**Harmonia axyridis**

**System:** Terrestrial

<table>
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<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
<th>Family</th>
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<tbody>
<tr>
<td>Animalia</td>
<td>Arthropoda</td>
<td>Insecta</td>
<td>Coleoptera</td>
<td>Coccinellidae</td>
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**Common name**
Harlequin ladybird (English), Japanese lady beetle (English), multivariate lady beetle (English), Harlequin lady beetle (English), multicolored Asian lady beetle (English), southern lady beetle (English), Asian lady beetle (English), Halloween lady beetle (English), Asiatischer Marienkafer (English), pumpkin lady beetle (English), veelkeurig aziatisch lieveheersbeestje (English), la coccinelle asiatique (English)

**Synonym**

**Similar species**

*Hippodamia convergens*

**Summary**
Harmonia axyridis (lady beetle) is native to Asia and has been used extensively around the world for biological control of various aphid species. While it is a popular control agent, it has also brought with it several negative effects. Its establishment appears to decrease the diversity of native Coccinellidae. Harmonia axyridis can also quickly become a human nuisance when it seeks shelter during the winter months and takes up residency in the walls and insulation of houses and other structures. Surprisingly, Harmonia axyridis has also attained status as a pest of fruit production; particularly in the vineyards of the Midwestern USA.

[view this species on IUCN Red List](http://iucngisd.org/gisd/species.php?sc=668)

**Species Description**

*Harmonia axyridis* adults are larger than most of other ladybird species and measure 5-8mm in length and 4-7 mm in width. They are oval in shape and convex. The elytron usually displays a wide transverse "keel" at the apex. They are a highly polymorphic with elytra ranging from pale yellow-orange to black bearing 0-19 spots. The head, antennae, and mouthparts are generally straw-yellow and sometimes tinged with black. The pronotum is also straw yellow with markings being five black spots, lateral spots that generally join to form two curved lines, an M-shaped mark, or a solid trapezoid. Larvae have tubercles and spines which are elongate and somewhat flattened. Mature larvae are distinctive in their coloring which is black to dark bluish-gray, with a prominent bright yellow-orange patch extending over the dorso-lateral lobes of abdominal segments 1-5 on each side (Adriaens et al., 2003; Koch, 2003; Soares et al., 2008).

**Notes**

*Harmonia axyridis* is believed to be an effective colonizer and strong competitor because it has a wide trophic niche, a high level of phenotypic plasticity for several of its life-history traits, is a voracious predator, and has strong dispersal capacities that allow it to undertake long range migrations to over-wintering sites (Adriaens et al., 2003).
Lifecycle Stages
Harmonia axyridis undergoes a holometabolous life cycle going through the egg, four larval instars, pupal, and adult stages. Studies show that temperature has an effect on the adult weight and the rate of development of the stages. The diet of the beetle is also known to have an effect on larval development (Koch, 2003). It has been demonstrated that at 26°C on a diet of the pea aphid Acyrthosiphon pisum, the mean duration of each stage of H axyridis is as follows: egg 2.8 days, first instar 2.5 days, second instar 1.5 days, third instar 1.8 days, fourth instar 4.4 days, pupa 4.5 days (LaMana and Miller, 1998). Adults typically live for one to three months, but may live up to three years (Koch, 2003).

Uses
Harmonia axyridis is widely used as a biocontrol agent for reducing pest aphid populations in greenhouses, orchards, and gardens in North America since 1916 and in Western Europe since 1982 (Adriaens et al, 2003; Brown et al, 2008a; Koch, 2003). In several cases, this coccinellid has proven to be an effective biocontrol agent, particularly in pecans groves in southern United States (Koch & Galvan, 2008).

Habitat Description
Harmonia axyridis is known to colonize a wide range of habitats. They are found in cropping areas, meadows, and semi-natural areas (Branquart, 2004). In North America they are found on a variety of nursery, ornamental, and field crops, including cotoneaster, rose, Christmas trees, apple, pecan, alfalfa, wheat, cotton, tobacco, and small grains (Cornell University, 2004). In Belgium H. axyridis was most commonly found on nettle (Urtica dioica L.) and deciduous such as maple (Acer sp.), willow (Salix sp.), lime (Tilia sp.), oak (Quercus sp.) and birch (Betula sp.) but the number of observations was also high on pine tree (Pinus sp.), hawthorn (Crataegus sp.), and on a number of herbs such as reed Phragmites australis (Adriaens et al, 2008). They tend to overwinter in buildings where they aggregate in secluded dark places (Branquart, 2004). Its lower limiting temperature has been found to be a round 10°C (Putsma et al, 2008).

Reproduction
Harmonia axyridis may produce up to 1,642 to 3,819 eggs per female over their entire life span, at a rate of about 25 eggs per day. Eggs are typically laid in clusters of 20 to 30 eggs (Koch, 2003; Roy & Roy, 2008).

Nutrition
Harmonia axyridis preys mostly on tree-dwelling hemipteran insects such as aphids, psyllids, and scale insects. It also feeds on immature stages of other Coleoptera and Lepidoptera and plant material such as pollen and injured fruits (Koch, 2003).
**Global Invasive Species Database (GISD) 2015. Species profile Harmonia axyridis.**


**Global Invasive Species Database (GISD) 2015. Species profile Harmonia axyridis.**

Management Info

Physical: Household infestation by *Harmonia axyridis* may be prevented by sealing or screening entrance points such as window seams, weather stripping, cracks and small holes, exhaust vents, etc. The use of a broom or vacuum is recommended to remove large aggregations from homes. Various traps, including black light and other light traps specifically for capturing beetles are also available (Kenis *et al.*, 2008; Koch & Hutchison, 2003a).

Chemical: Traps utilizing pheromone and semiochemical lures are being investigated (Kenis *et al.*, 2008). Exterior application of insecticides focused around windows, doors, foundations, and eves may be prevent infestation by *H. axyridis* (Koch, 2003; Koch & Hutchison, 2003b). Most insecticides commonly used in agricultural environments are toxic to *H. axyridis* (Kenis *et al.*, 2008). DEET (N,N-diethyl-3-methylbenzamide) and repellents camphor and menthol have also been found to be effective (Koch & Galvan, 2008).

Insecticide treatment of *H. axyridis* in vineyards should not be done preventively but an integrated pest management program should be based on the timing of infestation, estimated levels of infestation and resulting taint, and control methods. *H. axyridis* adults begin to move to grape clusters between 2 and 3 weeks prior to harvest. Even though fluctuate during the growing season, grape growers should not act until 2 or 3 weeks before harvest when the proportion of injured berries increases, which then attracts and provides opportunity for *H. axyridis* to feed on the grapes. Grape growers can follow *H. axyridis* population fluctuation in vineyards using yellow sticky traps, which can be used as an early warning. Control measures to manage *H. axyridis* before it can become a wine contaminant are essential for reducing the economic impact of this pest on the wine industry. In field and laboratory studies, carbaryl, bifenthrin, zeta-cypermethrin, thiamethoxam, and imidacloprid showed either toxic and/or repellent effects. However, of these insecticides, only carbaryl, thiamethoxam and imidacloprid are currently labeled in the United States for use on wine grapes within 7 days of harvest, which is when *H. axyridis* typically reaches high densities (Koch & Galvan, 2008). Some discourage against the use of insecticides in vineyards and orchards because of their effect on native aphidophages and beneficial insects (Roy & Roy, 2008).

Biological control: Several parasitoids attack *H. attack* including phorids *Phalacrotophora philaxyridis* and other *Phalacrotophora* spp., tachinids *Degeria lutuosa* and *Strongyuster trianulifera*, and braconid *Dinocampus coccinellae* but have not been investigated as potential biological controls (Koch, 2003). The entomopathogenic fungus *Beauveria bassiana* infects *H. axyridis* and has been found to reduce egg production and cause winter mortality in studies and may hold potential as a biological control (Roy *et al.*, 2008b; Steenberg & Harding, 2009).

Pathway

The argument has been made that the current populations of *H. axyridis* in North America may have stemmed from accidental sea-port introductions (Koch, 2003).


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FULL ACCOUNT FOR: *Harmonia axyridis*