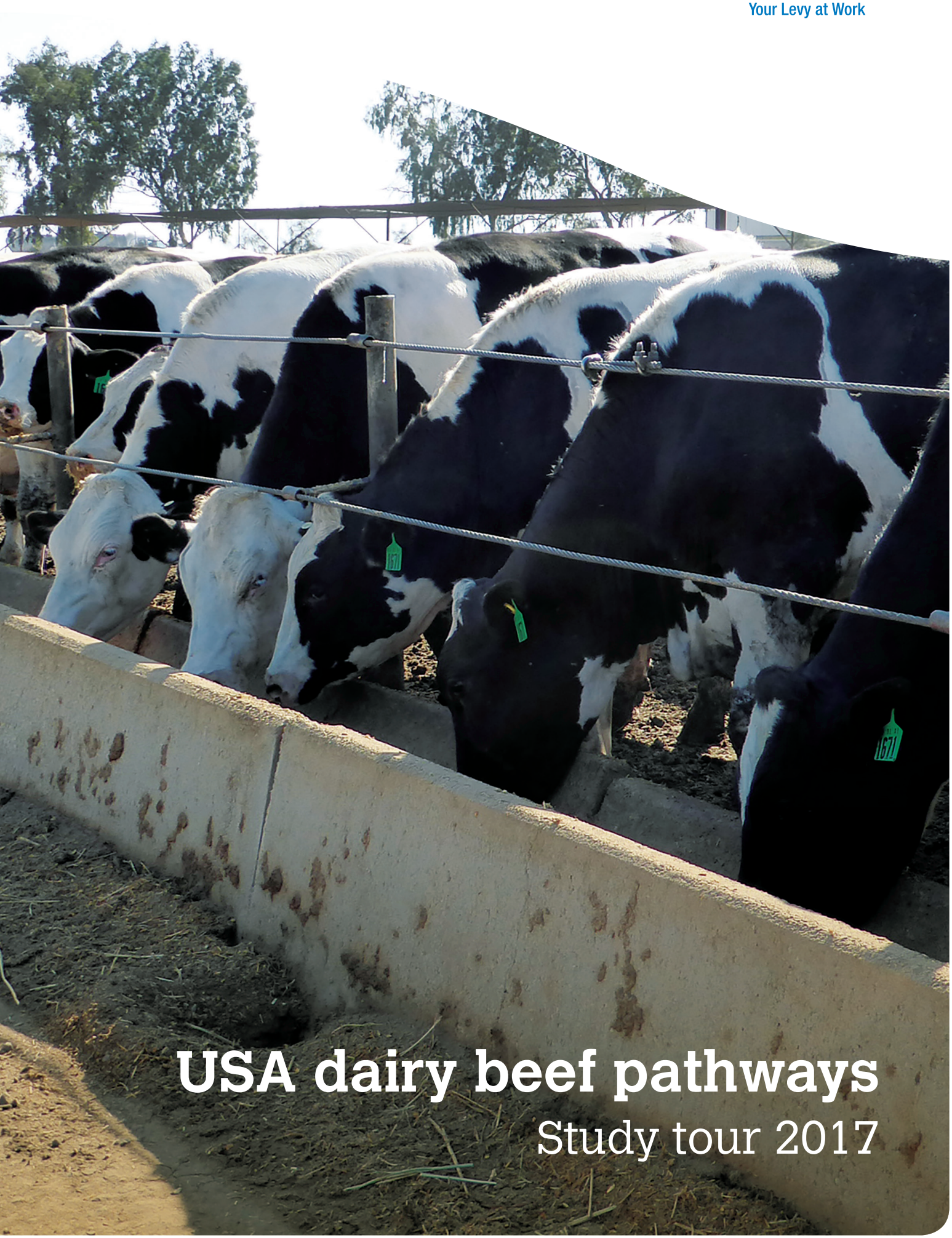
Dairy Australia
Your Levy at Work



USA dairy beef pathways

Study tour 2017

Background

The Australian dairy industry is supporting the development of more profitable and sustainable pathways for surplus dairy calves. A peer review study of the well established dairy beef supply chain in the United States of America (USA) was conducted to inform our industry about options for rearing and marketing calves for veal and beef production.

The production of dairy beef requires specialist production systems and produces an animal with different carcass specifications to traditional beef breeds. With the goal of improving the knowledge and skill base of industry, Kathryn Davis (Dairy Australia's Program Leader for Animal Health and Fertility) arranged for collaboration between industry representatives to investigate and study pathways for dairy beef in the United States. The principal aim of the tour was to explore ways to improve the management and utilisation of male dairy calves in Australia. This report documents the insights gained from visits to research leaders, farm businesses and processors involved in the dairy beef supply chain in Texas, California and Wisconsin during September-October 2017.

To gain a broad picture of the USA industry, the participants visited three dairy farms, four calf rearing ranches, two beef feedlots, one milk-fed veal producer and three meat processing works across the three states. They held meetings with academic staff at two universities, a specialist extension service provider, a genetics company and also visited a high-end steak restaurant serving 100% Holstein beef.

Participants on the USA tour and co-authors of this report were:

- Dr Sarah Chaplin – Dairy Development Specialist – Animal Performance, Agriculture Victoria. Specialist expertise in biosecurity, animal behaviour and welfare, social license, risk management and regulation.
- Peter Havrlant – Development Officer – Dairy, NSW Department of Primary Industries. Awarded the Jack Green Churchill Fellowship 2016. Experience in beef feedlotting, business management, agriculture markets, commodity trading and agribusiness banking.
- Dr Jamie McNeil – Veterinarian and Dairy Australia Project Leader – Healthy Calves project. Specialist expertise in calf rearing and animal health.
- Jessira Perovic – Project Officer – Eating Quality Data Analytics, Meat and Livestock Australia. Specialist expertise in meat quality and markets.

2016 CHURCHILL FELLOW

mla MEAT & LIVESTOCK AUSTRALIA

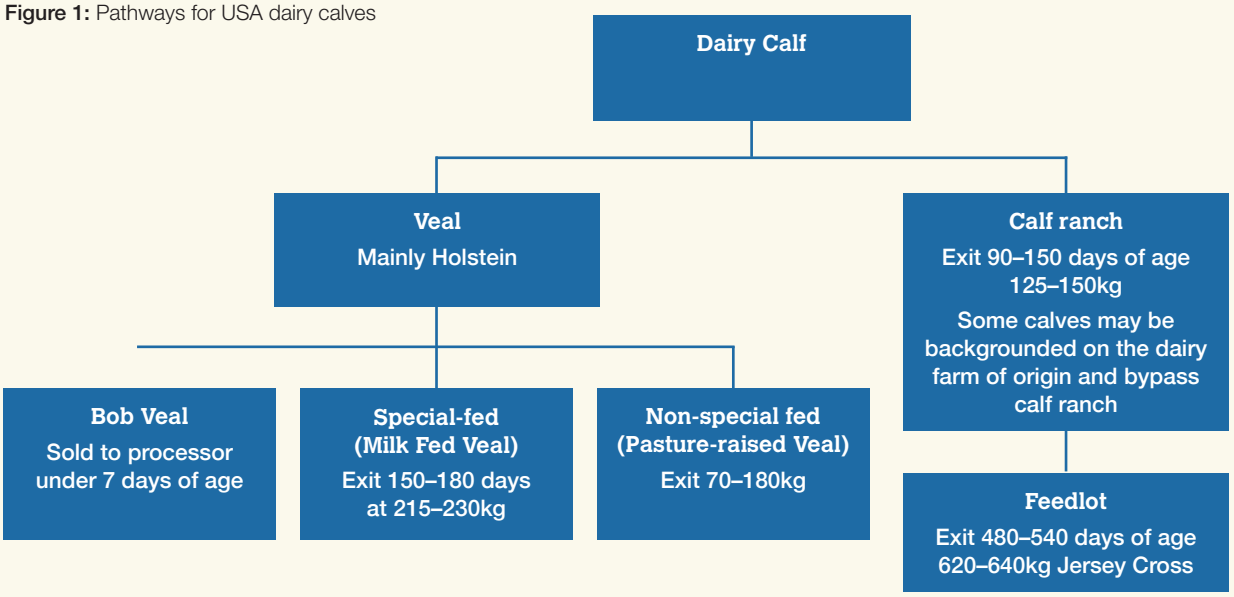
NSW GOVERNMENT Department of Primary Industries

AGRICULTURE VICTORIA | Economic Development, Jobs, Transport and Resources

USA Pathways for Dairy Beef Calves

There are two possible markets for dairy beef calves in the USA: veal and dairy beef (Figure 1).

Figure 1: Pathways for USA dairy calves



Veal

Veal farmers purchase dairy calves (primarily male Holstein calves) within their first week of life at around 45–50kg liveweight. The industry has structured leadership and an established quality assurance system. Veal production systems can be split into three distinct production systems:

Special-fed (Milk-fed) veal: Special-fed veal calves (also known as milk-fed and formula-fed veal calves) are fed nutritionally-balanced milk or soy-based diets. Iron levels are carefully monitored throughout the process to achieve a standardised end product. The industry is well organised and governed by the American Veal Association. The majority of veal calves in the USA are 'special-fed'.

Non-special-fed (Pasture-raised) veal: Non-special-fed veal calves are fed a variety of diets, including milk replacer, grain and forages. They are typically marketed at lower live weights.

Bob veal: This is a poorly regulated and monitored pathway for dairy calves in the USA. Calves that are too light weight or deemed not suitable for rearing are directed to this processing path. It was reported that these young calves could be transported significant distances to reach their markets. Most calves are slaughtered under seven days of age with a lesser quality and value veal end product. Approximately 15% of all USA veal production is bob veal.

Calf ranch and feedlot

Calves arrive at either large or small-scale operators and are reared on milk for around 60–70 days, weaned and fed for another 60–70 days before moving to a feedlot. Average time in the feedlot is approximately 360 days with a range of approximately 340–380 days. Jersey cross calves may require longer time on feed. The objective is to turn off at between 15–18 months of age.

General observations

Labour and costs

Low costs of labour and production, have enabled profitable dairy beef facilities to be developed on a large scale. Employment conditions for their workforce are now improving, although still not generous by Australian standards, with an increase in the minimum wage and a reduction in the working week. This was seen as a challenge to the future of the dairy beef industry by many operators. General costs of operation were also low by Australian standards for key items such as feed, transport and animal health supplies. This further enhanced the profitability of these operations though margins are slim.

Training

Many operations employed veterinarians, with qualifications not recognised in the USA, as herd managers enabling high levels of herd health management. With a heavy reliance on employed labour, the operations that we visited undertake a lot of in-house training using packages produced by industry bodies or pharmaceutical companies. Emphasis was on stock handling and safety for staff.

Sources of information

Consultants played a significant role in the operations visited. Nutritional consultants and veterinarians made weekly visits to monitor progress against set indicators. Animal welfare consultants were also involved with many farms. Pharmaceutical companies input was also highly valued though incentive programs may be an influence.

The tour group at Texas Tech University Research Station

Biosecurity

Biosecurity was not considered a major concern through the chain. There was an acceptance that Bovine Respiratory Disease (BRD) was endemic in their systems and required managing rather than prevention. Animal identification and traceability have been slow to gain traction in the USA. The current Animal Disease Traceability (ADT) system provides traceability for interstate movements (unless to a processing plant or specifically exempted) but not for movements within a state.

Social licence and animal welfare

A number of businesses that we visited had first hand experiences with animal rights activists. Many operations kept tight control over images taken of their operations, although conversely, one feedlot was located in full view of the freeway and manages perceptions by giving people a fantastic eating experience close by. Across all businesses, staff training in animal handling was a high priority.

Key findings

Dairy farms

Breed choice

The majority of dairy beef in the USA is derived from either Holstein or Holstein beef cross calves. There was little enthusiasm for a straight Jersey calf as a beef animal, although some producers considered Jersey x beef cross calves as viable. Examples of Jersey x beef crosses that we saw which performed well in the feedlot were Limousin, Angus and Stabilizer, a multi-breed composite. A beef cross breeding program for dairy breeds helps to compensate for issues such as lower rates of gain, poorer feed efficiency, reduced meat yields and dairy conformation discounts. Dairy farmers that supply the dairy beef market make strategic reproductive and management decisions to optimise their returns.

Reproduction management

The availability of the dairy beef pathway for calves has seen USA dairy farmers change and adapt how they have traditionally managed reproduction in their herds. Reproduction management is not solely focused on the milking herd as dairy beef is considered an important aspect of the overall farm business. Selection of beef sires is not random. Semen companies promote particular beef-on-dairy bulls to complement characters of the particular dairy breed. In this way, the breeding of dairy beef takes as much planning as the dairy side. Use of whole herd genomic testing was common. Based on this information, and factoring in other issues such as age and health, animals are either bred to dairy or beef sires. Sexed dairy semen was used to reduce the number of bull calves.

Calf rearing

Calves can be between 1–7 days old when they leave the farm and within the federal 28-hour law, cattle are permitted to be transported for up to 28 hours.

Herd vaccination programs and individual clean maternity pens are provided taken to ensure healthy calves. The four key principles of colostrum management 'Quickly', 'Quantity', 'Quality' and 'Cleanliness' are embedded in every dairy's colostrum management protocols. Some farms use immunoglobulin supplements to achieve even higher quality. Selling calves via video sales is a common practice that has significant influence on prices. In California, the going price for a good Holstein calf at one day of age was AUD$130 though demand and supply effects can see this price drop to AUD$30.

Special-fed veal

Veal production occurs on a much bigger scale in the USA than we see in Australia. Most veal calves enter the small but well-structured Special-fed/Formula Veal industry where calves are fed milk-based products and grain with the goal of producing a high-quality veal product. (Non-Special Fed veal production was not studied on this trip).

While traditional European white veal production has very negative welfare connotations, the USA is building the credentials of their veal as an ethically reared product. Calves have restricted iron intake to maintain a light pink meat colour, but not to the extent of inducing anaemia.

Nutrition

Calves are fed a high milk solid intake. Milk replacer is used, fortified with whey and other milk-based products. Desired total solids is 12.5%. Grain intake over the five month period varies but ranged between 25–115 kg/head. Pasture is not fed and iron intake is carefully controlled. All animals have haemoglobin levels checked at six weeks and then 10% are sampled every fortnight following to monitor iron levels. If not at acceptable levels, iron supplementation is commenced.

Health

Calf scours are a common problem in the first 14 days and are treated with oral or intravenous fluids. Respiratory disease is seen at around 3–5 weeks of age. No prophylactic antibiotics are fed but antibiotics are relied upon to treat BRD. Tail tip injury is commonly reported due to tails dropping through slats in flooring and being stood on by other animals.

Housing

Veal calves are housed for life but given limited space. Individual pens are used initially. Some producers allow groups of two to four calves by removing a pen separator. Pen size allows for 1 m^2/calf. At 5 weeks, calves are moved to a larger facility where they are grouped in pens of around eight calves allowing for 1.5 m^2/calf. Wooden pens are used to minimise the risk of increasing iron intake from metal rails. Positive ventilation and automatically activated, temperature-controlled sprinklers are common.

Animal welfare

No castration or dehorning is undertaken. An industry-driven voluntary phase-out of tethering was introduced and is now nearing 100% compliance.

Conclusions

Veal calf housing conditions observed would not be acceptable under Australian animal welfare standards.

Key findings

Calf ranches

Large scale calf rearing facilities are commonly owned by a group of farmers or a larger company. Some larger dairies diversify and run dairy beef as another enterprise, utilising established infrastructure and feed resources to minimise costs of production. During the rearing period at the ranch, calves are fed milk then transition onto grain-based rations.

Nutrition

Milk feeding is undertaken for the first 60–70 days of life. Surplus milk, mostly from fresh cows and hospital cows is commonly sourced from surrounding dairies or milk factories. It is common practice for all milk to undergo pasteurisation prior to feeding. Excellent hygiene of milk feeding equipment is practised with systems also in place to monitor bacterial counts and coliform counts of milk fed to calves.

The volume of milk feeding ranged from 10–15% of bodyweight. Long-term feeding of high milk volumes is uncommon. The most profitable approach is to have calves weaned at 60–70 days of age. Every ranch carefully monitors the total solids fed daily, limiting the incidence of gastrointestinal problems such as abomasal bloat and scours. Skim milk powder, whey, fat and lactose are commonly added to achieve a consistent daily total solids for each calf with high precision. The range of total solids in milk fed is 11–15%, varying by season, with consistency being of the utmost importance. Farms feeding higher total solids levels intake gradually transition calves onto this ration over a few weeks. It is commonly reported that feeding beyond 16% total solids is not cost effective.

Weaning is a gradual process involving reductions in milk volume and/or total solids fed. After weaning calves are offered rations tailored to each operation and available feed stuffs. Core ingredients vary from region to region but pellets, grain, cotton trash, corn and short stalk hay are common components. Protein percentages of rations are similar across farms and ranged from 21–23%.

Health and husbandry

Total protein measurements of calf serum are commonly undertaken to monitor the passive transfer of immunity. Ranch managers provide feedback to source farms on their calf morbidity, mortality and protein levels and penalties may be imposed if failing to meet set standards.

The major health issues seen are scours, mostly in younger calves, and BRD or pneumonia in older calves. Reported mortality rates are typically under 5%. Morbidity rates, particularly in relation to BRD, are high. Disease treatments are all based on protocols developed with their veterinarians. Treatments including intravenous fluids are administered by trained staff. Antibiotics are used both therapeutically and prophylactically. Mass medication through the addition of antibiotics to milk is practised.

Vaccination is a major component of animal health management particularly in relation to BRD. Vaccination schedules varied from farm to farm and appeared to lack a strong scientific basis. Many of the vaccines provide protection against multiple pathogens and calves receive multiple injections. Vaccination is used strategically at times of high risks such as when moving calves to group pens. Vaccinations are cheaply priced at US$0.10/dose.

The most common method for disbudding is via the use of caustic paste within a few days of arrival at the calf ranch. Castration is carried out at between 1–30 days of age via either banding or physical cutting.

Housing

Calves are housed individually until weaning in wooden pens or plastic calf hutches. The wooden pens are smaller than acceptable under Australian animal welfare standards. Plastic hutches have variable internal size and external penned areas but more closely fit our welfare standards. Hygiene and maintenance of hutches occurs on a regular schedule, aided by the mobility of the infrastructure. Bedding materials used in plastic hutches vary depending on climate and weather conditions. Sand is commonly used in summer and straw in winter due to its better thermoregulatory properties. Individual penning allows for a very high standard of disease management. After weaning, calves are transferred into group housing. Increased rates of BRD are commonly observed at this time.

Calf hutches (California)

Calf hutches (Texas)

Key findings

Animal welfare

A strong focus on animal health and welfare is evident. There is considerable investment in staff training to ensure optimum standards of animal welfare and husbandry are met at all times. This industry has become well aware of the cost of failing to meet the expectations of the US public.

We observed a high incidence of oral stereotypies such as tongue rolling, repetitively mouthing pen fittings and cross-sucking in young calves and older cows which appears to begin at calf rearing stage. The scientific literature indicates that ruminants may have a behavioural need to perform a certain amount of oral behaviour and it is generally accepted that the presence of oral stereotypies is indicative of poorer welfare. The oral stereotypies do not appear to be detrimental in themselves and producers that we spoke to felt that they are more prevalent in Jerseys.

Conclusions

Individual calf housing during the first 14 days of life offers advantages for quarantine and limiting spread of infectious diseases. Plastic hutches with an open pen at the front provide greater space per calf than wooden pens and could meet our minimum welfare standards. Public acceptance of a large installation of plastic calf hutches may be a challenge. The management of respiratory disease would need to be a major consideration in the design of Australian systems.

Feedlots

Feedlotting is the predominant beef production system employed in the USA. Dairy beef animals enter traditional feedlot enterprises and are managed similarly to beef breeds. Cattle may be moved interstate to feedlots for climatic and economic reasons.

The profit margins quoted were around US$123 for a Choice quality carcass and US$153 for a Select quality carcass.

Nutrition

Ration ingredients reflect locally accessible products. Stock start on a low grain/high roughage ration and transition to a high grain/low roughage ration over a period of around 100 days. Hormonal growth promotants (HGPs) are widely used. Implants are applied on two occasions during the feedlot phase. The most widely used implants contain trenbolone acetate and estradiol. A beta-agonist, ractopamine, is fed in the last month to further increase the rate of weight gain, feed efficiency, ribeye area and red meat yield.

Health

BRD was a significant health issue in the feedlots visited. There are significant differences in deaths and culls for Holsteins compared to beef breeds. For example, one feedlot indicated 6–8% ‘outs’ for Holsteins compared with 1–2% for beef breeds. This could be attributed to:

- Holsteins being more inquisitive and so more likely to try to move through or over fences. This results in a higher number of physical injuries than beef breeds.
- Liver abscesses being more common in dairy animals, particularly in Texas, with the cause as yet unknown, although possibly linked to the time on feed.

Extensive vaccinations schedules are in place, mainly focusing on BRD. The low price of vaccines in the US makes this approach a relatively cost-effective disease management strategy. Documented treatment protocols for BRD and other health problems are applied and there is a heavy reliance on antibiotics to limit the impact of BRD on animal health and performance.

Housing

Dairy beef animals are commonly housed in feedlots pens the same as used for beef cattle. However, they are usually penned separately from ‘native’ beef cattle. Some modifications to fencing are required to limit the number of physical injuries. Most feedlots we visited, but not all, had adequate shade provided.

Animal welfare

Tongue rolling and other stereotypic behaviours occur in feedlot animals but are not confined to dairy breeds. Whilst there is no legal requirement to have a heat stress management strategy in place, a number of practices were employed at one large feedlot that we visited. These included ration formulation, shade structures and sprinklers which were used at night to enable cattle to shed heat load but not during the afternoon (when they might increase humidity).

Conclusions

US beef feedlots have a high reliance on HGPs to promote feed conversion efficiency and carcass yield. In Australia, the use of HPGs may restrict access to some markets, while the use of beta-agonists is not permitted. Feedlotters also rely on low cost vaccinations and antibiotics to maintain animal health. Dairy beef animals within feedlots may be more susceptible to injury and disease than their beef bred counterparts. Heat stress also needs to be well managed within feedlots.

Key findings

Retailers (butchers & restaurants)

The USA beef industry takes pride in their quality yield grading system that determines retail beef value. Restaurants and fast food chains tend not to promote products based on the origins of the beef beyond being lot fed. While quality grading supports high value meat products, ground beef accounts for the majority of beef consumed in the USA. As culled dairy cows and younger dairy animals reared for beef are significant sources of ground beef, it was estimated that over half the volume of beef consumed by Americans originates from dairy bred animals, although consumers are largely ignorant of this provenance.

Processors

Dairy beef is discriminated against by processors around the world due to a noticeably lower carcass yield, poorer muscling and different dressing percentages when held by meat compared to 'native' beef.

However, dairy beef has the potential to achieve high-quality grades due to an increased expression of intramuscular fat (marbling). Dairy carcasses produce a smaller steak which is suitable for some consumer market segments.

The USA quality grading system ranks the entire carcass based on various carcass attributes, with particular reference to maturity and intramuscular fat. The dairy-bred carcasses, while yielding lower at a 1 or 2 on a scale of 1 to 5, meet a Prime or Choice quality grade 70–75% of the time. The remaining carcasses meet a Select quality grade which is similar to the quality required for our supermarket trade. At the time of the tour, processors were paying USA$1.90/lb resulting in a total price of approximately USA$2,660 for a 1400lb live animal.

Given the time on feed and use of multiple implants, it is hard translate the USA meat quality grading into the Meat Standards Australia grading system. However, it is estimated that excluding the deduction for implants in Australia, the longer fed animals were dressing out to a quality similar to the top 25th percentile of Australian beef.

There were major challenges observed in the processing of dairy beef. One particular issue relates to the handling of the carcass. Fully grown out dairy carcasses have different dimensions to their beef counterparts possessing longer frames with narrower bones. They have the potential to drag on the processing floor or chain which would be unacceptable under Australian food safety standards. Most processors routinely dealing with dairy cattle are equipped with longer and higher chains however for those that were not well equipped, the drag factor slowed the chain.

The body conformation can also affect of dairy animals can also affects processing chain efficiency. It was generally considered the difference in Hot Carcass Weight (HCW) yield between grain feed dairy and beef carcasses was acceptable. The lower red meat and high-value cut yields were offset by higher quality attributes. However, on a live weight basis, dairy beef carcasses yield considerably less on an HCW basis due to their larger gastro-intestinal tract capacity. This is equivalent to processing lighter cattle, which occupy capacity on the kill chain for less yield and total beef processed at the end of the shift. At the time of the tour, a major processor stopped accepting Holsteins into their plants as they were able to preferentially source beef breeds. Jersey cattle are even less desirable given their lighter, smaller carcasses and low meat yield on HCW basis.

However, one of the largest USA processors has set up certain plants with the infrastructure to cater specifically for dairy animals. Processors that take both dairy and beef breeds overcome these issues through a variety of actions. Some ensured dairy bred cattle were put through in batches throughout the day or their heads were removed early on the chain, adding an extra labour unit. Plants with flexible chain and processing platform heights assigned certain shifts or days for dairy beef.

Conclusions

Australian dairy beef producers will need to overcome some misperceptions of dairy beef quality held by meat processing companies. Special design of processing chains may be required for dairy beef.

Recommendations

A profitable Australian dairy beef industry will look very different to the USA systems studied, due the marked differences in scale, input costs, welfare regulations and markets. However, Australian producers could learn from the USA dairy calf rearing systems in a number of areas including:

- written protocols for treatment and vaccination of animals
- precise record keeping to monitor animal performance, reduce input costs and improve efficiency
- outsourcing of calf rearing to specialised calf growers
- improved colostrum management practices
- pasteurisation and standardisation of calf milk to maintain a consistent total solids intake.

The key issues observed in the USA system which would most likely be difficult to apply or unacceptable in Australian systems include:

- lower wages and longer working hours
- lower input costs for feed, transport and energy
- heavy reliance on hormonal growth promotants
- extensive use of vaccination and non-therapeutic use of antibiotics
- highly confined systems of calf rearing associated with behavioural issues and other health and welfare risks
- rearing pre-weaned calves in large scale ranches
- long periods of grain or high cost/ input feeding
- availability of suitable processing chains.

Notwithstanding these challenges, we identified a number of opportunities to develop dairy beef and veal production in Australia and add value to surplus male dairy calves:

- adopt a whole of supply chain approach to developing new markets for dairy breeds
- identify potential profitable and sustainable markets for products of dairy provenance
- challenge consumer and processor perceptions that breed is the major determinant of beef quality
- develop the market for welfare-friendly veal, with emphasis on meat tenderness and unique flavour
- increase the use of sexed semen and use beef breeds over late calving or lower genetic merit animals to produce a more valuable calf
- develop efficient systems of calf rearing on scale, compatible with our higher labour and input costs and community expectations
- improve our understanding of the nutritional requirements and performance of dairy beef animals under Australian feedlot conditions
- conduct research into pasture-based finishing systems that could offer efficiency and better public acceptance than feedlots.

Acknowledgements

The authors gratefully acknowledge the sponsors of the tour: Agriculture Victoria, Dairy Australia, Meat & Livestock Australia, New South Wales Department of Primary Industries and the Winston Churchill Memorial Trust. Most importantly, the tour group would like to thank the many farmers, business owners, managers, researchers and field staff who welcomed the tour onto their premises and generously gave their time to share their experience and knowledge.





Dairy Australia
Your Levy at Work

Dairy Australia Limited ABN 60 105 227 987
Level 3, HWT Tower
40 City Road, Southbank VIC 3006 Australia
T + 61 3 9694 3777 F + 61 3 9694 3701
E enquiries@dairyaustralia.com.au
dairyaustralia.com.au

1350 | May 2018