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THE FULANI ECOTYPE CHICKEN: GROWTH AND FEED UTILIZATION POTENTIALS

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Abstract: One hundred and eighty three (183) Fulani Ecotype Chicken (mixed sexes) were used to study the growth potential of this Chicken Ecotype. Data were generated through measurements of body parts and body weight from 0-20 weeks of age. The mean values obtained for Body Weight (BW) ranged from 30.45 ±1.24 to 1049.15 ± 189. The bi weekly rate of increase in body weight from 0 to 20 weeks were 31.63, 79.21, 112.47,126.66, 84.89, 96.72, 94.61, 142.46, 170.85 and 121.99 while the growth rate constant (%) for body weight were 98.89, 57.55, 35.80, 19.38, 17.99, from 0 -4, 5-8, 9-12, 13-16, and 17-20 weeks of age respectively. There was rapid development in FEC body weight from 0 -8 weeks of age and they maximized their body weight gain from 14 – 18 weeks of age. 663.98 45 ± 122.20 to 997.29.45± 187.16. They have better growth efficiency (0.51) between 13 and 16 weeks of age, the feed conversion ratio were 1.12, 1.17, 1.63, 1.77 and 2.24 while the feed efficiency were 0.64, 0.52, 0.50, 0.46 and 0.32 at week 0-4,5-8,9-12,13-16 and 17-20weeks respectively. The FEC can be selected for an improved body weight at ages below twenty week.

INTRODUCTION

The native chicken constitutes about 80 percent of the 120 million poultry birds found in Nigeria and they contribute significantly to animal protein intake. They are known for adaptation superiority in terms of resistance to disease and other harsh environmental conditions [1], yet they have remained unselected and unimproved with low productivity. Importation of high yielding stocks from developed countries continue to increase tremendously but their performance is poorer in Nigeria due to the problem of acclimatization, disease and management procedure [2]. Generally, the costs of producing these imported stocks are higher and the prices of their products are beyond the reach of the common man, hence it is necessary to develop our indigenous stocks, which are readily available at an affordable price for better yield so as to alleviate the shortage in animal protein intake.

The Fulani Ecotype Chicken (FEC) is native to the Fulani tribe in the middle belt and northern parts of Nigeria. They are known to be superior in live weight than any other chicken ecotype within Nigeria [3]. They are superior to the Yoruba ecotype in growth traits when raised under the same management procedure [4]. The detail characterization of the FEC with respects to their growth potential and performance will be useful for breeder in future selection programme designed to upgrade the Fulani Ecotype Chicken for meat production.

MATERIALS AND METHOD

One hundred and eighty three Fulani Ecotype Chickens were obtained from incubation and hatching of five hundred eggs collected from different Fulani kraals. On the day of hatch, the chicks were wing banded, weighed and randomly distributed to the brooding pen at the Animal Pavilion unit of the Department of Animal production University of Ilorin, Kwara state, Nigeria. The chickens were placed

The process of data collection started immediately the birds arrived from the commercial hatchery (Hilfoday Farms Ltd.) located at Lasoju, Kwara, state. The feed intake was taken as total feed consumed on weekly basis. These were obtained by subtracting the left over feed from the total feed given to the chicken on weekly basis. Feed efficiency was obtained by expressing the weight gain over a period of time as a percentage of feed intake over the same period. Feed conversion ratio was measured as the amount of feed consumed per unit weight gain. Growth efficiencies were obtained by dividing weight gains over a particular period by initial live weight [6]. The weights of each bird were measured from 0 – 2 weeks using the Scout II electronic Top Loading balance (600g capacity), and later after a sensitive 10 kg measuring scale was used. The Shank Diameter (SD) was measured with the aid of Vernier caliper, while Body Length (BL), Body Girth (BG), Wing Length (WL), Drumstick Length (DL), Keel Length (KL), Thigh Length (TL), and Shank Length(SL), were measured with a flexible measuring tape . BL was measured from the nasal opening through the back to the tip of the pygostyle of the bird with the neck gently stretched. The circumference of the body around the breast was measured as BG, WL was taken from the humerous -coracoid junction to the tip of the digit, SL was measured from the foot pad to the hock joint, KL was measured from the cranial of the keel to its caudal terminals, while DL was measured from the tip of the hock joint to the back of the femur. All the linear body measurements were centimeters while the body weight is in gram; data collections were on weekly basis. The growth rate constant was calculated from this expression:

$$T = \frac{\frac{W_2 - W_1}{W_2 + W_1}}{2} \times \frac{100}{1}$$

T = Growth within a particular period (in percentages).
W_1 = Initial weight,
W_2 = Final weight [7]

RESULTS AND DISCUSSION

The mean of body weight and body parts obtained for the FEC are presented in Table 1 while the rate of increase in Table 2. FEC maximized their body weight gain from 14 -18 weeks of age; 663.98g ± 122.20 to 977.29g, ± 187.16 (Table 1, Fig. 1) and this agrees with the fact that local chicken generally maximize their weight gain from the ages of 10 – 14 weeks [5] after which they grew at a slower rate at the onset of puberty [9]. The mean body lengths increase rapidly at early stage from 0 - 4 weeks, then at a slower rate from 6 weeks to 20 weeks of age (Table1), while the mean body girth and wing length shows rapid development between week 0 and 6 weeks of age. Other body parts (TL, KL, SL, and SD) increase at a faster rate from 0 week to 6 weeks of age, then at slower rate from 8 to 12 weeks. (Table1). A more rapid development in body weight was obtained from 0 - 8 weeks (Table 2, Fig. 2). then a slight decrease in the rate of development between 8 and 10 weeks. An increase in the rate was observed from 10 to 18 weeks; however it is at a slower rate from 10 to 14 weeks of age while a higher rate from 14 to 18 weeks of age was observed.

The result of body weight and some body part measured from week 0 to 20 weeks indicate that the rate of growth for development of body weight and different body parts were different from each other. Higher growth rate constant was obtained for body weight from 0 - 4 weeks (Table 3, Fig. 3) and constant lower growth rate from 5 – 20 weeks; these might be due to the fact that chicken grows at a slower rate at the onset of puberty. The Feed conversion ratio was 1.12, 1.17, 1.63, 1.77, and 2.14 between 0 - 4, 5 - 8, 9 - 12, 13 - 16, and 17 - 20 weeks of age. The feed efficiency was high between 0 - 4 and 5 - 8 weeks of age 63% and 52% respectively. The growth efficiency was generally low and below average, it was declining as the birds advancing with age. Better growth efficiency of 51%

Traits	0	1	2	3	4	5	6	7	8	9	10
N	183	180	175	175	170	170	170	170	168	168	168
BW	30.45± 1.24	37.81± 6.15	69.42± 14.87	108.17± 20.86	148.64± 33.43	214.48± 39.51	261.10± 59.72	328.94± 75.72	387.77 ±99.95	417.± 98.18	472.65± 105.9
BL	9.20± 0.89	11.81± 1.32	15.11± 1.55	18.03± 1.98	20.16± 1.64	22.97± 1.64	24.85± 2.36	27.18± 2.30	28.56± 3.74	29.41± 3.72	30.59± 3.25
BG	8.73± 0.75	9.13± 1.43	10.96± 1.18	12.87± 1.02	20.16± 1.64	15.19± 1.54	16.48± 1.48	17.45± 1.72	17.59± 1.79	17.78± 1.80	18.34± 1.59
DL	2.99± 0.32	3.38± 0.34	4.20± 0.40	5.12± 0.58	5.84± 0.71	6.54± 1.02	8.29± 1.64	8.74± 1.75	8.85± 1.93	9.31± 1.96	9.34± 1.34
KL	1.65± 0.12	1.90± 0.20	2.88± 0.44	3.98± 0.75	4.52± 0.72	5.26± 0.91	6.12± 0.54	6.63± 0.46	6.68± 0.86	6.74± 1.78	7.10± 1.10
SD	0.35± 0.01	0.40± 0.14	0.58± 0.13	0.64± 0.09	0.74± 0.18	0.76± 0.26	0.78± 0.22	0.84± 0.26	0.85± 0.07	0.85± 0.07	0.87± 0.09
SL	1.95± 0.11	1.98± 0.25	3.00± 0.87	3.92± 0.43	4.76± 0.59	5.46± 0.77	5.88± 0.99	6.26± 0.85	6.62± 0.94	7.07± 1.37	7.63± 1.14
TL	1.98± 0.55	2.19± 1.67	3.12± 0.47	3.94± 0.51	4.74± 0.92	5.05± 0.54	6.33± 1.05	6.82± 1.14	7.00± 1.27	7.12± 1.51	7.32± 1.32
WL	4.36± 0.78	5.34± 0.59	7.40± 1.92	9.12± 1.15	10.51± 1.17	12.01± 1.39	14.40± 1.60	14.48± 1.80	16.49± 1.64	16.57± 1.85	16.57± 1.85

Table 1a: Means of body weights and body parts measured for the FEC, from week 0 to week 10

between the ages of 13 – 16 showed that maximum growth was taking place at this time; also this was the period where the FEC maximize their body weight. Lower growth efficiency at other ages indicates that the birds grow at a slower rate at those ages. The growth rate constant decline with age it was very high between 0 - 4 weeks of age and far below average between 17 - 20 weeks of age.

The graphical representation of the body weight and the body parts measured are shown in Figures 1-3

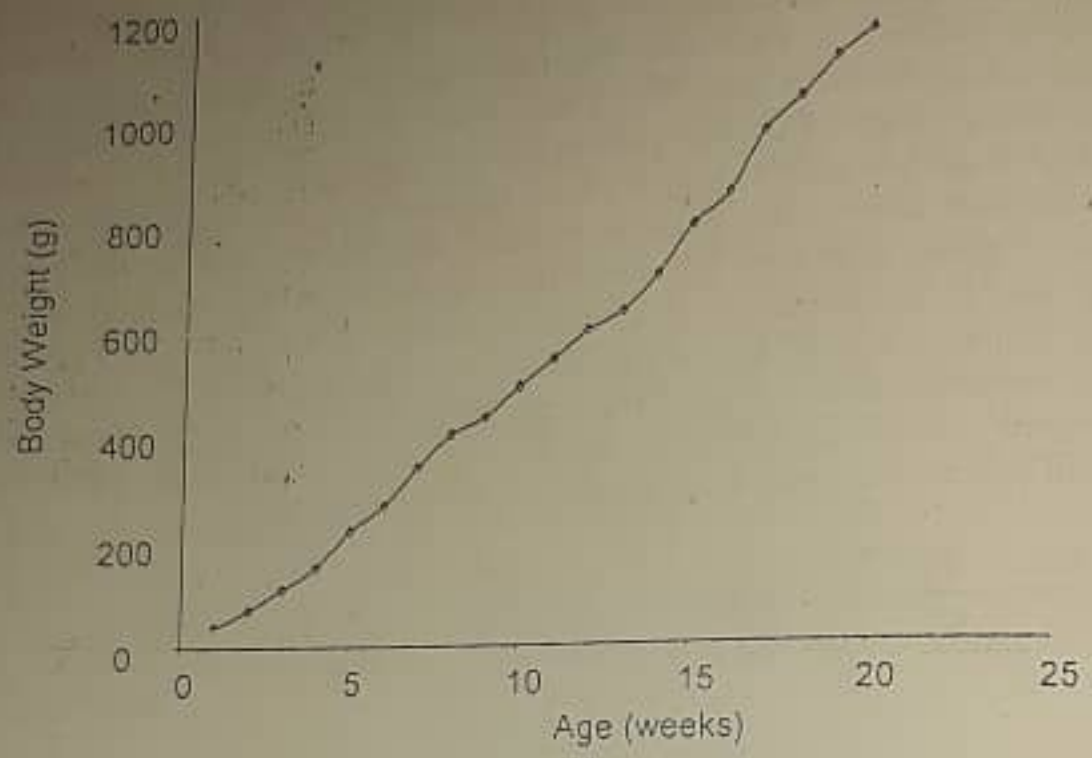


Fig. 1: Body weight as a function of age

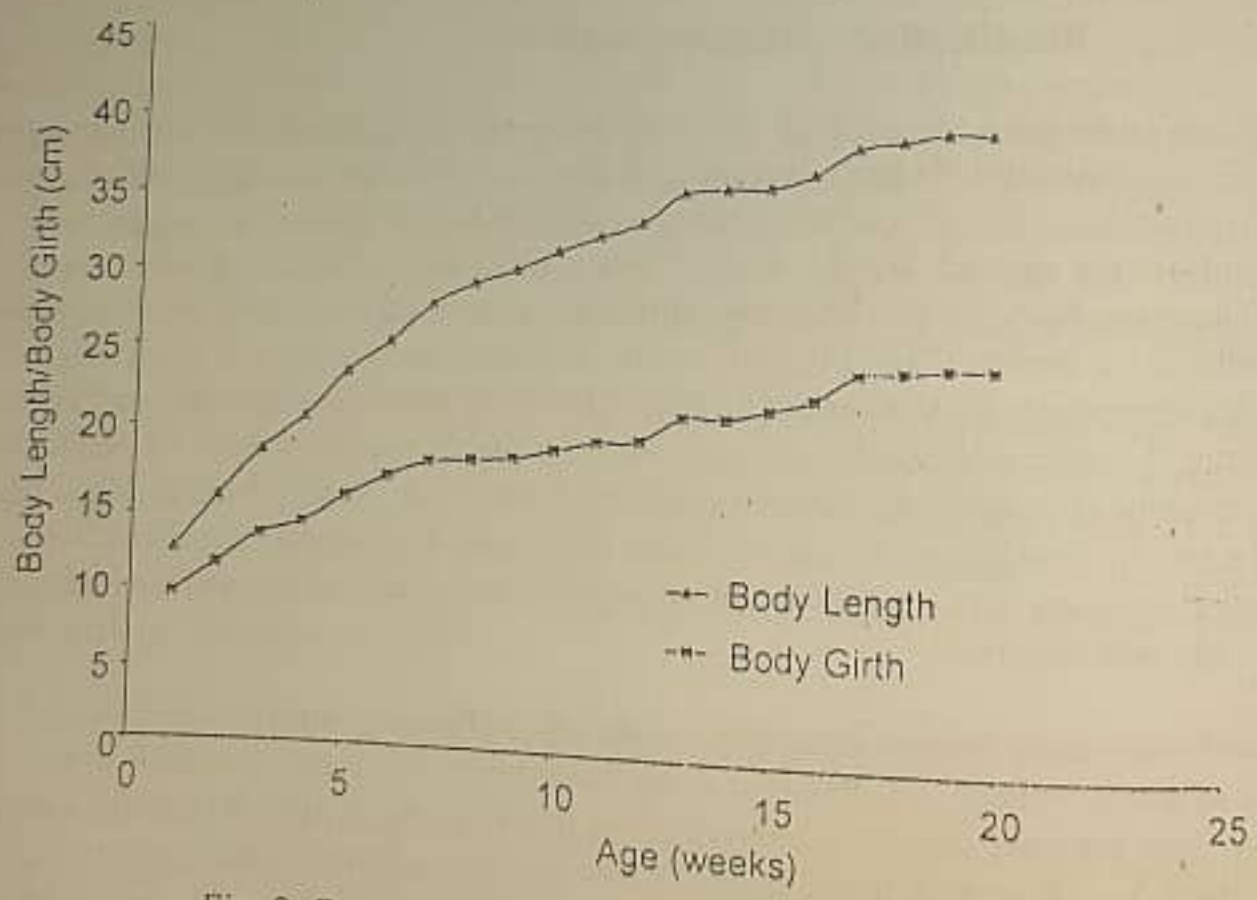


Fig. 2: Body Length vs Age and Body Girth vs Age

Traits	11	12	13	14	15	16	17	18	19	20
N	168	165	165	162	162	162	162	160	160	160
BW	519.44 ±107.9	569.37± 143.9	600.13± 135.2	663.98± 122.2	752.67± 153.6	806.44± 181.7	917.80 ±185.7	977.29 ±189.0	1049.15± 189.	1099.28± 196.
BL	31.58± 3.36	32.49± 3.07	34.43± 3.63	34.69± 3.32	34.66± 3.25	37.27± 4.46	37.73± 4.20	38.23± 3.51	38.24±3. 68	38.36± 3.06
BG	18.93± 1.87	19.10± 2.30	20.60± 2.41	20.62± 2.31	21.18± 1.84	21.95± 2.63	23.51± 2.89	23.68± 2.67	23.96±3. 02	23.99± 2.76
DL	10.31± 1.30	10.73± 1.74	10.82± 1.74	11.05± 1.02	11.65± 1.50	12.04± 1.64	12.23± 1.80	13.11± 1.26	13.54± 1.42	15.09± 1.77
KL	7.13± 1.01	7.47± 1.16	7.56± 1.44	8.12± 1.08	8.48± 0.87	8.72± 1.01	0.95± 0.04	0.95± 0.05	0.97± 0.07	1.00± 0.06
SD	0.87± 0.13	0.89± 0.70	0.89± 0.75	0.93± 0.16	0.93± 0.18	0.95± 0.02	9.48± 1.21	9.59± 1.16	9.63± 1.52	10.94± 1.54
SL	7.74± 1.00	7.98± 1.30	8.06± 1.03	8.34± 0.93	9.06± 1.01	9.33± 1.15	9.00± 0.92	9.46± 0.93	10.32± 1.54	10.39± 1.13
TL	7.47± 1.18	7.88± 1.98	7.98± 0.98	8.55± 1.00	8.56± 0.79	8.61± 1.12S	8.75± 1.08	9.43± 0.92	9.79± 1.52	9.84± 0.99
WL	16.84± 2.23	16.98± 2.25	17.14± 1.77	17.16± 2.14	19.02± 1.77	19.16± 2.42	19.43± 2.78	19.45± 2.40	19.80± 2.37	20.11± 3.41

N= total number of chicken per wk. BW= body weight, BL= body length, BG body girth, DL =drumstick length, KL =keel length, SL shank length SD shank WL= wing length; Age – (weeks)

Tale 1b: Means of body weights and body parts measured for the FEC, from week 11 to week 20



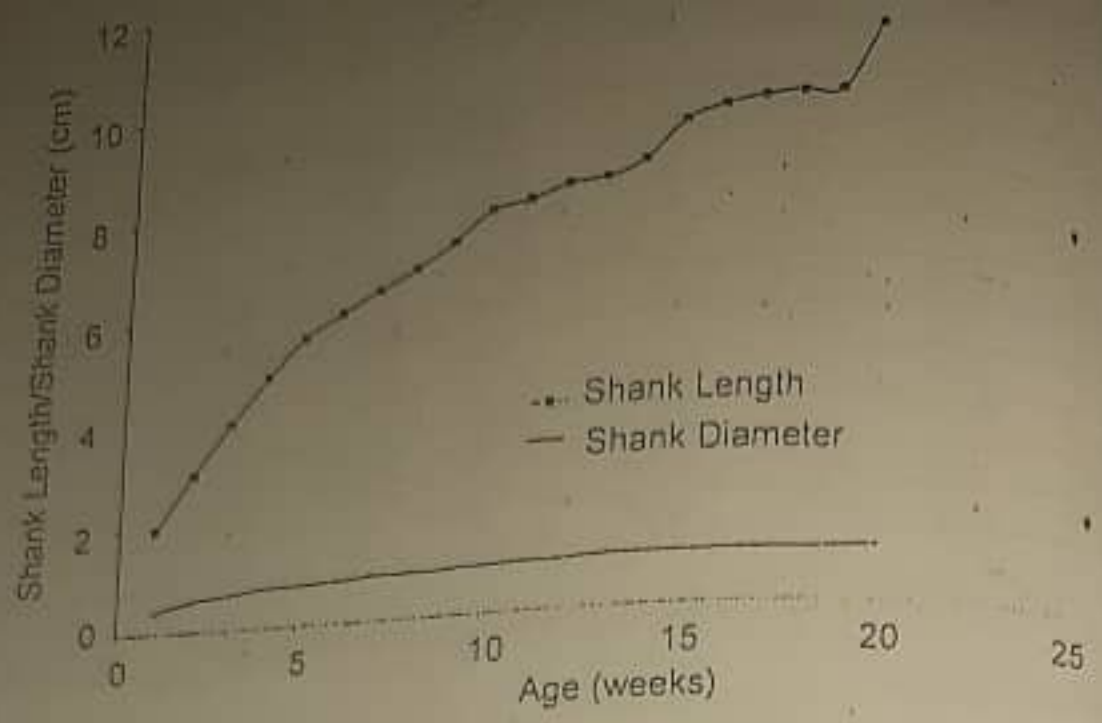


Fig. 5: Shank Length vs Age and Shank Diameter vs Age

Period (weeks)	N	Average Feed intake (g)	Feed Conversion Ratio.	Feed Efficiency.	Growth Rate constant (%).	Growth Efficiency
0-4	180	11.45±0.67	1.12	0.64	98.89	0.26
5-8	170	43.80±2.12	1.17	0.52	57.55	0.30
9-12	165	76.24±4.56	1.63	0.50	35.80	0.20
13-16	162	96.24±7.45	1.77	0.46	19.38	0.51
16-20	160	154.39±10.3	2.24	0.32	17.99	0.31

Table 3: Feed Intake, Feed conversion Ratio, Feed Efficiency, Growth rate constant and Growth Efficiency of the Fulani Ecotype Chicken from 0- 20 weeks.

CONCLUSION AND RECOMMENDATION

Although, the growth rate constant and feed efficiency of the FEC were high at early stages of life they can not be selected for growth traits at these age, because the rate of increase in their body weight and other body parts measured is slower, they have lower value for feed conversion ratio and growth efficiency at early ages .The FEC can be selected for growth traits between the ages of 13 – 16 weeks when they have better feed efficiency and weight gain is almost double, also the wide variation in body weight of these FEC at various stages will give room for selection of those with higher body weight this can lead to development of an indigenous chicken that will reach slaughtered weight at an early ages, making it possible for the masses to have access to a quality animal protein sources at an affordable price for the masses thus contributing to poverty alleviation .

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(Weeks)	BW	BL	BG	WL	DL	KL	TL	SL	SD
0-2	38.97	3.30	1.84	2.06	0.82	0.98	0.93	1.02	0.18
2-4	79.22	5.05	2.68	3.11	1.64	1.65	1.63	1.76	0.16
4-6	112.46	4.69	2.84	3.89	2.45	1.60	1.59	1.13	0.04
6-8	126.67	3.71	1.11	2.08	0.57	0.56	0.67	0.73	0.06
8-10	84.88	2.03	0.75	0.18	0.48	0.42	0.31	1.01	0.02
10-12	96.72	1.90	0.77	0.31	1.39	0.37	0.29	0.35	0.02
12-14	94.61	2.20	1.51	0.48	0.32	0.65	0.95	0.36	0.05
14-16	142.46	0.97	1.33	1.70	0.99	0.60	0.06	0.99	0.01
16-18	170.85	2.07	1.73	0.29	1.07	0.74	0.81	0.25	0.00
18-20	121.99	0.50	0.31	0.65	1.98	0.93	0.42	1.35	0.05

BW, BL BG, DL, TL, SL, SD, WL, KL, as in table 1.0

Table 2: Rate of increase from week 0 to week 20 in various body measurements of the Fulani Ecotype Chicken.

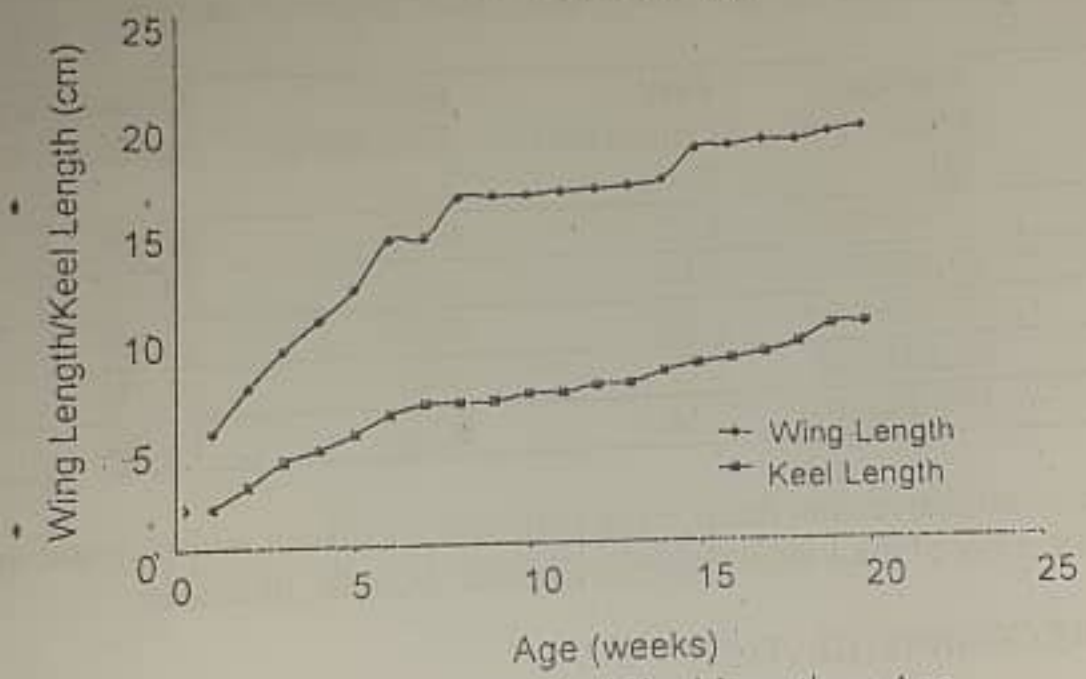


Fig. 3: Wing Length vs Age and Keel Length vs Age

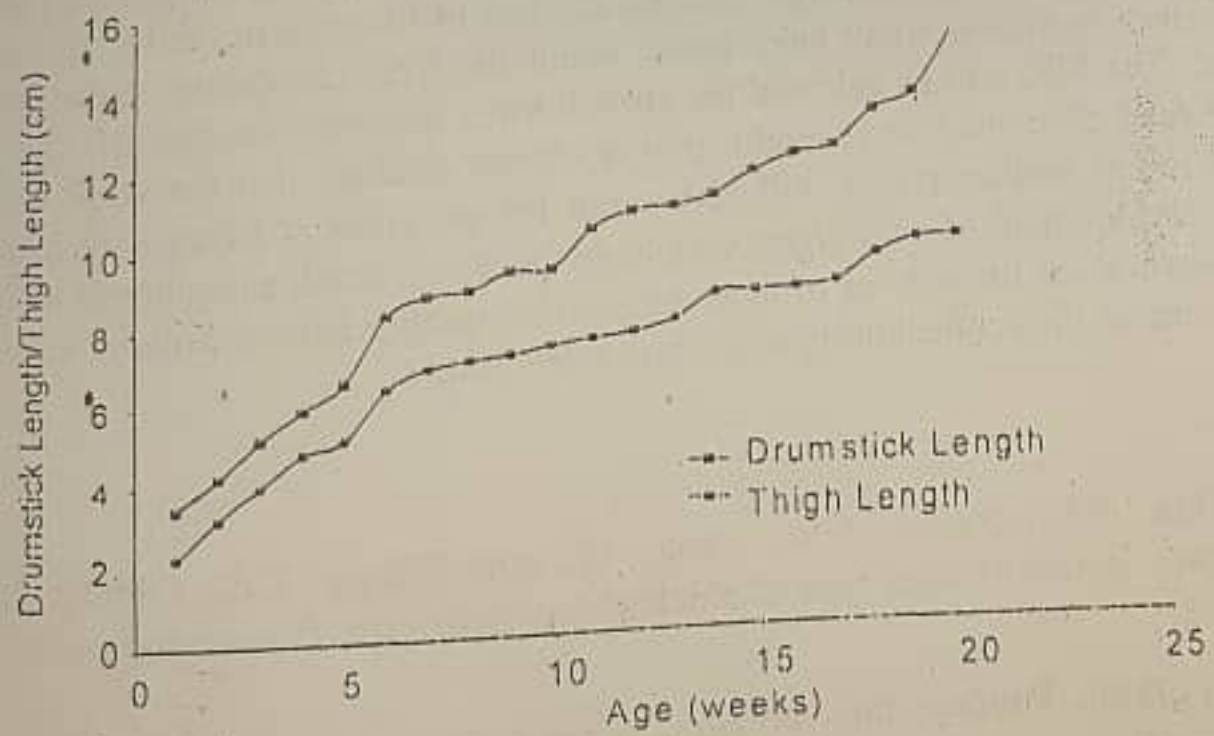


Fig. 4: Drumstick Length vs Age and Thigh Length vs Age

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