tia TASMANIAN INSTITUTE OF AGRICULTURE
Dairy Australia Your Levy at Work

Tassie Dairy News

www.utas.edu.au/tia/dairy | November 2017

Inside the newsletter

Avoid mouldy hay

Frank Mickan, Agriculture Victoria and Sam Flight, TIA

Moulds live and multiply by consuming the energy and protein in hay, causing loss of dry matter and nutritive value. Usually, mouldy hay is a result of baling forage when it is too wet.

The life cycle of mould begins in the standing crop. Plant leaves and stem surfaces are covered in bacteria that protect the living plant from fungal and yeast infections. Once mown, the moisture content of plants rapidly decreases resulting in the dominant bacteria and yeasts being outcompeted by a different group of microbes (bacteria, some yeasts and fungi) as the crop continues to wilt.

These micro-organisms multiply feeding off sugars and organic acids emitted from the wilting plant. Once cut, the more rapidly the forage dries, the lower the dry matter losses occurring from fungal growth.

Once the forage is baled another group of fungi and yeasts begin to multiply, especially when moisture content is between 20 percent and 30 percent. These new fungi out-compete the windrow fungi because they grow at lower moisture and higher temperature levels occuring in baled hay.

In storage, the main groups of fungi that grow are *Alternaria, Aspergillus, Cladosporum, Fusarium, Mucor, Penicillium* and *Rhizopus*. Some of these fungi that grow during storage, such as *Aspergillis Flavus*, are known to produce mycotoxins which may cause animal health issues. This risk is minimal or non-existent in hay that has been wilted to recommended moisture levels.

Most hay made will have some mould growth containing mycelium and spores. Mycelium are the stringy growth structures of fungi and the spores are the reproductive structures. The main concern arising from mouldy hay fed to cattle comes from the combined total biomass of mycelium and spores being fed. Spores can also cause respiratory problems in humans and horses. Studies have indicated depressed feed intake for cattle fed hay with high fungal biomass levels.

Forage that is too wet when baled can lose digestibility and occasionally can spontaneously combust. If the heat generated by the bacteria and fungi in the baled hay exceeds 38 degrees Celsius, a reaction between the amino acids in the proteins and plant sugars occurs. This (Maillard Reaction) causes darkening of the hay and loss of quality, becoming less degradable and/or less digestible.

The resulting hay is often referred to as being caramelised and can be recognised by the presence of brown to dark brown material in the centre of the stack or bales. This hay, while very appealing to stock, has lost lots of energy and digestible proteins. If heating caused by the heat resistant bacteria and fungi continues and the heat cannot readily escape from the bales, then spontaneous combustion of the stack can occur.

Continued over page > >

Tassie Dairy News is published monthly by the TIA Dairy Centre as part of the Dairy On PAR project, which is jointly funded by Dairy Australia and TIA.

How do we prevent the mould development and subsequent losses?

Fungi are always present in the pasture, but to minimise the amount of mould growth, it is important to bale hay at the recommended moisture content (Table 1).

Machines such as tedders and mower conditioners will help achieve a faster wilt. Tedding the mown crop as soon as possible after mowing will increase the rate of water loss while the stomata in the leaves remain open. This can reduce the wilting time by at least one to three days, depending on factors such as yield, prevailing weather conditions and the soil moisture.

Various types of hay preservatives are marketed and these work by inhibiting or reducing the growth and activity of the bacteria, yeasts and moulds found in the hay after bailing. These additives do not improve the quality of the original forage but reduce or prevent any further decline in quality caused by microorganisms. They allow the safe baling of hay at slightly above the standard target moisture levels, allowing baling at up to 25 percent moisture, depending on preservative type.

Four main categories of hay preservatives are available: organic acids and their salts, bacterial inoculants, sulphur based preservatives and ammonia-based additives. Some products may also include enzymes, antioxidants and some nutrients.

Table 1. Recommended moisture contents (%) for safe storage of hay in various bale types

Bale type	Moisture content range (%)	Dry matter content range (%)
Small rectangular bales	16 - 18	82 – 84
Round bales (Soft centre)	14 - 16	84 – 86
Round bales (Hard centre)	13 - 15	85 – 87
Large rectangular bales	12 - 14	86 – 88
Export bales	Less than 12	More than 88

Protein Check

Lesley Irvine, TIA

Recent analysis of pasture samples at TIA's Dairy Research Facility (TDRF) has shown the pasture is low in protein. Follow-up tests on a few farms in the Devonport region have shown other paddocks with relatively low levels of crude protein (Table 1). Typically, crude protein levels in pasture that is green and growing are 20-30%, which is higher than cow requirements (Table 2), so these low protein results are surprising.

Keep in mind, these are just rules of thumb, which are a good guide, but in reality, crude protein requirements are more complex to calculate and there are many factors involved. For example, if cows are walking long distances, they partition more energy to walking rather than to milk production, so their protein requirement is lower. Or cows fed a highly metabolisable energy diet have higher crude protein requirements (and in particular, for rumen degradable protein).[1]

Table 1. Feed test results November 2017. Pasture sampled randomly across paddocks cows were due to graze. Samples were taken to a height of 5 cm. Samples were analysed by Agrifood Technology (FeedTest) using NIR.

	TDRF 1	TDRF 2	TDRF 3	Farm 1	Farm 2	Farm 3	Farm 4
Dry Matter (%)	18.0	21.2	19.0	17.3	16.1	22.1	17.6
Crude Protein (% of DM)	15.1	10.3	11.4	20.3	15.3	15.3	22.0
Neutral Detergent Fibre (% of DM)	41.5	42.1	46.2	43.2	50.0	52.2	46.1
Digestibility (DMD; % of DM)	81.1	82.3	76.5	82.2	76.8	71.7	79.8
Est. Metabolisable Energy (MJ/kg DM)	12.3	12.5	11.5	12.5	11.6	10.7	12.1
Fat (% of DM)	3.6	3.6	3.5	4.1	3.7	3.5	4.1

Protein is important for both milk production and liveweight growth. Cows producing milk need 16-18% crude protein in their diet. The standard rules of thumb for protein requirement are shown in Table 2. In general, the more energy that is provided for milk production, the higher a cow's protein requirement.

Table 2 Rules of thumb for crude protein requirements

Stage of lactation	Crude protein requirement
Early lactation	18%
Mid lactation	16%
Late lactation	14%
Dry	10-12%

Before you throw your hands in the air and say "*How are we meant to know how much protein to feed*?" there is some good news. Modelling undertaken by DairyNZ has shown it is rare for milk production to be limited by crude protein levels in pasture-based systems, even if crude protein levels in the available pasture are low. Typically, production is nearly always limited by energy intake. The most likely scenario that results in crude protein levels being too low arises when there are low quantities of pasture available and high quantities of a low crude protein supplement are supplied (e.g. maize

[1] Roche, J. Is protein supplementation needed during summer? Dairy NZ Technical Series, November 2011.

silage). Table 3 shows the results of the modelling undertaken by DairyNZ. It is a fairly complex table so I will take a bit of time to explain it.

Firstly, it covers pasture with three differing energy levels:

- High (11.5 MJ ME) – includes Diets 1-7
- Medium (10.75 MJ ME – includes Diets 8-12
- Low (10 MJ ME) – includes Diets 13-17

The types of feed are listed across the top of the table (pasture, pasture silage, maize silage, PKE and soybean meal) with the amount of metabolisable energy (ME) and crude protein (CP) contained in each feed listed in rows two and three respectively. For example, maize silage has an ME of 10.5 MJ ME/kg DM and 8% crude protein. Rows below show the kg of dry matter (DM) being fed for each type of feed.

The columns after those listing the types of feed are:

- **Ration ME MJ/kg DM** – the amount of ME in each of the diets. Diet 3 contains 8 kg DM of pasture and 8 kg DM of maize silage providing an average of 10.7 MJ ME/kg DM and 10% CP.
- **Ration CP %DM** – the percentage of crude protein in the diet (see above point for an example).
- **Potential MS from energy** – the potential kilograms of milksolids (MS) which can be produced with the amount of energy provided in the diet. If this number is lower (indicated by being red) than the number in the protein column, it means feeding more energy would increase milk production.
- **Potential MS from protein** – the potential kilograms of MS which can be produced with that amount of protein in the diet. If this number is lower than the energy number (indicated in red), it means protein is the limiting factor in the diet and feeding more protein would increase milk production.

Continued over page > >

Table 3. Amount of metabolisable energy and metabolisable protein available for milksolids production when cows are fed different diets (ME-MS – metabolisable energy available for milksolids production; MP-MS = metabolisable protein available for milksolids production). When ME-MS is red, cows will benefit from energy supplements if they do not have enough pasture. When MP-MS is red, the diet is deficient in protein and extra energy will not increase milk production without supplementary protein. (Source: Roche, J. Is protein supplementation needed during summer? Dairy NZ Technical Series, November 2011.)

Ingredient	Pasture	Pasture silage	Maize silage	PKE	Soybean meal	Ration-ME MJ/kg DM	Ration CP %DM	Potential MS from energy (ME-MS)	Potential MS from protein (MP-MS)
ME, MJ/kg DM	See below	10.3	10.5	11	12				
Crude protein, %DM	12	16	8	14	52				
11.5 MJ ME pasture									
Diet 1	16					11.2	12.0	1.47	1.61
Diet 2	11		5			10.9	10.8	1.41	1.40
Diet 3	8		8			10.7	10.0	1.37	1.26
Diet 4	8		6	2		10.7	10.8	1.37	1.32
Diet 5	8	2	4	2		10.8	11.8	1.38	1.45
Diet 6	8		7		1	11.0	12.7	1.42	1.65
Diet 7	8		4	4		10.7	11.5	1.36	1.37
The above scenario is unlikely, as high quality pasture (high ME) will, in general also contain reasonable crude protein levels (greater than 15%)									
10.75 MJ ME pasture									
Diet 8	16					10.4	12.0	1.26	1.61
Diet 9	8		8			10.3	10.0	1.25	1.26
Diet 10	5	3	8			10.2	10.8	1.23	1.20
Diet 11	5	5	6			10.2	11.8	1.22	1.26
Diet 12	5	3	7	1		10.3	11.2	1.24	1.25
10 MJ ME pasture									
Diet 13	16					9.9	12.0	1.12	1.51
Diet 14	11		5			10.0	10.8	1.14	1.28
Diet 15	8		8			10.0	10.0	1.15	1.14
Diet 16	8	1	7			10.0	10.5	1.15	1.17
Diet 17	8		6	2		10.1	10.8	1.17	1.23

Example: A cow fed Diet 3 would be eating 8 kg DM of high energy pasture (11.5 MJ ME/kg DM and 12% CP) and 8 kg DM of maize silage (10.5 MJ ME/kg DM at 8% CP). This would provide an average diet of 10.7 MJ ME/kg DM with 10% CP. The energy in the diet is sufficient for the cow to produce 1.37 kg MS but the protein provided is only sufficient to produce 1.26 kg MS/cow.

If, based on this you decided to add a protein supplement (in Table 3 this is soybean meal) and fed Diet 6 you would be feeding 8 kg DM of high energy pasture (11.5 MJ ME/kg DM and 12% CP), 7 kg DM maize silage (10.5 MJ ME/kg DM at 8% CP) and 1 kg DM soybean meal (12 MJ ME, 52% CP). This would provide an average of 11 MJ ME/kg DM and 12.7% CP which is enough energy to produce 1.42 kg MS and enough protein to produce 1.65 kg MS. In this example, energy is now the limiting nutrient.

Because protein is an expensive nutrient, it is very important to consider the cost:benefit of supplementing with protein. That is, if it costs an extra $1 per cow per day to provide extra protein but you only obtain a benefit (kg MS) of fifty cents, it isn't worth it.

Know what you are feeding

While lower than expected milk production or animal growth rates might be indications that protein levels are too low, there can be other reasons.

Pasture and supplements being used (or that will be used) should be tested. The Dairy Australia website (www.dairyaustralia.com.au) has guidelines on collecting samples, a list of feed testing laboratories and information on understanding feed test results.

If the feed analysis identifies that pasture is low in protein, a decision needs to be made on whether to supplement and if so, what supplement to use. If good quality silage is available, this is often the cheapest supplement. Some crops can also have high levels of protein. Cereal grains, maize silage and palm kernel extract are all typically low in protein. Pellets can be purchased at varying protein levels. Canola meal is commonly used as a protein supplement. Cost of the protein source should always be considered when deciding which supplement is best to use.

Working out how much supplement to add can be calculated manually (see example) or using a diet calculator or ration balancing program. Rumen8 is a free nutrition software package that can be downloaded online. More information about this program is available on the Dairy Australia website.

Example of how to calculate the protein percentage of a diet:

Table 4 Example diet (kg are per cow per day)

	kg as fed	DM%	kg DM	% CP	kg CP fed
Pasture			9	15	1.35
Pellets	4.4	90	4	16	0.64
Silage	5	45	2.25	11	0.25
Total			**15.25**		**2.2**

% of CP in the diet: 2.2 ÷ 15.25 x 100 = 14.4% CP

Pasture
9 kg DM/cow/day, 20% DM, 15% CP

To calculate the kgs of CP
9 kg DM x 15% CP = 1.35 kg CP

Pellets
4.4 kg (as fed), 90% DM, 16% CP

Need to calculate the kgs of DM first
4.4 kg x 90% = 4 kg DM

To calculate the kgs of CP
4 kg DM x 16% CP = 0.64 kg CP

Silage
5 kg silage (as fed), 45% DM, 11% CP

Need to calculate the kgs DM first
3.5 kg x 45% = 2.25 kg DM silage

To calculate the kg of CP
2.25 kg DM x 11% CP = 0.25 kg CP

Total CP = 1.35 + 0.64 + 0.25 = 2.2 kg CP

Total DM = 9 + 4 +5 = 15.25 kg DM

To calculate the CP% in the diet
2.2 kg CP ÷ 15.25 kg DM x 100 = 14.4% CP

Keep in mind, these are just rules of thumb, which are a good guide, but in reality, crude protein requirements are more complex to calculate and there are many factors involved.

Pasture quality and the results from recent feed testing are going to be the focus of the Dairy On PAR Devonport Discussion Group being held on November 30 at Merseylea, all interested farmers are welcome to attend.

And don't forget young stock, they need a minimum of 16% crude protein in their diet to achieve good growth rates. On most farms, pasture forms the largest component of the diet so if pasture drops below these levels, their diet is likely to be deficient in protein.

‘Tis the season – for pinkeye

Lesley Irvine, TIA

Pinkeye in cattle is caused by the bacterium *Moraxella bovis* infecting the eye producing a toxin. The toxin attacks and degrades the surface of the eye and the surrounding membranes causing inflammation.

The disease can affect either one or both eyes. Pinkeye is a very painful condition that causes distress, light sensitivity and can cause permanent blindness if left untreated. While more commonly occurring in calves, any age or class of cattle can be infected. Outbreaks of pinkeye cause financial impact through weight loss, reduced milk production as well as the cost and time spent treating cases.

The disease spans from year to year as infected cattle can become carriers for the disease. For cattle to become infected there needs to be recent damage to the cornea (eye). This damage can be caused by dust, UV sunlight, trauma (e.g. long, stalky grass; hay; bush), or dry conditions. Typically, bacteria are spread between infected and uninfected animals by flies.

Symptoms of pinkeye include:

- Watery eye – often the first sign noticed is the ‘tear trail’ down the face of the animal
- Increased blinking
- Eye is held partly closed as sensitivity to light increases
- A white dot – this is the start of an ulcer forming
- Cloudiness

It is important at this time of year to check animals regularly for pinkeye so they can be treated promptly minimising distress to them and spread to other animals.

Treatments include ointment, sprays and antibiotic injections. Your vet can advise on the best treatment. It is best to avoid powder antibiotics as these can increase irritation of the eye.

A vaccine is available that will protect against some strains of *M. bovis*. The vaccination can reduce the risk of infections but does not totally eliminate the risk. It is still possible for animals to become infected by contact with strains not covered by the vaccine so even vaccinated animals should be checked regularly for pinkeye.

If the vaccine is used, it should be given before the start of pinkeye season, don’t wait until the disease is spotted in the animals. It takes time after vaccination for the animals to develop the antibodies that fight the infection. If you don’t give the vaccine in time to build the immunity, animals will still become infected even if it is a strain the vaccine normally protects against.

Pinkeye is a very painful condition that causes distress, light sensitivity and can cause permanent blindness if left untreated.

DairyTas update

For more information contact DairyTas Executive Officer Jonathan Price, phone 6432 2233, email admin@dairytas.net.au, or go to the DairyTas website: www.dairytas.com.au.

Your Levy at Work

What is happening at DairyTas?

Focus Farm Field Day

Montagu farmers Dave and Jane Field have hosted their first field day as part of the Focus Farm project.

This DairyTas initiative will see the farm followed over the next two years with a strong focus on business performance and the bottom line.

The business has a split calving system, peaking at 1400 cows milked this year in a once per day milking cycle.

The herd is comprised of both Holstein and cross-bred cows. Going forward, the emphasis will be on improving genetic merit and increasing the proportion of cross-bred cows in the herd.

The Fields see this as an important step as they focus on increasing pasture utilisation while adapting to the once a day milking system.

The business has been in a growth phase for the past two years and entered the project with the aim of maximising the use of homegrown feed from the property and improving their work-life balance.

Information on the project including upcoming field days can be found online at

www.facebook.com/TasFocusFarm/
or www.dairytas.com.au/projects/focus-farm/

DairyTas AGM

The DairyTas AGM was held during November at the Hagley School Farm. Outgoing board members – Simon Bennett, Cherrylyn Ker and Greg Bott – were thanked for their contribution, both to the organisation and to the Tasmanian dairy industry. Three new board members were welcomed:

- **Angelique Korpershoek** – dairy farmer from Forest in Circular Head
- **David Risbey-Pearn** – manager of Agrilac's Oxberry Dairy at Waterhouse near Scottsdale
- **Josh Taylor** – Chief Financial Officer and Company Secretary, The Van Diemen's Land Company

A copy of the 2016-17 DairyTas annual report is available on the DairyTas website.

A tour of the school farm took place following the AGM. DairyTas has supported the development of a dairy demonstration shed – where students are able to watch a cow being milked and learn more about the dairy industry through interactive displays and activities. Over 5000 students from across Tasmania visit the school farm each year.

Taking Stock 1:1 consultations available

Now may be a good time to have a consultant come and review your farming situation under the Taking Stock program. A limited number of Taking Stock visits will be available to farmers across the state. Farmers will have access to one Taking Stock visit, for their farm, for the season.

If you are interested in receiving some free support for your business please contact Liz Mann on 0428 121 655 or email emann@dairyaustralia.com.au.

Above: DairyTas Board (L-R) Jonathan Price, Richard Rawnsley, Josh Taylor, David Risbey-Pearn, Symon Jones, Wolfie Wagner, Duncan Macdonald, Angelique Korpershoek, Simon Elphinstone.

Right: Hagley School Farm Dairy Demonstration Area

Ringarooma crowned 2017 LEGENDAIRY Capital of Australia

The search started in early February 2017, to find and recognise Australia's LEGENDAIRY towns. Stories were shared from Beaudesert to Berry, Cowaramup to King Island, as well as everywhere in between.

Nine months later, the search is over. Australia's LEGENDAIRY Capital for 2017 is Ringarooma, in the heart of Tasmania's north-east.

Home to just 232 people, the town is the second national LEGENDAIRY Capital to be announced as part of Dairy Australia's search for the nation's most inspiring and connected dairy towns.

Dairy Australia's Managing Director, Ian Halliday, said the nominations received highlighted the enormous pride regional communities felt for their town and local dairy industry.

"It's important we continue to recognise hard working dairy farmers and their families and the contribution they make to their vibrant communities, the dairy industry and Australia's economy, Mr Halliday said.

"It is clear from Ringarooma's nomination that they're an inclusive community that's passionate about dairy farming and committed to sharing dairy's story with the next generations."

Known as the heart of family farming in the Dorset municipality, Ringarooma has a strong dairy farming history dating back to the 1860s when the land was first cleared for farming. After a property subdivision in 1882, the community was born. The town was initially called Krushka Town, after the original landowner and was renamed Ringarooma in 1888.

An event was held at the Ringarooma Show for the community to celebrate becoming the 2017 LEGENDAIRY Capital.

As the LEGENDAIRY Capital of Tasmania, Ringarooma received a $2,500 community grant to renew recreational areas of the Ringarooma primary school, as well as extending the school's vegetable garden and maintaining the town's defibrillator. The town will now receive an additional $7,500 to help restore the primary school's historical dairy to help connect students with the local dairy industry.

DAIRY DIARY 2017/2018

December

2 Dec: Young Dairy Network Pre-Christmas Dinner and NZ Study Tour presentation, North East (DairyTas)

5 Dec: Southern and Northern Midlands Discussion Group, Ouse (DairyTas)

5–6 Dec: ChemCert, Launceston (TasTAFE)

6 Dec: Young Dairy Network Pre-Christmas Dinner and NZ Study Tour presentation, Circular Head (DairyTas)

6 Dec: TIA Open Day, TIA Dairy Research Facility (TDRF), Elliott (TIA) POSTPONED UNTIL FEBRUARY 2018

7 Dec: Robotic Milking Systems Discussion Group, van Adrichem's, Togari

8 Dec: Young Dairy Network Pre-Christmas Dinner and NZ Study Tour presentation, Southern Tasmania (DairyTas)

12 Dec: Legendairy Women's Discussion Group, North East (DairyTas)

12–13 Dec: Beyond 8 Steps Program, Deloraine. Contact Nicki Hayward 0477 334 080 (No.8HR)

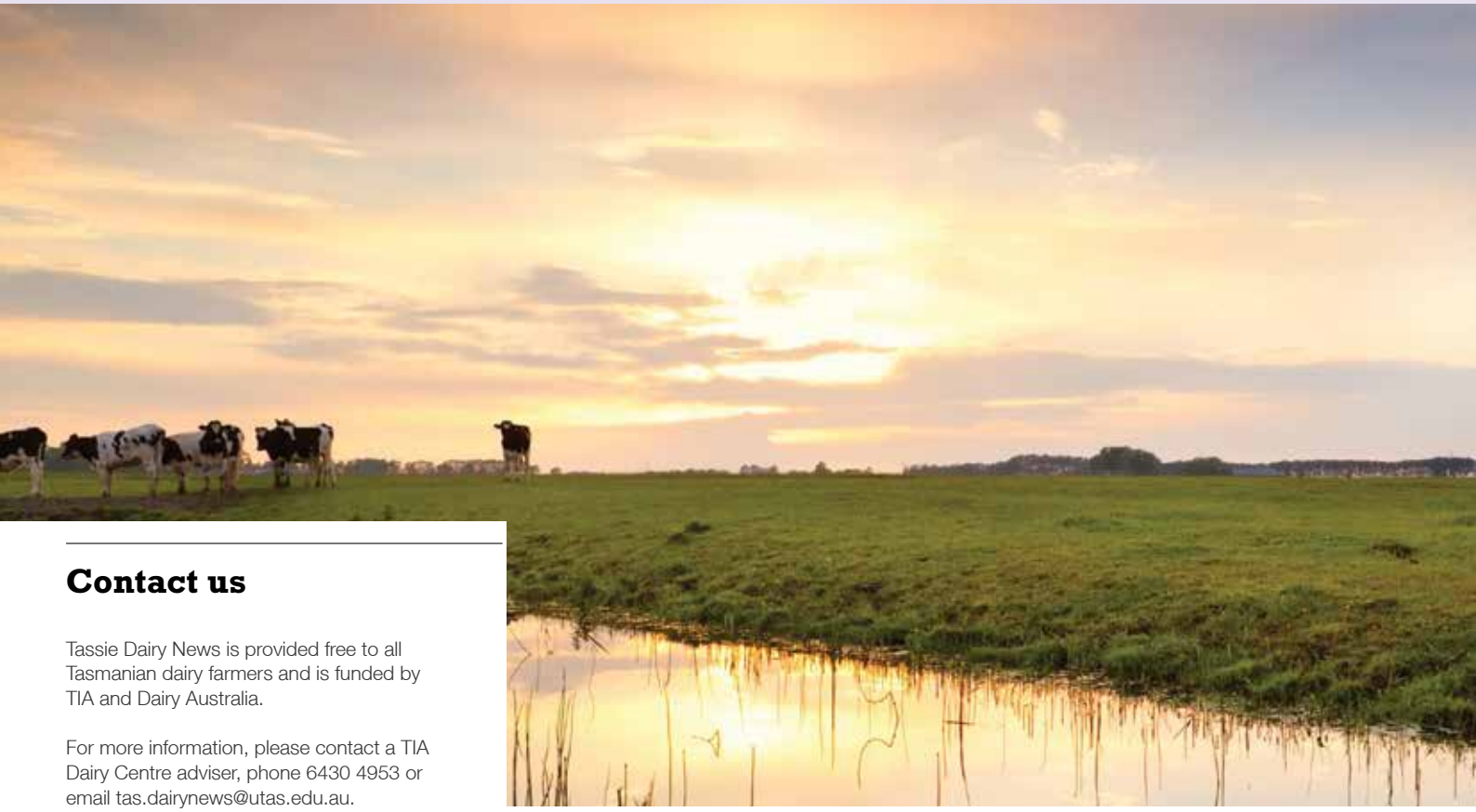
12–13 Dec: Small Business Finance, King Island (TasTAFE)

2018

13–15 Feb: Australian Dairy Conference, Melbourne

14 Mar: Tasmanian Pre-Conference Tour, North East Region

15 Mar: Tasmanian Dairy Conference and Dinner, Launceston Country Club Casino



Contact us

Tassie Dairy News is provided free to all Tasmanian dairy farmers and is funded by TIA and Dairy Australia.

For more information, please contact a TIA Dairy Centre adviser, phone 6430 4953 or email tas.dairynews@utas.edu.au.

Electronic copies of this newsletter are available at www.utas.edu.au/tia/dairy.

DairyTas | Dairy Australia
Your Levy at Work

tia TASMANIAN INSTITUTE OF AGRICULTURE

TasTAFE | Dairy Australia National Centre for Dairy Education
Your Levy at Work

UNIVERSITY of TASMANIA | Tasmanian Government

TIA is a joint venture of the University of Tasmania and the Tasmanian Government

@TasInAg
@TIADairy

TasInAg

DairyTas (03) 6432 2233
TIA (03) 6430 4953
TasTAFE 1300 655 307
Agritas (03) 6415 4100