



Multiple disease resistant lines for sunflower breeding

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First author Lili Qi removes anthers from sunflower in order to pollinate desired pollens in the greenhouse. Photo courtesy of Lili Qi.

Rust and downy mildew are two of the most important yield-limiting sunflower diseases globally. There has been a long history of using resistant varieties or hybrids to control rust and downy mildew in sunflower. However, resistance is generally not durable due to the emergence of new pathotypes that overcome current resistance sources. Stacking more than one resistance gene in a hybrid is expected to considerably extend the durability of resistance due to the low probability of the pathogen being able to overcome multiple resistance genes at the same time.

In the *Journal of Plant Registrations*, researchers report the development of sunflower breeding lines with enhanced levels of genetic resistance to both diseases using marker-assistant selection. Three breeding lines, HA-R14, HA-R15, and HA-R16, were developed to stack different rust resistance genes with a downy mildew resistance gene, resistant to all known races of rust and downy mildew. One line, HA-R17, pyramids two rust resistance genes resistant to all known races of rust. These lines will provide a broad spectrum of useful sources of resistance to all modern pathotypes of rust and downy mildew. Ultimately, durable resistance will reduce chemical applications and enhance net returns for sunflower growers and processors.

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Qi, L., Ma, G., & Seiler, G. (2021). Registration of HA-R14, HA-R15, HA-R16, and HA-R17 oilseed sunflower germplasm with broad resistance to rust and downy mildew.

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