

GENOME EDITING

DairyBio has rye on the fast track

By KATE DOWLER

RYEGRASS researchers hope genome editing methods used in the DairyBio project will not be considered as genetic modification and therefore not subject to heavy GM regulations.

This is according to DairyBio project leader Noel Cogan who spoke to *The Weekly Times* at an open day at Agriculture Victoria's Hamilton research farm last week.

Dr Cogan (pictured) said the combination of several new breeding methods — aimed at getting better pastures to farmers sooner — was fast-tracking pasture development.

"We are reinventing plant breeding," Dr Cogan said.

"This research, led by Australia and New Zealand, is making us leaders in the world in terms of application of these technologies."

One of the new technologies being explored was genome editing — where breeders can edit or "turn off" certain unwanted genes.

Dr Cogan said the research team hoped the Office of the Gene Technology Regulator, which was currently considering the use of the technology, would not



subject to heavy GM regulations.

"With genome editing, we are hoping that if we... turn a gene off using that technology, we are hoping that will have low to no regulation," Dr Cogan said.

"This (method) is a very precise way of turning the gene off."

The researchers had found they were able to reduce the lignin, or woodiness, of some ryegrass plants and therefore increase pasture digestibility.

Use of the technology could also produce hypo-allergenic grasses where pollen allergens could be removed, he said.

"This is particularly relevant after the thunderstorm of last November in Melbourne," Dr Cogan said. That freak event led to asthma attacks and deaths.

This work is one part DairyBio's research, a five year joint venture between the Victorian Government

and Dairy Australia that began last year.

Meanwhile, the cornerstone of DairyBio's projects — the world's largest precision-planted perennial ryegrass field trial looking at conventionally bred cultivars and FI hybrid grasses — was opened for its first major field day last week.

Hamilton's Agriculture Victoria research farm had 270,000 ryegrass plants in this trial on show and more than 150 dairy and livestock farmers, and service providers from all states in Australia attended.

The ryegrass trial was planted in autumn last year and by the end of next year, researchers aim to have identified elite plants and then have that breeding material transferred to a commercial partner to begin getting the new ryegrasses ready for market.

The researchers involved in this trial have developed ways to use new technologies, such as sensors mounted on drones and ground vehicles, to efficiently measure the quality and growth attributes of the hundreds of thousands of individual plants involved.

DairyBio co-director David Nation said the rye-

grass work was the largest project for the research body and was a joint investment by Agriculture Victoria, Dairy Australia, DairyNZ and Heritage Seeds.

Farmers could expect to see new ryegrass cultivars commercially released by 2023-24.

The field trials at Hamilton do not involve gene technology regulated by the OGTR.

All DairyBio work on gene technologies is in laboratories and glasshouses and is kept separate to the field trials, Dr Nation said. These technologies include genetic modification, under way in secure glasshouses at Hamilton, and genome editing, in the AgriBio Melbourne laboratory.

"By working (with Dairy NZ) we can get this technology to market earlier and build the right-sized project to ensure all technologies can work together: the hybrid breeding method, the use of new sensors to identify elite plants and the use of genomic selection to make DNA-based decisions," Dr Nation said.

Genomic selection involves making a decision on the best plants by studying its DNA makeup.



Ground-breaking: Dairy NZ chief executive Tim Mackle during the DairyBio open day at the Hamilton site where the world's biggest perennial ryegrass trial is under way. Picture: KATE DOWLER

in perennial ryegrass breeding program — a co-investment between Agriculture Victoria, Dairy Australia, DairyNZ and Heritage Seeds.

The project uses a combination of the latest technologies to fast-track progress including hybrid breeding, the use of new sensors to identify elite plants and the use of genomic selection to make DNA-based decisions.

Dr Mackle said the pasture-based production system was an "efficient cost structure" that enabled NZ — which exports 95 per cent of its production — and Australian farmers — who export

40 per cent — to compete against international, subsidised competitors.

Other countries concentrated their research efforts on cut and carry crops, like maize, so Australia and NZ needed to put their research resources together to invest in pasture development.

That work was not being done anywhere else, except some programs in Ireland.

"The Victorian Government's Agriculture Victoria seems to be supportive of the dairy industry and that collaboration is really important," Dr Mackle said.

"In NZ, we do have that

too, but the NZ government is looking for options other than agriculture, and we have a smaller population base, so it is something that we, too, must keep working at to maintain these collaborations; these projects are resource-hungry.

Meanwhile, Dairy Australia managing director Ian Halliday said the Hamilton site was a "hidden jewel" in the field of Australia's agricultural science.

"This is your levies at work," he told the 150 dairy farmers and service providers, who travelled from across Australia for the event.

Push for pasture research

By KATE DOWLER

THE pasture-based nature of Australian and New Zealand dairying was what gave the two countries their "competitive advantage" over other dairy-producing nations.

And that made pasture research vital for the future prosperity of both countries' dairy farmers.

This is according to DairyNZ chief executive Tim Mackle, who spoke at the DairyBio open day at Agriculture Victoria's Hamilton research site last week.

The Hamilton site is home to the world's largest perennial ryegrass field trial.

Dr Mackle said the NZ and Australian dairy farming sectors were "getting much closer" and collaborating more on research and extension.

He said the two countries needed to take control of pasture research initiatives and move them forward. They underpinned "our competitive advantage globally, so it makes a great deal of sense for us to work together".

DairyBio's major project is

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FOCUS FARMS



GippsDairy

Jindivick

Date: September 12, 2017
 Farm Area: 165ha

Production	
Cow numbers	290
Kg milk solids/cow/day	2.09
Litres/cow/day	23.0
Fat %	4.9
Protein %	4.2
Grazing and Supplement Feeding (kg DM per cow)	
Wheat + 8% Canola Mix @ \$273/t or 30.33 cents/kgDM	5.0
Additive @ 32 cents/cow/day	0.34
Pasture (kgDM) approx	13.0
Rotation length	38
Grazing area (ha per 24 hours)	4ha
Daily Income over Supplementary Feed Costs (IOSFC)	
September Milk Price (\$/kg milk solids)	\$4.86
Income/cow	\$10.16
Supplementary Feed Cost/cow	\$1.84
IOSFC/cow	\$8.32
IOSFC/ha	\$14.62

Comments: Wet conditions continue to cause issues on-farm with higher BMCC and pugging at grazing. Cow densities have been lowered per hectare to 73 cows/day to reduce pugging but this results in higher post-grazing residuals. Topping not possible without causing damage, so residuals will be corrected when cut for silage in late September—early October. 80 cows to calve — all on the springer paddock and fed 3kgDM lead feed plus ad-lib low DCAD pasture hay. Milk fever has been a problem particularly in 3-4 year-olds. Magnesium Chloride (MgCl₂) has been added to the springer water trough and a slurry of MgCl is applied to the pasture hay daily.

• The Jindivick Focus Farm will host an Open Day on Friday, September 22 at 335 Main Rd, Jindivick from 10.15am to 2.30pm. All welcome, please RSVP for catering on 5624 3900.

WESTVIC DAIRY
Terang
 Date: September 11, 2017
 Farm Area: 254ha

Production	
Cow numbers	574
Kg milk solids/cow/day	2.03
Litres/cow/day	27.8
Fat %	3.89
Protein %	3.46
Feedbase	
Pellets costing 42.9c/kgDM (\$386/t)	6.1
Rye Grass kgDM	11.6
Straw costing 15.9c/kgDM(\$140/t)	3.0
Area in rotation (ha)	242
Rotation length (days)	45
Grazing area (ha per 24 hours)	5.4
Milk income over supplementary feed costs	
September Milk Price (\$/kg milk solids)	\$4.82
**Income/cow	\$9.78
Supplementary Feed Cost/cow	\$3.09
IOSFC/cow	\$6.69
IOSFC/ha	\$15.12

Comments: The area in rotation has now expanded to 242ha. Silage feeding reduced to 0kgDM/cow/day as grass intakes increase. Straw being fed at 3kgDM/cow/day. The farm has 247 heifer calves weaned. The farm is utilising the cow manager heat detection system and has been joining for nine weeks. Nitrogen applied weekly with a urea/SOA blend at 100kg/ha behind the herd. Some paddocks had been shut for silage early as the season appeared to be taking off, but with the rain these paddocks are back in the round now. The August field day was a great success with 85 people attending.
 # Cost of pasture has not been included. This will range from 10c - 20c per kg DM during the year
 ## Milk price is current announced total package and inclusive of productivity and quality.

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