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THE ESSENTIAL PARAMETERS IN SELECTING TO BE IMPROVED SYNTHETIC PARENT STRAINS FOR USE IN BROILER PRODUCTION

Les paramètres essentiels à'la sélection des lignée de parents synthètiques pour la production chez le broiler

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INTRODUCTION

First of all, the performance of material and some related parameters have to be known before making a decision about a breeding program.

Some estimates of genetic parameters between performance of purebred and their crossbred progenies may indicate that which method of selection is more effective on the genetic improving of crosses. High and positive genetic correlation between performance of purebreds and their crossbred half sibs is the sign of additive gene action and proposes that performance of the cross might be improved through intra-population selection in both parents (5,17). It is suggested that 8th week body weight of a cross could be improved more rapidly by ihtra-population selection in the parental populations (7).

If genetic correlation is negative or has a low positive value some other selection method based on crossbred progeny performance might be more preferable (17). The reciprocal recurrent selection based on crossbred performance would be more effective for genetic improving of quantative traits which are determined by non-additive genes than the within strain selection based on purebred performance (3, 4,13).

While considering several characters similar studies are done in many species of animals and also in egg production of popultry (5,6,9,12,14,15,17,18). But there are less studies especially on the body weights of different ages of broiler.

The main purpose of this study was to estimate heritability of body weights at different ages and genetic correlations between performance of purebred (RTxRT) and their crossbred (RTxYR) progenies and to find out an effective selection method on parent stock of broiler.

MATERIALS AND METHODS

This experiment was conducted at the Faculty of Agriculture, Çukurova University and Regional Agricultural Experiment Institute of Adana, TURKEY.

The parental strains were called RT and YR respectively, which were first back crossed progeny of Ross ($\hat{\sigma}$) X T_2 (φ) and Y_2 ($\hat{\sigma}$) X Ross (φ).

One RT male was mated concurrently with 5 females of RT and 5 females of YR in each of mating pens. We had such 30 mating pens of which 28 could be evaluated.

While doing this evaluation the data from 272 male and 285 female chicks of RTxRT mating and 294 male and 312 female chicks of RTxYR mating could be used for analyzing.

Chicks of each of the two groups were hatched on the same date-on 4 th of April, 1977. The purebred and crossbred chicks were mixed and reared altogether in the adjacent pens in the same poultry house.

For the progenies, the body weights at 2 (14 days), 4 (28 days), 6 (42 days),

TABLE 1.

Heritability estimates for body weights in different ages of males and females of purebred (above row) and crossbred (blow row) Progenies.

Body weights	Males $h^2 \pm S\ h^2$	Females $h^2 \pm S\ h^2$
2 Weeks	0.64 ± 0.29	1.05 ± 0.41
	0.64 ± 0.29	0.38 ± 0.24
4 Weeks	0.49 ± 0.27	1.27 ± 0.43
	0.65 ± 0.29	0.52 ± 0.25
6 Weeks	0.42 ± 0.25	1.26 ± 0.44
	0.59 ± 0.27	0.53 ± 0.24
8 Weeks	0.62 ± 0.30	1.10 ± 0.40
	0.49 ± 0.24	0.39 ± 0.22
10 Weeks	0.65 ± 0.29	1.13 ± 0.41
	0.67 ± 0.28	0.43 ± 0.24

TABLE 2.

Estimates of genetic correlations between purebred and their crossbred progenies for body weights of different ages.

Body weights	Males $r_g \pm S\ r_g$	Females $r_g \pm S\ r_g$
2 Weeks	0.65 ± 0.19	0.72 ± 0.15
4 Weeks	1.02 ± 0.01	0.91 ± 0.15
6 Weeks	1.11 ± 0.09	0.91 ± 0.05
8 Weeks	1.19 ± 0.12	1.01 ± 0.01
10 Weeks	0.92 ± 0.01	0.89 ± 0.07

8 (56 days) and 10 (70 days) weeks and the survival rate at the end of 10 week were investigated.

The differences within sires, genatype groups and sexes and the interactions between them were determined by "Least-Squares Method" of analyse of variance (10).

Heritability estimates (h^2) and their standard errors (Sh^2) based on sire comp.. variance were calculated according to the method on phanotypic correlation between full and half sibs which is experessed by several authors (e.g.2,8).

The formula given by Singh and Dev (17) was used for the genetic correlation coefficients (rg) based on sire and dam compenents of varianceand covariance between the performance of purebred and crossbred progenies. The Standart errors of genetic correlation coefficients (Sgr) were estimated according to formulas given by Robertson (16).

RESULTS AND DISCUSSIONS

The body weights for different ages of genotype groups in both sexes were found. Statisfactory development was obtained for RT x RT and RT x YR progenies.

Differences among cocks used, were significant for body weights in all ages. Differences between sexes from 4 th and 6 th weeks to 10 th week respectively for crossbred and purebred progenies were also significant. But, the interactions between Genotype X Sex and Cock X Genotype were not significant.

The mortality of purebred and crossbred progenies at the end of 10th week was less than 2 % and this can be taken as a good result.

Heritability estimates based on sire components for body weights of different ages in both sexes were found. Although some estimates were over 1, it is possible to say that all heritability values are high for all the characters investigated (Table 1).

High genetic correlations between purebred and crossbred progenies performance were observed. Some of the estimates were over 1 (Table 2).

Finding the heritability and the genetic correlations over 1, could be the result of the sampling error. However, the number of cocks' families in this study were not less than similar studies, when for the purpose of analyzing separately the progenies were fairly decreased especially in purebred females of some cocks' families. For this reason, the heritability estimates in the group of sexes were generally found very high and even some of them were found over 1. Başdoğan (1), suggests that in the case of the heritability over 1, it is better to accept it rather than unuseful one. Similar to this, when the genetic correlation over 1, it is suggested that the correlations can be considered like 1. The genetic correlations which are found fairly high and over 1 are also reported in several studies (5,9,11) as in the present study.

In conclusion; the significant high positive genetic correlations obtained for body weights at the end of 2,4,6,8 and 10 weeks of ages show that the performance of crossbred progeny would be improved by improving the performance of purebreds (RT and YR parental strains) through intra-population selection for these characters. Also, according to high heritability estimates the use of individual selection method is suggested.

SUMMARY

This experiment was conducted in order to estimate some genetic parameters between pure (RT x RT) and their cross (RT x YR) progenies and to find an effective selection method on parent stock of broiler.

The heritabilities of the body weights of chickens at the end of 2, 4, 6, 8 and 10 weeks and genetic correlations beetween purebred and their crossbred progenies for weights of different ages were investigated.

It is possible to say that the heritability coefficients are high for all the characters investigated. Also high genetic correlations between puredred and their crossbred progenies were estimated.

In conclusion; significantly high positive genetic correlations obtained show that it is possible to improve the performance of crossbred progenies by improving pure breds performance through intra-population selection. Also, according to high heritability estimates the use of individual selection method is suggested.

RESUME

Ce travail a été fait afin de détérminer certains paramètres entre les descendants pure (RT x RT) et croisés (RT x YR) et de trouver une méthode efficace de la sélection pour les stocks de parents de broiler.

Il a été determiné les poids vifs journaliers des poulets à la fin de 2, 4, 6, 8 et 10 semaines; avec leure héritabilitiés à differents d'âge et les corrélations génétiques entre les descendants croisés et purs pour les poids vifs à ces âges.

Il est possible de dire que les coefficients de l'héritabilité sont hautement significatifs tous les carractères envisagés. Les corrélations génétiques ont été calculées hautement positives entre les descendants purs et leurs ceux croisés.

En conclusion; la détermination des hautes corrélations génétiques, d'une manière positive, montre que la performance des descendants croisés pourait être améliorée avec la sélection dans la population des races pures. En même temps, ceci montre que les possiblités de haute héritabilité pourrait aboutir a un bon résultat dans l'application de la sélection individuelle.

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