

Natural elimination of tobacco rattle virus in tulip ‘Apeldoorn’

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For several years samples from commercial lots of tulip cultivars infested with tobacco rattle virus (TRV) have been grown at the TRV-free experimental field of the Plant Protection Service at Wageningen. Plants developing from bulbs of flowering size were always found to carry the virus. Offset bulbs were not included in these observations. Contradictory is the opinion of some tulip growers in the province of Zeeland, that infested batches of bulbs produce virus-free plants if planted in uninfested soil.

We have therefore in 1973 selected and labeled 200 plants of ‘Apeldoorn’ with typical TRV symptoms (Van Slogteren, 1958), such as black stripes on petals and light coloured spots and stripes on foliage leaves, from a heavily infested field at Ouwerkerk, Zeeland (Van Hoof, 1974). The bulbs of these plants were harvested when full-grown. They were planted at Lienden, province of Gelderland, in clay soil proved by testing to be free of trichodorids and TRV. Next spring the flowering plants were inspected for TRV symptoms. Half of the plants showed symptoms indicating the presence of TRV, the others were free of symptoms.

Of each category 60 plants were labeled. Their bulbs were later planted in clay soil free of trichodorids and TRV. Due to unforeseen circumstances the flowering plants were not inspected for TRV symptoms in 1975. The two groups, however, were harvested separately in due time and the bulbs planted in a new field free of trichodorids and TRV.

When visually inspected in 1976, we found that the plants derived from those marked healthy in 1974, were all free of TRV symptoms. Of those originating from the plants marked diseased, 55 plants were flowering, 30 of which had TRV symptoms, 25 were free of symptoms in flowers as well as in foliage. Thus, in the third year only ca 25% of the offspring from tulips, clearly diseased at the beginning of the experiment, were diseased.

This observation confirms the experience of tulip growers in the province of Zeeland. Successive cropping of TRV-infested bulb lots in uninfested soil gradually frees them from TRV, i.e. infected bulbs often produce virus-free plants if not reinfected from the soil.

These results led the Plant Protection Service to adapt their rules for certification of tulips as regards TRV. Infested lots are not definitely refused, but can be presented for reinspection the next year.

In potato the virus is also known not always to cause a fully systemic infection, depending on the strain of the virus. The strain of TRV which is responsible for tuber necrosis ('kringerigheid') reaches the progeny to a very low extent. The stem mottle strain does so to a higher percentage, although never 100%, as observed by Lihnell (1957) and Van Hoof (1964) and further confirmed by personal observations.

Samenvatting

Natuurlijke uitschakeling van tabaksratelvirus in 'Apeldoorn' tulp

Tot nu toe bestond de mening, dat bloeibare tulpebollen, die met het tabaksratelvirus (TRV) geïnfecteerd zijn, bij nateelt opnieuw ratelzieke planten leveren. In Zeeland heerst bij enkele kwekers echter de overtuiging, dat het TRV bij nateelt op niet besmette grond geleidelijk uit de besmette partij bollen verdwijnt. Deze opvatting kon in een proef worden bevestigd. In het derde jaar van nateelt was nog slechts ca 25% van het oorspronkelijk aantal zieke bollen van 'Apeldoorn' door het virus aangetast.

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