

Russian wheat aphid

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Russian wheat aphid

Russian wheat aphid (RWA) (*Diuraphis noxia*), is a newly arrived pest of wheat, barley and other cereal grains. Russian wheat aphid damages plants by injecting salivary toxins and can severely reduce yields if not controlled.

Russian wheat aphid is adapted to semi-arid dryland climates with an average annual rainfall less than 600 mm and therefore is expected to survive in Australian grain growing regions.

Hosts

The main crops affected by RWA are wheat and barley. Other crops where RWA is minor pest include oats, rye, sorghum and triticale. The host range includes several non-crop grasses such as barley grass and wild oats.

Identification

Russian wheat aphid is a small (2 mm), slender bodied aphid that varies in colour from pale yellowish-green to grey-green and may be covered in a waxy fine white powder coating. Russian wheat aphid has a winged and wingless form. Winged aphids have dark patches on the thorax and a slightly darker green abdomen.

The distinguishing feature that sets RWA apart from other cereal aphids is an appendage above the cauda (tail), a supracauda, giving the aphid the appearance of having two tails. This can be seen with a 10x magnification hand lens. Also more evident with a hand lens, are very small cornicles or siphunculi, commonly known as "exhaust pipes" (Figure 2) which are larger on other cereal aphids.

Initial detection of RWA is most likely to be by observation of symptomatic plants. Initially RWA feeding causes a small light brown blotch that can be confused with damage by other insects and more problematically with symptoms caused by disease.

As feeding continues, leaves develop continuous white, yellowish and red/purple streaks along the length of the leaf (Figure 1). The occurrence and intensity of colouration varies, with the coloured streaks on young, lightly infested plants often restricted to the leaf edge.

Aphids feeding on new leaves can prevent leaf opening which gives the young plant an onion-leaf like appearance. Feeding on open leaves causes the leaf to roll inwards around the aphid.



Figure 1. Russian wheat aphid causes leaf striping (Photo: A. Gorman, Ag Grow Agronomy and Research, 2016).

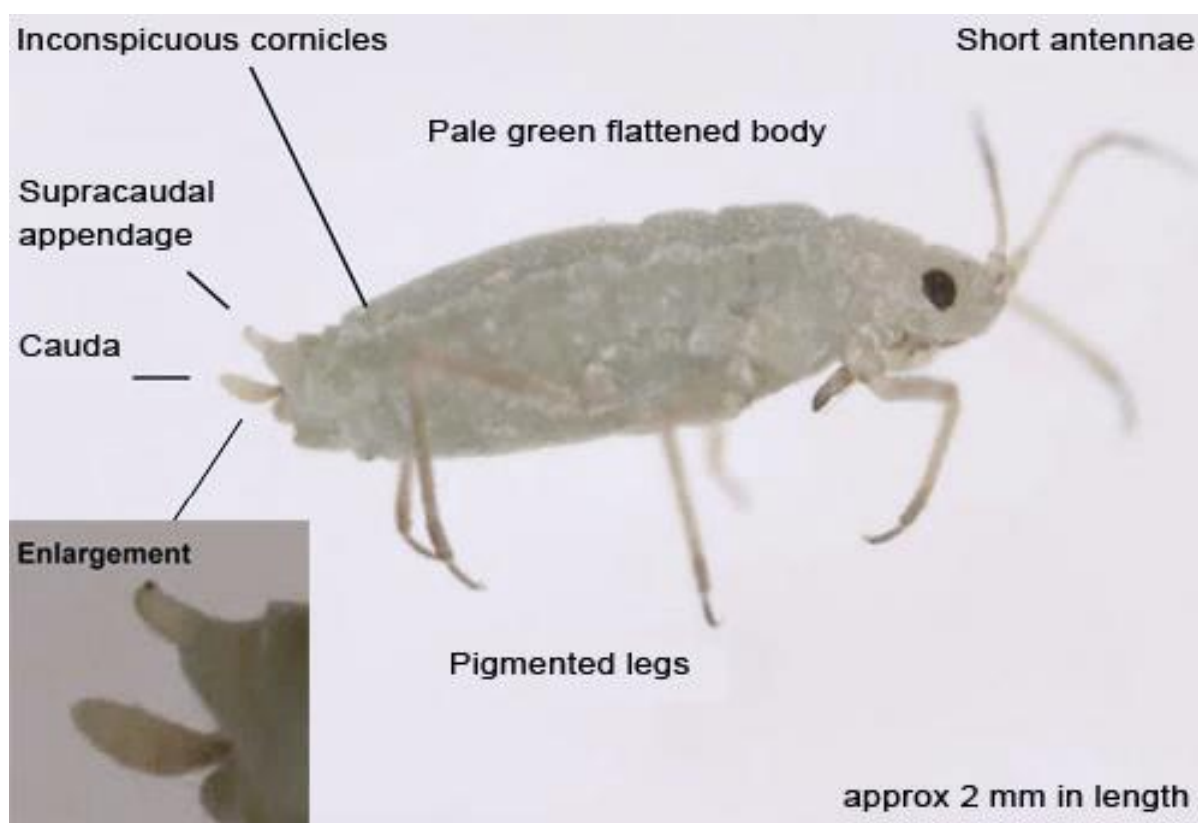


Figure 2. Key identifying features of Russian wheat aphid (Photo: A. Nicholas, Oklahoma 2011).

Life cycle

In its native range, the lifecycle of RWA includes sexual and asexual phases. However, like most other introduced aphids in Australia, RWA reproduces asexually with females giving birth to live female offspring clones.

Russian wheat aphid is more suited to cooler temperatures than other cereal aphids. Survival of aphids outside the shelter of leaf rolls is affected by exposure to rainfall, drying winds, predators and parasitoids.

When populations are low, the vast majority of aphids are wingless. As aphid densities increase, the proportion of winged aphids increases.

Spread

In autumn, aphids that have survived on volunteer cereals and grasses may infest host crop seedlings soon after emergence

Wingless RWA are generally found in “hot spots” which become larger with increased aphid densities rather than spreading evenly across a crop. Dispersal between paddocks, farms and regions is more likely to occur through the movement of winged RWA travelling on wind currents. Aphids may also spread on machinery, vehicles and clothing.

Damage

Aphids feed in dense colonies, typically at the base and sheath of younger leaves and within curled leaves. Toxins injected by the aphid during feeding destroy chlorophyll and prevent carbohydrate formation. Heavy infestations can kill plants.

Low aphid populations can cause symptoms to appear as early as 7 days after infestation. Damage symptoms are characterised by longitudinal rolling of leaves and whitish, yellowish to pink-purple chlorotic streaks along the length of leaves. Viewed from a distance, damage may appear as a general loss of colouration across the affected crop area.

Heavily infested plants are often stunted and may appear flattened, with tillers lying almost parallel to the ground. The most severe damage usually occurs when plants are stressed.

As the crop develops awns may become trapped by rolled leaves, resulting in hook-shaped, bleached and sterile heads.

Management

Russian wheat aphid was first detected in Australia in 2016. Best management practices for RWA are being developed as the ecology of the aphid and varietal response is determined under Australian conditions.

Monitoring

Inspect crops regularly from seedling emergence to soft dough stage. Aphids can be found in crops at any stage but are difficult to spot when numbers are low. The high risk period for damage is from early booting to soft dough (Z40-85). During inclement weather RWA is found on the newest leaves and in leaf sheaths. In fine weather and in high populations aphids can be dispersed all over plants (Figure 3).

Russian wheat aphid has been found in mixed populations with other cereal aphids such as oat and corn aphid.

Inspect plants for the characteristic leaf streaking and rolling. Inspect crop edges on the windward side or adjacent to infested grasses. Russian wheat aphid is known to favour areas that are stressed or have less ground cover. Populations may first appear in “hot spots”, but may spread through the crop in heavy infestations.



Figure 3. Russian wheat aphid (Photo: Primary Industries and Regions, South Australia).

Farm hygiene

Farm hygiene can slow the spread of RWA between farms and fields. Russian wheat aphid can spread by movement of machinery and vehicles and on clothing. Keep traffic out of affected areas and minimise movement in adjacent areas.

Control volunteer cereals and grasses in fallows during summer and autumn to prevent an early build-up of RWA in winter crops.

Cultural control

A vigorous and dense plant canopy will inhibit RWA development. Agronomic practices to promote crop vigour will reduce the impact of RWA on yield.

Chemical control

Decisions on the need for foliar treatments are based on the proportion of seedlings or tillers infested. Whilst some permits have been issued by the APVMA, treatment thresholds and chemical recommendations are still under development.

The current recommended threshold for chemical control is an excess of 10% of plants infested during the high risk stages of early booting to soft dough. Yield losses can be minimised by protecting the top 3 leaves from damage.

Due to the cryptic feeding habits of RWA, maximising chemical coverage is essential, including high water volumes, selecting an appropriate droplet size and the addition of surfactants depending on label recommendations.

Beneficial insects

Preserving populations of beneficial insects is a key management strategy for managing aphids. Beneficial numbers increase as temperatures increase and can provide control in spring to prevent RWA population build up.

Russian wheat aphid is attacked by a range of natural enemies including ladybird beetles, lacewings, damsel bugs some parasitoids and entomopathogenic fungi.

More information

For the latest nationally developed RWA management guidelines from the Grains and Research Development Corporation see www.grdc.com.au

For the latest information from the Russian Wheat Aphid Technical Group including RWA distribution maps see www.biosecurityportal.org.au

Acknowledgments

Primary Industries and Regions, South Australia.
Plant Health Australia.

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