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

Melanotus communis

Identity

Name: *Melanotus communis* (Gyllenhal)
Synonyms: *Elater communis* Gyllenhal
Taxonomic position: *Insecta*: *Coleoptera*: *Elateridae*
Common name: common wireworm, corn wireworm, community wireworm (English)
EPPO code: MELNCO
Phytosanitary categorization: EPPO A1 action list no. 305

Hosts

Recent literature concentrates on *M. communis* as a pest of maize, sugarcane, potatoes and sweet potatoes, although wheat, sorghum, unspecified grasses, small grain crops, flower and vegetable crops (e.g. carrot) can also be attacked (Sorensen & Baker, 1994). Older literature refers to capsicums and celery as hosts that suffered economic damage (Wilson, 1940).

Geographical distribution

EPPO region: absent
North America: USA (Alabama, Arizona, Arkansas, Colorado, Florida, Georgia, Illinois, Indiana, Iowa, Louisiana, Missouri, Nebraska, New York. North Carolina, Ohio, Pennsylvania, South Carolina, South Dakota, Texas, Virginia, West Virginia)
EU: absent

Biology

Overwintered adults become active in early summer, feeding on pollen. They mate and females lay individual eggs in the soil amongst the roots of grasses or other hosts. First-instar larvae emerge in July and begin feeding on roots. The larvae develop throughout the summer and overwinter in the ground as second-instar larvae. Most immatures continue to develop over the next five years moulting once or twice each year, but some develop fully in three years. Mature larvae construct oval earthen cells 15–30 cm deep in the soil and pupate. Adults emerge 7–39 days later and feed on pollen before hibernating in sheltered areas (Fenton, 1926).

M. communis larvae attack seeds, germinating seedlings, tubers and the roots of well established plants. Most plants are attacked in the early summer although in cooler years larvae feed for longer (Riley *et al*., 1974).

Detection and identification

Symptoms

Maize crops establish poorly if seeds are attacked and completely eaten out, preventing germination. Root feeding on seedlings and older plants causes them to wilt. Plants may be stunted. Characteristically, only plants in part of a field will be damaged. On potato and carrot, third-instar larvae make very narrow holes 1 mm deep, while older instars make deeper holes up to 3 mm in diameter and 2 mm deep (Jansson & Seal, 1994).

Morphology

Eggs
Pearly white and shiny, spherical to oval, 0.3 mm in diameter.

Larvae
The main body is pale yellow to reddish brown while the head is brown. The body is slender, cylindrical, hard-bodied and jointed, 21–25 mm long. Riley *et al.* (1974) provide a key to larvae for nine *Melanotus* species from the northern central USA.

Pupa
White, soft-bodied oval 13 mm long.

Adult
Reddish brown to black, 13 mm long with the distinctive elaterid feature of a backward-pointing anterior projection near the middle of the narrow, tapering body.

Pathways for movement

Transport of soil containing eggs and larvae, or of potato tubers containing larvae, appears to be the most likely pathway for movement of this pest into the EPPO region. Locally, adults fly at night, usually remaining within 3 m of the ground. Peak

flight activity in Florida is during May and June, when females are ovipositing (Cherry & Hall, 1986). Within infested fields, larvae spread out slowly from the regions where damage is first seen, enlarging the area of crop damaged (Fenton, 1926).

Pest significance

Economic impact

In northern central states of the USA, *M. communis* is the commonest wireworm found in maize fields and can constitute 85% of the total elaterid population present (Riley *et al*. Keaster & Enns, 1974; Baranowski & Waddill, 1975).

In Florida, *M. communis* is the largest and most abundant wireworm in the Everglades agricultural area, especially in soils rich in organic matter (Cherry & Hall, 1986; Cherry, 1988). On potato, wireworms are the most serious insect pest, and *M. communis* is the most important of them. In two consecutive growing seasons in the 1980s, up to 45% of many potato crops were downgraded due to damage from wireworms (Jansson & Lecrone, 1989), and Jansson & Seal (1994) rated *M. communis* has been the single most important constraint on potato production in southern Florida.

Sugarcane also suffers significant economic damage due to larval feeding in southern Florida. Yield reductions of 5.9 t ha^{-1} of sugarcane have been reported, with sugar reductions assessed as 3.8% per wireworm per 1.5 m crop row length (Hall, 1990).

Control

M. communis populations are reduced by discing the soil before planting. This physically injures the larvae and brings them to the soil surface where they can desiccate or be eaten by birds. However, this does not prevent *M. communis* from reaching economically damaging levels in Florida, where soil insecticides or flooding of fields are tactics that are also used (Hall & Cherry, 1993). In trials in Florida, where potato crops are grown following summer cover crops, delaying the planting of the summer crop can reduce wireworm tuber damage by nearly 10% and save 1300–3300 USD per ha (Jansson & Lecrone, 1991).

Phytosanitary risk

Wireworms are among the best known soil-inhabiting crop pests. They occur in all kinds of soil and attack many crops (Gratwick, 1992). *M. communis* has been highlighted from the hundreds of wireworm species around the world as of particular concern, together with *Limonius californicus* (OEPP/EPPO, 2005), since it is an important pest of maize, potatoes, and sugarcane and because it inhabits regions of North America whose climate is similar to that of relevant parts of the EPPO region (mainly southern and central). Given that European growers currently manage indigenous wireworms in the EPPO region by techniques like those used in North America, it is likely that such techniques would be effective against *M. communis*. However, the presence of an increased diversity of wireworms in Europe would increase the overall risk of wireworm attack under a wider range of conditions, and thus the overall use of soil-applied insecticides.

Phytosanitary measures

M. communis was added in 2002 to the EPPO A1 action list of pests recommended for regulation as quarantine pests. 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 accordingly be effective against *M. communis*, even on potatoes since the larvae only feed superficially and withdraw from tubers when not feeding. Concerning seed potatoes and ware potatoes, EPPO Standard PM 8/1 (OEPP/EPPO, 2004) recommends, for imports from countries where *M. communis* occurs, freedom from plant debris and from soil (to a tolerance of 1% for seed potatoes and 2% for ware potatoes).

Acknowledgements

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