European and Mediterranean Plant Protection Organization
Organisation Européenne et Méditerranéenne pour la Protection des Plantes

Data sheets on quarantine pests
Fiches informatives sur les organismes de quarantaine

Diabrotica speciosa

Identity

Name: *Diabrotica speciosa* (Germar)
Taxonomic position: *Insecta*: *Coleoptera*: *Chrysomelidae*
Common names: San Antonio beetle (English): vaquita de San Antonio (Spanish); vaquina-patriota, vaquina-das-cucurbitaceas, vaquina-verde-amarela (Portuguese)
EPPO code: DIABSC
Phytosanitary categorization: EPPO A1 action list no. 303

Hosts

The larvae of *D. speciosa* feed on roots of maize, wheat, groundnut, soybean and potato, and various other crop and non-crop hosts. The adults are highly polyphagous, being recorded on over 60 species, mainly vegetables, but are particularly associated with *Cucurbitaceae* (e.g. *Cucurbita maxima*, *Cucurbita pepo*).

Geographical distribution

D. speciosa does not have any particular history of international spread.
EPPO region: absent
Central America & Caribbean: Costa Rica (unconfirmed), Mexico (doubtful), Panama (unconfirmed)
South America: Argentina, Bolivia, Brazil (mainly in south and east), Colombia, Ecuador, French Guiana, Paraguay, Peru, Uruguay, Venezuela
EU: absent
Distribution map: see CABI/EPPO (2003)

Biology

D. speciosa overwinters as an adult, and is fairly tolerant of cold. It can be found in winter in small numbers concealed in the rosette and crowns of winter-growing plants. Eggs are laid on the soil near a larval host plant, and hatch in 8 days. There are three larval instars, developing over about 25 days. The first-instar larvae feed throughout the root system of the host, but older instars feed in the upper 10 cm under the crown. The pupal stage lasts 6 days. Young adults are yellowish or pale brown colour, becoming green with bright yellow spots. Mating occurs 4–6 days after emergence, and each female lays over 1000 eggs, mostly on days 16–56. The number of overlapping generations depends on the latitude and the climate. In tropical areas, *D. speciosa* multiplies continuously. In northern Argentina, there are three generations per year. Adult beetles feed on pollen-rich plant structures, such as the flowers of cucurbits, thistle and sunflower. Like other *Diabrotica* spp., they are especially associated with *Cucurbitaceae*, and are tolerant to cucurbitacins. When flowers become scarce, beetles may feed on the tender green parts of other hosts, such as lucerne, potatoes, maize, beans, soybean, lettuce and cabbage.

Detection and identification

Symptoms

Root feeding causes stunted growth, and in particular 'goose neck' in maize (bending of the first internodes). In groundnut and potato, the pods or tubers may be externally damaged or bored. Adults cause defoliation and general feeding damage to leaves, flowers and fruit. On maize, they feed on the tassels, preventing pollination, and thus reducing the number of ripening grains from the tip of the ear to the base.

Morphology

Eggs
Ovoid, about 0.74×0.36 mm, clear white to pale yellow.

Larva
Larvae are about 8.5 mm long at maturity, subcylindrical; chalky white; head capsule dirty yellow-light brown. A detailed description has been published by Defago (1991).

Pupa
Pupae are 5.8–7.1 mm long; white, formed in a 8×4 mm oval cell in the soil.

Adult
Adults are 5.5–7.3 mm long; antennae 4–5 mm. General colour grass-green, with yellow spots (recalling the colours of the

Brazilian flag). Antennae dark, first three basal segments lighter; head ranging from reddish brown to black; labrum, scutellum, metathorax, tibiae and tarsi black; elytra with three large oval transverse spots on each, basal spots larger and usually reddish toward the humeral callus, the rest yellow. Ventrally, head and metathorax dark brown, prothorax green, mesothorax and abdomen light brown or yellow-green. Pronotum bi-foveate, convex, smooth, shiny, 1/4 wider than long. Male antennae proportionally longer than female. Males with an extra sclerite on the apex of the abdomen that makes it look blunt, compared with the rather pointed female apex. Full descriptions of *D. speciosa* are given by Baly (1886), Araujo Marques (1941) and Christensen (1943).

Pathways for movement

D. speciosa can move locally by adult flight, and probably by movement of eggs, larvae or pupae in soil contaminating vehicles or farm machinery. For long-distance spread, adults could be present on host plants for planting, but these are not of the kind normally moved in international trade, and the active adults will not necessarily remain on their hosts. Larvae could be associated with groundnuts or potatoes, but the underground parts of maize, wheat or soybean are unlikely to be moved. Nor is it likely that the larval hosts would be traded as plants with soil. Accordingly, the main potential pathway is soil as such.

Pest significance

Economic impact

Like the North American *Diabrotica* spp. (EPPO/CABI, 1997; OEPP/EPPO, 1999), the South American *D. speciosa* has larvae which feed on the roots of *Poaceae*, especially maize, and adults which feed on the foliage, flowers and fruits of many hosts, especially *Cucurbitaceae*. Maize is a major larval host in South America, but also various other crops. In Argentina, *D. speciosa* particularly affects groundnuts, and in southern Brazil, potatoes and wheat. The adults do more damage than those of the North American species, attacking especially watermelon, squash and tomatoes in Brazil, vegetables in Paraguay, also ornamental flowers such as dahlias and chrysanthemums (USDA, 1957). Significant damage is also caused by adults feeding of the tassels of maize, and reducing grain set. An economic threshold of 2 insects per plant of *Phaseolus vulgaris* was determined by Pereira *et al*. (1997).

Control

Plant protection products are widely used to control *D. speciosa*, either applied to the soil to control larvae or to the above-ground parts to control adults (according to the crop concerned). Intensive use of products is required to control larvae in soil. In southern Brazil, IPM programmes combine no-till agriculture, rotation of soybeans with maize or wheat, and use of insecticides only when damage is evident. Using this system, wheat is produced with virtually no pesticides in this area. Adults can be lured to baits composed of insecticide on the cucurbitacin-rich roots of wild cucurbits (Hamerschmidt, 1985; Roel & Zatarin, 1989). Although some natural enemies of *D. speciosa* are known (Heineck-Lionel & Salles, 1997), there is no prospect of biological control of this species.

Phytosanitary risk

D. speciosa presents a risk to the EPPO region similar to that for the North American *Diabrotica undecimpunctata* (OEPP/EPPO, 1999), and also to a certain degree *Diabrotica virgifera* and *Diabrotica barberi* (EPPO/CABI, 1997). Its introduction into the EPPO region would lead to increased use of insecticides on a variety of important crops, or else to the need for a restrictive crop rotation (as is now happening for *D. virgifera* which has established and is spreading). Trade pathways for introduction of *Diabrotica* spp. from America are not obvious, and it seems in the case of *D. virgifera* that adults were probably carried from America on aircraft, while spread in Europe could be partly on ground vehicles. A similar pathway could operate for *D. speciosa* at any time.

Phytosanitary measures

D. speciosa was added in 2002 to the EPPO A1 action list of pests, and endangered EPPO member countries are thus recommended to regulate it as a quarantine pest. In general, most EPPO countries prohibit the import of soil, and restrict the import of plants with soil (OEPP/EPPO, 1994), from other continents. This measure should be effective against *D. speciosa*. Host plants should be free from the pest.

Acknowledgements

The CABI Crop Protection Compendium was used as a major source of information for this data sheet.

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