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Parajulid milliped studies XII: Initial assessment of *Ptyoiulus* Cook 1895 and neotype designations for *Julus impressus* Say 1821 and *J. montanus* Cope 1869 (Diplopoda: Julida)

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(Diplopoda: Julida)

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Parajulid milliped studies XII: Initial assessment of *Ptyoiulus* Cook 1895 and neotype designations for *Julus impressus* Say 1821 and *J. montanus* Cope 1869 (Diplopoda: Julida)

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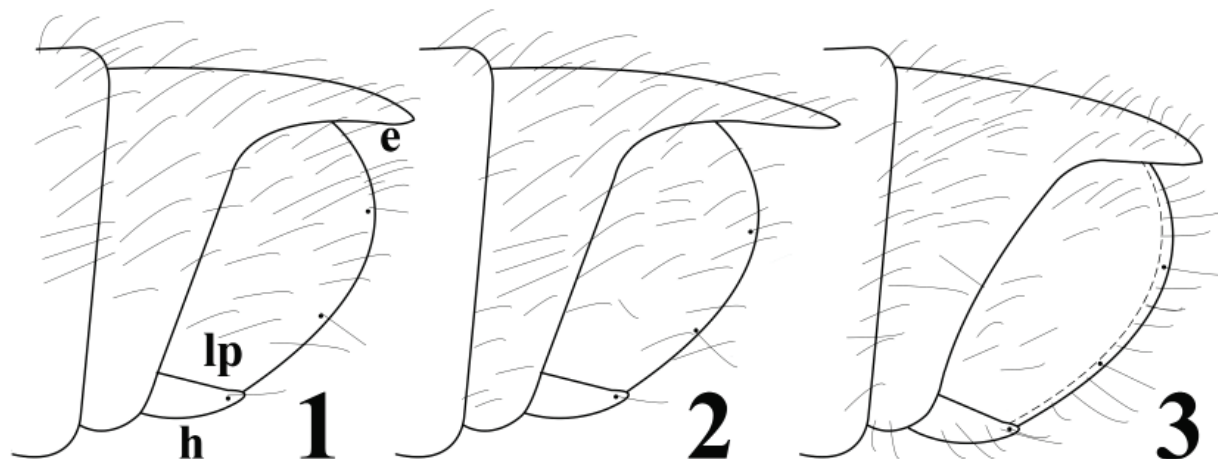
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Abstract. *Ptyoiulus* Cook 1895, the dominant parajulid diplopod genus in the eastern United States (US), comprises two species – *P. impressus* (Say 1821), with a slanted, flared, circumferentially entire, and marginally serrate apical calyx on the anterior gonopod coxal process, and *P. montanus* (Cope 1869), n. comb., with a smooth, upright, cupulate calyx that is open caudad and coaxial with the process' stem. The genus occupies a broad area between the Mississippi River and Atlantic Ocean extending from southern New England, Ontario, and Michigan to the Florida Panhandle and four small disjunct ones – from Montreal, Québec, to northern Vermont, along southwestern Lake Michigan in Wisconsin and Illinois; northeastern/eastcentral Arkansas, primarily in Crowley's Ridge physiographic feature and beside the "bootheel" of Missouri; and a point locality in northeastern Louisiana just south of the Arkansas line. A male from Chester County (Co.), Pennsylvania, is designated as the neotype of *Julus impressus*, as is one from Durham Co., North Carolina, for *J. montanus*. As both species inhabit Montgomery Co., Virginia, the type locality of *J. montanus*, we exercise the right of first reviser, conserve the latter name, and assign it to the species with the smooth, cupulate, and coaxial calyx. We also exercise first reviser rights and assign *Parajulus ectenes* Bollman 1887 to this form, thereby relegating it to synonymy under *Ptyoiulus montanus*. Other new synonymies include *Ptyoiulus georgiensis* Chamberlin 1943 under *P. impressus* and *P. coveanus* Chamberlin 1943 under *P. montanus*. Both *Ptyoiulus* and *P. impressus* are projected for Delaware and Rhode Island and newly reported from Québec, Connecticut, District of Columbia, Maryland, Mississippi, South Carolina, Vermont, West Virginia, and Wisconsin, and the genus and species, respectively, are newly documented from Louisiana and Arkansas; *P. montanus* is newly cited from Alabama, Arkansas, Georgia, Mississippi, and South Carolina. *Ptyoiulus impressus* occupies every state except perhaps Louisiana and is the only species in areas that were inundated during the Cretaceous and glaciated during the Pleistocene; by contrast, *P. montanus* inhabits a relatively narrow east/west transect through the center of the generic range. Their distribution patterns suggest an old species, *montanus*, being actively displaced by the younger and more successful *impressus*. The decurvature of the epiproct in uroblaniulinines appears to increase with age and developmental stage. A key is presented to parajulid family-group taxa in the US and Canada east of the Rocky Mountains.

Key Words. Aniulini, Bollmaniulini/*Bollmaniulus*, calyx, *ectenes*, Florida, North Carolina, *Parajulus*, Tennessee, Uroblaniulinini

Introduction

Parajulid millipeds occur along the Atlantic Coast of North America from James Bay, Ontario, southern Québec, and New Brunswick, Canada, to the southern tip of peninsular Florida, United States (US) (Causey 1974; Hoffman 1999; Shelley 2000a, 2008; Shelley and Golovatch 2011). Three family-group taxa are represented – Aniulini, Uroblaniulini, and Ptyoiulinae – the last dominant in the northern/northeastern US, with a single component genus, *Ptyoiulus* Cook 1895, and known or projected for every state from Vermont southward. A few mostly general records exist for Ontario, Canada, that apparently lack vouchers; we question their authenticities but report two new Ontario localities and the first from Québec. More Canadian samples should seemingly be available given the amount of sampling in the projected area in Ontario (Fig. 4, 14).



Figures 1–3. Pilosity and epiproct variation on caudalmost rings of *Ptyoiulus impressus*. **1)** Specimen from Morgan Co., Ohio. **2)** Specimen from Allen Co., Kentucky. **3)** Specimen from Leon Co., Florida. e, epiproct; h, hypoproct; lp, left paraproct.

Ptyoiulus is readily distinguished by the pilose caudal rings and paraprocts and by the straight, spiniform epiproct that overhangs and clearly extends beyond the caudal paraproctal margins (Fig. 1–3; Blake 1931, Fig. 2 in part). Aniulini and Uroblaniulini have at most only scattered tergal setae; the

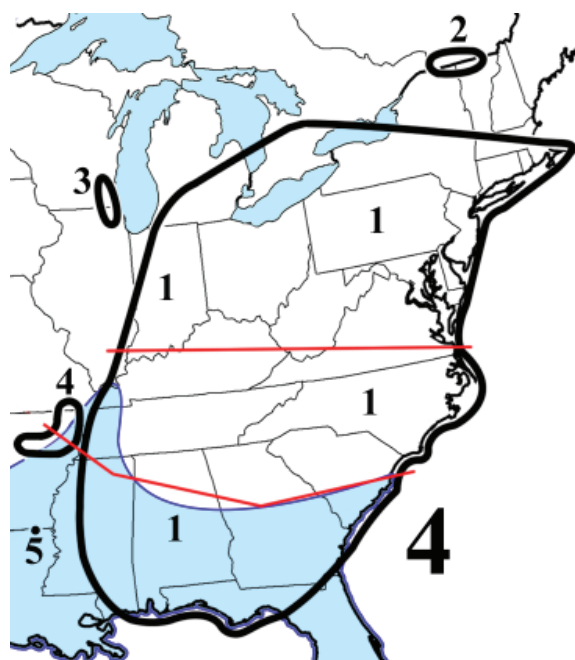
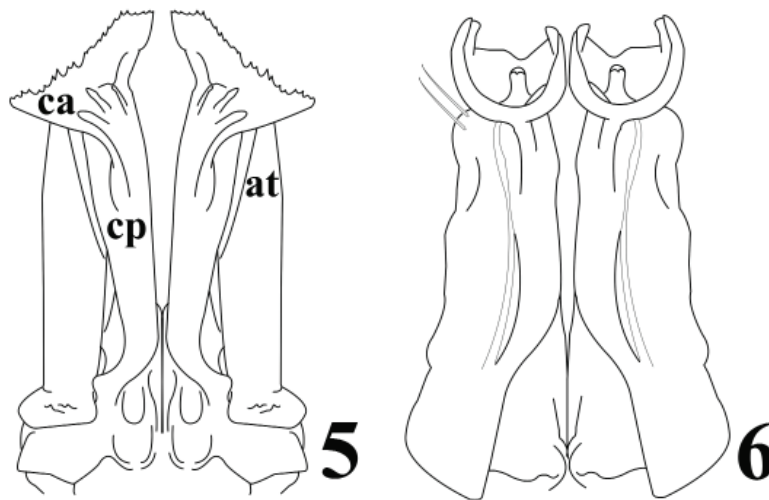


Figure 4. Distributions of *Ptyoiulus*/*Ptyoiulinae* plotted against the maximal extent of the Western Interior Seaway during the Cretaceous Period, Mesozoic Era. All land areas shown are in the eastern land mass, Appalachia, which was separated from western Laramidia by the vertical, latitudinal arm of the Seaway (not shown), which segregated *Ptyoiulus* from bollmaniulinines in Laramidia but is irrelevant to *Ptyoiulus* itself. The Seaway spread eastward south of Appalachia and when it receded, *P. impressus* spread southward into the formerly inundated area. **1**, large, contiguous main range area. **2**, small, disjunct northernmost population extending from Montreal, Québec, to northern Vermont. **3**, disjunct population along the southwestern coast of Lake Michigan. **4**, disjunct area in northeastern/eastcentral Arkansas. **5**, point locality in northeastern Louisiana vouchered by females. The transect denoted by the red lines near the center of the distribution is the band occupied by both *P. montanus* and *P. impressus*; the latter occurs alone to the north and south.

epiproct in the former is usually shorter than or only barely overhangs the paraprocts; and the structure is a strongly decurved hook in adult uroblaniulinines (Blake 1931, Fig. 2 in part) and slants gently ventrad, particularly apically, in juveniles. From RMS' sampling and field observations, the degree of epiproctal slanting and/or falcateness in uroblaniulinines increases with age and developmental stage. A parajulid in eastern North America with a seemingly linear epiproct and only scattered segmental hairs is an immature uroblaniulinine, not a *Ptyoiulus*, whose caudal rings are noticeably pilose in even early instars.

Long, dark, and cylindrical, *Ptyoiulus* is common in the aforementioned area between the Atlantic Coast and Mississippi River, and it spreads discontinuously westward to southeastern Wisconsin, the Mississippi River from southern Illinois to southern Tennessee, and northeastern Arkansas, with a point locality in northeastern Louisiana near the Arkansas border represented by females (Fig. 4). Causey (1974) proposed a familial taxonomy, but Hoffman (1980) noted that the subfamily Ptyoiulinae seemed superfluous with only one component tribe, Ptyoiulini, that clearly is such. We recognize only two species in the genus: *Ptyoiulus impressus* (Say 1821) and *Ptyoiulus montanus* (Cope 1869) **n. comb.**, originally assigned to *Julus* L. These species are distinguished primarily by the configuration and orientation of the laminate apical calyx on the anterior gonopod coxal process, which is best viewed in caudal aspect. The structure slants laterad, is discontinuous with the stem of the process, circumferentially entire, flared, and usually marginally serrate in the dominant form, for which *impressus* is the oldest available name, and is upright, coaxial with the stem, cupulate, open caudad, and marginally smooth in the form to which we assign *montanus* (Fig. 5–6). Proposed 195 and 147 years ago, the types of *J. impressus* and *J. montanus*, respectively, have long been lost, and neotype designations are necessary. According to Say's original account, the type specimen of *J. impressus* was in his "cabinet," but he sent some types to William Leach in London, and some of these are now in the Natural History Museum (Beccaloni 2012). RMS visited this institution in 1997, searched for Say's types, and that of *J. impressus* was not there, nor is it cited in the museum's on-line Arachnida and Myriapoda database. Consequently, in accord with Chamberlin and Hoffman (1958) and Hoffman (1999), we designate as Neotype a male in the ANSP (acronyms below) from Chester County (Co.), Pennsylvania, adjacent to Philadelphia, where Say spent much of his adult life. Appropriately, the specimen was collected by H. C. Wood, the first US author to publish comprehensively on diplopods.



Figures 5–6. *Ptyoiulus* spp. anterior gonopods, caudal views. **5)** *P. impressus*. **6)** *P. montanus*. at, anterior gonopod telopodite; ca, calyx; cp, coxal process stem.

The situation with *Julus montanus* Cope 1869 is not so easily resolved. The type was taken at an unknown site in Montgomery Co., Virginia, which today harbors both species of *Ptyoiulus*. Lacking both a gonopod illustration and a meaningful description, it is impossible to determine which species Cope had, but to credit him and conserve his name, we exercise the right of first reviser and designate as Neotype a male in the FSCA from Durham Co., North Carolina, with the cupulate, coaxial calyx, since

the Montgomery Co. male, illustrated in fig. 15, 22, was misplaced and cannot now be located. Such action also allows us to synonymize the second oldest name for this form, *Parajulus ectenes* Bollman (1887a), and remove it from nomenclature. Lacking labels and statements of typification, the original male and female are necessarily syntypes, but the former individual is also lost. They were from Chapel Hill, Orange Co., North Carolina, and the cupulate, coaxial form is the only species in central North Carolina. In comparing it to *Pt. impressus*, Bollman noted the “much more slender” body form and that the epiproct does not pass “beyond (the) anal valves” or paraprocts, suggesting an aniulinine. However, he also stated that the paraprocts “are pilose,” the condition in *Ptyoiulus*. Though citing it as a parajulid of “uncertain generic position or validity,” Hoffman (1980, 1999) speculated that *Pa. ectenes* may be a senior synonym of the sympatric aniulinine, *Aniulus orientalis* Causey 1952, based on the body form characterization and the fact that its epiproct does not extend beyond its lightly hirsute paraprocts. However, two aniulinines inhabit central North Carolina, the other being *Oriulus venustus* Wood 1864 (= *Aniulus carolinensis* Shelley 2001) (Shelley 2000b, 2001, 2002), so if *Pa. ectenes* does refer to an aniulinine, there is no way to infer which species from Bollman’s (1887a) description. Hoffman (1980, 1999) did not mention it, but Bollman could also have been correct; he could have had the ptyoiuline in central North Carolina, which is far more abundant than either aniulinine, because he did mention pilose paraprocts. Bollman’s (1887a) description is thus ambiguous, citing features more characteristic of an aniulinine than *Ptyoiulus* and vice versa, but Hoffman selectively latched onto the subjective comment about “much more slender body form” and ignored the objective one about pilose paraprocts. We think he overemphasized what could have been an off-hand comment to the exclusion of the rest of the account, but without gonopod illustrations and the male syntype, it is impossible to determine the identity of *Pa. ectenes* with certainty, and we cannot designate a neotype because the female syntype still exists at the NMNH (see following list of acronyms). Additionally, there is no way of determining whether the male and female syntypes truly were conspecific; they could have represented two of the parajulids in central North Carolina with the existing female syntype differing from the lost male! The identity of *Pa. ectenes* is thus an unsolvable problem, but after 129 years, it is time to act decisively rather than carry the enigma even longer. Consequently, we again exercise first reviser rights, assume Bollman was correct because he did compare *Pa. ectenes* to *Pt. impressus* and did note pilose paraprocts, and formally assign *Pa. ectenes* to the *Ptyoiulus* in central North Carolina to which we just assigned *Pt. montanus*, which holds priority by 18 years. *Parajulus ectenes* therefore falls in synonymy under ***Ptyoiulus montanus*, n. comb.**, and disappears from nomenclature.

Causey (1974) placed *Ptyoiulus* in its own subfamily thereby opposing it to all other parajulid genera. Hoffman (1980, 1999) noted a technical error, but otherwise we tentatively accept her taxonomy, not being competent now to effect changes. We have not yet studied the multitude of western taxa, many species of which are assignable to *Bollmaniulus* Verhoeff 1926 and the tribe Bollmaniulini (Hoffman 1999). Nonetheless, we think Causey’s action was unjustified because the gonopods of *Ptyoiulus* and *Bollmaniulus* exhibit similar configurations, and we interpret the former as the eastern representative that became detached when the Cretaceous Western Interior Seaway segregated it in Appalachia around 100 mya (Fig. 4). *Ptyoiulus* appears to us to be a bollmaniulinine with a calyx atop the anterior gonopod coxal process, but we defer formal action to our study of *Bollmaniulus* and other western parajulids, the next project in this series.

In the ensuing accounts, “MM”, “FF”, and/or “juvs.” mean too many individuals to count, and the abbreviation “GSMNP” signifies the Great Smoky Mountains National Park, which straddles the southwestern border between North Carolina and Tennessee. Missing data in locality listings was not provided on vial labels. Because it is less abundant, we provide full locality data for *P. montanus*; excepting North Carolina and the easternmost counties of Tennessee in/near GSMNP, we provide detailed localities for *P. impressus* in states where it occurs in six or fewer counties and list the latter for states where it occupies seven or more counties. Because both species seemingly occur side-by-side in western North Carolina and eastern Tennessee, we provide locality citations for all counties in these areas. Repository acronyms are **AMNH**, American Museum of Natural History, New York, New York; **ANSP**, Academy of Natural Sciences of Drexel University, Philadelphia, Pennsylvania; **CMN**, Canadian Museum of Nature, Ottawa, Ontario, Canada; **CMNH**, Carnegie Museum of Natural History, Pittsburgh, Pennsylvania; **DAH**, private collection of D. A. Hennen, Blacksburg, Virginia; **FEM**, Frost Entomological Museum, Pennsylvania State University, State College; **FMNH**, Field Museum of

Natural History, Chicago, Illinois; **FSCA**, Florida State Collection of Arthropods, Gainesville; **GMNH**, Georgia Museum of Natural History, University of Georgia, Athens; **INHS**, Illinois Natural History Survey, Champaign; **LEM**, Lyman Entomological Museum, Macdonald Campus, McGill University, Ste-Anne-de-Bellevue, Québec, Canada; **MCZ**, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; **MEM**, Mississippi Entomological Museum, Mississippi State University, Starkville; **MNHN**, Muséum National d'Histoire Naturelle, Paris, France; **MPM**, Milwaukee Public Museum, Milwaukee, Wisconsin; **NCSM**, North Carolina State Museum of Natural Sciences, Raleigh; **NMNH**, National Museum of Natural History, Smithsonian Institution, Washington, DC; **PMNH**, Peabody Museum of Natural History, Yale University, New Haven, Connecticut; **UCT**, Biology Department, University of Connecticut, Storrs; **UMMZ**, University of Michigan Museum of Zoology, Ann Arbor; **UTIC**, University of Texas Insect Collection, Austin; **UVT**, Biology Department, University of Vermont, Burlington; **VMNH**, Virginia Museum of Natural History, Martinsville.

Taxonomy

Order Julida Brandt 1833

Family Parajulidae Bollman 1893

Key to US and Canadian parajulid family-group taxa occurring east of the Rocky Mountains

1. Epiproct short and blunt, not, or only barely, overhanging paraprocts; anterior gonopods with lateral syncoxal processes **2**
- Epiproct moderately long to long, clearly overhanging and extending beyond level of paraproctal margins, apically acuminate; anterior gonopods without lateral syncoxal processes **3**

2. Small-bodied to minute parajulids, posterior gonopods with three ventrally directed projections (two in the Mexican genus), solenomere longest; central Colorado to northwestern Arizona, east central Texas, and Nuevo León, Mexico (Shelley and Smith 2016) **Gosiulini Causey 1974**
- Small-bodied to moderately large parajulids; posterior gonopods usually with two ventrally directed projections, solenomere usually longer; anteromedial margins of 8th male sterna with anteriorly-directed lobes protruding over aperture and usually between gonopods; Alberta and Québec to southern peninsular Florida, the Rio Grande in Texas, southern New Mexico, and southwestern Arizona **Aniulini Causey 1974**

3. Caudal rings, paraprocts, and epiproct heavily setose; latter extending directly caudad; Québec and northern Vermont to northern Florida, westward to southeastern Wisconsin, the Mississippi River from southern Illinois to southern Tennessee and northeastern Arkansas **Ptyoiulinae Causey 1974**
- Caudal rings, paraprocts, and epiproct glabrous or with at most only scattered setae; epiproct either angling slightly ventrad distally (juveniles) or strongly decurved and falcate (late instars and adults); James Bay, Ontario, southern Québec, and western New Brunswick to central Georgia, westward to Illinois **Uroblaniulini Causey 1974**

Subfamily Ptyoiulinae Causey 1974

Ptyoiulinae Causey 1974: 32. Shelley et al. 2000: 51.

Ptyoiulini Causey 1974: 33. Shelley et al. 2000: 51.

Genus *Ptyoiulus* Cook 1895

Ptyoiulus Cook 1895: 6. Silvestri 1897: 650. Chamberlin 1940a: 15. Causey 1952a: 23. Chamberlin and Hoffman 1958: 141–142. Jeekel 1971: 174. Hoffman 1980: 108; 1999: 162. Shelley et al. 2000: 51. Shelley and Golovatch 2015: 4.

Type species. *Julus (Julus) pennsylvanicus* (recte: *pennsylvanicus*) Brandt 1841, by original designation. Gervais (1847, 1859) repeated the original spelling, but Wood (1865) and nearly all subsequent authors (see synonymies under *Ptyoiulus impressus*) have employed the “two n” spelling. The earliest editions of the International Code of Zoological Nomenclature did not allow such corrections even for unequivocal misspellings; Pennsylvania, after all, is named for William Penn, with the two “n” spelling. However, the fourth edition of the Code, whose provisions took effect on 1 January 2000 and supersede those in previous editions, allows such corrections. Article 33.2.3.1 states “when an unjustified emendation is in prevailing usage and is attributed to the original author and date it is deemed to be a justified emendation,” and article 33.3.1 states “when an incorrect subsequent spelling is in prevailing usage and is attributed to the publication of the original spelling, the subsequent spelling and attribution are to be preserved and the spelling is deemed to be a correct original spelling.” Consequently, “*pennsylvanicus*” is now a justified emendation and the correct spelling for the specific name of the type-species (Shelley and Golovatch 2015).

Descriptive notes. Adults long-bodied, upwards of 65 rings including collum and epiproct. Anterior rings lightly setose, gradually or abruptly becoming more setose and distinctly more so on caudal rings, epiproct, and paraprocts. Epiproct setose and spiniform, overhanging paraprocts and extending varying lengths beyond their caudal margins. Male first legs greatly enlarged, strongly forcipulate (Blake 1931, fig. 2 in part), clearly more so than in other eastern family-group taxa. Telopodites of both pairs of gonopods lying entirely outside of aperture *in situ*, angling caudad over body and extending between leg pairs to level of rings 9–10. Anterior gonopod (Fig. 5–6) comprising long, clavate, and distally hirsute telopodite and longer, glabrous coxal process terminating in laminate apical calyx, latter either slanting laterad, circumferentially entire, and marginally serrate or coaxial with stem of process, marginally smooth and cupulate on medial, lateral, and anterior surfaces (open caudad) (Fig. 5–6); lateral syncoxal process absent. Posterior gonopod subacicular, inconspicuous, closely appressed to medial surface of stem of anterior gonopod coxal process, comprising two branches -- a long, slender major branch and shorter, spiniform, secondary branch arising at 1/4–1/3 of length of former; major branch curving basally then narrowing smoothly and continuously to scoop-like flange around 7/8 length, curving to acuminate tip distal to flange.

Distribution. The distributions of Ptyoiulinae and *Ptyoiulus* are the same, but we place our commentary with the genus because of doubts as to the merits of the subfamily. Past range descriptions include “Appalachian region from New York southward to Georgia, west to Illinois” (Chamberlin and Hoffman 1958), “centered in the Appalachian Mountains, extending north into southern Ontario, west to Arkansas, and south to Florida” (Causey 1974, for the redundant Ptyoiulini), and “Eastern North America” (Hoffman 1999).

Ptyoiulus occupies five areas (Fig. 4, 14) -- a large one covering most of the US east of the Mississippi River, and four small, detached areas, two east and two west of this watercourse, one of the latter being a point locality. Overall, the known and projected generic range extends, north-south, from Montreal, Québec, to northern Florida and the Gulf Coast of the Panhandle; east-west, it spreads from Plymouth Co., Massachusetts, Currituck and Wilmington, North Carolina, Charleston, South Carolina, and Savannah, Georgia, to the southwestern shoreline of Lake Michigan, northeastern/eastcentral Arkansas, and the northeastern periphery of Louisiana. The known and projected range encompasses parts of two Canadian provinces, Ontario and Québec, and 27 US states and the District of Columbia, including all or essentially all of the following 16 listed from north to south: Rhode Island (projected), Connecticut, New Jersey, Pennsylvania, Ohio, Indiana, Delaware (projected), Maryland, West Virginia, Kentucky, Virginia, North Carolina, Tennessee, South Carolina, Georgia, and Alabama. The only states east of the Mississippi for which *Ptyoiulus* is neither known nor projected are Maine and New Hampshire; the only states west of the Mississippi where the genus either occurs or is projected are Missouri (projected for the “bootheel”), Arkansas, and Louisiana. *Ptyoiulus* is dominant in the southern Appalachian Mountains.

In Fig. 4, the main area is number “1” and the detached ones are numbers 2–5. The first extends, north - south, from Boston, Massachusetts, Lake Ontario and the vicinities of Orillia, Ontario, and Flint, Michigan, to the Florida Panhandle; east - west, it extends from the Atlantic Ocean from Boston

to Savannah to northwestern Indiana, the Mississippi River from southern Illinois to southern Tennessee, and 2/3 of the breadth of Mississippi. Maximal dimensions, both north/south and east/west, are around 1,508.0 km (942.5 mi). The detached areas are as follows:

(2). Montreal, Québec, to Franklin/Chittenden cos. in northern Vermont; length around 136.0 km (85.0 mi). We combine Montreal with the northernmost US sites for both the genus and *P. impressus* because the city is closer to them than to the nearest Canadian locality, Orillia, Ontario.

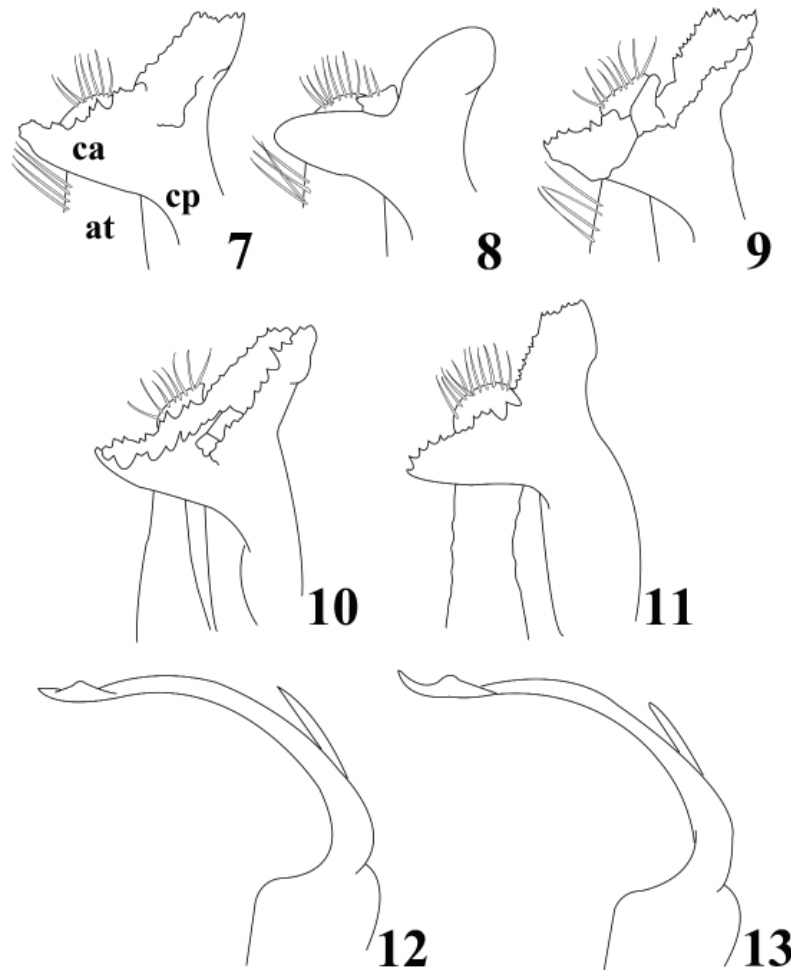
(3). Along the southwestern margin of Lake Michigan from Milwaukee, Wisconsin, to Lake Co., Illinois, north of Chicago, a distance of some 83.0 km (50.0 mi). We do not know how far inland this area extends.

(4). From the northeastern corner of Arkansas, and doubtlessly in the adjacent Missouri “bootheel,” to Cleburne Co., eastcentral Arkansas, a distance of 193.3 km (120.8 mi). The sites in Clay and Greene cos., adjacent to the “bootheel,” are in Crowley’s Ridge physiographic feature, which may have originated as an island between the Mississippi and Ohio Rivers that became a ridge of low hills on the west side of the former after their courses changed (Shelley et al. 2012). Consequently, these populations of both species lie west of the Mississippi River and are detached from the rest of the generic range located east of the watercourse. The Cleburne Co. locality, the westernmost for the genus and *P. impressus*, is detached to the west-southwest and in the eastern Ozarks, suggesting more widespread occurrence in this region of the state.

5). A point locality in Morehouse Co., Louisiana, just south of the Arkansas state line, represented only by females. Latitudinally equivalent records in Mississippi, Alabama, Georgia, and Florida suggest that the species is *P. impressus*.

Remarks. In general, the species are anatomically stable with insignificant variation, the antithesis of *Gosiulus conformatus* Chamberlin 1940 (Gosiulini), in which the gonopods of every male differ (Shelley and Smith 2016). Such stability reflects age, and *Ptyoiulus* is clearly an old taxon that has occupied today’s North American land mass for a long time, perhaps since ancestral diplopods penetrated Euramerica after Baltica + Avalonia merged with Laurentia in the early Silurian Period, Paleozoic Era, 440 mya (Shelley and Golovatch 2011). *Gosiulus conformatus*, however, is a young species that could not have arisen until after the Western Interior Seaway receded and the Texas lowlands became available for occupation. Insufficient time has passed since it arose for the gonopodal structure to stabilize.

The species of *Ptyoiulus* intermingle in the narrow east-west band of the generic range where *P. montanus* occurs (Fig. 4, red lines; 14). This distribution pattern suggests an old species, *P. montanus*, being displaced by the younger, more adaptable, and ecologically superior *P. impressus*. Sizeable populations of apparently pure *P. montanus* still exist, particularly in the central Carolinas and northeastern Mississippi, and both species seem to be abundant in the GSMNP and the Blue Ridge Mountains of southwestern North Carolina, where they tend to occur side-by-side. Otherwise, only small, isolated, and even point populations of *P. montanus* exist, some surrounded by primarily or exclusively *P. impressus*. The northernmost locality of the former is in Gallatin Co., Illinois, and a moderate-size population of the species occurs along the Ohio River in the southeast of this state. The northernmost population of *P. montanus* in the east is in Montgomery/Giles Cos., Virginia (Fig. 14); *P. impressus* alone occurs from there northward, in formerly glaciated territory and in the following states with definite records plus the District of Columbia: Vermont, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Ohio, Indiana, Michigan, Wisconsin, Maryland, West Virginia, and Kentucky although records of *P. montanus* exist in Illinois and Tennessee that border Kentucky. *Ptyoiulus impressus* is also the only species in Florida and the southern halves of Georgia, Alabama, and Mississippi, which were inundated by the Western Interior Seaway in the late Cretaceous, approximately 60–80 mya. That *impressus* alone dispersed that far from refugia to the north testifies to its greater motility and adaptability. It is a substantially more successful species than *P. montanus*, whose populations are gradually dwindling and apparently relictual or nearly so in Virginia, Georgia, and Alabama.



Figures 7–13. Gonopodal variation in *P. impressus*. **7)** Distal extremity of right anterior gonopod of neotype, caudal view. **8)** The same of male from Rabun Co., Georgia. **9)** The same of male from Liberty Co., Florida. **10)** The same of male from Leon Co., Florida. **11)** The same of male from Greene Co., Arkansas. **12)** Right posterior gonopod of male from Rabun Co., Georgia, lateral view. **13)** The same of male from Greene Co., Arkansas. Abbreviations as in Fig. 5–6.

***Ptyoiulus impressus* (Say 1821)**

Fig. 1–3, 5, 7–13.

Julus impressus Say 1821: 102. Brandt 1841: 101. Preudhomme de Borre 1884: 56. McNeill 1887: 324. Bollman 1893: 144.

Julus (Julus) pennsylvanicus (Recte: *pennsylvanicus*) Brandt 1841: 102–103.

Iulus impressus: Gervais 1847: 176; 1859: 18. Wood 1865: 196. Provancher 1873: 418. McNeill 1888: 11.

Iulus pennsylvanicus: Gervais 1847: 177; 1859: 18. McNeill 1888: 12.

Iulus pilosiscutis Wood 1864: 11.

Iulus pilosiscuta: Wood 1865: 198.

Iulus pennsylvanicus: Wood 1865: 201, fig. 34.

Julus pennsylvanicus: Preudhomme de Borre 1884: 59.

Julus pilosiscuta: Preudhomme de Borre 1884: 59.

Paraiulus impressus: Bollman 1887b: 36–37, 44 (list). Brölemann 1922: 294–295, fig. 35–42. Blake 1931: 16–19 (list, caption, text).

Paraiulus pennsylvanicus: Brölemann 1896: 45, 68 (list, account); 1902: fig. 10–15; 1922: 291–292, fig. 22–27. Chamberlin 1940b: 58.

Parajulus pilosiscutis: Brölemann 1896: 45, 69 (list, account).

Parajulus impressus (not Williams and Hefner 1928): Bollman 1888a: 344; 1888b: 404; 1893: 119, 144 (text). Gunthorp 1913: 165. Bailey 1928: 20 (list). Brimley 1938: 498.

Parajulus pilosiscutus: Bollman 1887b: 44 (list).

Parajulus pennsylvanicus: Bollman 1887b: 44; 1888a: 344; 1888b: 404; 1888c: 106, 112; 1888d: 339; 1893: 119. Chamberlin 1918: 27. Bailey 1928: 20 (list). Williams and Hefner 1928: 126, fig. 19A, B. Brimley 1938: 498. Loomis 1944: 169.

Ptyoiulus pennsylvanicus: Chamberlin 1940a: 15, pl. 8, fig. 71–73. Wray 1967: 153.

Ptyoiulus georgiensis Chamberlin 1943: 12, fig. 26–27. Chamberlin and Hoffman 1958: 142. Hoffman 1999: 162. **New Synonymy.**

Ptyoiulus impressus: Chamberlin and Hoffman 1958: 141–142. Filka and Shelley 1980: 13, fig. 6. Kevan 1983: 2965. Snider 1991: 181. Hoffman 1999: 162–163. Shelley 2000b: 183. Snyder 2008: 20.

Ptyoiulus species incertis: Hoffman 1950: 31.

Aniulus impressus: Wray 1967: 153.

Type specimens. Male neotype and numerous male, female, and juvenile paraneotypes (ANSP) collected by H. C. Wood on an unknown date at an unspecified locality in Chester Co., Pennsylvania. One female paraneotype (FSCA) collected by J. Oughton. 31 October 1934, in Philadelphia (Fairmont Park), Philadelphia Co., Pennsylvania.

Diagnosis. Calyx of anterior gonopod coxal process (Fig. 5, 7–11) slanting laterad, not coaxial with stem, lamellae flared and circumferentially entire, margins usually irregularly serrate to jagged, occasionally smooth or nearly so.

Color in life. Usually a mottled, subuniform dark brown, gray, or black. According to the vial label, the decapitated female from Wayne Co., Kentucky, exhibited a yellow circumferential band on most rings.

Variation. So many adult males of *P. impressus* reside in preserved repositories that no human could begin to measure a significant sample, particularly as part of an initial, broad, generic overview with time a factor. In the few individuals with fully-developed gonopods that we did measure, lengths varied from 28.9 to 57.9 mm, and the number of rings, including the collum and epiproct, ranged from 57 to 65. From the caudal end, heavily setose rings extend anteriorly for at least 15 rings and even to around midbody, and the change to denser pilosity can be abrupt and noticeable or gradual, with denser and sparser pilosities blending together over a number of rings without a detectable change. Additionally, the denser pilosities may be random, subuniform, patchy, or in sublinear, circumferential rows (Fig. 1–3; Blake 1931, fig. 2 in part). The epiproct is always apically acuminate and always overhangs and extends beyond the caudal paraproctal margins, but this too varies. The structure can be relatively short and narrow, as in fig. 1 of a male from Morgan Co., Ohio; long and spiniform as in fig. 2 of one from Allen Co., Kentucky; or short and stubby, as in fig. 3 of an individual from Leon Co., Florida, and Blake (1931, fig. 2 in part) of a New England male. Gonopodal variation is minimal, subtle, and primarily involves the calyx on the anterior gonopod coxal process (Fig. 5, 7–11), which always slants laterad. However, the angle of the slant varies slightly (compare those of the neotype, Fig. 7, and the male from Greene Co., Arkansas, fig. 11) and some calyces also lean or tilt caudad such that in caudal view one can see slightly inside the structure (Fig. 10 of a male from Leon Co., Florida). In some individuals the caudal flange of the calyx is shorter than the anterior one, so again one can view inside the calyx in caudal aspect (Fig. 9 of a male from Liberty Co., Florida). The degree of serration and the jaggedness of the margins vary dramatically; from lightly and shallowly wavy or nearly smooth (Fig. 8 of a male from Rabun Co., Georgia), to a host of continuous and irregular serrations, as in most individuals that we examined (Fig. 10–11 of males from Leon Co., Florida, and Greene Co., Arkansas, respectively). Posterior gonopods (Fig. 12–13) are subuniform. Relative lengths of the two branches vary slightly as do the lengths and degrees of curvatures of the main projections, the sizes of the subterminal flanges, and the lengths and degree of curvatures of the apices distal to the latter. All these variations are trivial and clearly intraspecific.

Ecology. Say (1821) characterized the habitats as “under stones and in humid situations.” An adult female that we examined from Wayne Co., Kentucky, was decapitated and dead on a trail. Habitat notations on vial labels include “under small pieces of 2x4s in oak litter,” “yellow pan trap,” “under stove in woods,” “fungus & under rock,” “upland forest,” “ground cover in woods,” “in woods near cave,” “pitfall trap in mixed mesic forest ravine,” “pitfall in deciduous woods,” “upland (oak) woods,” “litter around cotton,” “in junk pile,” “in house,” “mammal burrow,” “moist leaf mold in rotting logs in mixed mesophytic forest,” “in leaf litter and moist very rotten logs on ground in mixed mesophytic woods,” “beech woods,” “under bark of rotting pine log,” “west side of hill, open woods, under rock, leaf litter, & rotten wood,” and “around pines, hardwoods.”

Distribution (Fig. 4, 14). Southern Québec, northern Vermont, southern Michigan, and southeastern Wisconsin to the Gulf Coast of the Florida Panhandle, southern Alabama and Mississippi, east central/northeastern Arkansas, and probably the northeastern periphery of Louisiana, presently documented only for the genus. With this possible exception, *P. impressus* inhabits every state documented for the genus and is anticipated in Rhode Island and Delaware, where *Ptyoiulus* is projected. Dimensions of the areas occupied by *P. impressus* are the same as those of the genus, and it alone inhabits detached areas 2 and 3. As only *P. impressus* has dispersed southward into areas inundated in the Cretaceous, we suspect that the unassigned records in southern Alabama and Mississippi (Fig. 14, blue dots) also are this species.

Published records. Overall range statements: United States east of the Rocky Mountains and Pennsylvania to Iowa and south to Florida (McNeill 1888). Northeastern US west to Indiana and south to western North Carolina and Kentucky (Chamberlin and Hoffman 1958, Filka and Shelley 1980). Widespread in the northeastern US (Kevan 1983). **CANADA: Ontario:** Province in general (Kevan 1983). Milton, Rattlesnake Pt. (Causey 1952b, as *Ptyoiulus* sp.). **USA:** USA in general (Gervais 1847, 1859). **Alabama:** Alabama in general (Hoffman 1999). *Blount Co.* (Causey 1952a). **Georgia:** Georgia in general (Bollman 1887b, 1893). *Bibb Co.*, Macon (Bollman 1888a). *Butts Co.*, Indian Springs (Bollman 1888a). *Habersham Co.*, Tallulah (Bollman 1888a). *Rabun Co.*, NW of Clayton (Chamberlin 1943, Chamberlin and Hoffman 1958, Hoffman 1999). **Florida:** Florida in general (McNeill 1888, Bollman 1893). *Escambia Co.* (McNeill 1887). **Illinois:** Illinois in general (Bollman 1887b, McNeill 1888). **Indiana:** Indiana in general (Bollman 1887b; McNeill 1887, 1888). *Crawford Co.*, Wyandotte (Bollman 1888b). *Fayette Co.*, Connersville (Bollman 1888b, 1893). *Franklin Co.*, Brookville (McNeill 1888; Bollman 1888b, 1893). *Monroe Co.*, Bloomington (Bollman 1888b, 1893). **Iowa:** Iowa in general (McNeill 1888). **Kansas:** *Clay, Coffey, Cowley, Douglas, Franklin, Graham, Jefferson, Labette, Montgomery, Sumner, and Trego Cos.* (Gunthorp 1913). **Massachusetts:** North to the latitude of Boston (Blake 1931); *Norfolk Co.*, Milton, Wellesley (Blake 1931); *Plymouth Co.*, Hingham (Blake 1931); *Suffolk Co.*, Boston (Roxbury neighborhood) (Blake 1931). **Michigan:** Michigan in general (Bollman 1887b, Kevan 1983). *Barry, Cass, Hillsdale, Ingham, Jackson, Kalamazoo, Kent, Lapeer, Lenawee, Livingston, Macomb, Van Buren, Washtenaw, and Wayne Cos.* (Snider 1991). **Minnesota:** Minnesota in general (Bollman 1887b). **Nebraska:** *Cuming Co.*, West Point (Kenyon 1893). *Lancaster Co.*, Lincoln, Roca (Kenyon 1893). **New Jersey:** *Morris Co.*, Rockaway (Causey 1952a). **New York:** New York in general (Bailey 1928, Kevan 1983). *Oswego Co.*, Oswego (Loomis 1944). **North Carolina:** North Carolina in general (Brölemann 1896, Chamberlin 1940a). *Avery Co.*, (Wray 1967, Filka and Shelley 1980); Grandfather Mt. and Linville (Chamberlin 1940a, Wray 1967). *Buncombe Co.* (Shelley 2000b). *Burke Co.* (Shelley 2000b). *Cleveland/Gaston Cos.*, Kings Mountain Region (Filka and Shelley 1980). *Durham Co.*, Duke Forest (Brimley 1938, Wray 1967). *Haywood Co.* (Shelley 2000b); GSMNP, Cataloochee, Purchase Knob (Snyder 2008). *Henderson Co.* (Shelley 2000b). *Jackson Co.* (Shelley 2000b). *Macon Co.* (Chamberlin and Hoffman 1958, Shelley 2000b). *McDowell Co.* (Shelley 2000b). *Polk Co.* (Shelley 2000b). *Rutherford Co.* (Shelley 2000b). *Surry Co.* (Shelley 2000b). *Swain Co.* (Shelley 2000b); GSMNP, Ravensford (Snyder 2008). *Transylvania Co.* (Shelley 2000b). *Wake Co.*, Raleigh (Brimley 1938, Wray 1967). *Watauga Co.* (Shelley 2000b). *Yancey Co.* (Shelley 2000b). **Ohio:** Ohio in general (Williams and Hefner 1928, Kevan 1983). **Pennsylvania:** Pennsylvania in general (Brandt 1841; Gervais 1847, 1859; Wood 1865; Preudhomme de Borre 1884; McNeill 1888; Chamberlin 1940a; Hoffman 1999). *Forest Co.*, Marienville (Loomis 1944). *McKean Co.*, Ludlow (Loomis 1944). *Philadelphia Co.*, Philadelphia vicinity (Chamberlin and Hoffman

1958, Hoffman 1999). *Susquehanna Co.* (Wood 1864, 1865; Chamberlin and Hoffman 1958; Hoffman 1999). **Tennessee:** *Blount Co.*, GSMNP, Chilhowee (Snyder 2008). *Davidson Co.*, “beyond Glendale” (Chamberlin 1918). *Jefferson Co.*, Jefferson City (=Mossy Creek) (Bollman 1888a, d). *Knox Co.*, Knoxville (Bollman 1888c). *Sevier Co.*, GSMNP, Brushy Mtn., Goshen Prong, Twin Creeks (Snyder 2008). **Virginia:** *Page Co.*, Luray (Bollman 1888a).

Deletions: Iowa, Kansas, Minnesota, Nebraska, and Durham and Wake Cos., North Carolina. Gonopod illustrations were not published for records from the first four states, and RMS has not found vouchers in any repository. All are also well outside the ranges we document (Fig. 4, 14) for the genus and species, so we consider them misidentifications of other parajulids, probably aniulinines. Likewise, Durham and Wake Cos., in central North Carolina where *P. montanus* is common, are also outside the range of *P. impressus* (Fig. 14), and we do not believe the latter occurs in this part of the state.

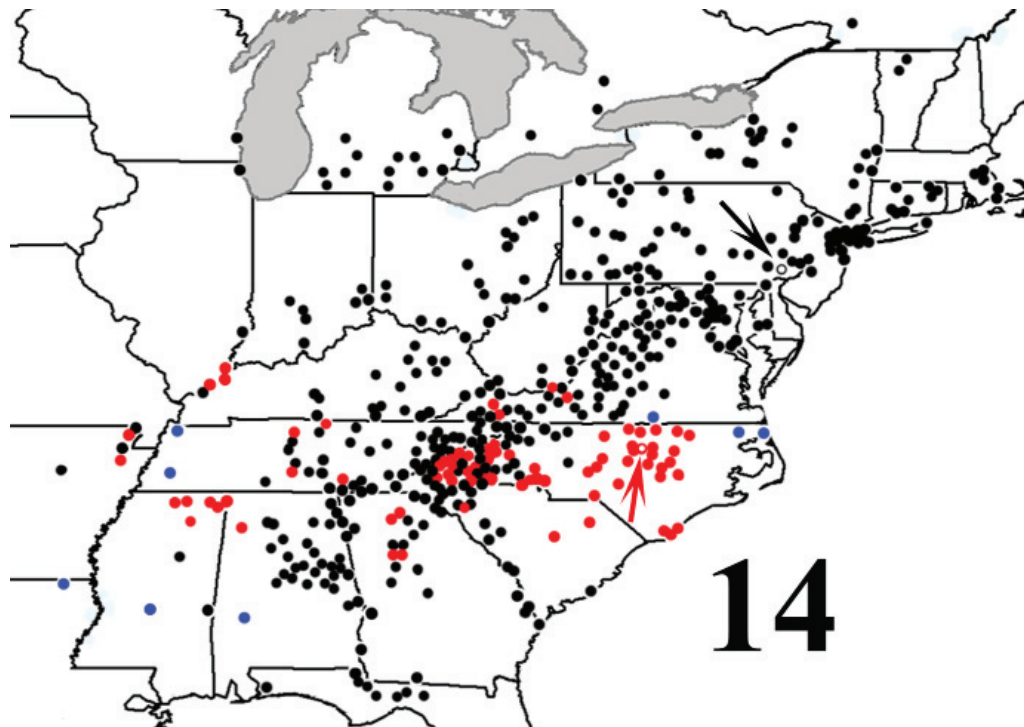


Figure 14. Distributions of species of *Ptyoiulus*. Black dots, *P. impressus*. Open black circle in southeastern Pennsylvania, denoted by the black arrow, is the neotype locality. Red dots, *P. montanus*. Open red circle in central North Carolina, denoted by the red arrow, is the neotype locality. Blue dots, geographically significant samples lacking adult males and presently unidentifiable to species.

Material examined

CANADA:

Ontario: *Middlesex Co.*, London, F, 3 August 1964, W. W. Judd (CMN). *Simcoe Co.*, “Idiot Asylum, probably near Orillia,” M, F (NMNH).

Québec: Montreal, 3F (LEM). **New Provincial Record for the Genus and Species.**

USA:

Alabama: *Bibb, Blount, Cherokee, Clay, Cleburne, Coosa, Cullman, DeKalb, Henry, Jackson, Jefferson, Lee, Marshall, Randolph, Shelby, St. Clair, Talladega, Tallapoosa,* and *Walker Cos.* (AMNH, FSCA, MEM, NCSM, NMNH, VMNH).

Arkansas: *Clay Co.*, Chalk Bluff Natural Area, M, 19 November 2010, C. T. McAllister, H. W.

Robison (NCSM). *Cleburne Co.*, 9.6 km (6.0 mi) SSW Drasco, M, F, 22 March 1979, D. Hildebrandt, Plonczynski (MPM). *Greene Co.*, Crowley's Ridge, F, 20 March 2014, and juv., 29 March 2014, D. A. Hennen (DAH). **New State Record for the Species.**

Connecticut: *Litchfield Co.*, Salisbury, M, 10 September 1982, M. F. O'Brien (UMMZ). *New Haven Co.*, Bethany, M, F, 9 October 1960, and 2F, 7 May 1962, C. L. Remington, and M, 30 April 1973, G. L. Miller (PMNH); East Rock Park, M, 28 September 1963, C. Anderson, and F, 4 October 1980, S. L. Mazer (PMNH); Mt. Carmel, 2F, J. P. Prudden, and F, 11 September 1982, J. B. Kochmer (PMNH); North Haven, 2M, F, 3 October 1985, R. Raguso (PMNH); North Plains, F, 13 April 1931, S. C. B. (PMNH); Seymour, 2 juvs., 29 September 1973, J. R. Lynch (PMNH); and West Rock Park, M, 31 September 1984, L. C. Perkins (PMNH). *Tolland Co.*, Storrs, F, 6 November 1957, L. R. Penner, M, 4 April 1962, J. H. Penner, M, F, 2 May 1967, P. Marsh, F, 11 April 1968, K. A. Hosko (UCT) and 3F, 14 April 1951, R. Coppa (FSCA); Tolland, 2F, 6 April 1962, L. Bach (UCT); and Mansfield, M, 25 September 1973, P. Marsh (UCT). **New State Record for the Genus and Species.**

District of Columbia: Washington, M, Schumacher (NMNH) and M, 30 March 1908, J. V. Nichols (AMNH); Catholic University, juvs., June 1892 (NMNH); Georgetown, F (NMNH). **New Record for the Genus and Species.**

Florida: *Escambia Co.*, Pensacola, 1.9 km (1.2 mi) S jct. US hwy. 90/90A, 3M, 5F, juvs., 22 January 1965, N. B. Causey (FSCA). *Jackson Co.*, Florida Caverns St. Pk., F, 2 juvs., 14-19 April 1960, H. V. Weems, F, 23 April 1961, P. Weems, and FF, juvs., 8 June 1994, P. E. Skelley (FSCA); and Marianna, Chipola Jr. Coll., M, 23 January 1965, N. B. Causey (FSCA). *Jefferson Co.*, Monticello, Big Bend Horticultural Lab. (exact location unknown), 4M, 3F, 8 October 1968, MM, FF, 30 December 1968, F, 17 February 1969, and 4M, F, 3-10 March 1969, Whitcomb (FSCA). *Leon Co.*, Tall Timbers Res. Sta., 2F, juv., 6-14 June and 8 July 1968, W. W. Baker, W. H. Whitcomb, M, 8-15 February 1971, D. L. Harris, 2F, 1 December 1973, W. Riess (FSCA), 2M, 3F, 31 January 1972, D. R. Whitehead (NMNH), and Woodyard Hammock, 3M, F, 16-23 March 1970, and F, 24 April-1 May 1972, D. L. Harris (FSCA); and Tallahassee, Tom Brown Pk., M, 17 April 1977, R. M. Shelley (NCSM). *Liberty Co.*, Torreya St. Pk., 2F, 15 April 1964, and 3M, 4F, 24-25 January 1965, H. V. Weems (FSCA).

Georgia: *Butts, Chatham, Dade, Dawson, DeKalb, Effingham, Fayette, Floyd, Fulton, Gwinnett, Lumpkin, Meriwether, Muskogee, Rabun, Screven, Stephens, Thomas, and Towns Cos.* (FSCA, MCZ, MPM, NCSM, NMNH, VMNH).

Illinois: *Lake Co.*, Highland Park, 7F, 12-17 March 1958 (FSCA). *Pope Co.*, Herod, juv., 12 October 1933, Frisson, Ross (INHS). *Wabash Co.*, Mount Carmel, F, 17 June 1947, Burks, M. W. Sanderson (FSCA).

Indiana: *Crawford Co.*, 6.4 km (4.0 mi) SW English, Hemlock Cliffs, 2F, 6 June 2005, R. M. Shelley, J. J. Lewis (NCSM). *Monroe Co.*, Bloomington, 2M, F, C. H. Bollman (NMNH) and 2M, F, 1 December 1949, R. W. Siegel (INHS); and 8.0 km (5.0 mi) S Bloomington, F, 5 October 1951, B. G. Owen (FSCA). *Orange Co.*, 0.8 km (0.5 mi) SE Orangeville, Kimball Tract Sink, Hoosier Nat. For., M, 23 September 2015, J. J. Lewis (VMNH). *Owen Co.*, McCormick Creek St. Pk., M, F, 29 September 1961 (FSCA).

Kentucky: *Allen, Bell, Boyle, Edmonson, Estill, Greenup, Letcher, Menifee, Morgan, Nicholas, Rockcastle, Wayne, Whitley, and Wolfe Cos.* (AMNH, FSCA, NCSM, VMNH).

Maryland: *Anne Arundel, Baltimore, Calvert, Caroline, Cecil, Charles, Frederick, Garrett, Montgomery, Prince Georges, St. Marys, and Talbot Cos.* (AMNH, ANSP, NCSM, NMNH, UTIC, VMNH). **New State Record for the Genus and Species**

Massachusetts: *Barnstable Co.*, Falmouth, Woods Hole, 5F, 5 July 1908, F. Silvestri (AMNH). *Plymouth Co.*, Hingham, M, 19 April 1931 (MCZ).

Mississippi: *Lauderdale Co.*, 4.8 km (3.0 mi) SW Increase, MM, FF, 3 December 1961, L. Hubricht (VMNH). *Webster Co.*, 11.2 km (7.0 mi) W Walthall, "The Cove," 2M, F, 25 March-2 April 1988, T. L. Schiefer (MEM). **New State Record for the Genus and Species.**

New Jersey: *Bergen, Camden, Essex, Monmouth, Morris, Passaic, Somerset, Sussex, and Union Cos.* (AMNH, FSCA, NMNH, PMNH).

New York: *Bronx, Cattaraugus, Columbia, Greene, Kings, Madison, Monroe, New York, Oneida, Onondaga, Putnam, Queens, Rensselaer, Suffolk, Tompkins, Ulster, and Westchester Cos.* (AMNH, FSCA, MCZ, MNHP, NCSM, NMNH, PMNH, UMMZ, VMNH).

North Carolina: *Alleghany Co.*, 1.2 km (0.7 mi) SW Roaring Gap, F, 24 July 1973, R. M. Shelley (NCSM). *Cleveland Co.*, 6.4 km (4.0 mi) W Polkville, MM, FF, 19 September 1953, L. Hubricht (FSCA). *Haywood Co.*, GSMNP, Purchase Knob, MM, FF, 21 November–7 December 2001, Parker, Stocks, Petersen (NCSM); and Soco Falls nr. Waynesville, M, F, 29 April 1939, N. B. Causey (FSCA). *Jackson Co.*, Whitewater Falls pkg. area, 2M, 22 August 1973, R. M. Shelley (NCSM); and 11.7 km (7.3 mi) SSE Cashiers, 9F, juvs., 28 August 1973, R. M. Shelley (NCSM). *Macon Co.*, Coweeta Hydrologic Station, M, 8 June 1973, R. Duffield (VMNH) and MM, FF, juvs., 7 April 1977–24 November 1978 and 15 November 2003, L. Reynolds (MCZ, NCSM, NMNH); Highlands, juvs., July 1949, N. B. Causey (FSCA) and M, 16 November 1961, R. L. Hoffman (VMNH); and 3.6 km (2.3 mi) NW Highlands, 9 April 1980, R. M. Shelley, M. S. Morgan (NCSM). *McDowell Co.*, 3.5 km (2.2 mi) S Dysartsville, 2M, 2F, 19 September 1953, L. Hubricht (FSCA). *Rowan Co.*, 4.0 km (2.5 mi) SSW Woodleaf, 3M, F, 25 October 1952, L. Hubricht (FSCA). *Rutherford Co.*, Lake Lure, Bottomless Pits, 4M, 2F, 23 September 1997, R. M. Shelley, S. B. Kiser (NCSM). *Surry Co.*, Pilot Mountain St. Pk., 4F, 31 May 1973, R. M. Shelley (NCSM); and Elkin, M, 12 October 1975, R. M. Shelley (NCSM). *Swain Co.*, GSMNP, Ravensford, 5M, 23–30 October 2001, E. C. Bernard, T. Goodrich (NCSM) and along Goldmine Branch, F, 4 May 2004, Major, Layden, Nichols, Rock, Jenkins (NCSM); and 4.8 km (3.0 mi) N Tapoco, 2F, 26 April 1974, R. M. Shelley (NCSM). *Watauga/Wilkes Cos.*, 16.0 km (10.0 mi) NE Deep Gap, M, 17 October 1965, J. & W. Ivie (AMNH).

Ohio: *Adams, Butler, Fairfield, Gallia, Hocking, Holmes, Kent, Morgan, Preble, Summit, Washington,* and *Wayne Cos.* (DAH, FSCA, NCSM, PMNH).

Pennsylvania: *Adams, Bedford, Bucks, Butler, Cambria, Centre, Chester, Clearfield, Dauphin, Delaware, Erie, Fayette, Greene, Lebanon, McKean, Monroe, Montgomery, Northampton, Philadelphia, Potter, Somerset, Warren,* and *Westmoreland Cos.* (AMNH, ANSP, CMNH, FEM, FSCA, MCZ, NCSM, NMNH, PMNH, VMNH).

South Carolina: *Aiken Co.*, Savannah River Plant, 3M, 2F, 14 November 2010, S. Poppy (VMNH). *Barnwell Co.*, Savannah River Plant, Rainbow Bay, 2M, F, 15 February 1979 (NCSM). *Charleston Co.*, Charleston, MM, FF (NMNH). *Greenwood Co.*, MM, juvs., 28 May 1958, L. Hubricht (FSCA). *Greenville Co.*, Chestnut Springs, MM, FF, 4 October 1953, L. Hubricht (FSCA); and Caesar's Head St. Pk., 2M, 3F, 21 October 1961, H. V. Weems (FSCA). *McCormick Co.*, F (FSCA). *Pickens Co.*, Clemson Univ., M, 1 April 1950, B. C. Turner, MM, FF, juvs., 25–30 March 1951, J. C. Martin, MM, FF, 6–13 December 1961, D. Dowling, and M, FF, 17 October 1981 (FSCA). **New State Record for the Genus and Species.**

Tennessee: *Bedford, Blount Co.* [Marysville, 2M, June 1921, G. G. Ainslie (MCZ); and GSMNP, M, 29 August 1964, N. B. Causey (FSCA), along US hwy. 129 at Lake Chilowhee, 3M, F, 14 October 2006, and 2M, 2F, 15 April 2007, B. A. Snyder (NCSM)]. *Bradley, Carter Co.* [Burbank, 3M, 1890s, R. Thaxter (MCZ); 8.0 km (5.0 mi) NW Hampton, Doe R. bluff, M, 3 May 1951, L. Hubricht (FSCA); and along TN hwy. 143, 3.5–13.6 km (2.2–8.5 mi) S Roan Mtn., M, F, 11 October 1975, J. C. Clamp (NCSM)]. *Clay, Cocke Co.* [GSMNP, Brushy Mt., M, 15 November 2008, C. B. Parker (VMNH)]. *Coffee, Cumberland, Davidson, Franklin, Grainger, Hamblen, Hamilton, Jefferson, Johnson, Knox, Lawrence, Marion, Marshall* [Henry Horton St. Pk., campground area, 2M, 9 May 1979, R. K. Tardell, R. M. Shelley (NCSM)]. *McMinn, Morgan, Putnam, Sevier Co.* [GSMNP, M, 12 March 1984, G. T. Baker (MEM) and Newfound Gap along US hwy. 441, 3M, 2F, 12 March 1939, A. C. Cole (NMNH); Gatlinburg, 2M, F, 2 October 1960, W. J. Gertsch, W. Ivie (FSCA)]. *Sullivan, Trousdale, Unicoi, Union,* and *Washington Cos.* (AMNH, FSCA, MCZ, MEM, NCSM, VMNH).

Vermont: *Chittenden Co.*, Bolton, M, 21 September 1969, S. Boulford (UVT). *Franklin Co.*, Bakersfield, M, 25 September 1976, S. Leavins (UVT). **New State Record for the Genus and Species.**

Virginia: *Albemarle, Alleghany, Amherst, Appomattox, Augusta, Bath, Bedford, Bland, Botetourt, Buchanan, Campbell, Dickinson, Fairfax, Fauquier, Floyd, Franklin, Frederick, Giles, Grayson, Highland, King George, Loudon, Madison, Montgomery, Nelson, Page, Patrick, Pittsylvania, Prince Edward, Prince William, Pulaski, Rockbridge, Rockingham, Scott, Shenandoah, Smythe, Warren, Washington,* and *Wythe Cos.* (FSCA, NCSM, NMNH, VMNH).

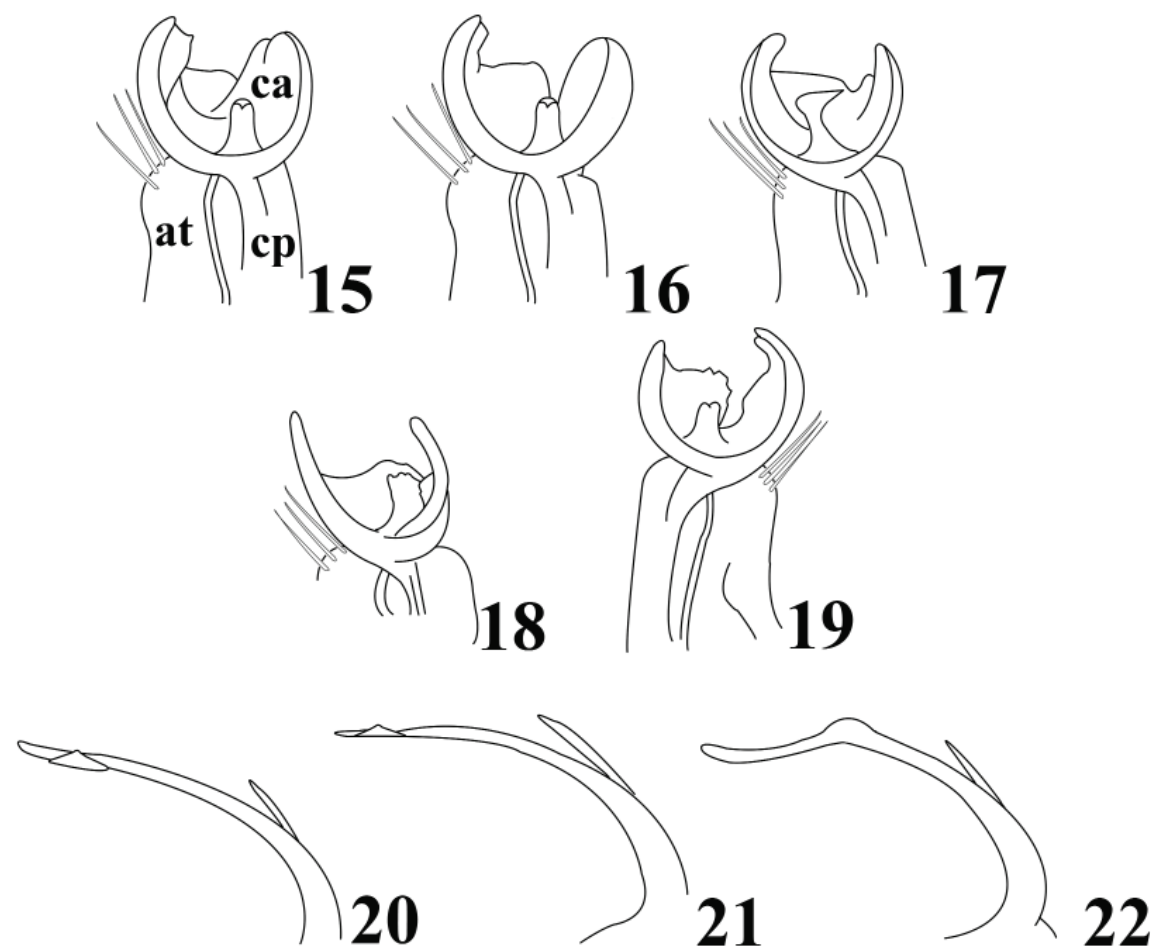
West Virginia: *Barbour, Berkeley, Greenbrier, Hampshire, Hardy, Jefferson, Mercer, Mingo, Pendleton, Pocahontas, Raleigh, Randolph, Ritchie,* and *Tucker Cos.* (FSCA, MCZ, NCSM, NMNH, VMNH). **New State Record for the Genus and Species.**

Wisconsin: *Milwaukee Co.*, Milwaukee, Whitnall Park, M, 11 October 1977, A. M. Young (MPM).
New State Record for the Genus and Species.

Remarks. Without adult males, Hoffman (1950) declined to provide a species for the form he found to be abundant at Highlands, Macon Co., North Carolina, calling it “*Ptyoiulus*, species incertis.” As the only mature males known from there today are *P. impressus*, we assign Hoffman’s moniker to this species.

As shown by their key and gonopod figures, Williams and Hefner (1928) assigned *Parajulus impressus* to an aniulinine that we do not recognize and recorded true *Ptyoiulus impressus* as *Parajulus pennsylvanicus*. Their fig. 19A shows the unmistakable gonopods of *P. impressus* with the slanted calyx, and its key characteristic is “anal valves (paraprocts) and posterior segments densely pilose.” They report the species as “general but not abundant” throughout Ohio; we suspect it occurs statewide.

Morse (1903), in the Zoology Department, Ohio State University, Columbus, reported a mass aggregation of *P. impressus* on the campus. Individuals covered sidewalks, terraces, and even entered buildings, making it virtually impossible to avoid crushing numbers of millipeds at every step.



Figures 15–22. Gonopodal variation in *P. montanus*. **15)** Distal extremity of right anterior gonopod of male from Montgomery Co., Virginia, caudal view. **16)** The same of male from Tishomingo Co., Mississippi. **17)** The same of male from DeKalb Co., Georgia. **18)** The same of male from Craighead Co., Arkansas. **19)** The same of male from Clay Co., Arkansas. **20)** Right posterior gonopod of male from Mason Co., Tennessee, lateral view. **21)** The same of male from Tishomingo Co., Mississippi. **22)** The same of male from Montgomery Co., Virginia. Abbreviations as in Fig. 5–6.

Chamberlin and Hoffman (1958) assigned *Julus montanus* Cope to synonymy under *Ptyoiulus impressus*, where it was retained by Hoffman (1999). As first reviser, we resurrect *montanus* as the name of the other species.

Hefner (1929a, b) conducted two non-taxonomic studies on, purportedly, *Ptyoiulus impressus*. The first concerned genitalic development, and judging from the gonopod drawings (pl. 2, fig. 7–9), the parajulid actually was *Aniulus garius* (Chamberlin) (Aniulini). Without gonopod drawings, the true identity of the species in the second study cannot be determined.

***Ptyoiulus montanus* (Cope 1869), New Combination**

Fig. 6, 15–22.

Julus montanus Cope 1869: 181.

Parajulus ectenes Bollman 1887a: 617–618; 1893: 202. Brimley 1938: 498. Chamberlin and Hoffman 1958: 142. Hoffman 1999: 169. **New Synonymy.**

Ptyoiulus ectenes: Filka and Shelley 1980: 12–13, fig. 5.

Ptyoiulus coveanus Chamberlin 1943: 10–11, fig. 24–25. Chamberlin and Hoffman 1958: 142. Hoffman 1999: 162. Shelley 2000b: 183. Snyder 2008: 20. **New Synonymy.**

Aniulus ectenes: Wray 1967: 153.

Ptyoiulus sp.: Shelley 1978: 43, 48, fig. 8–9 (list, account).

Type specimen. Male neotype and numerous male and female paraneotypes (FSCA) taken by A. S. Pearse, 24 September 1952, in Duke Forest, Durham Co., North Carolina.

Diagnosis. Calyx of anterior gonopod coxal process (Fig. 6, 15–19) three-sided, open caudad, upright and cupulate, coaxial with stem, lateral and medial lamellae joined by smaller one anteriorly, margins usually smooth.

Variation. Somatic features vary as in *P. impressus*. On the anterior gonopods (Fig. 15–19), the calyx is subcontinuous anteriorly, with a gap in the lamina that varies from deep to shallow. The thicknesses of the lateral and medial lamellae vary (compare fig. 15–16, of the males from Montgomery Co., Virginia, and Tishomingo Co., Mississippi, respectively) as do the terminal configurations, particularly that of the latter. The calyx tilts slightly laterad in a male from Craighead Co., Arkansas (Fig. 18). The posterior gonopods (Fig. 20–22) also vary as in *P. impressus* but form longer and narrower arcs, and the tip is prolonged in the male from Montgomery Co., Virginia (Fig. 22), which also has a longer, broader, and lobe-like flange.

Ecology. Labels with samples carry the following habitat characterizations: “bottomland hardwoods,” “under decaying pine tree bark,” “woods, pitfall traps,” “large aggregation near light on carport,” “pitfall traps in oaks,” “under dead pig,” “wooded hillside,” “in ravine,” “oak-maple litter,” and “under bark of decaying pine tree.”

Distribution. All localities fall roughly between 37°42' and 33°46' N, a mere four latitudinal degrees; by contrast, the distribution of *P. impressus* covers around 15° of latitude. *Ptyoiulus montanus* extends, north/south, from southeastern Illinois and western Virginia to east-central South Carolina, north-central Georgia, northwestern Alabama, and northeastern Mississippi and Arkansas, an area of some 584.0 km (365.0 mi) north-south, and 1,160.0 km (725.0 mi), east-west. Longitudinally, *P. montanus* ranges from the Atlantic Ocean along southeastern North Carolina to west of the Mississippi River in northeastern Arkansas adjacent to the Missouri “bootheel.” An older species that is apparently being displaced by a younger and more successful congener, *P. montanus* seems to have already been reduced to a host of relictual populations in Virginia, central Tennessee, and Georgia. The one Alabama record is a logical extension of the moderate-sized population in northeastern Mississippi, and minute, point populations survive in southeastern Illinois and northeastern Arkansas,

The largest population of purely *P. montanus* occupies the central Carolinas and extends to the coast in southeastern North Carolina; no authentic males of *P. impressus* have been taken within this

area. The second largest is in northcentral/northeastern Mississippi and northwestern Alabama, and if the female samples from Chickasaw and Obion Cos., Tennessee, are *P. montanus*, they would tend to connect the Mississippi population to that along the Ohio River in southeastern Illinois, where *P. impressus* also occurs.

A sizeable population inhabits the Great Smoky and Blue Ridge Mountains of western North Carolina, extending from easternmost Tennessee to westernmost South Carolina, which intermingles tightly with an equally large one of *P. impressus*. While the Gatlinburg area and the Visitor's Center and administrative offices of the GSMNP seem to be in primarily *P. montanus* territory, the two species otherwise occur sympatrically and essentially side-by-side along the North Carolina/Tennessee border from the southern GSMNP to the Black Mountains in Mitchell and Yancey cos., North Carolina. We interpret this mutual occurrence as an area of active displacement, and one must examine every individual male for reliable determinations.

Published records. Illinois: Illinois in general (Chamberlin and Hoffman 1958, Hoffman 1999). *Gallatin Co.* (Causey 1952a). *Hardin Co.* (Causey 1952a). *Pope Co.* (Causey 1952a). **North Carolina:** North Carolina in general (Bollman 1893, Hoffman 1999). *Brunswick Co.* (Shelley 2000b). *Buncombe Co.* (Shelley 2000b). *Chatham Co.* (Shelley 1978, 2000b). *Cleveland/Gaston Cos.*, Kings Mountain Region (Filka and Shelley 1980, Shelley 2000b). *Durham Co.*, Durham (Causey 1952a). *Halifax Co.* (Shelley 1978, 2000b). *Haywood Co.* (Shelley 2000b); GSMNP, Cataloochee, Purchase Knob (Snyder 2008). *Henderson Co.* (Shelley 2000b). *Johnston Co.* (Shelley 1978, 2000b). *Moore Co.* (Shelley 1978, 2000b). *Nash Co.* (Shelley 1978, 2000b). *Orange Co.* (Shelley 1978, 2000b); Chapel Hill (Bollman 1887, Brimley 1938, Chamberlin and Hoffman 1958, Wray 1967, Filka and Shelley 1980, Hoffman 1999, Shelley 2000b). *Polk Co.* (Shelley 2000b). *Rockingham Co.* (Shelley 2000b). *Swain Co.* (Shelley 2000b). *Wake Co.* (Shelley 1978, 2000b); Raleigh (Causey 1952a). *Warren Co.* (Shelley 1978, 2000b). *Wayne Co.* (Shelley 2000b). **Tennessee:** Tennessee in general (Chamberlin and Hoffman 1958, Hoffman 1999). *Cocke Co.*, GSMNP, Albright Cove (Snyder 2008). *Davidson/Sumner/Robertson Cos.*, Goodlettsville (Causey 1952a). *Sevier Co.*, GSMNP, Greenbrier Cove, Indian Gap, Twin Creeks (Chamberlin 1943, Chamberlin and Hoffman 1958, Hoffman 1999, Snyder 2008). **Virginia:** *Giles Co.* (Cope 1869). *Montgomery Co.* (Cope 1869, Hoffman 1999).

Material examined

Alabama: *Franklin Co.*, Rock Bridge Canyon nr. Hodges, M, FF, 21 May 1961, H. R. Steeves. **New State Record for the Species.**

Arkansas: *Clay Co.*, Chalk Bluff Natural Area, M, 19 November 2010, C. T. McAllister, H. W. Robison (NCSM). *Craighead Co.*, Jonesboro, MM, FF, 17 March 1962, N. B. Causey (FSCA) and 3M, F, 3 September–15 December 1966, M. Hite (FSCA). **New State Record for the Species.**

Georgia: *DeKalb Co.*, Atlanta, MM, FF, 7 July 1960, R. Davidson (FSCA). *Fulton Co.*, Atlanta, MM, FF, juvs., 6 December 1960 (FSCA). *Pickens Co.*, 6.4 km (4.0 mi) N Jasper, M, 6 November 1960, L. Hubricht (VMNH); and Burt Mtn., 5M, F, 6 November 1960, L. Hubricht (VMNH). **New State Record for the Species.**

Illinois: *Hardin Co.*, Karber's Ridge, Shawnee Nat. For., M, 4 May 1950, M. W. Sanderson, Standard (FSCA).

Mississippi: *Alcorn Co.*, 11.2 km (7.0 mi) W Corinth, 3M, 2F, 27 February 1961, L. Hubricht (VMNH). *Benton Co.*, 1.6 km (1.0 mi) W Canaan, M, 27 February 1961, L. Hubricht (VMNH). *Marshall Co.*, 3.2 km (2.0 mi) E Slayden, M, 27 February 1961, L. Hubricht (VMNH). *Pontotoc Co.*, 1.6 km (1.0 mi) SE Ecu, 12F, 7-22 May 1980, W. H. Cross (MEM). *Tishomingo Co.*, 8.6 km (5.4 mi) E Iuka, 2M, 2F, 27 February 1961, L. Hubricht (VMNH); and 2.6 km (1.6 mi) W Burnsville, 2M, 2F, 27 February 1961, L. Hubricht (VMNH). **New State Record for the Species.**

North Carolina: *Brunswick Co.*, 26.6 km (16.2 mi) N Bolivia, M, 16 October 1979, R. M. Shelley, P. T. Hertl (NCSM); and Brunswick Town State Historic Site, M, 3 November 1986, R. M. Shelley (NCSM). *Buncombe Co.*, 32.0 km (20.0 mi) SW Asheville, foothills of Mt. Pisgah, M, F, 18 October 1965, J. and W. Ivie (AMNH); and 10.9 km (6.9 mi) SW Asheville, Bent Creek Forest Exper. Sta., M, 20 October 1974, R. M. Shelley (NCSM). *Buncombe/Yancey Cos.*, Pensacola, M, 18 June 1967, J. H. Hunt (FSCA).

Burke Co., Linville Gorge nr. Table Rock Mt., M, F, 18 October 1969, L. S. Knight (VMNH). *Chatham Co.*, Pittsboro vicinity, MM, FF, 4-28 June 1975, R. M. Shelley, J. C. Clamp (NCSM). *Cleveland Co.*, 4.8-7.0 km (3.9-4.4 mi) SW Kings Mountain (town), 6F, 6 juvs., 17-18 October 1976, M. E. Filka, G. Wicker (NCSM). *Durham Co.*, Durham, M, 2F (NMNH), along Pickett Rd., F, 14 May 1965, J. A. Beatty (FSCA), Duke University campus, M, 3F, 15 April 1965, J. A. Beatty, I. Braun (NMNH, FSCA), and along Chapel Hill Blvd. at New Hope Cr., M, 20 September 1964, J. W. Berry (FSCA); and along US hwy. 15-501 at New Hope Cr., M, J. A. Beatty (FSCA). *Franklin Co.*, Dickens and Margaret, 2M, 10 August 1971, R. M. Shelley (NCSM); and 2.4 km (1.5 mi) W Alert, juv., 22 July 2006, S. D. Busack (NCSM). *Gaston Co.*, vicinities of Bessemer City, Gastonia, and Kings Mountain (town), MM, FF, juvs., 16-31 October 1976, M. E. Filka, G. Wicker (NCSM). *Granville Co.*, 10.6 km (6.6 mi) E Creedmoor, M, 10 October 1971, R. M. Shelley (NCSM). *Halifax Co.*, 7.5 km (4.7 mi) NE Brinkleyville, M, 9 April 1971, R. M. Shelley (NCSM); and Medoc Mountain St. Pk., M, 9 April 1973, R. M. Shelley (NCSM). *Harnett Co.*, Buies Creek, M, 1 September 1971, R. M. Shelley (NCSM); and Raven Rock St. Pk., M, 15 August 1972, R. M. Shelley (NCSM). *Haywood Co.*, Mt. Pisgah, F, juvs., 5 July 1959, P. Weems (FSCA) and M, 28 August 1960, H. V. Weems (FSCA); Soco Gap, M, F, 23 September 1961, R. L. Hoffman (VMNH); and along US hwy. 276 just S Waynesville, M, 19 October 1974, R. M. Shelley (NCSM). *Henderson Co.*, 16.6 km (10.4 mi) NE Hendersonville, M, 9 September 1978, and Flat Rock, M, 18 October 1974, W. B. Jones (NCSM). *Jackson Co.*, Soco Falls and Soco Gap, 2M, F, 10 May 1956, W. H. Lund, R. L. Hoffman, W. T. Keeton (FSCA); Cullowhee, Western Carolina Univ. Pres. on Cullowhee Mt., 3M, 2F, 25 October 1969, W. A. Shear (VMNH); Fred Coyle's farm nr. Webster, M, 2 October 1970, W. A. Shear (VMNH); and numerous localities, MM, FF, juvs., J. Laerm (GMNH). *Johnston Co.*, 19.8 km (12.4 mi) E Clayton and 17.8 km (11.1 mi) S Smithfield, MM, FF, 27 October 1971, R. M. Shelley (FSCA, NCSM); 4.8 km (3.0 mi) S Middlesex, M, 16 April 1989, R. M. Shelley (NCSM). *Lee Co.*, 17.3 km (10.8 mi) NE Sanford, White Pine Area, F, 27 May 1975, J. C. Clamp (NCSM). *Lincoln Co.*, 7.0 km (4.4 mi) SE Lincolnton, M, 31 August 1973, R. M. Shelley (NCSM). *Macon Co.*, Coweeta Hydrologic Sta. and numerous additional localities, MM, FF, juvs., J. Laerm (GMNH). *Mitchell Co.*, Roan Mt., 2M, F, 3 March 1950, and M, 3 July 1956, L. Hubricht (FSCA). *Mitchell/Yancey Cos.*, Black Mts., M, September 1901, W. Beutermüller (AMNH). *Montgomery Co.*, 13.1 and 18.1 km (8.2 and 11.3 mi) NW Troy, 19 May 1976, R. M. Shelley, M. E. Filka (NCSM). *Moore Co.*, 7.0 km (4.4 mi) SW Robbins, juvs., 24 April 1973, R. M. Shelley (NCSM); and Weymouth Woods St. Pk., 2M, 3F, 25 March 1975, R. M. Shelley (NCSM). *Nash Co.*, 3.2 km (2.0 mi) SW Spring Hope, along US hwy. 64 at Tar R., MM, FF, 4 November 1973, R. M. Shelley (FSCA, NCSM). *Northampton Co.*, 8.3 km (5.2 mi) WSW Gaston, M, 4 May 1973, R. M. Shelley (NCSM). *Orange Co.*, 8.0 km (5.0 mi) S Hillsborough, M, 2F, 8 November 1936, J. P. E. Morrison (NMNH); Chapel Hill, M, Atkinson (NMNH); 10.9 km (6.8 mi) N Chapel Hill, Duke For., FF, juvs., 17 May 1970, R. M. Shelley (NCSM); 9.6 km (6.0 mi) ESE Hillsborough, along Eno R., juvs., 12 May 1973, R. M. Shelley (NCSM); 9.0 km (5.6 mi) S Hillsborough, F, 26 October 1974, R. M. Shelley (NCSM). *Polk Co.*, along co. rd. 1154, 0.5 km (0.3 mi) S Henderson Co. line, 4M, 9 September 1978, W. B. Jones (NCSM). *Randolph Co.*, vicinities of Asheboro and Seagrove, M, 19 May 1976, R. M. Shelley, M. E. Filka (NCSM). *Richmond Co.*, 7.0 km (4.4 mi) SE Ellerbe, M, 22 August 1973, R. M. Shelley (NCSM). *Rockingham Co.*, 13.2 km (8.2 mi) SW Reidsville, M, 19 April 1975, R. M. Shelley (NCSM). *Stanly Co.*, Morrow Mountain St. Pk., M, 9 August 1973, R. M. Shelley (NCSM). *Swain Co.*, GSMNP, along US hwy. 441, 8.0 km (5.0 mi) SE Newfound Gap, M, F, 24 May 1973, D. H. Kavanaugh, H. Goulet (NMNH) and Smokemont, M, 26 October 1950 (FSCA). *Transylvania Co.*, Wagon Road Gap, Pisgah Nat. For., 2M, 19 June 1961, H. V. Weems (FSCA). *Wake Co.*, Raleigh, M, F, 1940, C. S. Brimley (FSCA), and Currituck St., M, 15 March 1975, J. B. Funderburg (NCSM); William B. Umstead St. Pk., 10 juvs., 11 October 1971–20 September 1972, R. M. Shelley (NCSM); Bayleaf, M, 31 October 1975, D. S. Lee (NCSM); Holly Springs, M, 1 January 1982, D. L. Stephen (NCSM). *Warren Co.*, 8.6 km (5.5 mi) N Norlina, M, 16 May 1973, R. M. Shelley (NCSM); and 8.3 km (5.2 mi) N Macon, M, 4 May 1973, R. M. Shelley (NCSM). *Wayne Co.*, Cliffs of the Neuse St. Pk., M, 8 October 1974, R. M. Shelley (NCSM). *Wilson Co.*, 4.3 km (2.7 mi) E Sims, M, 2 April 1974, R. M. Shelley (NCSM). *Yancey Co.*, along Blue Ridge Pkwy. nr. rd. to Mt. Mitchell St. Pk., M, 25 May 1970, W. A. Shear (VMNH).

South Carolina: *Darlington Co.*, Hartsville, Coker College campus, M, 2F, fall 1966, I. Boleik (FSCA). *Pickens Co.*, Clemson, M, 3F, 20 September 1962, J. A. Payne (VMNH). *Richland Co.*, 19.2 km (12.0 mi) N Columbia, M, F, 23 November 1977, R. M. Shelley (NCSM). **New State Record for the Species.**

Tennessee: *Cocke Co.*, GSMNP, Maddron Bald Trail at Albright Grove Loop, M, 19 November 2004, A. Mayor (FSCA). *Marion Co.*, M, F, 26 April 1979, R. M. Shelley (NCSM). *Marshall Co.*, Henry Horton St. Pk., campground area, 2M, 9 May 1979, R. M. Shelley (NCSM). *Mason Co.*, 9.6 km (6.0 mi) SE Lafayette, M, juv. 19 April 1955, L. Hubricht (VMNH). *Sevier Co.*, GSMNP, Greenbrier Cove, M, 4 September 1938, M. Hickman (NMNH) and MM, FF, 14-19 June 1942, H. S. Dybas (FMNH).

Virginia: *Montgomery Co.*, M, 6 December 1943, D. Sherry (FSCA). *Russell Co.*, Pinnacles Nat. Area NW Lebanon, M, July 1989, R. L. Hoffman (VMNH). *Washington Co.*, Clinch Mt. Wildlife Management Area, MM, FF, 1-21 September 2011, S. M. Roble (VMNH).

Remarks. Shelley (1978, fig. 8-9) declined to assign a specific name to what was clearly *P. ectenes* (= *montanus*), as shown by his gonopod illustrations, in deference to studies then being conducted by N. B. Causey. She died a year later without publishing on this matter. Cope (1869) admitted that this species is closely similar to *Julus pennsylvanicus* of Wood, but he distinguished it on a slightly higher number of rings (69 vs. 63) with the medial parts smooth and the ventral parts striate ("closely many grooved"). The name may have indeed been proposed for an individual of *P. impressus*, but since both species occupy Montgomery Co., Virginia, one of the two counties Cope listed, we conserve *montanus* as the senior name for the second species of *Ptyoiulus*.

Ptyoiulus sp.

For completion and to delineate the entire generic and subfamilial ranges, we cite here samples, 10 with specific localities, without adult males and mostly from counties where males have not been collected. Judging from other records at the general latitudes of the Alabama and Louisiana record, the species there is probably *P. impressus*.

Alabama: *Perry Co.*, 9.6 km (6.0 mi) NNW Marion, FF, juvs., 6 January 1954, N. B. Causey (FSCA).

Louisiana: *Morehouse Par.*, along LA hwy. 142, 3.2 km (2.0 mi) S AR state line (NCSM) **New State Record for the Genus.**

North Carolina: *Alexander, Ashe, Caldwell, Clay, Currituck* [3.2 km (2.0 mi) N Poplar Branch, along US hwy. 158, 1.9 km (1.2 mi) S jct. SR 1140], *Gates* [4.8 km (3.0 mi) WNW Eure, along SR 1200, 1.2 km (0.7 mi) E jct. SR 1201], *Guilford, Iredell, Madison, New Hanover* [along US hwy. 421, 15.2 km (9.5 mi) S Wilmington], and *Stokes Cos.* (AMNH, NCSM).

Tennessee: *Bledsoe Co.*, Fall Creek Falls St. Pk., 4F, 14 October 1962, H. R. Steeves (FSCA). *Chester Co.*, Chickasaw St. Pk., F, 2 juvs., 20 June 1958, N. B. Causey (FSCA). *Knox Co.* (NCSM). *Lawrence Co.*, Davie Crockett St. Pk., juv., 1 October 1970, T. N. Trudeau (FSCA). *Obion Co.*, Reelfoot Lake St. Pk., F, 28 April 1956 (FSCA).

Virginia: *Mecklenburg Co.*, "Department of Forestry site nr. Kerr Dam Powerhouse," 5F (FSCA).

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