First record of *Dysschema sacrifica* (Hübner, [1831]) on Soybean (*Glycine max* (L.) Merr) (Lepidoptera: Erebidae, Arctiinae)

E. González & H. M. Beccacece

Abstract

The presence of *Dysschema sacrifica* (Hübner, [1831]) on soybean (*Glycine max* (L.) Merr) is reported for the first time. Larvae of this species were found consuming soybean leaves in soybean fields in Córdoba province, Argentina, and were able to complete their life cycle. Characteristics of adults and larvae are provided for rapid identification in the field. Due to the widespread distribution of this species within the region where soybean is more intensively cultivated in South America, we conclude that *D. sacrifica* is a potential soybean pest. Further studies on infestation frequency, damage levels and control by natural enemies are needed.

KEY WORDS: Lepidoptera, Erebidae, Arctiidae, *Dysschema sacrifica*, soybean, pest, Argentina.

Introduction

The legume family is the third largest family within the Angiospermae and represents the second economically most important plant family after Poaceae. Soybean, also known as soya (*Glycine max* (L.) Merr) is one of the most important crops within this family (LEFF et al., 2004). It is native to East Asia and the main producers are the United States, Brazil, Argentina, China and India (FORECAST USDA, 2016). In Argentina, soybean represented half of the cultivated surface in 2006 (AIZEN et al., 2009) and 86.5% of the total soybean production corresponds to the Pampean region, situated in the center-east of Argentina (PIASTRELLINI et al., 2015).

Although soybean is an exotic plant, the crop has been established in different locations and with increasing areas for many uses. Many arthropod species in the American continent gradually adapted to the crop, sometimes causing considerable damage or becoming pests (CARRARO-FORMENTINI et al., 2015). According to a review, several arthropod herbivores that feed on soybean across the globe were identified and, particularly, 70 species of lepidopteran larvae were reported to produce damages by different
feeding strategies like leaf eaters, leaf-rollers, borers, pod eaters and cutworms (FICHETTI et al., 2013; CARRARO-FORMENTINI et al., 2015). The accurate identification of the species that feed on crops is extremely important for proper management and to avoid economic losses (CARRARO-FORMENTINI et al., 2015). This study reported for the first time a species of Lepidoptera that feeds on soybean leaves.

Materials and methods

Recently, during field sampling of soybean arthropods, in two of twelve fields (March 15th and April 14th, 2016) within Santa Maria department, Córdoba province, Argentina (Fig. 1) lepidopteran larvae were observed feeding on leaves of soybean. Larvae and leaves of soybean were collected and transported to the laboratory. The larvae were reared to adulthood for determination. Both soybean fields were adjacent to fragments of Chaco forest.

Results and discussion

The larvae collected belong to *Dysschema sacrifica* (Hübner, [1831]). The larvae ate leaves, causing an important defoliation. Life cycle of the species was completed consuming soybean, therefore *Glycine max* can be considered as an alternative feeding source for immature stages. There are three previous
reports of the subfamily Arctiinae, commonly named tiger moths, feeding on soybean leaves (CARRARO-FORMENTINI et al., 2015) (Table I).

Table I.– Species of Arctiinae (Lepidoptera: Erebidae) reported on Glycine max crops. * = new report. The reference column refers to the number of the references in text.

<table>
<thead>
<tr>
<th>Genus / species</th>
<th>Frequency on soybean</th>
<th>Geographical distribution</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aloa moorei (Snell.)</td>
<td>Sporadic</td>
<td>India, Pakistan</td>
<td>SINGH et al., 1990</td>
</tr>
<tr>
<td>Estigmene acrea (Dry.)</td>
<td>Sporadic</td>
<td>Canada to south of Central America</td>
<td>MARRERO-ARTABE et al., 2013</td>
</tr>
<tr>
<td>Dysschema sacrifica (Hb.)*</td>
<td>Potential</td>
<td>South America</td>
<td>CARRARO-FORMENTINI et al., 2015</td>
</tr>
<tr>
<td>Paracles cajetani (Rothsch.)</td>
<td>Sporadic</td>
<td>Uruguay</td>
<td>CARRARO-FORMENTINI et al., 2015</td>
</tr>
<tr>
<td>Paracles vulpina (Hb.)</td>
<td>Sporadic</td>
<td>Argentina</td>
<td>CARRARO-FORMENTINI et al., 2015</td>
</tr>
<tr>
<td>Spilarctia casigneta (Koll.)</td>
<td>Sporadic</td>
<td>North Pakistan, Himalaya, Nepal, Bhutan</td>
<td>NEUPANE &amp; SHRESTHA, 2015</td>
</tr>
<tr>
<td>Spilarctia dalbergiae Mre.</td>
<td>Potential</td>
<td>Himalayas</td>
<td>TIWARI &amp; KASHYAP, 1990</td>
</tr>
<tr>
<td>Spilarctia obliqua Wlk.</td>
<td>Frequent</td>
<td>South East Afghanistan, North Pakistan, India, Bhutan, Bangladesh, Burma</td>
<td>BISWAS, 2013</td>
</tr>
<tr>
<td>Spilosoma virginica (F.)</td>
<td>Frequent</td>
<td>North America (introduced in South America)</td>
<td>CARRARO-FORMENTINI et al., 2015</td>
</tr>
</tbody>
</table>

D. sacrifica has a wide distribution in South America, and is usually present in open and/or disturbed areas (BOURQUIN, 1945). It is present from Northern Brazil to the centre of Argentina, also occurring in Peru, Paraguay, Bolivia and Uruguay. Previous studies showed that immature stages have polyphagous habits, feeding on different plant families, mostly herbaceous plants (BOURQUIN, 1945; PASTRANA, 2004; FONSECA et al., 2014) (Table II). Furthermore, larvae can feed on different hosts plants during their larval stages and complete their life cycle without problems (PASTRANA, 2004). Field observations during sampling of this study revealed that larvae were also found on forest remnants close to the soybean crops, feeding on native herbaceous plants. The profound changes on Cordoba’s natural habitats over the last decades have led to deforestation and forest fragmentation (ZAK et al., 2004), mainly for agricultural expansion due to an increase in soybean cultivated surface (ZAK et al., 2008). A recent study found that insects move intensely between forest fragments and soybean crops (GONZÁLEZ et al., 2016), which suggests that D. sacrifica can be leaving forest patches occasionally to feed on soybean.

The complete life cycle of D. sacrifica was previously studied (BOURQUIN, 1945). Nonetheless, we mention some characteristics for quick identification of the species in the field. The adults of this species are medium sized, with females bigger than males (wingspan of males: 41.5-42mm, females: 49-52mm). The identification of the adults is not difficult due to their color pattern, the forewings are brownish dark with a white cross-like mark. There is also sexual dichromatism, since hindwings in females are darker than males. The final larval instar has a size of approximately 45 mm and the dominant coloration is greenish yellow with longitudinal black lines, verrucae are metallic blue and reddish brown bearing black and white setae, head and thorax legs are shiny black. (Fig. 2).

We suggest that producers should control their crops in future soybean campaigns in order to develop an early response. Also, more research is needed to determine the areas where D. sacrifica feeds on soybean and if damages are economically significant. Moreover, since it is a native species, it is likely that natural enemies are attacking all life stages, so this should also be considered in future studies. A large number of predators and parasitoids move between natural and cultivated habitats (GONZÁLEZ et al., 2016) and more species are found near forest fragments and in landscapes with high forest cover.
Soybean (*Glycine max* (L.) Merr) is registered as a new host plant for the tiger moth *D. sacrifica*. The species has a wide distribution that coincides with the region where soybean is more intensively cultivated in South America, which makes it a potential pest of this crop. More studies are needed to understand how frequently this species attacks soybean plants, the damage it produces and how natural enemies can be used to control it.

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Fig. 2.—Photographs of *D. sacrifica*. A-D: Final larval stage feeding on soybean leaves. E: Adult male. F: Adult female.