

Lady Beetles of Nebraska

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Lady beetles are some of the most noticeable and popular insects found in the garden and on the farm. This publication will help the farmer, gardener, or amateur naturalist to better understand and identify lady beetles found in Nebraska.

Biology

Lady beetles are in the family *Coccinellidae*, of which nearly all members are predators. Most lady beetles are recognizable by their black-on-red spotted pattern and hemispherical shape (*Figure 1*). Other beetles, including *Scymnus* species, are smaller and black, and are often beneficial in controlling spider mites and small insects.

Lady beetles undergo complete metamorphosis, passing through the developmental stages of egg, larva, pupa, and adult. Both larvae and adults feed voraciously on aphids, mealybugs, and other soft-bodied insects. They may also feed on insect eggs, pollen, and other protein sources.

Lady beetles often lay their eggs on vegetation. They deposit them upright in clusters of 5 to 50 bright yellow eggs (*Figure 2*). Just before hatching, the eggs darken. Once the tiny larvae hatch, they eat their eggshells, usually staying clumped together for a day or so before they crawl off in search of prey. They grow in four discrete larval stages called *instars*, and molt between each stage.



Figure 1. Adult Seven-Spotted lady beetle searching for prey



Figure 2. Lady beetle egg cluster on a leaf (photo by Dori Porter)

Highly active, elongate, and gray or black (Figure 3), the larvae often have soft spines and orange markings that become more distinct as they develop.

Lady beetle larvae have an anal organ resembling a suction cup, which they use to grip vegetation as they move about. After the fourth instar, the larvae are engorged from eating and attach themselves securely to a surface to prepare for pupation (Figure 4). The cast larval skin can often be seen attached to the base of the newly formed pupa (Figures 4 and 5).

After a few days, a soft-bodied adult emerges from the pupal casing (Figure 6), inflates its wings, and allows its newly formed exoskeleton to harden. Within a few hours the lady beetle is hardened enough to walk about, and within a day or two, it has assumed its red-and-black color and can fly.

Adult lady beetles exhibit a peculiar behavior called **reflex-bleeding**. The bright yellow blood, or hemolymph, of lady beetles is distasteful to most predators and has a strong odor. When agitated, the beetles squeeze hemolymph out of their leg joints to ward off their predators and parasites. This odor can be noticed by smelling your fingers after capturing an adult lady beetle in your hand.

After a period of active feeding, adult lady beetles mate and the female lays her eggs. Most Nebraska lady beetles have one or two generations per year. Lady beetles overwinter as adults, emitting a chemical called an aggregation pheromone that attracts them into groups of hundreds or even thousands of adults. These aggregations are usually found in leaf litter, or under logs or other debris. The aggregation habits of multicolored Asian lady beetles attract them to houses and other structures, where they overwinter in walls. Because of this habit, the multicolored Asian lady beetle, which is otherwise a beneficial insect, is sometimes considered a pest. This will be discussed later.

Biological Control

Using natural enemies of pest organisms to aid in controlling them is called **biological control**. Lady beetles have long been known as natural enemies of pest insects such as aphids, mealybugs, and scale insects.

Lady beetles can be purchased commercially in large quantities for release, but this practice is not recommended as the lady beetles usually will fly away within a few days. Generally speaking, it is better to allow lady beetles to arrive of their own accord and to avoid practices such as the spraying of broad-spectrum insecticides, which hinder their success.



Figure 3. Lady beetle larva eating another insect's eggs



Figure 4. Prepupa and newly-formed pupa (photo by Dori Porter)



Figure 5. Mature lady beetle pupa (photo by Dori Porter)



Figure 6. Newly emerged lady beetle adult hanging below pupal case (photo by Dori Porter)

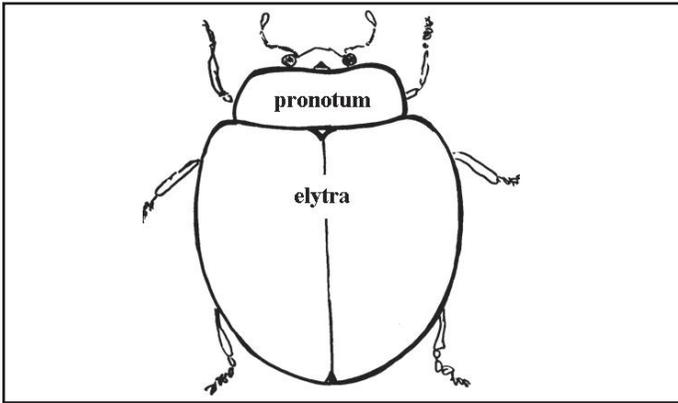


Figure 7. Generalized diagram of a lady beetle viewed from above, showing parts used in identification

Guide to Lady Beetles of Nebraska

The following species are regularly collected in garden and farm settings in Nebraska. Photos of adult lady beetles are provided, but please note that using color and number of spots to identify lady beetles to species is not the best method. The most important characteristics are the patterns on the pronotum and elytra, and overall body shape.

The pronotum is a plate visible from the top of the insect just behind the head. It is usually white or cream-colored and marked with a distinct black pattern.

The elytra are shield-like structures behind the pronotum that cover adult beetles' wings, as seen in *Figure 7*. A similar drawing is provided with each species description.

Elytra are tan to deep red and often bear the characteristic spots. Even within species, the color of elytra, and number and size of spots, may vary.

Lady Beetle Identification

What follows is a simple identification key to the most common lady beetle adults included in this publication. Characteristics are based on the colors and patterns on the pronotum and elytra as illustrated below. To use the key, read each pair of choices and compare your lady beetle with the appropriate figure.

- 1a Pronotum is black with two converging white dashes Convergent lady beetleFigure 8
- 1b Pronotum is not as described in 1a..... 2a
- 2a Pronotum is black with white marks at the front corners and the elytra are orange-red with seven spots in total Seven-Spotted lady beetle.....Figure 9
- 2b Beetle is not as described in 2a..... 3a
- 3a Pronotum is white with a solid or broken "M" shape in black, which separates two round lobes on each side Multicolored Asian lady beetleFigure 10
- 3b Pronotum is not as described in 3a..... 4a
- 4a Beetle is elongate and orange with 13 black spots evenly spaced on the elytra Thirteen-Spotted lady beetle.....Figure 11
- 4b Beetle is not as described in 4a..... 5a
- 5a Beetle is only 4-5mm long, elytra are tan to red in color with no spots, pronotum is white around the border with two thin lobes extending into the black center Polished or Red lady beetleFigure 12
- 5b Beetle is not as described in 5a..... 6a
- 6a Beetle has parenthesis-shaped marking on each elytron..... Parenthesis lady beetleFigure 13
- 6b Pronotum is pink to red with two irregularly-shaped black spots and elytra are colored similarly with 10 black spots, some of which may be fused Spotted lady beetle.....Figure 14

The Convergent Lady Beetle, *Hippodamia convergens* (Figure 8). This lady beetle is easily recognized by its distinctive pronotum, which bears two white converging dashes that give the beetle its name. A native species, this beetle's elytra are orange to red and may have as many as 12 spots. Some adults have no spots at all. Overwintering aggregations of thousands of convergent lady beetles are sometimes found in wooded areas in the late fall and early spring. In the heat of summer, they often aggregate in cool places such as shady spots or along lake shores.



Figure 8. Convergent lady beetle (photo by Dori Porter)

The Seven-Spotted Lady Beetle, *Coccinella septempunctata* (Figure 9). This large lady beetle, introduced from Europe, is the "classic" lady beetle depicted in images throughout the United States and Europe. It was released many times in the later part of the 20th century throughout the United States. It became increasingly common in Nebraska in the 1990s and may be displacing native species. Adults are robust and nearly hemispherical. Each individual elytron bears three spots, with one central spot near the pronotum, for a total of seven spots. The central spot is often highlighted with hazy white at the front, and the black pronotum is marked at the front corners with white.



Figure 9. Seven-Spotted lady beetle

The Multicolored Asian Lady Beetle, *Harmonia axyridis* (Figure 10). This notorious lady beetle, native to China and Japan, is our most recent arrival in Nebraska. It is given its name because its elytra vary from yellow to brown, with a spectrum of oranges and reds in between. It may be covered in spots, or have no spots at all. Its most distinguishing characteristic is the pronotum. It is white with a solid or broken "M" shape in black, which separates two round white lobes on each side.

To the homeowner, the most distinctive characteristic of this species is its tendency to invade houses and other buildings each fall. On warm days, these beetles may be crawling all about, much to peoples' annoyance. They have been known to bite, although they have no venom. They tend to be more attracted to whichever sides of buildings receive afternoon sun. Prevent an indoor invasion by carefully sealing cracks and other points of entry. The most recommended means of removal is a vacuum cleaner with a hose attachment. Smashing them or attempting to sweep them away may result in small yellow stains on carpet caused by the beetles' reflex bleeding. In the summer this species is an excellent predator of many pests, especially those in trees. Its comparatively large size and appetite, however, may result in displacement of native species. Now established, this lady beetle must be tolerated, if not appreciated, as it is here to stay.

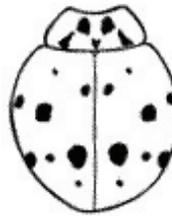


Figure 10. Multicolored Asian lady beetle. Note the variation in color and pattern on elytra and variations of the distinctive pattern on the pronotum.



Figure 11. Thirteen-Spotted lady beetle (photo by Marlin Rice)

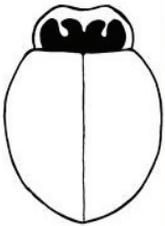


Figure 12. Polished or Red lady beetle (photo by Dori Porter)



Figure 13. Parenthesis lady beetle



Figure 14. Spotted lady beetle (photo by Jim Kalisch)

The Thirteen-Spotted Lady Beetle, *Hippodamia tredecimpunctata* (Figure 11). At the time of publication, this was the least collected lady beetle species listed in this publication. This species is native to Nebraska. It is elongate and orange with 13 round black spots evenly spaced on its elytra.

Polished or Red Lady Beetle, *Cycloneda munda* (Figure 12). This attractive beetle is smaller than some species (4-5 mm) and never has any spots. Its pronotum is white around the border, with two thin lobes extending into the black center. It is domelike in shape and ranges from tan to red. It is sometimes found in gardens, ditches, and fields.

Parenthesis Lady Beetle, *Hippodamia parenthesis* (Figure 13). This native species is named for the patterns resembling parentheses on its elytra. It is an elongated, smaller beetle (4-5 mm), often found in prairie settings and overgrown areas. It moves very quickly when disturbed, often dropping to the ground and running under debris. It is not as common in Nebraska as most of the other species listed in this publication.

The Spotted Lady Beetle, *Coleomegilla maculata* (Figure 14). This is a native species especially common in southeastern Nebraska. It is the only species in this guide with a pronotum that is not black or white. Adults are medium-sized (5-7 mm), light to dark pink, and have two irregularly shaped black spots on a pink pronotum. Together, the elytra are somewhat almond-shaped and have 10 spots, some of which may be fused together. This insect is often noticed on flowers, where it sometimes feeds on pollen.

Other Lady Beetles of Nebraska

The following species (not pictured) are recorded as having been collected in Nebraska. Brief descriptions are provided.

Chilocorus stigma — the twice-stabbed lady beetle. Small and round like *C. munda*, but entirely black except for two large red spots, one on each elytron.

Anatis quindecimpunctata — A very large and striking lady beetle. Elytra are red to brown with black spots circled with off-white.

Adalia bipunctata — Usually red to orange-red elytra, each with one large black spot. This species was last recorded in Nebraska in 1952.

Coccinella transversogutata — This relative of the Seven-Spotted lady beetle has a thick transverse line on its elytra near the pronotum.

Psyllobora vigintimaculata — This is a very small but attractive beetle with a brown-and-cream colored pattern on its elytra.

Stethorus punctum — minute (1.4 mm), shiny black.

Tiny lady beetles in the genera *Hyperapsis* and *Scymnus* have been recorded, but not identified to species. They are often brown to black in color.

For More Information

For more information about lady beetles, their identification, and their role in biological control, the following Web sites are excellent:

<http://lancaster.unl.edu/enviro/pest/Articles/asialadybeetle.htm>

http://entomology.unl.edu/images/beneficials/beetles/bene_beetles.htm

<http://www.nysaes.cornell.edu/ent/biocontrol/predators/ladybintro.html>

<http://www.ncipm.org/alerts/malb.cfm>

<http://ohioline.osu.edu/hse-fact/1030.html>

<http://www.ars.usda.gov/is/br/lbeetle/>

Acknowledgment

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