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The Russian Wheat Aphid in Utah: An Update

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Introduction

Since arriving in Utah in 1987, the Russian wheat aphid, Diuraphis noxia (Kurdjumov), has spread to all grain growing areas of the state. It is very unpredictable in that at times it becomes an economic pest and at other times it is just present. In some areas it has caused losses in wheat and barley of up to 50 percent or more. It can be a problem in fall or spring planted grains.

Biology

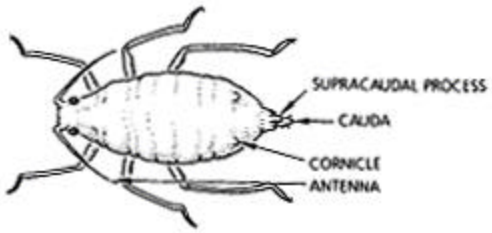
Russian wheat aphids infest wheat, barley, and triticale, as well as several wild and cultivated grasses. Broadleaf plants such as alfalfa, clover, potatoes, and sunflowers are not hosts. Volunteer grain plays a key role in the life cycle of this pest by providing a food source in the interval between grain harvest and the emergence of fall-seeded crops. Many species of grasses act as reservoir hosts during the late-summer dry season; however, grasses such as barnyard grass and foxtail grass that grow on irrigation ditch banks and other wet waste areas are poor hosts. Most wild desert grasses are normally dormant and unsuitable for aphids during this period. In some cases, winged forms may feed on corn during heavy flights, but no colonization occurs.

In the summer, all Russian wheat aphids are females that do not lay eggs but give birth to live young at a rate of four to five per day for up to four weeks. The new young females can mature in as little as 7-10 days. Because of this reproductive ability, large infestations can spread rapidly. Throughout the year, overcrowding and weather conditions may stimulate the production of winged forms which are easily dispersed on wind currents. Russian wheat aphids prefer to live in leaf whorls and tightly rolled leaves that develop shortly after they begin feeding. As the colonies become crowded or the plant declines, wingless aphids move to neighboring plants. Russian wheat aphids survive Utah's cold winters as wingless nymphs or adults. They seem to be more cold-hardy than the other cereal grain species. They have overwintered in Utah every year since they were found, although the heavy snow, severe cold, or both during the 1988-89 and 1990-91 winters drastically reduced populations in most areas.

Identification

Following are the major characteristics by which the Russian wheat aphid can be identified and separated from the other small grain aphids:

- Light green, elongated, and spindle shaped, not globular
- Short antennae
- Wartlike projection above tail (two tails)
- Cornicles very short and not obvious (no tailpipes on abdomen).



Detection and Damage

The characteristic damage of the Russian wheat aphid is the best way to identify its presence in a field. The aphids cause longitudinal leaf rolling and white (warm weather) or purple (cool weather) streaking on the leaves. The damage is caused by injection of a toxin into the plants as it feeds, which prevents the production of chlorophyll and causes the leaves to curl. Heavily infested plants are severely stunted and sometimes flattened. 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 allow proper grain maturation.

1. Surveying should begin when plants begin to grow in the spring
2. Check at least 10 plants in 4 areas of each field
3. Survey fields at least once, preferably twice, per week
4. Generally each 1% infestation level will result in a 0.5% yield loss at harvest.

After the soft dough stage, insecticides will have no benefit (do not spray).

Recent evidence from other states indicates that much of the reduction in yield attributed to fall infestations of Russian wheat aphids occurs because aphid feeding increases the susceptibility of the plant to winter injury. Feeding reduces the plant's cold tolerance and stunts root growth. As a result, fall crops in areas where winter kill is a common problem cannot tolerate as many Russian wheat aphids as those in areas where winter injury is uncommon. Early detection is important. Listed below are recommendations for surveying and identifying Russian wheat aphid presence and damage in fields.

Barley Yellow Dwarf Virus

Unlike most other cereal aphids, Russian wheat aphids are currently not significant vectors of barley yellow dwarf virus (BYDV) in North America. This disease causes yellowing

beginning at the tips of leaves and progresses towards the base. In contrast the Russian wheat aphid damage begins at the base and progresses towards the tip of the leaves in longitudinal white to yellow streaks. Soon after infestation, the leaves begin to curl protecting the aphids inside.

Control

Plant winter wheat late in the fall after trap collections indicate that late- season flights have subsided.

Plant spring wheat as early as possible to minimize crop exposure to aphids. Initial spring suction trap collections reflect the beginning of flight activity, so spring-planted grains should be monitored intensively after the trap catches begin to collect Russian wheat aphids. Contact your local county agent for suction trap information.

Chemicals registered in Utah for aphids or Russian wheat aphid

Granular and Soil Applied Systemics

Thimet 15G (wheat only at planting)/Thimet 20G (wheat only at planting): Do not feed or graze foliage within 70 days of treatment. Do not make any later applications after planting. Do not harvest within 70 days of application.

Phorate (Terra & Clean Crop) (Application at planting time)/(Application over the plant): Do not feed or graze foliage within 45 days of treatment. Do not make any later appli-cation after planting time treatment. Do not apply over plants if application was made at planting time. Do not make more than one application over the plants. Do not apply within 70 days of harvest of grain. Do not feed or graze foliage within 28 days of treatment.

Di-Syston 15G (barley): Apply by drilling or broadcast at planting time or as a broadcast after emergence. Do not apply more than twice per season nor within 60 days of harvest for grain. Allow a minimum of 21 days between applications. Do not graze or cut for forage within 30 days of treatment.

Wheat (fall): Apply by drilling or broadcast at planting time in the fall. Make only one application and do not graze or cut for forage within 75 days of treatment.

Wheat or barley (dry land): Apply by drilling or broadcast at planting time.

Wheat or barley (irrigated only): Broadcast preplant, preemergence, or postemergence by air or ground.

Foliar Applied Systemics

Dimethoate (wheat only): Cygon 400 (35 days to harvest) Dimate 4E (60 days to harvest) Clean Crop Dimethoate 400 (60 days) Drexel dimethoate 4EC (60 days): Do not apply

within 14 days of grazing immature plants. Do not make more than 2 applications per season.

Lannate, L, LV (wheat, oats, & barley): From last application: 7 days to harvest or 10 days to livestock.

Di-Syston 8E (wheat & barley) (spring or fall application): Do not make any applications within 30 days of grain harvest. Do not graze treated fields or cut for forage after any application. Two applications only 30 days apart.

Volunteer grain after harvest or discing is considered a new crop and can be cut or grazed.

Foliar Applied Contacts

Gowan Prokil Malathion 8E Gowan Malathion 8 Flowable Drexel Malathion 5EC Clean Crop Malathion 57 EC (Wheat, Oats, & Barley): Do not apply within 7 days of harvest or forage use.

Clean Crop Methyl Parathion 4E Prokil Methyl Parathion 5 (Wheat, Oats, & Barley): Do not use within 15 days of harvest.

Thiodan 3 EC (Wheat, Oats, & Barley): Applications may be made with aerial or ground equipment. Do not apply after heads begin to form. Do not feed treated forage to livestock. Do not make more than 2 applications per year. Do not exceed a maximum of 1.0 lbs active ingredient per acre per year.

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.