

EFFECT OF SELECTION FOR CARCASS SCORE ON THE GENETIC IMPROVEMENT OF ITS COMPONENTS IN SWINE

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Received April 29, 1970, accepted September 11, 1970.

ABSTRACT

Selection for carcass score was practiced for ten generations in two separate lines of Yorkshire pigs. Three components of the score were studied: carcass length, loin eye area, and backfat thickness. In line 2, carcass score was the sole criterion of selection, while in line 3, it was combined with feed utilization into an overall merit. Line 1, selected solely for feed utilization, served as a control. Carcass length and loin eye area increased by approximately 2 and 9%, respectively, in both lines. However, backfat thickness also increased by

about 3% in line 2 and 0.4% in line 3. Pooled heritability estimates derived from the analysis of variance and the regression of offspring on mid-parent were 0.64 for carcass length, 0.48 for loin eye area and 0.67 for backfat thickness. Genetic correlations among the components of carcass score, between the components and carcass score and between the components and feed utilization were moderately high and favorable for combined genetic improvement of all traits.

RESUME

On a sélectionné, pendant 10 générations, deux lignées de porcs Yorkshire en vue d'améliorer la qualité de la carcasse. Celle-ci était exprimée par un pointage comprenant la longueur de la carcasse, la surface de l'oeil de longe, et l'épaisseur du gras dorsal. Le pointage de la carcasse était le seul critère de sélection dans la lignée 2, tandis que dans la lignée 3, il était combiné à l'utilisation alimentaire. Une troisième lignée servait de témoin. La longueur de la carcasse et la surface de l'oeil de la longe augmentait approximativement de 2% et 9% respectivement dans les deux lignées. Cependant, l'é-

paisseur du gras dorsal augmentait aussi d'environ 3% dans la lignée 2 et 0.4% dans la lignée 3. Les estimés d'héritabilité dérivés de l'analyse de variance et de la régression des descendants sur la moyenne des parents étaient de 0.64 pour la longueur de la carcasse, 0.48 pour la surface de l'oeil de la longe, et 0.67 pour l'épaisseur du gras dorsal. Les corrélations génétiques entre les composants du pointage de la carcasse, et entre les composants du pointage et l'utilisation alimentaire étaient modérément élevées et favorables pour une amélioration génétique combinée de tous les caractères.

INTRODUCTION

Most of the selection experiments designed to improve the quality of swine carcasses have been performed on single traits. Zoellner *et al.* (14), Minkema *et al.* (10), Hetzer and Harvey (8) and Gray *et al.* (6) selected for thinner backfat, while Duckworth and Holmes (2) selected for longer carcasses. Carcass quality, however, is usually evaluated and dealt with in industry in terms of an index or score including from two to five traits. In a previous paper, Bernard and Fahmy (1) reported the amount of genetic and phenotypic progress obtained in carcass score as determined from four traits, by selecting during nine generations for this composite measurement of carcass quality. The purpose of the present investigation was to measure the effect of selection for carcass score on the phenotypic and the genetic changes in the components of that score.

MATERIALS AND METHODS

Carcass records were obtained on 2031 Yorkshire pigs born to 749 dams and 154 sires between 1956 and 1966, inclusive. The pigs were slaughtered at an average weight of about 90 kg and each carcass was scored according to the Record of Performance procedures then practiced in Canada. The score was based on carcass length (maximum 20 points) measured from the first rib to the interior side of the pelvic bone; the area of loin eye muscle, longissimus dorsi, (maximum 30