



# GM Crops: Frequently Asked Questions

## What are GM crops?

Genetically modified (GM) crops are agricultural plants that have had their DNA altered by genetic techniques. This typically involves adding a specific segment of DNA to the genome of the plant to give it new or different characteristics.

## What is the difference between GM and traditional plant breeding?

Plant breeders and farmers have cross-bred crops for centuries to exchange genes between plants and produce varieties with desirable traits. Conventional breeding allows us to select for the traits that growers, consumers and industry want. On average, it takes about 7 years to bring a new variety to market.

GM crops use genetic technologies to find the specific genes that control the trait of interest and that gene only is transferred to the crop plant. It is a faster and more precise way to achieve similar outcomes to conventional plant breeding.

## What GM crops are grown in Australia?

Three GM crops are grown in Australia: cotton (approved 1996), canola (approved 2003) and safflower (approved 2018). Other crops are undergoing field trials. Worldwide, there are approximately 80 different types of GM crops grown including soybean, maize, papaya, potato, squash and tomato.

- **Cotton** is grown commercially in regions of NSW and Queensland. Almost all cotton grown in Australia is genetically modified to be resistant to some insect pests and to tolerate certain herbicides.
- In 2017 about 21 per cent of the national **canola** crop was genetically modified. The types of GM canola licensed to be grown commercially in Australia are resistant to glyphosate and/or glufosinate herbicides, and canola which can produce Omega-3 oil.
- The first commercial GM **safflower** was released in Australia in 2018. The two GM lines approved for release have been genetically modified to increase the level of a particular oil, oleic acid, in their seeds. The GM safflower oil extracted from the seeds is intended for use in industrial oil production and animal feed.
- There are currently experimental field plantings in Australia of GM banana, barley, ryegrass, mustard, sugarcane and wheat. In the past there have also been trials of rice, clover, maize, poppy, papaya, pineapple and grapevines.

## What regulations are in place for GM crops grown commercially in Australia?

The growth of GM crops in Australia is carefully regulated at both State and Federal levels. Evidence of the safety of GM varieties, and confirmation that they have no detrimental impacts on the environment, humans or animals, must be provided to the regulatory bodies before they are approved.

The federal *Gene Technology Act 2000* regulates all dealings with live and viable genetically modified organisms (GMOs) in Australia, including research, manufacture, import, production, propagation, transport and disposal of GMOs. This Act deals with human health and environmental impacts of GMOs and is administered by the Office of the Gene Technology Regulator (OGTR).

New products and GM varieties are assessed on a case-by-case basis.

## GM crops in South Australia

South Australia has had a moratorium on the production of GM crops and transportation of GM crop products since 2003, under the South Australian *Genetically Modified Crops Management Act 2004* and subsequent regulations.

An independent review taken in late in 2018 by Emeritus Professor Kym Anderson AC evaluated the benefits and costs of the GM Moratorium to the South Australian economy and agricultural industries. It concluded that there was no price premium on GM-free South Australian grain compared to other states where GM crops are grown; that the moratorium had had an overall economic cost of at least \$33M to South Australia's farmers; and that maintaining the moratorium until 2025 would mean new technology and some research and development investments would remain unavailable to South Australia<sup>1</sup>.

Based on this advice and extensive public consultation, the South Australian parliament passed new legislation in 2020 that enables GM food crops to be grown in South Australia, with the exception of Kangaroo Island.

### What are the benefits of sowing GM crops?

In Australia, GM is mainly a crop management option that provides growers with an opportunity to access new varieties with improved agronomic features. For example, GM varieties that are resistant to some pests and diseases can reduce the need to use pesticides, leading to reduced on-farm costs and environmental benefits. This has been a particularly effective strategy for the Australian cotton and canola industries.

In states such as Victoria, secondary benefits of GM Canola sowing have been seen in following seasons for barley and wheat. Growers typically use annual crop rotations to maintain the quality of their soil, avoid pest and weed build up and maximise yield over time. The use of GM herbicide-tolerant canola to control weeds has been reported to reduce the overall amount of spraying at some sites for up to 5 years, supporting yields and reducing inputs for higher value crops such as wheat and barley.

In the future, GM crops could potentially provide farmers with varieties that might be better suited to our local conditions – eg, crops that grow better in high temperatures or with less water. In many cases, the genes underlying environmental stress tolerance have been identified and GM crops are in development and ready to test in field conditions.

### What about research?

We have a long history of GM research in SA and at the Waite Research Institute. The innovations of Professor Allen Kerr in the 1960's here at the Waite directly seeded the GM industry. As a leader in the application of new plant breeding technologies, GM crop research and GM stewardship, we have trained many international researchers and collaborated with diverse agri-biotech organisations from around the world.

In particular, research at the Waite has led to development of prototype crops that show substantial improved tolerance to drought and salt. The new GM legislation in SA provides incentive for researchers, breeders and farmers, to trial these GM crops under local conditions. It also provides clarity for potential national and international investors in GM technologies, since the trend is towards growing GM crops rather than the other way.

Applying GM brings with it the responsibility to consider stewardship and the long term sustainability of agriculture in South Australia.

## More information

**The Office of the Gene Technology Regulator (OGTR):** <http://www.ogtr.gov.au/>

The Gene Technology Regulator is responsible for administering the Gene Technology Act 2000 (the Act) and corresponding state and territory laws.

Factsheet: Genetically modified crops in Australia:

[http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/9AA09BB4515EBAA2CA257D6B00155C53/\\$File/11%20-%20Genetically%20modified%20\(GM\)%20crops%20in%20Australia.pdf](http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/content/9AA09BB4515EBAA2CA257D6B00155C53/$File/11%20-%20Genetically%20modified%20(GM)%20crops%20in%20Australia.pdf)

**Primary Industries and Regions SA (PIRSA):** <https://www.pir.sa.gov.au/>

GM crops: [https://www.pir.sa.gov.au/primary\\_industry/genetically\\_modified\\_gm\\_crops](https://www.pir.sa.gov.au/primary_industry/genetically_modified_gm_crops)

Independent Review of SA's moratorium on GM food crops:  
[https://pir.sa.gov.au/primary\\_industry/genetically\\_modified\\_gm\\_crops/gm\\_review](https://pir.sa.gov.au/primary_industry/genetically_modified_gm_crops/gm_review)

**For discussions on other questions on consumer attitudes to GM foods see:**

- [www.adelaide.edu.au/research/news/list/2019/08/23/gm-crops-to-ban-or-not-to-ban-thats-not-the-question](http://www.adelaide.edu.au/research/news/list/2019/08/23/gm-crops-to-ban-or-not-to-ban-thats-not-the-question)
- <https://theconversation.com/perceptions-of-genetically-modified-food-are-informed-by-more-than-just-science-72865>

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<sup>1</sup> Anderson K (2019), Independent Review of the South Australian GM Food Crop Moratorium. Report to the SA Minister for Primary Industries and Regional Development.