Revista de la Sociedad Entomológica Argentina
ISSN: 0373-5680
ISSN: 1851-7471
santiago@cepave.edu.ar
Sociedad Entomológica Argentina
Argentina

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Revista de la Sociedad Entomológica Argentina, vol. 78, no. 2, 2019
Sociedad Entomológica Argentina, Argentina
Available in: https://www.redalyc.org/articulo.oa?id=322058500005

Notas

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Primer registro de la plaga exótica *Sitona discoideus* Gyllenhal 1834 (Coleoptera: Curculionidae) en Argentina

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Revista de la Sociedad Entomológica Argentina, vol. 78, no. 2, 2019

Sociedad Entomológica Argentina, Argentina

Received: 09 February 2019
Accepted: 01 May 2019
Published: 27 June 2019

Redalyc: https://www.redalyc.org/articulo.oa?id=322058500005

Abstract: The alfalfa root weevil *Sitona discoideus* Gyllenhal 1834 (Curculionidae: Entiminae) is herein reported for the first time for Argentina. This weevil is native to southern Europe and northern Africa and was accidentally introduced in Australia, New Zealand, the United States of America, and Chile. In Argentina, it was collected in the Upper valley of Río Negro, associated with alfalfa plants (*Medicago sativa* L.).

Keywords: Alfalfa, Alfalfa root weevil, Entiminae, Introduced pest, *Medicago sativa* L..

Resumen: El gorgojo de la raíz de la alfalfa, *Sitona discoideus* Gyllenhal 1834 (Curculionidae: Entiminae), es reportado por primera vez en la Argentina. Este gorgojo es nativo del sur de Europa y noreste de África, y fue introducido accidentalmente en Australia, Nueva Zelanda, Estados Unidos y Chile. En Argentina fue colectado en el Alto valle de Río Negro, asociado con plantas de alfalfa (*Medicago sativa* L.).

Palabras clave: Alfalfa, Entiminae, Gorgojo de la raíz de la alfalfa, Medicago sativa L. , Plaga introducida.

Sitona Germar is a Holarctic genus of broad-noosed weevils (Coleoptera: Curculionidae: Entiminae) with about 100 species, all of them feeding on Fabaceae (Leguminosae) in both larval and adult stages, being common in grasslands and open wood habitats (Velázquez de Castro et al., 2007). Some species have been introduced in other regions becoming pests of

legumes, one of them is *Sitona discoideus* Gyllenhal 1834, species that attacks alfalfa (*Medicago sativa* L.), other *Medicago* species and *Trifolium* species (May, 1993; Velázquez de Castro et al., 2007). Larvae feed on roots and root nodules, whereas adults feed on leaves, usually of the same host plants.

This weevil species was originally distributed in southern Europe and northern Africa (Roudier, 1980; Aeschlimann, 1983) and was introduced and established in Australia since 1954 (Chadwick, 1978), in New Zealand since 1974 (Esson, 1975), in the United States of America (O'Brien & Wibmer, 1982) and in Chile since 1983 (Elgueta, 1986). It is a pest of alfalfa in Australia and New Zealand, becoming a major pest in South Australia (Hopkins, 1982), where it reduces the yield of legume forage crops (Bardner et al., 1979; Goldson et al., 1985). The New Zealand's *S. discoideus* may have originated from Australia (Esson, 1975), since it was intercepted at the New Zealand border in association with goods imported from Australia in several occasions before 1974 (Richardson, 1979; Keall, 1981).

Adults of *S. discoideus* are 4-5 mm long, the body is elongate, covered with dark brown scales with three longitudinal light stripes along the pronotum (the medial one more slender than the others) continued on elytral intervals 5-10 from base to apex and scutellum also covered with light scales (Elgueta, 1993) (Fig. 1). The head narrows from base to apex, is deeply excavated between eyes, and bears a rostral median sulcus that extends to the hind margin of eyes; the eyes are rounded and slightly convex; each elytron shows a preapical callus in intervals 5 to 6; and the elytral intervals bear short erect setae. Females are larger than males but there is considerable size overlap within a population (Wightman, 1986). This species is very similar to *S. humeralis*, and was misidentified and referred several times in literature with this name (Elgueta, 1993). They are mainly distinguished from each other because *S. humeralis* has larger, more oblique, oval eyes; forehead narrower than rostrum at the antennal insertion, and pronotum less transversal (Velázquez de Castro, 1997). The other invasive species of *Sitona*, *S. obsoletus* (Gmelin) (= *S. lepidus* Gyllenhal), already present in Australia and New Zealand, does not show a distinct colour pattern of elytral vestiture (it only has few feeble disperse white or dark spots), and the elytral intervals lack erect setae. Based on studies carried out in Australia and New Zealand, it is known that adults of *S. discoideus* are present during all year long and can live 9-11 months, whereas larvae are found between August and December (Wightman, 1981). Adults feed on leaves causing hemispherical notches from 2-3 mm along leaf margins and leading to defoliation if population densities are high. During the winter they feed on alfalfa foliage and become reproductively mature. In Australia and New Zealand adults show aestivatory seasonality, and in this way they survive the hot and dry conditions. This is not a full diapause, but an aestival reproductive diapause (Wightman, 1986). In the Mediterranean Basin, lack of food is only a problem during the short summers so that the reproductive phase is correspondingly longer. In Chile adults were

collected between September and May, but there are not studies about aestivatory seasonality (Elgueta, 1993).

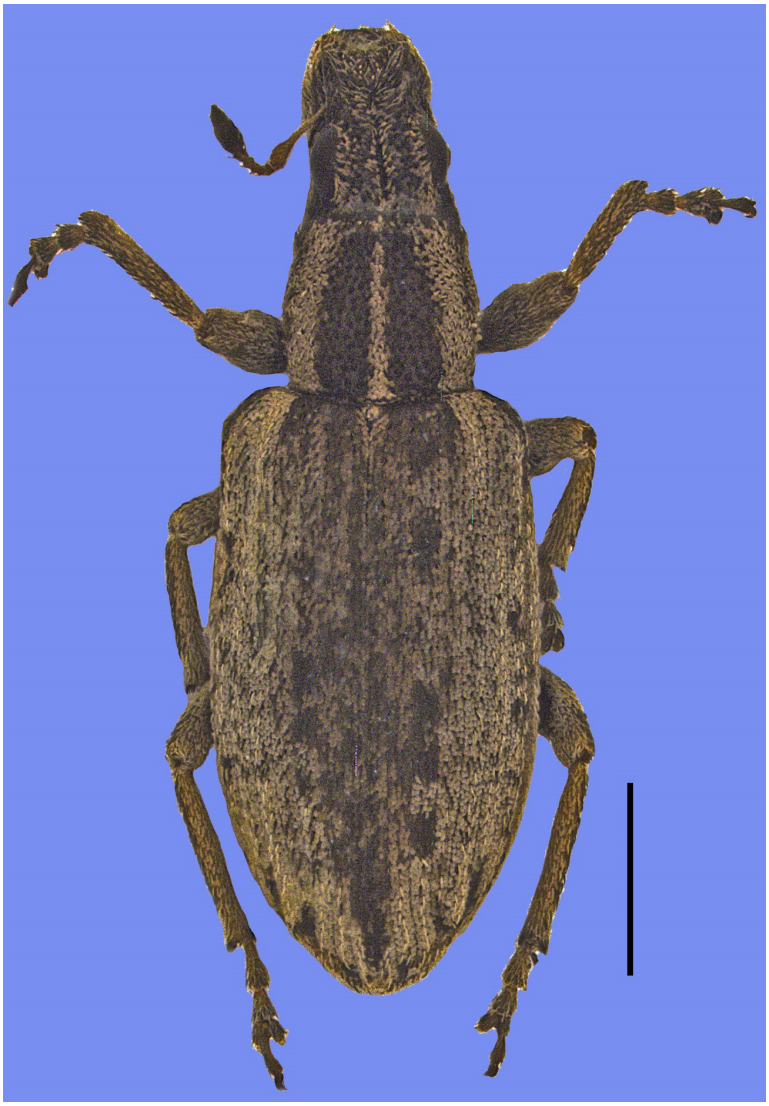

Fig. 1. *Sitona discoideus* **Gyllenhal 1834 habitus, dorsal view** [Scale = 1 mm].

Oviposition usually takes place from April to December in New Zealand and Australia (Wightman, 1981). Females could lay 1,000-2,000 scattered eggs usually near the soil (Wightman, 1979). Eggs are spheroidal, 0.3-0.4 mm long, bright cream, and turn black before hatching (Goldson & French, 1983). After eggs hatch, larvae burrow into the soil where they feed on root nodules, resulting in stunting and yellowing of host plants due to nitrogen deficiency (Wightman, 1981; Goldson et al., 1988; May, 1993). Larvae can destroy 97-100% of root nodules (Kwong et al., 1980). As happens in other root weevils of the subfamily Entiminae, the root-feeding larvae were found to be more damaging than the adults, particularly during severe drought (Goldson et al., 1985). The threshold occurred at about 1,200 larvae/m^2 in the dry season and about 2,100 larvae/m^2 in the wet season (Goldson et al., 1985). *Sitona* spp. has the bionomic characteristics of colonizers r-strategists (Wightman, 1986).

The material examined for this work consisted of 113 adult specimens of *S. discoideus* collected in one alfalfa field located in the Upper valley of Río Negro province, Argentina, from December 2018 to January 2019. The location is an experimental field of 0.47 hectares belonging to the Facultad de Ciencias Agrarias de la Universidad Nacional del Comahue, National Route 151, km 12.5, Cinco Saltos, Río Negro province, Roca Department, 38^0 50.0' 31.0" S; 68^0 4.0' 9.0" W. The specimens were collected in four opportunities (29 ex 6/XII/2018; 14 ex 21/XII/2018; 66 ex 4/I/2019; 4 ex 18/I/2019) using a sweeping net. The first and last samples were taken after the alfalfa was cut.

The alfalfa plot in which the weevils were collected is divided into two lots that correspond to pure alfalfa variety Pampa Flor (group 6) (implanted three years ago) and pure alfalfa variety CUF 101 (group 9) (implanted two years ago). They are separated by a consociated grass pasture (*Dactylis glomerata* L.) and red clover (*Trifolium pratense* L.), planted in April 2017 and used for direct grazing. The average of alfalfa plants *per* m^2 is 71.8 for both varieties. Alfalfa is irrigated 6-7 times every spring-summer period, cut 4-5 times every season, and the production is destined to hay for feeding small ruminants. Pest management does not include applications of agrochemicals and minimal maintenance work is carried out on headwaters and ditches. The general sanitary condition of the crop is very good, and several beneficial arthropods have been found, especially predators and parasitoids.

Based on the geographical proximity and the extent of commercial trade, we may suspect that the Argentine specimens of *S. discoideus* came from Chile. In Chile the weevil is currently distributed from IV to VI regions (Choapa, Valparaíso, Chacabuco, San Antonio, Melipilla, Santiago, Cordillera, Talca), including Juan Fernández Islands (Elgueta & Marvaldi, 2006). Another possibility is that the species was introduced along with alfalfa seeds imported from other countries such as Australia (48% in 2016, 51% in 2015 and 43% in 2014), USA (29% in 2016, 36% in 2015 and 51% in 2014), Canada, France or Italy (lower percentage of seed importations) (Basigalup, 2017). At this stage, further sampling efforts are necessary in order to determine the current distribution of *S. discoideus* in Argentina. Furthermore, molecular analyses including specimens from potential countries of origin would help to unravel the source of the Argentine specimens.

Argentina is one of the main producers of alfalfa in the world. From the approximately 3.2 million hectares of alfalfa currently cultivated in Argentina about 60% are planted as pure stands and 40% in mixture with temperate forage grasses. Approximately 80% of the total alfalfa area is cultivated under dry conditions devoted to the production of dairy and beef in the Pampean region, while the remaining 20% is destined to the production of hay and seed under irrigation in the North Werstern, Cuyo and Patagonia regions (Basigalup et al., 2018). In Río Negro province, the alfalfa cultivated area is 5,564 hectares. The department of Roca is the second in importance, with 1,448 hectares (26% of the total area cultivated in the province) (SENASA, 2018). Therefore, it is important

to evaluate the impact of *S. discoideus* on alfalfa crops of these areas, and to search for its possible occurrence in other alfalfa cultivated areas.

On the other hand, it is necessary to be aware about the possibility of accidental introduction of other exotic species of *Sitona* harmful for legumes. Indeed, in Australia and New Zealand there is another introduced species of *Sitona*, *S. obsoletus*, harmful for clover ("clover root weevil"), and *S. hispidulus* (Fabricius) and *S. lineatus* (Linnaeus) are considered risks for biosecurity due to their history of invasion and pest status overseas (Phillips & Barratt, 2004).

Sitona discoideus is herein reported for the first time in Argentina and there is no precise information on its origin, geographic range, population dynamics and life cycle. Although it may not pose an obvious threat to alfalfa at the moment, it is necessary to monitor its populations and to take measures against further accidental human-assisted introductions of this or other exotic species.

Acknowledgements

Authors are grateful to Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Instituto Nacional de Tecnología Agropecuaria (INTA), Agencia Nacional de Promoción Científica y Tecnológica (ANPCYT), Universidad Nacional de La Plata (UNLP), and Universidad Nacional del Comahue (UNCo) for financial support (grants BID-PICT 2016/2798, 2016/0739, and 11/N852).

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