

Russian Wheat Aphid

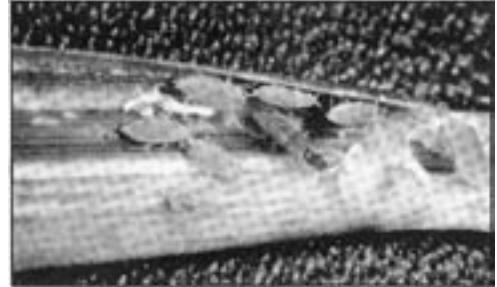
Diuraphis noxia

Order: Homoptera (aphids, white flies, scales, mealy bugs, hoppers, cicadas)

Family: Aphididae (aphids)

Metamorphosis: Simple (egg-nymph-adult)

Mouthparts: Piercing and sucking in nymphs and adults



RUSSIAN WHEAT APHID, *Diuraphis noxia*, on wheat, see color print, Fig. 8, on publication B-1013.

The Russian wheat aphid was first detected in the United States in the late 1980s in Texas. It is found throughout the small grains-growing area of the western United States. It causes the most severe damage to barley and wheat in Wyoming. Rye and oats are less preferred, and sorghums and millets do not appear to be susceptible to damage. Southeast Wyoming is the most heavily infested part of the state.

Body Form

Eggs: Eggs are formed within the female but not laid. Females give birth to live young.

Nymphs: Nymphs have elongated, oval bodies, approximately $\frac{1}{4}$ inch in length or shorter. They are a dull, light green color. The antennae are short (approximately $\frac{1}{4}$ the length of the body), the cornicles are cone shaped and short (not obviously protruding from the body wall), and the anal end appears to be double tailed when viewed from the side (a 10X hand lens is needed to see these features). Nymphs are not winged, but wing pads may be visible on older nymphs that will mature into winged adults.

Adults: Adults have the same basic characteristics as nymphs with the exception of wings, if present. Adults may be winged (alates) with a hardened and darkened thorax to support the wing structure. Non-winged adults (apterae) are uniformly green.

Life History

Russian wheat aphids overwinter as nymphs or adults on the leaves of host plants including some non-cultivated grasses, winter wheat, and volunteer grains. As weather warms in the spring, surviving aphids feed and reproduce. Reproduction is asexual; only females are known to occur in the United States. In combination with the good overwintering survival of aphids, warm dry springs may result in high aphid reproduction. Under these conditions, plant damage may be severe. In contrast, wet springs may result in high aphid mortality although mortality should not be assumed sufficient to prevent economic plant injury. Reduced host-plant quality, high Russian wheat aphid densities, and changing day length will initiate the reproduction of winged aphids. Winged aphids will be a source of infestation in spring grains. After

winter wheat is harvested, aphids will oversummer on late-maturing spring grains, volunteer wheat, and wild grasses that still have green foliage. Wild grasses that are hosts include crested wheat grass, brome-grass, and Canada wild rye. The oversummering population (many of which may be winged) are a source of fall infestation in winter wheat. There are multiple generations per year. The winged aphid generations are generally associated with plants that are drying down or are newly emerged. The non-winged aphid generations are associated with the rapid growth of plants prior to drying down.

Plant Injury

The most susceptible cultivated hosts are barley and wheat. All stages of plant development are susceptible to aphid attack, but aphid feeding on new growth results in the most severe plant damage. Damaged developing leaves do not unfold, and become white and purple-streaked down the length of the leaves. Within the curled leaf, large numbers of aphids may be found. Damaged, overwintered winter wheat may contain aphids if winter conditions were such that aphids survived the winter in large numbers. These aphids may quickly infest and damage the new spring growth. Even low winter survival may result in heavy spring infestation if the spring is hot and dry. Head and grain development may not occur if head becomes trapped in the curled leaves. If the head emerges, seed weight may be reduced.

Management

Plants should be inspected for aphid activity prior to tilling, and checking should continue through the time of the head emergence. Plant damage may be used to time the beginning of aphid monitoring because damage is an indicator of possible aphid activity. Aphid presence should be verified by picking tillers and inspecting the leaves down to the base of the new growth. Leaves should be unfolded during inspection. Once aphids are detected, a random sample of tillers should be inspected to determine the general level of infestation. In early spring, overwintered wheat plants and volunteer wheat along fallowed strips on south-facing slopes should be inspected to assess aphid overwintering survival. Currently, insecticide use is the principle method to control Russian wheat aphids. The timing of insecticide applications will depend on a plant's growth stage and aphid density. Methods such as economic thresholds have been developed to optimize timing of insecticide applications.

There are several natural enemies of Russian wheat aphids including parasitic wasps, lady bird beetles, syrphid flies, and lacewings. Not native to Wyoming, appears to be sufficient to prevent economic injury to susceptible wheat and barley. There has been a regional effort to release enemies of Russian wheat aphids that are native to its original home range. Barley and wheat resistant to Russian wheat aphids are or will soon be available. These plants are, in part, tolerant of Russian wheat aphid presence; they do not show damage despite being fed upon by aphids. Resistant host plants combined with natural enemy activity may be important future management strategies.

Sources of further information: A guide to sampling Russian wheat aphids is available from the University Of Wyoming Department of Plant Sciences.

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