

## 20. **Etch** TEV

Brenda Kennedy, University of Kentucky, USA

### **General**

TEV is a member of the potyviridae (potyvirus) family of plant viruses. Found primarily in North and South America, it is one of the more prevalent viruses affecting burley and flue-cured tobacco throughout the southeastern USA. It has also been reported in tobacco producing regions of South Africa and the Far East.

### **Symptoms**

Initial symptoms of TEV on tobacco are very subtle. Veins of inoculated leaves begin to clear which gradually develops into an etching pattern (Fig. 20.1). Mosaic symptoms are found on newly developed leaves as the virus becomes systemic (Fig. 20.2). Disease severity depends greatly upon the strain of the virus. In general, older infections typically result in breakdown of interveinal tissue by necrotic spotting and occasional browning of veins. Infected plants are often lighter in color (Figs. 20.3, 20.4). Like many virus infections, symptom expression is increased significantly when young plants become infected soon after transplant. Even though the etching symptom of TEV is a distinctive characteristic, TEV symptoms can often resemble symptoms of TMV (Ch. 21) and PVY (Ch. 19). These viruses are often found in combination and are often referred to as the tobacco virus complex. For this reason visual identification can often become misleading. A correct diagnosis is only possible by immunological tests (ELISA), PCR or host range differentiation.

### **Source and Transmission**

TEV is widely distributed in perennial solanaceous weeds and is transmitted by over 10 species of aphids (Ch. 51) in a non-persistent manner. Transient aphids are believed to play a significant role in moving the virus from weed hosts to tobacco. Seed transmission has not been reported.

### **Site Selection and Planting Date**

Proper site selection helps eliminate the risk of introducing virus inoculum to tobacco. Avoid planting tobacco near weedy sites in which the virus overwinters and near TEV-susceptible crops. These hosts serve as potential inoculum reservoirs. Eliminate the potential for greater disease pressure by not setting tobacco late when the aphid and weed populations are at their peak.

### **Alternate Hosts**

TEV has a wide host range infecting over 120 species in 19 dicotyledonous plant families including several economically important solanaceous crops such as tobacco, tomato, sweet pepper, tobasco pepper and potato. Many solanaceous weeds, such as Jimson weed (*Datura stramonium*) are hosts (Ch. 61). A list of hosts can be found at the website <http://www.agls.uidaho.edu/ebi/vdie/descr799.htm>

### **Resistant Varieties**

Those tobacco cultivars which possess the monogenic recessive “va” gene derived from Virgin A Mutant (VAM) are moderate to highly resistant to most strains of TEV. The first commercially acceptable virus resistant burley tobacco cultivar was ‘TN 86’. This cultivar continues to be the most widely used source of virus resistance to date.

### A.3. Virus Diseases

#### **Sanitation**

Eliminate overwintering weed hosts which harbor the virus. Rogue infected virus plants when practical.

#### **Scouting**

Both the seedbeds/floatbeds and fields should be scouted regularly for aphid infestations. This is especially important for late-set fields which are at greater risk for infestations because the aphids have had time to reproduce on earlier plantings. Virus infected seedlings should always be destroyed prior to transplant to avoid introducing inoculum into production areas.

#### **Chemical Control**

There are no chemicals available for control of virus diseases. Because the aphid vector can acquire and transmit the virus within a very short period of time; insecticide sprays are not effective in preventing the initial introduction of virus inoculum to a field. An insecticide application (Ch. 70) is recommended if aphid colonies are found on 20% more of the plants that are examined to prevent colonizing aphids from causing secondary spread of the virus within a field. Use systemic insecticides such as imidacloprid (e.g. Admire) and acephate (e.g. Orthene) if locally registered.

#### **Biological Control**

No biological control agents have been reported for the control of virus diseases.

#### **Summary**

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

- . Grow a resistant variety
- . Avoid planting near weedy sites in which the virus overwinters and there is a history of virus incidence
- . Avoid planting tobacco near TEV-susceptible crops such as tomato, sweet pepper, tobacco pepper and potatoes
- . Eliminate overwintering weed hosts which harbor the virus
- . Avoid setting tobacco late when the aphid and weed populations are at their peak.
- . Destroy virus infected seedlings prior to transplant
- . Spray insecticides when aphid colonies reach unacceptable thresholds

#### **References**

**Blancard, D., R. Delon, B.W. Blair and T. Glover. 1999.** Virus Diseases. Pages 198-215 in: Tobacco production, Chemistry and Technology. Blackwell Science Ltd.

**Lucas, G.B. 1975.** Tobacco Vein Mottle. Pages 493-494 in: Diseases of Tobacco. Biological Consulting Associates, Raleigh, North Carolina.

**Nesmith, W.C., T.P. Pirone and C.C. Litton. 1984.** Burley Tobacco Virus Complex. University of Kentucky Cooperative Extension Service Publications PPA-22, Lexington, KY.

A.3. Virus Diseases

**Seebold, K., J.D. Green and L. Townsend. 2008.** Insect Control. Pages 36-37 in: 2008 Kentucky Tobacco Production Guide. University of Kentucky Cooperative Extension Service Publications ID-160, Lexington, KY.

**Shew, H. D. and G.B. Lucas. Eds. 1991.** Compendium of Tobacco Diseases. APS Press. ISBN: 0-89054-117-5.



Brenda Kennedy, UK, USA

**Fig. 20.1:** Initial etching symptoms of TEV



Brenda Kennedy, UK, USA

**Fig. 20.2:** TEV etching symptoms on burley tobacco



Brenda Kennedy, UK, USA

**Fig. 20.3:** Symptoms of TEV in field inoculated burley tobacco



Brenda Kennedy, UK, USA

**Fig. 20.4:** TEV inoculated burley field Resistant cultivars to the left and right of susceptible cultivar