

Research Article

High, up and down: Updating the distribution of the painted bug *Bagrada hilaris* (Burmeister) (Heteroptera: Pentatomidae) in Chile

En altura, al norte y sur: Actualizando la distribución de la chinche pintada *Bagrada hilaris* (Burmeister) (Heteroptera: Pentatomidae) en Chile

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Abstract. An update of the distribution of the painted bug *Bagrada hilaris* (Burmeister) in Chile is given. The species is recorded from the Atacama to Libertador General Bernardo O'Higgins region, and also in the high Andes, very close to the boundary with Argentina. The history of invasion is discussed as well as the factors that may had facilitated its rapid spread in the country.

Key words: Invasive species, distribution, Hemiptera, Strachiini.

Resumen. Se actualiza la distribución de la chinche pintada *Bagrada hilaris* (Burmeister) en Chile. Se registra la especie entre las regiones de Atacama y del Libertador General Bernardo O'Higgins, y también a gran altitud en los Andes, cerca de la frontera con Argentina. Se discute la historia de invasión de esta especie y los factores que podrían haber contribuido a su rápida dispersión.

Palabras clave: Especie invasora, distribución, Hemiptera, Strachiini.

Introduction

The painted bug or bagrada bug, *Bagrada hilaris* (Burmeister, 1835) (Fig. 1) is a member of the Pentatominae and more specifically, the tribe Strachiini (Bundy *et al.* 2018). This species was originally described from India, where it is a pest in oilseeds and several vegetables (Schaefer and Panizzi 2000). Actually, it is one of the most invasive pentatomids and has been recorded in Asia, Africa, Europe, North America and South America (Faúndez *et al.* 2016, 2017). This species which has been recorded on more than 15 families of plants (Bundy *et al.* 2018), although it seems to prefer member of the Brassicaceae. It is considered a major pest on cabbages (*Brassica oleracea* L.) (Palumbo *et al.* 2016).

In Chile this species was first detected on late 2016 in Estero Las Cruces, Metropolitan Region, being the first record in South America (Faúndez *et al.* 2016). This species rapidly increased its populations and started to spread in the middle of the country (Faúndez *et al.* 2017). More recently this species has been even found causing problems not only as an agricultural but also a household pest, invading homes and even with a record of an adventitious bite (Faúndez 2018).

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The purpose of this contribution is to review its distribution in Chile as well as provide new distributional records.

Materials and Methods

On identification we follow Faúndez *et al.* (2016) and Bundy *et al.* (2018). In systematics we follow Rider *et al.* (2018). Specimens are deposited in the collection of the Instituto de la Patagonia, Universidad de Magallanes (Punta Arenas, Chile). Data has been collected by identification services made by authors and continuous field sampling. Photos have been taken with a digital camera adapted to a stereoscopic microscope. Maps were developed with Google Earth® and PanMap, Pangaea®.

Results

Up to the paper published by Faúndez *et al.* (2017), this species was well established in the Metropolitan Region, and started to show up in the Valparaíso Region. Up to June, 2018, the Servicio Agrícola y Ganadero of Chile (SAG 2018) indicate on his website that they have abundant records for this species in the Metropolitan and Valparaíso Regions, and that in 2018 they have found the first specimens on the communes of Salamanca, Los Vilos, Illapel and Choapa in the Coquimbo Region, and Pichidegua in the Libertador General Bernardo O'Higgins Region. Our data confirms the establishment of the species in these localities as well as extends the distribution to the north and south (Fig. 2):

Material examined. CHILE: Atacama Region, Huasco, 7-V-2018 2♂♂, 2♀♀, collected from an aggregation with adults in copulation as well as immatures, R. Arriagada leg. Coquimbo Region, Los Vilos, 29-V-2018 2♂♂, 1♀ 3V nymphs, J. Cereceda leg.; Los Vilos, 27-IV-2018, 1♀, M. de A. Sáez leg. O'Higgins Region, 10 km S of Cerro Poqui, 1-V-2018, 2♀♀, A. Martínez leg.; 10 km N. of Chimbarongo, 7-V-2018, 1♀, E. Irrarrazabal leg.

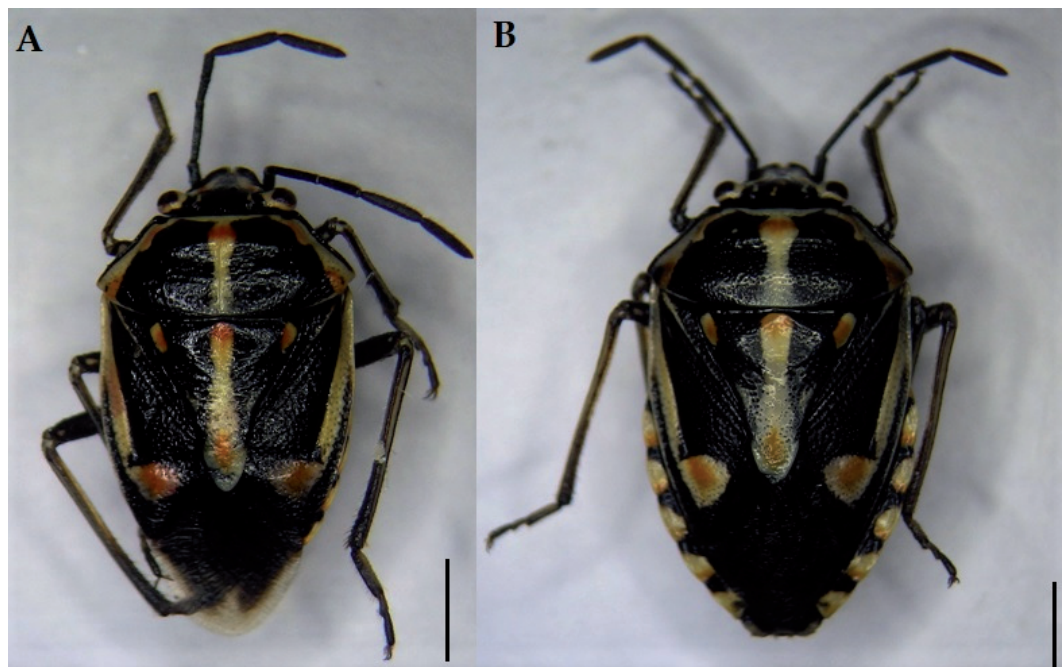


Figure 1. Couple of *B. hilaris* collected in Huasco, Chile. A. Male, B. Female. Scale: 1 mm.

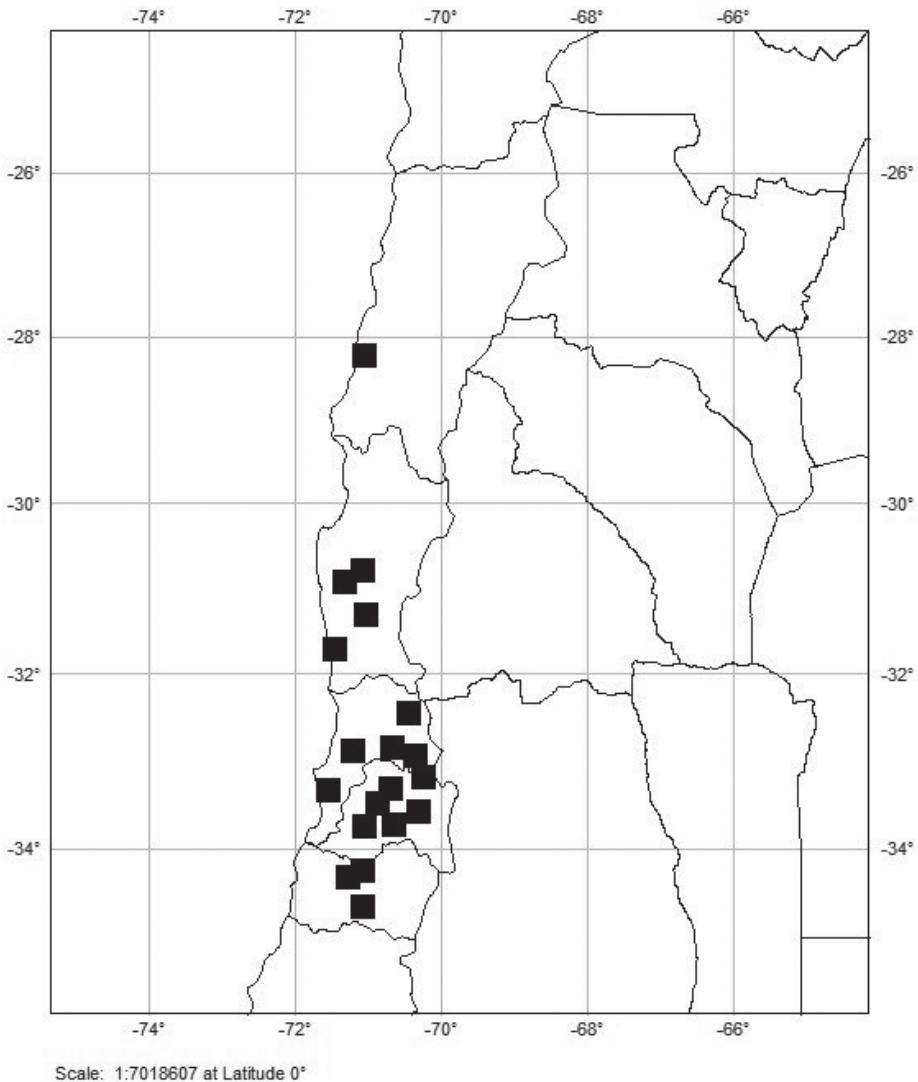


Figure 2. Distribution of *B. hilaris* in Chile by July 2018. Based on Faúndez *et al.* (2016, 2017), Faúndez (2018), SAG (2018), and this contribution.

In addition to these latitudinal records, interesting altitudinal records have been collected, including specimens in Farellones and Cajón del Maipo and a survey was conducted in Putaendo, Valparaíso: Region on December 2017 with the following results (Fig. 3):

Locality: Resguardo Los Patos, Putaendo (32°29'59.10"S - 70°34'50.93"W, 1202 msnm), 11-XII-2017. There have been observed abundant adults and immature specimens on *Hirschfeldia incana* (L.) Lagr.-Foss. (Brassicaceae).

Locality: Estero Chalaco, Putaendo (32°23'25.73"S 70°32'18.43"W, 2094 msnm), 12-XII-2017. One dead specimen found. This zone is used by muleteers who let animals feeding by large periods in the summer.

Locality: Cerro Alto del Cuzco, San Felipe de Aconcagua (32°20'17.12"S 70°26'39.66"W, 3529 msnm), 14-XII-2017. One specimen capture on flight. This point is only 6.6 km away from Choapa Province in the Coquimbo Region and 14.1 km away from San Juan Province, Argentina.

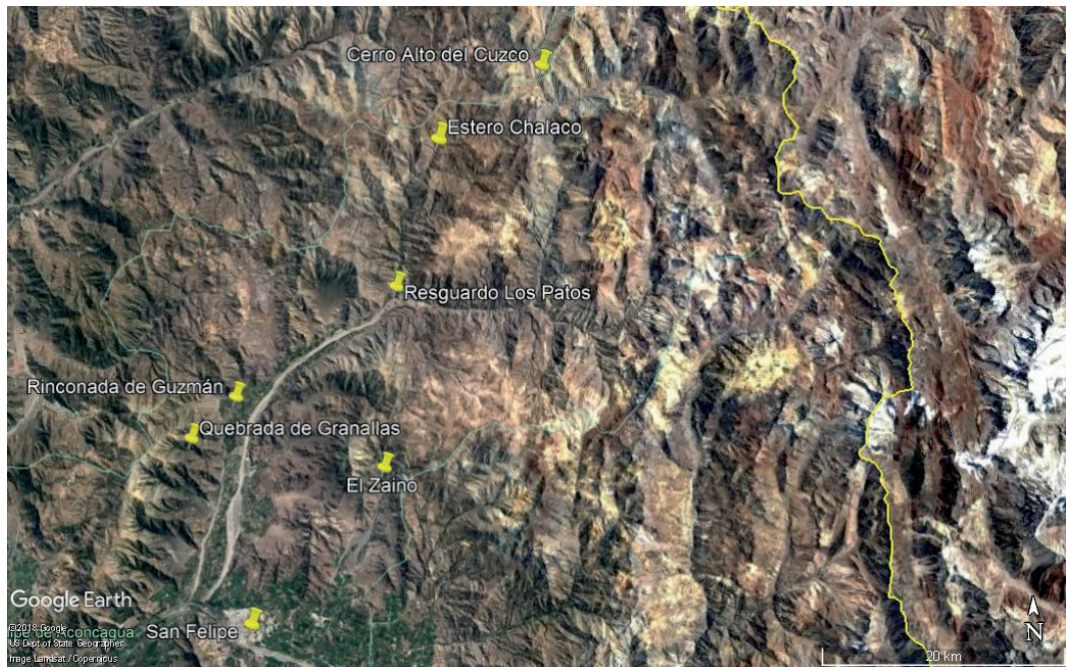


Figure 3. Localities where *B. hilaris* was found in San Felipe de Aconcagua Province prospection.

Discussion and Conclusion

Bagrada hilaris has experienced an extremely fast expansion in the country in both ways, altitudinal and longitudinal. The success of this species in Chile has been noted by its big aggregations and even colonization of urban environments becoming a household pest (Faúndez 2018). The Chilean invasion looks more aggressive in terms of distributional area covered on its first two years. It reached nearly 500 km to the north and 150 km to the south for a total covering of 650 km in straight line. It has been faster than other recent invasions like in the United States and Mexico (Bundy *et al.* 2018). This situation may be due to the lack of natural enemies, the good conditions of the area for the development of the bug (Faúndez 2018), the use of human tracks and roads in the area, and the relative low diversity of native pentatomines that may act as competence for this species including mostly a few species in the genera *Acletra* Signoret, *Chinavia* Orian, *Neoacletra* Faúndez, *Thestral* Faúndez & Rider and *Thyanta* Stål (Faúndez and Verdejo 2009; Faúndez and Carvajal 2011; Faúndez and Rider 2014; Faúndez *et al.* 2017), whose collections drastically decreased in the areas already invaded by *B. hilaris* (E. I. Faúndez unpublished data). This situation conversely may result in conservation issues for the native pentatomines, especially rare species as *Thestral incognitus* Faúndez and Rider. On the other hand, the record high altitudinal records shows another problem as the bugs are almost in the boundary with Argentina. The bugs may reach that country just by passing several small transverse valleys in the zone (Fig. 3), and its arriving to Argentina may be considered imminent.

It is worth to mention also that recently another world level invasive pentatomid arrived to Chile, the brown marmorated stink bug *Halyomorpha halys* (Stål, 1855), also in the Metropolitan Region (Faúndez and Rider 2017). However this species although is well established in the country, has not left the urban areas of Santiago, showing a very different pattern than the expansion of *B. hilaris*.

Up to this point it seems that *B. hilaris* has done well in all the invaded areas in Chile, and it is most likely that it will still be expanding and neighboring countries should start more aggressive prospection and educational programs to avoid the entrance of this bug.

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