Tomato spotted wilt virus, a problem on grass pea and field pea in the greenhouse in 1990 and 1991

R.C. Zimmer[1], K. Myers[2], S. Haber[3], C.G. Campbell[1] and G.H. Gubbels[1]

Tomato spotted wilt virus severely affected grass pea, ***Lathyrus sativus,*** and field pea, ***Pisum*** sativumvar. ***arvense,*** inthe greenhouseduringthe winters of 1989-90 and 1990-91. On grass pea, symptoms varied from loss of chlorophyll and wilting and drying up of the foliage of the entire plant to those where stem segments at one or more nodes became bleached and dried up. On field pea, leaf symptoms were light brown often with a purplish tinge and occurred randomly on the plant. Also on field pea, purplish or purplish brown streaking of the stem and petiole was prominent. On both hosts, purplish circular lesions or diffuse purplish areas were characteristic on the pods. Flower and pod abortion occurred on severely affected plants. Symptoms of this virus also were observed on potato, tomato, Nicotinia and petunia. The western flower thrip, ***Frankliniella occidentalis,*** vector of this virus, was abundant throughout the greenhouse area.

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Le virus de la maladie des taches bronzees de la tomate a sévèrement affecte la gesse cultivee, ***Lathyrus sativus,*** et le pois de grande culture ***Pisum sativum*** var. ***arvense,*** en serre durant les hivers 1989-90 et 1990-91. Sur les gesses cultivees, les symptômes furent variés. Certains plants ont montre une perte de chlorophylle, un fletrissement et un dessechement du feuillage de la plante entière. D'autres plants ont montre un blanchiement et un dessechement des segments pres de un ou de plusieurs noeuds. Sur les pois de grande culture, les symptômes foliaires ont montre un brun pâle accompagnessouvent d'une teinte violacee, et ce changement de couleur fut present au hasard sur les plants. De plus, dans les champs de pois, des necroses violacees ou brune violacees sur les tiges et les petioles furent proeminent. Sur les gousses des deux hôtes, des lesions circulaires violacees ou des regions violacees diffuses furent caracteristiques. L'avortement des fleurs et des gousses s'est produit sur des plants severement affectes. Les symptômes de ce virus ont ete observes aussi sur la pomme de terre, la tomate, la nicotine et le petunia. Le thrip des petits fruits, ***Frankliniella occidentalis,*** vecteur de ce virus, fut abondant partout a l'interieur de la serre.

Introduction

During the winters of 1989-90 and 1990-91, at the Agriculture Canada Research Station, Morden, Manitoba, greenhouse-grown plants of grass pea, ***Lathyrussativus*** L, and field pea, ***Pisum sativum*** var. ***arvense*** L, produced atypical growth.

Symptoms on *L. sativus* plants varied from progressive loss of chlorophyll and drying of foliage from the base to the top of the plant, to plants on which leaf and stem segments at one or more nodes became bleached and dried up (Fig. 1). Leaf symptoms on field pea often were a light brown accompanied with a purplish tinge (Fig. 2). On ***L. sativus,*** but more ***so*** on field pea, purplish or purplish brown discoloration of the stem and petioles was prominent. Circular purplish lesions or diffuse purplish discolored areas were characteristic of this disease on the pods (Figs. 3,4). Flower and pod abortion occurred on severely affected plants.

The cause of this problem was not evident; therefore, a series of tests were carried out to implicate or eliminate variables such as: planting medium, water source, nutrition, lighting and soil-borne diseases as possible causes. In all test treatments some plants developed lesions, but no trend was evident. Plants with similar treatments grown in a growth cabinet did not develop symptoms, indicating that the probable cause was common only to the greenhouse area.

Since a bacterium or fungus was not implicated, a virus was considered to be the cause. The symptoms were similar to those caused by the pea streak virus or by several other viruses known to cause streak type symptoms. However, two factors did not support such a premise. Firstly, the symptoms on peas varied somewhat from those reported and, secondly, aphids are known to transmit pea streak, but there was no aphid problem in the greenhousesduring 1990 and 1991. There were, however, significant populationsofwhiteflyandthrips inthe greenhouses.

The cause of the problem at Morden was confirmed by enzyme-linked immunosorbent assay as due to the

[1] Research Scientist, Agriculture Canada, Research Station, P.O. Box 3001, Morden, Manitoba, Canada ROG 1J0.

[2] Summer Student, Agriculture Canada, Research Station, P.O. Box 3001, Morden, Manitoba, Canada ROG 1J0.

[3] Research Scientist, Agriculture Canada, 195 Dafoe Road, Winnipeg, Manitoba, Canada R3T 2M9.

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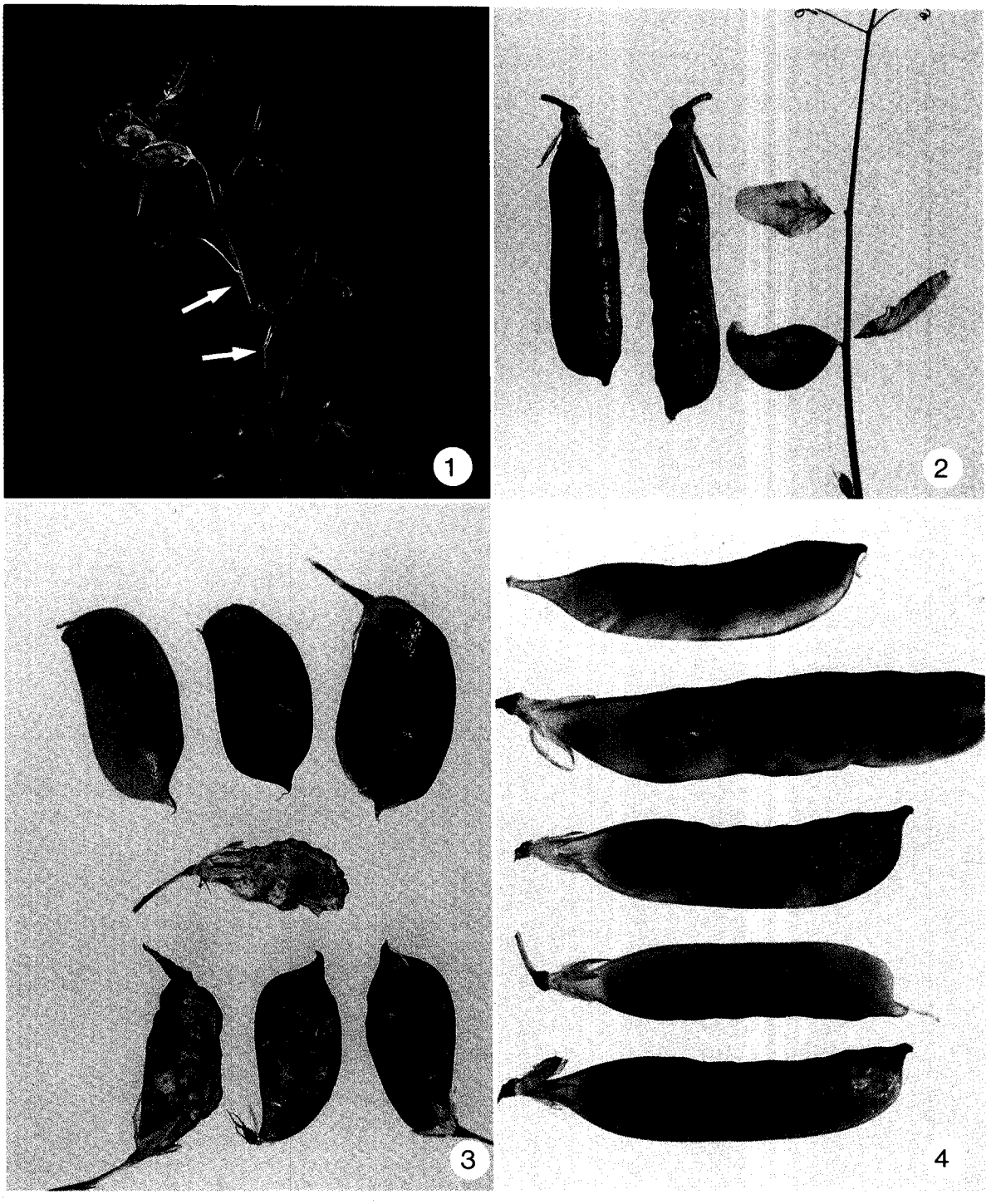

Fig. 1. Stem of grass pea, *Lathyrus sativus*, with tan areas at two nodes (arrows); nodes above and below the arrows appear healthy.

Fig. 2. Leaf symptoms on field pea, *Pisum sativum* var. *arvense*, tan with purplish veination.

Fig. 3. Pods of grass pea with a range of symptoms.

Fig. 4. Pods of field pea with a range of symptoms.

Impatiens strain of tomato spotted wilt virus (TSWV-I). It also was found in 1991 on Impatiens in the conservatory greenhouse at Assiniboine Park, Winnipeg, Manitoba. This is the first report of this virus in Manitoba and a first report of ***Lathyrus sativus*** as a host.

Why this virus appeared suddenly in Manitoba and how it was introduced probably will never be known. TSWV has a wide host range (1,4,5). The possibility of seed transmission of this virus has not been answered satisfactorily. Seed transmission has been reported only in the compositae, Cineraria. Jones (3) obtained seed transmission of up to 96% in Cineraria. However, Crowley (2) examined 5000 seeds from infected Cineraria plants and found no infected seedlings. In addition to ***L. sativus*** and field pea at Morden, symptoms of TSWV were apparent on potato, tomato, Nicotiana and petunia. Once introduced, TSWV was spread efficiently throughout the greenhouse cells at Morden by the western flower thrip, ***Frankliniella occidentalis*** Pergande. Control of this virus is hard to obtain because of its wide host range and because of the difficulty in obtaining efficacy by chemical means.

Acknowledgements

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