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Recent Detections of a Rare Native Lady Beetle, *Coccinella novemnotata* (Coleoptera: Coccinellidae), in Minnesota

Robert L. Koch¹

Abstract

Coccinella novemnotata Herbst (Coleoptera: Coccinellidae) was once widespread and commonly collected in North America; however, its abundance and distribution decreased over the 1970s and 1980s. It has not been collected by recent surveys in some areas and in other areas is only rarely collected. Museum records were examined and a survey of Minnesota soybean fields was conducted via sweep-net sampling in July and August 2011. Results suggest that *C. novemnotata* is absent from or below the detection threshold in the majority of the state of Minnesota. However, there appears to be an area in east central Minnesota with at least sustained low, but detectable populations of *C. novemnotata* and it is active in agricultural crops.

The status of *Coccinella novemnotata* Herbst (Coleoptera: Coccinellidae) populations is of concern to conservation biologists (Harmon et al. 2007, Losey et al. 2007). This species was once widespread and commonly collected in North America (Gordon 1985). In Minnesota, Stehr (1930) wrote: "This is the commonest species of the genus *Coccinella* in the state. It is usually abundant wherever aphids are present. It is especially common on field crops and grass and must be rated among those species of greatest economic benefit." However, the abundance and distribution of *C. novemnotata* decreased over the 1970s and 1980s to a point where it has not been collected by recent surveys in some areas and in other areas is only rarely collected (Wheeler, Jr. and Hoebeke 1995, Harmon et al. 2007, Losey et al. 2007, Hesler and Kieckhefer 2008, Hesler et al. 2009, Fothergill and Tindall 2010). The reasons for the decline of this species remain undetermined, but several factors have been proposed (Wheeler, Jr. and Hoebeke 1995). Of these, two potentially important factors for consideration are the establishment of adventive coccinellids and changes in land use and cropping systems (Harmon et al. 2007).

Coccinella novemnotata remains rare in the upper midwestern United States. For example, this species has not been recorded from Iowa since 1972 (Hesler 2009). However, there have been some recent detections of *C. novemnotata* in the region. Two adult *C. novemnotata* were collected near Madison, Wisconsin in 2000 (Harmon et al. 2007). In 2008, three adults were collected from western South Dakota and nine from western Nebraska (Hesler et al. 2009), but no detections were made in the eastern portion of South Dakota (Hesler and Kieckhefer 2008). More recently in Wisconsin, single adult *C. novemnotata* were collected from Buffalo County in 2009 and 2010 (Discover Life 2011). However, the status of this species in Minnesota has remained undocumented in the literature over recent years. Recent literature including coccinellids in Minnesota have not reported *C. novemnotata* (Wold et al. 2001, Galvan et al. 2005, Chacón

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and Heimpel 2010, Gardiner et al. 2010). Here, I report the detection of this species via field surveys in Minnesota and report on recent museum records.

A survey of Minnesota soybean fields was conducted via sweep-net sampling in July and August 2011. Over 300 soybean fields were sampled throughout Minnesota, except the northeastern portion of the state where production of agricultural crops is minimal. In each field, three sets of 30 180°-sweeps were taken. The sweep contents were bagged and brought to the laboratory for identification of contents. Adult coccinellids were identified using Gordon (1985) and Gordon and Vandenberg (1991). From 978 adult coccinellids examined, two maculate *C. novemnotata* adults were found. On 10 August 2011, an adult *C. novemnotata* was collected from Anoka County. Other coccinellid adults collected from the sample (three sets of 30 sweeps) in the same field included seven *Harmonia axyridis* (Pallas). On 22 August 2011, an adult *C. novemnotata* was collected from Isanti County. Other coccinellid adults collected from the sample (three sets of 30 sweeps) in the same field included: 12 *Coccinella septempunctata* L., two *Cycloneda munda* (Say), 66 *H. axyridis*, and four *Hippodamia variegata* (Goeze). The identification of the two adult *C. novemnotata* was confirmed by Natalia Vandenberg (USDA ARS Systematic Entomology Laboratory) and these specimens were deposited in the University of Minnesota Insect Collection.

Examination of museum records showed that *C. novemnotata* has been collected periodically from the same general area of the state over the last 30 years (Table 1). There were no specimens from other areas of the state for the same time period. The majority of these records, all those from Anoka and Isanti counties in the University of Minnesota Insect Collection and Cedar Creek Ecosystem Science Reserve Insect Collection came from collections conducted at the Cedar Creek Ecosystem Science Reserve (Table 1). The specimen from Aitkin County in the Minnesota Department of Agriculture insect collection was collected from a cornfield during an autumn European corn borer, *Ostrinia nubilalis* (Hübner) (Lepidoptera: Crambidae), survey (Table 1).

The combination of published surveys, museum records and results of 2011 soybean survey suggest that *C. novemnotata* is absent from or below the detection threshold in the majority of the state of Minnesota. However, there appears to be an area in east central Minnesota with sustained low, but detectable populations of *C. novemnotata*. Unlike the relatively recent detections of *C. novemnotata* on milkweed (*Asclepias* sp.) in Wisconsin (Harmon et al. 2007) and on uncultivated plants, on roadside vegetation and in rangeland pasture in western South Dakota and western Nebraska (Hesler et al. 2009), the data presented here suggest that *C. novemnotata* in east central Minnesota is still active in agricultural crops (e.g., corn and soybean). Further, more focused, work is suggested to try to better determine the range, abundance and host and habitat utilization of *C. novemnotata* in Minnesota.

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Table 1: Recent records of *Coccinella novemnotata* occurrence in Minnesota based on museum records and a statewide soybean survey.

Year	Number of specimens of <i>C. novemnotata</i>			
	Aitkin County	Anoka County	Isanti County	Anoka/Isanti County ^a
1981				
1982		5 ^{bc}	6 ^{bc}	
1983		8 ^{bc}		
1984		4 ^c	4 ^c	
1985		4 ^{bc}		
1986				
1987			1 ^b	
1988			1 ^c	
1989		1 ^b	1 ^b	
1990			1 ^b	
1991				
1992			5 ^c	1 ^c
1993				
1994				1 ^c
1995				
1996				
1997				
1998				1 ^c
1999				1 ^c
2000				2 ^c
2001				
2002				1 ^c
2003				
2004	1 ^d			
2005				
2006				
2007				
2008				
2009				
2010				
2011		1 ^e	1 ^e	

^a Location labels for individual specimens listed both counties.^b University of Minnesota Insect Collection.^c Cedar Creek Ecosystem Science Reserve Insect Collection.^d Minnesota Department of Agriculture Insect Collection.^e 2011 Minnesota Department of Agriculture soybean survey.

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