SOME OBSERVATIONS ON THE SEMEN AND TESTICULAR CHARACTERISTICS OF BEEF BULLS IN NORTHERN QUEENSLAND

Bull fertility is an important aspect of reproduction in beef cattle. It can be depressed in a variety of ways, including injury to the sex organs, general injuries and illnesses (Donaldson and Aubrey 1960; Donaldson 1962). The effects of high ambient temperatures on the fertility of bulls have not been extensively studied, though there is a wealth of data in sheep to illustrate the adverse effects on rams of high ambient temperatures (e.g. McKenzie and Berliner 1937; Gunn, Saunders, and Granger 1942; Moule and Knapp 1950). Increased scrotal temperature was shown to produce lower quality semen in Hereford bulls (Austin, Hupp, and Murphree 1961) and the relationships between body, scrotal and intratesticular temperatures in bulls were studied by Reimerschmid and Quinlan (1941) and Quinlan and Reimerschmid (1941). Breed differences in testicular temperature between Africander and British breed bulls during the summer months were observed by Bonsma (1940).

MATERIALS AND METHODS

On a number of occasions the opportunity presented itself to examine the semen and testicular characteristics of bulls in beef herds in North Queensland. Semen was usually collected by electro-ejaculation and scored for colour, density, motility and wave motion. In addition, a smear was examined for live, dead and abnormal spermatozoa according to the nigrosine eosin technique of Campbell, Dolt, and Glover (1960). Testicular tone was evaluated on a scale from 1 to 5, ranging from 1, which was very soft without any tone, to 5, which was firm with very good tone. Bulls were also checked for the presence of any clinical abnormalities of the testes.

Details of the properties inspected and the number and breed of bulls inspected, type of observation and date are presented for convenience in tabular form in Table 1.

TABLE 1

DETAILS OF INSPECTIONS OF BULLS

Observation No.	Number of Bulls	Breed	Nature of Examination*	Time of Examination	Locality
1	5	Santa Gertrudis	S & T	Autumn–winter, 1959	Coastal—tropical wet belt
2	2	Shorthorn	S & T	Autumn, 1959	Inland—hot arid area
3	21 (18)†	Shorthorn and Devon	S & T	Autumn 1961 (winter 1961)	Charters Towers district
4	27	Brahman Crossbreds	S & T	Autumn 1961	Charters Towers district
5	6	Hereford	T	Winter 1960	Gladstone district
6	10	Hereford	T	Autumn 1961	Rockhampton district
7	19	Hereford	T	Autumn 1961	Charters Towers district
8	150	Shorthorn	T	Winter 1961	Charters Towers district
9	17	Shorthorn	T	Winter 1961	Charters Towers district

* S & T, semen and testicular examination; T, testicular examination only

† Repeat visit in the same winter

TABLE 2

EXAMINATION OF EXTERNAL GENITALIA OF HERD BULLS

Property	Date	Testicular Tone					Testicular Hypoplasia	Total Number of Bulls	Breed
		1	2	3	4	5			
A	July 1961	0	2	27	93	18	4 (3 suspicious)	150	Shorthorn
D	March 1961	0	2	4	4	0	0	10	Hereford
E	March 1961	1	6	7	3	2	1	19	Hereford
F	July 1961	0	0	4	8	5	1	17	Shorthorn
C	August 1960	0	1	5	0	0	0	6	Hereford

RESULTS

Semen which appeared reasonably normal according to the criteria used was found in observations numbered 1, 3 (winter) and 4, whereas the semen studied in observations 2 and 3 (summer) appeared to be lower quality semen.

A total of 202 bulls was examined for testicular characteristics, of which 4 per cent. showed a clinical condition classified as testicular hypoplasia (Donaldson 1962). Of the bulls examined, 29 per cent. exhibited lower testicular tone or some clinical abnormality of the testes or associated structures (Table 2).

In the number of cases where both semen and testicular examinations were made it appeared that there was an association between the semen criteria and the scoring for testicular tone. Bulls scoring between 1 and 3 for testicular tone appeared to have poorer quality semen as indicated particularly by lower motility.

The bulls noted in observation 3 as being examined both in summer and winter were found to have lower ratings in all characters during the summer (Table 3).

TABLE 3

CHANGES FROM MARCH TO JULY 1961 IN BULL AND SEMEN CHARACTERISTICS
(Means and standard errors)

Testicular tone $+1 \cdot 8 \pm 0 \cdot 2$ units
Percentage of live sperm $+13 \pm 9$ (not significant)
Sperm density $+1 \cdot 5 \pm 0 \cdot 2$ units
Motility $+1 \cdot 7 \pm 0 \cdot 5$ units
Colour (opacity) $+3 \cdot 1 \pm 0 \cdot 5$ units
Wave motion $+ 0 \cdot 8 \pm 0 \cdot 4$ units (not significant)

Except where noted, differences are statistically highly significant ($P < 0 \cdot 001$).

DISCUSSION AND CONCLUSIONS

From the observations recorded above, there appears to be some association between the seminal and testicular characteristics studied and season and it is suggested that the influence of climatic stress, particularly heat stress, is worthy of closer examination. The few observations made on the different types of animal would indicate that differences could exist between the British breed and animals with infusions of *Bos indicus* blood.

Palpation of the testes shows some promise of being a practical field method of assessing the fertility of bulls but more work is required to relate it to not only semen characters but actual fertilizing capacity of bulls.

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