

Data Sheets on Quarantine Pests

Potato black ringspot nepovirus

IDENTITY

Name: Potato black ringspot nepovirus

Synonyms: Tobacco ringspot nepovirus, potato calico strain

Tobacco ringspot nepovirus, Andean potato calico strain

Taxonomic position: Viruses: Comoviridae: *Nepovirus*

Common names: PBRSV (acronym)

Notes on taxonomy and nomenclature: Salazar & Harrison (1978b) demonstrated a very close relationship between PBRSV and the Andean potato calico strain of tobacco ringspot nepovirus described by Fribourg (1977); they are here regarded as synonymous.

EPPO computer code: POACXX

EPPO A1 list: No. 246

EU Annex designation: I/A1

HOSTS

The principal host of PBRSV is potatoes (*Solanum tuberosum*), but many plant species of 11 families have been infected experimentally, including the families Amaranthaceae, Chenopodiaceae, Cucurbitaceae, Fabaceae and Solanaceae (Fribourg, 1977; Salazar & Harrison, 1978a). *Arracacia xanthorrhiza* has been found to be a natural host of a strain of PBRSV (Lizarraga *et al.*, 1994).

GEOGRAPHICAL DISTRIBUTION

EPPO region: Absent.

South America: Only in Peru, but preliminary tests suggest its presence in other Andean countries (Fribourg, 1983).

EU: Absent.

BIOLOGY

It is thought that PBRSV is transmitted by a vector, but no vector has been identified. It is easily transmitted by contact between plants and through tubers. Seed transmission has been demonstrated and the virus passes readily through true seed of potatoes. PBRSV is serologically distantly related to tobacco ringspot and eucharis mottle nepoviruses.

DETECTION AND IDENTIFICATION

Symptoms

Several potato cultivars develop calico-like symptoms under Andean highland conditions. Bright yellow areas on the margins of middle and upper leaves gradually increase in size to form large patches. Most of the plant foliage may eventually turn yellow without stunting or leaf deformations. Primarily infected plants show local and systemic necrotic spots and ringspots and sometimes systemic necrosis (Fribourg, 1983).

Morphology

Virus particles are isometric and about 25 nm in diameter, and sediment as three components similar in size: empty protein shells and two nucleoproteins containing different amounts of RNA (Salazar & Harrison, 1978a,b).

Detection and inspection methods

Indicator plants

Chenopodium quinoa and *C. amaranticolor* exhibit necrotic local lesions followed by systemic apical necrosis. *Vigna unguiculata* reacts with reddish necrotic lesions in the inoculated leaves and with systemic apical necrosis. *Nicotiana tabacum* develops local and systemic chlorotic and necrotic ringspots and line patterns.

Serological detection methods

High-titre antisera can be prepared against PBRSV. ELISA has been successfully used for virus detection (Schroeder & Weidemann, 1990).

MEANS OF MOVEMENT AND DISPERSAL

Local spread is by contact between plants and possibly insect vectors. PBRSV is readily transmitted through tubers (Salazar & Harrison, 1978a). In international trade, it could be carried by potato tubers or by true seed of potato.

PEST SIGNIFICANCE

Economic impact

PBRSV causes damaging symptoms in some potato cultivars under certain conditions. Fribourg (1977) describes it as widespread. However, it has not been recorded as causing any particular losses in potato production. It does not appear to be a very important virus in the area where it occurs, any more than tomato black ring nepovirus is on potato in Europe.

Control

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

Phytosanitary risk

PBRSV is included among the non-European potato viruses of the EPPO A1 quarantine list (OEPP/EPPO, 1984a). 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 PBRSV 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, PVT could be regarded, among the group of South American potato pathogens, as of medium importance for the EPPO region. It is probably of little direct economic importance but it is 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 PBRSV occurs should be prohibited. PBRSV 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 PBRSV 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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