26. Streak TSV

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General

Tobacco streak virus causes only minor losses of tobacco in Canada, China, France, Iran, Italy, Japan, Sumatra, the United States and Venezuela, but losses as high as 50 percent have been reported in Brazil. Although it has a very wide host range of both weeds and crops, serious losses to this virus occur only on peanuts and sunflower in India, and sunflower in Australia. TSV can affect tobacco in the seedbeds and in the field. At the beginning of spring, the vectors multiply quickly and infest the crops.

Symptoms

TSV symptoms show three distinct stages: **1:** the acute or necrotic stage – local lesions appear as rings, solid necrotic spots or diamond-shaped patterns (Fig. 26.1); **2:** the early recovery stage – new leaves develop which appear normal except for chlorotic veins (Fig. 26.2); and **3:** the chronic or late recovery stage – the leaf is thicker than normal with a smoother texture and the tubular corolla splits with the petals becoming separated, especially the upper half (Fig. 26.3).

Symptoms are strongly influenced by temperature. At mild temperatures (around 20°C), only small necrotic spots develop. At temperatures above 30°C, the symptoms are more severe and appear as large necrotic arcs, broken rings and lines and dots around the necrotic secondary veins.

In advanced stages, the disease can be confused with other viruses due to the similarity of some symptoms. In some cases it can be confused with TSWV (Ch. 23) because of the presence of broken rings and leaf deformation. In other cases it can be confused with PVY^{n} (Ch. 19) because of the presence of advanced necrosis in midrib and stem. The presence of other viruses associated with TSV in the field is quite common.

Source and Transmission

TSV is transmitted by infected pollen from alternate hosts and the only known mechanism of insect transmission is ingress of the virus from the pollen through wounds made by the action of thrips feeding on the leaf. The thrips do not transmit the virus directly through feeding, as with most other insect-vectored viruses. Seed transmission has not been demonstrated in tobacco, although it does occur in some other weed and crop species. It is also transmitted mechanically and through grafts, but neither of these has been demonstrated as important in the spread of the disease.

Site Selection and Planting Date

Sites near possible host crops of TSV should be avoided. In warmer areas where this is possible, early planting is recommended.

Alternate Hosts

The host range of TSV includes at least 200 species in more than 31 monocotyledonous and dicotyledonous families, both weeds and other crops. There are many weed hosts; a few examples are Jimson weed (*Datura stramonium*), field bindweed (*Convolvulus arvensis* L.), black nightshade (*Solanum nigrum)* and several other *Solanum* species (Ch. 61). All weed hosts should be removed from the vicinity of the crop.

Crop hosts include bean, clover, cotton, crotalaria, pea, peanut, sunflower, tomato and soyabean. The website http://www.agls.uidaho.edu/ebi/vdie/descr811.htm lists some of the identified hosts.

Resistant Varieties

No resistant varieties been developed to date.

Sanitation

Plant debris should be destroyed at the end of the tobacco harvest. Any exposed infected plant material may serve as a source of inoculum, and isolated infected plants in a field should be removed. As long as temperatures are cool enough, leave the plastic covers on the seedbeds to prevent thrips from moving onto the seedlings.

Chemical Control

Infection during the seedbed stage is critical for the occurrence and dissemination of this virus. Preventative chemical control of the thrips vector should be done in the seedbeds, to reduce the incidence after planting, and in the field (Ch. 69, Ch. 70). No isolated control is sufficient to control the transmission of TSV in seedbeds or in the field. Some insecticides control the vector better than others e.g. acephate (e.g. Orthene, Matrix) and bifenthrin (e.g. Talstar) during the seedling development, and imidacloprid + cyfluthrin (e.g. Confidor S, Leverage) pre-planting.

Biological Control and Barrier Crops

No biological control agents have been found effective against this disease.

Suitable barrier crops, such as sugar cane, can decrease infection by providing barriers to thrips movement.

Summary

An integrated approach (Ch. 68) to the management and control of TSV includes:

- Do not remove the covered plastic sheet off the seedbeds in any stage, as it will prevent the thrips from moving into the seedbeds
- Use good farm hygiene practices
- Control weeds in and near the crop
- Plant a quick growing barrier crop
- Destroy all plant residues at the end of the season
- Select the site in order to avoid late planted crops near other solanaceous crops
- Avoid planting in dry and windy periods
- Control thrips in the seedbed and field with insecticide if necessary

References

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Fig. 26.1: Necrotic stages of TSV

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Fig. 26.2: Veinal discoloration of greenhouse seedling during the recovery phase of TSV

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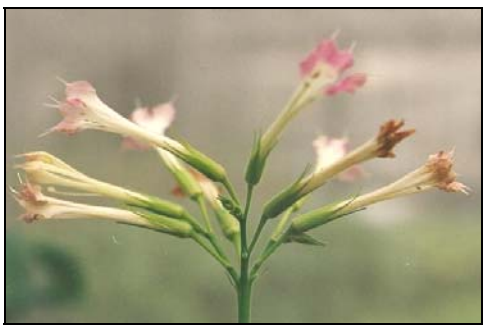

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Fig. 26.3: Separated petals are a symptom of the chronic stage of TSV