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Data Sheets on Quarantine Pests

Potato yellow dwarf nucleorhabdovirus

IDENTITY

Name: Potato yellow dwarf nucleorhabdovirus
Taxonomic position: Viruses: Rhabdoviridae: *Nucleorhabdovirus*
Common names: PYDV (acronym)
EPPO computer code: POYDXX
EPPO A1 list: No. 29
EU Annex designation: I/A1

HOSTS

PYDV occurs principally in wild Solanaceae and has been transmitted artificially to species in the families Apocynaceae, Asteraceae, Brassicaceae, Fabaceae, Lamiaceae, Polygonaceae and Scrophulariaceae (Black, 1970; OEPP/EPPO, 1980). It is found only sporadically in potatoes (*Solanum tuberosum*). It occurred naturally during 1986-88 in Minnesota (USA) on the ornamental herbaceous plants *Mirabilis jalapa*, *Nicotiana alata*, *Tagetes erecta* and *Zinnia elegans*, causing severe stunting, chlorosis, vein yellowing and systemic vein and leaf necrosis (Lockhart, 1989).

GEOGRAPHICAL DISTRIBUTION

EPPO region: Absent.
North America: Canada (Alberta, British Columbia, New Brunswick, Ontario, Quebec), USA (California, Florida, Indiana, Maine, Maryland, Massachusetts, Minnesota, Montana, Nebraska, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, South Dakota, Vermont, Virginia, Wisconsin, Wyoming) (Falk *et al.*, 1981).
EU: Absent.
Distribution map: See CMI (1975, No. 111).

BIOLOGY

PYDV isolates can be distinguished by their serological reactions and their vector specificity. There are two serotypes: one transmitted by the leafhopper *Aceratagallia sanguinolenta* and another *Aceratagallia* sp. ("sanguinolenta yellow dwarf virus"), the other by the leafhopper *Agallia constricta* ("constricta yellow dwarf virus"). Both forms are transmitted by *Agalliota quadripunctata*. The California isolate is closely related to the sanguinolenta serotype (Falk & Weathers, 1983).

Both serotypes have a long incubation period in their respective vector leafhoppers (at least 6 days), during which they multiply (Chiu *et al.*, 1970). Nymphs, adult male and female insects transmit PYDV. The virus can overwinter in adult vectors even in the absence of food plants. *Leucanthemum vulgare* serves as the principal virus source for infecting potato crops. *Catharanthus roseus* is a natural host in California. There are no reports of virus transmission through true seed or pollen. PYDV is carried through tubers derived from infected plants.

DETECTION AND IDENTIFICATION

Symptoms

Infected plants are dwarfed and show typical yellowing and necrosis. Internal necrotic spots occur in stems, particularly in upper nodes. Pith necrosis of stems is common. Tubers are usually few, small and deformed with surface cracking and internal necrotic spots. Infected tubers hardly germinate. High temperatures favour and low temperatures delay symptom development.

Morphology

PYDV is bacilliform, with one type of particle of about 380 x 75 nm.

Detection and inspection methods

Indicator plants

The virus is mechanically transmissible to seven species of tobacco. *Nicotiana debneyi* and *N. rustica* are the best hosts for symptoms and virus maintenance. Inoculated leaves show bright yellow lesions, followed by systemic mosaic of the upper leaves. *N. tabacum*, *N. glutinosa* and *N. clevelandii* also show local lesions, followed by systemic mosaic and vein yellowing (Falk *et al.*, 1981).

Serological detection methods

High-titre antisera can be produced. ELISA has been successfully used for PYDV detection and strain differentiation (Falk & Weathers, 1983). For routine use, mixed antiserum containing antisera of the two serotypes is recommended.

MEANS OF MOVEMENT AND DISPERSAL

PYDV spreads locally by insect vectors. It is not transmitted by true seed but is carried by tubers. In principle, PYDV could be carried by potato tubers in international trade.

PEST SIGNIFICANCE

Economic impact

PYDV is not primarily a pathogen of potato and only occurs sporadically in that crop. It has not been seen in the mid-west of the USA for forty years, until a recent outbreak on ornamental plants (not on potato) (Lockhart, 1989).

Control

No particular measures are needed in practice to control PYDV. However, as with all potato viruses, high-quality seed potatoes must be derived from virus-free nuclear stock, including freedom from PYDV.

Phytosanitary risk

PYDV is included among the non-European potato viruses of the EPPO A1 quarantine list (OEPP/EPPO, 1984). It does not, however, originate in the high-risk centre of diversity of potato in South America, but in North America where it appears to infect potatoes only incidentally and very sporadically and is not regarded as a significant problem for potato production. The virus appears to survive more as a laboratory curiosity than as a real problem in the field. It can therefore be regarded as of very minor importance for the EPPO region. There is, however a perceived risk of the introduction of PYDV into seed-potato production schemes, causing some difficulties with respect to the phytosanitary certification of exports.

PYDV can relatively easily be excluded by prohibition of commercial trade in potato tubers. The risk of introduction with breeding material is minor, since it is not carried by

true seed, and besides would probably cause obvious symptoms on material held in quarantine.

PHYTOSANITARY MEASURES

Seed potatoes from countries where PYDV occurs should fully satisfy the requirements of an official virus certification scheme covering PYDV. Ware potatoes should have been treated so as to suppress the possibility of germination.

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