* can be proposed, one featuring, and the other lacking, the prefemoral process. In the latter branch, *cingulata* and *furcata* are closely related, as the acropodites of both have a distal constriction and a subterminal dorsal projection. Neither, however, is close to *dentata*, which lacks these traits. Likewise, in the former branch, *clavata* and *aciculata* have distinctly different acropodites, leading me to believe that anatomically intermediate forms remain to be discovered in coastal Alabama and Mississippi.

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