THE HIGHS AND LOWS OF RECORDING CALF AND CALVING TRAITS

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SUMMARY

Centralised recording of calf identity, pedigree, treatments and health events are essential to the development of evaluations for calf traits so that farmers can breed for lower morbidity and mortality. Additionally, these same records help to inform decisions that 1) improve calf management protocols, 2) provide access to premium markets for surplus stock that demand evidence to support raising claims and 3) provide industry with greater insight of the health and welfare of young animals that is important in sustainability reporting activities. Farmers have recorded calf and calving traits for more than 30 years, but the frequency of recording is changing based on an analysis of almost 4M Australian calving records. In general, about 20% of herds in Australia and 10% of calvings are recorded with calving traits in the national database. The number of herds as well as recorded herds has declined over time but the number of herds with good calving records has declined at a slower rate. There are opportunities to improve the quality and quantity of calf trait data by lifting recording practices, improving connectivity between on-farm software and populating missing pedigree through genotyping.

INTRODUCTION

Producers and consumers share a deep interest in the welfare of calves. Calves that are born alive and with ease contribute to a sustainable dairy industry. Industry standards, quality assurance programs and animal raising label claims increase requirements for farmers to record and analyse animal health data (Animal Health Australia 2016; Saputo Dairy Australia 2022/23) of which calving traits are a component. Calf records are a valuable resource to farmers as they inform changes to herd management practices that lift productivity and sustainability. Dairy farmers have recorded calf health and calving traits for more than 30 years in Australia on a voluntary basis. Farmers are obliged to record the movement of an animal when it leaves their property through the National Livestock Identification System's (NLIS) central system, but NLIS devices simply record the property where the animal originated without any description of the animal's identity, breed or age (NLIS 2016). Current stores of calf data are the direct result of farmers willingly recording and sharing calf data, rather than through legal obligation. The aim of this study was to report trends in calf and calving traits over time and suggest opportunities for improved practices that will increase the monitoring and genetic improvement for calf survival and other traits affecting calf welfare.

MATERIALS AND METHODS

Farmer recorded calving and pedigree records were obtained for calvings with a calving ease observation that occurred from 1/1/1990 to 3/2/2023 as well as sire identity information from DataGene Ltd, Melbourne, Australia. These records can be defined as 'well-recorded' calving records which differ from more numerous calving records where only the dam's identity and calving date are recorded. Well-recorded calving records include dam identity, breed, pedigree, calf fate, calf sex, calving ease, calf size and litter size. Nonsensical calving records were removed e.g. if the calving date occurred before the dam's birth date. Using R Studio, data was grouped by calving year

and then total counts, percentages and means were calculated to better understand trends over time (RStudio Team 2021).

RESULTS AND DISCUSSION

In 2022, 1 in 5 dairy herds recorded traits such as calf fate, calf size and calving ease using a system that supplies data to Australia's centralised data repository but 1 in 10 Australian dairy cows had a well-recorded calving event in the same year. The number and percentage of herds with well-recorded calvings between 1990 and 2022 is shown in Figure 1. At its peak in 2000, 1,926 herds with 128,821 calvings were well-recorded, which was 49% of recorded herds and 23% of all dairy herds in Australia (Australian Bureau of Statistics 2004). Twenty years later, 134,513 cows from 875 herds are well recorded, representing 71% of recorded herds and 20% of all dairy herds. This increase in the proportion of well-recorded calvings could be the result of 1) large scale genotyping projects, such as Ginfo, that have encouraged recording (Pryce *et al.* 2018) 2) those that remain in herd recording are more committed data recorders or 3) the increased use of technology on farm has made it easier to electronically record data through apps.

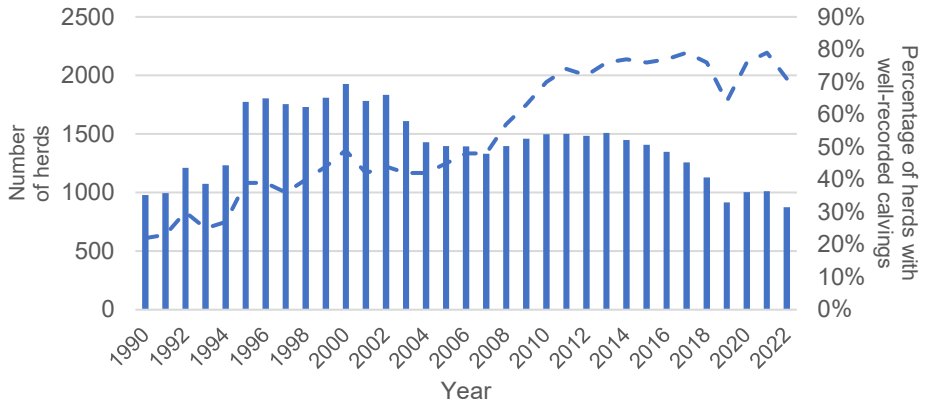

Figure 1: Number (column) and percentage (line) of herds with well-recorded calvings

Changes to Australia's dairy herd size, farm numbers and trends in herd recording practices, as described by Newton *et al.* (2021) are having a major impact on the availability of data, including calf data. Despite the improved proportion of herds recording calvings at a high standard, the number of records per year has declined. Over the past two decades, the size of the National milking herd has declined by about one third (Australian Bureau of Statistics 2004; Dairy Australia 2022). Additionally, herds that participate in official herd recording have a smaller average herd size compared to all herds (266 compared to 303 in 2022) and not all calvings in each herd are well-recorded (DataGene 2022). In summary, the number of herds as well as recorded herds has declined over time but the number of herds with good calving records has declined at a slower rate.

Based on the national herd identification codes, 69% of herds with well-recorded calvings are likely to be located in Victoria, followed by New South Wales (15%), South Australia (6%), Queensland and Western Australia (both 4%) and Tasmania (1%). This is inconsistent with the national distribution of herds where Victoria, New South Wales and Tasmania are the most populous states, specifically highlighting an under-representation of herds located in Tasmania. Regional differences provide an opportunity to tailor activities to specific groups for larger benefit.

Data quality, as well as quantity, is important for the evaluation of new traits. One way to characterise quality is to look for missing values, such as breed of the sire. In the past decade to 2022, the percentage of dams with well recorded calving observations but unknown breed of sire has almost doubled to 9% after being stable at around 5% throughout the previous decade. This presents an opportunity to recover reasonable quantities of data through better recording practices as well as using genotyping to populate pedigree and breed so that more animals can be evaluated.

Pleasingly, in the period 2012-2020, the percentage of calvings producing a female calf was close to 50% as expected. The percentage varied between 51-53% suggesting that calvings producing males and females are being similarly recorded. In 2021-22, the percentage of calvings producing females has increased to 55-57% which is in line with the increased use of sexed semen in dairy herds reported by the National Herd Improvement Association (2022).

The number of sires of dams is consistently more than double the number of calf sires in the dataset with 2385 sires of calves and 6594 sires of dams in 2022. Within a herd, both old and young cows produce calves so a larger number of sires of dams is expected. On average 56 progeny per sire were born in 2022, as illustrated in Figure 2. This has increased by 20 progeny after 2008 and the beginning of the genomic era. It will be important for researchers to carefully consider the minimum progeny per sire as one-third of sires in 2022 had less than 5 progeny.

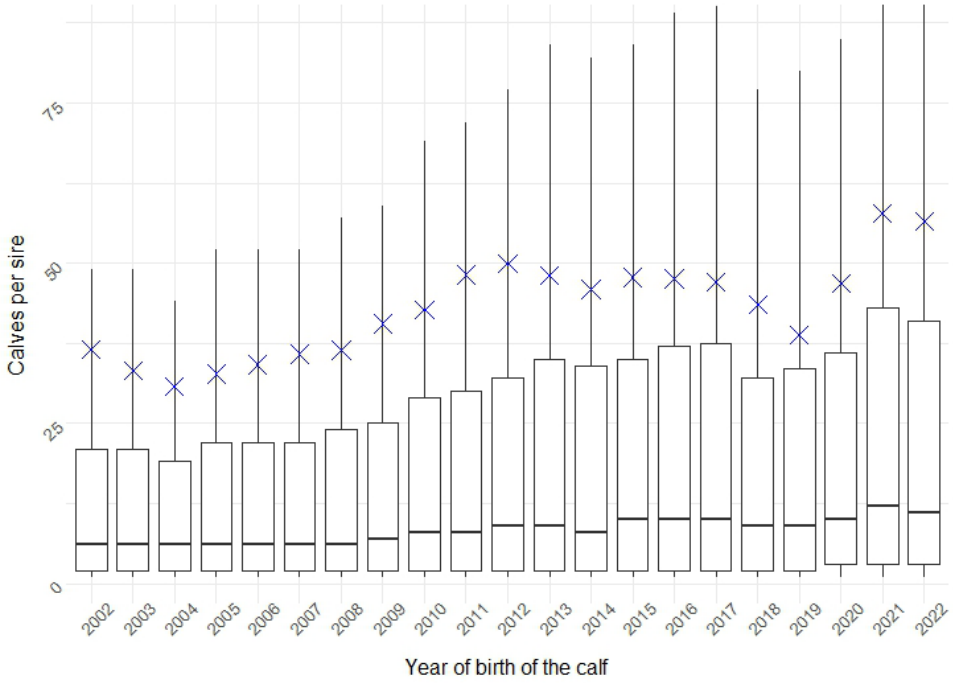

Figure 2: Average number of progeny by year of calving observation
Boxplots represent the mean (blue cross), median (solid line), first and third quartiles (contained in the boxes), outliers not shown.

A closer look at the characteristics of sires of calves revealed that only half of sires with at least 5 progeny had Estimated Breeding Values of sufficient merit to meet the minimum industry standards set by DataGene's Good Bulls Guide and are advised for use in all dairy matings. This group of bulls sired 73% of calves born in 2022. The remaining calves were sired by AI bulls that don't meet the Good Bulls Guide criteria (50% remaining calves), recorded herd bulls (28%), beef

AI or natural bulls (6%), cross-bred bulls (6%) and other groups that cannot be easily characterised. This data suggests that further improvements can be made to sire selection to ensure high quality AI sires are used for every joining to optimise the value of the resulting calves, however, a more complete dataset of well-recorded calvings would verify this suggestion.

According to the National Herd Improvement Association, 17% of semen sold is beef and an increasing proportion is used in lower merit cows in dairy herds (National Herd Improvement Association 2022). At 2% of all 2022 born calves, the recording of beef sired calves is under-reported in this dataset. This is likely the consequence of software, systems and protocols that were designed for dairy sire over dairy cow matings rather than beef sire over dairy cow matings.

CONCLUSIONS

Improvements to calf trait recording are of benefit to farmers, the industry that supports them and the broader community. This analysis reveals that there is a long history of good recording practices and that there are opportunities for continuous improvement. We conclude that improvements to calf trait recording may come through: 1) understanding the hurdles that prevent the recording of calving ease, calf size, calf fate and sire of most calvings, 2) generating pathways to participation for farmers not enrolled in conventional herd recording services, 3) targeting activities to regions and groups where small changes will return large quantities of new data and 4) the use of technology to make high quality data collection more efficient, 5) using genotyping to complete missing pedigree and 6) continuing to monitor for emerging trends in data recording practices.

ACKNOWLEDGEMENTS

The authors acknowledge the contribution of farmers who routinely collect data as well as the herd recording, genotyping and software services that participate in data collation. In particular, the authors recognise the late Mr Geoff Potts who was a driving force in Australia's herd improvement industry. We also thank DataGene Ltd and its staff for their ongoing contribution. This research has been funded by DairyBio, an initiative of Dairy Australia, Agriculture Victoria and The Gardiner Foundation and contributed to a PhD project at La Trobe University.

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