Genetic Parameters of Body Weight from an Exotic Line of Duck in Vietnam

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Abstract The V1 duck is a grandparent line of Cherry Valley Super Meat Duck which was bred in England. The V1 duck was imported to Vietnam Institute of Animal Husbandry in 1991 and used for selection experiments. A total of 1040 records of V1 duck raised in Vietnam were used to estimate genetic parameters and the genetic trend of body weight. Body weight at 8 and 24 weeks (BW 8 and BW 24) were measured through 4 generations. Best linear unbiased prediction method with an animal model and restricted maximum likelihood were applied to estimate breeding values and heritabilities, respectively. Means of BW 8 and BW 24 were 2,202 and 3,297 g for male and 2,168 and 3,071 g for female. Estimated heritabilities were 0.104 for BW 8 and 0.128 for BW 24, respectively. Genetic trends were not significant for either BW 8 or BW 24.

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In Vietnam 80% of the population, 12 million households, are engaged in crop and animal production. Duck is very common livestock and they scavenge on fallen grains, insects and weeds in rice paddy field. Farm income has been reported based on rice and ducks⁵⁾. The number of 140 million poultry are raised in Vietnam and 32 million, 23%, are occupied by ducks. Cherry Valley Super Meat Duck (C.V Super M Duck) originated from Cherry Valley Ltd. in England¹⁾ and this strain is well known for its high producing performance. The V1

line is one of the grandparent lines of C.V Super M Duck, that was imported from England by Vietnamese National Institute of Animal Husbandry in 1991. A selection experiment was carried out from 1991 to 1995 and the objectives were as follows.

- 1) To investigate egg and meat production of V1 line using local feeds and in relation to the climate of Vietnam.
- 2) To increase the growth rate of V1 line by selection.

In this paper, we report estimated genetic

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parameters and genetic trends on the growth rate from a 4 generation selection experiment.

Materials and Methods

Number of 1040 records of body weight at 8 weeks (BW 8) and 446 records of body weight at 24 weeks (BW 24) were observed from 1040 ducks of V1 line. These data were from a selection experiment to improve the growth rate of V1 duck. Selection was based on the individual performance of BW 8. The top 5% of males and 20% of females were selected as parents for the next generation. During the experiment period ducks were fed concentrate from local feeds. All data were from a station of National Institute of Animal Husbandry in Vietnam.

Breeding values were estimated by best linear unbiased prediction method with an animal model²⁾. Heritabilities were estimated by restricted maximum likelihood³⁾. In the model, sex and generation effects were considered as fixed effects. Estimated sire breeding values were used to observe genetic trends. Sires' breeding values were weighted with progeny number in each generation and the average of weighted sires breeding values from each generation were used as an indicator of genetic trend.

Results and Discussion

Numbers of observations, mean, standard de-

viation, minimum and maximum values for the main traits are shown in Table 1. Though males and females were reared under the same conditions, mean values of body weight of male were larger than female at 8 and 24 weeks, respectively. The means of BW 8, 2,202 g for male and 2,168 g for female, were significantly different at the 5% level. The means of BW 24, 3,297 g for male and 3,071 g for female, were significantly different at the 1% level. Mean values of BW 8 of the V1 line were 36.6-40.8% higher than Co duck, a Vietnamese native duck, at 8 weeks⁴⁾. The target weight of V1 female duck was around 2,000 g for BW 8 and around 2,800 g for BW 24 in England¹⁾. Means of BW 8 and BW 24 of V1 female in Vietnam were larger than the target values. Though body weight records in Vietnam showed the high variation, for example, BW 8 for females ranged from 1,400 to 2,850 g. It suggested some inequality in management or environmental conditions during the experiment.

The estimated heritabilities were only 0.104 for BW 8 and 0.128 for BW 24. Variance of breeding values and residual for BW 8 were 5,526 and 47,516, respectively. These values were 7,266 and 49,688 for BW 24, respectively. Pingel⁵⁾ listed the heritabilities of body weight from Muscovy duck and Pekin duck. He reported the heritabilities from 0.43 to 0.53 for Muscovy ducks and from 0.23 to 0.89 for Pekin ducks. The estimated heritabilities, 0.104 and

Table 1. Basic statistics of growth traits

Traits	N	Mean	SD	Minimum	Maximum
Male :					
Body weight at :					
8 weeks (g)	437	2, 202	239	1, 450	2, 900
24 weeks (g)	115	3, 297	264	2, 600	4, 100
Female :					
Body weight at :					
8 weeks (g)	603	2, 168	228	1, 400	2, 850
24 weeks (g)	331	3, 071	245	2, 400	3, 700

N : Number of records SD : Standard deviation

0.128, for V1 duck were lower than those from other breeds.

Since wide range of body weight was observed, lower heritabilities might be caused by heterogeneous or unsuitable conditions. Group feeding, for example, often causes bias in the food supply. Severe climate, such as high temperature and humidity, can influence the estimate of heritability. High temperature and humid environmental condition in Vietnam might work as disturbance to express the original genetic potential.

The genetic trends of body weight through 4 generations were examined. Genetic improvements were around +16 g for BW8 and +26 g for BW24 from generation 1 to 4. However, a positive genetic trend was observed for BW8 and BW24, their improvements were relatively small and were not significant. Genetic improvement of BW8, 16 g, was only 0.7% of mean, 2,202 g, for male. Since heritabilities for BW8 and BW24 were only around 0.1, it was hard to expect large genetic improvement. Environmental conditions should be considered again to clarify the genetic performance of Individual and it could increase the heritability.

Only the growth rate was targeted to improve in this selection experiment. Though egg yield traits as well as body weight are important in duck breeding. After accumulat-

ing the data, genetic parameter for egg production with growth traits should be estimated together under a multiple traits model.

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