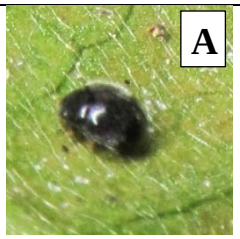
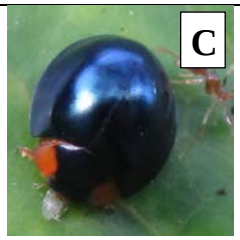
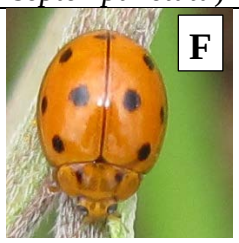
Not All Lady Beetles are Created Equal:
Learn about different Types of Lady Beetles in Hawaii with Special Talent

Jane Tavares, Koon-Hui Wang, and Jensen Uyeda
Department of Plant and Environmental Protection Sciences, CTAHR,
University of Hawaii

Sustainable Pest Management Lab

Although commonly known as ladybugs in America, Entomologists prefer to call insects in the Coccinellids family as ladybird beetles or lady beetles, as these insects are not true bugs. There have been at least 138 species of lady beetles (Coccinellids) reported to be introduced into Hawaii, either intentionally or adventively, of which 87 of these species are known to be established (Nishida, 2002). Lady beetles have various sizes, colors, patterns on their hardened forewings (elytra), and even on their prey preference. They can be as small as 1 mm long like those in the genera of *Stethorus* (A) or can be 7.5 mm long like the 7-spotted (B). Some can have elytra with no patterns like the metallic blue lady beetles (C), have strips like the three striped lady beetles (D), or have halos around their spots like the 10-spotted lady beetles (E). The spots can be small (F), large (G), or oblong (H). The morphology of lady beetle larvae can vary as much as the adults. Some can be mostly grey like the 7-spotted lady beetle (I), be strikingly colorful as seen with the 10-spotted lady beetle (J), be covered in white fluffy hairs like the globe-marked lady beetles (K), or be spiky as seen with the genus *Scymnus* (L) and the minute 2-spotted lady beetle (M).

 **A** (*Stethorus* sp.)	 **B** Seven-spotted lady beetle (*Coccinella septempunctata*)	 **C** Metallic blue lady beetle (*Curinus coeruleus*)	 **D** Three-striped lady beetle (*Brumoides suturalis*)
 **E** Ten-spotted lady beetle (*Bothrocalvia pupillata*)	 **F** Variable lady beetle (*Coelophora inaequalis*)	 **G** Variable lady beetle (*Coelophora inaequalis*)	 **H** Seven-spotted larva (*Coccinella septempunctata*)

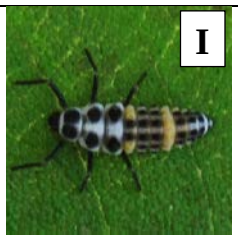
 Ten-spotted larva (*Bothrocalvia pupillata*)	 Globe-marked lady beetle (*Azya orbigera*)	 *Scymnus* sp.	 Minute two-spotted lady beetle (*Diomus notescens*)

Fig 1. Different types of lady beetles commonly found in Hawaii with distinct morphology.

Lady beetles are well-known to be good insect pest predators and were introduced into Hawaii to control certain pests. Often we think of lady beetles as good natural enemies of aphids (Aphididae). However, aphids are not the only insects they eat. Whereas some lady beetles eat many different types of prey, others tend to be more specific. This article introduces several species of lady beetles that occur in Hawaii with special feeding preference (Fig. 2).

	Mite eaters: The genus *Stethorus* is comprised of small lady beetles that are easy to miss. This particular lady beetle (1 mm long) posted on the left was found on tea (*Camellia sinensis*) plants at the Poamoho Experiment Station. This tea plot was infested with several species of mites including the broad mite, the spider mite, and the false flat mite. No insecticide was sprayed on these plants. A close observation on the leaves revealed that many *Stethorus* were wandering on the infested leaves and preying on these mites. *Stethorus* spp are known to feed on all life stages of various species of spider mites (Raros & Haramoto, 1974; Wainwright-Evans, 2005).
	Scale eaters: The globed-marked lady beetle (*Azya orbigera*) is covered with many fine bristles giving them a greyish appearance with two bristle-free black spots as shown on the left. They are well known for their preference for soft scale insects, specifically the green scale (*Orcus chalybeus*), but may also prey on other insects such as mealybugs and aphids (Charanasri & Nishida, 1975). This globed lady beetle on the left was found on an a'ali'i plant, a native plant in Hawaii, in front of Gilmore Hall, University of Hawaii.

	Psyllid eaters 1: The ash-grey lady beetle (*Olla v-nigrum*) is primarily a predator of psyllids. In Florida it is a major predator of the asian citrus psyllid (*Diaphorina citri*) (Michaud, 2001). In Hawaii it has been observed feeding on nymphs of the leucaena psyllid (*Heteropsylla cubana*) on the koa haole plant (*Leucaena leucocephala*) (NFTA, 1988).
	Psyllid eaters 2: The common name of this lady beetle is common spotted lady beetle (*Harmonia conformis*). It will primarily feed on psyllids and reproduce well on this food source. However, when psyllids are not available, it will feed on aphids (Bellows & Fisher, 1999). In Hawaii, it has been observed feeding on eggs and nymphs of the acacia psyllid (*Acizzia uncatoides*) found on *Acacia koaia*, a Hawaiian endemic plant (Leeper & Beardsley, 1976).
	Powdery mildew eaters: The common name of this lady beetle is 20-spotted lady beetle (*Psyllobora viginti taedata*). It does not feed on arthropods but on powdery mildew fungus instead. It was purposely introduced into Hawaii to manage various mildews. However, its establishment in Hawaii has been scattered. It was collected at the Institute of Astronomy, University of Hawaii, Maui during an arthropod monitoring assessment in 2010 (Brenner, 2010). In several occasion we found this beetle on powdery mildew infected plants such as zucchini and sunn hemp in Kunia and Kaneohe, papaya and squash at Poamoho Experiment Station on Oahu.

Fig. 2 Different lady beetles in Hawaii that have special feeding preferences.

How to invite lady beetles into agroecosystems?

Although Fig. 2 indicates that lady beetles have their preference to feed on certain pests, the adults of lady beetles will feed on pollen and nectar of flowering plants to obtain additional energy (Hogg et al., 2011). Thus, planting insectary plants (plants that attract beneficial insects) in your field borders or inside your field through intercropping would provide a favorable habitat for lady beetles. Avoid broad spectrum insecticide spray or other pesticides that might be harmful to lady beetles (Johnson, 2004). Keeping flowering weeds around farm areas will also ensure lady beetles stays abundant in your farm.

Acknowledgement: This project is partially funded by CTAHR Hatch project number HAW09022-H, and partially funded by NRCS project number 69-9251-10-879.

For more information about insectary plants and lady beetles in Hawaii, please visit http://www.ctahr.hawaii.edu/WangKH/insectary.html. Information about where these lady beetles have been reported in Hawaii can be obtained from Nishida (2002).

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