



How do I find out more?

This brochure is one of a series of *Biotechnology briefs* on biotechnology and Australian agriculture.

Other titles in this series of *Biotechnology briefs*:

- *GM canola: potential impacts on organic farming*
- *GM grains in Australia: identity preservation*
- *Market acceptance of GM canola*
- *GM crops: tools for insect pest and weed control*
- *GM canola: an information package*
- *GM crops in emerging economies*
- *Value of biotechnology applications to Australian agriculture*
- *GM oilseed crops and the Australian oilseed industry*
- *Genetically modified crops*
- *Australia's crops and pastures in a changing climate*
- *Economic impacts of GM crops in Australia.*

The Australian Government's National Biotechnology Strategy funded the production of these brochures and reports.

How can I get copies?

For a free copy of these and other DAFF publications please email: agbiotech@daff.gov.au.

Visit the Australian Government Department of Agriculture, Fisheries and Forestry website for regular updates and information on agricultural biotechnology: www.daff.gov.au/agbiotech.

We want to ensure that developments in biotechnology are captured for the benefit of the Australian community, industry and the environment, while safeguarding human health and ensuring environmental protection.

The Australian Bureau of Agricultural and Resource Economics (ABARE) is an independent economic research agency of the Australian Government.

Is the stockfeed supply segregated?

Segregation of GM material already occurs on a client-need basis in Australia. An increase in the use of GM ingredients in stockfeed is unlikely to require additional administration costs.

The Australian pig meat industry and some chicken meat and dairy processors have indicated they try to avoid using GM rations in stockfeed due to concerns about market acceptance. However, virtually all imported pig meat consumed in Australia, including products imported from Denmark, is likely to be produced using at least some GM stockfeed.

A strict non-GM identity preservation system already exists in the Australian organic stockfeed system, where the intentional use of genetically modified organisms is prohibited. Organic farming standards include strict guidelines on the manufacture of organic stockfeed outside of organic farms, including how the grain is handled and milled and how feed is stored. Records of outside feed sources must be kept.

There is evidence of support for the segregation measures employed by the Australian organic industry. The price premiums for organic beef and organic chicken meat reflect the increased costs of production, including segregation costs involved in producing organic stockfeed and livestock products.

How might genetic modification improve stockfeed quality?

Stockfeed manufacturers' willingness to use GM ingredients may be influenced by the availability of feed ingredients with improved nutritional benefits or the ability to increase livestock productivity.

GM crops could, in the future, provide health benefits for livestock. These crops may include soybeans, maize and canola with increased amino acid levels and wheat and barley with modified plant cell walls to improve digestibility. If made available for commercial use, demand for these ingredients may increase as productivity gains are realised.

In the future, the use of GM material in animal feed may also help to reduce greenhouse gas emissions from livestock and improve the digestibility of feed.

How do markets react to products from animals which might have been fed GM stockfeed?

There is no evidence of import restrictions on meat, egg and dairy products derived from animals fed GM feed in any of Australia's major export markets. These markets do not require mandatory labelling of products from animals fed GM stockfeed.

Consumer awareness of the use of GM ingredients in stockfeed is low, both in Australia and its major export markets for meat, egg and dairy products. Studies in Australia and the United States indicate some consumer aversion to products from animals fed GM stockfeed. However, there is no evidence of this lowering demand for these products.

More information is available in the report:

Ansell, E and McGinn, E, 2009, *GM stockfeed in Australia: economic issues for producers and consumers*, ABARE research report 09.2. Prepared for the Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, January 2009.

Biotechnology

GM stockfeed in Australia: economic issues for producers and consumers

briefs

The use of genetically modified (GM) crops offers Australian farmers the opportunity to boost productivity by reducing inputs and increasing yields. The key driver for adoption of GM crops has been the yield and production cost benefits.

GM crops such as corn may be grown for stockfeed. However, stockfeed ingredients derived from GM crops such as cotton, soybean and canola are generally secondary to the more valuable primary products of oil and fibre. Farmers' decisions to plant GM or non-GM crop varieties are more likely to be based on prices received for the primary products, rather than decisions by stockfeed manufacturers to use GM feed ingredients. GM stockfeeds are now being used by livestock industries in Australia and other countries, and consumers are eating food produced from these animals. Stockfeed manufacturers' decisions may be influenced by consumer acceptance of products from animals fed GM stockfeed.

Demand for non-GM feed will determine the need for segregation. If demand is high, investment in infrastructure may be required to maintain a segregation system.

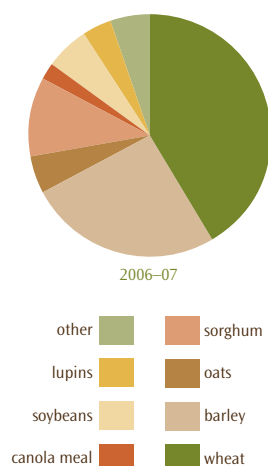
Livestock rations in Australia and elsewhere contain GM ingredients

Stockfeed containing GM oilseed meals is already used in Australia and Australia's major export competitor nations.

The increasing use of GM stockfeed in Australia reflects developments overseas, where the rapid adoption of GM soybeans, maize, cotton and canola has increased availability for stockfeed.

GM animal feed is used by Australia's main export competitors—Canada, the United States, New Zealand, Denmark and Brazil. Of these countries, Australia is estimated to use the least amount of GM feed in percentage terms. Canada and the United States use the most. There is no reliable feed usage date for New Zealand.

Feed consumption mix in Australia, by volume ^{a,b}



^a Based on the marketing year for each commodity; year ending February 2007 for maize and sorghum, March 2007 for cotton and soybean, September 2007 for wheat, October 2007 for barley, canola, field peas, lupins, oats, and triticale, and December 2007 for copra. ^b Field pea and lupin feed use is based on consumption data in ABARE (2008). As stockfeed use is not treated separately to human consumption, it is assumed that all lupins and field peas are consumed by livestock. Source: ABARE 2008, Australian Oilseed Federation 2008, USDA 2008a.

Which stockfeeds are commonly used in Australia?

In 2006–07, the major grains and grain products used in animal feed in Australia were wheat, barley and sorghum. The grain component of feed may also contain maize, soybean, canola, cottonseed, oats or derived meal products.

The specific mix of grains in feed rations is typically determined by the nutritional requirements of the animal. It will also depend on the cost of grain commodities, seasonal conditions and availability of grains.

Which stockfeeds include a GM component?

In Australia, an estimated 487 200 tonnes of GM material was used in animal feed in 2006–07 (approximately 5 per cent of total grain and grain products used in animal feed that year).

Domestically sourced GM meals make up a minor but growing proportion of ingredients used in stockfeed mix. The use of GM stockfeed in Australia has been increasing over time, with the rapid adoption of GM cotton varieties by Australian farmers and GM soybeans, maize, cotton and canola internationally.

GM cottonseed meal, a by-product of domestic cottonseed oil production, is used by stockfeed manufacturers as a key protein ingredient. Imported GM soybean and canola meal products are also used to boost the protein content of stockfeed. In coming years, domestically sourced GM canola meal will also form part of the mix.

Although no GM pastures or fodder crops have been approved for commercial production in Australia, varieties are being researched and may be approved in the future. In the meantime, Australian livestock may graze on GM canola stubble or be fed hay from GM canola crops.

Estimates of GM material by weight in animal feed in 2006-07 by industry and grain ^a

| | chicken meat | eggs | pigs ^{b,c} | beef feedlot | dairy | sheep for live export | grazing ruminants | others | total |
|--------------------------|--------------|------|---------------------|--------------|-------|-----------------------|-------------------|--------|-------|
| Canola meal | kt 16.9 | – | – | 2.1 | 0.8 | – | – | 0.8 | 20.6 |
| Cottonseed | kt – | – | – | 20 | 6.7 | – | 0.9 | – | 27.6 |
| Cottonseed meal | kt 44.6 | 15.6 | – | – | 8.8 | – | – | – | 69 |
| Soybean meal | kt 264.2 | 37.7 | – | – | 68.1 | – | – | – | 370 |
| Total | kt 325.7 | 53.3 | 0 | 22.1 | 84.4 | 0 | 0.9 | 0.8 | 487.2 |
| Proportion of GM in feed | % 14.2 | 13.1 | 0 | 0.6 | 3.2 | 0 | 0.2 | 0.3 | 4.5 |

^a Year ending October 2007 for canola, and March 2007 for cottonseed and soybean. Totals may not add because of rounding. ^b Australian Pork Limited have made a statement indicating GM feed is not used in Australian pig meat production (APL n.d.) ^c Adjustments to GM feed grain usage has been made accordingly. Source: Hagi Hiram et al. 2007; ABARE 2008; AOF 2008; US Department of Agriculture 2008a; ABARE estimates.

Which livestock industries are most reliant on stockfeeds?

The reliance on feed grain varies across the Australian livestock industries. Grain is less than 10 per cent of feed consumed by grass fed beef cattle and sheep, whereas virtually all feed consumed by laying hens is grain.