



An online key and field guide to the tardigrades of the Great Smoky Mountains National Park (North Carolina & Tennessee, USA, North America) with taxonomic revisions of two species

PAUL J. BARTELS¹ & DIANE R. NELSON²

¹*Department of Biology, Warren Wilson College, CPO 6032, PO Box 9000, Asheville, NC 28815, USA.*

E-mail: pbartels@warren-wilson.edu

²*Department of Biological Sciences, East Tennessee State University, Johnson City, TN, 37614, USA. E-mail nelsond@etsu.edu*

An online key and field guide is now freely available for the tardigrades of the Great Smoky Mountains National Park (GSMNP). This project is the culmination of a ten-year inventory of the tardigrades in the park as part of the All Taxa Biodiversity Inventory (www.dlia.org). The key was produced using Lucid 3.5.2 (www.lucidcentral.org) developed by the Centre for Biological Information Technology at the University of Queensland, Australia.

The key covers the 79 tardigrade species thus far discovered in the park. This includes three species previously reported from the Park (Riggin, 1962), seven recently described species (Bartels *et al.* 2007, 2008, 2009, and 2011), an additional six probable new species that are still being studied, and a further 63 new park records. Ten of the new park records were also new to North America and, according to Meyer (pers. comm.), prior to our inventory 108 species had been listed from the Eastern USA. Thus, excluding our new species and new North American records, this key covers half (56/108) of the previously known Eastern USA tardigrade fauna. Including all of our species, the key covers 60% (79/131) of currently known Eastern USA tardigrades.

The key has a user friendly and pictorial interface that runs on any internet browser. Each character has an explanatory page, each character state has an illustration, and each species has multiple photos and a species summary. These summaries not only include species descriptions but also information on habitats, feeding, and frequency of occurrence in our collections. Distribution maps of species occurrence within the Great Smoky Mountains National Park are included. A set of instructions is provided, and there is also on-line help available through the Lucid Player. References are cited for all illustrations and descriptions, and a complete bibliography is embedded. The key can be accessed at http://www.warren-wilson.edu/~pbartels/E-Guide/Read_First!.html.

Recent work on this key has led us to propose two changes to previously reported species names. Bartels *et al.* 2009 described a new species, *Macrobotus halei* Bartels, Pilato, Lisi, & Nelson 2009. This species was described before the new genus *Paramacrobotus* was erected (Guidetti *et al.* 2009), and since it clearly contains all characteristics of the new genus it should be transferred and renamed *Paramacrobotus halei* (Bartels, Pilato, Lisi, & Nelson, 2009). Additionally, Bartels *et al.* 2011 included measurements of what we then called *Macrobotus recens* Cuénot, 1932. We have yet to recover eggs for this species from GSMNP, but recent examinations of the GSMNP specimens and morphologically similar specimens from nearby Roan Mountain, Tennessee, lead us to believe that we should revise our identification to *Macrobotus nelsonae* Guidetti, 1998. Both of these changes are reflected in the current key.

Acknowledgements

The work involved on the tardigrade inventory and the development of this key was partially funded by grants from Discover Life in America, with additional support from the Environmental Leadership Center of Warren Wilson College. Dr. Gary Grothman (St. Mary's University College, Alberta, Canada) evaluated the key and made helpful comments.