Line pattern in Limonium latifolium caused by tobacco rattle virus

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Abstract

Tobacco rattle virus (TRV) was isolated from plants of Limonium latifolium showing bright yellow or red line patterns and ringspots on the leaves. It was proved that this virus, designated TRV-Lim, was the causal agent of the disease. In its reactions on Nicotiana clevelandii it resembled a yellow strain of TRV from Oregon (USA), but the symptoms in N. glutinosa, N. megalosiphon, N. tabacum and Petunia hybrida were more comparable to those caused by so-called unstable variants of TRV. Dilution end-point was $10^{-6} - 10^{-7}$, thermal inactivation at 75 - 80°C, and ageing in vitro 55 - 60 days. The purified virus suspension contained particles of three normal lengths, 70, 102, and 194 nm. The virus sedimented as three components with average sedimentation coefficients of 129, 161 and 206 S, respectively. In purified suspensions TRV-Lim had two different buoyant densities. A serological relationship was found with TRV isolated from Europe and Brazil.

Additional keywords: Limonium dumosum, Limonium vulgare.

Introduction

Some years ago the Plant Protection Service (PD) at Wageningen received diseased plants of Limonium latifolium Kuntze (fam. Plumbaginaceae) from a nursery. The leaves of the affected plants showed bright yellow or red line patterns and ringspots. In routine transmission tests carried out at the PD a necrotic local lesion was observed once on a tobacco plant inoculated with crude sap from diseased L. latifolium, but the test plant was discarded before further transmission experiments could be performed. The diseased L. latifolium plants, maintained in the experimental garden of the PD, displayed symptoms throughout the years (Fig. 1).

Initially, transmission experiments performed in the Laboratory of Virology with sap from leaves ground at room temperature gave negative results. However, when partly macerated leaf material was frozen, followed by further maceration and thawing, the inoculum thus obtained induced a few big necrotic local lesions on leaves of Chenopodium quinoa and Nicotiana tabacum ‘Samsun NN’ resembling those caused by tobacco rattle virus (TRV).

The aim of the present study was to identify the virus.
Materials and methods

Isolation, maintenance and propagation of the virus. The virus was isolated by mechanical transmission from diseased *L. latifolium* to *N. tabacum* ‘Samsun NN’ and *C. quinoa*, maintained in *C. quinoa*, and propagated in *N. clevelandii*. The original isolate was used in all experiments.

Inoculation. Manual inoculations were done with purified virus or water-diluted crude sap from virus-infected plants using carborundum (600 mesh) as abrasive. The original inoculum from diseased *L. latifolium* was prepared by freezing the partly ground leaf material and further grinding of the frozen slurry; after thawing the sap obtained was used for inoculation.

Host range. Seedlings of 20 species and cultivars were inoculated with water-diluted sap from infected *N. clevelandii* leaves. Uninoculated leaves of the test plants were back-tested on *N. tabacum* ‘Samsun NN’ after about three weeks. Purified virus suspensions were inoculated onto seedlings of *L. latifolium* and *L. dumosum* ‘Zilverwit’ and onto healthy-looking plants of *L. vulgare*.

Persistence of infectivity in crude sap. Sap from infected *N. clevelandii* leaves was used as inoculum. Infectivity assay was on detached leaves of *N. glutinosa*.