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Winter Grain Mite

A Fall and Winter Pest of Cereals and Grasses in Oregon

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Figure 1.—Gray-silvery cast to wheat leaves damaged by winter grain mite.



Figure 2.—Winter grain mite. The dorsally located anus (arrow), orange legs, and blue-black body are characteristic of this pest.

Winter grain mite, *Penthaleus major* (Duges), is a small, colorful, cool-season mite that damages grass and cereal crops throughout the Pacific Northwest as well as in most other temperate regions of the world. Hosts include most cereals and grasses of economic importance.

Winter grain mite has been a frequent fall and winter pest of wheat, grass seed crops, and pastures in central Oregon, the Columbia Basin, and the Grande Ronde Valley. In recent years, large populations have appeared, causing significant damage to orchardgrass and timothy pastures from Madras through Bend and to winter wheat in the Mid-Columbia region. It emerged as an important pest in the Mid-Columbia area in 2008, perhaps due to mild late-winter weather.

Crops produced on loose sandy or loamy soils usually are at greater risk than those grown on hard, clayey soils. Because fall populations develop from eggs laid in spring, this mite is most problematic in perennial grasses and no-till cropping systems. In no-till fields, problems are more likely when heavy postharvest residues remain on the soil surface.

Damage

From October through May, infested fields take on a grayish to silvery cast (Figure 1). This discoloration results from cellular injury as mites feed. Leaf tips may turn brown. Leaves and even entire plants may die when exposed to large populations. Delayed regrowth

and increased susceptibility to leaf diseases occur in spring. The mites contribute to crop moisture stress, particularly under dryland conditions.

Description

Winter grain mites are about 1 mm long, with a dark blue to black body and four pairs of conspicuously reddish-orange legs (Figure 2). Their front legs are slightly longer than the three other pairs.

Eggs are clustered on leaves and stems of host plants. They are found occasionally on the stem below ground. Eggs are clear when first laid but later become pale yellow and, eventually, red.

Hosts

Host plants include wheat, barley, oats, grasses (including bluegrass, bentgrass, ryegrass, orchardgrass, fescue, and timothy), many broadleaf plants, and various weeds.

Life history and behavior

Winter grain mites generally have two generations per year. The first generation appears in October as weather cools and days become shorter. These conditions are favorable for overwintering eggs to hatch.

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In general, this generation peaks in December or January.

The second generation develops from eggs laid by the first generation, with populations peaking in March, April, or May, depending on location and weather. Winter grain mite numbers then decrease as day length and daily temperatures increase.

Females of the second generation lay eggs on plants at and below the soil surface. These eggs become uniformly reddish-orange in mid- to late spring. They hatch in the fall, and the cycle begins again.

When eggs hatch, six-legged larvae begin to feed on leaves and tender growth near the ground. Larvae molt once to produce eight-legged nymphs, which later molt into adults. Nymphs and adults feed higher up on the plants, particularly at night and on cloudy or cool days.

Sunlight drives these mites underground. As the sun rises and the day warms, the mites seek protection under the soil surface or under surface vegetation. On bright, warm days, they often move deeper into the soil in search of moisture and cooler temperatures.

Temperature and moisture are the most important physical factors influencing mite development and abundance. In nonirrigated crops, eggs do not hatch in the fall until some rain has provided adequate moisture. Cool weather favors mite

development; activity is greatest between 40° and 70°F.

Rain can be catastrophic to mite populations; mites may not be detectable within a few days following a rain. Freezing conditions, particularly when snow covers the ground, do not seem to impede their population growth.

Scouting

Scout fields in October and early November as well as in late winter, to determine whether the pest should be controlled. Beginning in October, look very carefully on foliage and on the soil surface for blue and orange mites. Also look for mites under the soil crust and clods and along the underground parts of plants. A 10x hand lens is helpful. Also look for yellowing and silvering leaves on crop plants; this discoloration indicates mite damage.

Winter grain mites avoid sunlight and wind. The best time to observe them on foliage is pre- and early dawn, at dusk, at night, or on calm, cool, overcast days. Under warm, dry conditions, these mites might be several inches below the soil surface. It might be necessary to dig 4 or 5 inches into the soil to find them.

Check several places in the field, as infestations can begin almost anywhere. Field borders may become infested when mites migrate from adjacent wild or cultivated hosts.

Control

If mites and accompanying symptoms of damage are found in early October, chemical control likely will be needed soon to prevent economic injury. If populations are small and dispersed (and little injury is seen), inspect fields again in a week to determine whether the population is building and, if so, how rapidly.

Infestations should exceed several mites per plant, with visible leaf symptoms, before chemical treatment is considered. Consult the current edition of the *PNW Insect Management Handbook*, available in print through the Extension catalog (<http://extension.oregonstate.edu/catalog>) or online (<http://pnwpest.org/pnw/insects>) for appropriate chemical controls.

Tillage (such as plowing and disking between crops) can control the mites. Control is proportional to the amount of tillage. Other ways to reduce and/or temporarily eliminate winter grain mite problems include rotating into most broadleaf crops and/or fallowing ground free of vegetation.

Field burning has not always been successful, most likely because mites can be underground and protected during the brief period of fire. Occasionally, burning increases damage to a perennial grass crop by killing crowns previously weakened by this or other pests.