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Data Sheets on Quarantine Pests

Rhagoletis mendax

IDENTITY

Name: *Rhagoletis mendax* Curran
Taxonomic position: Insecta: Diptera: Tephritidae
Common names: Blueberry maggot (English)
Mouche de l'airelle (French)
Notes on taxonomy and nomenclature: *R. mendax* is very closely related and similar to *R. pomonella* (EPPO/CABI, 1996); records of *R. pomonella* from species of Ericaceae refer to *R. mendax*.
Bayer computer code: RHAGME
EPPO A1 list: No. 243
EU Annex designation: I/A1

HOSTS

The hosts of *R. mendax* are cultivated and wild-harvested species of Ericaceae, especially *Gaylussacia* and *Vaccinium* spp. (*V. corymbosum*, *V. angustifolium* and *V. vitis-idaea*) (Bush, 1966). In the EPPO region, *Vaccinium* spp. would be at risk.

GEOGRAPHICAL DISTRIBUTION

EPPO region: Absent.
North America: Canada (New Brunswick, Nova Scotia, Ontario, Prince Edward Island, but recent surveys show absence from Quebec despite earlier reports; Vincent & Lareau, 1989), USA (Connecticut, Florida, Maryland, Massachusetts, Maine, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Tennessee, Virginia, West Virginia, Wisconsin).
Distribution map: See Foote *et al.* (1993).
EU: Absent.

BIOLOGY

Eggs are laid below the skin of the host fruit and hatch after 3-7 days. The larvae usually feed for 2-5 weeks. Pupariation is in the soil under the host plant and this is the normal overwintering stage. Adults may live for up to 40 days under field conditions (Christenson & Foote, 1960). Geddes *et al*. (1987) and Steck & Payne (1993) give a general account of the species.

DETECTION AND IDENTIFICATION

Symptoms

Attacked fruit will be pitted by oviposition punctures, around which some discoloration usually occurs.

Morphology

R. mendax is very difficult to separate on morphological criteria from *R. pomonella* (EPPO/CABI, 1996) and should be referred to a specialist (Bush, 1966). It is, however, easy to separate by reference to its hosts. The following description applies to both.

Larva

See Phillips (1946), Kandybina (1977), Berg (1979).

Adult

Head: Three pairs of frontal setae; genae usually less than one-quarter eye height; ocellar setae long, usually similar in length and strength to orbital setae; two pairs of orbital setae; 1st flagellomere usually with a small antero-apical point.

Thorax: Scutum predominantly black, with two or four longitudinal bars of tomentum that form grey stripes, with dorsocentral setae based close to a line between the anterior supra-alar setae; scutum with dorsocentral setae and presutural supra-alar setae; anatergite without long pale hairs, at most with a fine pubescence; scutellum marked black at sides and in base half, with basal and lateral black areas broadly joined, flat and with four marginal setae (one basal and an apical pair).

Wing: Vein Sc abruptly bent forward at nearly 90°, weakened beyond this bend and ending at subcostal break; vein R1 with dorsal setulae; vein R4+5 usually without dorsal setulae, except sometimes at the base of the vein (except in some aberrant individuals); apex of vein M meeting C with a distinct angle; cup extension short, never more than one-fifth as long as vein A1+Cu2, and vein CuA2 straight along anterior edge of cup extension; cell cup always considerably broader than half depth of cell bm, and usually about as deep as cell bm. Cells r1 and r2+3 without any markings between the discal and preapical crossbands; preapical crossband (the band which covers the dm-cu crossvein) running obliquely from a point on the discal crossband near the r-m crossvein, so that it is almost parallel to the apical crossband; apical crossband separated from vein C leaving a hyaline margin at least across the apices of veins R2+3 and R4+5. Length 2-4 mm.

Abdomen: Predominantly black; female with an ovipositor that is shorter than the wing length, and straight.

Detection and inspection methods

Traps already in use within the EPPO region for *R. cerasi* should be suitable for monitoring any invasion of North American *Rhagoletis* spp. They capture both sexes and are based on visual, or visual plus odour, attraction. They are coated in sticky material. Traps are usually either flat-surfaced and coloured fluorescent yellow to elicit a supernormal foliage response, or spherical and dark-coloured to represent a fruit; traps which combine both foliage and fruit attraction can also be used. The odour comes from protein hydrolysate or other substances emitting ammonia, such as ammonium acetate. See Boller & Prokopy (1976) and Economopoulos (1989) for a discussion of these traps.

MEANS OF MOVEMENT AND DISPERSAL

Adult flight and the transport of infected fruits are the major means of movement and dispersal to previously uninfected areas. In general, *Rhagoletis* spp. are not known to fly more than a short distance. In international trade, the major means of dispersal to previously uninfested areas is the transport of fruits containing live larvae. There is also a risk from the transport of puparia in soil or packaging with plants which have already fruited.

PEST SIGNIFICANCE

Economic impact

R. mendax is a damaging pest of blueberry in North America.

Control

Control procedures already established in the EPPO region for *R. cerasi* are similar to those used against the North American pest species and could therefore be implemented against any outbreak of *R. mendax* within the EPPO region. If possible, wild and abandoned plantations should also be destroyed. Boller & Prokopy (1976) note that systemic organophosphates, such as dimethoate, are highly effective against most species, killing eggs, larvae and adults. Recently, Belanger *et al*. (1985) discussed the use of pyrethroids, but these were only of use when pest activity was low. More environmentally acceptable techniques have been tried; namely bait sprays (insecticide plus ammonia source) which can be applied as a spot treatment; soil application of insecticide to destroy pupae; and juvenile hormone analogues which can be applied to the soil (Boller & Prokopy, 1976). Pheromone traps can be used to monitor populations (Geddes *et al*., 1989; Gaul *et al*., 1995), and Pearson & Mayer (1990) have constructed a model to predict infestation risk.

Phytosanitary risk

The EPPO A1 quarantine list category "non-European Trypetidae" (OEPP/EPPO, 1983) includes *R. mendax*. EPPO's original documentation of this category concerned only *Rhagoletis* spp. in North America; the tropical tephritids were added to the data sheet only at a late stage. Thus, the temperate fruit flies are the obvious direct quarantine pests for the EPPO region. *R. mendax* presents a risk to a developing *Vaccinium* crop in Europe. Though not listed as a quarantine pest by any other regional plant protection organization, *R. mendax* is a quarantine pest for Canada, which is attempting to limit its further spread.

PHYTOSANITARY MEASURES

Consignments of blueberries and other *Vaccinium* spp. from countries where *R. mendax* occurs should be inspected for symptoms of infestation and those suspected should be cut open in order to look for larvae. EPPO recommends that such fruits should come from an area where *R. mendax* does not occur, or from a place of production found free from the pest by regular inspection for 3 months before harvest. Fruits may also be treated, but specific treatment schedules have mostly not been developed for *Rhagoletis* spp., since there is no need for them in the USA. Schedules developed for other fruit flies on blueberries will probably be adequate, e. g. treatment in transit by cold treatment (e.g. 13, 15 or 17 days at 0.5, 1 or 1.5°C, respectively) (USDA, 1994). Ethylene dibromide was previously widely used as a fumigant but is now generally withdrawn because of its carcinogenicity; methyl bromide is less satisfactory, damaging many fruits and reducing their shelf life, but treatment schedules are available (e.g. 32 g/m^3 for 2-3.5 h at 21-29.5°C; USDA, 1994).

Plants of host species transported with roots from countries where *R. mendax* occurs should be free from soil, or the soil should be treated against puparia, and should not carry fruits. Such plants may indeed be prohibited importation.

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