GMO MORATORIUM REVIEW

DairyTas Board Submission April 2019

KEY POINTS

- **Gene technology innovations in the R&D pipeline would add value to Tasmanian dairy farm profitability, as described in this submission.**
- **Many Tasmanian dairy farmers question whether any market benefits of remaining GMO-free outweigh the on-farm value of gene technology innovations**.
- **Recent changes to the Gene Technology Regulations will result in improved on farm efficiencies whilst maintaining the the state's current GMO free status**

SUGGESTED OUTCOMES OF THE REVIEW

- **Any market premium for GMO-free provenance must be substantiated with economic analysis and include examination of which industries benefit. The size of the benefit at the dairy farm gate and/or to dairy farm-level profitability must be accounted for in such an analysis.**
- **Should any market premium exist from the state-wide moratorium on GMOs, this must be weighed against the agronomic benefits that Tasmanian dairy farmers stand to gain from new gene technology innovations in pasture, grains and animal breeding. Conversely, the scale of their disadvantage, should access be denied by an extended moratorium, must be made clear.**
- **If the moratorium is to remain, the review period should be reduced so potential efficiency gains can be measured against market advantages on a more regular basis.**

INTRODUCTION

DairyTas welcomes the opportunity to provide this submission to the Tasmanian Government's GMO Moratorium. It is timely and important to review the moratorium on GMOs in Tasmania when considering the pipeline of research and development (R&D) innovations under development and approaching commercialisation.

New gene technology innovations relevant to dairy are in active use in the Australian R&D pipeline, as well as in New Zealand and elsewhere. Uncertainty around legislation is a risk for investors such as Dairy Australia and dairy farmers who stand to gain significant agronomic advantages from new plant and animal breeding programs.

To remain internationally competitive, the dairy industry needs access to pastures, grains and livestock that are reliably productive in an environment that has continued increasing costs and uncertain environmental pressures. Breeding will continue to play a critical role in meeting these challenges.

BACKGROUND

DairyTas is the Tasmanian service delivery arm of Dairy Australia, investing farmer levies and other funds to support the Dairy Industry. We are the Regional Development Program (RDP) for the Tasmanian Dairy Industry. There are eight nationally assigned RDPs across the country, funded by Dairy Australia and the dairy service levy. RDPs exist to represent and support dairy farmers in key dairying areas of Australia. DairyTas aims to identify, prioritise, promote, facilitate and leverage opportunities for research, development and extension activities in assisting dairy farmers to manage change. We also work to encourage the development of a sustainable, vigorous and dynamic dairy industry in Tasmania that offers economic and social rewards to dairy farmers and the wider community.

DairyTas delivers both Tasmanian-specific and Australia-wide dairy research, development, extension and education activities that support and develop dairy farmers to build robust and sustainable businesses.

In constantly changing global, regulatory and natural environments, DairyTas prioritise and facilitate those opportunities that best support Tasmanian dairy farmers to manage their farms and businesses.

DairyTas co-operates with a range of industry and government stakeholders to help add further value to our programs. These organisations and groups include:

- Tasmanian Institute of Agriculture (TIA)
- TasTAFE
- NRM organisations
- State Government
- Industry consultants and agribusiness
- TFGA Dairy Council (TFGA)

Given the role DairyTas plays within the industry, we feel equipped to provide insight and perspectives into the GMO review in relation to the terms of reference highlighted below.

a. The potential market advantages and disadvantages of allowing or not allowing the use of gene technology in Tasmanian primary industries, including food and non-food sectors;
b. Domestic and international gene technology policy relevant to primary industries;
c. Research and development relevant to the use of gene technology in primary industries;
d. Any other relevant matters raised during the review.

THE DAIRY INDUSTRY

Nationally, milk production continues to decline. In the drought impacted states of NSW, Queensland and Northern Victoria, production in 2018/19 is expected to decrease by over 10%. These dairying regions have traditionally serviced both the domestic fresh milk markets of their respective states (Queensland / NSW) with the surplus production in Victoria used to supply various domestic and export markets.

Within Tasmania the industry continues to grow. In 2017/18 Tasmania produced a record 913 Million litres of milk, primarily produced seasonally maximising pasture and home-grown feed. 62 Million litres (6.7%) was consumed as packaged milk while the balance was processed to service the domestic and export markets. This record production was produced by 412 dairy farmers (average production 2.12 Million litres) across the state with the majority of milk being processed by the large processors such as Fonterra, Saputo Dairy Australia, Lion & Mondelez (Cadbury) with a number of new processors recently commencing collection direct off farm (Parmalat, Australian Consolidated Milk and Organic Dairy Farmers of Australia).

At a farm level there have been several corporate farm entities recently purchase farms within the state due to our low cost of production, driven by reliable rainfall, stable climate and consequently good pasture growth. In recent years, existing and new entrants to the industry have also been comforted by the competition and consequently choice in selecting a processor to supply.

In the last Tasmanian Agri-Food Scorcard (2016/17) when the states milk production was 834 Million litres), the farm gate value of milk was $326 Million. This represented approximately 26% of the total farm gate value of the states agriculture production. With significant growth in milk production in 2017/18 of 9.5% and improved farm gate prices it is expected that this value will have increased significantly.

PASTURE IMPROVEMENT

Pasture improvement is a fundamental driver of on-farm productivity, particularly in Tasmania where pasture makes up 85% of the dairy feedbase. Gene technology is expected to be the foundation of future productivity gains. Australia has a preeminent global position in the use of gene technologies for pasture development.

DairyBio is a 5-year, $60 million initiative with Agriculture Victoria, Gardiner and Dairy Australia. DairyBio has seven projects that will improve pasture performance. The focus is on yield, persistence and quality.

DairyBio projects are improving perennial ryegrass, short term ryegrass and tall fescue. Going forward, and in recognition that a changing climate is likely to impact on how far north perennial ryegrass can flourish, other forages will be targeted too. Arguably, given its makes up 85% of the dairy feed base, the focus on perennial ryegrass is more relevant to Tasmania than anywhere.

A wide range of plant breeding innovations are used in these projects.

- Large-scale observation of plant performance (called phenomics),
- DNA based selection to increase the rate of genetic gain and reduce the breeding cycle (called genomic selection),
- Utilization of hybrid vigour to impact yield (by up to 35%), and
- New gene editing breeding technologies to impact ryegrass quality (by several hundred dollars per hectare).

One of the critical success factors for DairyBio is the ability for many innovations to converge into a single commercial breeding program. This way, the new pasture cultivars can contain multiple innovations and deliver productivity gains of over 30%, worth in the range of $800-1000 per hectare.

DairyBio is using a gene editing technique called Exzact™. Easily conceived as acting like molecular scissors, this Zinc Finger Nuclease is being used to delete four specific genes. Two of the genes deleted are involved in regulating lignin content. This makes the plant less woody and therefore more palatable and easier to digest. The target is an increase of 1.5 MJ/kg dry matter metabolisable energy.

The other two genes being deleted are involved in the control of pollen allergen formation - the major cause of hay fever in humans.

Because of the way this technology works, in that it mimics natural mutations and does not involve importing foreign DNA, the Australian Gene Technology Regulator has undertaken an extensive scientific risk assessment and found it carries no more risk to humans or the environment than unregulated counterparts. The Australian dairy industry has argued it should therefore be treated the same way in regulations – where plant breeding techniques carry the same risk, they should be regulated the same way. Therefore it follows that gene edit 'delete' not be regulated.

On the basis of this scientific risk assessment, the Legislative and Governance Forum on Gene Technology has agreed this month (April 2019), to exempt gene edit 'delete' (Exzact™) from the definition of GMO.

This regulatory amendment would result in Tasmanian dairy farmers gaining access to new cultivars whose development included gene editing within the current Tasmanian GMO-free legislative setting.

DairyTas welcomes the April 2019 decision of the COAG Legislative and Governance Forum on Gene Technology to amend the *Gene Technology Regulations 2001* to exempt gene edit 'delete' from being regulated as a GMO.

However it is important to note that Tasmanian dairy farmers stand to gain also from transgenic (GMO) ryegrass under development in New Zealand.

In current research trials, this high lipid ryegrass is demonstrating enhanced energy and yield and may have the potential to decrease methane emissions by 20%. Water use efficiency is also a trait of interest.

In both examples (gene edited and transgenic ryegrass programs) there are several management responses to additional higher quality feed:

- Increased production per cow
- Reduction in non-pasture forage usage
- Increased stocking rate
- Shift in calving date, extension of lactation period
- Production of more silage

Uptake by farmers and pasture renewal rates will then determine impacts on net farm income. Modelling work by Dairy Australia and DairyNZ has attempted to quantify the benefits specific to Tasmania, given in Table 1.

Table 1. Value to the Tasmanian dairy industry of two example gene technologies in perennial ryegrass breeding programs.[a]

Perennial ryegrass scenario	Revenue increase ($AUD per hectare)	Net present value for Tasmanian dairy industry ($AUD by 2035)	Value per farm per year by 2035
Exzact™ (commercial release 2028 [b])	$600	$13.7 million	$33,252
High lipid transgenic (commercial release 2027)	$1445	$37.5 million	$91,019

[a] *ME increased by 1.0MJ per KG, adoption 70%;* [b] *commercial release may be earlier than this date once gene edit 'delete' is deregulated in October 2019*

Bringing new cultivars to market is a lengthy exercise. Once the technology is proven, it then needs to be trialled in the field in real and simulated dairy farming systems to enable farmers to assess value and technology providers to refine recommended management practices. A moratorium extending beyond 2019 in Tasmania hinders this critical step in bringing innovations to dairy farmers in this state, while those on the mainland and in other countries gain access.

OTHER PLANT BREEDING INNOVATIONS USING GENE TECHNOLOGY

Significant quantities of grain are fed to dairy cattle, alongside pasture and in drier conditions. The use of gene technology to increase drought tolerance in wheat would represent a cost saving to dairy farmers who normally experience a spike in feed costs during drought.

Elsewhere, such have been the global adoption rates of gene technology innovations that Tasmanian dairy farmers risk falling behind in relation to the productivity competitors are gaining from these advantages (Table 2).

Table 2. Gene technology innovations in the global dairy feedbase.

Canola: added feed value and herbicide tolerance (GM and gene edited)
Corn for added feed value, herbicide tolerance, pesticide tolerance
Sorghum: added feed value
Soybean: added feed value
Sugar Beet: herbicide tolerance
Alfalfa: low lignin, increased fibre

ANIMAL BREEDING INNOVATIONS USING GENE TECHNOLOGY

Of particular interest to dairy farmers in the short term is the R&D undertaken by US Company Recombinetics to improve on dairy cattle welfare traits.

Polled and heat tolerant animals exist but the inbreeding and production discount are limiting. Polled genetics is a clear way of avoiding the need for dehorning and disbudding.

Recombinetics is using gene editing to breed out horns. This technology, delivered in semen, is only two years away from being commercially available. Dairy Australia understands that the company intends to make this available to Australian dairy farmers.

This is just the first trait in a portfolio of welfare traits under investigation.

In an era where welfare is in the spotlight and an increasing market access issue, Tasmanian dairy farmers may be disadvantaged where mainland and international producers can use this semen. In the case of disease resistance, the scale of such a disadvantage would be an extremely serious concern.

KEY CONCLUDING POINTS

- **Gene technology innovations in the R&D pipeline would add value to Tasmanian dairy farm profitability, as described in this submission.**
- **Many Tasmanian dairy farmers question whether any market benefits of remaining GMO-free outweigh the on-farm value of gene technology innovations**.
- **Recent changes to the Gene Technology Regulations will result in improved on farm efficiencies whilst maintaining the the state's current GMO free status**

SUGGESTED OUTCOMES OF THE REVIEW

- **Any market premium for GMO-free provenance must be substantiated with economic analysis and include examination of which industries benefit. The size of the benefit at the dairy farm gate and/or to dairy farm-level profitability must be accounted for in such an analysis.**
- **Should any market premium exist from the state-wide moratorium on GMOs, this must be weighed against the agronomic benefits that Tasmanian dairy farmers stand to gain from new gene technology innovations in pasture, grains and animal breeding. Conversely, the scale of their disadvantage, should access be denied by an extended moratorium, must be made clear.**
- **If the moratorium is to remain, the review period should be reduced so potential efficiency gains can be measured against market advantages on a more regular basis.**