Retrospective analysis of semen quality of bulls in the Cal Poly Bull Test

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Introduction

The Cal Poly Bull Test acts as a performance test of yearling beef bulls from across the western United States since 1951. Phenotypic data related to growth and reproductive performance were collected at yearling age. These data were then used for the annual Cal Poly Bull Test Sale.

Objective: The aim of this study was to determine the relationship between growth traits and semen quality traits as well as breed effects related to semen quality traits.

Materials & Methods

	Low ADG (0-1.4 kg/d)	Mod. ADG (1.4-1.8 kg/d)	High ADG (1.8-2.7 kg/d)	Total
Angus	177	714	725	1692
Hereford	26	156	76	290
Total	203	870	801	1982

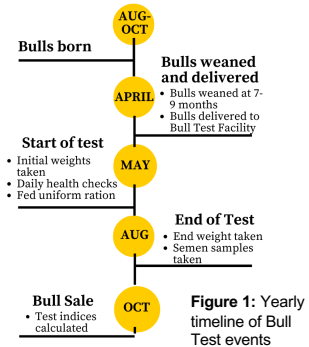

Figure 1: Yearly timeline of Bull Test events

- Records of Hereford and Angus bulls were collected over a 12-year span from 2001-2013
  - Year 2008 excluded
- A total of 1,982 bulls were analyzed
- Data were analyzed using Pearson Correlation and the Mixed Procedure in SAS
- Semen samples were collected at approximately one year of age by the same technician over this time span
- Samples were assessed for sperm motility, morphology, and total sperm count

Results & Discussion

Figure 2: Breed and Semen Quality Characteristics

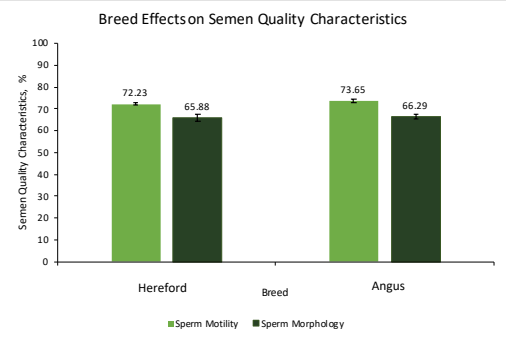

Figure 3: Relationship between Sperm Motility and Average Daily Gain

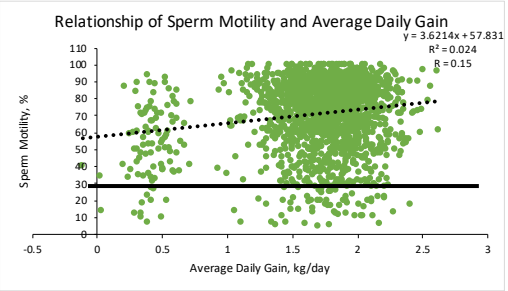

Figure 4: Semen testing at Cal Poly Bull Test Facility

- Angus bulls had a higher percentage of progressively motile and morphologically normal spermatozoa than Hereford Bulls ($P < 0.01$; Figure 2)
- Bull age was moderately, negatively correlated with scrotal circumference ($P < 0.01$; r = -0.3)
- Sperm motility and morphology were moderately correlated (r = 0.35)
- Bull average daily gain (ADG) was not strongly correlated with semen motility or morphology (r = 0.15; Figure 3)
- ADG classification had no impact on semen motility or morphology ($P \geq 0.50$)
- Growth rate between the age of 6-16 months does not affect sexual development and function (Brito et al., 2012)
- Research suggests that an ADG of 1-1.6 kg/day does not cause decreased sperm production (Brito et al., 2012)

Implications

These results indicate that higher levels of ADG during the testing period did not negatively impact semen quality attributes. More data must be collected to assess the biology behind the breed effects and validate the effect of body weight gain on semen quality attributes.

Works Cited

Brito, L.F.C., A.D. Barth, R.E. Wilde, J.P. Kastelic.2012. Effect of growth rate from 6 to 16 months of age on sexual development and reproductive function in beef bulls. Theriogenology 77(7):1398-1405. https://doiorg.ezproxy.lib.calpoly.edu/10.1016/j.theriogenology.2011.11.003