



Extension Entomology
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Russian Wheat Aphid in Utah

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Introduction

One of the most recent and important pests of small grains is the Russian wheat aphid (RWA). It is spreading very rapidly through the Great Plains, the Rocky Mountains, the Pacific Northwest, and Canada. It was first discovered in Texas in March of 1986 but spread rapidly north and west and more slowly eastward. In Utah, it was first found infesting wheat and barley in San Juan County during August of 1987. Several occurrences of this pest were found in the grain growing regions of Colorado, Wyoming, New Mexico, and Idaho during 1987. Because of its rapid expansion northward during 1986, an aphid suction trap was put in operation in Cache County during the early part of 1987. No additional discoveries were made during the year so two additional traps were set up early in 1988, one in Uintah County and the other in Salt Lake County. The next observations were made on wheat in Salt Lake County and on barley in Utah County in June. Shortly after grain harvest in July and August, a few aphids were picked up in the Salt Lake trap. Then in late August, traps in Cache and Uintah County began to pick up the pest. Beginning in October, fields in Cache and Box Elder Counties showed signs of RWA damage. By the 15th of November, over 20,000 acres of wheat, oats, and barely had been sprayed in northern Utah. This insect is expected to be a serious pest of small grains in Utah during the upcoming years.

Biology

This species spends its entire life cycle on grains and grasses. It reproduces asexually and survives the winter as wingless nymphs or adults. It seems to be more cold-hardy than the other cereal grain species. Throughout the year, overcrowding and weather conditions may stimulate the production of winged forms, which are easily dispersed on wind currents. After a short feeding period on new plants, these females begin giving birth to wingless living young at a rate of 4-5 per day for about four weeks. The new young females can mature in as little as 7-10 days. Russian wheat aphids prefer to live in leaf whorls and tightly rolled leaves shortly after they begin feeding.

Host Plant

Wheat, barley, triticale, oats, rye, and wild grasses (including various bromes, timothy, painted

goatsgrass, and cheatgrass) are preferred hosts. Broadleaf plants, such as alfalfa, potatoes, and sugarbeets, are not hosts nor are corn, Johnsongrass, or sorghum. Volunteer grains and grasses around field margins play a major role by providing a food source between summer grain harvest and emergence of fall planted crops.

Identification

There are four major characteristics that can be used to identify the RWA. These characteristics can be used to separate it from other aphids that feed on wheat and small grains. They are:

1. Extremely short antennae
2. The two tails (bifurcate cauda)
3. The absence of prominent cornicles - tubes or tailpipes on the abdominal section of the aphid
4. Spindle shaped body, as opposed to the more globular body of most aphids

Other aphids frequently identified on small grains include: corn leaf aphid, English aphid, greenbug aphid, oat bird cherry aphid, and rose grass aphid. These are sometimes confused with the RWA and may be found as mixed colonies. Identifying characteristics are difficult to see without the use of a microscope or hand lens. When using a hand lens in the field, look at the side of the insect so the two tails can be more easily seen.

Detection

One of the best ways to identify the presence of RWA in a field is by looking for damage symptoms caused by the aphid. The RWA damage is caused by injection of a toxin into the plant as it feeds, which prevents the production of chlorophyll (green color) and causes the leaves to curl. The toxin first causes white streaks along the veins which may turn to a bright purple discoloration. Under cold conditions, purple streaking and longitudinal white streaks will both be present. Later infestation and damage causes the flag leaf to curl and prevents the head from completely emerging. This produces a "gooseneck" head that does not properly mature the grain. Early detection is important. Listed below are recommendations for surveying and identifying RWA presence and damage in fields.

1. When plants begin to grow in the spring, surveying of fields should begin
2. Check at least 10 plants in 4 areas of each field. A more accurate assessment can be made in large fields if more than four areas are checked
3. If the RWA is found on one plant in ten plants (10% infestation) in more than one area in the field, control will probably be necessary
4. Survey your fields at least once a week and preferably twice a week
5. Research has indicated that each 1% infestation level will result in a 0.5% yield loss at harvest.

TABLE I: ECONOMIC THRESHOLD FOR CONTROLLING RUSSIAN WHEAT APHID

Season - Plant Growth Stage* - Threshold

Fall - Emergence to tillering - 15-20% plants infested

Spring - (Winter Grain) Regrowth - 10% plants infested to flowering
 Spring - (Spring Grain) Emergence - 10% plants infested to flowering
 Spring - Beginning flowering - 10% tillers infested
 Spring - Early milk stage - 20% tillers infested

*After the soft dough stage insecticides will have no benefit (don't spray).

Russian Wheat Aphid and Barley Yellow Dwarf Differences

Barley yellow dwarf virus (BYDV) causes yellowing beginning at the tips of leaves and progresses towards the base. Leaves are always erect with the damaged part drooping. There is no curling of the leaves. Laboratory diagnosis is impractical, so field identification of symptoms is the best method to diagnose BYDV.

In contrast, the RWA damage begins at the base and progresses towards the tip of the leaves in longitudinal white to yellow streaks. Often the leaves will lay prostrate on the ground. Soon after infestation, the leaves begin to curl, protecting the aphids inside. The Russian wheat aphid has not been implicated in the transmission of BYDV.

Prevention

One way of reducing heavy RWA infestations is by interrupting the aphids' food cycle. Volunteer grain or grasses in the field play a key role in the life cycle of this pest by providing a food source in the interval between grain harvest and emergence of later grain crops. Below are some recommendations for breaking the cycle of this species of aphid.

1. Control volunteer grains to eliminate alternate host plants
2. Control aphids in borders or on ditch banks. Aphids can be controlled with malathion or several other chemicals registered for aphid control on grass or uncultivated land
3. Where possible, avoid planting small grains too early in the fall. This theory has not been proven so it may not work all the time. The success may depend on weather conditions at planting time.

Control

Damage to the plant is caused primarily by the toxins that are injected by the RWA. The combined effects of chlorophyll-reducing toxins and removal of sap can seriously injure the crop and greatly reduce yields. Infestations can spread rapidly when large numbers of aphids are produced inside of the rolled leaves. It is usually necessary to apply a systemic insecticide. Table II lists the insecticides that are registered for use on small grains.

TABLE II: INSECTICIDES REGISTERED FOR THE CONTROL OF THE RUSSIAN WHEAT APHID ON SMALL GRAINS.

Insecticides - lb. a.i./acre - Restrictions*

Foliar-Applied Contacts

Parathion - 1/2 lb. - 15 days to harvest or grazing

Pennacp M - 1/2 lb. - 15 days to harvest or grazing

Malathion - 1 lb. - 7 days to harvest or grazing

Foliar-Applied Systemics

Disulfoton (Di-Syston 8E)

Barley - 1 lb. - 30 days to harvest Do not graze

Wheat - 3/4 lb. - 30 days to harvest Do not graze

Dimethoate (Cygon 400, Dimate 40)

Wheat only - 3/4 lb. - 14 days before grazing immature plants, 60 days to harvest

Granular Systemics

Disulfoton (Di-Syston 15G)

Barley, dryland or irrigated - 1 lb. - Drill or broadcast at planting time or post emergence; no more than two applications; 60 days to harvest. Do not graze within 30 days.

Wheat, fall planting - 1 lb. - 75 days to graze or cut for forage

Phorate (Thimet 20G) granular

Wheat only

Planting time - 1 lb. - Don't feed or graze for 45 days. Don't make any later applications.

Over the Plants - 1 lb. - 70 days to harvest; do not graze within 28 days.

* Consult the product label for additional restrictions for some uses.

In areas with high probability of infestation, the use of systemic insecticides at planting time is recommended.

Spraying Next to Livestock, Dairy Barns, or Poultry Sheds

Some fields of small grains are located in areas that are next to beef cattle, dairies, and poultry sheds. The following guidelines are given to reduce the possibility of drift into these non-target areas.

1. The use of Dimethoate (Cygon) is preferred
2. Spray on a very still day when the wind is not blowing in the direction of the non-target areas
3. Confine poultry in a closed building for 24 hours. Keep beef cattle and dairy cattle inside corrals
4. Use a ground sprayer only and lower the boom as close to the ground as possible

5. Use as low a pressure as possible, thus keeping droplet size as large as possible. Smaller droplets will drift easier than large ones.

Sources of Information

The information in this fact sheet is the best available and was obtained from several surrounding states. As new information is obtained and learned from Utah experiences this coming season, this fact sheet will be updated.

Precautionary Statement

All pesticides have both benefits and risks. Benefits can be maximized and risks minimized by reading and following the labeling. Pay close attention to the directions for use and the precautionary statements. The information on pesticide labels contains both instructions and limitations. Pesticide labels are legal documents, and it is a violation of both federal and state laws to use a pesticide inconsistent with its labeling. The pesticide applicator is legally responsible for proper use. Always read and follow the label.

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