

Sperm Abnormalities: a pain in the gut?

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Abstract

Seedstock bulls in Australia are commonly fed high energy supplements prior to sale (Holroyd et al., 2002). These supplements contain readily fermentable carbohydrates which may precipitate ruminal acidosis (Bevans et al., 2005). This experiment evaluated the extent and duration of effects of acidosis upon semen production and the associated changes in circulating hormones and metabolites.

Two groups of 10 Santa Gertrudis bulls (age 20 ± 6 mths) were relocated and fed in yards on ad lib hay (g/kg; 918 DM, 66 CP, 660 NDF) with individual grain feeding (g/kg; 910 DM, 165 CP, 230 NDF) once daily at 0.5% LW. One group were penned only and the other randomly assigned to a ruminal acidosis or sham challenge. Semen was collected fortnightly prior to challenge with sperm parameters and blood hormone parameters determined. Ruminal acidosis challenge treatments consisted of either a single oral dose of oligofructose (6.5 g/kg LW) or an equivalent sham dose of water in bulls that had achieved a stable spermiogram. Rectal and scrotal temperature, heart rate, rumen pH, VFAs, lactose and tone, were monitored 3 hourly during 24 hrs post challenge and again at 48hr. Semen was collected every third day for a period of 7 weeks, then once weekly until 12 weeks post-challenge with associated blood collections.

Relocation and penning alone transitorily decreased sperm morphology ($P < 0.05$) accompanied by increased levels of cortisol and inhibin ($P < 0.05$) with reduced levels of FSH ($P < 0.05$). Sperm quality decreased in oligofructose dosed bulls from 18 days post treatment and remained lower upon completion of the study at 90 days post challenge ($P = 0.02$). This was associated with increased cortisol ($P = 0.03$) and a trend towards decreased FSH ($P = 0.07$). This study shows that a single transient acidotic event causes a reduction in sperm quality sufficient to preclude bulls from sale as single sire breeding animals three months after the event.

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