Genetic analysis for productiving of gabali rabbits raised in the north-western coast of egypt

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The experimental work of this study was carried out at Maryout experimental station, Desert Research Centre, Ministry of Agriculture and Land Reclamation, Egypt. Data collected on Gabali rabbits during four consecutive years of production (2003 to 2007), were used to investigate some genetic and non-genetic effects on litter traits (litter size and weight at birth, 21 and at 4 weeks, i.e. weaning; body weight at 4, 8, 12 weeks of age; and daily gain during the intervals 4-8, 8-12 and 4-12 weeks of age and carcass traits consists of pre-slaughter weight, PSW, hot carcass weight, HCW, fore legs weight, FLW, thoracic cage weight, TCW, loin weight, LW and hind legs weight, HLW in addition dressing percentage. Theses data were used to estimate components of variance and components of variance (direct additive, permanent environmental, residual, phenotypic variances, heritability, repeatability, predicted breeding values and their accuracies, as well as genetic and non-genetic correlations). Data were analyzed by multi-trait animal model. The results of the present study could be summarized as follows:5.1 For litter traitsThe performance of Gab rabbits was lower in magnitude for size and weight of most litter traits than that obtained from available literature for the same breed. Moderate coefficients of variation were found for all litter traits in Gab breed rabbits. Actual means of litter traits according to year-season show that LSB, LS21 and LW21recorded the best means during winter/2006, while, the best means for LWB were recorded during spring season/2006. Actual means for litter traits in Gab rabbits according to parity indicated that the first parity recorded the lowest means for all traits. Also, means of LSB, LS21, LWB and LW21 were increased with advance of parity till reached its peak at the sixth and seventh parity with small differences in magnitude. While, means of LSW and LWW were increased with the advance of parity till reached its peak at the sixth parity and decreased at the seventh one. Percentage of additive genetic variance for litter traits were somewhat low, moderate or high and tend to increase from birth up to weaning for litter size traits and have a negative curve linear pattern for litter weight traits. Proportion of permanent environmental in Gab rabbits for doe performance of litter traits was low, moderate or high in values and have positive curve linear pattern for litter size traits, while the negative curve linear for litter weight traits. Heritability estimates in the present study varied from low to high for litter size and tended to increase from birth up to weaning. Repeatability estimates for litter traits were higher than those reported in the available literature except for LSB and LW21 which were the ranges estimated by Henderson III or REML methods. Estimates of doe predicted breeding values in this work for litter size in Gab rabbits indicate that they increased with advance of age from birth up to weaning. Estimated of sires breeding values for all sires of Gab rabbits were 0.91, 0.86 and 0.85 young for LSB, LS21 and LWW at 28 days, respectively, while, 53.0, 0.38 and 24.gm for LWB, LW21 and LWW. These results indicate that the accuracyincreased with advance of age. In the present study, estimates showed that the phenotypic correlations between litter traits were positive and moderate to high in magnitude, except between LSB and each of LWW, LWB and LSW. Genetic correlation in this work among most litter traits for Gab rabbits was strong and positive with high values. For rogeny grow thtraitsActual means of post-weaning body weight in Gab rabbits indicate that body weight for Gab rabbits increased with advance of age, While, these of daily gain during the age intervals of 4-8, 8-12 and 4-12 weeks of age which decreased with advance of age. The coefficient of variation for progeny growth traits in Gab rabbits was low or moderate. Actual

means for BW at 4, 8 and 12 weeks of age in Gab rabbits according to year-season of birth indicates that the rabbits born in winter/2003 were the heaviest for 4- and 12- week body weight. Also, the rabbits born in summer/2005 recorded the best means for daily gain during intervals of 8-12 and 4-12 weeks of age. Actual means of progeny growth traits according to parity show a general trend indicating that body weight had increased slightly with advance of parity till reached its maximum at the seventh parity. Sex differences of body weight of Gab rabbits at 4, 8 and 12 weeks of ageshowed that females at all ages was heavier than males atdifferent ages. Direct additive genetic variance for progenygrowth traits was low. This reflects the importance of thecommon litter effect on post-weaning body weight in rabbits.Heritability estimates in the present work for progeny growthtraits was low or moderate in magnitude. The accuracies ofsire predicted breeding values for post-weaning body weight and daily gain were higher at 4- and 8-weeks than 12-week body weight. Estimates of phenotypic correlation among body weight and daily gain traits at different age were positive and high in magnitude. Also, estimates of genetic correlation between body weight traits at different age were positive and high in value between 4- and 8-weeks body weights, while, for daily gain between 8-12 and 4-12 was recorded positive and high in value. Common litter correlation between all progeny growth traits was positive and high in value; also, environmental correlation recorded the same direction and values between all progeny growth traits. For Carcass TraitsThe mean of cuts were higher than these obtained from the available literature. Actual means according to year-season and parity indicate that there was difference between means of carcass traits but without any consistent trend. Estimates of direct additive genetic variance were positive and small to high in values of carcass traits. Estimates of common litter variance for carcass traits in the present work were higher for HCW and HLW compared to that PSW and TCW. Heritability estimates for cuts of carcass was small in magnitude except HCW which recorded 0.13. Estimates of correlations among the carcass traits at 12 weeks of age in Gab rabbits was positive and low, moderate or high in magnitude, while, estimates of genetic correlation among carcass traits were positive and low, moderate and high in values except between LW and HLW which exerted negative value. Common litter correlation was positive and high inmagnitude except between FLW and TCW had a moderatevalue. from of the present study it could be concluded that:1.Using updated multi-trait animal model methodology produced moderate and favorable estimates of heritability for litter size at 21 days and at weaning at 28 days (0.338 and 0.568) which could be an encouraging factor to improve pre-weaning maternal performance of does in Gab rabbits through selection.2.Estimates of genetic parameters obtained in the present work using multi-trait animal model seem to be the most accurate since the relationships among all animals as well as common litter effect were considered (Henderson, 1984; Lukefahr et al., 1996). Therefore, common litter effect must be considered in the models of analysis for post-weaning growth traits in rabbits to obtain unbiased estimates of heritability and breeding values and accurately.3.High variation in progeny predicted breeding values for body weight at 8 weeks of age might be an encouraging factor to improve body weight in this herd of Gab rabbits through selection.4.The low estimates of permanent environment for litter size and weight at birth, litter size at weaning and litter weight at 21 days could not be affected considerably by permanent environmental effect.5.Because the common litter effect is very important for post-weaning growth weight one can concludethat the common litter effect should be included in genetic evaluation of breeding programs.6.The correlation between litter traits or progeny growth traits and carcass traits is supposed to be important.7.from results obtained in the present study, it could be concluded that the environmental errors was the main factor that affect litter size. So, there is no enough evidence to use the individual selection to improve litter size in rabbits.