An assessment of the effect of body condition score, weight, hip height and age on the incidence of calf loss in 2-year-old Brahman and Tropical Composite heifers in the northern NT

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Heifers are known to have a higher incidence of calf loss than mature cows, especially those having their first calf as 2-year-olds. This is thought to be largely due to their smaller size and younger age leading to dystocia and poor maternal behaviour. Breeding programs can adopt yearling mating to increase selection pressure for early puberty, however there may be an increased risk of calf mortality (Dollemore and Bailey-Preston, 2019).

Dollemore and Bailey-Preston (2019) reported a higher occurrence of calf mortality for heifers calving for the first time at 2-years-old (14.8%) compared to 3-years-old (9.8%). This study used the same data, with two year groups added, and explored several candidate risk factors that may contribute to calf loss in 2-year-old heifers including age, body condition score (BCS), hip height and weight, before and during the first pregnancy. These factors were tested with univariate models using logit regression to try and ascertain if these characteristics associated with size in smaller/younger heifers are responsible for a higher incidence of calf loss.

The records of 866 Brahman (BRA) and Composite (CMP) heifers that conceived during yearling mating from 2009-2017 were used in this study. These animals were part of a long term project with the aim of producing animals that are adapted to the North Australian environment with high fertility and are also able to reach the weight target for the export market at a young age. The breeder herds were located at Victoria River Research Station (BRA) and Beatrice Hill Farm (CMP) and all weaners were sent to Douglas-Daly Research Farm where they were studied for their first 2 calving opportunities. Bulls were selected using a selection index that placed a high value on fertility traits, especially early puberty. Pre-mating measurements were recorded in December prior to the mating period which was from January to the end of March. The other measurements were collected in May (600 day data) and the heifers then calved from October to December. Heifers were inspected daily during calving and observations recorded, and any calves that were not weaned were included in the calf loss percentage.

Overall, 21.3% of heifers lost their first calf and this was not associated with breed (BRA= 19.9%, CMP = 22.2%, P = 0.55), although CMP were smaller on average than BRA (Table 1). Heifers that failed to successfully wean a calf weighed less prior to mating but not significantly (P=0.25) and BCS (P=0.56), age (P=0.13), hip height (P=0.51) and 600 day weight (P=0.78) also did not have significant effects.

Table 1. The average weights, BCS, hip height and age at mating of heifers that conceived as yearlings and either lost or weaned their calf with 95% confidence intervals included.

		Number (hd)	Pre-mate Weight (kg)	600 Day Weight (kg)	BCS	Hip Height (cm)	Age at Mating (months)
BRA	Lost Calf	58	230.7±8.1	311.5±7.5	3.4±0.08	127.4±1.3	13.4±0.2
	Weaned Calf	291	234.9±3.2	314.0±3.8	3.4±0.04	127.1±0.5	13.5±0.1
CMP	Lost Calf	94	222.0±6.3	302.1±6.7	3.4±0.07	124.2±1.2	13.4±0.2
	Weaned Calf	423	224.2±2.9	301.4±2.9	3.4±0.03	125.1±0.6	13.5±0.1

The risk factors when considered individually were not found to play a large part in the incidence of calf loss in yearling mated heifers suggesting that there are other factors influencing the higher calf loss. Weight and age have a large effect on yearling heifer pregnancy rates, but once they are pregnant it appears that these factors have little influence on whether the calf survives. It should be noted that age had a significant effect on calf loss when comparing heifers first calving at 2 or 3 years of age, but within the smaller age range of a year cohort (7 months), age did not have an effect. It is generally accepted that smaller weight and size in heifers increases the risk of dystocia, but these results indicate that within heifers calving as 2-year-olds, there are other factors that are more important. Fetopelvic disproportion (birth weight of the calf relative to the size of the heifer) may have more of an effect and as the bulls used in this herd were selected if their dam successfully weaned a calf at 2 years old, this could explain why the age/weight/size of the heifers didn't have an effect. Additionally, these two herds have been selected for the ability to raise a calf to weaning for many years and calving ease is a large part of this which could explain why the factors investigated may not contribute to calf mortality as much as they might in other (unselected) herds.

References

Dollemore W and Bailey-Preston G (2019) *NBRUC Proceedings 2019*. Retrieved from: https://www.nbruc2019.com/wp-content/uploads/2019/10/NBRUC-Conference-program.pdf