ISSN No:-2456-2165

Effects of Different Feed on the Growth Rate of *Gallus Gallus Domesticus* (Linnaeus, 1758)

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Abstract:- Effects of different feed on the growth rate of Gallus gallus domesticus was conducted at intensive poultry farm situated in Minbu Township, Magway Region from December 2016 to January 2017 to find out the supplementation effects of different foods and feeding types from one week to six weeks old Chaoren Pokphand broilers. A total of 14 males and 16 females were randomly selected from the same breeder flock and were distributed in two pens. Seven males and eight females were randomly placed in each pen determined by different foods and feeding types. T1 birds were given commercial industrial diet twice per day, in T2 pen the birds were fed with synthesized foods containing maize, broken rice, fish meal and peanut cake with a ratio of 1:1:1:0.5 as much as they consume. At six weeks old, T1 birds had a total of feed intake 68260 g and T2 birds had 34950 g feed intake. Mean body weight (1872g and 1347.33g), feed conversion ratio (2.43 and 1.73) were recorded in T1 and T2 birds respectively. In two types of study, high correlation r^2= 0.977 and 0.971 between feed intake and body weight, and r^2=0.993 and 0.923 between body weight and feed conversion ratio were observed. Mean body weight of six weeks old male and female birds were 1822.86 g and 1557.4 g in T1 birds, and 1915 g and 1163.75 g in T2 birds. The present study will assist to local farmer in the sense of the ability of agricultural by-products as broiler diets.

Keywords:- *Different Feed, Growth Rate, Gallus Gallus Domesticus.*

I. INTRODUCTION

Domestic fowls are the most popular birds in the world largely because of their socio-economic importance by serving as a source of protein for human consumption. *Gallus gallus domesticus* (the domesticated fowl) was one of the most common and widespread livestocks, there are more chickens in the world than any other species of bird. Humans primarily practice keeping to chickens as a source of food both for their meat and eggs (Eriksson *et al.*, 2008) [cited in 1]. Chickens raised for meat are the most numerous of any livestock in the world. Selection broiler chickens have been bred for rapid growth to market weight (Boersma, 2001) [1]. In 1920, a chicken reach 1000 g in 16 weeks, but in 2000, broiler chicken strains reached 2270 g in only 7 weeks (Smith and Daniel, 2000) [1]. Effective integration of housing, feeding, watering, disease control, slaughtering, and processing operations determine the progress of high quality broiler chicken production [2]. Dietary manipulation also improves the performance of broiler production [3].

Human diets such as maize, soy and wheat were used as food sources for industrial broiler chickens. Farrell (2005) proposed that feeding of industrial broiler should change with ingredients which are less sought after in the human diet [4]. Agriculture is the major livelihood activity in the study area with rice and corn being the dominant crop grown. Broken rice, corn, peanut cake and fish meal are able to function usefully as ingredients of poultry feed and plenty with cheap. Rice is rich in carbohydrates. Its energy value for chicks was found to be around 3,600 Kcal/Kg [5]. Cereal grains are important foodstuffs and contain considerable amount of protein [6]. Peanut cake obtained after the oil extraction from peanut seeds contains protein rich, low fibre, high oil and relative absence of antinutritional factors. It is widely used to feed all classes of farm animals [7]. Fishmeal that is an excellent source of protein for poultry contains high levels of essential amino acids, unsaturated fatty acids, certain minerals and vitamins such as A, D and B-complex [8].

With respect to agricultural scene, there is desirable to have some appreciations of how utilize crops and bio-residues as feeds to the livestock production. Most farmers in the rural and sub-urban areas with bad and inadequate access roads and transportation are difficult to reach areas where complete feed can easily be found on time; hence this study was designed to investigate the effects of local agricultural products on broiler performance.

The objectives of the present study were

- to evaluate the effect of two different diets on the growth rate of broiler chicken
- to assess the growth performance parameters in the studied species
- to investigate differences in the growth rates of male and female broiler chickens with respect to different feeding types

ISSN No:-2456-2165

II. MATERIALS AND METHODS

This experiment was carried out in 24m^2 poultry house located in Minbu Township at the geographical coordinates of 20º 10' 48.0" N and 94º 52' 46.0" E during December 2016 to January 2017. The poultry house was divided into two pens separated by bamboo fence and each pen had an area of 12 m^2 and the floor of each pen was covered with rice husks. A total of 14 male and 16 female broiler chickens of one day old were first randomly selected from the same breeder flock as an experimental unit. Seven males and eight females were reared in each pen and provided with tube thick feeders and drinkers. Tube thick feeders were cleaned once a week and drinkers were cleaned daily. In each pen, light was provided with three bulbs suspended at one feet above the chickens to maintain the temperature of 35ºC and the lighting program adopted 12 hours per day at night. Type 1 pen of chicken (T1) was given commercial industrial diet twice per day; in type 2 pen (T2), broiler chickens were fed diets containing four ingredients (maize, broken rice, fish meal and peanut cake as 1:1:1:0.5 ratio) as much as they can consume. Commercial industrial diets include CP 910 SP, CP 910 and CP 911. CP 910 SP was fed to chickens at first two weeks, at 3rd and 4th week CP 910 was fed and, CP 911 was fed in 5th and 6th week.

Content of the commercial industrial diets were

	CP 910 SP	CP 910	CP 911
Protein Min.	21%	19%	18%
Fat Min.	4%	4%	4%
Fibre Max.	5%	5%	5%
Moisture Max.	13%	13%	13%

Table 1

Chicken weight, weight gain, feed intake, and food conversion ratio (FCR) and coefficient of correlation were evaluated as performance parameters. These parameters were recorded weekly starting from one-week old hatchlings to six-week birds. Body weight was measured to the nearest gram using a digital balance.

According to Ross broiler management handbook 2014 [9], Calculate the feed conversion ratio:

$$FCR = \frac{\text{Total Feed Consumed / Intake}}{\text{Total Live Weight}}$$

Fig 1:- Map of the study site
Source: Google earth (2017)

III. RESULTS

Feed intake of the species studied differed between two types and ranged from 5250 g to 68260 g; and 3530 g to 34950 g in T1 and T2. In this study, body weights of T1 and T2 broiler chickens were recorded at the range between 2420g and 28080g, and 2180g and 20210g respectively (Table 2, 3 and Fig. 2, 3). Mean body weights were increased steadily in this study. Remarkable increased body weights were observed between weeks two to six week (Table 4). Weight gains of birds in T1 and T2 were increased relatively with feed intake. Gain in weight was remarkable at week 3 and 4 in T1, and between week 3 and 6 in T2. A little variation that deviate from the successive increasing weight gain was observed in T1 birds. In T1 birds the value of weight gain at week 4 was slightly greater than the values of week 5 and 6 (Table 2, 3).

With respect to feed conversion ratio (FCR), T1 showed similar trend during study period and variation occurred slightly in 3rd week. Variations of FCR values were more varied in T2 birds. The maximum value (2.30) was observed in 3rd week and minimum (1.62) in 1st week (Table 2, 3).

Correlations between feed intake and body weight, and body weight and feed conversion ratio were presented (Fig. 4 - 7).

Weekly recorded mean body weight of males and females was compared in Table 5, 6 and Fig. 8, 9. Mean body weight of male broiler chickens in this study increased remarkably between week 3 and 6 in T1 and between week 4 and 6 in T2 (Table 5). Remarkable increase of female body weight was from week 3 to 6 in T1 and between week 5 and 6 in T2 (Table 6).

No mortality was recorded in this study but leg disorder of some chickens in T2 pen was observed.

Age	Sample size	feed intake (g)	Body weight (g)	Weight gain (g)	feed conversion ratio
1-week	15	5250	2420	1530	2.17
2-week	15	13130	5620	3200	2.34
3-week	15	21010	10900	5280	1.93
4-week	15	36760	16680	5780	2.20
5-week	15	52510	22340	5660	2.35
6-week	15	68260	28080	5740	2.43

Table 2:- Performance efficiency of broiler chickens in T1

Age	Sample size	feed intake (g)	Body weight (g)	Weight gain (g)	feed conversion ratio
1-week	15	3530	2180	1320	1.62
2-week	15	8230	3680	1500	2.24
3-week	15	13270	5770	2090	2.30
4-week	15	18480	8480	2710	2.18
5-week	15	23860	13530	5050	1.76
6-week	15	34950	20210	6680	1.73

Table 3:- Performance efficiency of broiler chickens in T2

Age	Body weight (mean ± SD)					
	T1			T2		
1-week	161.33	±	30.67	145.33	±	14.07
2-week	374.67	±	60.69	245.33	±	49.41
3-week	726.67	±	95.82	384.67	±	110.70
4-week	1112	±	144.58	565.33	±	174.51
5-week	1489.33	±	134.35	902	±	250.15
6-week	1872	±	161.15	1347.33	±	276.96

Table 4:- Mean body weight (g) of broiler chickens on different feeding types.

Age	Body weight (mean ± SD)					
	T1			T2		
1-week	165.71	±	32.07	148.57	±	18.64
2-week	365.71	±	79.76	272.86	±	50.57
3-week	708.57	±	134.59	461.43	±	112.16
4-week	1074.29	±	183.59	705.71	±	165.01
5-week	1460	±	173.97	1078.57	±	261.49
6-week	1822.86	±	214.61	1557.14	±	201.35

Table 5:- Mean body weight (g) of male broiler chickens on different feeding types

Age	**Body weight (mean ± SD)**					
	T1			**T2**		
1-week	157.5	±	31.05	142.5	±	8.8
2-week	382.5	±	42.00	221.25	±	35.63
3-week	742.5	±	47.13	317.5	±	51.75
4-week	1145	±	101.28	442.5	±	24.93
5-week	1515	±	91.79	747.5	±	89.88
6-week	1915	±	62.11	1163.75	±	189.97

Table 6:- Mean body weight (g) of female broiler chickens on different feeding types.

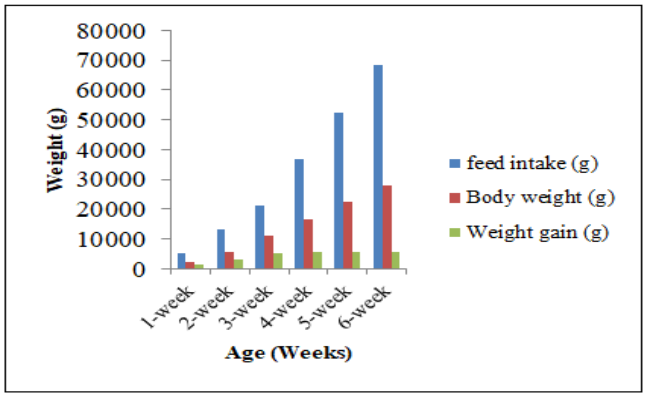

Fig. 2:- Weekly comparison of feed intake, body weight, weight gain of broiler chickens from Type 1

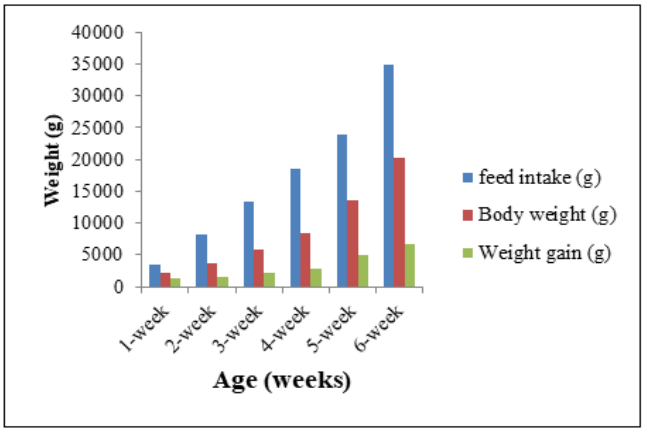

Fig. 3:- Weekly comparison of feed intake, body weight, weight gain of broiler chickens from Type 2

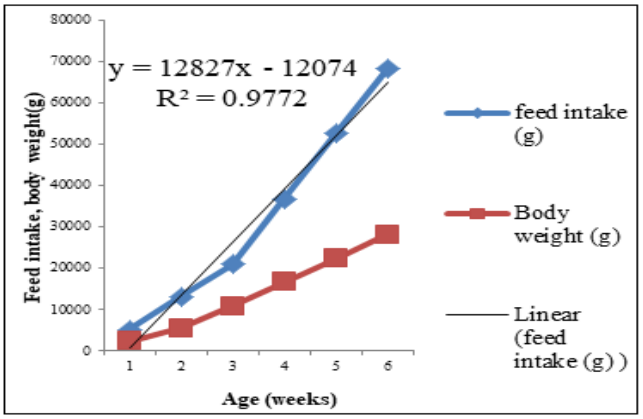

Fig. 4:- Correlation of feed intake and body weight of broiler chickens from Type 1

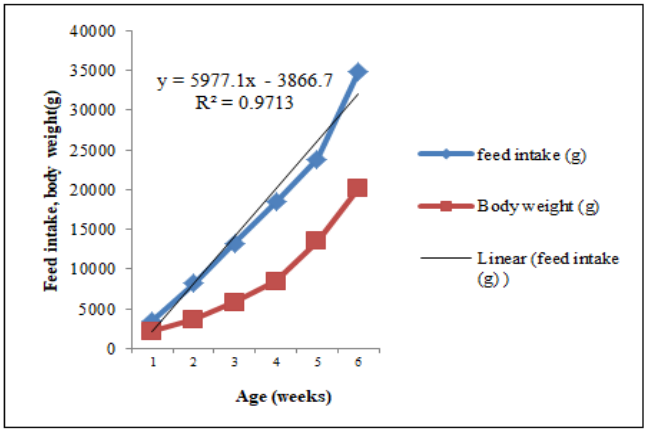

Fig. 5:- Correlation of feed intake and body weight of broiler chickens from Type 2

ISSN No:-2456-2165

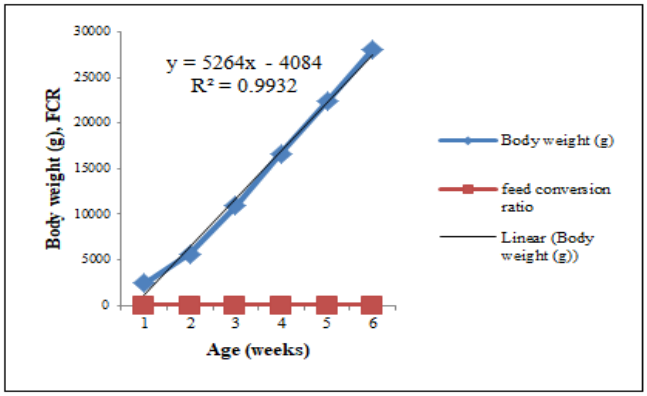

Fig. 6:- Correlation of body weight and feed conversion ratio from Type 1

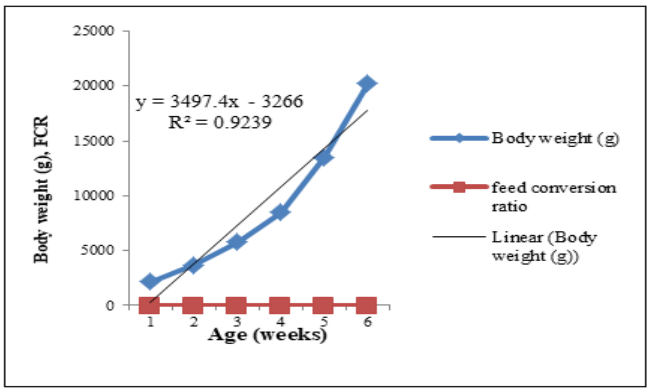

Fig. 7:- Correlation of body weight and feed conversion ratio from Type 2

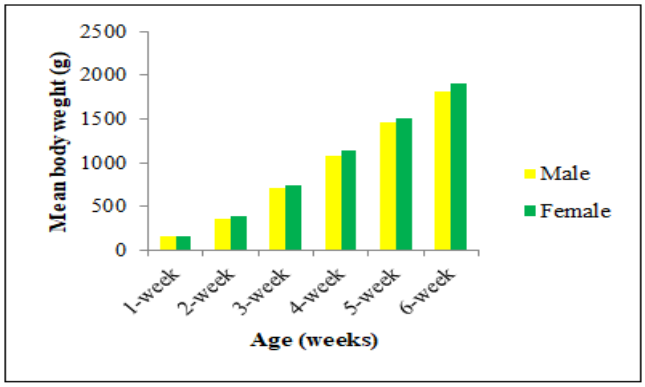

Fig. 8:- Weekly comparison of mean body weight of male and female chickens from Type 1

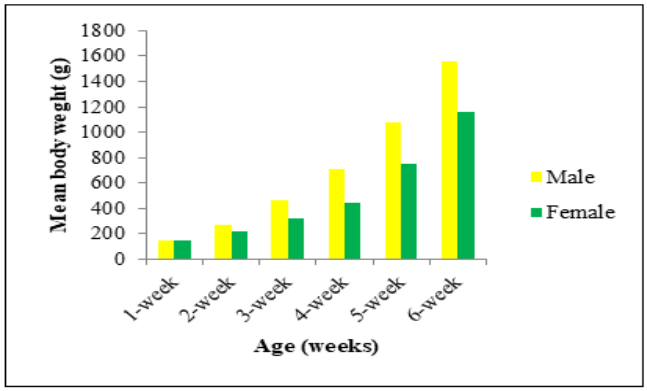

Fig. 9:- Weekly comparison of mean body weight of male and female chickens from Type 2

IV. DISCUSSION

The domestic fowls are descended from red jungle fowl and all are omnivorous, confined to the *Gallus* species. In the livestock production industry, feed is known to represent the greatest input cost in an operation. In the present study, T1 birds were fed with commercial industrial diet twice per day and T2 birds were fed with integrated pellet foods containing corn, broken rice, peanut cake and fish meal. Feed intake by T1 broiler chickens (68260 g) was higher than T2 (34950 g). This may be probably due to food ingredients in the diet of T2 birds were lack of any exogenous feed additives. Broiler chickens may reach 2000g within five weeks under proper management [2]. Mean body weight 2160 g in six weeks age was presented in the record of Ko Ko Zaw, 2015[1]. In the present study the mean body weight during six weeks of age was 1870kg in T1, and 1350 g in T2. Differences may be attributed to differences in feeding types.

Body weight increased in accordance with increment time and consumption to the commercial industrial broiler diet. Supplementation of diets with exogenous enzymes enhanced the nutrient digestibility of pigs and poultry [10]. Enzyme supplementation increased nutrient digestibilities of broiler diet [11].

In the present study, final weight gains of 5740 g in T1 and 6680 g in T2 were observed. The differences in body weight gain could not be explained by differences in nutrient digestibility but were probably caused by the lack of ability to increase their feed intake sufficiently.

Feed conversion ratio (FCR) is a measure of how well a flock converts feed intake into live weight and provides an indicator of management performance, and also profit at any given feed cost [12]. Feed conversion ratio increased with increasing age in T1 birds, but little decreased value 1.93 was observed in third week. The feed conversion ratio varied remarkably in T2 birds ranging from 1.62 in first week and 2.30 in third week. The standard in broiler performance is achievement of 2500 g live weight with a feed conversion ratio of 1.72 at 42 day (6 weeks) of age [13]. In the present study 28080 g live weight with FCR value 2.43 and 20210 g live weight with FCR value 1.73 at 42 days of age were recorded in T1 and T2 respectively.

There is a close relationship between feed intake and body weight of the studied species. Correlation coefficient of r^2= 0.977 and 0.971 were observed in T1 and T2. Similarly, the close relationship between body weight and feed conversion ratio of the chickens studied were mentioned in the data of r^2=0.993, and 0.923 for T1 and T2.

With respect to mean body weight of male broiler chickens, the minimum and maximum value of 165.71 g and 1822.86 g and 148.57 g and 1557.14 g were observed for T1 and T2 birds. Gathered data for mean body weight of female chickens showed the lowest and highest mean value of 157.5g and 1915 g, 142.5 g and 1163.75 g for T1 and T2 respectively.

No mortality was recorded in the present studied species. Arbor Acres, 2008 pointed out that good quality chick is provided with proper management and nutrition will raise good quality chicks and mortality less than 0.7% [14]. Mudhunguyo and Masama, 2015 also pointed out that proper management bring about 5% and below broiler mortality rate [2]. Although no mortality was recorded in the present study, leg disorder in some chickens was observed in T2 birds. The symptom of slipped tendon or perosis is deforming leg weakness in chickens, ducks and turkeys under six weeks of age. The causes of this disorder were injuries received when other chicks pile upon it or when the chick is placed on slick flooring soon after hatching or by a deficiency of some trace nutrients [15]. In the present work, it may be due to less of rice husks at the floor of pen and deficiency of a number of trace nutrients in their feeds.

V. CONCLUSION

Myanmar is an agricultural country and economy of Magway region is based on agriculture. Food ingredients (maize, broken rice, fish meal and peanut cake) used in this study are plentiful in the study area. This investigation can give the information i.e., broiler chickens can grow without serious harmful effects by feeding of local agricultural by-products to farmers.

ACKNOWLEDGEMENTS

I would like to thank Dr Khin Maung Oo, Rector, University of Magway, for permitting the opportunity to present this paper. I would like to express my special thanks to Dr Htay Htay Sein Professor and head (Rtd), Dr Cho Cho Oo Professor and Head, Department of Zoology, University of Magway for their invaluable and kind help during this research paper.

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