

# Species Status Assessment

**Common Name:** Nine-spotted lady beetle

**Date Updated:**

**Scientific Name:** *Coccinella novemnotata*

**Updated By:**

**Class:** Insecta

**Family:** Coccinellidae

**Species Synopsis** *(a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York):*

*Coccinella novemnotata* is a small, oval-shaped insect that ranges from 4.7 to 7 mm. The head is broad with a pale spot between the eyes. Key characteristics for identifying *C. novemnotata* (also known as C-9) include a large ventral pale trapezoidal spot that extends posteriorly as far as the dorsal spot. The elytra have black spots that get smaller in size and in number until the scutellar spot. Typically, there are a total of nine spots, but the number can vary. Sexes are similar.

C-9 is typically found in open landscapes, especially agricultural land. Aphids are a preferred food. Historically, this species' range included the Nearctic Region of the United States and southern Canada. It was once considered the most common lady beetle in New York and was named the state insect in 1989. Populations have sharply declined since the 1980s and the species has not been found in the Northeast with the exception of a small population at a farm in Suffolk County, New York (Cornell University 2013).

## I. Status

### a. Current legal protected Status

i. **Federal:** Not listed **Candidate:** No

ii. **New York:** Not listed

### b. Natural Heritage Program

i. **Global:** G2

ii. **New York:** Not ranked **Tracked by NYNHP?:** No

### Other Ranks:

-New York 2025 SGCN status: Species of Greatest Conservation Need

-IUCN Red List:

-Northeast Regional SGCN:

### Status Discussion:

## II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Declining	1987-2013		
Northeastern US	Yes	Declining	Declining	1987-2013		
New York	Yes	Declining	Declining	1970-2013		Yes
Connecticut	No	Choose an item.	Choose an item.	1987-2013	SH	No
Massachusetts	Yes	Unknown	Unknown	1989-2013	Not listed	No
New Jersey	Yes	Unknown	Unknown	1989-2013		Yes
Pennsylvania	Choose an item.	Unknown	Unknown	1989-2013	Not listed	No
Vermont	Choose an item.	Unknown	Unknown	1989-2013	Not listed	No
Ontario	Choose an item.	Unknown	Unknown	1989-2013		
Quebec	Choose an item.	Unknown	Unknown	1989-2013		

Column options

**Present?:** Yes; No; Unknown; No data; (blank) or Choose an Item

**Abundance and Distribution:** Declining; Increasing; Stable; Unknown; Extirpated; N/A; (blank) or Choose an item

**SGCN?:** Yes; No; Unknown; (blank) or Choose an item

### **Monitoring in New York** (*specify any monitoring activities or regular surveys that are conducted in New York*):

Regular surveys are not taking place, but there is a citizen science project (The Lost Ladybug Project) that started in 2000.

USDA APHIS surveys in 1993 found zero *C. novemnotata* during surveys in 11 Northeastern states, including New York (Harmon et al. 2007, The Lost Ladybug Project, 2013).

### **Trends Discussion** (*insert map of North American/regional distribution and status*):

*C. novemnotata* was once widespread and common across North America. As of December 2013, The Lost Ladybug Project reported sightings from only 14 states and two provinces. The majority of the sightings were from the western United States, especially dry, high elevations of Colorado and South Dakota and pan handle of Nebraska (Cornell University 2013). In 1993, USDA APHIS conducted comprehensive surveys in which no *C. novemnotata* were found in the Northeast (Harmon et al. 2007). More recent surveys have shown a sharp decline in the population and range of this species.

*C. novemnotata* is the state insect of New York. It was once considered the most common lady beetle in the state. The decline went largely unnoticed until the 1980s. The Lost Ladybug Project has reported a single known location in New York with 21 lady beetles from an organic farm in Amagansett on 8/16/2011 (Cornell University 2013).

Year last collected:

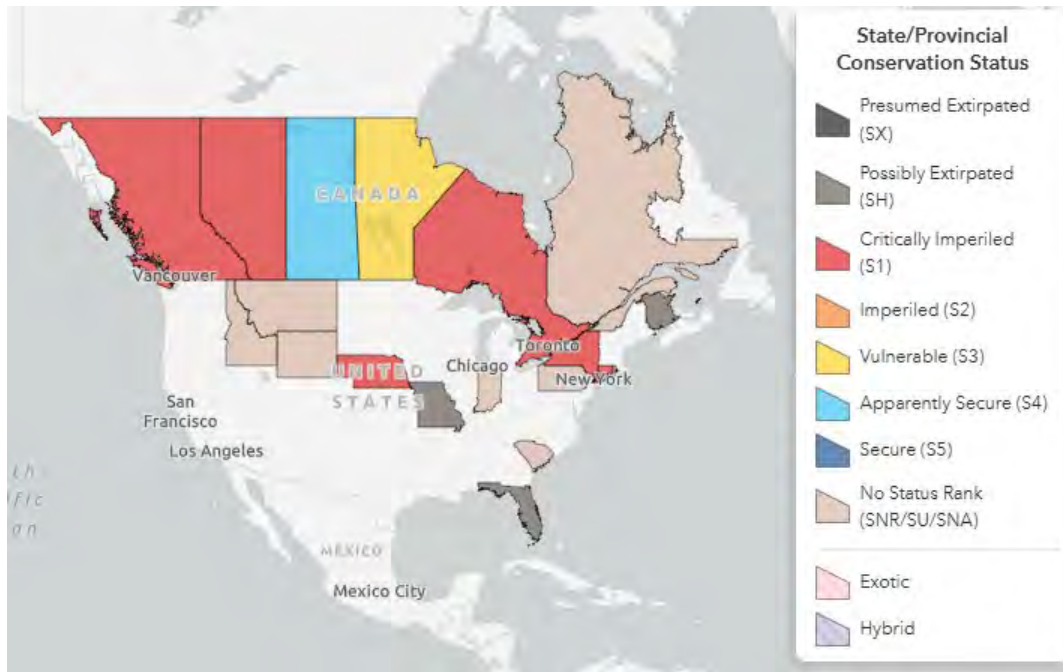
Maryland 1987

Pennsylvania 1987

Delaware 1988

Maine 1992

Declines noted in Alabama, Mississippi since the 1990s. It is possibly extirpated from southern Ontario and is being considered for listing in Canada.



**Figure 1.** Conservation status of *Coccinella novemnotata* in North America (NatureServe 2024).

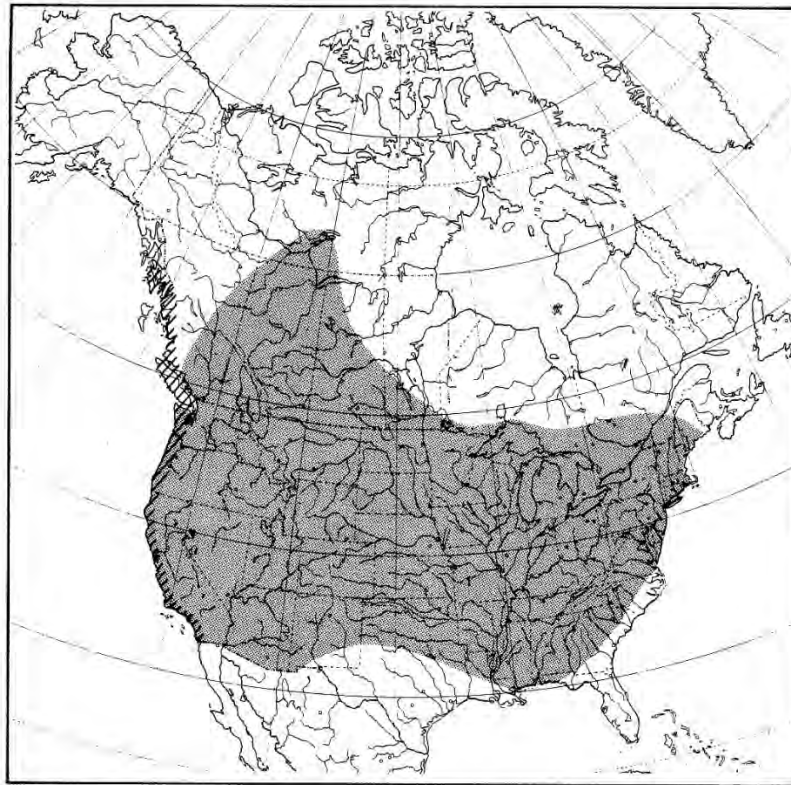


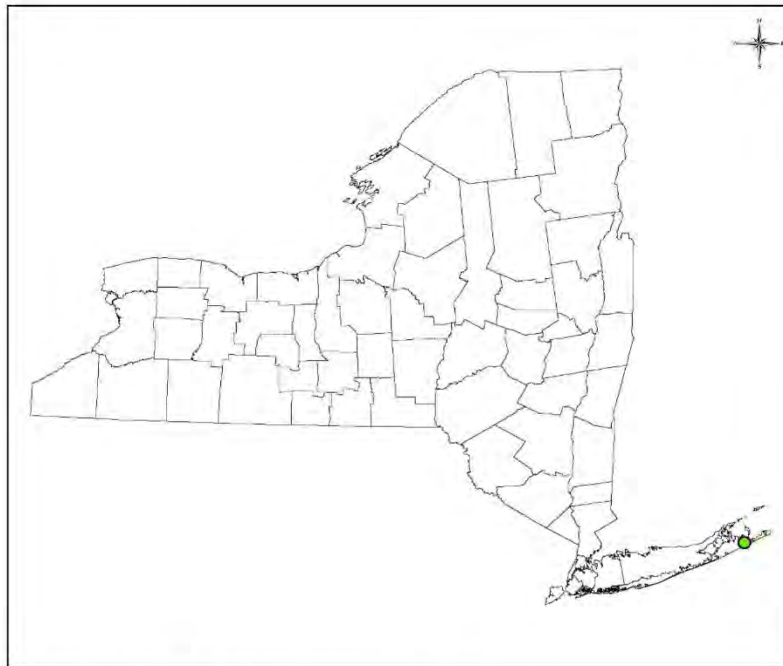
Fig. 644. Distribution. *Coccinella johnsoni* (cross hatch, west coast); *C. novemnotata*.

**Figure 2.** *C. novemnotata* range map prior to recent decline (Gordon 1985)



**Figure 3.** *C. novemnotata* range map 2000-2013 (Cornell University 2013)

**III. New York Rarity** (provide map, numbers, and percent of state occupied)



New York State Range Map for *Coccinella novemnotata* (ninespotted lady beetle) 2000-2013 (The Lost Ladybug Project 2013)

**Figure 4.** Records of *C. novemnotata* in New York 2000-2013 (The Lost Ladybug Project 2013)

Years	# of Records	# of Distinct Waterbodies/Locations	% of State
Pre-2000	_____	_____	_____
2000-2023	_____	_____	<1%

**Table 1.** Records of *C. novemnotata* in New York.

**Details of historic and current occurrence:**

While it's difficult to assign numbers concerning the historical range, there were small studies in the last 100 years that give some indications of the population status. In 1924, a study in Ithaca found that C-9 made up 13% of the Coccinellidae. Another study in 1971 shows a decline with a maximum of one C-9 per 100 stems counted (weekly). Another study on Long Island from 1956-1958 found C-9 represented 19% of the Coccinellidae population in a potato crop. USDA records show that C-9 was not common in the Northeast in the 1980s or early-1990s (Harmon et al. 2007). It has not been found in any Northeastern state except New York in recent years.

There is one known location where approximately 21 individuals have been found on a farm in Amagansett in Suffolk County (Cornell University 2013).

**New York’s Contribution to Species North American Range:**

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Core	

*Column options*

**Percent of North American Range in NY:** 100% (endemic); 76-99%; 51-75%; 26-50%; 1-25%; 0%; Choose an item

**Classification of NY Range:** Core; Peripheral; Disjunct; (blank) or Choose an item

As of 2013, there is only one known New York population in Amagansett in Suffolk County. In general, there have been notable declines throughout *C. novemnotata*’s range. Since the beginning of The Lost Ladybug Project (Cornell University 2013) in 2000, this species has not been found in any state or Canadian province that borders New York.

**IV. Primary Habitat or Community Type** *(from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):*

- a. Agricultural (NLCD agricultural class 81-82) (confirmed)
- b. Open Shrubland/grassland

**Habitat or Community Type Trend in New York**

Habitat Specialist?	Indicator Species?	Pollinator Species?	Habitat/Community Trend	Time frame of Decline/Increase
No	Yes	Choose an item.	Declining	

*Column options*

**Habitat Specialist, Indicator Species and Pollinator Species:** Yes; No; Unknown; (blank) or Choose an item

**Habitat/Community Trend:** Declining; Stable; Increasing; Unknown; (blank) or Choose an item

(Stephens and Losey (2003) suggested lady beetles are a good indicator of ecological health because of their sensitivity to natural enemies and anthropogenic influences.)

**Habitat Discussion:**

The preferred habitat is open landscape such as grasslands and agricultural land. Preferred agricultural crops include: alfalfa, clover, corn, potatoes, and soybeans. Suburban areas and wooded habitats have also been reported as suitable habitat. The Lost Ladybug Project (Cornell University 2013) reported the following habitats across North America: yard/backyard, woods/trees, garden (fava bean), meadow (non-agricultural- grass/weed), bushes/shrubs, wetland, and soil/rock/sand (not shore).

Agricultural land has been declining in New York since the 1880s. Between 1940 and 1997, there was a 57% decline in farmed land in New York (Harmon et al. 2007).

## V. Species Demographic, and Life History:

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/Catadromous?
Yes	Yes	Choose an item.	Yes	Yes	Choose an item.

Column options

First 5 fields: Yes; No; Unknown; (blank) or Choose an item

Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

**Species Demographics and Life History Discussion** (include information about species life span, reproductive longevity, reproductive capacity, age to maturity, and ability to disperse and colonize):

*C. novemnotata* larvae hatch from eggs after four days and undergo four instars before pupating. It takes approximately four to five days to reach the third instar. Seven days later, the larvae are at the pre-pupal stage for one day before pupating and metamorphosing. Adults emerge approximately four days after pupating. Elytra harden after one day. Sexual maturity is reached two to four days after emergence (Losey et al 2012). Adults are polygynandrous and breed for several weeks. The last generation overwinters (Ijaz 2013). (Summary: 20 days from egg to adult; adults live/mate for several weeks.)

This species is diurnal. Movement is either flight or crawling.

Interspecies depredation and cannibalism have been documented. *Perilitus coccinellae*, a braconid wasp, parasitizes lady beetles (Ijaz 2013). Microsporidia, a pathogen, has been documented and its impact on this species is under investigation (Cornell University 2013).

It appears that competition with other aphid-eating insects, such as *C. septempunctata*, may be leading to smaller ninespotted ladybeetles. This leads to higher mortality and lower fecundity (Losey et al 2012, The Lost Ladybug Project 2013). Losey et al (2012) found that simply limiting the number of aphids has a significant effect on the C-9's size. The size of the field collected specimens was similar to lab-reared beetles that were fed 5 aphids per day. Survival for this group in the lab was 23% compared to the highest survival rate of 75% for lady beetles that were fed 21 aphids per day.

## VI. Threats (from NY 2015 SWAP or newly described):

1. While it is difficult to prove, it appears this species has been displaced by the nonnative C-7. C-7 and C-9 use similar habitats. Note: Some field collected C-9 were significantly smaller than their laboratory offspring which had constant access to aphids. These recently collected field specimens are also smaller than specimens at Cornell University that were collected between 1909 and 1972. Smaller adults have lower survival and fecundity. C-9 may be smaller as a result of competition with C-7 (Lost Ladybug Project, 2013).
2. A decline in farming (farm/open habitat loss) has decreased the available suitable habitat.
3. C-9 appears to be sensitive pesticide use (Stephens and Losey 2003).

Note: These are general threats that may or may not apply to the site on Long Island. However, C-7 has been found at the site making competition a likely threat.

<b>Threat Level 1</b>	<b>Threat Level 2</b>	<b>Threat Level 3</b>	<b>Spatial Extent</b>	<b>Severity</b>	<b>Immediacy</b>	<b>Trend</b>	<b>Certainty</b>
7. Natural System Modifications	7.3 Other Ecosystem Modifications	Choose an item. (loss of agricultural land/ open habitats)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
8. Invasive & Other Problematic Species	8.1 Invasive Non-Native Plants & Animals	8.1.1 Terrestrial animals ( <i>C. septempunctata</i> (C-7))	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
9. Pollution	9.3 Agricultural & Forestry Effluents	9.3.3 Herbicides & pesticides	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

**Table 2.** Threats to *Coccinella novemnotata*.

**Are there regulatory mechanisms that protect the species or its habitat in New York?**

Yes: x

No:

Unknown:

**If yes, describe mechanism and whether adequate to protect species/habitat:**

The preservation of farm land via conservation easements would help preserve/conservate suitable habitat. Sustainable and/or organic farming practices would be beneficial

**Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:**

Action Category	Action	Description
A.2 Direct Species Management	A.2.2.1.0 Reintroduce species	
A.2 Direct Species Management	A.2.3.0.0 Stewardship of captive individuals	Ex-situ conservation (laboratory rearing)
B.5 Economic and Other Incentives	B.5.4.0.0 Economic incentives and disincentives	Conservation Payment (Farmland Conservation)

**Table 3.** Recommended conservation actions for *C. novemnotata*.

Note: These are general conservation action that may or may not apply to the site on Long Island.

Additional research is needed to determine specific habitat needs. Additional survey work is needed to determine the full range and population size in New York. Consider incentives that encourage sustainable farming or reduced pesticide use.

Implement landowner incentives to organic farmers or other productive open areas where pesticides are not used. This addresses the threat of insecticides, and could be applied on Long Island or other areas where reintroductions are being considered.

**VII. References**

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