

## The dissemination of genetic improvement through the French pig industry

R. GUEBLEZ, L. OLLIVIER

*I.N.R.A., Station de Génétique quantitative et appliquée,  
F 78350 Jouy-en-Josas*

Substantial genetic improvement in French breeding farms (*nucleus*) over the last fifteen years has been demonstrated. The question dealt with in this paper is that of the extension of this improvement to the commercial farm (*base*). In the 1st part of the paper, the difference in genetic level between the nucleus and the base, i.e. the improvement lag, is evaluated using a simple model of migration through a three-tier « pyramid » : nucleus, multiplier, commercial. The lag can then be expressed as a function of the proportion of genes entering commercial herds from the nucleus (a), multiplier (b) and commercial (c) levels. From a survey of the exchanges of breeding animals in France in 1978, the following values have been obtained :  $a = 0.43$  ;  $b = 0.23$  ;  $c = 0.34$ . By also taking account of the genetic superiority of the boars migrating directly from the nucleus to the commercial farm, the estimated lag is 1.8 generation, or 3.6 years of selection, which is equivalent to 29 FF (1981) in overall economic value per pig fattened. In the 2nd part of the paper, an attempt is made to measure the actual lag as well as the evolution through time of the commercial level. Comparisons carried out in the testing stations between the genetic level of the purebreds and that of the commercial products confirm the existence of a genetic lag of the latter relative to the former, consistent in sign but variable in size through the period 1972-1981. On the other hand, the trends observed between 1975 and 1980 over a large sample of commercial farms, for growth rate and feed conversion, represent 2/3 of the genetic trends estimated in the nucleus (over the period 1965-1973). However, as genetic comparisons are difficult to make in commercial farms, the genetic part of the trends observed cannot be established. Possible genotype-environment interactions must also be considered when dealing with trends in performances measured under commercial conditions.

## Choice of boar line for terminal crossing

P. SELLIER

*I.N.R.A., Station de Génétique quantitative et appliquée,  
F 78350 Jouy-en-Josas*

Pig sire lines in France are characterized by a broad variety since at the present time about ten boar lines are used to a significant extent. This diversity originates from a number of causes : the main explanation is the between-region variations in the relative economic impact of carcass quality on the benefit per pig and the market demands in terms of carcass weight and conformation.

The qualities required from the terminal boar are reviewed. The merit of a male line mainly depends on (1) the reproductive ability of the boar and its influence on the numerical productivity of the sow herd, (2) the sire effect on progeny production traits. Other aspects such as the « cost price » of the young boar and the expectation of future genetic improvement within the sire line are also evoked. It is to be pointed out that the many traits contributing to the overall merit of a boar line are of unequal importance according to the point of view considered.

Assuming that the commercial crossbred female proceeds from the *French Landrace* × *Large White* combination, the choice of the terminal male line offers a double alternative : (1) backcrossing or crossing with a « specialized » terminal boar, (2) purebred or crossbred

boar. These two aspects are dealt with successively. The compared characteristics of six pig breeds (*Large White*, *French Landrace*, *Belgian Landrace*, *Piértrain*, *Hampshire* and *Duroc*) are analysed, both for boar reproductive performance (libido, feed and leg soundness, stress susceptibility, fertility, effect on litter size) and for growth and carcass traits of crossbred progeny. The results of the ten-year I.N.R.A. programme on the evaluation of pig sire lines are presented and discussed, particularly in terms of lean tissue growth rate and lean tissue food conversion in crossbred pigs sired by boars from these six breeds.

An overall analysis of all traits considered, shows that at the present time, several genetic types of terminal boars following different routes give similar results. In most cases, use of a « specialized » boar line prevails over backcrossing and the trend of progressive decline of backcrossing in France seems to be justified. Among the « specialized » sire breeds, *Belgian Landrace* and *Hampshire* are the highest ranking breeds for lean tissue growth rate and lean tissue food conversion in crossbred offspring : these two breeds have a major part to play, for instance as a crossbred *Hampshire* × *Belgian Landrace*, boar. Taking into account the unfavourable influence of *Hampshire* on meat quality and the advantage of *Large White* as regards boar reproductive efficiency, the *Belgian Landrace* × *Large White* combination is another interesting boar choice for terminal crossing.

#### IV. — FEEDING

##### Utilization of cereals in simple feeds for weaned piglets Comparison between maize, wheat and barley

J. FEKETE \*, J. CASTAING \*\*, O. LAVOREL \*, M. LEUILLET \*

\* I.T.C.F., 8, avenue du Président-Wilson, F 75116 Paris

\*\* A.G.P.M., 122, boulevard Tourasse, F 64000 Pau

Four trials were made in the same conditions and in two experimental stations to compare different lots of cereals : Maize - Wheat - two and six-row Barley.

The experimental feeds included a minimum of 3.5 g lysine per 1000 kg digestible energy by combining a cereal, soybean-oil meal and a vitamin-mineral mixture.

The levels of incorporation of the cereals varied from 54 to 66 p. 100 and those of the soybean meal « 50 » from 29 to 37 p. 100.

Piglets were weaned at a mean age of 26 days (mean weight 6.4 kg) whereafter the experimental groups were formed taking into account the weight at weaning and the mean litter weight at birth. They were housed in groups of 6 or 7 animals per box in isolated warmed and ventilated post-weaning rooms (flat-deck). They were fed for two weeks the first age diet (pellets) already used before weaning, then for 28 or 35 days one of the experimental diets (pellets) *ad libitum*. A total of 2 592 piglets were used, i.e. 405 to 771 animals per diet.

Simple diets composed of cereals and soybean meal allowed to obtain high performances when used in weaned piglets between 8-10 and 25-27 kg (feed intake 920 to 1080 g/d, growth : 500 to 570 g/d).

Piglets tended to consume all the more as diets were less energetic. This resulted in a spontaneous adjustment to the consumption expressed in digestible energy. As regards the growth rate, comparisons between the various groups of cereals did not indicate differences superior to 2 p. 100. Feed conversion ratios regularly increased from the feeds based on maize to those based on six-row barley together with a reduction in the energy concentration of the diets, the discrepancies being often significant. According to the energy conversion ratios expressed in kcal digestible energy per kg live weight gain, the two barley varieties were often ranked first.