



Wheat Spindle Streak Mosaic Virus

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Wheat Spindle Streak Mosaic Virus

Wheat spindle streak mosaic virus (WSSMV) is also known as wheat yellow mosaic virus. It was first reported in North America in 1960 from Ontario, Canada. It was first found in Kansas in Sedgwick County in 1984, but it may well have been present before 1984. Since then it has been detected in most counties in the eastern two thirds of the state. It is also present in many center pivot

irrigated fields in the western counties. The disease is usually most intense in south central Kansas. The symptoms, life cycle, and field pattern of WSSMV are similar to those of wheat soilborne mosaic virus (WSBMV). This similarity probably prevented the recognition of WSSMV as a distinct disease until varieties with resistance to WSBMV became available. The similarity is only superficial, however, since they are unrelated viruses.

SYMPTOMS

Symptoms typically appear in early spring right after green-up. In most cases, symptoms of WSSMV appear before those of WSBMV. The optimum temperature for symptom development is 50°F. Above 64°F new growth will be symptomless, but symptoms may persist on older leaves. The symptoms of WSSMV are yellow to light green streaks or dashes on a dark green background. Dashes are usually 1/8 to 1/4" long. The dashes and streaks are oriented parallel to the leaf veins and often are tapered, which gives the lesions a spindle shape. In contrast, WSBMV typically has a mosaic of green islands against a yellow background. Plants severely infected with WSSMV may have mottled leaves which resemble infection by WSBMV. In such cases, positive identification requires a serological test. The situation is confused further by the fact that many plants are found to be infected with both viruses. WSSMV also causes a mild stunting and reduced tillering. Like WSBMV, the field pattern of WSSMV tends to follow the lower, wetter areas of the field.

DISEASE CYCLE

WSSMV and WSBMV are both vectored by a fungus called *Polymyxa graminis*. The virus particles are carried on or in the fungal zoospores (swimming spores). The fungus invades root hairs of the young wheat in the fall during periods of high soil moisture. Apparently spring infections are possible but inconsequential to the wheat.

The fungus forms dark clusters of resting spores in the wheat roots which are released to the soil when the roots decay. Since the fungus survives in the soil as resting spores, the disease is always associated with infested soil. Soils may remain infective for at least 8 years. Neither WSSMV nor WSBMV are insect-borne or seed-borne. Wheat is the only known host of WSSMV.

LOSSES

We believe that losses in Kansas are usually low. Plants seem to recover well from this disease when temperatures increase in April. However, losses caused by WSSMV are difficult to measure. They are dependent both on the cultivar and the weather. Losses are roughly proportional to the length of time during which plants show obvious symptoms. A long, cool spring prolongs the symptomatic period and increases losses. In a warm spring, losses may be minimal. In Michigan, losses of soft white winter wheats were reported to be 2 to 18%. In Canada, losses were reported to be 7 to 59%. In Pennsylvania, losses were estimated to be 7 to 24%. In Georgia, losses were estimated at 22 to 35%. In each case, loss was attributed mostly to reduced numbers of tillers.

CONTROL

Some of the most susceptible cultivars are Sierra, Mustang, and Thunderbird. These varieties should be avoided in fields infested with WSSMV. In addition, fields with WSSMV usually also have WSBMV, so avoid varieties which are susceptible to it as well. Although no cultivars are completely resistant to WSSMV, many wheat varieties express moderate resistance. See publication MF-991, "Wheat Variety Disease and Insect Ratings," for current information on variety reactions. Late planting is sometimes effective in avoiding infection periods in the fall. Due to the longevity of the vector, crop rotation is not an effective control for WSSMV. Infection takes place at the time of wheat emergence in the fall, so avoid irrigation during this period if you have a susceptible variety.

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