

First Record of the Millipede *Cleidogona nantahala* Shear, 1972 (Chordeumatida: Cleidogonidae) for New York State, U.S.A.

Author(s): Bruce A. Snyder and Chad L. Seewagen

Source: Entomological News, 121(1):104-105. 2010.

Published By: The American Entomological Society

DOI: 10.3157/021.121.0103

URL: <http://www.bioone.org/doi/full/10.3157/021.121.0103>

BioOne (www.bioone.org) is an electronic aggregator of bioscience research content, and the online home to over 160 journals and books published by not-for-profit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Web site, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/page/terms_of_use.

Usage of BioOne content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

SCIENTIFIC NOTE

FIRST RECORD OF THE MILLIPEDE *CLEIDOGONA NANTAHALA* SHEAR, 1972 (CHORDEUMATIDA: CLEIDOGONIDAE) FOR NEW YORK STATE, U.S.A.¹**Bruce A. Snyder² and Chad L. Seewagen^{3,4}**

On 8 October 2008, a single male millipede was collected in a riparian forest fragment on the grounds of the Bronx Zoo in Bronx Park, New York City (40° 85' N, 73° 87' W, see Seewagen and Slayton 2008 for further site description). The specimen was determined, using male copulatory structures (gonopods), to be *Cleidogona nantahala* Shear, 1972 (Chordeumatida: Cleidogonidae), and is deposited in the collection of the first author. The species is believed to be endemic to western North Carolina and northern Georgia (Shear, 1972; Hoffman, 1999; Shelley, 2000), but introductions to New England (Connecticut and Rhode Island) have recently been documented (Shear and Shelley, 2004). Our report represents the first record of the genus in New York State, and the second report of the species outside its native range.

In northern North America relatively few native soil-dwelling invertebrate species have dispersed into regions where they were extirpated by the Wisconsinan glaciation, and the fauna currently contains a large proportion of nonnative invasive species, primarily European species which are cold-adapted (Shear and Shelley, 2004; Snyder and Hendrix, 2008). Shear and Shelley (2004) concluded that the most likely explanation for the New England records were human introductions. There are three possible explanations for the route of introduction of *C. nantahala* to New York. Dispersal from invaded sites in New England is possible, but unlikely as these are more than 110 km from the Bronx. More likely is the possibility that the millipede arrived in horticultural material that was transported to the Bronx, either from New England or from the species' native range. Our specimen was collected from an area of the park that recently underwent habitat restoration, during which native herbaceous vegetation was planted. These plants originated from a nursery located 30 km from known invaded sites in Connecticut. *Cleidogona nantahala* populations from localities in New England (Shear and Shelley, 2004) may have survived and expanded their range this far over the last four decades, or materials from these sites may have been transported to the nursery and subsequently brought to the Bronx Zoo. A final possi-

¹ Received on January 26, 2009. Accepted on February 9, 2009.

² Division of Biology, Kansas State University, Manhattan, KS 66506 USA. E-mail: bruceasnyder@gmail.com

³ Department of Ornithology, Wildlife Conservation Society, Bronx, NY 10460 U.S.A. E-mail: cseewagen@wcs.org.

⁴ Department of Biology, University of Western Ontario, London, ON N6A 5B7 Canada.

bility is that *C. nantahala* was transported in organic material or on plants originating from within the species' native range and dispersed on site. Horticultural materials and plants are commonly imported by the Bronx Zoo and the adjacent New York Botanical Garden from many geographic locations for use in naturalistic animal exhibits and for botanical collections, respectively. Transport of soil invertebrates by this method is infrequently documented yet is of great importance for understanding how invasive species achieve their current distributions.

We suggest that habitat restoration efforts may ironically and inadvertently facilitate the spread of species outside of their native ranges. Further, zoos and botanical gardens may represent an overlooked pathway for invertebrate introductions. Most native millipede species are usually found in low densities and are unlikely to pose a significant risk when introduced to new ecosystems. However, little is known about the ecosystem impacts and reproductive capabilities of most invasive soil-dwelling species and thus prevention of new introductions should be a priority (Snyder and Hendrix, 2008). Prevention is almost always cheaper and easier than removal or management of established populations of invasive species (Callaham et al., 2006).

ACKNOWLEDGEMENTS

The millipede specimen was discovered while conducting field research supported by the Wildlife Conservation Society and University of Western Ontario. We thank W. A. Shear for confirming the identity of our specimen and P. F. Hendrix, M. A. Callaham Jr., and four anonymous reviewers for helpful comments on the manuscript.

LITERATURE CITED

- Callaham, M. A. Jr, G. Gonzalez, C. M. Hale, L. Heneghan, S. L. Lachnicht, and X. Zou.** 2006. Policy and management responses to earthworm invasions in North America. *Biological Invasions*, 8: 1317-1329.
- Hoffman, R. L.** 1999. Checklist of the millipeds of Middle and North America. Virginia Museum of Natural History Special Publication 8.
- Seewagen, C. L. and E. J. Slayton.** 2008. Mass changes of migratory landbirds during stopovers in a New York City park. *Wilson Journal of Ornithology*, 120: 296-303.
- Shear, W. A.** 1972. Studies in the milliped order Chordeumida (Diplopoda): a revision of the family Cleidogonidae and a reclassification of the order Chordeumida in the new world. *Bulletin of the Museum of Comparative Zoology*, 144: 151-352.
- Shear, W. A. and R. M. Shelley.** 2004. Introduction of the milliped, *Cleidogona nantahala* Shear, in New England, U.S.A. (Diplopoda, Chordeumatida, Cleidogonidae). *Entomological News*, 115: 71-77.
- Shelley, R. M.** 2000. Annotated checklist of the millipeds of North Carolina (Arthropoda: Diplopoda), with remarks on the genus *Sigmoria* Chamberlin (Polydesmida: Xystodesmidae). *Journal of the Elisha Mitchell Scientific Society*, 116: 177-205.
- Snyder, B. A. and P. F. Hendrix.** 2008. Current and potential roles of soil macroinvertebrates (earthworms, millipedes, and isopods) in ecological restoration. *Restoration Ecology*, 16: 629-636.