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Data Sheets on Quarantine Pests

Potato Andean latent tymovirus

IDENTITY

Name: Potato Andean latent tymovirus
Synonyms: Potato (Andean) latent virus Andean potato latent virus
Taxonomic position: Viruses: *Tymovirus*
Common names: APLV (acronym)
Notes on taxonomy and nomenclature: APLV is sometimes considered to be a strain of eggplant mosaic tymovirus but sequence comparisons show them to be distinct species.
EPPO computer code: POALXX
EPPO A1 list: No. 244
EU Annex designation: I/A1

HOSTS

The principal host of APLV is potatoes (*Solanum tuberosum*). The virus can also be transmitted mechanically to species of Amaranthaceae, Chenopodiaceae, Cucurbitaceae and Solanaceae (Gibbs *et al.*, 1966; Fribourg *et al.*, 1977).

GEOGRAPHICAL DISTRIBUTION

EPPO region: Absent.
South America: Widespread in the Andean countries Bolivia, Colombia, Ecuador and Peru, especially at high altitudes (Koenig *et al.*, 1979). Also recorded from Argentina, Chile and Paraguay (unconfirmed).
EU: Absent.

BIOLOGY

APLV belongs to the tymovirus group, members of which are typically beetle-transmitted. In experiments APLV was transmitted by a flea beetle (*Epitrix* sp.) with low efficiency. *Epitrix* spp. could act as natural vectors but only when high populations are present. The virus is readily transmitted by contact and at a low frequency through true potato seed (Jones & Fribourg, 1977). Transmission to tubers is erratic.

APLV was considered to be a strain of eggplant mosaic tymovirus (see Identity), but its isolates differ in several characteristics (Gibbs & Harrison, 1969, 1973; Angarita, 1977; Angarita & Dekegel, 1979). They can be combined into three major strain groups recognized by spur formation tests (Koenig *et al.*, 1979). Isolates of the Col-Caj-group and of the CCC-group have been found more commonly in the northern Andean region and the members of the Hu-group in the southern Andes from central Peru to Bolivia.

DETECTION AND IDENTIFICATION

Symptoms

The symptoms vary depending on virus strain, potato cultivar and growing conditions. They range from mild to severe mosaic with necrotic flecking, curling and leaf-tip necrosis. A wide daily fluctuation in temperature, in particular cold conditions, seems to favour symptom expression in infected plants growing at high altitude. Severe symptoms are also induced in mixed infections with other potato viruses (Jones & Fribourg, 1978).

Morphology

The virus contains isometric particles of about 30 nm in diameter which sediment in two components: empty protein shells and nucleoprotein particles (Gibbs *et al.*, 1966).

Detection and inspection methods

Indicator plants

Nicotiana bigelovii seems to be the best host for detecting APLV. Local lesions are developed in inoculated leaves followed by a systemic mosaic and characteristic systemic netting of minor veins. *Nicotiana clevelandii* shows necrotic or chlorotic spots on inoculated leaves with most isolates and a strong systemic mosaic with netting of the minor veins.

Serological detection methods

High-titre antisera can be prepared. The latex agglutination test detects all known isolates with the same antiserum, but it is less sensitive than ELISA (Koenig & Bode, 1977; Fribourg & Nakashima, 1984). ELISA is rather strain-specific (Koenig *et al.*, 1979), but this can be overcome by using a mixture of antisera for each of the three virus strain groups (Schroeder & Weidemann, 1990). Dot-ELISA on nitrocellulose membranes has been successful (CIP, 1989).

MEANS OF MOVEMENT AND DISPERSAL

APLV is transmitted by contact between plants, insect vectors, possibly through tubers (transmission is erratic) and by true seed. In international trade, APLV could in principle be carried by potato tubers or by true seed of potato.

PEST SIGNIFICANCE

Economic impact

Despite its name, APLV can cause serious symptoms in secondarily infected potato plants (see Detection and identification); however, yield reductions have not been studied, and it is not clear how important APLV is in practice.

Control

As with all potato viruses, control depends on the production of high-quality seed potatoes from virus-free nuclear stock.

Phytosanitary risk

APLV is included among the non-European potato viruses of the EPPO A1 quarantine list (OEPP/EPPO, 1984a). It is also considered of quarantine concern by NAPPO and, in general, all regional plant protection organizations outside South America recommend very strict measures for potato material from that continent. The principal perceived risk is the introduction of new viruses into seed potato production schemes, increasing the cost and difficulty of operating these schemes, and opening up new possibilities for yield losses from single or mixed virus infections. Any seed potato-exporting country in which APLV

was reported would immediately find itself in difficulties with respect to the phytosanitary certification of its exports. The risk is particularly important because of the simple pathway which exists from useful germplasm material (local potato cultivars, wild tuber-forming *Solanum* spp.) in the potato's centre of diversity in South America through to nuclear stock material of new cultivars in seed potato-producing countries. Thus there is a great risk of introduction due to the increased international exchange of breeding material and germplasm, whether in the form of tubers, rooted cuttings, *in vitro* cultures or true seeds.

Individually, APLV could be regarded, among the group of South American potato pathogens, as of major importance for the EPPO region. It is distinguished, despite its name, by being a damaging disease, and it is also transmitted by true seed. Though it can relatively easily be excluded by prohibition of commercial trade in potato tubers, there is a risk of introduction with breeding material, in which it could only be detected by careful testing under quarantine.

PHYTOSANITARY MEASURES

Importation of potato tubers from countries where APLV occurs should be prohibited. APLV is one of the group of South American pests of potato which justify strict post-entry quarantine procedures in the EPPO region, together with equivalent checks before export. Only material for scientific purposes, in quantities limited to what is strictly necessary and subject to import permit, should normally be imported from countries where APLV occurs. Because of the probability that any material of wild tuber-forming *Solanum* spp. originates ultimately from South America, the same tests should be applied whatever the origin. EPPO's specific quarantine requirements (OEPP/EPPO, 1990) outline suitable quarantine measures, while EPPO's phytosanitary procedures lay down the test procedures to be followed both before export and in post-entry quarantine after import (OEPP/EPPO, 1984b).

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