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Growth performance of broilers in Cauvery Delta region of Tamil Nadu

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Abstract
A six-week duration biological experiment was conducted to access the growth performance of broiler chicken at Veterinary College and Research Institute, Orathanadu, Thanjavur District, Tamil Nadu, India. A total of 250 broiler chicks used for the study, were reared under standard and uniform managemental conditions throughout the experimental period. They were fed *ad libitum* with pre-starter, starter and finisher diets during 0-7, 8-21 and 22-42 days, respectively. Body weight and feed consumption was recorded daily form 0- 42 days of age. The birds attained final body weight of 2121.66±21.52 grams (gms) and have consumed an average of 4049.6 gms of feed at the end of 6 weeks of age. The data on daily body weight (a) and feed consumption (b) was plotted against the age of the birds (x) in days and the linear equation is given as a = 54.308x - 293.45 and b = 4.6136x - 1.6641. The study revealed optimum performance of broilers attaining desirable weight with FCR less than 2.0 in the study area.

Keywords: broiler, growth performance, Cauvery Delta region

Introduction
The red jungle fowl, an Asian breed, is assumed to be the ancestor of our modern poultry breeds. By natural selection over years, they were sturdy birds which have much of the heat tolerant and disease resistant capacity with very less production capacity. As the population of the world increased, with increasing demand for quality protein, man was primarily aimed towards developing a high producing bird for food, rather than working towards non production traits. This leads to the production of today's commercials with excellent egg and meat producing capacity.

However, most of the major international poultry breeders are located in temperate countries (Canada, France, Germany, the Netherlands, the UK and the USA). The question then arises whether commercial stocks developed in more moderate climates are optimal for the high heat and humidity conditions of a very large segment of the poultry-producing areas in the world.

Hence, this experiment was conducted at the Poultry Unit, Veterinary College and Research Institute, Orathanadu during the months of May-June to assess the growth performance of broilers. The district lies between 9º 50' and 11º 25' North latitude and between 78º 45' and 79º 25' East longitude. In the study area, the maximum temperature reaches to about 38.00 ºC during the month of May and the minimum touches to 20.30º C, in December months. Heat becomes intense in April and increases in May-June and comes down gradually in June-July when the southwest monsoon on sets in. The relative humidity was high throughout the year in range of 65 to 85 per cent.

Materials and Methods
The experimental birds were reared up to six weeks of age in an open sided, deep litter house and were reared under standard and uniform managemental conditions throughout the period. The experimental period was divided into three phases namely, pre-starter (0-7 days), starter (8-21 days) and finisher (22-42 days) based on the type of feed provided (BIS 2007). All the diets were isocaloric and isonitrogenous. The birds were fed *ad libitum* with pre-starter, starter and finisher mash diets during 0-7, 8-21 and 22-35 days, respectively. The birds were vaccinated against Newcastle disease at 7th day (RDVF), 28th day (Lasota) and Infectious Bursal Disease at 14th day of age.

The ingredient and nutrient composition of the experimental broiler diet is presented in Table 1.

Table 1: Ingredient and nutrient composition of the experimental broiler diet

Name of the ingredient (per cent)	Per cent inclusion level		
	Broiler pre-starter (0-7days)	Broiler Starter (8-21 days)	Broiler finisher (22-42 days)
Maize (Corn)	55.42	59.64	61.66
Soya bean meal	37.5	32.5	30
Oil (Fat)	2	3	4
Salt	0.275	0.3	0.3
Calcite Powder	1.3	1.2	1.2
DCP	1.8	1.8	1.6
Vitamin mix (AB_2D_3K)	0.02	0.02	0.02
Feed additives**	1.685	1.54	1.22
Total	100	100	100

**** -** Feed additive includes- Lysine, Methionine, Ultravit M, Perivac plus, Choline chloride and Cosmodot EP.

Birds were individually weighed (10 numbers) every day up to 42nd day by using electronic weighing balance of 0.1 g accuracy and the weights were recorded. Feed was weighed and fed to birds. At the end of each day, the left-over feed was weighed back and net feed consumption was calculated.

Result and Discussion

The data of daily Body weight and feed consumption of broilers during prestarter phase (1-7 days), starter phase (8-21 days) and finisher phase (22-42 days) are presented in table 2, III and IV respectively.

The average day-old broiler chick weight (gm) observed in the current study (43.66±0.98) was comparable with the previous reports by Srinivasan *et al.,* (2020) [7] (45.82±0.76), Kumar *et al.,* (2020) [4] (39.33 to 46 grams) and Mesquita et al., (2021) [5] (46.01 ± 0.11). The day-old chick weight is the reflection of egg weight, as there is a high genetic correlation between the two traits.

At the end of first week, the average body weight (g) of birds (120.61±3.12) was observed to be comparatively lower, than the values reported by H. Al-Khalaifa *et al.,* (2019) [1] (125.8 g), Al-Nedawi *et al.,* (2019) [2] in male (163.62±3.04 g) and female (157.79±3.55 g) broilers, Srinivasan *et al.,* (2020) [7] in Vencobb- 320 broiler chicks (162.68 ±1.26) and Priya *et al.,* (2020) [6] (182.90 ± 1.47) in Cobb 400 broilers. With regard to feed consumption, Chauhan *et al.,* (2020) [3] and Srinivasan *et al.,* (2020) [7] reported a lower cumulative feed consumption of 120.65± 0.56 and 147.6±0.93 grams, respectively than observed in the current study (158 grams).

Table 2: Body weight (g) and feed consumption of birds during Prestarter phase (1-7 days)

Day	Body Weight (n=10)	Feed Consumption (g/bird)
1	43.66±0.98	8.80
2	54.04±1.26	12.40
3	63.9±1.76	19.20
4	80.16±2.21	26.00
5	97.07±3.32	28.00
6	120.61±3.12	31.60
7	146.14±3.46	32.00

During the starter phase, the body weight of the birds increased gradually from 166.71±3.49 grams at 8th day of age to 329.43±7.42 at 14th days and 703.5±18.50 at the end of three weeks. There is a noticeable increase in feed consumption during the starter phase from 36.00 grams/ bird to 96.80 grams/ bird, with cumulative feed consumption of 481.2 and 1030 grams/ bird from 1-14 day and 1 to 21 respectively.

The results of body weight obtained in the current study at the end of 14 days were comparable with the weights observed by H. Al-Khalaifa *et al.,* (2019) [1] (304.00) and lower than observed by Srinivasan *et al.,* (2020) [7] (427.98 a ±4.10). However, at the end of three weeks comparable results on body weight were observed by Srinivasan *et al.,* (2020) [7] (787.78 ±17.06). With regard to feed consumption at the end of 3 weeks, the results obtained, were in complement with the reports of Srinivasan *et al.,* (2020) [7] (1034.91 ±18.82) and higher than observed by H. Al-Khalaifa *et al.,* (2019) [1] (789.9 g).

Table 3: Body weight (g) and feed consumption of birds during starter phase (7-21 days)

Day	Body Weight (g)	Feed Consumption (g/bird)
8	166.71±3.49	36.00
9	179.38±3.85	36.00
10	204.62±5.35	41.20
11	238.95±4.01	44.00
12	262.24±9.50	50.00
13	303.81±7.24	56.22
14	329.43±7.42	60.24
15	382.79±10.68	64.26
16	456.91±8.74	68.27
17	495.26±22.93	72.29
18	521.09±8.96	76.31
19	592.95±18.04	80.32
20	663.57±22.30	92.37
21	703.5±18.50	97.19

At the end of 42 days the birds attained the final body weight of 2121.66±21.52 grams and the cumulative feed consumption of 4096.12 grams from 1-42 days of age. However comparatively higher values of Body weight and feed consumption was reported by Srinivasan *et al.,* (2020) (2468 ±24.63 and 4590.01 ±65.21). However, Chauhan *et al.,* (2020) [3] reported lower overall feed consumption of 3982.88a± 31.33 9 / bird, but the birds gained around 1852.50 ± 0.31 at the end of 6 weeks.

The variations in growth rate and feed consumption might be attributed to genetic of the birds and variable environmental factors in the area of study.

The data on daily body weight (a) and feed consumption (b) was plotted against the age (x) of the birds (Figure: 1, 2) and the linear equation is given as a = 54.308x - 293.45 and b = 4.6136x - 1.6641 respectively. This equation may be used to predict the feed consumption and growth rate of broilers reared in delta zone of Tamil Nadu.

Table 3: Body weight (g) and daily feed consumption (g) of birds during finisher phase (22- 42 days)

Day	Body Weight (g)	Feed Consumption (g/bird)
22	774.52±21.80	100.40
23	857.83±24.90	100.81
24	882.32±24.68	104.84
25	941.49±30.03	108.87
26	1016.42±25.98	112.90
27	1094.63±49.71	117.41
28	1174.72±42.37	127.64
29	1266.88±39.98	130.08
30	1358.15±29.40	134.15
31	1417.89±32.66	142.28
32	1474.06±32.09	146.34
33	1569.43±24.65	144.31
34	1603.955±22.84	150.41
35	1683.55±19.25	154.47
36	1755.37±21.97	166.67
37	1822.66±30.92	170.73
38	1850.05±28.42	178.86
39	1911.95±24.26	186.99
40	1989.55±20.72	191.06
41	2040.94±17.54	195.12
42	2121.66±21.52	199.19

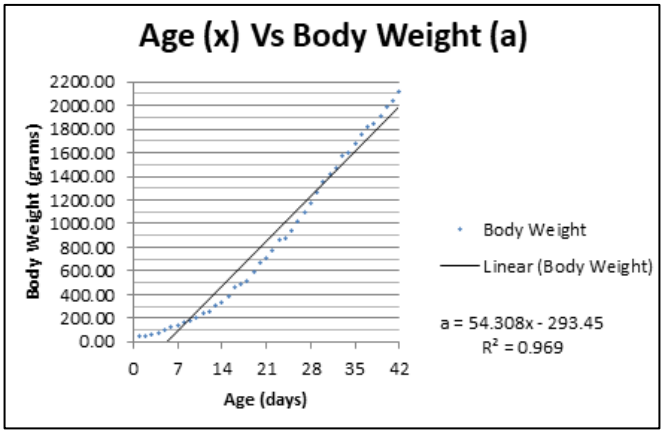

Fig 1: Graph showing body weight of broilers in relation with age

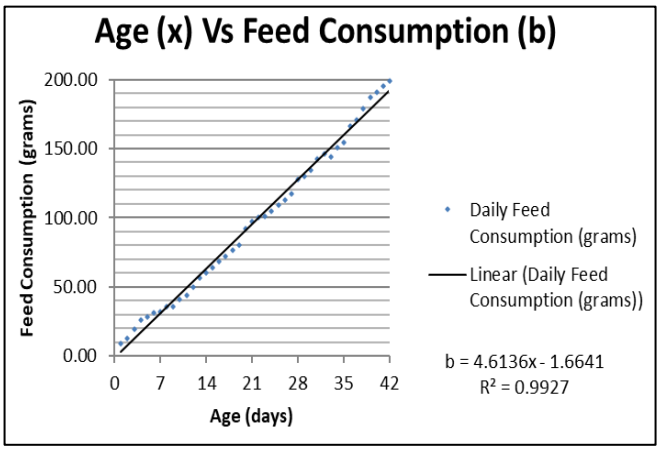

Fig 2: Graph showing feed consumption of broilers in relation with age

Conclusion

At present, climatic stress is a major treat for poultry industry, especially for marginal poultry farmers raising birds in open-sided poultry houses. A deeper knowledge of avian physiology, poultry management, poultry genetics, and poultry nutrition is much essential to meet the future demands not only to supply quality protein to the consumers, but also to provide better profitability for the poultry farmers.

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