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# THE OPTIMISATION OF GROUP BREEDING SCHEMES

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## THE ANALYSIS OF THE USE AI IN PIG BREEDING

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There are many methods adopted by commercial pig producers to obtain replacement stock—some involve purchase only while others include breeding and selection within the herd itself. The major systems used in Britain have been studied in terms of the genetic lag times and the economic consequences for each system. In particular, the use of AI as an alternative to natural service has been considered.

Some results and problems of this approach are presented. The comparison of AI and natural service has been considered in terms of the breakeven economic situation, either by reference to the difference in lag time required when using AI boars, or by reference to the maximum by which AI farrowing rates can be poorer than those achieved using natural service.

THE EVALUATION OF GROUP BREEDING SCHEMES  
IN RELATION TO THE STRUCTURE OF THE BREEDING SYSTEM

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A group breeding scheme of the "open nucleus" type in operation for improvement of the *Llyn* breed is compared with its nearest practical equivalents in two forms. One is a "closed nucleus" scheme where the nucleus is closed to other breeding animals after its foundation. The other scheme is a cooperative non nucleus structure where rams selected from members' flocks are pooled and distributed for general use. The analysis indicates, that over a ten year period the existing open nucleus scheme could increase prolificacy and milk yield in the breed by a substantial amount (0.27 lambs per ewe/annum and 1.38 kg per lamb at 8 weeks).

The closed nucleus is estimated to give only 80 p. 100 and the non nuclear scheme only 60 p. 100 of the progress.

The open nucleus scheme also has additional advantages in the ease of avoiding inbreeding and in providing a better focus of integration for the members and their flocks.

## COMPARISON OF TWO SELECTION METHODS FOR SHEEP

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Two selection methods, indices and independent culling levels for three characters with different genetic parameters, have been compared for efficiency. Experimental material consisted of 1,684 ewes of the *Polish Merino* sheep.

Greater genetic advance was achieved by the index method than by the method of independent culling levels. A still greater advantage of the index method over the independent culling levels method is to be expected in cases of heritability of the characters showing a greater differentiation, of high genetic correlation and low phenotypic correlation. Intensity of selection for two characters applying these two methods is hardly lower than intensity of selection for a single trait.

## THE OPTIMISATION OF GROUP BREEDING SCHEMES

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Beef and sheep improvement programmes suffer from low reproduction rates and long generation intervals. In an effort to overcome the problem, Open Nucleus Group Breeding Schemes have been developed. A central nucleus is formed from base herds and there is a

continual transfer of stock in both directions, usually with selected females moving from base herds to nucleus and males from the nucleus to all base herds. Factors such as initial genetic lift in the nucleus and consequent drop in base herds, herd merit, lag, accuracy of testing proportion of transfers and size of herds affect the rate of progress of a scheme.

A computer program which will optimise progress, estimate individual herd lag and assess alternative designs has been developed and is available. Results show that some schemes will reduce the rate of progress. However, schemes which increase the rate of progress still result in widely differing responses for the individual base herds—some benefit immediately, some after a few years while others may not recover the drop due to contributing to the nucleus in under 20 years. The design of a scheme is crucial to the genetic consequences and requires detailed study before schemes are adopted.

## V. — Communications libres

A NOTE ON ERYTHROCYTE REDUCED GLUTATHIONE LEVELS  
AND THERE RELATIONSHIP WITH WEIGHT GAIN IN *FINNSHEEP*

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An investigation of the association between erythrocyte reduced glutathione levels and body weight at 6 and 8 weeks, 4 and 5 months in *Finnsheep* showed that male lambs of GSH<sup>h</sup> type tended to be significantly heavier at 4 and 5 months than lambs of GSH<sup>m</sup> type.

DER ZUSAMMENHANG ZWISCHEN SERUMEIWEIßFRAKTION (68 P. 100) UND EIZAHL, BEI HUHNERN

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Von 196 Hennen aus triallelen Paarungen der Rasse "Partige Green Legged Polish" wurde im Alter von 16, 21, 26, 31 und 36 Wochen Blutproben entnommen und einer elektrophoretischen Serum-Protein-Untersuchung unterzogen. Auf der Grundlage der Elektrophoresebilder und mit Hilfe des Migrationskoeffizienten wurde eine Bestimmung der  $\alpha$ -Globulin-Fraktion mit der Passagestrecke  $R = 68$  p. 100 durchgeführt. Diese Fraktion mit einem charakteristischen Gipfel-punkt mit hohem Proteingehalt tritt auf bei Hähnen und bei nichtlegenden Hennen. Das Verschwinden der Fraktion bei 24 Hennen im Alter von 21 Wochen, bei 53 Hennen im Alter von 26 Wochen, bei 85 Hennen im Alter von 31 Wochen und bei 27 Hennen im Alter von 36 Wochen, ermöglichte die Aufteilung der Hennen in 5 Gruppen.

Bei den Hennen in den o.e. 5 Gruppen wurden die folgenden Merkmale ermittelt: körperlicher Reifegrad, 100 Tage Legeleistung, 500 Tage Legeleistung, Körpergewicht und Serum-Protein-Konzentration im Alter von 21, 31 und 36 Wochen. Es wurde festgestellt, daß das Verschwinden der Fraktion dem Einsetzen des Legens um 30-12 Tage vorausgeht. Eine Verzögerung des Verschwindens der Fraktion verzögert das Erreichen der Sexualreife; die Unterschiede zwischen den einzelnen Gruppen in Bezug auf die Sexualreife sind statistisch bedeutend. Ebenso nimmt die 100 Tage Legeleistung und die 500 Tage Legeleistung ab mit einem verzögerten Verschwinden der Fraktion.

In der Hauptzahl der Fälle sind die Unterschiede statistisch signifikant.

Das Körpergewicht der 21 und 26 Wochen alten Hennen (körperlich unreif), zeigt ähnliche Zusammenhänge mit den vorher besprochenen Merkmalen, während es bei Hennen im Alter von 31 und 36 Wochen (ausgewachsen) zufällige Schwankungen aufweist. Da das Verschwinden der "Hahn-Fraktion" dem Auftreten der besprochenen Merkmale vorausgeht, vermuten die Autoren, daß dieses nur korrelierte Erscheinungsmerkmale sind, die ihre gemeinsame Ursache in der Konzentration der Hypophysenhormone haben.