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Brown Wheat Mite

Sue Blodgett and Gregory D. Johnson, Department of Entomology, and Jack Riesselman, Department of Plant Science and Plant Pathology

Brown wheat mite is a pest of wheat and barley of particular concern during drought and dry weather cycles in Montana. The mite also transmits *barley yellow streak mosaic virus* (BaYSMV), a pathogen.

Brown wheat mite (BWM) has established itself as a pest of wheat during dry weather and drought cycles in Montana, especially in April–June. Prolonged drought cycles extending for multiple years or extended dry periods within a cropping season favor the mite and *barley yellow streak mosaic virus,* a pathogen transmitted by the mite. Populations of this pest are detected during prolonged and multiple year dry weather conditions.

Description
Mites are tiny, spider-like creatures that are about 0.025 inches in length —about as big as the period at the end of this sentence. Mites are oval with dark red-brown bodies and lighter red-orange legs. The front legs are about twice as long as the other three pairs of legs.

Life cycle
Female brown wheat mites are known to lay two types of eggs. Both types are attached to soil particles near the base of the wheat plant. In spring and early summer, mites lay red eggs that hatch after a brief incubation period, producing multiple, overlapping generations. However, as summer pro-gresses and warm, dry weather prevails, the brown wheat mite begins to produce white eggs. The white eggs are a resting stage and do not hatch through the summer. The presence of white eggs indicates that mite activity is declining. Cooler fall weather triggers the white eggs to hatch after a 10-day incubation period.

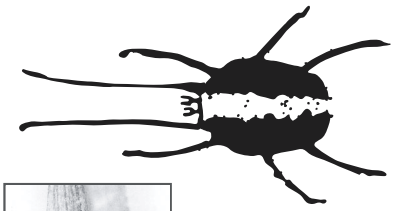
Because male mites have not been found, it is believed that the brown wheat mite can reproduce partheno-genetically—that is, without mating.

Damage
BWM moves from the soil to the host plant to feed. Feeding produces a fine stippling that causes leaves to take on a water-stressed appearance, turning first dusty gray and then yellow. Infested wheat or barley plants appear scorched or bronzed and withered, attributes that can easily be confused with drought symptoms.

Brown wheat mites feed on plant sap during the day and spend the night in the soil. Their activity peaks at about midafternoon on warm, calm days—the best time to monitor. This mite is not affected by cold temperatures, but populations are dramatically reduced by increased humidity or by being washed from the plant by driving rains or irrigation.

Mites are difficult to monitor because of their small size, lack of webbing and habit of dropping from the host plant to the soil when disturbed.

Host plants
Damage from brown wheat mite has been reported on a wide variety of cultivated plants, including alfalfa, clover, wheat and barley crops, as well as on a wide range of vegetable crops and Kentucky bluegrass turf.



courtesy Frank B. Peairs

BROWN WHEAT MITE

Enlarged severalfold

Distribution
Brown wheat mite is a pest of small grains in most small grain–producing areas of the world. In Montana, it is most common on drought-stressed winter wheat and barley in most production areas of the state.

Scouting and detection
Brown wheat mites can be seen by eye. Accurate counting can be aided by tapping plants over white paper and counting the dislodged mites. Volunteer wheat is an important reservoir for brown wheat mites and should be examined for their presence.

Barley yellow streak mosaic virus
BWM is known to vector barley yellow streak mosaic virus (BaYSMV). The disease, which was

first identified in 1988, has been documented to cause yield losses in excess of 30% in spring-planted irrigated malting barley that becomes drought-stressed early in the growing season. The virus infects both spring wheat and barley, reducing the yield of both; in barley, kernel weight and plumpness are also reduced.

During 1983–1987 the disease reached epidemic proportions in the Golden Triangle. Since 1988 the disease has spread through north central Montana and has been reported in Big Horn, Yellowstone and Gallatin counties and in southeast Idaho. During recent dry spring weather it has remained endemic in the Triangle.

Disease symptoms

Early symptoms may be confounded with mite feeding damage as leaves take on a yellowed appearance.

As the disease progresses the more characteristic symptoms—yellow to gray-white streaks on the leaves parallel to the leaf veins—begin to appear. Sometimes these streaks may be localized on one side of the midrib.

In severe cases brown streaks of necrotic tissue appear on leaves and plants may eventually die. Moderate to severe stunting accompanies BaYSMV infection.

BaYSMV requires the mite vector and cannot be transmitted by contact with infested plant material.

Management

Moist conditions are unfavorable for brown wheat mite populations. Rainfall or irrigation will cause a dramatic reduction in mite numbers. Dry, warm conditions, however, favor the development of brown wheat mite.

Management of volunteer wheat is an important preventive measure for brown wheat mite, as it is with several other small-grain pests. Once an outbreak occurs, however, chemical control is the only effective (albeit temporary) management option.

Assessing environmental conditions, determining whether volunteer wheat is present, and early mite detection are important factors in determining the impact of this pest.

Economic threshold

The economic threshold for this pest is not well defined, but treatment is not profitable unless there are at least several hundred mites per row-foot in the early spring. It is often difficult to justify a chemical treatment, since brown wheat mite infestations are associated with drought stress and chemical treatments are short-lived, lasting five to seven days before populations reach or exceed pre-treatment levels. However, treatment may be justified when BaYSM is prevalent.

If a driving rain of at least one-third inch occurs, mite levels will be significantly reduced regardless of chemical treatment. If it does not rain, crop yield may be so reduced by drought as to make chemical treatment uneconomical.

Also, if white eggs are present and red eggs are mostly hatched, the population is in natural decline and treatment is not economically justifiable.

A number of cultural practices may be used to mitigate BaYSMV. However, none is completely effective. Research conducted during the 1980s suggested that early-planted barley was less damaged than later-emerging barley during drought years. It was also shown that barley following barley was more favorable for disease development.

A common practice in many production areas is residue destruction by burning. This has partially reduced BaYSMV levels, but its effectiveness is variable.

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