SELECTION DIFFERENTIALS IN PIG HERDS

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This paper reports the results of a survey conducted to determine the selection differentials being achieved by pig breeders who are using the South Australian Pig Improvement Scheme (SAPIP). These selection differentials were required for the evaluation of SAPIP. They are the difference between the average index of the selected stock and that of all the stock from which they were selected.

METHODS

The technical officer for SAPIP visits piggeries at regular intervals to weigh and fat-measure pigs. Between 1 July 1981 and 30 June 1982 he collected details of boars used, stock introduced into the herd or sold from the herd, and a record of the boars' services since the last visit.

Four categories of stock within four classes of herd were identified. The four classes of herd were:

Commercial Herds — All boars bought, sow replacements retained.
Crossbred Breeding Herds — Both boars and sows retained as replacements.
Purebred Breeding Herds — Stock sold to other breeding herds and commercial herds. Both boar and sow replacements retained.
Purebred Breeding — Commercial Herds — Bi-level organisation combining breeding and commercial herds.

The four categories of stock were:

RB — Retained in breeding herds.
RC — Retained in commercial herds.
SB — Sold to breeding herds.
SC — Sold to commercial herds.

Indices were expressed in standard deviations above or below the mean.

For boars retained (RB), indices were first weighted for the boars' usage and averaged to give the herd selection differential. The herd class selection differential is an average of the herd selection differentials weighted for the number of sows in each herd.

Two selection differentials were calculated for boars retained (RB); one was the weighted average selection differential of all those boars used, which had been recorded in the herd. The second was the weighted average selection differential of all boars used, where those without herd records were recorded as having zero selection differential. This last figure is the average selection differential applied to the whole herd, as a result of selection within the herd.

Herd selection differentials for the other categories of stock (RC, SB, and SC) are the average selection index of the category within the herd. The herd class selection differential for these is the average of the herd selection differentials weighted for the number of sows in each herd.

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Table 1: Selection differentials for four classes of stock in four herd types (standard deviations)

Class of Herd	Commercial	Cross-Breeding	Purebred Breeding	Purebred Breeding/Commercial
Stock Category				
RB—Boars*	—	1.60	1.43	1.36
RB—Boars†	—	1.47	1.06	1.14
Sows	—	1.02	1.06	1.04
RC—Sows	1.42	—	—	1.11
SB —Boars	—	—	1.33	1.4
Sows	—	—	1.16	0.42
SC —Boars	—	1.02	1.05	0.89
Sows	—	0.64	0.25	0.33
Number of herds in survey	3	1	5	3
Number of sows in survey	269	199	552	336
Number of sows in SAPIP	485	199	1174	526

* Boars selected from herd performance records only.
† All boars used, selection differential of non herd-recorded boars = 0.

RESULTS

The selection differentials determined for four categories of stock in four classes of herd are reported in Table 1. Approximately the top 16 per cent of stock will have an index equal to or greater than one standard deviation above the mean. Thus, sows retained for breeding were, on average, in the top 16 per cent of the herd. Boars retained for breeding were, on average, in the top 10 per cent of the herd. Except for the case of sows in purebred breeding herds there was a pattern of reducing selection differentials from those retained for breeding through those sold for breeding down to those sold for commercial herds. These results show that breeders are placing a strong emphasis on their performance records in selecting their stock. It is of interest to note the high selection differentials obtained in sow selection — levels that cannot usually be obtained in less prolific species.

The average selection differential of sows selected in commercial herds was higher than that of those sold by breeding herds. This does not necessarily mean that the genetic merit of the sows selected in the commercial herd would be higher, since the overall genetic merit of the commercial herd would be expected to be lower than that of the breeding herd. However, the difference in genetic merit between a breeding herd using boars of selection differential 1.5 and that of a commercial herd buying boars of selection differential 1.0 from that breeding herd would not be enough to compensate for the differences in sow selection differential at the two sources.