

A NOTE ON PREDICTION OF SEMEN QUALITY AND FERTILITY

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The general objective of a fertility test programme for bulls is to maintain the rate of reproduction on a level allowing the highest economic return. At present there is no such test in the bull performance testing scheme at Irene.

In this pilot study an attempt was made to predict fertility and semen quality from testicular measurements. Such measurements, if applicable, could be helpful in evaluating reproductive performance of bulls where it is difficult to collect semen and in predicting mature reproductive potential of young bulls (Hahn, Foote & Cranch, 1969; Zemjanis, 1962). The experimental animals, viz., 30 Africander, 30 Hereford and 30 Simmentaler bulls were slaughtered in six different consecutive mass-groups. The following data were collected:

- (i) Live mass of animals at weekly intervals.
- (ii) Testicular consistency measurements with a tonometer (Hahn *et al.*, 1969).
- (iii) Testes volume (ml).
- (iv) Scrotal circumference (cm).
- (v) Mass of testes and seminal vesicles at slaughter.
- (vi) Histological determination of the seminiferous tubule diameter.

In this experiment the measurements of scrotal circumference were highly correlated ($P < 0,01$) with testes mass at slaughter ($r = 0,79$). Scrotal circumference was also highly correlated with seminiferous tubule diameter ($r = 0,59$).

Thus, scrotal circumference may be a reasonable estimate of testes mass, as well as potential current sperm production. This is in accordance with the results of others (Foote, Hahn & Larsson, 1970; Hahn, Foote & Seidel, 1969).

In figures 1 and 2 the testes mass and seminiferous tubule diameter of the three breeds are illustrated. In both cases the Africander exhibited the best development per unit mass.

As expected a highly significant correlation ($P < 0,01$) was found between testes mass (slaughtered animal) and testes volume (displacement capacity) in the live animal ($r = 0,798$).

It is known that a soft consistency of the testes is often related to poor semen quality and low fertility (Hahn *et al.*, 1969). Testes consistency is usually subjectively determined by manual palpation. Consequently Hahn *et al.* (1969) developed a tonometer to provide an objective measurement. Their results clearly indicated that tonometer measurements are highly correlated with semen quality but showed it had little prediction value for future performance (Foote *et al.*, 1970).

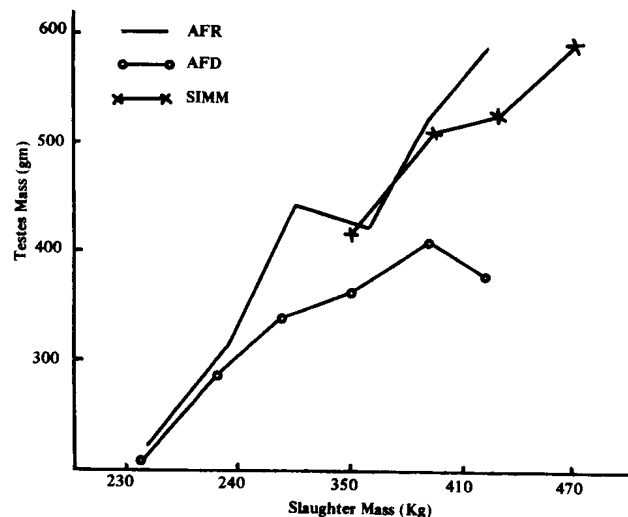


Fig. 1 Testes mass of Africander-, Hereford- and Simmentaler bulls slaughtered at different mass

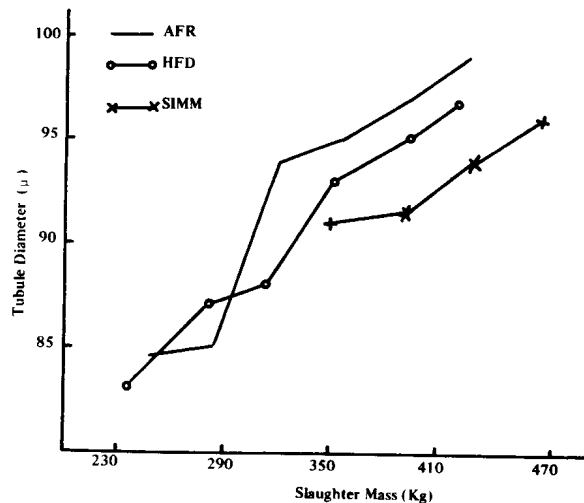


Fig. 2 Seminiferous tubule diameter of Africander-, Hereford- and Simmentaler bulls slaughtered at different mass

In this study the ratio of the two tonometer measurement was correlated with testes mass (in slaughtered animals), scrotal circumference, testes volume and seminiferous tubule diameter for the three breeds separately. However, there was no statistical significant correlation, and this contradicts the finding of Foote *et al.* (1970).

The present study was superimposed on an existing project and consequently an important aspect such as semen collection and the relationship between semen quality and other measurements was not possible. However, this problem was overcome to some extent in a second study where the testicular consistency of bulls in the local A.I. stud was measured. These tonometer ratios were then correlated with testes length, scrotal circumference, sperm motility, sperm concentration (determined by "spectronic-20") and percentage "non-returns" of individual bulls (non-returns from 3687 inseminations). These correlations are shown in Table 1 and were not significant.

The highly significant correlation ($P < 0,01$) between the two operators indicate that a high repeatability of tonometer measurements can be obtained provided that the instrument works with little friction and that the operators are suitably acquainted with the instrument.

In conclusion it may be mentioned that these results have shown that scrotal circumference is an excellent indicator of testes mass and actual sperm production. The low correlations obtained between tonometer ratios and semen quality and fertility parameters on the other hand seem to indicate that the use of this instrument in predicting semen quality and fertility appears to be of little value.

Table 1

Correlations found between the ratio of tonometer measurements and semen and fertility characteristics

Ratio of tonometer measurements correlated with:	r
Scrotal length (20,6 cm)	0,155
Sperm concentration ($1,244 \times 10^9$ cells/ml)	0,041
*Conception (71,4%)	0,034
Sperm motility (69%)	0,231
Scrotal circumference (37 cm)	-0,114
Operator I and Operator II	0,779

* Conception determined from 3687 inseminations

() Average

References

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