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FIVE NEW RECORDS OF ANTS (HYMENOPTERA: FORMICIDAE) FOR NEBRASKA

—Ants are ubiquitous and influential organisms in terrestrial ecosystems. About 1,000 ant species occur in North America, where they are found in nearly every habitat (Fisher and Cover 2007). Ants are critical to ecological processes and structure. Ants affect soils via tunneling activity (Baxter and Hole 1967), disperse plant seeds (Lengyel et al. 2009), prey upon a variety of insects and other invertebrates (Way and Khoo 1992, Folgarait 1998), are often effective primary consumers through their prodigious consumption of floral and especially extrafloral nectar, and honeydew (Tobin 1994), and serve as prey for invertebrates (Gotelli 1996, Gastreich 1999) and vertebrates (Reiss 2001).

In Nebraska, ants have been the subject of relatively few in-depth analyses, including theses (Bare 1929, Henzlik 1960, Schmitt 1973, McClelland 1978) and other studies (Fichter 1954, Ballard and Mayo 1979). Nebraska is the only state in the Great Plains that has not had the ant fauna recently surveyed, in contrast to North Dakota (Wheeler and Wheeler 1963, 1977), South Dakota (Wheeler and Wheeler 1987), Montana (Wheeler and Wheeler 1988a), Wyoming (Wheeler and Wheeler 1988b), Colorado (Gregg 1963), Kansas (Dubois 1985, Dubois and Danoff-Burg 1994), New Mexico (Mackay and Mackay 2002), Oklahoma (Wheeler and Wheeler 1989), and Texas (Wheeler and Wheeler 1985). To date, a comprehensive Nebraska ant list is currently unavailable, though a recent survey of Nebraska's ant fauna was conducted in 31 of 93 counties; results of this survey are currently being prepared for publication in the scientific literature (W.W. Hoback, University of Nebraska-Kearney, personal communication). Presently 104 known ant species have been documented in Nebraska, some of which have not been formally described in the scientific literature (J. Jurzenski, University of Nebraska-Lincoln, and R. Lawson, Chadron State College, personal communication).

During 2006, 24, 0.30-ha experimental plots were seeded in former cropland habitats by The Nature Conservancy approximately six miles south of Wood River, Nebraska (Hall County: 40°44' N, 98°35' W). Using pitfall traps, we collected all invertebrate species as part of a study comparing the surface-dwelling invertebrate communities of experimental tallgrass prairie restorations. We sampled invertebrates in 10 pitfall traps within each plot that remained open over a 3-day sampling period in late June and early September 2007–2009. Each pitfall trap consisted of an 18-mm diameter glass test tube that we filled approximately 67% full with Sierra antifreeze (Safe Brands Corporation, Omaha, Nebraska, USA) and inserted into a polyvinyl chloride [PVC] sleeve in the ground. The PVC sleeves remained permanently in the ground and were capped with cork stoppers when not in use. We collected a total of 18 ant species during our study, five of which have not previously been published in Nebraska and reported herein. Remaining ant species we collected included

Formica incerta, *F. montana*, *F. pallidefulva*, *Lasius interjectus*, *L. neoniger*, *Myrmica americana*, *M. brevispinosa*, *Nylanderia parvula*, *Pheidole pilifera pilifera*, *Ponera pennsylvanica*, *Prenolepis imparis*, *Solenopsis molesta*, and *Tapinoma sessile*. K. T. Nemeč [KTN] collected all ant specimens. For each record, the person who determined the identity of the specimen is preceded by the abbreviation “det.” Voucher specimens are either located at the Nebraska State Museum [NSM] or with KTN.

Aphaenogaster rudis Enzmann is common in deciduous woodlands and nests in soil, under stones or logs, in decaying wood, leaf litter, hollow stems of plants, or under bark at bases of trees (Smith 1979). Like most members of *Aphaenogaster*, it is not characteristic of prairies (Trager 1998), but may be found in prairie remnants or restorations that are adjacent to deciduous trees (Kittelson et al. 2008). We note that *A. rudis* is thought to be a complex of species (Umphrey 1996), some of which apparently are grassland specialists, and the Nebraska records, tentatively identified as *A. rudis*, may constitute more than one species when revisionary work is completed. This is a common, widespread species found from Massachusetts south to Alabama and west to Ohio, Indiana, and Missouri (Gregg 1963, Smith 1979, Wheeler and Wheeler 1988b, Umphrey 1996). Although there are no published records of *A. rudis* for Nebraska, the Nebraska State Museum insect collection contains 122 specimens from the state that were collected in Antelope, Cuming, Dodge, Lancaster, Madison, and Sioux Counties and identified by O. S. Bare in the 1920s.

Hall County, 2006 research plots: 16–19 June 2007, det. J. C. Trager [1 adult KTN]; 25–28 June 2007, det. E. Manley [1 adult NSM]; 16–19 June 2007, det. J. C. Trager [3 adults KTN, 2 adults NSM]; 16–19 June 2007, det. J. C. Trager [1 adult NSM]; 9–12 September 2007, det. J. C. Trager [1 adult NSM]; 9–12 July 2008, det. E. Manley [1 adult NSM]; 9–12 July 2008, det. E. Manley [1 adult NSM]; 9–12 July 2008, det. E. Manley [1 adult KTN]; 14–17 September 2008, det. J. C. Trager [2 adults NSM]; 14–17 September 2008, det. J. C. Trager [1 adult NSM]; 23–26 June 2009, det. E. Manley [6 adults KTN, 2 adults NSM]; 25–28 June 2009, det. E. Manley [1 adult NSM]; 22–25 June 2009, det. E. Manley [1 adult KTN].

Formica dolosa Buren is characteristic of prairies (Trager 1998). It is also found in savannas and open woodlands, typically on well-drained acidic soils, and usually nests at the base of a grass clump or other herbaceous vegetation, although it may nest under rocks or wood (Trager et al. 2007). *Formica dolosa* is found from New England across the Great Lakes region, west to Wisconsin and Iowa and south to northern Florida, the Gulf Coast states and Texas (Trager et al. 2007).

Hall County, 2006 research plots: 13–16 September 2007, det. J. C. Trager [1 adult NSM]; 13–16 September 2007, det. J. C. Trager [1 adult NSM]; 18–21 September 2008, det. J. C. Trager [6 adults NSM].

Formica pergandei Emery is found in woods, woodland edges, and semi-open or open areas near woodland edges (Coovert 2005). It nests under rotten logs or large branches or in soil, and starts its colonies in the nests of host species (Coovert 2005). Previous records from across Missouri and eastern Kansas indicated that this species occurred in open woodlands and prairies (J. C. Trager, Shaw Nature Reserve, unpublished data). This species is a slave-making (work-parasite) ant that uses members of the *F. fusca*, *F. pallidefulva*, *F. neogagates*, *F. microgyna*, and *F. rufa* species groups as hosts, often in combination (Fisher and Cover 2007). This species is distributed from Quebec and New Hampshire south to North Carolina, west to Michigan, North Dakota, South Dakota, and Iowa (Coovert 2005).

Hall County, 2006 research plots: 9–12 September 2007, det. J. C. Trager [1 adult NSM].

Hypoponera opacior (Forel) is found in open prairie and grasslands, and open woods (Coovert 2005). It nests in rotten stumps in partial shade, grass sod, or beneath stones (Coovert 2005). This species is distributed from Virginia to Florida, west to Ohio, Indiana, Illinois, Iowa, Colorado, Texas, Nevada; Oregon, California; and from Mexico south to Chile, Argentina, and the West Indies (Coovert 2005).

Hall County, 2006 research plots: 15–18 September 2009, det. J. Kalisch [2 adults NSM].

Nylanderia terricola (Buckley) is characteristic of prairies (Trager 1998, Phipps 2006), although it has also been collected from a variety of habitats from open disturbed areas to mesquite and woodlands (Trager 1984). It is found in most soil types, except very sandy soils, and nests under stones, logs, or cow dung (Trager 1984). This species is most abundant in Texas and adjacent states west of the Mississippi River, and is also distributed from Illinois south to Tennessee (Trager 1984).

Hall County, 2006 research plots: 9–12 September 2007, det. J. C. Trager [1 adult NSM]; 14–17 September 2008, det. J. C. Trager [1 adult NSM].

The collection of five new state records in a relatively disturbed habitat, young tallgrass prairie restorations with a high abundance of weedy plant species, reflects the paucity of ant research that has occurred in Nebraska. These species are present in ant checklists of surrounding states. Further research on the composition of the state's ant fauna and their responses to changing environmental conditions, including restoration projects, is warranted.

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LITERATURE CITED

- Ballard, J. B., and Z. B. Mayo. 1979. Predatory potential of selected ant species on eggs of western corn rootworm. *Environmental Entomology* 8:575–576.
- Bare, O. S. 1929. A taxonomic study of Nebraska ants, or Formicidae (Hymenoptera). Thesis, University of Nebraska, Lincoln, USA.
- Baxter, F. P., and F. D. Hole. 1967. Ant (*Formica cinerea*) pedoturbation in a prairie soil. *Soil Science Society of America Proceedings* 31:425–428.
- Coovert, G. A. 2005. The ants of Ohio (Hymenoptera: Formicidae). *Bulletin of the Ohio Biological Survey* 15:1–202.
- Dubois, M. B. 1985. Distribution of ants in Kansas: subfamilies Ponerinae, Ecitoninae, and Myrmicinae (Hymenoptera: Formicidae). *Sociobiology* 11:153–187.
- Dubois, M. B., and J. Danoff-Burg. 1994. Distribution of ants in Kansas - subfamilies Dolichoderinae and Formicinae (Hymenoptera, Formicidae). *Sociobiology* 24:147–178.
- Fichter, E. 1954. An ecological study of invertebrates of grassland and deciduous shrub savanna in eastern Nebraska. *American Midland Naturalist* 51:321–439.
- Fisher, B. L., and S. P. Cover. 2007. *Ants of North America: a guide to the genera*. University of California Press, Berkeley, USA.
- Folgarait, P. J. 1998. Ant biodiversity and its relationship to ecosystem functioning: a

- review. *Biodiversity and Conservation* 7:1221–1244.
- Gastreich, K. R. 1999. Trait-mediated indirect effects of a theridiid spider on an ant-plant mutualism. *Ecology* 80:1066-1070.
- Gotelli, N. J. 1996. Ant community structure: effects of predatory ant lions. *Ecology* 77: 630–638.
- Gregg, R. E. 1963. The ants of Colorado. University of Colorado Press, Boulder, USA.
- Henzlik, R. E. 1960. A study of the animal ecology of a man-made forest in the Nebraska sandhills. Thesis, University of Nebraska, Lincoln, USA.
- Kittelson, P. M., M. P. Priebe, and P. J. Graeve. 2008. Ant diversity in two southern Minnesota tallgrass prairie restoration sites. *Journal of the Iowa Academy of Science* 115:28–32.
- Lengyel, S., A. D. Gove, A. M. Latimer, J. D. Majer, and R. R. Dunn. 2009. Ants sow the seeds of global diversification in flowering plants. *PLoS ONE* 4:e5480.
- Mackay, W. P., and E. E. Mackay. 2002. Ants of New Mexico: Hymenoptera: Formicidae. Edwin Mellen Press, Lewiston, New York, USA.
- McClelland, L. A. 1978. The Nebraska distribution of the ant genus *Camponotus* Mayr (Hymenoptera: Formicidae). Thesis. University of Nebraska at Omaha, USA.
- Phipps, S. J. 2006. Biodiversity of ants (Hymenoptera: Formicidae) in restored grasslands of different ages. Thesis, University of Missouri-Columbia, USA.
- Reiss, K. Z. 2001. Using phylogenies to study convergence: the case of the ant-eating mammals. *American Zoologist* 41:507–525.
- Schmitt, L. R. 1973. Distribution of *Lasius* spp. Fabricius in Pierce County, Nebraska, with a checklist of Formicidae. Thesis, Kearney State College, Kearney, Nebraska, USA.
- Smith, D. R. 1979. Formicoidea. Pages 1323–1467 in K. V. Krombein, P. D. Hurd, Jr., D. R. Smith, and B. D. Burks, editors. *Catalog of Hymenoptera in America north of Mexico. 2. Apocrita (Aculeata)*. Smithsonian Institution Press, Washington D.C., USA.
- Tobin, J. E. 1994. Ants as primary consumers: diet and abundance in the Formicidae. Pages 279–308 in J. H. Hunt and C. A. Nalepa, editors. *Nourishment and evolution in insect societies*. Westview, Boulder, Colorado, USA.
- Trager, J. C. 1984. A revision of the genus *Paratrechina* (Hymenoptera: Formicidae) of the continental United States. *Sociobiology* 9:51–162.
- Trager, J. C. 1998. An introduction to ants (Formicidae) of the tallgrass prairie. *Prairie Journal* 18:4–8.
- Trager, J. C., J. A. MacGown, and M. D. Trager. 2007. Revision of the Nearctic endemic *Formica pallidefulva* group. Pages 610-636 in R. R. Snelling, B. L. Fisher, and P. S. Ward, editors. *Advances in ant systematics (Hymenoptera: Formicidae): homage to E.O. Wilson - 50 years of contributions*. *Memoirs of the American Entomological Institute*, vol. 80.
- Umphrey, G. J. 1996. Morphometric discrimination among sibling species in the *fulva-rudis-texana* complex of the ant genus *Aphaenogaster* (Hymenoptera: Formicidae). *Canadian Journal of Zoology* 74:528–559.
- Way, M. J., and K. C. Khoo. 1992. Role of ants in pest management. *Annual Review of Entomology* 37:479–503.
- Wheeler, G. C., and J. Wheeler. 1963. The ants of North Dakota. University of North Dakota, Grand Forks, USA.
- Wheeler, G. C., and J. Wheeler. 1977. North Dakota ants updated. Desert Research Institute, University of Nevada, USA.
- Wheeler, G. C., and J. Wheeler. 1985. A checklist of Texas ants. *The Prairie Naturalist* 17:49–64.
- Wheeler, G. C., and J. Wheeler. 1987. A checklist of the ants of South Dakota. *The Prairie Naturalist* 19:199–208.
- Wheeler, G. C., and J. Wheeler. 1988a. A checklist of the ants of Montana. *Psyche* 95:101–114.
- Wheeler, G. C., and J. Wheeler. 1988b. A checklist of the ants of Wyoming (Hymenoptera: Formicidae). *Insecta Mundi* 2:231–239.
- Wheeler, G. C., and J. Wheeler. 1989. A checklist of the ants of Oklahoma. *The Prairie Naturalist* 21:203–210.

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