II. — GENETIC IMPROVEMENT

Statistical analysis of numerical productivity components in sows of four french breeds
I. — Evolution from 1969 to 1975

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A total of 40,960 litters from 135 Large White herds, 17,359 litters from 73 French Landrace herds, 1,470 litters from 12 Pietrain herds and 7,493 litters from 28 Belgian Landrace herds were used to estimate the evolution from 1969 to 1975 of the numerical productivity components of sows reared in France.

The age at the first farrowing has decreased very markedly in Large White (4.3 days/year) and French Landrace (3.5 days/year) breeds. It was remained more constant in the two breeds of the " double-muscle " type. Lactation length has greatly decreased in each of the four breeds at an annual rate ranging between 2.6 and 3.4 days.

Reduction of the weaning-fertilization interval in the Large White and French Landrace breeds has led to a decrease in the interval between farrowings at annual rates of 3.1 and 3.9 days, respectively.

Evolution in the litter size at birth and at weaning was estimated by analysis of variance on account of the effect of age at farrowing (22 age classes) and of the regression of these variables on lactation length. In the Large White breed, a significant decrease ($P < 0.01$) was noticed in the litter size at the rate of 0.04 piglet whereas this variable remained unchanged in French Landrace. On the other hand, litter size at weaning significantly ($P < 0.01$) increased in each of these two breeds at annual rates of 0.04 and 0.08 piglet/year, respectively.

It may be concluded that the number of weaned piglet/sow/year regularly increases at the rate of 0.4 to 0.5 piglet/year in the first two breeds, whereas it remains relatively unchanged in the two breeds of the " double-muscle " type.

Statistical analysis of numerical productivity components in sows of four french breeds
II. — Components of the variance, repeatability, correlation

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A total of 40,960 litters from 135 Large White herds, 17,359 litters from 73 French Landrace herds, 1,470 litters from 12 Pietrain herds and 7,493 litters from 28 Belgian Landrace herds were used to estimate the " herd " and " sow " components of the variance as well as the repea-

tability of the variables affecting the numerical productivity of the sows. The herd of origin accounted for about 5 per cent of the variance of litter size and for 30 to 55 per cent of that of the lactation length. Estimations of the repeatability of the litter size varied from 0.13 to 0.17 those of the other variables were less homogenous.

Within-litter linear correlations between variables showed that the litter size was independent of the weaning-fertilization interval, but tended to decrease with lactation length. The curves representative of the polynomial regression equations accounting for the variations of the litter size at weaning in terms of litter size at birth show that the latter variable increases up to a maximum of 17 piglets born for Large White and French Landrace, 15 for Pietrain and 16 for Belgian Landrace. However, a piglet has a maximum of chances for surviving until weaning when born in a litter whose size varies from 6 to 9 in the first two breeds and from 5 to 8 in Belgian Landrace.

Heritability of defective nipples in gilts

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Teats of 892 gilts from 11 sires and 77 dams were observed. It appeared that defective nipples were located along the mammae line with higher frequency in the middle of line. When a gilt had several defective nipples they were arranged in groups.

Heritability of that abnormality was calculated by gilt/dam regression and by analysis of variance. We found the same heritability for absolute number and per cent of defective nipples. The heritability varied from 0.30 to 0.65. We conclude that selection against that abnormality can be efficient.

Genetical analysis of sperm production in the young large white boar : preliminary results

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Testicular and epididymal weight as well as gonadal and extragonadal sperm reserves have been analysed in 95 Large White boars from 8 different paternal lines and 53 litters, slaughtered at a mean body weight of 103.6 ± 16.2 kg and a mean age of 195.4 ± 14.2 d following performance testing. All the data have been adjusted for a constant body weight of 103.6 kg.

The characteristics of organ weights and sperm reserves were independant of growth rate between 30 and 80 kg and of the dorsal fat thickness at 80 kg. There was a large range of variation between the means per paternal lines: 22 and 23 per cent testicular and epididymal weights, 37 and 35 per cent for the gonadal and extragonadal sperm reserves. A strong correlation was observed between sperm reserves and the weight of the corresponding organs. All these parameters seem to be under genetic control, however the effect of litter size is more important than the paternal effect.