

PERFORMANCE OF MEAT-TYPE DUCKLINGS ON DIFFERENT LEVELS OF FEED RESTRICTION

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ABSTRACT

Body weights were reduced when ducklings were subjected to restricted feeding. However, no significant differences in body weights were obtained among treatments at 9 weeks old. The average fasted weights, uneviscerated weights, carcass weights (with and without giblets), and dressing percentages as well as the percentage of cut-up parts such as thighs, drumsticks, wings, neck, tail-back and rib-back were not significantly affected by feed restriction. However, the breasts of fully-fed ducklings were heavier and had higher percentage values than those of the restricted ducklings. Feed restriction also did not statistically influence the weights and percentage values of the giblets, head, blood, shanks and intestines. Highest returns-above-feed-and-duckling-costs can be derived when ducklings are marketed at 6 weeks of age. Ducklings whose feeds were restricted had higher returns-above-feed-and-duckling-costs than the fully-fed ducklings at later stages.

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Feed restrictions. Performance.

INTRODUCTION

The White Pekin duck (*Anas platyrhynchos*) is one of the most popular breeds of ducks being raised for meat. Although duck meat has not gained wide acceptance because of its peculiar flavor, Filipinos are nevertheless, beginning to appreciate its culinary value and have started to raise ducks like

broilers and dress them at an early age.

Since the cost of feeds in poultry raising is estimated to constitute about 70% of the total production cost, poultry raisers should find ways of augmenting their profit. One way of doing this is by reducing the amount of feed to be given while keeping the productivity of the flock at a maximum.

There have been many attempts to improve nutrient utilization in chicken by restricting the feed or energy intake. This has been accomplished by limiting the quantity of feed given, by restricting the feeding time or by limiting the amount of energy and protein in the feed.

Feed restriction resulted in better feed utilization, greater feed economy and higher monetary returns both during the growing and laying periods (Narahari, 1974). The net effects of restricted feeding had been estimated using economic returns as index (Gowe et al., 1960; Hollands and Gowe, 1961, 1965; Fuller and Dunahoo, 1962; Altis, 1972). All of these studies reported that feed restriction during the rearing period increased the economic returns per bird housed at the completion of one laying year.

Isaacks et al. (1960) found that restricting the quantity of feed to 70% resulted in 25% savings in feed during the rearing period of heavy breed chickens. Similarly, Voitle and Harms (1974) obtained approximately 22% reduction in feed consumption. However, Walter and Aitken (1961) reported that the considerable decrease in feed consumption in layers subjected to feed restriction at the rate of 12% during the laying period was offset by a drop in egg production. In turkeys, Owings and Sell (1980) observed that a 10% reduction in feed consumption did not have any carry-over effect on rate of egg production, feed per egg, hatchability, fertility and egg weight. In broiler breeder hens, 25% restricted groups produced more eggs than the fully-

fed layers (Voitle and Harms, 1974). Watson (1975) restricted the feed intake of broiler breeder hens during the rearing phase and obtained a 10% improvement in the laying rate of hatchable eggs compared with fully-fed hens. Gous and Stielau (1976) mentioned that restriction for 3 weeks resulted in lower feed cost during rearing and higher total egg production than restriction for 6 to 9 weeks. Thus, it was more profitable to restrict feeds of pullets.

Ward (1972) studied the performance of broilers without feed for varying lengths of time and found that feed restriction had no effect on weight and mortality. Chrappa and Peter (1973) reported that efficiency and mortality were generally not affected until the last 3 weeks when the restricted group was more efficient. They further observed that the weight of crops, gizzard, stomach and breast was increased by feed restriction. Beane et al. (1979) mentioned that full and restricted feeding regimes showed significant effects on body weight gain and feed efficiencies of both male and female broilers. However, the dressing percentage of the male broilers in the feed-restricted group was significantly smaller than in the fully-fed group, but not in the female.

This study was conducted to determine the effects of 5% and 10% feed restrictions on the growth performance of meat-type Pekin ducklings as compared to the fully-fed control. The criteria used to measure the effects of feed restriction were body weight, feed efficiency, mortality, dressing

percentage, weight of giblets and income over feed and duckling cost (IOFDC).

MATERIALS AND METHODS

Eighty-one heads of day-old Pekin ducklings were weighed and assigned to nine pens for the various experimental treatments in a completely randomized design (CRD). The birds in the control treatment were fully-fed and feeds were made available to them at all times. The second and third treatments were given only 95% and 90% respectively, of the feed consumed by the fully-fed birds. Three observations per treatment were made and nine ducklings comprise each experimental unit. Rice hull was used as litter material.

All birds were fully-fed with broiler-starter mash during the first 7 days. A water-soluble vitamin-antibiotic mixture was added to the drinking water daily during the brooding period. After the first 7 days, the feed restriction treatments were introduced and feed consumption and body weights were then recorded.

Feed restriction for the first week was based on the amount of feed consumed by the fully-fed group while feed restriction for the second week was based on the first week's feed consumption. For the restricted groups, the allocated amount of feeds for the day was divided into three parts and offered 3 times daily. Each pen was provided with a 50-watt bulb as source of heat and night light for the birds. Mortality in each group was recorded.

Data on carcass characteristics were taken at 9 weeks of age. Four ducklings (two males and two females) from each pen were sampled for dressing after fasting them for 12 hours. Data collected were fasted weight, freshly-killed weight, uneviscerated dressed weight and carcass weight with and without giblets. The weights of various cut-up parts and other organs were also recorded.

The income over feed and duckling costs (IOFDC) at the end of 5, 6, 7, 8 and 9 weeks as affected by feed restriction was computed using the prices of ₱2.50 per kg of broiler mash, ₱14.00 for each day-old duckling and ₱17.00 per kg liveweight of duckling when sold.

RESULTS AND DISCUSSION

Growth Rate

Body weights of Pekin ducklings significantly increased from the second to the ninth week as influenced by the 5% and 10% feed restrictions (Table 1). However, the fully-fed ducklings consistently performed better than the restricted group. The weekly weights of fully-fed birds from the 2nd to the 8th week were significantly heavier than those given restricted feeding, but their weight differences were no longer significant on the 9th week. Both feed restrictions did not significantly differ in their effect on growth. The absence of significant differences in body weights of all treatments on the 9th week implies that ducklings in the fully-fed group matured early then began to slow down in their growth

Table 1. Weekly body weights of Pekin ducklings from 0 to 9 weeks as affected by feed restriction.

| Treatment | Weekly Body Weight (g) ^{1/} | | | | | | | | | |
|-----------------|--------------------------------------|------|------|------|------|-------|-------|-------|-------|-------|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Full Feeding | 75a | 209a | 307a | 549a | 871a | 1325a | 1638a | 1762a | 1851a | 1998a |
| 5% Restriction | 75a | 209a | 229b | 340b | 711b | 1123b | 1528b | 1581b | 1682b | 1856a |
| 10% Restriction | 75a | 209a | 227b | 332b | 663b | 1083b | 1508b | 1544b | 1603b | 1838a |

^{1/}In a column, means followed by a common letter are not significantly different at 5% level, DMRT.

Table 2. Weekly cumulative feed consumption of Pekin ducklings as affected by feed restriction. n.

| Treatment | Weekly Cumulative Feed Consumption (g) ^{1/} | | | | | | | | |
|-----------------|--|------|-------|-------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Full feeding | 104a | 380a | 1080a | 1869a | 2822a | 3800a | 4847a | 6820a | 9084a |
| 5% Restriction | 104a | 203b | 465b | 1130b | 1880b | 2786b | 3713b | 4707b | 6582b |
| 10% Restriction | 104a | 198b | 446b | 1076c | 1786c | 2644c | 3524c | 4466c | 6242c |

^{1/}In a column, means followed by a common letter are not significantly different at 5% level, DMRT.

rate while ducklings in the two restricted groups were still gaining weight until the 9th week. This also indicates that the feed intake must not be restricted if ducklings for meat purposes are intended for early marketing (at 8 weeks of age or earlier). However, if marketing is to be done at the age of 9 weeks or older, feeding may be restricted by as much as 10%.

Cumulative Feed Consumption

Cumulative feed consumption significantly differed among the feeding treatments (Table 2). In treatments with 5% and 10% feed restrictions, cumulative feed consumptions after 9 weeks were 27.54% and 31.29% lower than that of full feeding. Cumulative feed consumption of birds under the 10% feed restriction was 5.17% lower than that of birds under the 5% feed restriction.

Cumulative Feed Efficiency

Results show that ducklings subjected to 10% and 5% restrictions in feed intake were significantly more efficient than the fully-fed ducklings (Table 3). However, the cumulative feed efficiency values of the 5% and the 10% feed-restricted groups were not significantly different from each other.

It is interesting to note that while the growth rate was unfavorably affected by feed restriction at 5 and 10% levels especially during the early weeks of growth, the reduced feed intake favorably affected feed conver-

sion. It appears that full feeding is more favorable if the purpose is to sell the Pekin ducklings for meat at an early age (about 6 weeks).

Dressing Percentage

The dressing percentage of Pekin ducklings was not affected by feed restriction (Table 4). The values based on carcass weight with or without giblets, the weight of uneviscerated carcass with head and shanks intact and the average fasted weights at 9 weeks were also not significantly different among the feeding treatments.

Percentage of Cut-Up Parts

The duckling carcasses were separated into cut-up parts to determine their relationship to the live-weight as affected by feed restriction. Table 5 shows that the weights of the cut-up parts of the carcasses of the restricted (5 and 10%) groups were not significantly different from that of the fully-fed group except for the breast. The breasts of the fully-fed ducklings were significantly heavier relative to their live weight than those of the restricted birds.

Weight and Percentage of Giblets, Head, Blood, Shanks and Intestines

The weights and percentage values of giblets, head, blood, shanks and intestines of 9-week old Pekin ducklings were not statistically affected by feed restriction (Tables 6 and 7).

Table 3. Weekly cumulative feed efficiency of Pekin ducklings as affected by feed restriction.

| Treatment | Weekly Cumulative Feed Efficiency (F/G) ^{1/} | | | | | | | | |
|-----------------|---|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Full feeding | 0.78a | 1.64b | 2.28b | 2.35b | 2.26b | 2.43b | 2.87b | 3.84b | 4.72b |
| 5% Restriction | 0.78a | 1.32a | 1.75a | 1.78a | 1.79a | 1.92a | 2.46a | 2.99a | 3.70a |
| 10% Restriction | 0.78a | 1.30a | 1.81a | 1.83a | 1.77a | 1.84a | 2.40a | 2.93a | 3.54a |

^{1/} In a column, means followed by a common letter are not significantly different at 5% level, DMRT.

Table 4. Dressing performance of 9-week old Pekin ducklings as affected by feed restriction.^{1/}

| Treatment | Fasted | Uneviscer- | Carcass | Carcass | Dressing | Dressing |
|-----------------|------------|-------------------------|-------------------------|----------------------------|----------------------------------|---------------------------|
| | Weight (g) | ated Carcass Weight (g) | Weight With Giblets (g) | Weight Without Giblets (g) | Percent- age With- out Gib- lets | Percent- age with Giblets |
| Full feeding | 1791 | 1579 | 1462 | 1358 | 83.06 | 75.85 |
| 5% Restriction | 1723 | 1523 | 1414 | 1283 | 82.03 | 74.45 |
| 10% Restriction | 1646 | 1443 | 1341 | 1217 | 81.46 | 73.93 |

^{1/} All values in columns are not significantly different at 5% level, DMRT.

Table 5. Weights and percentage values of cut-up parts (based on liveweight) of 9-week old Pekin duckling carcasses as affected by feed restriction.

| Treatment | Percentage Values/Weights (g) ^{1/} | | | | | | | |
|-----------------|---|---------------|---------------|---------------|---------------|---------------|---------------|--|
| | Breast | Thighs | Drumsticks | Wings | Neck | Tail Back | Rib Back | |
| Full Feeding | 19.01a (340) ^{2/} | 7.47 (134) | 7.74 (121) | 9.92 (177) | 9.36 (166) | 9.32 (166) | 5.78 (102) | |
| 5% Restriction | 17.56b (296) | 7.18 (117) | 7.31 (126) | 9.86 (171) | 9.29 (161) | 9.29 (161) | 5.72 (99) | |
| 10% Restriction | 17.17b (289) | 6.81 (118) | 6.77 (128) | 9.76 (161) | 9.07 (149) | 8.89 (146) | 5.27 (87) | |

^{1/} In a column, means without letters or followed by a common letter are not significantly different at 5% level, DMRT.

^{2/} Values in parentheses are weights of cut-up parts.

Feed Restriction in Meat-Type Ducklings

Table 6. Weights and percentage values of giblets (based on live weight) of 9-week old Pekin ducklings as affected by feed restriction.^{1/}

| Treatment | Heart | | Liver | | Gizzard | |
|-----------------|------------|---------|------------|---------|------------|---------|
| | Weight (g) | Percent | Weight (g) | Percent | Weight (g) | Percent |
| Full feeding | 12 | 0.65 | 38 | 2.10 | 80 | 4.45 |
| 5% Restriction | 13 | 0.73 | 37 | 2.14 | 81 | 4.70 |
| 10% Restriction | 11 | 0.69 | 36 | 2.21 | 76 | 4.63 |

^{1/} Values within columns are not significantly different at 5% level, DMRT.

Table 7. Weights and percentage values of head, blood, shanks and intestines (based on live weight) of 9-week old Pekin ducklings as affected by feed restriction.^{1/}

| Treatment | Head | | Blood | | Shanks | | Intestines | |
|-----------------|------------|---------|------------|---------|------------|---------|------------|---------|
| | Weight (g) | Percent | Weight (g) | Percent | Weight (g) | Percent | Weight (g) | Percent |
| Full feeding | 89 | 4.95 | 92 | 5.12 | 40 | 2.21 | 69 | 3.85 |
| 5% Restriction | 85 | 4.93 | 89 | 5.14 | 39 | 2.24 | 69 | 4.00 |
| 10% Restriction | 82 | 4.98 | 83 | 5.06 | 37 | 2.25 | 65 | 4.21 |

^{1/} Values within columns are not significantly different at 5% level, DMRT.

Income Over Feed and Duckling Cost (IOFDC)

Average income over feed and duckling costs per duckling is shown in Table 8. The highest returns for all treatments were noted when the ducklings were 6 weeks old. As the ducklings became older, a decline in the return was noted in all the treatments. However, the decline was less

pronounced in restricted ducklings. The body weight of fully-fed ducklings at 8 weeks was attained by those on 5% and 10% feed restriction at approximately 9 weeks of age (Table 1). This demonstrates a compensatory response in weight at later stages by ducklings subjected to feed restriction. Hence, the 5 and 10% feed restrictions gave higher returns than the full-feeding treatment at later stages.

Table 8. Average income over feed and duckling costs (IOFDC) per duckling at the end of 5, 6, 7, 8 and 9 weeks as affected by feed restriction.

| Treatment | Average Income Over Feed and Duckling Costs (P) | | | | |
|-----------------|---|------|------|------|------|
| | 5 | 6 | 7 | 8 | 9 |
| Full feeding | 2.44 | 6.26 | 6.12 | 2.97 | 0.25 |
| 5% Restriction | 0.76 | 6.60 | 5.32 | 4.27 | 3.66 |
| 10% Restriction | 0.20 | 6.55 | 5.07 | 3.90 | 4.16 |

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