

First record in Argentina of a plant-insect association, with interest in biological control

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ABSTRACT: The species *Chrysolina quadrigemina* (Suffrian) (Coleoptera: Chrysomelidae) is recorded for the first time in Argentina, this being also the first record of this genus in the country. Its host plant, *Hypericum perforatum* L. (Clusiaceae) is native from Asia, Europe and Africa, and has behaved as a strong invader in several countries of the world where the implementation of a biological control program was necessary. The only country in South America that implemented such a control was Chile, in 1953. The arrival of *C. quadrigemina* to southern Argentina is probably due to natural dispersion from Chile. This record increases the number of Chrysomelidae species in the country.

[Keywords: Coleoptera, Chrysomelidae, *Chrysolina*, *Hypericum*]

RESUMEN: Primer registro en la Argentina de una asociación planta-insecto, con interés para el control biológico. Se cita por primera vez en la Argentina a la especie *Chrysolina quadrigemina* (Suffrian) (Coleoptera: Chrysomelidae), lo que constituye también una cita nueva para el género en el país. Su planta hospedante, *Hypericum perforatum* L. (Clusiaceae) es originaria de Asia, Europa y África, y ha invadido varios países del mundo, en los cuales se han llevado a cabo programas de control biológico para erradicarla. Entre estos países, el único en América del Sur que implementó un programa de control biológico ha sido Chile en 1953. El arribo de especímenes de *C. quadrigemina* al sur de la Argentina se realizó probablemente por dispersión natural desde Chile. Su hallazgo constituye un nuevo registro de la familia Chrysomelidae en el país.

[Palabras clave: Coleoptera, Chrysomelidae, *Chrysolina*, *Hypericum*]

INTRODUCTION

The St.-John's -wort, *Hypericum perforatum* L. (Clusiaceae), is a native of Asia, Europe and Africa (Julien & Griffiths 1998), widely naturalized elsewhere (Wiersema & León 1999). Holloway (1957) described it as an erect, freely branching perennial herb with a stem one to five feet high. Its flowers are yellow and occur in clusters; its light green leaves are numerous and paired along the stem. Its root crown has

many lateral runners which are capable of starting new plants; thus the spread of the plant is not entirely dependent on its seeds. These are produced in a pod which breaks into segments, releasing numerous small, cylindrical brown seeds which are spread by wind, water, man and animals (Holloway 1957). This plant has some positive values. It produces essential oils and lipids and Folk traditions assigned antiviral or antidepressive properties (Wiersema & León 1999).

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However, it is considered a pest in most part of its exotic range. In the United States, St.-John's wort was first reported in 1793 near Lancaster. By 1940 the infestation of the weed had occupied 27 counties and 250.000 acres of range land. The economic damage that it produced was very important (Holloway 1957). As a weed, it competes with the cultivated forage. It is also an important poison for mammals and adversely affect cattle and sheep that graze on it (Holloway 1957). It also produces contamination of seeds as weed (Wiersema & León 1999).

Chrysolina hyperici (Foster) and *Chrysolina quadrigemina* (Suffrian) (Coleoptera: Chrysomelidae) are two biological control agents which were released in Australia (1930, 1980), Canada (1951), New Zealand (1943), Republic of South Africa (1960, 1973), and United States (1945) with the purpose to control *Hypericum perforatum* (Julien & Griffiths 1998). Liberation of the insects in these countries was done after exhaustive tests of host specificity; an established practice in biological control procedures (De Loach et al. 1989).

Hypericum perforatum L. has been recorded as a naturalized and widely distributed weed in Neuquén (area of Nahuel Huapi) and Chubut provinces, occasionally occurring in Buenos Aires and La Pampa provinces (Dimitri 1972; Cabrera 1965; Boelcke 1981; Zuluaga & Morrone 1999). Biological control of *Hypericum* has never been considered in Argentina (De Loach et al. 1989), but this weed has the potential to cause problems in the future, as happened in the United States (Boelcke 1981). In contrast, Chile has implemented a biological control program for this weed in 1953, in which both *Chrysolina* species were liberated and successfully established (Julien & Griffiths 1998). In 1952, 27300 adults of *Chrysolina* were imported from California and liberated in 1953. By 1959, 7000 ha were controlled (De Loach et al. 1989).

The objective of this work is to describe the first record of *Chrysolina quadrigemina* (Suffrian) (Coleoptera: Chrysomelidae) in Argentina, and to discuss the relevance of this discovery under the context of biological control of the weed *Hypericum perforatum* L.

Comunicación breve

MATERIALS AND METHODS

During December 2004 and January 2005, the author was looking for chrysomelid fauna in different plants in Villa La Angostura, Península Quettrihue, Lago Correntoso, San Martín de los Andes (Neuquén Province) and San Carlos de Bariloche (Río Negro Province). Photos of the insects eating plants were taken and then, insect specimens were captured by hand on burgeons of living plants. One plant species was *Hypericum perforatum*. The presence of the beetles eating an exotic plant called the attention of the author. The chrysomelids taken from them were kept in the Entomology Division of the "Bernardino Rivadavia" Argentine National Museum, authors' collection Paola Turienzo, Buenos Aires, and Gary Piper, Washington, United States. The distinction from closely related *Chrysolina* species is difficult because of their similar size and color pattern (Piper 2004). For this reason, some specimens were sent to G. Piper, who identified them. The identification of the *Hypericum* species was done by O. R. Di Iorio, using Dimitri's keys (1972).

In a second year of field work, during the months of December 2005 and January 2006, the author returned to the same places mentioned above and also visited a new locality, El Bolsón (Río Negro province) to search for this insect-plant association.

The methodology used was the same of the previous year. Only some specimens were taken from the plants and were kept in the Paola Turienzo's collection, Buenos Aires, and Penner & Herrera's collection (Essen, Germany). The total amount of specimens in each plant was counted.

RESULTS

From the two species liberated in Chile, *Chrysolina hyperici* (Foster) and *Chrysolina quadrigemina* (Suffrian) (Julien & Griffiths 1998), only the latter was found in Argentina. It was collected from Los Lagos Department (Neuquén Province). Data of localities, date and

number of specimens collected can be seen in Table 1. In Villa La Angostura, the plant was distributed in the town and around it, mainly in margin roads. D. Penner & L. Herrera (Essen, Germany) found them near Bariloche city, in the crossing of routes 237 and 231.

Insect distribution between plants was not uniform and few *Hypericum* plants were heavily infested; most of the individuals being free of beetles. For example, in Villa La Angostura town, during the summer of 2005-2006, only three groups of *Hypericum* attacked by *Chrysolina* were found. About 20 plants per group were observed to be infested by the beetles. The number of insects found ranged from one to six per plant.

DISCUSSION

The insect genus has not been previously recorded for Argentina (Cabrera & Roig-Juñent 1998, 2004). Therefore, this constitutes a new record for the Chrysomelidae fauna of the country.

The presence of *Chrysolina* in southern Argentina is probably consequence of its natural dispersion from Chile, following patches of *Hypericum* throughout the years. The ability for dispersal of this species has been previously analysed by Holloway (1957), who described that it is capable of long, sustained flights.

It would be most interesting, in future studies about the plant and insect distribution, to conduct further research on the population dynamics of insects and their relations with biological control practices.

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Table 1. Localities, data and numbers of specimens of *Chrysolina quadrigemina* captured.

Tabla 1. Localidades, fechas y cantidad de especies capturadas de *Chrysolina quadrigemina*.

Locality	Date	Specimens
Villa La Angostura	26-XII-04	10
	1-I-05	15
	24-XII-05	11
	28-XII-05	31
	1-I-06	16
	2-I-06	8
	4-I-06	14
Península Quetrichue	6-I-06	4
	2-I-05	19
Bariloche	24-XII-05	29

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