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First records of *Hippodamia variegata* (Goeze) (Coleoptera: Coccinellidae) for Iowa, U.S.A.

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Abstract. *Hippodamia variegata* (Goeze) (Coleoptera: Coccinellidae), a Palearctic lady beetle that has become established in North America, is reported for the first time from the state of Iowa, U.S.A. The earliest specimen of *H. variegata* from Iowa was collected in 2009, with two subsequent specimens in 2012. Collection records of an advancing, non-native species like *H. variegata* are important for determining comparative rates of geographic spread across various regions and understanding its invasion dynamics.

Key words. Lady beetles, non-native species, geographic distribution.

Introduction

Hippodamia variegata (Goeze) (Coleoptera: Coccinellidae) is a Palearctic lady beetle that has become established in North America after first being discovered near Montreal, Canada in 1984 (Gordon 1987; Wheeler 1993). It has gradually radiated from its initial detection site (Wheeler 1993; Wheeler and Stoops 1996; Ellis et al. 1999), and continues to expand its range into central North America (Gardiner and Parsons 2005; Pavuk et al. 2007; Williams and Young 2009; Heidel and Morey 2011; Hesler and Lundgren 2011; Semmler and Wrigley 2015; Hesler and Lundgren 2017). Hesler (2009) provided an annotated species list of coccinellids in Iowa, U.S.A., which is located in mid-continental North America, but *H. variegata* had not been previously reported from the state. Herein, we report the first records of *H. variegata* from Iowa.

Materials and Methods

Lady beetles were collected during general insect sampling at two locations in Iowa in 2009 and 2012, and one lady beetle was randomly collected upon its discovery in a water bucket in 2012. Species determinations were made by LSH and based on descriptions of coccinellids in Gordon (1987) and Gordon and Vandenberg (1991). Collected beetles were deposited as voucher specimens in the insect collection at the North Central Agricultural Research Laboratory (NCARL), USDA-ARS, Brookings, South Dakota, U.S.A.

Results

Three specimens collected in Iowa were determined to be *H. variegata*, and one constitutes a **new state record** as follows: **Iowa:** Allamakee Co., Heritage Valley, hill prairie #1, 43°22'N, 91°36'W, 25 August 2009, M. J. Hatfield, 1 male; Winneshiek Co., 100 Acre Wood, 43°25'54.65"N, 92°0'32.25"W, water bucket in yard, 1 May 2012, M. J. Hatfield, 1 female; Winneshiek Co., Plymouth Rock, planted prairie, 43°26'18.22"N, 92°0'16.71"W, 11 August 2012, M. J. Hatfield, 1 female.

Discussion

The detection of *H. variegata* in Iowa was expected, given the geographic range expansion of this species into mid-continental North America in recent years, including the adjacent states of Illinois in 2004 (Hesler and Lundgren 2017), Wisconsin in 2005 (Williams and Young 2009), Minnesota in 2009 (Heidel and Morey 2011), and South Dakota in 2010 (Hesler and Lundgren 2011). However, *H. variegata* has spread relatively slowly across North America compared to other invasive coccinellids such as *Coccinella septempunctata* L. and *Harmonia axyridis* (Pallas) (Rice 1992; Wheeler 1993; Wheeler and Stoops 1996; Obrycki et al. 2000). Collection records of advancing, non-native species such as these are important for determining the comparative rates of geographic spread across various regions and understanding their invasion dynamics (Obrycki et al. 2000; Urban et al. 2008).

Hippodamia variegata is principally an aphid predator (Hodek and Evans 2012). As such, it could provide fortuitous biological control of pest aphids on crops and horticultural plants (Gordon 1987), but it may also prey on native, non-target aphids. It will also compete with native aphidophagous coccinellids for prey. Thus, future monitoring will be important to determine the various impacts of *H. variegata* in Iowa and other areas (Ellis et al. 1999; Obrycki et al. 2000; Williams and Young 2009).

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