Fragmenta entomologica, 49 (1): 89-91 (2017)

eISSN: 2284-4880 (online version)
pISSN: 0429-288X (print version)

Short scientific note
Submitted: April 10th, 2016 - *Accepted:* May 28th, 2017 - *Published:* June 30th, 2017

First record of *Bruchidius raddianae* in Italy: infested seeds of *Vachellia karroo* from Lampedusa island (Coleoptera: Bruchidae; Fabales: Fabaceae)

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Abstract
Bruchidius raddianae (Anton & Delobel 2003), a species of seed beetle spread in Northern Africa, was detected for the first time in Europe in some localities of the Southern Iberian Peninsula in 2007. In Spain this coleopteran lives on the shrubs of the South African acacia tree, *Vachellia karroo* (Hayne) Banfi & Galasso, currently present in the Southern Iberian Peninsula. From seeds of *V. karroo* collected in October 2015, in Lampedusa island, Italy, where this plant is widely spread, 45 specimens of this coleopteran emerged. This observation represents the first record of *B. raddianae* in Italy and the second one for Europe.

Keywords: seed beetles, passive dispersion, South African acacia, Sicily, Europe.

Bruchidius raddianae (Anton & Delobel 2003) is an African coleopteran belonging to Bruchidae family, *centromaculatus* group (type species: *Bruchus centromaculatus* Allard) (Fig. 1a). In this note the Authors choose to keep the name of this group as a family according to Yus Ramos et al. (2007), despite the subsequent proposals introduced by Bouchard et al. (2011), where Bruchidae have been formally downgraded to a subfamily within Chrysomelidae. The *B. centromaculatus* group is distributed in the tropical Old World and comprises nine species developing in the seeds of various species of *Acacia* trees. Records on different plant genera are very rare and need confirmation (Anton & Delobel 2003). *B. raddianae*, mainly spread in Northern Africa, was detected for the first time in Europe in some localities of the Southern Iberian Peninsula in 2007 and it was qualified as "alien seed beetle" (Yus Ramos et al. 2014). In Spain this coleopteran has been studied in its biological cycle and mating behavior (Yus Ramos & Coello Garcia 2008) as pest species perfectly adapted to live on the shrubs of the South African acacia tree, *Vachellia karroo* (Hayne) Banfi & Galasso (Banfi & Galasso 2008) (formerly *Acacia karroo* Haynes), currently present in the Southern Iberian Peninsula; its biological cycle was thoroughly studied in Tunis (Derbel et al. 2007) on the "sunshade acacia" (*Acacia tortilis raddiana* (Hayne)). The South African acacia is a thorny tree considered important in Iberian Peninsula as ornamental plant and mainly as alive fence for its strongly prickly feature; there, this species grows in wild conditions so that it should have to be considered as an invasive species, at now (Castroviejo 1999). In Italy *V. karroo* is reported in some southern regions namely Puglia, Calabria, Sicilia and Sardegna where it is considered naturalized (Celesti-Grapov et al. 2010). In October 2015 ten pods of *V. karroo* acacia were collected in Lampedusa island, in the center of the homonymous town (Fig. 2); this plant is widely spread in the island as in the bushy country as well in the urban or semi-rural areas. The seeds were preserved in lab conditions at 20°C, 40%UR and daylight, in a 50ml tube. In total 45 specimens (24 females and 21 males) emerged from 26 seeds in three different emergences observed in November 2015, February 2016 and February 2017. Specimens were identified at specific level observing the features on the female pygidium and genitalia in both sexes, according to the description by Anton & Delobel 2003 (Figs 1a, b).

This finding is part of the extent phenomenon of the passive dispersion of alien species worldwide. In the last 200 years a significant number of exotic species have become established successfully in large areas of Europe (Hulme 2007), a situation which is expected to increase

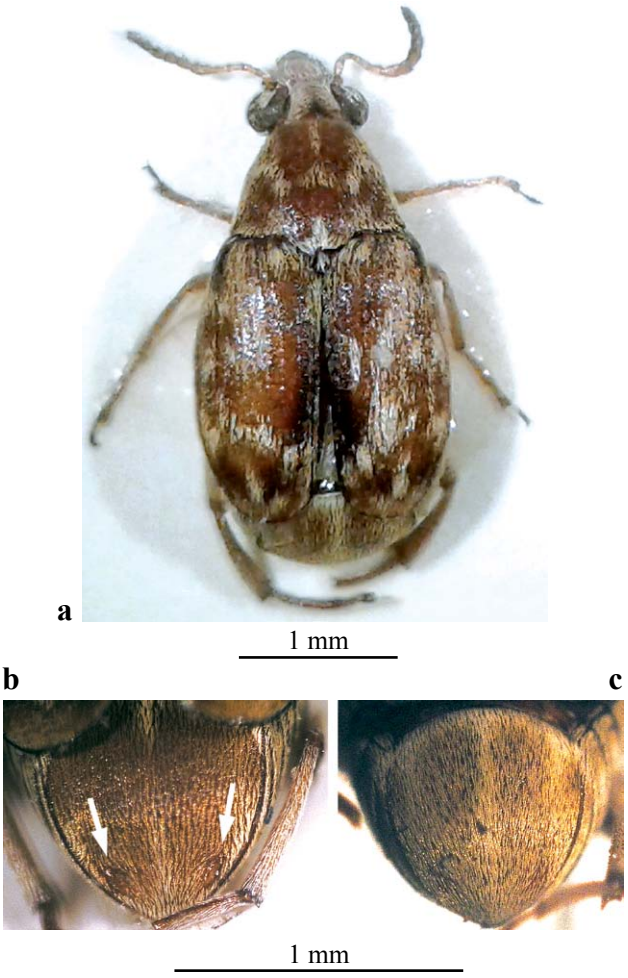

Fig. 1 – **a**, female of *Bruchidius raddianae* (dorsal view); **b**, female pygidium (the white arrows indicate eye-like foveae); **c**, male pygidium.

in the coming decades according to all forecasts (Sala et al. 2000) and could accelerate the degradation of the local ecosystems (Vilà et al. 2007). The natural range of *B. raddianae* appears to be North Africa (Morocco, Algeria, Tunisia, Libya, Egypt, Mali, Mauritania, Nigeria, Senegal, Sudan) but also extends to the Near East (Israel, Jordan) and descends to Saudi Arabia, Oman and Yemen, having its maximum eastward expansion towards India and Shri-Lanka, being found on diverse species of the genus Acacia (Anton & Delobel 2003). As all the bruchids, also *B. raddianae* is an endophytic spermophagous species during its pre-imaginal life, showing clear preference for the plant species belonging to the subfamily Mimosoideae (Leguminosae). This led to undertake biological control measures including import of some bruchid species able to compromise the reproduction of these invasive shrubs mainly in New Zealand and in Australia, where the invasion of exotic acacias as the South African one, causes relevant disruptions in the natural equilibrium of the native species (Syrett et al. 1999; Palmer 1999; Suasa et al. 2004). In Spain however the use of *B. raddianae* as biological control method is considered a possibility to contrast the spread of such invasive plant. It is possible that the distribution map of this species has not yet been well defined, for example, it has never been cited in any country of Europe, before the present record. The finding of this coleopteran, reproducing spontaneously in the natural environment in the south of the Iberian Peninsula, shows that this species has jumped the natural barrier of the Mediterranean Sea, using available food resources, also imported from Africa, such as the South African acacia, *V. karroo*. In fact *B. raddianae* to date has not been found on this acacia in its native region of origin (South Africa). In the Iberian Peninsula this coleopteran was found for the first time in the province of Cadiz, in the towns of San Fernando, on the Chiclana-Campano road and in El Colorao (Conil); afterwards it was confirmed in the province of Málaga, in the town of Torre del Mar (Vélez-Málaga). As the host plant spread in these localities is *V. karroo*, it is possible that the area of distribution of this insect extends to Huelva and southern Portugal, where this acacia also grows spontaneously in the coast (Castroviejo 1999). On the base of the extremely few data available at now, it should be assumed that the distribution of *B. raddianae* in Europe overlaps its breeding plant's one.

Anyway, data about the occurrence of *B. raddianae* in Italy are actually limited to the present finding in Lampedusa. For this reason an active research about the current distribution of this species should be started up on scrubs of *V. karroo* where this plant occurs.

Acknowledgements – We warmly thank Giuseppe Brundu (Science for Nature and Environmental Resources Department, University of Sassari, Sassari, Italy) and Riccardo Scalera (Programme officer, IUCN SSC Invasive Species Specialist Group) for their support about the diffusion of invasive plants in Italy.

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Fig. 2 – *Vachellia karroo.* The plant whose pods were collected: **a**, face of the tree in July and **b**, in October.

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