

Data Sheets on Quarantine Pests

Potato Andean mottle comovirus**IDENTITY**

Name: Potato Andean mottle comovirus

Synonyms: Potato (Andean) mottle virus
Andean potato mottle virus

Taxonomic position: Viruses: Comoviridae: *Comovirus*

Common names: APMoV (acronym)

EPPO computer code: POAMOX

EPPO A1 list: No. 245

EU Annex designation: I/A1

HOSTS

The major host of APMoV is potatoes (*Solanum tuberosum*). Strains have also been isolated from aubergines (*S. melongena*) (Brioso *et al.*, 1993) and *Capsicum frutescens*. Several other *Solanum* (Fribourg *et al.*, 1977) and solanaceous species are infected under experimental conditions. Some strains can also be transmitted to *Gomphrena globosa* (Amaranthaceae) and *Tetragonia tetragonioides* (Aizoaceae) (Salazar & Harrison, 1978a).

GEOGRAPHICAL DISTRIBUTION

EPPO region: Absent.

Central America and Caribbean: Honduras (Valverde *et al.*, 1995).

South America: Widespread in the Andean highlands of Chile, Ecuador and Peru. Also Brazil (Rio de Janeiro - C strain, Santa Catarina - B strain).

EU: Absent.

BIOLOGY

APMoV belongs to the *Comovirus* genus, members of which are typically beetle-transmitted. An isolate of APMoV from *Capsicum* was shown to be transmitted by *Diabrotica balteata* (Valverde *et al.*, 1995) and the virus has been experimentally transmitted by *D. viridula*. *Diabrotica* spp. are prevalent in regions where the virus is found (Avila *et al.*, 1984). APMoV is also readily transmitted by contact between plants but is not transmitted by true seed (Fribourg *et al.*, 1979).

Three serologically related but distinguishable strains have been identified: the type strain (C- and M-isolates) (Fribourg *et al.*, 1977) and strains H (Salazar & Harrison, 1978a) and B (Avila *et al.*, 1984).

DETECTION AND IDENTIFICATION**Symptoms**

APMoV causes mosaic and mottle symptoms in most Peruvian potato cultivars. Sensitive cultivars may react with initial systemic top necrosis, stunting and leaf deformations. Under

cool conditions, plants may develop yellow spotting, blotching or more generalized yellowing on leaves (Fribourg *et al.*, 1979).

Morphology

The virus contains isometric particles about 28 nm in diameter which sediment as three components similar in size: empty protein shells and two kinds of nucleoprotein with different amounts of RNA (Salazar & Harrison, 1978a). Components of the APMoV genome have been sequenced (Shindo *et al.*, 1992, 1993; Krengiel *et al.*, 1993).

Detection and inspection methods

Indicator plants

Nicotiana bigelovii can be used as a test plant; it produces a mosaic characterized by dark-green blotches and sometimes necrotic areas. *N. clevelandii* displays similar symptoms but no necrosis. *Nicandra physalodes* and *Lycopersicon chinense* react with systemic interveinal mosaic, vein clearing, chlorotic spotting and sometimes epinasty. *Chenopodium quinoa* and *C. amaranticolor* are not infected (Fribourg *et al.*, 1977).

Serological detection methods

High-titre antisera can be prepared. A modified latex agglutination test proved to be a simple and reliable test method (Koenig & Bode, 1977; Fribourg & Nakashima, 1984). ELISA variations, including dot-ELISA on nitrocellulose membranes, are also well suited especially for large-scale routine use (Dusi & Avila, 1988; CIP, 1989). Strain specificity by double-antibody sandwich ELISA is overcome by mixing antisera to the different strains (Schroeder & Weidemann, 1990).

MEANS OF MOVEMENT AND DISPERSAL

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

PEST SIGNIFICANCE

Economic impact

APMoV causes damaging symptoms in potato and is widespread in its area of occurrence. Although direct effects on yield do not appear to have been studied, there are clear indications of economic importance for this virus.

Control

As with all potato viruses, control depends on the production of high-quality seed potatoes from virus-free nuclear stock. Dodds & Horton (1990) stress the value of producing plantlets free from APMoV using nucleic acid spot hybridization and nitrocellulose membrane enzyme-linked immunosorbent assays. The wild species *Solanum brevidens* and *S. tuberosum* are resistant to APMoV, which opens possibilities for resistance breeding (Valkonen *et al.*, 1992).

Phytosanitary risk

APMoV is included among the non-European potato viruses of the EPPO A1 quarantine list (OEPP/EPPO, 1984a). APMoV is considered of quarantine concern by NAPPO and COSAVE 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 APMoV 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, APMoV could be regarded, among the group of South American potato pathogens, as of major importance for the EPPO region. It is distinguished by being a relatively widespread and damaging disease. It can, however, be relatively easily be excluded by prohibition of commercial trade in potato tubers. The risk of introduction with breeding material is reduced by the fact that it is not carried by true seed.

PHYTOSANITARY MEASURES

Importation of potato tubers from countries where APMoV occurs should be prohibited. APMoV 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 APMoV 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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