



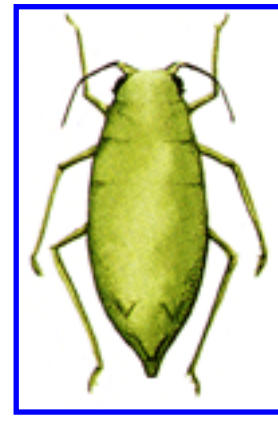
Small Grains XII-1

Russian Wheat Aphid

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Identification (and Life Cycle/Seasonal History)

Two forms of Russian wheat aphid (RWA) are found in the High Plains during the year: a wingless female and a winged female (See Aphids in Small Grains, Colorado State University Cooperative Extension Service in Action 5.568, for more information on telling Russian wheat aphid apart from other aphids that attack small grains in the region). It is difficult to determine if an individual aphid will be winged or wingless until it is near maturity. Most severe spring infestations of winter grains are caused by wingless aphids that overwintered in the crop. Winged aphids begin to appear in the High Plains in April and May and flights peak during July in most wheat-producing areas of the region. At this time winged aphids include both local aphids and immigrants from the south.

Winged aphids infest late maturing winter wheat and spring grains, but they will not infest corn, millet or sorghum. They also will infest a number of cool season grasses, particularly wheat grasses. Damage to newly seeded grasses can be significant. These grasses serve as alternate hosts for RWA during the period between grain harvest and the appearance of new wheat in the fall. Volunteer wheat and barley also may become infested. Volunteer wheat and barley are important sources of RWA for the new fall crop as soon as it emerges. Weather conditions that favor cool season grasses and volunteers will increase the number of aphids infesting the new wheat crop in the fall.

Movement to the new crop occurs in October and early November. RWA can survive the winter in most Colorado grain growing areas, except the San Luis Valley. RWA can overwinter in western Nebraska and Wyoming, but its occurrence will be more sporadic. Winter weather conditions that are detrimental to RWA include several cycles of wet snow followed by a rapid melt and a quick freeze, prolonged exposure to temperatures below 15°F, and extended periods of snow cover.

Plant Response and Damage

RWA can be found in winter wheat, usually on the younger leaves, from emergence in the fall to grain ripening. Aphid feeding prevents young leaves from unrolling. RWA colonies are found within the tubes formed by these tightly curled leaves. This not only makes it difficult to achieve good insecticide coverage, but also interferes with the ability of predaceous insects to reach and attack aphids. Leaves infested by RWA have long white, purple or yellowish streaks. Under some conditions, infested wheat tillers have a purplish color. Heavily infested plants are stunted and some may appear prostrate or flattened.

After flowering, some heads are twisted or distorted and have a bleached appearance. Heads often have a "fish hook" shape caused by awns trapped by tightly curled flag leaves. At this time most RWA are found feeding on the stem within the flag leaf sheath or on developing kernels.

There may be poorly formed or blank grains and the entire head sometimes is killed.

Management Approaches

Resistant Varieties

Resistant varieties are the most effective means of RWA management and should be used if there is a variety available that does well in your area. The first RWA resistant variety is Halt. This variety should perform well wherever TAM107 has done well. Insecticide applications have not been necessary on Halt under controlled research conditions. In addition, RWA resistant versions of Akron (Ankor), Lamar (Prowers99), TAM107 (Prairie Red) and Yuma (Yumar) also are available. Stanton, from Kansas State University, is also resistant.

In 2003, a new biotype of the Russian wheat aphid was observed. It is virulent to all of the resistant varieties mentioned in the preceding paragraph. In areas where surveys were conducted in 2005, the new biotype now predominates. Russian wheat aphid resistant varieties may still be used if they perform well in a given area, however, they likely will not provide any useful resistance.

There are also important differences among the small grain crop species. Oats are resistant to RWA.

Although heavy infestations have been observed, little economic damage has been detected. For feed grain production consider replacing barley, the most susceptible small grain, with triticale, which is moderately resistant to RWA.

Cultural Controls

Although resistant varieties provide the most effective RWA control, several other practices can provide additional control of the aphid. These practices should also help with other pest problems and make good agronomic sense as well.

1. Control volunteer wheat and barley. Although many grass species help RWA survive the summer, volunteers are the most important source of infestation for the new crop in the fall. Try to have a three week volunteer free period prior to emergence of fall seedlings.
2. Adjust planting dates. Plant winter wheat as late as possible in northeastern, southwestern and western Colorado, western Nebraska and Wyoming. Recommended planting dates for southeast Colorado are more variable. Spring grains should be planted as early as possible.
3. Produce a healthy, stress-free crop. RWA often gets its start in stressed fields or stressed portions of fields and causes relatively more damage to stressed plants. Test the soil and fertilize accordingly. Plant certified, treated seed. Select a variety that is well adapted to local growing conditions.

Chemical control

Chemical control of Russian wheat aphid will probably not be necessary on resistant wheat varieties, but may still be necessary on susceptible types and on barley. Treatment guidelines are given below (Table XII-2). If one tiller shows damage, then the plant should be considered damaged. Aphids can be very difficult to find during cold weather, so base treatment decisions on damage alone under such conditions.

Table XII-2. Treatment guidelines for Russian wheat aphid by crop stage.

Crop Stage	Level at which aphids should be treated
Fall	
Any growth stage	10-20% damaged plants
Spring	
Regrowth to early boot	5-10% damaged and infested tillers
Early boot to flowering	10-20% damaged and infested tillers
After flowering	More than 20% damaged and infested tillers

Seed treatments and soil treatments with granular or liquid systemic insecticides can control RWA for a substantial period of time after planting if adequate soil moisture is available. Since the fall RWA flight is expected six to eight weeks after planting, such treatments still may not last long enough. The risk of significant fall infestations is generally considered to be low in our area. Consider using planting time treatments only when the risk of fall infestation is high. For example: when planting near uncontrolled volunteers; when planting early; when planting near other common alternate hosts such as one of the wheatgrasses; when planting near rangeland or CRP; or if the area has a history of fall RWA infestations. An alternative threshold for the period from spring regrowth to heading is:

$$\text{Control Costs Per Acre} \times 200$$

$$\% \text{ Infested Tillers} = \frac{\text{Control Costs Per Acre} \times 200}{\text{Expected Crop Value Per Acre}}$$

If the percentage of infested tillers calculated in this manner is less than the percentage of infestation observed in the field, then a treatment should be considered. After heading, use a factor of 500 rather than 200 in the numerator. For more details, see *Sampling Russian Wheat Aphid on the Western High Plains*. Colorado State University Cooperative Extension/Great Plains Agricultural Council Bulletin GPAC 138.

Product list for Russian Wheat Aphid:

Pesticide	Product/Acre	Preharvest Interval, Remarks
At Planting		
Furadan 4FR	0.25 - 0.5 oz/1000 row ft	Do not feed treated forage to livestock. Colorado/Nebraska/Wyoming 24(c) registration. Label must be in possession. W,B, O ³
Gaucho (several formulations)	See labels	45 days to graze or feed. May not perform well in dry soil. W,B ³
Cruiser 5FS	0.75 - 1.33 oz/100 lb seed	See label for rotation crop restrictions. W,B ³
Ground or Aerial Application		
Baythroid XL ^{R,1}	1.8 2.4 oz	30 days. 7 days graze. . Do not apply more than 0.076 lb a.i. (4.8 oz) per season. W ³
chlorpyrifos 4E ^{R,1,2}	8 - 16 oz	28 days. 14 days graze. Not more than 2 applications per season. W ³
dimethoate ^{1,2}	See labels	35 days. 14 days graze. Not more than 2 applications/ season. W ³
lambda cyhalothrin ^{R,1,2}	2.56 - 3.84 oz	30 days. Not more than 0.48 pt/A/season. Best control before insects roll leaves. After boot stage, suppression only. W,T ³
Mustang Max ^{R,1}	3.2 4.0 oz	14 days. See label. W,T ³
PennCap M ^R	32 - 48 oz	15 days. W,B,O,R ³
Proaxis ^{R,1}	2.56 - 3.84 oz	30 days. Not more than 0.48 pt/A/season. Best control before insects roll leaves. After boot stage, suppression only. W,T ³

^RRestricted use pesticide ¹Labeled for chemigation. ²Generic active ingredient, several formulations. ³Labeled on W (wheat), B (barley), O (oats), R (rye), T (triticale).

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Note: If greenbugs are present and you are in a sorghum production area, be certain that the Russian wheat aphid population has exceeded the recommended economic threshold before making an insecticide application. Exposing greenbugs in small grains to unnecessary insecticide applications may lead to greenbug control failures in sorghum later in the season.

Categories: Small grains, Insects, Mites, Russian wheat aphid, Cereal aphids

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