



Extension FactSheet

Entomology, 1991 Kenny Road, Columbus, OH 43210-1000

Multicolored Asian Lady Beetle

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Common name—multicolored Asian lady beetle

Scientific name—*Harmonia axyridis* (Pallas)

Order: Family—Coleoptera: Coccinellidae

Lady beetles, which are sometimes called ladybugs or ladybird beetles, are familiar insects in many parts of the United States. For the most part, lady beetles are beneficial predators that consume aphids, scale insects, and many other pests that injure plants in our gardens, landscapes, and agricultural settings. Ohio's state insect is a native species, the convergent lady beetle, *Hippodamia convergens* Guerin. During late autumn, aggregations of some species of native lady beetles seek shelter in leaf litter or under loose bark, logs, rocks, etc., where they overwinter (hibernate).

The multicolored Asian lady beetle is native to Asia, where it is an important predator that feeds on aphids and other soft-bodied insects that dwell in trees. In their native habitat, large aggregations of these lady beetles often hibernate in cracks and crevices within cliff faces. Unfortunately, in the United States where cliffs are not prevalent, they seek overwintering sites in and around buildings.

During the past decade, the multicolored Asian lady beetle has emerged as a seasonal nuisance pest in many regions of our country. It was recognized in Ohio during October 1993, when some residents reported that thousands of lady beetles were congregating on homes and buildings, with many of these insects finding their way indoors. This species is sometimes called the Halloween lady beetle because some adults are a pumpkin yellow-orange color and large populations often occur in late October coinciding with Halloween festivities.

From October through March, OSU Extension offices receive numerous inquiries concerning the multicolored Asian lady beetle. Reports typically begin in October and November when the lady beetles start congregating and seeking hibernation sites, and again in February and March during bright, sunny, warm days, when the lady beetles are attempting to get out of the house for the outdoor habitat.

How Did These Exotic Lady Beetles Get Here?

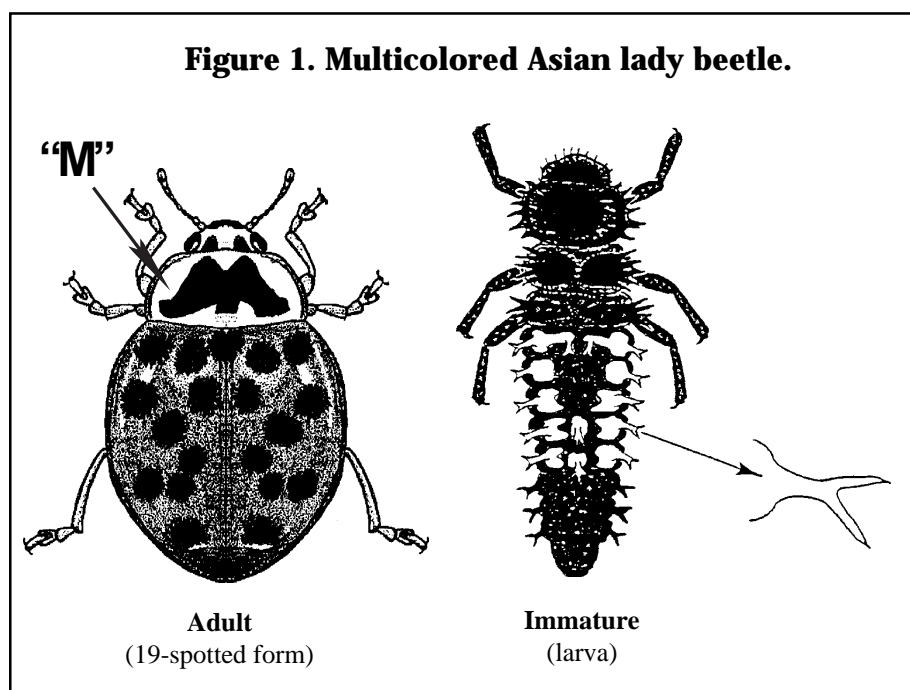
The multicolored Asian lady beetle made its way into the United States through a number of accidental and planned releases. There are several reports that this species was accidentally brought on ships to various ports, notably New Orleans and Seattle. This lady beetle was also intentionally imported from Russia, Japan, Korea, and elsewhere in the Orient and released in the United States as part of a Federal effort to naturally control insect pests in trees. The rationale was that native species of lady beetles are not particularly effective in controlling tree-feeding aphids and scale insects. The Federal releases were made in California as early as 1916 and again in the mid-1960s, but the multicolored Asian lady beetle apparently failed to establish.

During the late 1970s through the early 1980s, tens of thousands of multicolored Asian lady beetles were intentionally released by the U. S. Department of Agriculture's Agricultural Research Service (USDA-ARS) in an effort to control insect pests that injure trees. The USDA-ARS coordinated the lady beetle releases in many southern and eastern states, including Ohio, Maine, Connecticut, Delaware, Pennsylvania, Maryland, Georgia, Mississippi, and Louisiana. In Ohio, a total of approximately 1,800 lady beetles was released in Cuyahoga and Lake Counties during June 1979 and July 1980. (No releases were made by The Ohio State University.) During this period, the largest USDA-ARS releases (more than 11,000 lady beetles) were made in Georgia. In addition, more than 14,000 lady beetles were released in the western United States near Yakima, Washington. Small releases were also made in the District of Columbia and in Nova Scotia, Canada. The USDA-ARS release program was eventually discontinued because failed recapture efforts suggested that the multicolored Asian lady beetle was not surviving in the United States.

Hence, there is some controversy regarding the origins of this nonnative species. Nonetheless, the multicolored Asian lady beetle is now well established in the United States, where it currently thrives in many parts of the Midwest, East, South, and Northwest. This nonnative species appears to be displacing some of our native lady beetles in Ohio.

Identification

The name “multicolored” refers to the many different color forms of the adult lady beetles. Color variants found in the United States are different shades of yellow, orange, or red, either with or without black spots on the wing covers. Some have 19 black spots while others have faded spots that vary in number and size. On the white pronotum (top covering of middle body part), many



have several spots that fuse into a regular- to irregularly-shaped “M.”

Adult multicolored Asian lady beetles are approximately 0.2 to 0.3 inches long. They are typical of many other lady beetle species, with a domed, round to oval shape. Particularly in outdoor situations, the multicolored Asian lady beetle may be confused with other types of lady beetles, including native species, that also are various shades of yellow, orange, red, or black, either with or without spots. A guide to identification of various lady beetle species is available at the following interactive web site: <http://www.schoolnet.ca/vp-pv/ladybug/e/ladybuge/ladybugs/bugmap.htm>. An important behavioral characteristic of multicolored Asian lady beetles is that they often seek hibernation sites in and around buildings, whereas native lady beetle species typically overwinter in sheltered sites outdoors.

Immatures (larvae) are covered with tiny, flexible spines (non-stinging). Their body is elongate, somewhat flattened, and “alligator-shaped.” The immatures can rapidly move about leaves and branches, where they eat aphids and other soft-bodied insects. Eggs are yellow, oval shaped, and occur in clusters of about 20, usually on the undersides of leaves.

Life Cycle and Habits

Large lady beetle populations typically build up during cool, wet summers that favor tender foliage and large aphid infestations. The life cycle from egg to adult requires about a month or so, depending on the weather. Eggs hatch in 3 to 5 days. Larvae feed for 12 to 14 days, during which time they consume large numbers of aphids, scale insects, and other soft-bodied insects. Pupation lasts 5 to 6 days until adults emerge. The adult stage is the longest with some lady beetles living up to 2 or 3 years.

Once the weather starts to turn colder, typically by mid-October in Ohio, multicolored Asian lady beetle adults begin to seek overwintering sites. The lady beetles appear to orient toward light-colored, conspicuous objects, such as white buildings. Large numbers collect on outside walls warmed by the sun, especially on the south and southwest sides. When one lady beetle lands, many others soon follow. Some research suggests that this aggregation behavior may involve chemical cues (pheromones), visual cues, or a combination thereof. However, additional research is needed.

Good Ladies, ...

The multicolored Asian lady beetle is an important predator that consumes aphids and scale insects on trees, shrubs, and agricultural crops. During the spring and summer, the immature and adult lady beetles consume large numbers of plant-feeding pests, thereby reducing the need for pesticides. The multicolored Asian lady beetle has significantly benefited the pecan industry by nearly eliminating injurious pecan aphids (<http://www.ars.usda.gov/is/pr/2000/001030.beetlemagstory.htm>). It also has impacted pests that injure other commodities, such as fruit orchards, Christmas trees, ornamentals, small grains, and many agricultural crops.

... With Some Bad Habits!!!

In spite of their important role in nature, multicolored Asian lady beetles can be seasonal pests in and around homes, particularly from late autumn until early spring.

Nuisances. Homeowners often express concern and aggravation with these nuisance pests. During late autumn, homeowners

complain that multicolored Asian lady beetles cluster on the sides of houses; “crunch” under foot; get into food and drinks; alight on hands, arms, and other parts of the body; and sometimes enter the ears and mouth. The lady beetles can be so numerous that they appear to be “raining” outdoors or swarming like bees. A variety of other problems are associated with these lady beetles, as detailed below.

Home Invasion. Unlike our native species of lady beetles, the multicolored Asian lady beetle seeks protected hibernation (overwintering) sites in and around buildings. They may occur in any type of structure. Because these exotic lady beetles readily occur on trees, homes in forested areas are often infested. Multicolored Asian lady beetles often are pests in log homes, because they can slip through the cracks and crevices between the logs.

Multicolored Asian lady beetles seek protected sites where they can hibernate. Some may overwinter underneath siding, roof shingles, landscaping timbers, or leaf litter. Others readily slip through cracks and crevices and come indoors, where they make themselves at home. They may cluster together in corners of porches, attics, soffits, wall voids, door or window frames, or dark, undisturbed areas within buildings. The beetles can form large, hidden aggregations in secluded dark locations inside homes, commonly in attics and basements. They periodically invade living spaces, apparently in response to the warm interior temperatures. On warm sunny days during the winter, they tend to move about and fly within living spaces. They readily fly to windows. During the spring, these lady beetles are particularly noticeable in houses when they leave their hibernation sites and attempt to make their way outdoors.

Stains and Odor. When lady beetles are disturbed, they defend themselves by exuding a yellow-orange body fluid, which is their blood. This defense mechanism is termed reflex bleeding. The blood has a foul odor and can permanently stain walls, drapes, carpeting, etc. Thus, do not crush or swat lady beetles so as to minimize their defensive behavior.

“Bites.” Although an uncommon occurrence, multicolored Asian lady beetles have been reported to nibble, nip, or “bite” humans. These lady beetles are not aggressive toward humans, and they simply may be examining an unfamiliar substrate or they may be seeking moisture. Their occasional nibbling is not reported to break the skin or draw human blood.

Allergic Reactions. Some individuals report an allergic response to lady beetles. Although published reports are uncommon, multicolored Asian lady beetle apparently can cause inhalant allergies. These allergies clear up once the lady beetles are removed.

Some people are sensitive or allergic to the fluid that lady beetles secrete, which can cause contact dermatitis and a stinging sensation. However, lady beetles cannot sting, because they do not possess a stinger.

Dispelling Myths and Misconceptions

Multicolored Asian lady beetles do not breed (reproduce) in structures. Females apparently overwinter unmated. Mating occurs during the spring after males and females leave their hibernation sites.

Multicolored Asian lady beetles do not carry disease organisms. They **do not** eat wood, building materials, or human food. In fact, multicolored Asian lady beetles do not consume food while overwintering, but instead rely on their stores of body fat. Otherwise, they eat aphids and other soft-bodied insects.

Management Approaches

The best management recommendation is to **prevent** multicolored Asian lady beetles from entering the home or building. Preventive measures should include a variety of non-chemical pest-proofing tactics. Take measures to exclude these lady beetles **before late autumn** when they begin to seek overwintering sites in structures.

Pesticides may be used to supplement control efforts, particularly if you have encountered persistent, large infestations of multicolored Asian lady beetles. Read the label before considering whether to use or apply a pesticide. The label is the law! It is important to precisely follow label directions. To do otherwise is unlawful and could result in significant health risks. Pesticides generally are not recommended for treating areas occupied by humans, but instead should be applied only to specific sites in order to minimize chemical exposure. Many pesticides are labeled for use only by certified, licensed applicators that have received specialized training on the use and disposal of pesticides. These pesticides should not be applied by unlicensed homeowners.

Do not use pesticides to treat landscapes surrounding infested homes and buildings in an attempt to control lady beetles. Lady beetles are attracted to structures from distant areas and thus are unlikely to be impacted by the pesticides. General pesticide sprays also kill beneficial insects, thereby causing outbreaks of other plant-infesting pests.

Outside the Home

Pest Proofing. Multicolored Asian lady beetles and many other insects can slip through gaps of about 1/8 inch. If lady beetles have been getting into your home, cold air also is entering in the winter and hot air in the summer. A thorough outdoor and indoor inspection is essential and this may require the services of a professional contractor.

It is important to seal cracks and openings in your home **before** lady beetles have found their way into your home. The following pest-proofing measures are a useful guide for excluding lady beetles from structures.

- Seal cracks around windows, doors, siding, utility pipes, and other openings. Use weather stripping or a good quality silicone or silicone-latex caulk. Larger gaps can be sealed

with urethane foam, glass wool or stainless steel wool, etc.

- Install tight-fitting door sweeps or thresholds at all exterior entry doors.
- Around garage doors, install a rubber seal rather than vinyl, which seals poorly in cold weather.
- Install insect screening (20-mesh maximum) over attic and exhaust vents to prevent lady beetle entry.
- Replace and repair damaged door and window screens.

Exterior Pesticide Treatments. These chemical treatments involve an appropriately labeled repellent, long-lasting pesticide to help prevent pest entry. The pesticide typically is applied to outside walls and siding, as well as around eaves, attic vents, roof overhangs, and doors and windows. It may be a good idea to enlist the services of a professional pest control company licensed to chemically treat the building exterior. Many pesticides are labeled for use only by certified, licensed applicators.

Wettable powder and microencapsulated formulations of residual pyrethroid pesticides appear to be most effective against multicolored Asian lady beetles. Residual pyrethroids include a variety of active ingredients, such as bifenthrin, cyfluthrin, cypermethrin, deltamethrin, lambda-cyhalothrin, or tralomethin. Pesticides that contain the active ingredients carbaryl or chlorpyrifos appear to be less effective against these lady beetles. Examine the pesticide label to determine what chemical is listed as the active ingredient. A variety of trade names may be used for the same chemical (active ingredient), depending on the manufacturers and distributors.

Timing is very important, and outdoor preventive treatments should be done prior to overwintering attempts by the lady beetles. If the chemical is applied after the first cold snap of autumn, lady beetles that already have congregated indoors will be unaffected. If applied too early, the chemical may degrade and lose its effectiveness against the lady beetles.

In Ohio, an exterior chemical application **during late September and early October** should work best as a preventive treatment. A second application may be needed if the chemical begins to degrade over a prolonged season. Again, always read and follow pesticide label directions.

Inside the Home

Mechanical Removal. Swatting, smashing, or crushing lady beetles is not a good idea because their body fluid can leave a permanent stain on carpets, curtains, walls, etc. Lady beetles will stick to duct tape or similar sticky tape, which then can be discarded. Although it may be practical to remove small numbers of lady beetles using sticky tape, vacuuming is a much more efficient and rapid technique.

“Bag ‘em!!!” Using a Vacuum Cleaner. An effective way to minimize problems with large numbers of multicolored Asian lady beetles is to use a vacuum cleaner or shop-vac to “bag” the

beetles. The beetles can be captured inside a knee-high nylon stocking that has been inserted into the extension hose or wand and secured in place with a rubber band (see Figure 2). As soon as the vacuum cleaner is turned off, be sure to remove the stocking so that the captured beetles cannot escape. As you remove it, the rubber band closes around the stocking, effectively “bagging” the lady beetles. You then can discard the contents of the stocking.

If you want to keep the lady beetles and release them during the spring, place a damp cloth (they need moisture) inside the stocking. If you want to reuse the stocking, place the damp cloth inside a container perforated with numerous air holes and empty the lady beetles into the container. The collected beetles should be kept in a protected, unheated area, such as a detached garage or storage shed.

Trapping. An apparatus to trap flying nuisance insects was recently developed by USDA-ARS scientists. The collection apparatus for lady beetles calls for a 15-inch by 8-inch plastic bag, either with or without an insecticidal pest strip. This bag must be emptied or replaced periodically when it fills with captured insects. A blacklight lamp is recommended for indoor use. Because this trap relies on a light source, it should be used in darkened areas of a structure. Instructions and a schematic for this indoor blacklight trap are available at the following web site: <http://www.ars.usda.gov/is/pr/2000/001030.trap.pdf>

It is unproven whether traps can solve large indoor infestations of multicolored Asian lady beetles. In homes, traps might be useful in dark attics or crawl spaces. Depending on the level of infestation, numerous traps may be necessary, one in each room, or a single trap may have to be moved to different problem areas. The effectiveness of traps may depend on the number and position of traps in structures, but such research has yet to be reported.

Interior Pesticide Treatments. Pesticides used indoors against multicolored Asian lady beetles have very limited impact, because large numbers of these insects typically hide in inaccessible areas. If an insecticide is used indoors, it should be **limited to specific locations** for relief of persistent and large lady beetle infestations. Residual pyrethroids appear to be the most effective, but only when the beetles are sprayed directly or when they crawl over treated surfaces. Products that contain a residual pyrethroid as the active ingredient may be marketed by different companies under a variety of trade names.

Do not use any type of aerosol fogger or “bug bomb” in an attempt to control lady beetles. Such chemical treatments are not warranted because they do not affect the majority of lady beetles that are hidden. The active ingredient has very limited effectiveness against lady beetles, and humans are unnecessarily exposed to chemicals in indoor environments. Furthermore, such treatments can cause additional, persistent indoor pest problems because scavenging pests (i.e., ants, dermestid beetles, including carpet beetles and larder beetles; etc.) are attracted to feed on accumulated dead insects.

Recent Research On Plant-Derived Natural Products And Natural Enemies

Preliminary research by USDA-ARS scientists in Beltsville, Maryland, indicates that camphor and menthol, which are secondary plant compounds, may repel multicolored Asian lady beetles. Adult lady beetles displayed the greatest avoidance response to camphor (<http://www.ars.usda.gov/is/pr/2001/010130.htm>). However, both of these chemicals evaporated quickly, and repellency was short-lived. On-going research aims to develop natural products and protocols for repelling nuisance lady beetle aggregations from buildings.

In 1993, North Carolina Department of Agriculture researchers documented substantial levels of parasitism (14.2%) of the multicolored Asian lady beetle by a tachinid fly. However, parasitism levels subsequently dropped to an average of 2 to 4% from 1994 through 1999 in North Carolina (C.A. Nalepa & K.A. Kidd, personal communication), suggesting that this parasitoid does not cause significant mortality of multicolored Asian lady beetles.

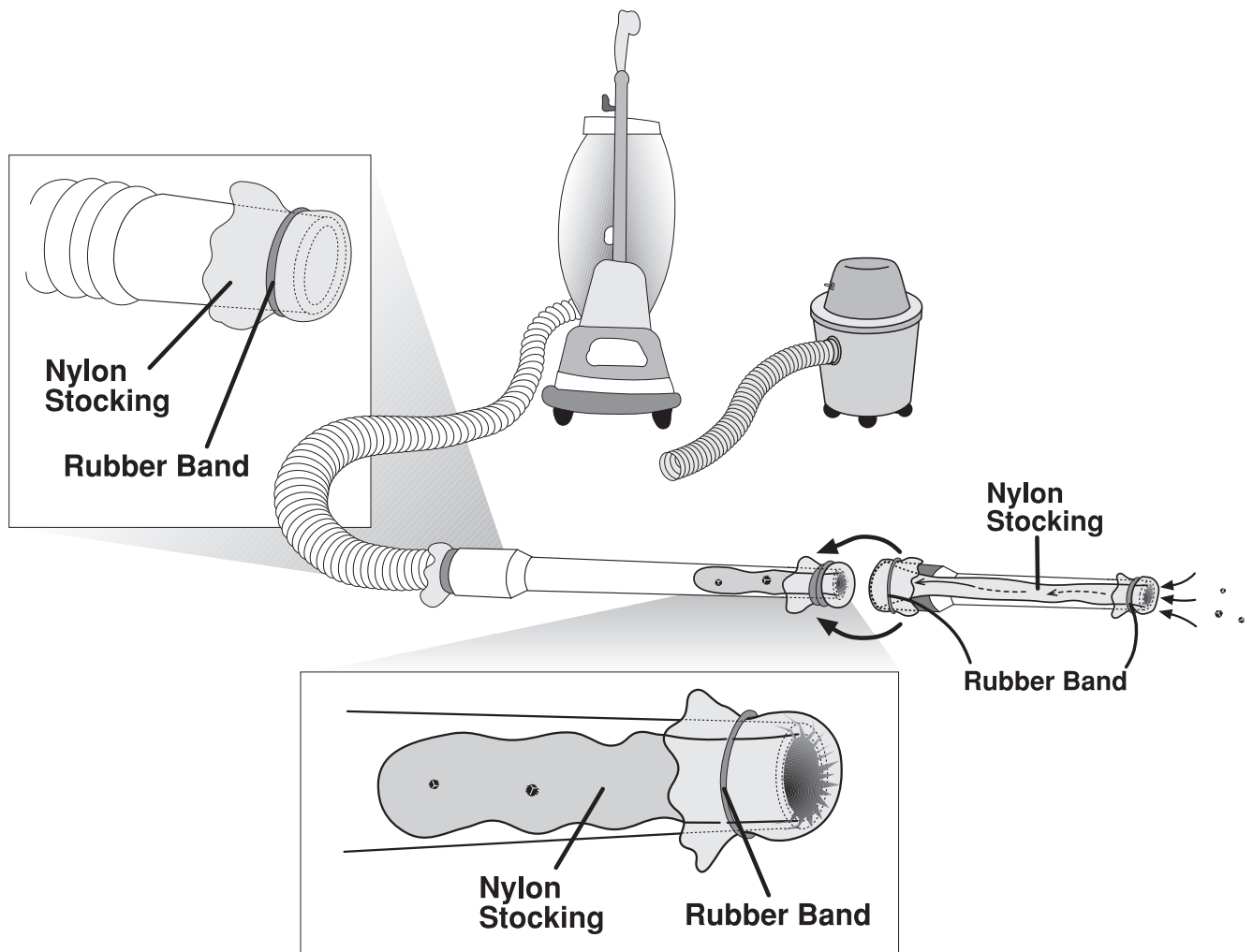


Figure 2. A nylon stocking inserted into a vacuum cleaner extension wand creates a handy bag for capturing lady beetles. Options are to also (A) rubber band a piece of nylon over the flexible hose to prevent lady beetle entry into the vacuum cleaner, (B) secure a nylon stocking (open at both ends) inside the foremost section of the wand to somewhat cushion the lady beetles and prevent staining.

Additional Resources

- USDA-ARS homeowner fact sheet:
<http://www.ars.usda.gov/is/pr/2000/001030.htm>
- USDA-ARS research laboratory that imported and released multicolored Asian lady beetles to control pecan pests in Georgia:
<http://www.ars-grin.gov/ars/SoAtlantic/Byron/seftnrl/>
- USDA-ARS research laboratory involved with the importation and release of multicolored Asian lady beetles for biological control of tree pests:
<http://ag.udel.edu/biir/>

Beneficial Insects Introduction Research

501 S. Chapel St.
Newark, DE 19713-3814
Phone: 302-731-7330
FAX: 302-737-6780

- University of Kentucky fact sheet:
<http://www.uky.edu/Agriculture/Entomology/entfacts/trees/ef416.htm>

- West Virginia University fact sheet:
<http://www.wvu.edu/~agexten/ipm/insects/ladybeetle.htm>
- Iowa State University fact sheet:
(<http://www.ent.iastate.edu/ipm/iin/ladybeetles.html>)
and images of various lady beetles:
(<http://www.ent.iastate.edu/imagegallery/lady/>).
- Interactive lady beetle identification (note that the multicolored Asian lady beetle [*Harmonia axyridis*] is labeled the “southern beetle”):
<http://www.schoolnet.ca/vp-pv/ladybug/e/ladybuge/ladybugs/bugmap.htm>
- Auburn University fact sheet:
(<http://www.aces.edu/department/ipm/ladybugs.htm>).
- Cornell University fact sheet:
<http://aruba.nysaes.cornell.edu/ent/biocontrol/predators/harmonia.html>

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