

## Ovulation Rates in Twinner Heifers before First Mating

L. Cummins<sup>A,D</sup>, E. Cummins<sup>A</sup>, J. Keiller<sup>B,E</sup> and I. McLeod<sup>C,F</sup>.

<sup>A</sup>Admetus, c/- 36 Skene Street, Hamilton, Vic 3300.

<sup>D</sup>Email: leocummins46@gmail.com

<sup>B</sup>Cashmore Park, 114 Wilmots Road, Cashmore, Vic, 3305.

<sup>E</sup>Email: cashmoreram@gmail.com

<sup>C</sup>1350 Strathkeller Road, Moutajup, Vic, 3294.

<sup>F</sup>Email: ianmcvet@hotmail.com

A long- term selection program at the United States Meat Animal Research Center (USMARC) in Nebraska developed a population of cattle with a natural twinning frequency of 50%. This selection was based largely on measuring ovulation rate in heifers (for between 4 and 12 consecutive oestrous cycles per heifer) by weekly rectal palpation/ultrasound starting between 12 and 14 months of age. Soon after the establishment of this line, observations in 1984 and 1985 showed single ovulations made up 91% of the observations and twins 9%. Between 2000 and 2002, single ovulations made up 54.5% of the observations, twins 42.8% and triplets 2.7%. (Cushman et al 2005). The productivity of this line of cattle in Australia has been reported (Cummins and Cummins 2018). This report looks at a modification of the USMARC method by using prostaglandins (PG) in an attempt to make the selection of replacements more practical.

Thirty-eight heifers, rising 15 months of age, which had been bred on one property and eighteen, rising 20 months old, which had been bred on another property were available. All had been grazing together in Western Victoria for several months. The heifers were weighed, and the younger ones divided into a heavier and lighter group. Ovulation rates were measured three times by counting Corpora Lutea (CL) using a Honda 2300 ultrasound with a 5MHz real time linear array. For the first examination, the heifers were mustered with no prior treatments (i.e. at unknown stages of the oestrous cycle). This first scan was carried out in poor weather conditions making visualisation of the screen difficult. At the first and second examinations, all heifers were injected with a PG (Cloprostenol 250 µ/ml given as 2 mls, IM) and the second and third scans were each 2 weeks after these injections. This meant that we were aiming to detect mid cycle CLs without the need for heat detection and the examination period covering up to 3 cycles was reduced to one month.

**Table 1. Ovulation Rates in Twinner heifers before first mating**

Group	Age (months)	N	Weight Range (Kg)	Corpora Lutea detected per cycle			Skipped Cycles #
				Only zeros	Only singles	Twins (at least once)	
A	14-15	19	319-393	4	7	8	7
B	14-15	19	394-528	4	6	9*	1
C	19-20	18	376-512	0	11	7*	4

\* One set of triplets observed in each group

#A skipped cycle was defined as when a CL had been detected but this was not followed by a CL at the next observation.

My expectation was that when the PG was given to a heifer with a CL, it would regress and she would then ovulate with a new CL which would be detected at the next scan and furthermore, the PG treatment itself would not alter the twinning rate. There has been no indication of unexpected twinning in normal cattle since the start of PG usage for oestrous synchronisation in the 1970's. The skipped cycles reported here may be due to immaturity or some other cause. Heifers where no ovulations (CLs) were detected could be considered pre-pubic. 52% of ovulations detected occurred in the right ovary and 48% in the left ovary. Of the twin ovulations detected, 73% were bilateral and 27% unilateral, however when only the last 2 cycles were considered, then 64% of the cycles were bilateral and 36% were unilateral. Our scanner (IMc) who was experienced in ultrasound examination of bovine reproductive tracts indicated that the scans seemed clearer for these last 2 cycles, possibly because these should have been all mid cycle CLs and better weather conditions for scanning. This data might suggest the possibility that we failed to detect some unilateral twin ovulations. At USMARC between 2000 and 2002, 51% of twin ovulations were bilateral.

Forty three percent of the heifers had at least one set of twin ovulations and would therefore be likely to have a higher probability of twinning in the future when compared to the remainder of the group. The use of PGs to collect several records of ovulation rate in a short time may make continued selection for twinning more practical than the previous USMARC protocol.

### References

Cushman RA, Allan MF, Snowden GD, Thallaman RM and Echterkamp SE (2005) *J. Anim. Sci.* **83**,1839-1844.

Cummins LJ and Cummins ES (2018) Abstract no 69 from 32nd biennial conference of the Australian Society of Animal Production.