

Researchers explore promising novel approach to control wild radish weed

July 6 2020



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Wild radish is a major weed afflicting Australian cereals, accounting for \$53-72 million per year in crop losses. Now, Australian researchers are shedding light into an innovative molecular approach that, used in conjunction with improving weed management farming practices, could help towards controlling this formidable weed.

"Wild radish is developing resistance to many commonly used herbicides, which is a huge problem. In this study, we explored the possibility of manipulating enzymes that produce a [plant hormone](#) called gibberellin (GA) that controls growth and fertility in plants. Our results show that even mild deficiencies of this hormone can cause considerable reductions in growth and fertility," says lead researcher Dr. Michael Groszmann, from the ARC Center of Excellence for Translational Photosynthesis (CoETP) at The Australian National University (ANU).

Wild radish (*Raphanus raphanistrum*) is a hugely successful [weed](#) because of its amazing capacity to establish and grow quickly, and to produce copious numbers of seeds.

"It makes sense to inhibit the hormone that promotes these processes in wild radish in order to control the weed," says Dr. Groszmann.

The research article explores two approaches. The first looked at the possibility of developing an inhibitor of the GA producing [enzyme](#) that is specific to wild radish. "For this to be possible, the wild radish and the crop enzymes that manufacture GA would have to be sufficiently different," explains Dr. Groszmann.

The scientists found that the evolutionary diversions between the weed and the crop gibberellin-producing enzymes are enough to be able to develop a specific inhibitor that affects wild radish but not the crop.

However, it was their second approach that holds the most promise, as it uniquely embraces the history of modern-day [crops](#) for a potential solution. During the Green Revolution of the 50s and 60s, scientists used mutations that targeted GA to produce dwarf high-yielding varieties of cereals such as wheat, rice, and barley. Over the past decade, co-author on the paper Dr. Peter Chandler of CSIRO has developed new improved versions of these original dwarfing varieties.

"The interesting bit for us was when we tested these new dwarfing mutations that increased yield, some also had the added benefit of being insensitive to inhibitors of the GA enzyme. This means we wouldn't necessarily need to develop a wild radish specific inhibitor, but rather we could spray with an existing chemical that generally blocks GA. These new crop varieties would not be affected; however, the spray would still inhibit the growth and fertility of the wild radish weed," says Dr. Groszmann.

Their novel molecular approach offers a promising innovative avenue to control wild radish populations. Targeting GA seems not only feasible, but could be a viable inclusion in [wild radish](#) management programs.

More information: Michael Groszmann et al. Manipulating Gibberellin Control Over Growth and Fertility as a Possible Target for Managing Wild Radish Weed Populations in Cropping Systems, *Frontiers in Plant Science* (2020). [DOI: 10.3389/fpls.2020.00190](https://doi.org/10.3389/fpls.2020.00190)

Provided by ARC Centre of Excellence for Translational Photosynthesis

Citation: Researchers explore promising novel approach to control wild radish weed (2020, July 6) retrieved 10 April 2024 from <https://phys.org/news/2020-07-explore-approach-wild-radish-weed.html>

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