



tech notes



TESTIS WEIGHT, FERTILITY AND BODYWEIGHT

INTRODUCTION

Fertility generally peaks between 30 and 38 weeks of age. However, during the latter stages of production (post-45 weeks) fertility can decline, sometimes rapidly. Data collected within Aviagen has shown testis size to be correlated with fertility. This Tech Note will discuss the relationship between testis weight, fertility and bodyweight.

TESTIS DEVELOPMENT

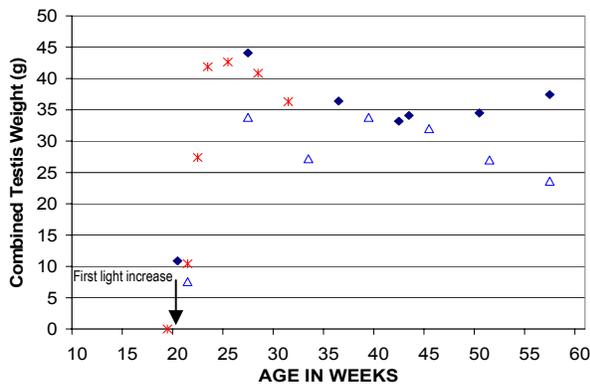


Fig. 1. Changes in testis weight with age

The data in Figure 1 were collected from 3 commercial farms in South Africa. The testis weights of small sample groups of males killed at different ages were recorded. The data indicate that rapid testis development was initiated by the first light increase, with testis weight peaking at around 25 – 28 weeks of age. It is not clear from this data what happens to testis weight after this peak, but there is some evidence of a gradual decline in average weight with age.

This is supported by data taken from the *post mortem* examination of depleted pedigree males which sometimes revealed a percentage with small, non-functional testis. It is not known if the apparent decline in testis weight is down to the regression of the testes in individual males at different ages, or to a general regression of the testes in all males.

TESTIS WEIGHT AND FERTILITY

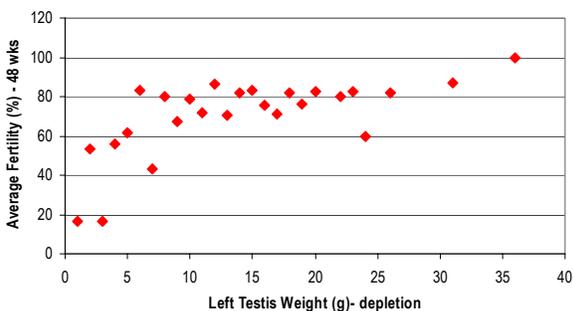


Fig. 2. Relationship between testis weight and fertility

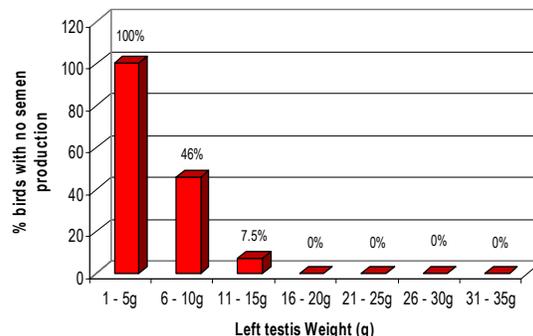


Fig. 3. Relationship between testis weight and semen production

Figure 2 shows that there is a general improvement in fertility with an increase in testis weight. However, once testis weight is greater than about 10g the improvement in fertility tends to be small. Figure 2 also shows that males with poor fertility at 48 weeks tended to have a small testis size when examined at depletion. The data in Figure 3 shows that as testis weight increases the number of males producing semen is increased. Figure 3 also shows that all males with very small testis (< 6g) will almost certainly be infertile because they are not producing any semen.

In Figure 2 there is a record of fertility in males with testis below 6g in weight. This is probably due to the time delay between the measurement of fertility, at 48 weeks, and the measurement of testis weight at depletion. It is likely that the testes will have regressed in size and function over this period so that testis weight and hence fertility at 48 weeks would have been greater than that recorded at the end of the flock.

The following generalised conclusion can be drawn from Figure 3:

Testis Weight	Functionality
1 – 5g	Small (non-functional)
6 – 10g	Borderline
> 10g	Functional

The conclusions that can be drawn from Figures 2 and 3 are in agreement with published data (Hocking, 1990)¹ which found that at low testis weight (< 11g) a high proportion of males were infertile

TESTIS WEIGHT AND BODYWEIGHT

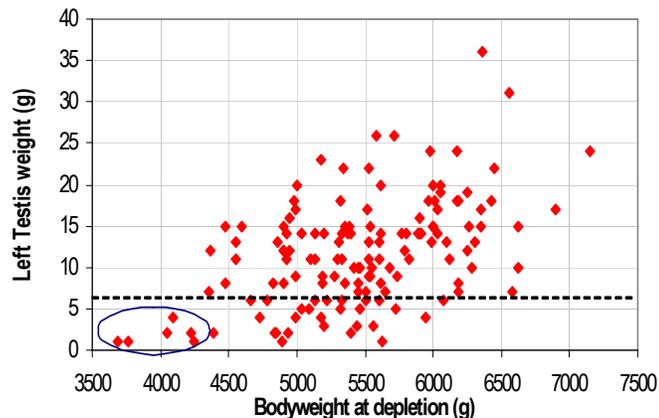


Fig. 4. Relationship between BWt at depletion and testis weight. The dotted line represents 6g, below this testis are non-functional

Figure 4 shows the relationship between depleted bodyweight and testis weight. Although the data are variable there is a positive relationship between testis weight and depleted bodyweight. In particular males with low bodyweights at depletion (below 4.25kg) tend to have small non-functional testes. Low testis weight at depletion may be a consequence of a loss in bodyweight and/or condition, thus these data highlight the negative impact that a loss of condition (or bodyweight) can have on testis weight. A reduction in testis weight is likely to have a negative impact on fertility as smaller testes are associated with poorer fertility.

Although the data in Figure 4 indicate a positive relationship between bodyweight and testis weight it is essential that male bodyweight is adequately controlled and that males are not allowed to get too heavy. Heavy males will have a reduced ability to mate. It is therefore necessary to achieve an 'optimum', not a maximum bodyweight which will allow both testis weight and mating behaviour to be optimised.

CONCLUSIONS

Testis weight increases rapidly from the time of light stimulation, peaking at around 25 – 28 weeks of age. After this peak there is some evidence of a decline in testis weight with age. Data collected within Aviagen shows that there is a positive relationship between testis weight and fertility such that males with small testes (<6g) are generally infertile. Low bodyweights or a loss of body condition/weight is associated with low testis weight. This may have a negative impact on fertility as smaller testis is associated with poorer fertility. The data emphasize the need to maintain male bodyweight and condition and show that, the avoidance of weight loss in older males will help to maintain testis weight and hence fertility, later on in production. The data do not show a requirement to grow males heavier - heavy males show reduced fertility due to ineffective mating - but highlight that maintaining male bodyweight and condition throughout lay is important if late fertility is to be improved/maintained.

¹Hocking P. M. (1990) 'The relationship between dietary crude protein, body weight and fertility in naturally mated broiler breeder male', *British Poultry Science*, 31: 743 – 757

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This information comes to you from the Technical Team at Aviagen. Although it is considered to be the best information available at the present time, the effect of using it cannot be guaranteed as performance can be affected substantially by many factors including flock management, health status, climatic conditions, etc.

Every attempt has been made to ensure the accuracy and relevance of the information presented. However, Aviagen accepts no liability for the consequences of using the information for the management of flocks. Data presented in these Ross Tech Notes should not therefore be regarded as specifications but illustrate potential performance.

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