

## *Harmonia axyridis* in Chile: a new threat

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### Abstract

**A. Grez, T. Zaviezo, G. González, and S. Rothmann. 2010. *Harmonia axyridis* in Chile: a new threat. Cien. Inv. Agr. 37(3): 145-149.** In this work, we document the presence of *Harmonia axyridis* in Chile, an invasive coccinellid species that has had negative effects in other regions of the world, such as: impacts on non-target arthropods, invasions of houses and fruit damage. This species has been found in the last three years in the Metropolitan and Valparaíso regions, in crops, pine plantations and inside houses. We warn about the consequences of the introduction of this species to Chile and claim to take actions to avoid its spread in the country.

**Key words:** biological invasions, Coccinellidae, *Harmonia axyridis*, Harlequin lady beetle, Asian lady beetle.

### Introduction

The multicolored Asian lady beetle or harlequin ladybird, *Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae), is a generalist predator native to Asia that has been imported to various countries in North and South America and Europe, for the biological control of aphids and other insects (Koch, 2003; Saini, 2004; Koch *et al.*, 2006). Nevertheless, after its introduction to new areas, the insect has spread rapidly and increased in abundance, becoming a successful invader and considered one of the most risky exotic natural enemy used in inundative biological control (van Lenteren *et al.*, 2003; Roy and Wajnberg, 2008). Koch *et al.* (2006) reviewed its invasion history in the western hemisphere.

In these new areas, several adverse effects have been reported such as: impacts on non-target arthropods, particularly the apparent displacement of native coccinellid species (Cottrell and Yeargan, 1998; Burgio *et al.*, 2002; Lucas *et al.*, 2002; Brown, 2003, Koch and Galvan, 2008); invasions of houses where they aggregate when seeking overwintering sites, causing cosmetic damage and, occasionally, biting humans and causing allergic reactions (Huelsenman *et al.*, 2002); indirect damage on fruits where they aggregate, causing contamination and potentially direct damage by feeding on agriculture products (Hesler *et al.*, 2004; Koch *et al.*, 2004; Kovach, 2004; Koch and Galvan, 2008). The problems caused by this species seem to result from a number of ecological traits including generalist feeding habit, voracity and aggressiveness towards other predators through intra-guild

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predation and propensity to overwinter in buildings (van Lenteren *et al.*, 2003; Pell *et al.*, 2008). *Harmonia axyridis* is now widely regarded as an unwanted invasive alien species for which there are currently no control strategies (Kenis *et al.*, 2008).

In South America, *H. axyridis* has been reported to be present in Argentina (Saini, 2004) and Brazil (Almeida and Silva, 2002), being intentionally introduced to Mendoza, Argentina, in the late 1990's, and later on found in Buenos Aires and in Curitiba, Brazil. Also, Silvie *et al.* (2007) have reported the presence of adults and larvae in cotton fields in Paraguay (Caaguazú, Itapúa and Cordillera), and in material from Perú (Tumbes and Lima) (G. González personal observation), where *H. axyridis* is frequently found, and is apparently established. The results of climate and habitat matching analyses comparing South America to Asia have suggested that much of South America may be suitable for establishment of *H. axyridis* (Koch *et al.*, 2006), and therefore, other countries beside Argentina, Brazil, Paraguay and Perú may be soon incorporated to the distribution range of this species.

Up to now, *H. axyridis* has not been reported in the scientific literature to be established in Chile. In 1998 a flightless strain of *H. axyridis* was introduced from France to Chile, to be used as a biological control agent in greenhouses. It was released near La Cruz (Quillota Province, Valparaíso Region), but it was not subsequently found (F. Rodríguez, Instituto de Investigaciones Agropecuarias INIA, Chile, personal communication). In 2003, there were reports of the presence of large numbers of flying individuals associated with aphids in poplar trees (*Populus* sp.) near Los Andes (Los Andes Province, Valparaíso Region), but no new observations of these populations were reported in subsequent years (F. Rodríguez, Instituto de Investigaciones Agropecuarias INIA, Chile, personal communication). It is possible that these individuals represent accidental introductions from Argentina. In this study, we document new geographical areas and habitats where this species has been found in Chile, and highlight problems associated with the potential spread of this invasive species.

Collections reported here were made from May 2008 to August 2009, where *H. axyridis* was found accidentally while monitoring insects (Table 1); funnel traps are used by SAG (Servicio Agrícola y Ganadero) in their permanent surveillance program to detect forest pest introductions, and the sticky traps were used in a study to determine the effect of edge vegetation on coccinellid migration to alfalfa fields (Grez *et al.*, 2010). After the acceptance of the manuscript, in fall 2010, a large number of new records took place and were added to Table 1. Specimens were identified by G. González and A. Grez and deposited in the collections of the Laboratory of Ecology, Faculty of Veterinary Sciences, University of Chile; Laboratorio de Entomología, Subdepto. Laboratorios y Estación Cuarentenaria Agrícola, SAG, and also in G. González private collection. Between 2008 and 2009, a total of 27 specimens –all adults– were found in these collections (Table 1), suggesting that *H. axyridis* was in a colonization phase. However, in 2010 (April – June), these numbers raised to 1128 individuals -including larvae, pupae and adults- which represent about 80 times more of what was found the previous two years (Table 1). Most *H. axyridis* (99.7%) were collected from April to June, and the rest from July to September, but never in summer. Therefore, they probably are active when temperatures are mild. So far, this species has been collected only in central Chile, in locations near to the foothills of the Andes, close to Argentina. However, it is interesting to note the diversity of habitats where the specimens have been found, ranging from pine plantations, alfalfa fields and inside houses in the Santiago suburbs. This last finding is important because represents one of the main problems associated with this species, which is considered a direct nuisance to humans and as a household pest (Koch *et al.*, 2006).

Biotic invasions are considered to be one of the most important mechanisms of global environmental change as well as a leading threat for worldwide biodiversity, after habitat destruction (Vitousek *et al.*, 1996; Pimentel *et al.*, 2000; Roy and Wajnberg, 2008). This is particularly true for Mediterranean ecosystems like Central Chile (Sala *et al.*, 2000). Given the negative impacts of *H. axyridis* reported in

other regions, and the considerable number of individuals collected in the last three years in Central Chile, we consider that it is important to prohibit intentional introduction of this species, and to take actions to monitor and limit the spread of the current populations of this invasive species in Chile.

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**Table 1.** Details of locations, sampling methods, habitat, date, number of individuals and collectors of *Harmonia axyridis* in Chile.

Place (County, Province, Region)	Sampling method and Habitat	Date	N° of individuals	Collector
Pirque, Cordillera, Metropolitan Region	Sticky trap in alfalfa	May 2008	1	Constanza Torres <sup>a</sup>
Llay Llay, San Felipe, Valparaíso Region	Funnel trap in <i>Pinus</i> sp.	May 2008	12	Álvaro Silva <sup>b</sup>
San Felipe, San Felipe, Valparaíso Region	Funnel Trap in <i>Pinus radiata</i>	September 2008	1	nn
San Esteban, Los Andes, Valparaíso Region	Funnel trap in <i>Pinus radiata</i>	May 2009	9	Iván Ahumada <sup>b</sup>
Los Andes, Los Andes, Valparaíso Region	Funnel trap in <i>Pinus radiata</i>	May 2009	1	Iván Ahumada <sup>b</sup>
Huechuraba, Santiago, Metropolitan Region	Inside apartment	July-August 2009	3	Allison Fernández <sup>a</sup>
Pirque, Cordillera, Metropolitan Region	Sticky trap and visual observation in alfalfa	April 2010	2	Brisy Arancibia <sup>a</sup> ; Audrey Grez <sup>c</sup>
Huechuraba, Santiago, Metropolitan Region	Inside apartment	April 2010	9	Allison Fernández <sup>a</sup>
La Pintana, Santiago, Metropolitan Region	On tree trunks, mainly <i>Populus</i> sp.	May 2010	181	Elizabeth Gazzano <sup>d</sup> , Brisy Arancibia <sup>a</sup> , Audrey Grez <sup>c</sup> , Gabriela Lankin <sup>c</sup>
Huechuraba, Santiago, Metropolitan Region	Inside apartments	May 2010	669	Allison Fernández <sup>a</sup>
Colina, Chacabuco, Metropolitan Region	While mowing the lawn	May 2010	9	Sergio Rothmann <sup>b</sup>
Providencia and La Dehesa, Santiago, Metropolitan Region	Inside house and apartment	May 2010	4	nn, Gabriela Lankin <sup>c</sup>
Huechuraba, Santiago, Metropolitan Region	Inside apartments	June 2010	219	Allison Fernández <sup>a</sup>
La Pintana, Santiago, Metropolitan Region	On <i>Populus</i> trunks	June 2010	22	Elizabeth Gazzano <sup>d</sup>
Ñuñoa, Santiago, Metropolitan Region	Apartment window	June 2010	9	Daniel Tapia <sup>e</sup>
Puente Alto, Cordillera, Metropolitan Region	Apartment window	June 2010	1	nn
La Reina, Metropolitan Region	On tree trunks	June 2010	3	Constanza Torres <sup>a</sup>

nn: name of collector unavailable.

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## Resumen

**A. Grez, T. Zaviezo, G. González y S. Rothmann. 2010. *Harmonia axyridis* en Chile: una nueva amenaza. Cien. Inv. Agr. 37(3): 145-149.** En esta nota se documenta la presencia de *Harmonia axyridis* en Chile, un especie de coccinélido invasiva que ha provocado efectos negativos en otras regiones del mundo, como impactos en otros artrópodos, invasión a hogares y daño en fruta. La especie ha sido encontrada en los últimos tres años en la Región de Valparaíso y Metropolitana, tanto en cultivos, plantaciones como en interior de domicilios. Se advierte de las consecuencias de la introducción de esta especie a Chile y se hace un llamado a tomar medidas, para evitar que esta especie se siga propagando en Chile.

**Palabras clave:** invasiones biológicas, Coccinellidae, *Harmonia axyridis*, chinita Asiática o Arlequín.

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