Wheat Curl Mite

The wheat curl mite is widely distributed throughout North America and has a broad host range that includes most grasses and sedges. The mites are ovoviviparous. Its importance relates to its ability to transmit wheat streak mosaic virus and High Plains virus in the Great Plains and the Pacific Northwest. These diseases affect both corn and wheat. In the central High Plains most corn varieties have relatively strong resistance to both diseases. However, wheat varieties are quite susceptible to the diseases.

Identification (and life cycle/seasonal history)

The wheat curl mite is very small, .25 millimeter (.001 inch) long, and has only two pair of legs. In the field, mites can best be detected on plants with the aid of a 20x magnifier. Mites are nearly always found in protected areas of the plant such as a curled leaf or the leaf whorl, axil or sheath. On the leaves, mites often lie in the depressions between the leaf veins. Crop hosts of the wheat curl mite include wheat, corn, barley, oats, and foxtail millet. It has several other grass hosts with the best being western wheatgrass, jointed goatgrass, sandbur, and Canada wildrye.

Wheat curl mites cannot fly or produce silk so they must rely totally on air currents to move from one plant to the next. They are capable of standing on their tail and waving their legs, which helps them to launch into the air currents. They are very light and will float much like dust particles.

Plant Response and Damage

Wheat curl mite feeding on wheat causes the edges of young leaves to curl very tightly. The mites colonize these curled leaves until the leaf is fully expanded and the crop is no longer rolled. As the plant grows the subsequent leaf can be trapped in the previous leaf's curl causing distorted leaves. If the area becomes crowded in the curled leaf, the head will become thick and seed set may be reduced on the head. Wheat curl mite damage reduces the crop yield potential.

Chemical control of the wheat curl mite is not recommended unless the field has substantially increased risk from other wheat diseases, uncontrolled volunteer or other over summering hosts. The only product that has shown adequate control of wheat curl mite in the core crop is carbofuran. To minimize disease transmission, the wheat should be treated at least eight to 10 days before harvest. Wheat curl mites cannot fly or smother plants so they rely totally on air currents for movement from plant to plant. They are capable of standing on their tail and waving their legs, which helps them to launch into the air currents. They are very light and will float much like dust particles.

Environment

Wheat varieties have been developed that show resistance to the wheat curl mite. Wheat curl mites are not likely to cause serious yield losses on TAM 107, and this variety has shown a reduced incidence of serious wheat streak disease.

Cultural Controls

In order for wheat curl mites to move into the fall-planted winter wheat crop they must survive the summer in some habitat. A number of potential sites exist for the mite where the wheat curl mite is found are known to winter from the fall until maturity the following summer. The mites are not capable of surviving for very long off green plants so those plants that are "green bridges" for the mite can be an important source of transmission. Effective green bridge results may be obtained where there has been "green bridge" hosts for them to survive on until new wheat is present in the fall. Therefore, the mites will move from the volunteer to the new wheat crop and transmit disease.

Crop and volunteer millet can also serve as green bridge hosts as the mites will move to these crops when they become available. Wheat curl mites present in the heads of the wheat then move to this new volunteer as the wheat begins to grow. Wheat curl mites present in the heads of the wheat then move to this new volunteer as the wheat begins to grow. Wheat curl mites present in the heads of the wheat then move to this new volunteer as the wheat begins to grow. Wheat curl mites present in the heads of the wheat then move to this new volunteer as the wheat begins to grow.

Host Plant Resistance

Wheat varieties have been developed that show resistance to the wheat curl mite. Wheat curl mites are not likely to cause serious yield losses on TAM 107, and this variety has shown a reduced incidence of serious wheat streak disease.

Another cultural practice that reduces the potential for wheat streak and High Plains disease is to avoid early planting of winter wheat. Early planting allows for a shorter green bridge period, and allows a longer period of time for mites and virus to build up in the winter wheat in the fall. Plant at agronomically practical dates, and if fields are at an increased risk from mite infestation (i.e. next to uncontrolled volunteer, corn, foxtail millet etc.), plant these fields far to the east at a practical date. Corn hybrids that are tolerant to wheat streak mosaic virus are good hosts to the mites, and plants infected early may be severely stunted and die. The effects of both viruses being present together in wheat or corn are not well understood.

Management Approaches

Chemical control of wheat curl mite has been sporadic and may not be effective enough to reduce the risk of disease transmission. Good cultural control practices will be more effective and likely cost less. Cultural control of wheat curl mite and High Plains disease is to avoid early planting of winter wheat. Early planting allows for a shorter green bridge period, and allows a longer period of time for mites and virus to build up in the winter wheat in the fall. Plant at agronomically practical dates, and if fields are at an increased risk from mite infestation (i.e. next to uncontrolled volunteer, corn, foxtail millet etc.), plant these fields far to the east at a practical date. Corn hybrids that are tolerant to wheat streak mosaic virus are good hosts to the mites, and plants infected early may be severely stunted and die. The effects of both viruses being present together in wheat or corn are not well understood.

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