Use of frozen semen for estimating genetic gains in production traits in pigs

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Frozen semen from 7 *Large White* and 13 *Landrace* boars born in 1977 was used in commercial herds of two French districts (Vienne and Deux-Sèvres). Inseminations were mainly made in *Large White* × *Landrace* crossbred females. The 87 piglets sired by *Large White* boars and the 57 sired by *Landrace* boars were compared to piglets sired by boars in 1982 for estimating genetic gains.

In the *Large White* breed, the yearly genetic gain (in p. 100 of the mean) ranged around 2.5 p. 100 for growth performance and 1-4 p. 100 for carcass composition. Meat quality seemed to have slightly deteriorated.

In the *Landrace* breed, the annual genetic gain was lower : 0.5-1.5 p. 100 for growth performance and about 1 p. 100 for carcass composition. The unfavourable trend in meat quality seemed to be larger than in *Large White*.

These estimations are more favourable than those of other authors dealing with the same subject in France. These results show that the selection tools developed 20 years ago played a major role in genetic improvement.

A study on the reduction of age of boars at the entry into central performance test stations

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Ranking of boars in central testing stations may be biased by non-genetic differences between herds of origin. A trial was made to determine to what extent the influence of pre-test environment can be reduced by shortening by half the length of the pre-test period, i.e. by lowering the age of male piglets at the arrival into the station by around one month and by rearing them in the same post-weaning unit until 70 days of age. The basic principle of the design consisted of coupling two contemporary batches in two stations : one batch was submitted to the system currently used (C = entry at about 70 days of age), whereas the other batch was submitted to the new system (N = entry at about 33 days of age, i.e. just after weaning). Pairs of full sibs were used with one sib on treatment C and the other on treatment N, in order to equalize genetic variances in both treatments. Six « replicates » of the comparison between contemporary C and N batches were carried out, and a total of 409 pairs of littermates from 342 sires were included in the analysis. There was no effect of treatment on age at 35 kg and ultrasonic backfat thickness at 90 kg. However, boars submitted to treatment N, as compared to those submitted to treatment C, exhibited higher daily gain on test (948 *vs* 924 g from 35 to 90 kg), improved food conversion ratio (2.56 *vs* 2.61) better health status and lower rates of culling for constitutional disorders. Some decrease in within-batch phenotypic variance was observed in daily gain on test with treatment N. The percentage of variance due to the herd of origin was estimated for each

treatment : it was lower on treatment N for daily gain on test (24 *vs* 27 p. 100), food conversion ratio (21 *vs* 26 p. 100) and backfat thickness (24 *vs* 29 p. 100). As the genetic portion of these variance components is expected to be similar in both treatments, it is suggested that the reduction in age at the entry into the station can result in some decrease in the environmental portion of the between-herd variance for traits recorded in central boar testing stations.

Analysis of boar buying policies in a commercial herd

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The results of a previous theoretical study (JAMES J.W., 1980. *Ann. Génét. Sél. anim.*, **12**, 33-47) are here applied to the case of boar purchases in a commercial herd. An expression is derived for the net present value of a boar from the expected gains in productivity of its progeny, as a function of purchase price and relative breeding value. But the producer must also consider the genetic gains made by the breeding nucleus providing him with boars. This leads to define an optimum length of time for which a boar should be used, which depends on price, breeding value, and rate of genetic gain in the nucleus. It is also shown that net present value and optimum length of use depend on the crossbreeding system which the boar enters as well as the way in which it is used, i.e. artificial insemination (A.I.) or natural service. A numerical application is provided by the boars auctioned from French performance test stations (C.I.). Very highly significant relationships between boar price and breeding value (estimated by the selection index) have been established, for each category of buyers, on 4566 boards sold in 1981-1983 at those stations. The price paid by producers and A.I. centers may be approximated by a linear function of the index, whereas a curved relation is obtained for breeders. On the basis of those relationships, the buying of C.I. boars by a producer appears to be a very profitable operation, the overall annual benefit being around 2.3 millions F.F. for the French producers using such boars. Boars used in A.I. contribute to nearly 75 percent of that global profit, as a result of their high genetic value as well as of the diffusion allowed by the reproduction technique. With the observed price function, the best policy for the producer is to buy the best available sires. Furthermore, a quick renewal is economically justified for A.I. boars. These should indeed be used, for the best of them, less than one year.

A note on genetic parameters of on-the-farm control in France (1981-1984)

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This analysis deals with performance records collected in the years 1981-1984 in 104 breeding farms participating in the French on-farm testing programme. Data were obtained from 142,218 purebred gilts or boars from *Large White* (LW) or *French Landrace* (FL) breed. Traits are age (AGE) and ultrasonic backfat thickness (BT) at 10 kg live weight. Deviations from batch average were used for analysis, the batch being a group of about 30 contemporary pigs from the same herd-breed-sex combination and born within the same