

Carcass yields of two different strains of ducks raised in different altitude

St Y F G Dillak, N G A Mulyantini, G M Sipahelut and U R Lole

Faculty of Animal Science, Universitas Nusa Cendana Kupang – NTT Indonesia

E-mail: ngamulyantini@yahoo.com.au

Abstract. The objective of this research was to determine if there is a difference in performance and carcass yield between ducks of two different strains raised in different altitude. Ducks different strains (*Muscovy* vs *Pekin* ducks) and they raised either in high or low altitude (high altitude which was between 500 and 1000m vs low altitude which was below 500m). All ducks were given one of two different diets and provided water *ad libitum*. The diets were: 1) commercial diet, and 2) local diet. There were three replicate per treatment and there were 5 ducks per replication. Ducks from each strain were standardized to a similar weight. The results show that Pekin ducks carcass performance was significantly better than Muscovy ducks. Ducks given diet 2 had significantly ($P < 0.001$) lower carcass performance than those given diet 1. Pekin ducks had greater genetic potential for carcass performance in high altitude environment. However, abdominal fat percentage in Pekin ducks is significantly ($P < 0.01$) higher than abdominal fat percentage in Muscovy ducks.

1. Introduction

The duck industry has considered duck strains in regard to carcass yields. Many factors influence duck performance, one of the factors that are less well understood is the geographical location, especially with respect to the altitude from sea level. The relationship between variable environmental parameters and duck performance has not been clearly described. The level of genetic variation within population decreased with the environmental altitudinal gradients increased. However, there are also reports showed opposite results, genetic variations was not by altitude at all. Thus, the relationship between the altitude and genetic diversities are needed to be more investigated. The objective of this research was to determine if there is a difference in performance and carcass yield between ducks of two different strains raised in different altitude. Ducks different strains (*Muscovy* vs *Pekin* ducks) and they raised either in high or low altitude (high altitude which was between 500 and 1000m vs low altitude which was below 500m). The objective of this research was to determine if there is a difference in performance and carcass yields between ducks of two different strains raised in different altitude.

2. Materials and Methods

The experiment method was used 2 x 2 x 2 factorial arrangement. 90 ducks were allocated to 6 treatments with 3 replicates of 5 ducks per replicate. The treatments were (2 different strains of ducks; 2 different diets; and 2 different altitudes). Ducks different strains (*Muscovy* vs *Pekin* ducks) obtained from traditional farmers. The ducks raised either in high or low altitude (high altitude which was between 500 and 1000m vs low altitude which was below 500m). Ducks were provided with regular



pelleted starter diet until 3 weeks of age. From 3 to 6 weeks of age, all ducks were given one of two different finisher diets (commercial vs local). Diets and water were provided *ad libitum*. Composition of experimental finisher diets can be seen in Table 1. All of the finisher diets contain 16% crude protein and EM 3150 kkal/kg. At 6 weeks of age, ducks from each group were selected for carcass analysis. Ducks from each strain were standardized to a similar weight. Variables measured were : live weight, carcass weight, carcass percentage, breast meat yield and weight of abdominal fat. Data were subjected to One-Way ANOVA procedures of SAS software for analysis of variance. The significant level was set at $P < 0.05$ by Duncan's multiple range test.

Table 1. Composition of experimental finisher diets (%) for two different strain of ducks in different altitude.

Ingredients (%)	Diet 1	Diet 2
Corn	68.00	68.00
Soybean meal	27.00	26.20
Cornstarch	0.50	0.50
Dicalcium phosphate	-	1.30
Limestone, 38% Ca	2.00	1.50
Vitamin and mineral premix	1.00	1.00
Salt	0.50	0.50
Vegetable oil	1.00	1.00
Total	100	100

3. Results and Discussion

It can be seen in Table 1 that live weight, carcass weight, carcass percentage and breast meat yields of two different strain of ducks were significantly ($P < 0.05$) much better in high altitude compared with ducks raised in low altitude. However, abdominal fat percentages of 2 strains ducks were significantly higher in high altitude than in low altitude.

The results also show that Pekin ducks carcass performance whether raised in high and low altitude were significantly better than Muscovy ducks. The better carcass performance of Pekin ducks would be expected as it was the strain selected for higher body weight, faster growth and breast yield. Generally, studies comparing different strain of ducks found that strain affects breast weight. [1] reported that factors inherent to ducks that may affect product appearance and carcass yields are breed, selection within breed, and sex. Previous researchers found differences between duck breeds (Pekin and Muscovy) for breast meat color, cooking loss and shear value. Baeca *et al.* [2] stated that selection of Muscovy ducks improved body and breast meat weight. Witkiewicz *et al.* [3] found that two different strain of Pekin ducks were observed to have significantly different live weight, breast meat yield, and collagen content. Omojola found that breed (Pekin and Muscovy) affected live weight, carcass yield, shear value and color as evaluated by a sensory panel [4].

Numerically, ducks given diet 2 had lower carcass weight, lower carcass percentage and lower breast meat yield than those given diet 1. These results suggest that ducks given adequate phosphor in the diet 2 gave better carcass performance than ducks given diet inadequate P (diet 1). Omojola [4] stated that during finisher period, the requirement of available Phosphorus for ducks is reduced from 0.45 to 0.30%. Pekin ducks had greater genetic potential for carcass performance in high altitude environment. However, abdominal fat percentage in Pekin ducks is significantly ($P < 0.01$) higher than abdominal fat percentage in Muscovy ducks which has to be considered by consumers.

Table 2 shows live weight, carcass weight, carcass percentage, breast meat weight and abdominal fat weight of two different strains of ducks raised in different altitude.

Table 2. Live weight, carcass weight and carcass percentage of two strain of ducks given different diets in different altitude												
Variables measured	Low altitude						High altitude					
	Muscovy			Pekin			Muscovy			Pekin		
	Diet 1	Diet 2	Average for Muscovy	Diet 1	Diet 2	Average for Pekin	Diet 1	Diet 2	Average for Muscovy	Diet 1	Diet 2	Average for Muscovy
Live weight (g)	1,461.00 ±32.34 ^a	1,508.00 ±32.35 ^b	1,484.50 ±32.34 ^a	1,736.22 ±32.36 ^b	1,801.23 ±32.35 ^b	1,768.73 ±32.34 ^b	1,904.00 ±8.01 ^c	1,896.00 ±8.01 ^c	1,900.00 ±8.01 ^c	1,987.01 ±7.36 ^c	1,950.02 ±7.36 ^c	1,968.50 ±7.36 ^c
Carcass weight (g)	762.20 ±17.36 ^a	755.96 ±17.33 ^a	759.08 ±17.35 ^a	916.03 ±12.06 ^b	904.22 ±12.06 ^b	910.13 ±12.06 ^b	1,077.76 ±39.06 ^b	1,048.49 ±39.08 ^b	1,068.13 ±39.06 ^b	1,200.94 ±40.86 ^d	1,160.06 ±40.86 ^d	1,180.50 ±40.86 ^d
Carcass percentage	52.17 ±3.08 ^a	50.13 ±3.06 ^a	51.15 ±3.08 ^a	52.76 ±2.88 ^a	50.20 ±2.88 ^a	51.48 ±2.88 ^a	57.13 ±2.76 ^b	55.30 ±2.76 ^b	56.22 ±2.76 ^b	60.44 ±3.16 ^b	59.49 ±3.16 ^b	59.97 ±2.76 ^b
breast meat(g)	231.21 ±12.26 ^a	221.48 ±12.26 ^a	226.35 ±12.26 ^a	207.12 ±11.34 ^a	219.26 ±11.34 ^a	213.19 ±11.34 ^a	251.17 ±8.14 ^b	247.23 ±8.14 ^b	249.20 ±8.14 ^b	243.00 ±9.15 ^b	239.01 ±9.15 ^b	241.01 ±9.14 ^b
abdominal fat (g)	1.48 ±0.14 ^a	1.55 ±0.14 ^a	1.52 ±0.15 ^a	2.34 ±0.13 ^b	2.30 ±0.13 ^b	2.32 ±0.13 ^b	2.25 ±0.13 ^b	2.18 ±0.13 ^b	2.22 ±0.13 ^b	2.30 ±0.16 ^b	2.89 ±0.16 ^c	2.60 ±0.13 ^c

Values are means ± SEM

Means ± SEM followed by the same superscripts in each parameter are not significantly different at the 5% level

4. Conclusion

In conclusion, Pekin ducks had greater genetic potential for growth carcass performance in high altitude environment. Live weight, carcass weight, carcass percentage and breast meat yields of two different strain of ducks given adequate phosphor diet had better carcass yields in high altitude compared with ducks raised in low altitude.

References

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