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Cover Page Footnote

This research was supported by funding through USDA-ARS CRIS Project Number 3080-21220-006-00D. Eric Beckendorf assisted in collection maintenance. Al Wheeler, Mathew Brust, Lauren Hesler and Eric Beckendorf graciously reviewed drafts of this paper.

First Record of *Hippodamia variegata* (Coleoptera: Coccinellidae) in Illinois, U.S.A., and Relation to Its Other Midwestern Collection Records

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Abstract

Hippodamia variegata (Goeze) (Coleoptera: Coccinellidae) is an Afro-Eurasian lady beetle first discovered in North America near Montreal, Canada, in 1984. Subsequent records have occurred over a gradually expanding area radiating from the initial detection site and also include a disjunct record from British Columbia. Here, we report the first Illinois specimen of *H. variegata*, collected in 2004, and discuss this in relation to previous reports of *H. variegata* in North America.

Hippodamia variegata (Goeze) (Coleoptera: Coccinellidae) is an Afro-Eurasian lady beetle first discovered in North America near Montreal, Canada, in 1984 (Gordon 1987). Subsequent collections have been made over a gradually expanding area radiating from the initial detection site (Wheeler 1993, Wheeler and Stoops 1996, Ellis et al. 1999). In recent years, *H. variegata* has expanded into mid-continental North America (Gardiner and Parsons 2005, Pavuk et al. 2007, Gardiner et al. 2009, Williams and Young 2009, Heidel and Morey 2011), and it now extends to South Dakota, North Dakota and Manitoba (Hesler and Lundgren 2011, Semmler and Wrigley 2015). A disjunct population of *H. variegata* exists in British Columbia, Canada (Klimaszewski et al. 2015).

During routine insect collection maintenance at the USDA-ARS North Central Agricultural Research Laboratory (NCARL), Brookings, South Dakota, we discovered an unsorted specimen of *H. variegata* collected from Illinois in 2004. Here, we present its collection information and briefly discuss the record in relation to previously published reports of *H. variegata* in North America.

New state record. ILLINOIS. Champaign County, Champaign, University of Illinois, Cruse Research Farm, 40.092° N, -88.242° W, 24-IV-2004, J. G. Lundgren, 1 adult female. The specimen was collected in a pitfall trap, and its identity was determined

to species using the description in Gordon and Vandenberg (1991). The specimen is housed at the NCARL.

Hippodamia variegata was collected at the Illinois site as part of a study that sampled predatory beetles (Lundgren et al. 2006). Other agrobiont lady beetle species were also sampled from this site, but this was the only specimen of *H. variegata*. The collection of *H. variegata* in an agricultural setting is consistent with many of its previous collection records in North America (Ellis et al. 1999, Gardiner and Parsons 2005, Day and Tatman 2006, Pavuk et al. 2007, Heidel and Morey 2011, Hesler and Lundgren 2011).

This finding prompted us to search for additional records of *H. variegata* from Illinois in the Severin-McDaniel Insect Research Collection (SMIRC), South Dakota State University; the insect collection at the NCARL; and the Symbiota Collections of Arthropods Network database (SCAN 2017), which houses specimen occurrence records and images from more than 80 North American arthropod collections, including ones in and around Illinois. No records of *H. variegata* earlier than 2012 were found for the Midwestern U.S.A., and no additional Illinois record of it was found.

The Illinois specimen represents the earliest record of *H. variegata* from the Midwestern U.S.A. and predates the first records of *H. variegata* from nearby states to the east (Michigan in 2005, Gardiner and Parsons 2005; Ohio in 2007, Pavuk et al. 2007) and north (Wisconsin in 2005, Williams and Young 2009). Records of *H. variegata* west

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of Illinois do not occur before 2009 (Heidel and Morey 2011, Hesler and Lundgren 2011).

Thus, the Illinois record of *H. variegata* reported herein begs the question of how it pre-dates records from Midwestern states further east. Possible explanations include the chance detection of this individual from an established, but initially low-density population of *H. variegata* in Illinois. *Hippodamia variegata* might have been established, but not yet detected, in Ohio when the Illinois specimen was collected in 2004. Alternatively, the record could represent fortuitous collection of an individual *H. variegata* in Illinois that had leapfrogged adjacent states to the north and east. It is unlikely that this individual stemmed from releases of *H. variegata* in states west of Illinois from 1987 to 1994 because there is no evidence of establishment following those releases (Prokrym et al. 1998, Ellis et al. 1999). The reporting of any additional survey and collection data for *H. variegata* in Illinois and adjacent states is encouraged to develop context for this record and to improve our understanding of this species' dispersal in central North America.

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