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***HARMONIA AXYRIDIS* (PALLAS, 1773), NEWLY RECORDED INVASIVE SPECIES FOR ALBANIA¹**

Halil Ibrahim, ²Iva Mihoci, ³Vlatka Mičetić Stanković, ³Dragan Bukovec, ³ and Mladen Kučinić⁴

ABSTRACT: The biological control agent and alien invasive ladybird *Harmonia axyridis* (Pallas, 1773), once introduced for pest control in Europe, is now spreading very rapidly over the European continent, especially since 2002. In this paper we give the first documented record of *H. axyridis* from Albania, southeastern Europe. The species was recorded in three localities in Albania.

KEY WORDS: *Harmonia axyridis*, Albania, Balkan Peninsula, spread

INTRODUCTION

The invasive and exotic generalist predator *Harmonia axyridis* (Pallas, 1773) (Coleoptera: Coccinellidae) (Koch, 2003) known most commonly in English as ‘the harlequin ladybird’ and ‘multicolored Asian lady beetle’ in North America (Albanian ‘mollëkuqja aziatike’ and ‘nusepashke aziatike’) is native to China, Japan, Korea, Mongolia and Siberia (e.g. Dobzhansky, 1933; Kuznetsov, 1997; Orlova-Bienkowskaja et al., 2015), but is spreading rapidly throughout the globe, including Europe. *Harmonia axyridis* is found most often on deciduous trees and shrubs but it has also been recorded in meadows, heathlands and riparian zones (Adriaens et al., 2008), reedbeds (Brown et al., 2008a) and in a variety of anthropogenic habitats (Adriaens et al., 2008; Colunga-Garcia and Gage, 1998).

Ladybirds have a long history of use as biological control agents against pest insects (Majerus, 1994) and as such *H. axyridis* was intentionally introduced in many countries. In Europe the earliest introductions of *H. axyridis* occurred in the Ukraine and Belarus commencing during the early 1960s (Katsoyannos et al., 1997; Sidlyarevich and Voronin, 1973). In Western Europe, *H. axyridis* was first used as a biological control agent in 1982 in France (Coutanceau, 2006). In the Balkan Peninsula *H. axyridis* has been released as a biological control agent in Greece but for a long time no sound evidence of establishment was found. Now the harlequin ladybird has spread without human assistance to many European countries, including the Balkans (Kulijer, 2010; Mičetić Stanković et al., 2010; Tomov et al., 2009a; Thalji and Stojanović, 2008), due to its high potential for adaptation to different habitats.

In this paper we report the first record of *H. axyridis* in Albania.

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MATERIALS AND METHODS

Study site

Albania has a total area of 28,748 square kilometers and lies between latitudes 39° and 43°N, and mostly between longitudes 19° and 21°E (a small area lies east of 21°). A total of 35 locations all over Albania, but mostly located in the middle part of the country, were visited during 2012 as part of an aquatic insect survey. All of the investigated stations are located directly in or close to freshwater habitats.

Data collection

Harlequin ladybird specimens were observed casually and collected at night amongst moths and caddisflies trapped using ultraviolet light, and during the day while collecting aquatic insect adults with an entomological net. The light trap was placed on stream banks and open grassland areas and operated for approximately one hour and fifteen minutes immediately after dusk. All sampled harlequin ladybird specimens were preserved in 96% ethanol and identified later in the laboratory.

RESULTS AND DISCUSSION

The results of this investigation are the first documented and verified records of *H. axyridis* from Albania (Table 1). According to the decision of the Government of the Republic of Albania no. 241, date 06 March 2009 and based on the proposal of the Ministry of Environment, Forestry and Water Administration, *H. axyridis*, together with 158 other alien invasive species, is forbidden to be transported into Albania due to its negative impact on biodiversity (Albanian Government, 2009). Several exotic ladybirds have been used as biological control agents in Albania in recent years (Tomov et al., 2009b) but there is no information of *H. axyridis* being used for this purpose. The arrival of the species into Albania has been expected (Roy and Migeon, 2010; Tomov et al., 2009b), considering its expansion routes and occupancy potential. The species has apparently spread out in Albania in recent years after 2010, considering the fact that it was not found during a pretty detailed inventory of invasive species during the period 2006-2009 (Tomov et al., 2009b). The color form *succinea* found in Albania is the major form found in other parts of Europe (Brown et al., 2008a). One hundred and two alien invasive plant and animal species were officially registered in Albania up until 2009 (Albanian Government, 2009). However, this list is incomplete because a study presented during the same year (Tomov et al., 2009b) lists one hundred and thirty-four insect species considered to be of alien origin in Albania. With the current research, *H. axyridis* is now added to this list. Although the species is not reported yet from some Balkan countries (Kosovo, Macedonia and Montenegro), most probably because of a lack of survey efforts, it is highly possible that the invasion of this area has either taken place already, or will take place very soon. The species spread across Great Britain at approximately 100 km per year (Brown et al., 2008b) and in Hungary after one year of

recording it became one of the most common ladybirds (Marko and Pozsgai, 2009).

Table 1. Locality data, date of find, number of specimens and color form of *Harmonia axyridis* specimens found in Albania.

Locality	Coordinates	Date	Number of specimens	Color form
Dibër District, Selishtë Village	N41° 37.483', E20° 16.500'	26 July 2012	2	succinea
Dibër District, Peshkopi town	N41° 41' 10.21", E20° 25' 07.35"	25 July 2012	2	succinea
Dibër District, Shkëmbi i Shkënderbeut	N41° 38.792', E20° 11.390'	26 July 2012	3	succinea

The expansion of *H. axyridis* in Europe has been met with considerable concern both from ecological and anthropogenic perspectives (Roy and Wajnberg, 2008) and thus investigations to quantify the extent of any negative effects and the level of invasion in Albania are of immediate importance. As proposed by Majerus et al. (2006), *H. axyridis* may be an excellent biological indicator on which the spread and impacts of invasive alien insects can be monitored (Brown et al., 2008b; Roy et al., 2012).

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