

GENETIC AND PHENOTYPIC STUDY OF PRE- AND POST-WEANING WEIGHTS AND GAINS IN SWINE

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ABSTRACT

Data on body weights at five ages (birth, 21, 42, 56 and 140 days) and pre- and post-weaning average daily gains of 6846 pigs from 780 dams and 161 sires in three lines were analyzed to determine the effects of some environmental factors, to estimate heritabilities, to calculate genetic and phenotypic correlations and to ascertain the associations between these traits and some economically important characters in swine. Significant year effects occurred in all traits other than birth and 21-day weights; line effects were highly significant for birth and 21-day weights but were not significant at subsequent stages. Sex effect was pronounced only at older ages. Males were consistently heavier than females

up to weaning age. Unweighted averages of estimates of heritability derived by two methods were 0.17, 0.09, 0.11, 0.13, 0.10, 0.12, and 0.07 for weights at birth, 21, 42, 56, and 140 days, and pre- and post-weaning average daily gains, respectively. The genetic and phenotypic correlations between the seven characters were positive and generally high. Favorable genetic and phenotypic associations were found between birth, weaning and 140-day weights and feed utilization, age at finish, carcass length and average backfat thickness. Weights at weaning and 140 days of age were negatively correlated with carcass score and loin eye area.

RESUME

On a mesuré le poids à cinq âges différents et le gain journalier moyen, avant et après le sevrage, de 6846 porcs issus de 780 truies et 161 verrats, de trois lignées afin d'estimer l'héritabilité, les corrélations génotypiques et phénotypiques, et l'effet de certains facteurs du milieu. On a aussi étudié la relation entre ces mesures de performance et autres caractères d'importance économique. L'effet des années sur le poids ne devenait significatif qu'à partir de l'âge de 42 jours, tandis que l'effet des lignées était hautement significatif à la naissance et à 21 jours et diminuait par la suite. L'effet du sexe augmentait avec l'âge; les mâles étaient régulièrement plus lourds que les femelles au sevrage. La moyenne

non pondérée des estimés d'héritabilité était de 0.17, 0.09, 0.11, 0.13, 0.10 pour le poids à la naissance, 21, 42, 56 et 140 jours, et de 0.12 et 0.07 pour le gain journalier moyen avant et après le sevrage. Les corrélations génotypiques et phénotypiques entre les sept caractères étaient positives et généralement élevées. Il existait des corrélations génotypiques et phénotypiques favorables entre les poids à la naissance, au sevrage, et à 140 jours d'une part, et l'utilisation alimentaire, l'âge à la finition, la longueur de la carcasse, et l'épaisseur moyen du gras dorsal d'autre part. Par contre, les poids au sevrage et à 140 jours étaient négativement associés au pointage de la carcasse et à la surface de la longe.

INTRODUCTION

Many studies on the inheritance of body weights in swine at birth, 56 and 154 days and the growth rates between these ages have been reported in the literature (2, 4, 6, 12, 13). However, few reports (4, 10) are available on studies conducted on weights at other ages, and especially during the preweaning period. With the increased importance of early weaning at ages prior to 56 days, further knowledge is needed of the genetic parameters and of the environmental factors which affect weights at different ages and the associations between these weights. An objective of the present investigation was to meet part of this need by analyzing pig weights at birth, and at 21, 42, 56 and 140 days of age, together with pre- and post-weaning average daily gains. The interrelationships among weights at these stages and average daily gains were also determined. In addition, the data provided some information on the genetic and phenotypic association between weights and other productive traits usually included in selection schemes for net merit.