REPRODUCTIVE PERFORMANCE OF HEIFERS FED A GRAIN SUPPLEMENT CONTAINING UREA AND AMMONIUM SULFATE TO LIMIT INTAKE

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Dairy heifers in Western Australia, grazing annual pastures alone, cannot achieve the desired growth rates to reach a suitable liveweight for mating at 15 to 18 months. To avoid a delay in the age at first calving, supplementary feeding is required in summer and early autumn. Management strategies based on feeding grain containing varying amounts of non-protein nitrogen (N) compounds, to restrict grain intake, have been developed to achieve the desired growth rates over summer (Barker et al. 1988; Hough et al. 1992). When urea and ammonium sulfate (AS) are used to restrict grain intake, the amount of N consumed exceeds that which can be used by the animal. In dairy cattle negative relationships between urea-N concentration in blood and conception have been reported in some (eg. Ferguson et al. 1988) but not all studies (eg. Carroll et al. 1988). The aim of this study was to examine the impact of feeding grain, containing urea and AS, on reproductive performance.

The reproductive performance of heifers grazing dry annual pasture and offered grain ad libitum which contained urea and AS to restrict intake was compared with heifers offered a similar amount of grain without additives. Seventy-one heifers (average liveweight 310 kg) were offered a supplement containing either the additives provided ad libitum or a similar amount of grain without any additive offered daily, for 15 weeks prior to and during mating. After an introductory period, the final supplement containing additives consisted of 88% grain, 8% urea, 2% AS, 1.5% limestone and 0.5% salt; the supplement without additives was 98% grain, 1.5% limestone and 0.5% salt. Both supplements were provided on a group basis. The heifers grazed 1 of 2 paddocks of dry annual ryegrass pasture and were rotated between paddocks every 2 weeks. Heifers were artificially inseminated on detected oestrus during an 8 week period beginning in mid April. Immediately prior to insemination, samples of vaginal mucus and coccygeal blood were collected. Samples were assayed for total protein, albumin, urea, glucose, creatinine, aspartate amino transferase, calcium, magnesium and phosphorus.

Heifers offered the supplement with urea and AS ad libitum consumed about 3.0 kg of grain dry matter (DM)/day; heifers offered grain without the additives consumed about 3.2 kg of grain DM/day. The reproductive performance of heifers offered grain containing additives was not adversely affected compared with those without additives as 35/35 and 33/36 heifers became pregnant respectively; conception rates to first service were 69 and 72% respectively.

Urea concentrations were increased by the additive treatment ($P < 0.001$) with levels of $10.4 \pm 0.26$ vs $4.6 \pm 0.25$ (mean $\pm$ s.e.) mM in plasma, and $28.9 \pm 0.155$ vs $9.0 \pm 0.141$ (mean $\pm$ log s.e.) mM in mucus. Total protein and albumin increased ($P < 0.01$) in the plasma by feeding grain with the urea and AS with concentrations of $73.8 \pm 1.10$ vs $69.9 \pm 1.09$ mM and $35.7 \pm 0.44$ vs $33.1 \pm 0.44$ mM respectively. There were no significant differences in any other biochemical measures.