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DISCOVERY OF THE MILLIPED *SCYTONOTUS GRANULATUS* (SAY, 1821) IN OKLAHOMA AND ALABAMA, WITH A REVIEW OF ITS DISTRIBUTION (POLYDESMIDA: POLYDESMIDAE)

Rowland M. Shelley¹, Chris T. McAllister², and Zachary D. Ramsey²

ABSTRACT.—*Scytonotus granulatus* (Say, 1821) (Polydesmida: Polydesmidae), the most widely ranging polydesmid species in North America and the 4th most widely distributed indigenous continental milliped, is recorded from LeFlore and Latimer Counties, Oklahoma, and Jackson County, Alabama, the 1st records from these states. It also occurs in Logan and Independence Counties, Arkansas. The Latimer County record corresponds approximately to the terminus of the eastern forested biome and extends the distributions of the species and the genus some 255 miles (408 km) westward; along with literature records from Shawnee County, Kansas, and Cass County, Nebraska, it constitutes the western range limits. The projected overall distribution extends around 1100 miles (1760 km) east–west and 985 miles (1576 km) north–south and encompasses parts of Ontario, Québec, and 19 states, including all of Pennsylvania, West Virginia, Ohio, Indiana, and Illinois. New localities are detailed as are those from Missouri and that from Dare County, on the Outer Banks of North Carolina.

Key words: *Scytonotus granulatus*, *Scytonotus*, *Oklahoma*, *Arkansas*, *Missouri*, *Alabama*.

A substantial number of the milliped genera and species that inhabit the Atlantic Coastal states range westward beyond the Mississippi River. Some distributions terminate in the forested biome that ends primarily in eastern Texas and Oklahoma and western Missouri, while others extend into the prairie ecosystems of the Central Plains. Two prominent examples are *Narceus americanus* (Beauvois) (Spirobolida: Spirobolidae)³, the most common eastern chilognath milliped that Keeton (1960) recorded from Murray County in central Oklahoma, and *Pleuroloma flavipes* Rafinesque (Polydesmida: Xystodesmidae), which occurs from Connecticut to North Carolina and ranges westward to northeastern Texas, central Oklahoma and Kansas, southeastern Nebraska, and eastern North Dakota (Shelley 1980, Shelley et al. 2004). Most preserved samples of these westward-ranging millipeds are from eastern areas because of proximities to repositories in Atlantic Coastal states, as most past collectors were located in the East and worked primarily there and along the Gulf Coast. Fewer samples are available from west of the Mississippi River

because fewer surveys have been conducted there and because some species are less abundant and less frequently encountered in their range extremities. Consequently, distributions west of this watercourse are typically poorly documented, and the western termini are imprecise if not totally nebulous. With such minimal knowledge, a chance discovery of a single individual can represent new state occurrences and significantly alter long-standing impressions of distributions, such that published documentation is in order. This was the situation with *P. flavipes* (Shelley et al. 2004), when the species and genus could be documented from Texas and the western limit expanded in Oklahoma and Kansas, and such is now necessary for *Scytonotus* Koch and *S. granulatus* (Say, 1821) (Polydesmida: Polydesmidae).

Occurring both east of the Central Plains and west of the Continental Divide, *Scytonotus* is 1 of only 2 indigenous polydesmidan genera found on both sides of the North American continent, the other being *Ergodesmus* Chamberlin (Nearctodesmidae), which inhabits caves in Illinois and epigeal biotopes in the Pacific

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³Opinions differ as to the relative statuses of *N. americanus* and *N. annularis* Rafinesque, which Keeton (1960) recognized as distinct species and recorded from west of the Mississippi. Shelley (1988) reduced the latter to a subspecies of the former, but Hoffman (1999) and Shelley (2001) did not recognize subspecies. Shelley (2003a) observed that *Narceus* is probably more complex than the current concept of 4 species and that a modern revision is needed to assess this possibility; substantial size differences among ostensibly conspecific individuals suggest that some names Keeton placed in synonymy represent valid species. For simplicity, we reference this milliped by the oldest name, *N. americanus*, until a definitive study can address the generic composition and taxonomic uncertainties in *Narceus*.

Northwest and British Columbia (Hoffman 1962a, 1999, Shelley 1994, Whitney and Shelley 1995). It is 1 of 6 indigenous polydesmid genera in the West, where it comprises 6 species and occupies 5 disjunct areas extending from the Pacific Coast to western Wyoming and southeastern British Columbia (Shelley 1993, 2003b). In the East, however, it is 1 of only 2 family components, the other being *Pseudopolydesmus* Attems, both of which occupy continuous areas, extend northward into Ontario and Québec, and traverse the Mississippi (Shelley 1988, 2002a, Hoffman 1999). *Scytonotus* comprises 3 species in the East, 2 of which are endemic to the Blue Ridge Mountains from northern Virginia to north Georgia (Hoffman 1962b, Shelley 1993). The rest of the eastern area is occupied solely by *S. granulatus*, a small-bodied species (adults ca. 8–9 mm long) characterized by pinkish or grayish color, dentate paranotal margins, and 4 to 5 rows of rounded, setose tubercles on the metatergites that impart a “fuzzy” or velveteen appearance to the dorsum. Present knowledge shows that it ranges westward to the eastern plains in Kansas and riparian habitats, primarily along the Missouri River, in southeastern Nebraska, with the following additional occurrences west of the Mississippi: southeastern Minnesota, eastern and central Iowa and Missouri, and northeastern Arkansas (Bollman 1893, Kenyon 1893, Gunthorp 1913, Chamberlin 1928, 1942, Chamberlin and Hoffman 1958, Shelley 1993, Hoffman 1999). The westernmost records are in Shawnee County, Kansas, and Cass County, Nebraska (Kenyon 1893, Gunthorp 1913), and the only Arkansas locality is Jonesboro, Craighead County, in the northeast corner near the “heel” of Missouri (Shelley 1993).

In 2001 the 2nd author began surveying myriapods in the “Ark-La-Tex” region to elevate knowledge of the fauna west of the Mississippi. One new species has been described, *Abacion wilhelminae* Shelley, McAllister, and Hollis (Callipodida: Abacionidae), from Polk County, Arkansas (Shelley et al. 2003), and significant occurrences, including new state records and western/southwestern limits, have been published for 6 millipeds in addition to *P. flavipes* (McAllister et al. 2002a, 2002b, 2003); *Thrinaxoria lampra* (Chamberlin) (Polydesmida: Xystodesmidae); *Eurymerodesmus mundus* and *E. dubius*, both by Chamberlin, and *E. angu-*

laris Causey (Polydesmida: Eurymerodesmidae); *Virgoiulus minutus* (Brandt) (Julida: Blaniulidae); and *Brachycybe lecontii* Wood (Polydesmida: Andrognathidae). While sampling that year on the western slope of Rich Mountain in the eastern fringe of LeFlore County, Oklahoma, he collected a juvenile female of *Scytonotus* that constituted the 1st generic record from this state and a dramatic range extension from Jonesboro, the most proximate locality. The specific identity could not be determined from this individual, and the range expansion was so significant that it might have been a new species, particularly because *A. wilhelminae* was discovered simultaneously just 6 miles (9.6 km) to the east in Polk County, Arkansas. We therefore deferred publication until a male could be taken in Oklahoma to positively determine the species. Continued sampling at this site for 2 years failed to produce one, during which time the senior author reexamined institutional holdings and discovered a sample of females from Latimer County, the adjacent county to the west, and samples with a male of *S. granulatus* from Logan County, Arkansas, around 50 miles (80 km) to the northeast. This individual suggested that the Oklahoma species also was *S. granulatus*, and the 3rd author found a male in LeFlore County in December 2003. As the specific identity is now certain, we record below the new Arkansas and Oklahoma localities along with another from northeastern Alabama, also constituting a new state record, that the 1st author discovered among unsorted samples at the FSCA (see acronyms below). It contains a single female, which, though unidentifiable, is surely *S. granulatus* that occurs in adjacent Franklin County, Tennessee (Shelley 1993). We also detail localities from Missouri, which were cited by county by Shelley (1993). Occurrences west of the Mississippi are shown in Figure 1, and the projected overall distribution is depicted in Figure 2. Anatomical accounts and pertinent illustrations are available in Hoffman (1962b) and Shelley (1978, 1988, 1993). Repository acronyms are as follows: AMNH—American Museum of Natural History, New York, New York; ANSP—Academy of Natural Sciences, Philadelphia, Pennsylvania; FSCA—Florida State Collection of Arthropods, Gainesville; NCSM—North Carolina State Museum of Natural Sciences, Raleigh; UAAM—University of Arkansas Arthropod Museum, Fayetteville;

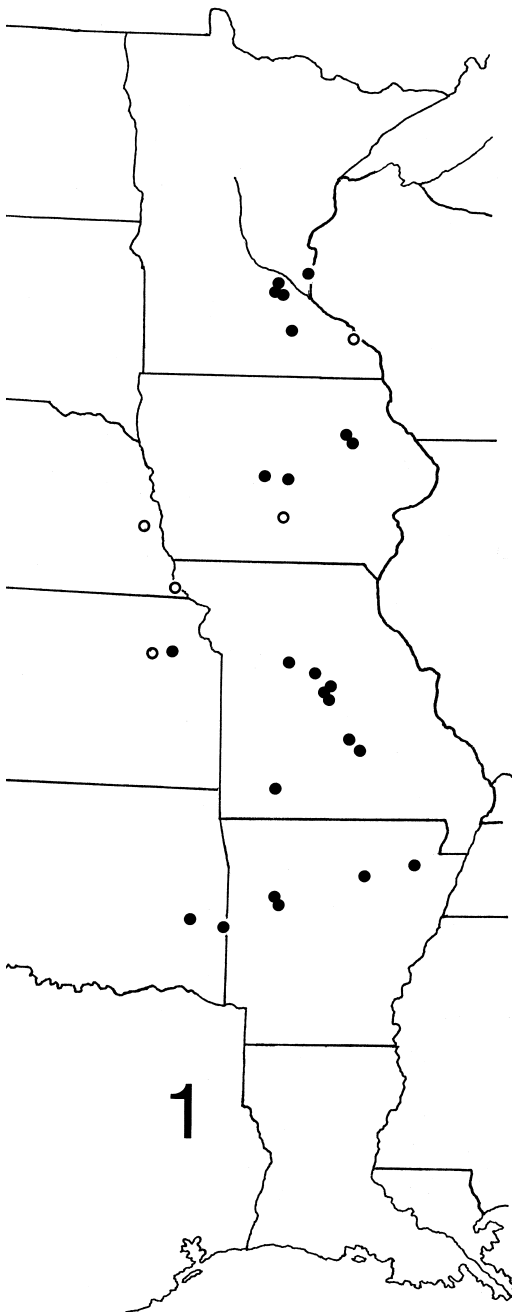


Fig. 1. Occurrences of *Scytonotus* and *S. granulatus* west of the Mississippi River. Open symbols denote literature records believed to be valid.

UMO–Enns Entomological Museum, Entomology Department, University of Missouri, Columbia.

ALABAMA: *Jackson Co.*, ca. 17 mi (27.2 km) NW Scottsboro (0.5 mi [0.8 km] E Swaim), Swaim Cave (Cv.), ♀, date and collector unknown (FSCA). **New state record.**

ARKANSAS: *Craighead Co.*, Jonesboro, ♂, ♀, 17 March 1962, N.B. Causey (FSCA) and ♂, 30 October 1966, M. Hite (FSCA). *Independence Co.*, 1.3 mi (2.1 km) W Cushman, vicinity of Blowing Cv., ♀, 5 March 1973, R.M. Blaney (FSCA). *Logan Co.*, Mt. Magazine, ♂, 30 October 1986, J.A. Tedder (UAAM), Cameron Bluff, juv. ♀, 25 July 1990, B. Leary (UAAM), and Signal Hill, 2 juvs., 21 July 1990, B. Leary (UAAM).

MISSOURI: *Boone Co.*, Columbia, 4♂, 4♀, 13 March 1966, W.W. Dowdy (FSCA) and ♂, May 1968, G. Moe (UMO). *Calloway Co.*, Jefferson City vicinity, 2♂, 28 July & 28 December 1965, W.W. Dowdy (FSCA). *Chariton Co.*, locality not specified, ♂♂, ♀♀, date unknown, C. Veatch (ANSP). *Christian Co.*, Ozark, Smallin's Cv., 2♂, 4♀, 8 December 1958, B. Ostting (FSCA). *Cole Co.*, Jefferson City, 2 juvs., 29 August 1965, W.W. Dowdy (FSCA); along U.S. Hwy. 50E, juvs., 29 August 1965, W.W. Dowdy (FSCA), and Le Pages & Neilhorn Places, ♂♂, ♀♀, 26 February–8 March 1966, W.W. Dowdy (FSCA). *Dent Co.*, 4 mi (6.4 km) SE Salem, 3♂, 12 October 1965, W. Ivie (AMNH). *Phelps Co.*, 6 mi (9.6 km) S Rolla, ♀, 11 October 1965, J. & W. Ivie (AMNH).

OKLAHOMA: *Latimer Co.*, locality not specified, 2♀, November 1990, K. Stephan (FSCA). *LeFlore Co.*, ca. 22 mi (35.2 km) S Poteau, Choctaw Nation State Historic site along OK Hwy. 1 on Rich Mtn. a few yards inside OK state line (road becomes AR Hwy. 88 across the line), ca. 6 mi (9.6 km) W Queen Wilhelmina St. Pk., Polk Co., AR, juv. ♀, 24 November 2001, C.T. & J.T. McAllister (NCSM), and under decaying oak log on Ouachita trail paralleling highway, ♂, juv. ♀, 5 December 2003, Z. Ramsey (NCSM). **New state record.**

Of the indigenous North American milliped species whose distributions are reasonably well known, only 3 to our knowledge cover greater areas than *S. granulatus*; in decreasing order they are *Oriulus venustus* (Wood) (Julida: Parajulidae), *N. americanus*, and *P. flavipes* (Keeton 1960, Shelley 1980, 2002b, Shelley et

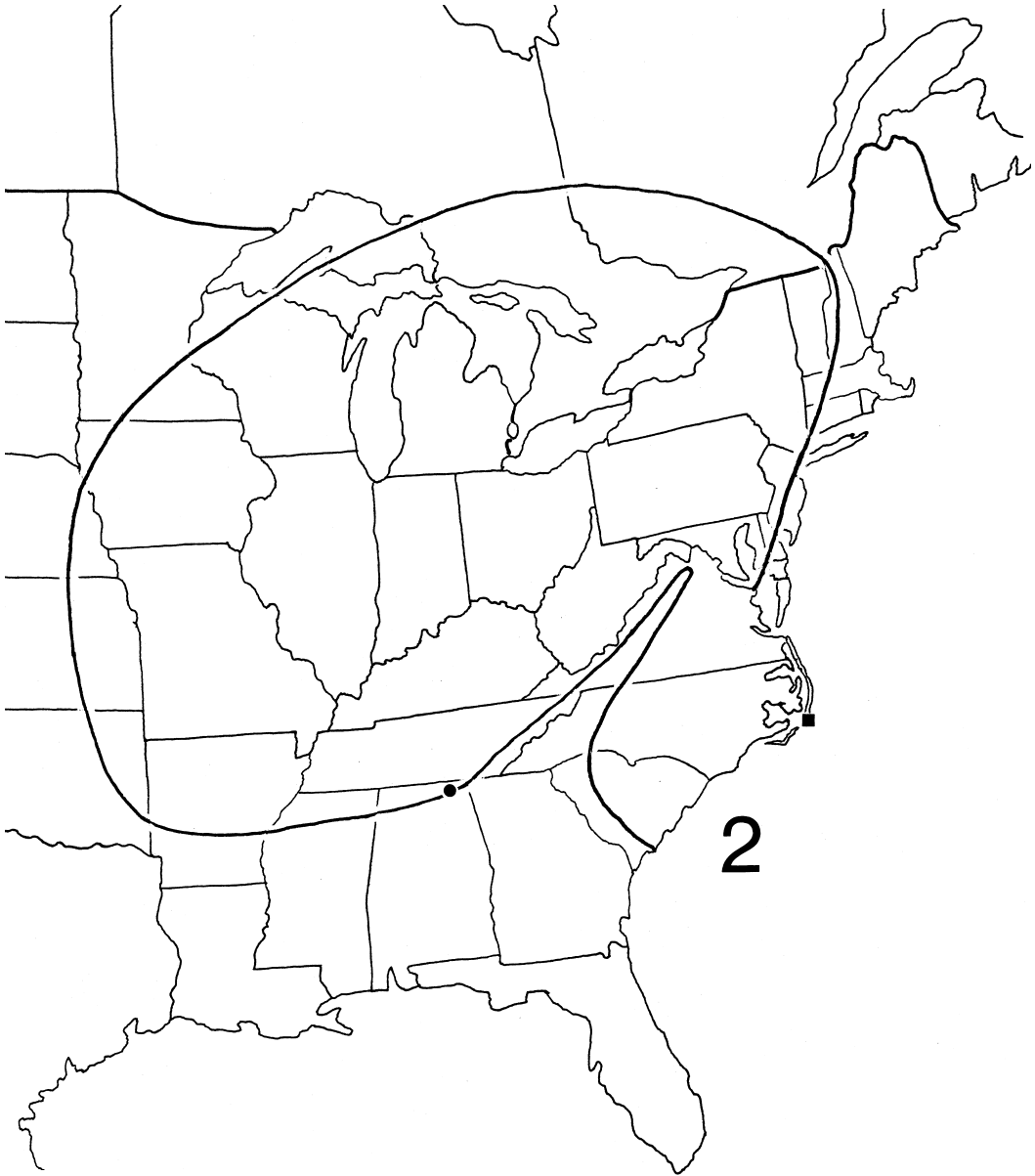


Fig. 2. Overall distribution of *S. granulatus*; a smooth curve is drawn around range extremes in all directions. The dot denotes the approximate location of the new record from Alabama, and the square shows the record from Buxton, on the Outer Banks of North Carolina.

al. 2004). As *S. granulatus* occurs in Kansas, Nebraska, Minnesota, Wisconsin, Michigan, and north of Sault Ste. Marie, Ontario, its distribution appears to be greater than that of *Apheloria virginiensis* (Drury) (Polydesmida: Xystodesmidae), based on range descriptions of the latter's subspecies by Hoffman (1999),

who overlooked the occurrence of *A. v. reducta* Chamberlin in Oklahoma, where it is known from McCurtain County (Causey 1954, McAllister et al. 2002b). The exact site in Latimer County is unknown, but we suspect the eastern periphery because of the more optimal habitat and more substantial deciduous forests

there, as *S. granulatus* prefers moist, deciduous litter. This area of Latimer County and sites in Shawnee County, Kansas, and Cass County, Nebraska, are at roughly the same longitude and constitute the western range limits for both *S. granulatus* and the generic distribution in eastern North America. Other range extremes are in Washington County, Minnesota; Algoma County, Ontario; Nicolet County, Québec; Windsor County, Vermont; Essex County, New Jersey; Queen Anne's County, Maryland; Dare County, North Carolina; and Orangeburg County, South Carolina (Shelley 1988, 1993). As Shelley (1993) did not provide locality details for states in which *S. granulatus* occurs in more than 5 counties, none were given for North Carolina. He mentioned that the millipede occurs on the Outer Banks, as far east in the state as one can go, which is striking because few native millipeds can survive in the small wooded patches on these islands, which are essentially just long, narrow sand bars; sample data are Dare Co., Hatteras Island, Buxton, 4♂, 19 November 1980, D.L. Stephan (NCSM).

The new Oklahoma samples constitute a westward range expansion of at least 255 miles (408 km) from Jonesboro, Arkansas, and are also well to the south of the latitude of this city, thereby forming the southern range limit along with Orangeburg, Orangeburg County, South Carolina. The projected distribution spans all 5 Great Lakes and such major rivers as the Arkansas, Mississippi, Missouri, Ohio, St. Lawrence, Hudson, Delaware, Potomac, James, Roanoke, Cape Fear, Tennessee, and Cumberland. It encompasses parts or all of 13 physiographic provinces and covers nearly the entire generic area east of the Central Plains, excepting the aforementioned absence from the Blue Ridge Province, occupied by *S. virginicus* Loomis and *S. australis* Hoffman (Fig. 2). Shelley (1993) concluded that these species are young, derivative entities that have displaced *S. granulatus* from these mountains and the western periphery of the adjacent Piedmont Plateau in the Carolinas and Georgia. Otherwise, the projected range is cohesive, encompassing around 1100 miles (1760 km) east–west and 985 miles (1576 km) north–south and parts of 2 Canadian provinces and 19 states, 6 of which—Pennsylvania, West Virginia, Kentucky, Ohio, Indiana, and Illinois—lie wholly within the range. With its discovery in Alabama, Oklahoma,

and western Arkansas, *S. granulatus* can also be projected for northern Mississippi, whose diplopod fauna, though east of the river, is also poorly known.

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