

NUCLEUS BREEDING SCHEMES FOR LARGE PIGGERIES

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Maximum response to selection can be made when all pigs are measured for the characters of interest. However, labour costs can be appreciable for measuring growth rate and backfat, while the resources required for measuring feed conversion, limit the number of boars that can be tested.

The rapid turnover of generations required to obtain maximum rate of genetic progress adds to the costs as gilts have smaller litters than older sows. Producers can reduce costs without reducing the rate of genetic improvement too severely by confining costs to part of the herd.

This cost reduction can be achieved in two schemes. We refer to these schemes as a "closed nucleus" and a "commercial nucleus"

The "closed nucleus" is a separate herd or stud used to produce breeding stock for the main herd. In general the age structure of the nucleus is that which gives the greatest response to selection, while that in the main herd gives greatest commercial value. This means that boars are used for about six months in the nucleus and up to two years in the main herd, while sows have two litters in the nucleus and five or more in the main herd. It can be shown that if 30% of the herd is in the nucleus, net returns from a breeding program are reduced by about 6% while with a nucleus of 10%, the reduction is 14%.

In the "commercial nucleus", sows and boars are used first in the nucleus, but are then kept for use in the main herd. Only animals born in the nucleus are available for selection. The main advantage of this scheme is that all replacements can be kept for the most profitable period, while at the same time the age structure in the nucleus is that which maximizes the rate of response to selection.

Hagenbuck and Hill (1978) suggested that if the best 26% of gilts were kept for a second litter and the best 4% for a third litter, up to 3% extra response could be obtained. This modification can readily be carried out with a commercial nucleus.

Opening the nucleus by bringing the best gilts from the main herd into the nucleus has little effect on the rate of response (James, 1977) but can halve the rate of inbreeding (James, 1978). The main limit to the size of the nucleus is the need to minimize inbreeding.

REFERENCES

- HAGENBUCK, P. and HILL, W.G. (1978) *Anim. Prod.* 27: 21-27
JAMES, J.W. (1977) *Anim. Prod.* 24: 287-305
JAMES, J.W. (1978) *Acta. Agric. Scand.* 28: 387-392.