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# Maize Stripe Tenuivirus[1]

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**INTRODUCTION:** Maize stripe is a severe viral disease of maize in the southern U. S., Central America, Africa, Australia, and several Pacific islands, and probably occurs in most tropical maize growing regions (Gingery 1985; Tsai and Zitter 1982). The first report of this disease in the Continental U.S. was in Florida in 1975 (Tsai 1975). A serious outbreak of a disease complex in maize occurred in south Florida from 1979-1980. At least five viral and two mollicute (mycoplasmas that lack a true cell wall) plant pathogens were involved in the outbreak. Maize stripe virus (MStV) was considered the most important component in the disease epidemic (Bradfute *et al.* 1981; Tsai and Falk 1988).

**Figure** 1. Maize stripe virus on *Zea mays*. Fine Chlorotic stipplings (left). Continuous chlorotic stripes (right).

**SYMPTOMS AND HOST RANGE:** Initial symptoms are fine chlorotic stipplings between leaf veins which later develop into continuous chlorotic stripes of varying width and intensity (Tsai 1975) (Fig. 1). Young plants infected at the 4- to 5-leaf stage often exhibit complete chlorosis on the emerging whorl leaf, and the center leaf usually remains folded and bent (Tsai 1975).

The host range of MStV includes *Zea* spp., several *Sorghum spp.*, and itchgrass *(Rouboellia exaltata L.f.)* (Greber 1983, Tsai and Falk 1988). Itchgrass is a noxious weed which was introduced into southern Florida from tropical Asia (Hitchock and Chase 1951).

**DISEASE DEVELOPMENT:** MStV is transmitted by the corn delphacid, *Peregrinus maidis* (Ashmead) (Homoptera: Delphacidae) in a persistent-propagative manner (Fig. 2). Nymphs of the 2nd and 3rd instal transmit MStV with twice the efficiency as adult insects (Tsai and Zitter 1982). *P. maidis* has been recorded from most tropical regions (Anonymous 1973). Under optimal temperatures (21.1 - 26.7°C), the average number of eggs laid by P. *maidis* was recorded to be 605 per female over a lifetime (Tsai and Falk 1988). MStV is also transmitted through the egg of the planthopper vector (Tsai and Zitter 1982). This may be significant to both the long distance spread and the ability of the virus to overseason between maize crops. The rate of transovarial transmission was reported from 33.3% (Tsai and Zitter 1982) to 59% (Gingery 1985).

Figure **2.** Brachypterous (shortwinged) adults (top); Macropterous (longwinged) adults (bottom) of the corn delphacid.

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**CAUSAL AGENT AND DIAGNOSTIC TECHNIQUES:** MStV is a member of the newly recognized tenuivirus group (Gingery 1985; Gingery *et al.* 1981). The MStV virions were reported as fine-stranded particles with a helical structure and measuring about 12 nm in diameter and up to 709 nm long (Chen *et al.* 1993). Antisera to 32.0 kDa capsid protein and 19.8 kDa noncapsid protein (NCP) purified from the MStV infected maize plants have been frequently used for immunological analyses of extracts from MStV-infected maize and viruliferous P. *maidis.* The NCP crystals can be found readily in sap from the MStV-infected plants by phase-contrast light microscopy (Bradfute and Tsai 1990). Fibrous intracellar inclusions are found in paradermal sections of the leaf sheath of MStV infected maize (Overman *et al.* 1992). MStV is serologically related to the rice stripe virus, but different from rice hoja blanca virus and *Echinochloa* hoja blanca virus (Tsai and Falk 1988).

**SURVEY AND DETECTION:** Look for plants that have chlorotic patterns of stripes or bands of varying width. Some of these symptoms are similar to those caused by nutrient deficiencies or one of several other corn pathogens. Laboratory confirmation is necessary for accurate diagnosis. Young plants infected at the early growth stage often are stunted with twisted whorl leaves. *P. maidis* nymphs may be found aggregating between the stem and leaf sheath. Adults are usually found feeding near the nymph aggregates.

**CONTROL:** Traditional methods of virus disease control such as vector control, prompt removal of infected plants, eliminating the itchgrass near plantings, and breeding for resistance to the insect vector or the virus are recommended.

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