Science Societies

Characterization of gene conferring resistance to U.S. Russian wheat aphid

March 9, 2025

Russian wheat aphid (RWA)-resistant (upper) and RWA-susceptible (lower) wheat lines at four weeks after infestation. Photo courtesy of Xiangyang Xu.

Russian wheat aphid (*Diuraphis noxia* Kurdjumov) is a highly invasive and destructive wheat pest evolving rapidly to overcome host resistance. Most Russian wheat aphid (RWA) resistance genes have lost effectiveness to new RWA biotypes. Novel genes conferring resistance to multiple RWA biotypes are needed to sustain wheat production. The gene *Dn7* confers resistance to all U.S. RWA biotypes. However, *Dn7* was identified in rye and is closely linked to the undesirable *Sec1* gene encoding monomeric secalins, which reduce dough strength and cause sticky dough; thus, negatively affect wheat end-use quality.

Scientists from Stillwater, OK and Manhattan, KS identified a new gene designated as *Dn625139* in the Iranian landrace PI 625139, which confers resistance to all five U.S. RWA biotypes, namely RWA1, RWA2, RWA3/7, RWA6, and RWA8. They mapped *Dn625139* to the short arm of chromosome 7D and developed markers that can be used to tag *Dn625139* in breeding populations.

Dn625139 can be widely used to enhance RWA resistance in wheat breeding and is an ideal alternative to *Dn7*. The molecular markers developed in this study, published in *Crop Science*, can facilitate the rapid introgression of *Dn625139* into locally adapted cultivars to enhance wheat RWA resistance.

Dig deeper

Xu, X., Li, G., Wolabu, T. W., Bai, G., Bian, R., Bernardo, A., Carver, B. F., & Wu, Y. (2025). Characterization of a gene conferring resistance to US Russian wheat aphid biotypes in the Iranian wheat landrace PI 625139. *Crop Science*, *65*, e21398. https://doi.org/10.1002/csc2.21398