ECONOMICS OF RAISING WHITE LEGHORN MALE CHICKS FOR MEAT

BY

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THESIS

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DECLARATION

I hereby declare that this thesis entitled "ECONOMICS OF RAISING WHITE LEGHORN MALE CHICKS FOR MEAT" is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship, or other similar title, of any other University or Society.

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CERTIFICATE

Certified that this thesis, entitled "ECONOMICS OF RAISING WHITE LEGHORN MALE CHICKS FOR MEAT" is a record of research work done independently by Kum. Maria Liza Mathew under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship, or associateship to her.

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INTRODUCTION

INTRODUCTION

The development of poultry farming in India as a large scale commercial enterprise took place only during the past two decades.

Poultry is one of the most efficient converters of plant food ingredients into food of high biological value. Poultry meat is becoming increasingly popular, beef and pork being taboo for particular segments of Indian population. Annually about 39.4 million animals including poultry are slaughtered to fulfil the demand for meat protein of the rich and poor communities. These animals provide around 0.66 million tonnes of meat and of this poultry meat contributes to approximately 0.08 million tonnes, ie, about 13% of total meat produced (Lechhiramani, 1979). Inspite of the production of such a huge quantity of meat and meat products, per capita consumption of animal protein (including fish) according to 1969-1970 census was 71.5g in U.S., 68.2g in Australia, 53.4g in U.K. (1970-71 census), 64g in France, 34.6g in Spain, 30.8g in Japan and 5.6g in India (Lister et al. 1976). This wide difference is due to many factors. But the two major reasons are the high cost of meat and meat products and their

poor availability.

The availability of broiler chicks in Kerala is rather low as there are no hatcheries in the state serving the industry in this direction. Commercial broiler chicks have to be procured from outside state sources and it is impossible to get smaller groups indented by small and marginal farmers. Further the prohibitive cost of broiler chick also is a drawback for a large number of poor farmers. Therefore, if found economical, rearing of White Leghorn male chicks will go a long way in augmenting meat production in the state, besides providing substantial income to many small farmers.

The hatcheries engaged in the production of commercial egg type chicks generally destroy the male chicks immediately after sexing and retain only females for sale. Taylor et al. (1975); Jain et al. (1977) and Haleem et al. (1978) reported that it is economical to rear the male chicks of layer strains for meat. On the other hand, Perez (1970) opined that it is not economical to rear the same. Thus the reports available are conflicting as to the economic utility of the male chicks belonging to the egg strains for meat production purposes.

University Poultry Farm, Mannuthy is engaged in the production of White Leghorn chicks known for high egg production. Male chicks of this egg producing strain are usually discarded immediately after sexing. A study was, therefore, planned to rear the White Leghorn male chicks with a view to evaluate the optimum age for slaughter, the carcass characteristics and to critically assess their economic utility for meat production purposes.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Cawecki et al. (1953) stated that the live weight of White Leghorn cockerels varied from 800g to 1,000g at 15 weeks of age.

Mondonedo, (1953) after rearing White Leghorn chicks for 12 weeks of age found that they weighed 571.4g.

Chueng-shyang, (1954) reported that the cockerels showed a greater and rapid growth than females even-though both were fed equal amounts of the same feed. Initial weight, weight at 3rd and 9th weeks of age of the males and females were 36, 143 and 930.4 and 36, 130.4 and 790g respectively.

Morales, (1955) reported that the best economic return would be from sale of eleven week old White Leghorns.

Podhradsky, (1957) reported that the feed utilization was efficient in the Leghorn cockerels only upto a body weight of 1,200g. Cockerels in runs utilized feed more efficiently and yielded a better carcass than did those in the range.

Yacowitz and Wind (1957) compared the nutrient requirements of male and female chicks. Male chicks

grew more rapidly and therefore had higher requirements than females. They needed higher levels of protein, fat, antibiotics and phosphorus. Unidentified growth factor responses were also found to be greater in males.

Moskalenko, (1960) reported that the average daily weight gain to 100 days was 8.61g for the straight run White Leghorn.

Saeki et al. (1963) reported that at 10 weeks of age White Leghorns (sexes combined) weighed 948g. Feed conversion ratio was 3.58.

Wilson et al. (1963) observed that feeding of low protein diets resulted in very low weight gains in White Leghorn cockerels.

Maaliev and Konopleva (1963) reported that for Russian White male chicks, the optimum age for slaughter was 64-65 days at a live weight of 850-890g. Various levels of protein were tried and 14% digestable protein was found to be economical.

Bhatnagar et al. (1964) stated that White Leghorn males were heavier than females at all ages and their growth rate also significantly higher particularly between 4 to 8 weeks of age. Males with a low hatch weight showed higher gains between 8 weeks and 3 months of age than those with a higher hatch weight.

Reddy et al. (1965)[a] in a study with single comb White Leghorn hybrid chicks observed that males were significantly heavier than females at eight, nine and ten weeks of age.

Reddy et al. (1965)[b] made a comparative study of the growth of White Leghorn chicks at four, six, eight, ten and twelve weeks on two different litters. Controls were kept in run. With groundnut husk as the litter material, the weight at 4, 6, 8, 10 and 12 weeks of age was 216, 326, 478, 754 and 977g respectively. With chopped straw the same was 198, 337, 412, 630 and 825g. Controls in the runs had 184, 328, 412, 429 and 790g of body weight for the corresponding period.

Briones and Tomillo (1965) in their study with Leghorns and Cornish X White Rock cross breds reported that White Leghorn male chicks required 66 days to reach 900g live weight and 84 days to reach 1,300g. The cross breds required 52 and 66 days respectively to attain the same weight. They also opined that if White Leghorn male chicks could be obtained at a reasonable price it would be an economic proposition to fatten them to 900g.

Tanabe et al. (1965) stated that White Leghorns (sexes combined) at 10 weeks of age attained 999g with a feed conversion figure of 3.60.

Varadarajalu, (1966) recorded the body weight of 3 strains of White Leghorns upto eight weeks of age. At this age, males of commercial strain, an inbred-hybrid strain and local college strain averaged 434.5, 536 and 461g respectively.

Francis (1969) in his study on location and feed effects on single comb White Leghorn males stated that the means for ration, strain and location were not significantly different for body weight.

Perez (1970) stated that at 10 weeks of age White Leghorn male chicks averaged 693g. Feed conversion averaged 5.07. He concluded that the use of White Leghorn male chicks for meat production was not a practical proposition.

Sapronova, (1971) reported that the average body weight was 862 and 842g at 90 days, 1,098 and 1,173g at 120 days and 1,449 and 1,462g at 150 days for penned and caged White Leghorn males.

Chhabra and Sapra (1973) stated that White Leghorns averaged 31.26, 136.75 and 649.64g at first day, fourth week and twelth week respectively.

Pathak and Bareaul (1973) reared White Leghorn chicks for eight weeks on deep litter. Thereafter only male chicks were retained upto 14 weeks of age. The chicks weighed 483 and 1,304g at eight (sexes combined) and fourteen (males only) weeks of age respectively. The feed conversion index averaged 4.21 and dressing percentage 69.24 at fourteen weeks of age.

Taylor et al. (1975) opined that it would be economical to raise male hybrid chicks of egg producing strains upto 75 days of age. Average body weight obtained at 75 days of age was 804.67g. Survival per cent was 75.6. With feed cost at Rs. 95/quintal and live weight rate of Rs. 5/kg, Rs. 2.10 per bird was estimated as profit.

Chand et al. (1976) conducted a study to assess the effect of two housing systems on body weight gain, meat quality and weight of internal organs of White Leghorn males. The birds housed in floor pens weighed slightly more than those in the individual cages at 140 days of age. The eviscerated yields were also high in the case of floor pen housed birds.

Ahmed and Joshi (1977) in their study on the economics of White-Austra males for table purpose showed

that average profit over feed and chick cost was Rs. 1.65 over a period of 12 weeks of rearing. The average feed consumption and average weight upto 12 weeks of age was 4,100 kg and 1,100g respectively. The average feed/gain ratio worked out to 3.82. The average per cent dressed weight and edible meat were 90.66 and 74.69 respectively.

Jain and Sharma (1977) reported that the mean live weight of White Leghorn cockerels at day old, two months and five months were 39.1, 612 and 1,846g respectively.

Singh and Barsaul (1977) reported that the White Leghorn male chicks attained a slaughter weight of 1,300g at 15 weeks of age.

Gupta et al. (1978) conducted an experiment using White Leghorn chicks hatched out in December and April. Average daily feed consumption of chicks hatched in December and April upto 85 days of age was 38.120 and 33.878 respectively. The same for 86-160 days was 81.628 and 81.932g respectively. Overall feed consumption was 57.895 and 55.721g respectively.

Haleem et al. (1978) reported that the economical age for slaughter of White Leghorn male chicks for meat

to be 8-12 weeks of age.

Lopez, (1952) stated that the average weight, dressed weight and dressing per cent of White Leghorn male chicks at twelve weeks of age were 791.3g, 564g and 71.4 respectively. Feed consumption was 4.98 kg/kg gain and mortality 10%.

Tilgner and Janicki (1952) reported that the most economic slaughter weight of cockerels was about one kg live weight. The average yield of meat as per cent of live weight was 37.6, 30.4, 39 and 38 for birds weighing 500, 800, 1,100 and over 1,250g respectively. Leghorns over 1 kg live weight yielded a higher per cent of meat.

Badreldin et al. (1962) opined that at 12 weeks of age average weight of White Leghorns was 475g. At 12 weeks, eviscerated carcass per cent was about 63 for the White Leghorn cockerels.

Sakaida and Nishida (1966) reported that White Leghorn males at 10 weeks of age had a feed efficiency of 3.48 and dressing per cent 68.33.

Ranganathan et al. (1967) reported that in White Leghorns the yield of edible parts was 69.22%. The correlation of live weight with edible parts was 0.98.

Negrutiu (1968) reported a dressing per cent of 78.35 for White Leghorns (sexes combined) at 8 weeks of age.

Stefanescu et al. (1970) opined that White Leghorn males at 60-90 days of age had a live weight of 981 ± 39 and dressing per cent 74.2 ± 0.6.

Menawat et al. (1977) reared White Leghorn male chicks on broiler starter diet from 0-6 weeks and broiler finisher diet from 7-10 weeks of age. At 10 weeks, the live weight was 822g, dressed weight, 635g, edible portion, 588.1g, carcass, 545.4g, Giblet, 42.7g, inedible viscera, 47.1g, blood, 42.8g and feather 43.8g. Feed efficiency upto 10 weeks of age was 2.78. Growth rate during 0-8 weeks was 74.3g and that during 8-10 weeks, 106.5g.

Jain et al. (1977) conducted a study using White Leghorn male chicks for twelve weeks of age. At twelve weeks, live weight was 937 g, dressed weight, 744g, edible portion, 633g, carcass, 578g, Giblet, 55g, inedible viscera, 111g, blood, 36g, and feather 69g.

MATERIALS AND METHODS

MATERIALS AND METHODS

An experiment was conducted to study the economics of raising male chicks of White Leghorns for meat. Two hundred, one day old male chicks belonging to a single hatch were used for the study and were reared upto fourteen weeks of age.

The chicks were wing banded, weighed, vaccinated (RDF) and debeaked on the first day of age. They were randomly allotted to four groups of fifty each. The allotment of groups to the pens were made at random. The chicks were housed in four well ventilated and well lighted identical deep litter pens with wood-shavings as litter material. Infra-red brooding was employed for four weeks. Two dietary treatments were employed and two groups formed one dietary treatment. One dietary treatment group comprised of chick starter and chick grower, while the other, broiler starter and broiler finisher. The rations were computed as per I.C.I. standards, (1977)(Table 1) and were analysed for proximate composition A.O.A.C.,(1970) (table 2). Chick starter diet was fed for eight weeks followed by chick grower for the rest of the period. Similarly, broiler starter diet was fed for six weeks of age

followed by broiler finisher. Feed and water were given ad libitum through-out the experimental period and both the treatments were under identical managemental conditions.

The chicks were individually weighed at weekly intervals and weekly feed consumption per group was recorded. This data was used to calculate the feed efficiency. The trial was run for fourteen weeks at the close of which final body weights were recorded.

Ten birds from each treatment were randomly selected and subjected to slaughter studies. Birds were fasted for six hours prior to slaughter. Water was provided ad libitum during the fasting period. The birds were slaughtered by the outer-cut method and a bleeding time of one minute was allowed after killing the birds in a bleeding funnel.

The birds were then scalded at a temperature of 56°C for 75 seconds. The defeathering was done on a mechanical feather plucker and finished off by hand. The birds were weighed at this stage to calculate dressing losses.

Head and shanks were removed. The skin on the back of the neck was cut from the point where the

head was severed to a point in line with the base of the neck and the skin was then pulled down to the shoulder. The gullet, crop and wind pipe were removed by pulling them away from the neck skin and then were cut off at a point nearest to the entrance to the body cavity. The neck was cut from the body at the beginning of the back. The oil gland was removed. A transverse incision was made below the end of the breast bone and around the vent. Gizzard, liver, heart and intestines were pulled through this opening. The carcass was washed, drained and weighed. The gizzard was split lengthwise and the lining and contents removed carefully. The gall bladder was removed from the liver. The giblet was weighed seperately and also along with the carcass to calculate the ready-to cook-yield.

Data pertaining to body weight gains, feed efficiency, dressing losses and carcass yields were subjected to statistical analysis (Snedecor and Cochran, 1967).

Table 1. Composition of experimental diets.

Ingredients (parts/100 kg)	Diet I		Diet II	
	Chick starter (0-8 weeks)	Chick grower (9-14 weeks)	Broiler starter (0-6 weeks)	Broiler finisher (7-14 weeks)
Groundnut cake	32.5	20	30	26
Yellow maize	20	18	42	54
Rice bran	19.5	30	14	8
Unsalted dried fish	12	10	12	10
Mineral mixture (poultrymin†)	1.5	1.5	1.5	1.5
Common salt	0.5	0.5	0.5	0.5
Tapioca chips	14	20	—	—
Total	100	100	100	100
Calculated composition				
Metabolisable energy K cal/kg	2,790	2,680	2,910	3,010
Crude protein	22	16.6	22.6	20.7
Energy protein ratio	127:1	167.5:1	132:1	150.5:1
Added per 100 kg of diet				
Vitablend[2] A, B_2 and D_3	20g	20g	30g	30g
Difuran[3]	50g	50g	50g	50g
Aurofac[4] 2A	—	—	125g	—

1. Poultrymin (Aries, Agro-vet Industries Pvt. Ltd), The mineral mixture contained 3% moisture, 32% calcium, 6% Phosphorus, 0.27% manganese, 0.01% Iodine, 0.26% Zinc, 0.03% Fluorine, 100 ppm copper and 1,000 ppm iron.
2. Vitablend A, B_2 and D_3 (Glaxo laboratories India Ltd) contained 40,000 i.u. of vitamin A, 25 mg of vitamin B_2 and 6,000 i.u. of vitamin D_3 per g respectively.
3. Difuran (Smith, Kline and French, India, Ltd) contained veterinary Nitro furazone B. Vet. C.25% W/W/, Veterinary furazolidone B Vet. C. 3.6% W/W.
4. Aurofac 2A (Cyanamid Agricultural Division India Ltd) contains 8 gms of Auromycin chlortetracycline per kilogram.

Table 2. Proximate composition of the diets (D.M. basis) (percentage)

Nutrient	Diet I		Diet II	
	Chick starter (0-8 weeks)	Chick grower (9-14 weeks)	Broiler starter (0-6 weeks)	Broiler finisher (7-14 weeks)
Drymatter	91.5	91.7	90.8	91.3
Crude protein	21.5	16.3	21.7	19.5
Ether extract	7.8	7.2	8.3	7.8
Crude fiber	6.7	7.3	5.2	5.8
N.F.E.	51	56	51.3	53.1
Total ash	13	13.2	13.5	13.8
Acid insoluble ash	3.8	4.2	3	3.2

RESULTS

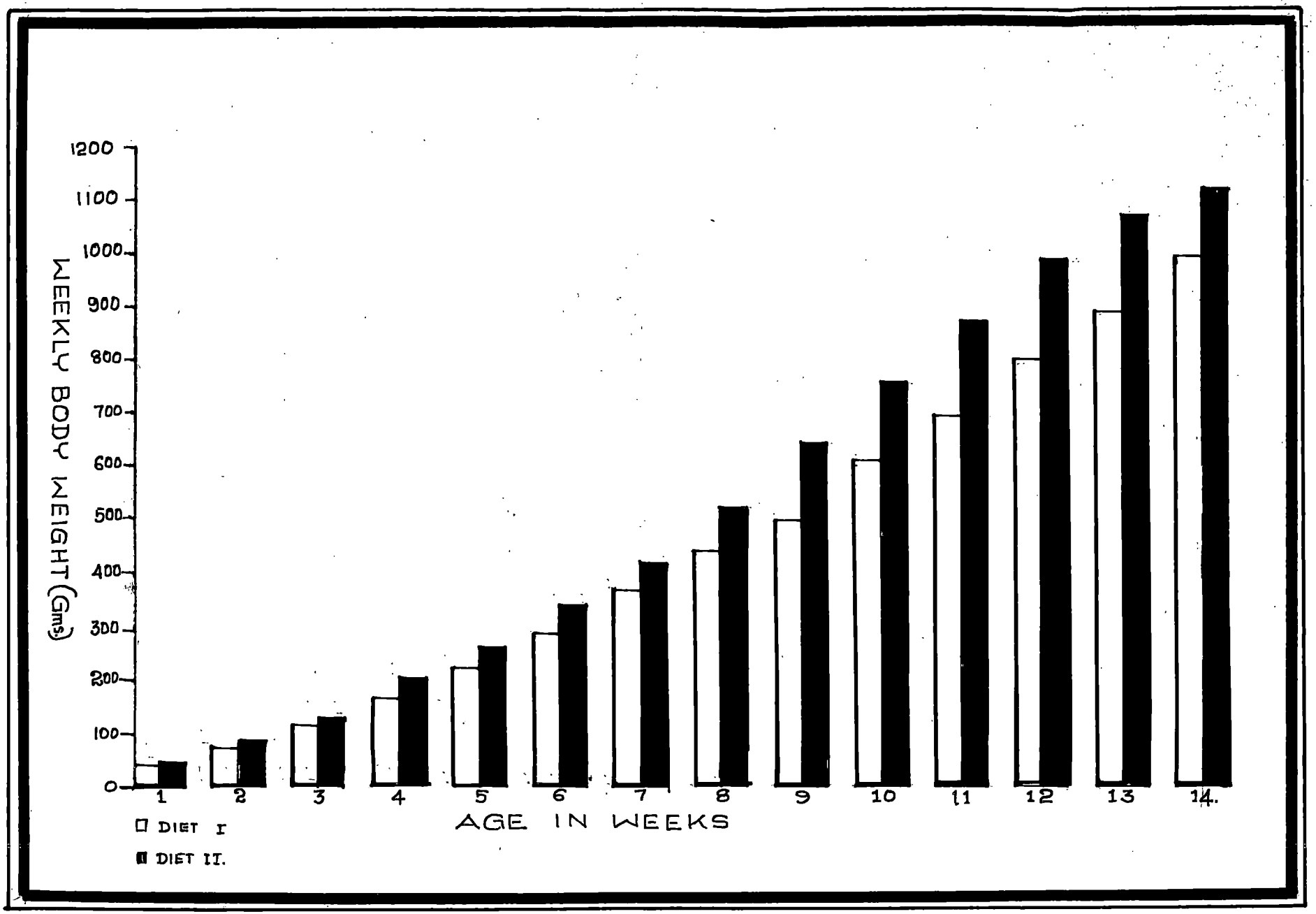
RESULTS

Growth

The data pertaining to the mean weekly body weights of the two treatment groups upto 14 weeks of age are presented in table 3. The statistical analysis of the mean body weights at 10, 12 and 14 weeks are presented in table 4. The data of mean gains in body weight for 14 week period are set out in table 5. The overall gain at the end of the experiment and the statistical analysis of the same are given in table 6 and 4 respectively. The chicks belonging to the treatment II registered higher body weights than those in treatment I throughout the experimental period. Mean final body weights of treatment I and II were 992 and 1,126g respectively. Total gain in body weight was 958 and 1,093g respectively for the treatments I and II. The maximum body weight gain of 108.5g was observed during the 10th week in treatment I. In the case of treatment II maximum gain obtained was 119.5g during the 11th week.

The birds belonging to treatment I registered a mean body weight of 612.5, 800 and 992g during 10, 12 and 14 weeks of age respectively. The treatment II registered a body weight of 760, 991.5 and 1,126g respectively for 10, 12 and 14 weeks. The mean body weights of birds in the two dietary treatments at different weeks of the experimental period is also shown graphically (Fig. 1).

Fig. 1. Mean weekly body weights of birds in the two treatment groups.


1200
1100
1000
900
800
700
600
500
400
300
200
100
0
WEEKLY BODY WEIGHT (Gms.)
1
2
3
4
5
6
7
8
9
10
11
12
13
14.
AGE IN WEEKS
DIET I
DIET II.

Feed consumption and Feed efficiency

The data pertaining to the feed consumption per chick per day, per chick per week, gain in body weight and feed efficiency are presented in table 8. The mean total feed consumption per chick during the entire experimental period was 4.448 kg and 4.128 kg respectively for the treatments I and II.

The mean feed efficiency over the 14 week experimental period was 4.64 and 3.78 for the treatments I and II respectively. A total of 444.870 kg and 412.802 kg of feed was consumed by the chicks belonging to treatments I and II during the entire experimental period. This implies that the birds of treatment I consumed 32.068 kg more feed when compared to those in the treatment II. However, when viewed in the light of the gains registered it was observed that treatment I had a feed efficiency of only 4.64 compared to 3.78 registered by treatment II. The best feed efficiency registered during the entire experimental period was 3.10 and 2.50 during the 4th week for both the treatments. Treatment I registered a feed efficiency of 4.24 during the 10th week and the corresponding figure for treatment II was 3.56. It is to be pointed out that the chicks belonging to the treatment II registered a feed efficiency of 8.71 during the 14th week as against

5.54 of the treatment I for the correeponding period. During the 12th week the birds belonging to treatment II had a feed efficiency of 4.13 as against 5.30 for the birds belonging to treatment I. The overall feed efficiency at the end of 12th week was 4.41 and 3.39 respectively (Table 9). The mean body weight at the close of the 12th week was 991.5g for treatment II whereas the corresponding figure for treatment I was 800g.

Mean carcass yields and losses

Slaughter data pertaining to the replicate of the two dietary treatments are presented in table 10 and the statistical analysis thereon in table 11.

The mean per cent fasting shrinkage observed was 2.76 and 1.77 for the treatments I and II respectively.

The mean per cent dressed yield was 88.0 for treatment I and 88.5 for treatment II.

The mean per cent eviscerated yields were 67.5 and 70.0 for the treatments I and II respectively.

The mean per cent giblet yield was 4.90 and 4.25 for the two treatments respectively.

The mean per cent ready-to-cook yield was 72.5 and 74.0 respectively for the treatments, the overall mean being 73.25.

Livability

The data pertaining to the livability are presented in table 13. A total of 5 birds died during the experimental period, one from treatment I and four from treatment II. The overall per cent mortality was 2.5.

Economics

The statement of costs and returns from the two treatment groups at 10, 12 and 14 weeks of age is presented in table 12. The feed cost for the chick starter and grower diets were Rs. 147/- and Rs. 126/- per quintal respectively. The same for broiler starter and finisher diets were Rs. 171/- and Rs. 161/- per quintal. The return per chick for treatment I was Rs. 1.07, Rs. 1.18 and Rs. 1.20 at 10, 12 and 14 weeks respectively. The corresponding figures for treatment II were Rs. 1.48, Rs. 176 and Rs. 1.20 respectively. In working out the return per chick, only chick cost and feed cost were considered and the sale price was assumed at Rs. 7.50/kg live weight, that being the prevailing local market rate.

Table 3. Mean weekly body weights (g) of White Leghorn male chicks

Treatment	Replications	Initial body weight (g)	Age in weeks													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
I	1	34	49	75	113	164	225	289	371	440	448	598	679	788	885	988
	2	34	48	74	110	167	228	295	374	443	520	627	721	812	907	996
	Mean	34	48.5	74.5	111.5	165.5	226.5	292	372.5	441.5	504	612.5	700	800	896	992
II	1	33	49	81	130	199	265	341	417	517	617	732	852	959	1,036	1,078
	2	33	49	81	129	203	274	354	425	539	672	788	907	1028	1,116	1,174
	Mean	33	49	81	129.5	201	269.5	347.5	421	528	644.5	760	879.5	991.5	1,076	1,126
	Overall Mean	33.5	48.75	77.75	120.5	180.75	248	319.75	396.75	484.75	574.25	686.25	789.75	895.75	986	1,059

Table 4. Analysis of variance for various growth characters studied.

Factor	Source	df	MSS
1. Body weight gain for 14 weeks.	Between treatments	1	9,00,931.03*
	Between replicates within treatment	2	5,61,301.43
	Error	196	26,191.29
	Total	199	
2. Body weight at 10th week.	Between treatments	1	10,75,394.67*
	Between replicates within treatment	2	40,127.90
	Error	194	14,741.83
	Total	197	
3. Body weight at 12th week.	Between treatments	1	18,17,596.67*
	Between replicates within treatment	2	71,503.47
	Error	194	16,593.92
	Total	197	
4. Body weight at 14th week.	Between treatments	1	8,80,487.07
	Between replicates within treatment	2	12,089.95
	Error	191	25,874.32
	Total	194	
5. Feed efficiency at 14th week.	Between treatments	1	0.68
	Error	2	0.02
	Total	3	

* Significant at 5% level.

Table 5. Mean weekly body weight gain (g) of White Leghorn male chicks.

Diets	Replications	Initial body weight (g)	Age in weeks														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total gain
I	1	34	15	26	38	51	61	64	82	69	48	110	81	109	97	103	954
	2	34	14	26	36	57	61	67	79	69	77	107	94	91	95	89	962
	Mean	34	14.5	26	37	54	61	65.5	80.5	69	62.5	108.5	87.5	100	96	96	958
II	1	33	16	32	49	69	66	76	76	100	100	115	120	103	81	42	1045
	2	33	16	32	48	74	71	80	71	114	133	116	119	121	88	58	1141
	Mean	33	16	32	48.5	71.5	68.5	78	73.5	107	116.5	115.5	119.5	112	84.5	50	1093
	Overall Mean	33.5	15.25	29	42.75	62.75	64.75	71.75	77	88	89.5	112	103.50	106	90.25	73	1025.5

Table 6. Mean body weight gains during the experimental period (0-14 weeks)

Treatment	Replications	Average initial weight (g)	Average final weight (g)	Weight gain (g)	Average daily weight gain (g)
I	1	34	988	954	9.73
	2	34	996	962	9.81
	Mean	34	992	958	9.77
II	1	33	1,078	1,045	10.66
	2	33	1,174	1,141	11.64
	Mean	33	1,126	1,093	11.15
	Overall Mean	33.5	1,059	1,025.5	10.46

Table 7. Mean feed efficiency of the two dietary treatments during the experimental period (0-14 weeks).

Treatments	Replications	Initial body weight (g)	Final body weight (g)	Gain in weight (g)	Feed consumed (kg)	Feed efficiency (kg feed/kg gain)
I	1	34	988	954	4.465	4.68
	2	34	996	962	4.432	4.60
	Mean	34	992	958	4.448	4.64
II	1	33	1,078	1,045	4.060	3.88
	2	33	1,174	1,141	4.196	3.68
	Mean	33	1,126	1,093	4.128	3.78
	Overall Mean	33.5	1,059	1,025.5	4.288	4.21

Table 8. Weekly feed consumption, weight gain and feed efficiency among two treatment groups.

Age in weeks	Treatment I					Treatment II				
	Feed consumed (g)	Gain in weight (g)	Feed efficiency	Average feed consumption per chick per week (g)	Average feed consumption per chick per day (g)	Feed consumed (g)	Gain in weight (g)	Feed efficiency	Average feed consumption per chick per week (g)	Average feed consumption per chick per day (g)
1	4,678	1,450	3.23	46.78	6.68	4,594	1,600	2.87	45.94	6.56
2	11,637	2,600	4.48	116.37	16.62	11,023	3,200	3.44	110.23	15.74
3	17,395	3,700	4.70	173.95	24.85	16,795	4,850	3.46	167.95	23.98
4	16,720	5,400	3.10	167.20	23.90	17,910	7,150	2.50	179.10	25.58
5	20,600	6,100	3.38	206.00	29.85	21,400	6,850	3.10	214.00	30.57
6	25,440	6,550	3.88	254.40	36.34	25,030	7,800	3.21	250.30	35.75
7	26,480	8,050	3.29	264.80	37.83	25,970	7,350	3.51	259.70	37.10
8	31,920	6,900	4.63	319.20	45.60	32,788	10,700	3.06	327.88	46.64
9	33,600	6,250	5.38	336.00	48.00	38,572	11,650	3.31	385.72	55.10
10	46,050	10,850	4.24	460.50	65.78	40,970	11,550	3.56	409.70	58.52
11	50,150	8,750	5.73	501.50	71.64	43,800	11,950	3.67	438.00	62.57
12	53,000	10,000	5.30	530.00	75.71	46,300	11,200	4.13	463.00	66.14
13	54,000	9,600	5.63	540.00	77.14	44,100	8,450	5.20	441.00	63.00
14	53,200	9,600	5.54	532.00	76.00	43,550	5,000	8.71	435.50	62.21
Cumulative total	444,870	95,800	4.64	4,448.70	45.39	4,12,809	1,09,300	3.78	4,128.02	42.12

Table 9. Overall feed efficiency at 10th, 12th and 14th week.

Weeks	Treatment I			Treatment II		
	Feed consumed (g)	Body weight gain (g)	Feed efficiency	Feed consumed (g)	Body weight gain (g)	Feed efficiency
10	3,30,820	66,850	4.95	2,35,059	72,700	3.23
12	3,37,670	76,600	4.41	3,25,159	98,850	3.39
14	4,44,870	95,800	4.64	4,12,809	1,09,300	3.78

Table 10. Slaughter data of White Leghorn male chicks at 14 weeks of age.

Treatments	Replications	Weight before fasting (g)	Weight after fasting (g)	Fasting shrinkage (g)	Fasting shrinkage (%)	Dressed yield (g)	Dressed yield (%)	Eviscerated yield (g)	Eviscerated yield (%)	Giblet yield (g)	Giblet yield (%)	Ready-to-cook yield (g)	Ready-to-cook yield (%)
I	1	1,085	1,053	32	2.95	930	88	720	68	52	4.9	772	73
	2	1,085	1,057	28	2.58	930	88	710	67	52	4.9	762	72
	Mean	1,085	1,055	30	2.76	930	88	715	67.5	52	4.9	767	72.5
II	1	1,190	1,174	16	1.34	1,025	87	820	70	50	4.3	870	74
	2	1,180	1,154	26	2.20	1,040	90	805	70	49	4.2	854	74
	Mean	1,185	1,164	21	1.77	1,032.5	88.5	812.5	70	49.5	4.25	862	74
	Overall Mean	1,135	1,109.5	25.5	2.27	981.25	88.25	763.75	68.75	50.75	4.57	814.5	73.25

Table 11. Analysis of variance table of slaughter data.

Sl. no.	Factors	Source of variation	df	MSS
1.	Shrinkage	Between treatment	1	21.80**
		Between replicate within treatment	2	11.53
		Error	36	0.77
		Total	39	
2.	Dressed yield	Between treatment	1	1.18 n.s.
		Between replicate within treatment	2	9.89
		Error	36	2.61
		Total	39	
3.	Eviscerated yield	Between treatment	1	25.44**
		Between replicate within treatment	2	14.45
		Error	36	3.01
		Total	39	
4.	Giblet yield	Between treatment	1	5.32**
		Between replicate within treatment	2	2.69
		Error	36	0.28
		Total	39	
5.	Ready-to-cook yield	Between treatment	1	9.99 n.s.
		Between replicate within treatment	2	6.59
		Error	36	3.58
		Total	39	

** significant at 1% level

n.s. non significant

Table 12. Statement of costs and returns from the two treatment groups at 10, 12 and 14 weeks of age.

Weeks	Treatment I						Treatment II					
	Chick Rs.	Feed[1] Rs.	Total Rs.	Returns[3] Rs.	Profit/ group Rs.	Profit[5]/ bird Rs.	Chick Rs.	Feed[2] Rs.	Total Rs.	Returns[4] Rs.	Profit/ group Rs.	Profit[5]/ bird Rs.
10	25	328	353	460	107	1.07	25	386	411	559	148	1.48
12	25	457	482	600	118	1.18	25	528	553	729	176	1.76
14	25	591	616	736.56	120.56	1.20	25	665	690	810.72	120.72	1.20

(1) Chick starter Rs. 147/quintal, chick grower Rs. 126/quintal

(2) Broiler starter Rs. 171/quintal, broiler finisher Rs. 161/quintal

(3),(4) Rs. 7.50/kg live weight

(5) Profit per bird - calculated over feed and chick cost only

Table 13. Overall performance of White Leghorn male chicks during the experimental period (0-14 weeks).

	Treatment I	Treatment II
Number of chicks started	100	100
Number died	1	4
Number at the close of experiment	99	96
Percent mortality	1	4
Average feed intake/bird (kg)	4.448	4.128
Average feed efficieney	4.64	3.78
Cost of production		
Chick cost (Rs)	25	25
Feed cost (Rs)	591	665
Total cost (Rs)	616	690
Returns		
Average final body weight (g)	992	1,126
*Return per group (Rs)	120.56	120.72
Profit per bird (Rs)	1.20	1.20

* sale price @ Rs. 7.50/kg live weight

DISCUSSION

DISCUSSION

Growth

The data pertaining to mean weekly body weights of the two treatments upto 14 weeks of age and the statistical analysis of body weights at 10, 12 and 14 weeks are presented in tables 3 and 4. The two treatments registered significant differences in body weight during the 10th, 12th and 14th weeks of age ($P < 0.05$). The mean final body weights of the treatments I and II were 992g and 1,126g respectively. The mean body weights observed were 612.5g and 800g respectively during the 10th and 12th weeks of age for the treatment I. The birds belonging to treatment II registered a mean body weight of 760g and 991.5g respectively during the corresponding periods. It was also observed that the birds in treatment I registered a mean gain of 87.5g, 100g, 96g and 96g during 11th, 12th, 13th and 14th weeks respectively. This, when viewed in the light of gains registered by the same group during the first 9 weeks, tends to suggest that the birds in this group continued to register satisfactory gains, even during the period from 11th to 14th week. However, it is to be pointed out that this group consumed 4.448 kg of feed per chick during the entire period in contrast to a consumption figure of only

4.128 kg for the corresponding period in treatment II. The mean feed efficiency registered was 4.64 and 3.78 for treatments I and II respectively.

The maximum body weight gain registered by birds in treatment II was 119.5g during the 11th week and they exhibited a gain of 112g during the 12th week and thereafter the gains were rather poor.

The live weight of the birds in the two treatment groups at 14th week was 992 and 1,126g respectively. Gawecki et al. (1953) reported that the live weight of White Leghorn cockerels varied from 800g to 1,000g at 15 weeks of age. The birds belonging to treatment I registered a weight of 992g as the mean live weight at 14 weeks which is above minimum recorded by them. This difference may be attributed to the strain differences as well as probably managemental differences. During the 12th week the birds belonging to the treatment II registered a mean body weight of 991.5g which is very close to the weight reported for White Leghorn male chicks at 12th week by Reddy et al. (1965[b]). The overall mean live weight at 13th week observed in the study was 986g which is higher than 862g reported by Sapronova (1971). The difference can be attributed to strain differences as well as differences in the plane of

nutrition. The mean body weight registered by the birds in treatment II at 11th week was 879.5g as against 804.67g reported by Taylor et al. (1975) in male hybrid chicks of egg producing strains for the corresponding period. The 12th week mean body weight observed in treatment II was 991.5g as against 937g reported by Jain et al. (1977) in White Leghorn males. The improvement observed in body weight in the present study can be attributed to the higher nutrient density provided to the birds in treatment II.

When only the gain in body weight is considered it can reasonably be surmised that the birds in treatment I continued to register gains during the period from 11 to 14 weeks which were comparable to the gains observed during the earlier weeks. However this has to be viewed in conjunction with the feed efficiency and the economics involved. On the contrary the gains registered by the treatment II were definitely poor after the 12th week and the maximum body weight gain of 119.5 was observed during the 11th week. This data has to be necessarily considered in the light of feed efficiency during the various weeks. The average daily gain in weight during the 98 day period was 9.77 and 11.15g for the two treatments (Table 6). However,

Moskalenko (1960) reported that the average daily weight gain of Leghorns to 100 days was 8.61g.

Feed consumption, Feed efficiency

The data pertaining to the feed consumption and feed efficiency of the two treatment groups are presented in table 7 and the statistical analysis in table 4. The mean feed consumption per chick during the entire experiment was 4.448g and 4.128g for treatments I and II respectively. The mean feed efficiency was 4.64 and 3.78 respectively for the two treatments. The birds in treatment I consumed 32.068 kg more feed in comparison to those in treatment II during the period of study. The difference in feed efficiency observed in the two treatments are found to be statistically significant ($P < 0.05$). The feed efficiency recorded by the treatment I and II was 4.24 and 3.56 during the 10th week (Table 8). Moreover it is to be pointed out that the birds belonging to treatment II registered a feed efficiency of 8.41 during the 14th week which implies that it would not be economical to raise the male chicks on broiler diet beyond 12 weeks. This conclusion does not appear to hold good as far as the birds on chick starter and grower diet are concerned because they continued to register satisfactory gain

even beyond 12 weeks of age.

The improved feed efficiency registered by treatment II is in line with the observations of Haque and Agarwala (1975) who reported that the egg type male chicks attained greater body weights with a ration containing 22% protein having energy protein ratio of 128.2:1. The findings of the present study also suggests that it would be economical to raise male White Leghorn chicks on a ration containing 22% protein having an energy protein ratio of 127 to 132:1. Wilson et al. (1963) opined that it would not be advisable to raise White Leghorn male chicks on low protein diet. The feed efficiency of 3.78 observed for the birds in treatment II as against 4.64 for those in treatment I also supports this contention. Perez (1970) reported that at 10 weeks of age White Leghorn male chicks registered a feed efficiency of only 5.07 and observed that it would not be economical to raise White Leghorn male chicks for meat. This contention does not appear sound in the light of the growth and feed efficiency registered by birds in treatment II. The mean feed efficiency of 3.78 observed in treatment II is better than the feed efficiency of 3.82 reported by Ahmed and Joshi (1977) with White Austra males.

Overall per cent livability observed was 97.5 as against 75.6 reported by Taylor et al. (1975) and 90% reported by Lopez (1952). The improved livability observed in the present study can be attributed to strain differences as well as managemental practices. The five deaths that occurred during the course of the experiment were due to non-specific causes. Livability observed in the present study clearly suggests that White Leghorn male chicks can be raised if the body weight gains and feed efficiency are satisfactory.

Slaughter data

Shrinkage.

The weight loss resulted from fasting the birds for 6 hours was 2.76% and 1.77% respectively for the dietary treatments I and II, the overall mean per cent shrinkage being 2.27. Varying figures have been reported by several workers under different experimental conditions. Higher values have been reported by Ranganathan et al. (1967); Prabhakaran and Ranganathan (1971); Radhamma et al. (1978)and Nair et al. (1978). The reason for significant difference in shrinkage between the two treatments in the present study is not clear.

Dressed yield.

Per cent dressed yields for the dietary treatments were 88 and 88.5 which did not differ significantly. Jain et al. (1977) observed a lower dressing per cent (79.4) for White Leghorns at 12 weeks of age. Similarly, Menawat et al. (1977) reported that the dressed yield of White Leghorn male chicks fed broiler diet was 77.3%. Dressing yield of 69.24% for White Leghorns at 14 weeks of age was reported by Pathak and Barsaul (1973). Negrutiu (1968) reported the dressing yield of White Leghorns reared to 8 weeks of age as 78.35%, while, Stefanescu et al. (1970) found that the dressed yield for White Leghorns at 60-90 days of age was only 74.2 $\pm$ 0.6%. However, Ahmed and Joshi (1977) showed that the average dressed weight for White Austra males at 12 weeks of age was 90.66%.

It may be seen from the foregoing reports that the average dressed yield varied from 69.24% to 90.66%. The variation in the reported yields might be due to differences in the experimental conditions namely the breed, age and sex of the bird, the diet employed and processing techniques.

Eviscerated yield.

The mean per cent eviscerated yields for the two dietary treatments were 67.5 and 70 respectively the difference being highly significant. Higher eviscerated yields for the treatment group that received broiler diet may be due to the fact that better fleshing and carcass finish were possible in this particular group. However, Badreldin et al. (1962) reported that the eviscerated carcass per cent was 66.3 for White Leghorn male chicks at 12 weeks of age, while Menawat et al. (1977) observed that eviscerated carcass per cent was 66.3 for White Leghorn male chicks at 10 weeks of age. The latter had employed broiler starter and finisher diets for his experiment while the former had used regular egg type starter ration. Jain et al. (1977) also reported lower carcass yields (61.7%) for White Leghorn male chicks processed at 12 weeks of age.

Giblet yield.

Giblet yield observed in the present study was 4.9% and 4.25% respectively for the two treatments. This difference was found to be statistically significant. Higher giblet yields (5.9% and 5.2%) were reported by Jain et al. (1977) and Menawat et al. (1977) for White Leghorn male chicks slaughtered at 12 weeks and 10 weeks respectively.

Ready-to-cook yield.

The edible yield obtained for the two dietary treatments were 72.5% and 74% respectively, the difference being non-significant statistically. Ahmed and Joshi (1977) also observed the ready-to-cook yield as 74.4% for White Austra males at 12 weeks of age. Similarly Menawat et al. (1977) reported edible portion of White Leghorn male chicks at 10 weeks of age as 71.5%. However lower ready-to-cook yield (67.6%) was reported by Jain et al. (1977) for White Leghorn males at 12 weeks of age. A per cent edible yield of 69.22 for White Leghorns was reported by Ranganathan et al. (1967). The overall mean ready-to-cook yield per cent of 73.25 observed in the present study appears to agree with the values reported by Jull (1951), Mountney (1966), Mathur and Ahmed (1968), Elizabeth et al.(1978) and Menawat et al. (1977). It was also observed in the present study that feeding White Leghorn male chicks with either regular starter and grower diet or broiler diets did not influence the per cent yields of edible meat at 14 weeks of age. Also the Ready-to-cook yield appeared to be excellent as observed in the present experiment.

It may be seen that significant variation in

shrinkage and per cent eviscerated yields were observed while slaughtering the two dietary groups. Also the ready-to-cook yield appeared to be higher for the broiler type ration fed group even though the difference was not statistically significant. Generally, the treatment group that received broiler diets appeared to return more edible carcass. A perusal of literature on processing shrinkages clearly indicates that these are influenced by the kinds and classes of poultry, the age, sex, size and breeding. Mountney (1966) observed that shrinkage was greater in younger and light weight ones than in older or heavier birds.

Economics

The return per chick in the Ist treatment was Rs. 1.07, Rs. 1.18 and Rs. 1.20 when marketed at 10th, 12th and 14th week respectively. The same group registered a feed efficiency of 4.95, 4.41 and 4.64 during 10th, 12th and 14th week periods respectively. Considering the feed efficiency, body weight gain and return per chick it appears that it would be desirable to raise White Leghorn male chicks on chick starter mash for 8 weeks and then on regular grower upto 14 weeks. The male chicks of White Leghorns have a

potential to give a return of Rs. 1.20 over the chick cost and feed cost if reared upto 14 weeks on chick starter and grower mash.

The return per chick in treatment II were Rs. 1.48, Rs. 1.76 and Rs. 1.20 when reared upto 10th, 12th and 14th week periods respectively. This group also registered a mean overall feed efficiency of 3.39 at the 12th week. These observations suggest that it would be economical to raise the male chicks on broiler diets upto 12 weeks of age. This contention is supported by the fact that this group registered a feed efficiency of 3.39 and 3.78 during the 12th and 14th weeks. The conversion ratio of 3.78 observed during the 14th week was poor when compared to the overall mean conversion ratio of 3.39 observed at the 12th week which is comparable to even the conversion ratio of hybrid broiler chick at 8 weeks of age. Also, as the chick cost for White Leghorn males is very low, it appears highly economical and within reach of the small and marginal farmers to take up this kind of farming as a side line.

From the observations of the present study it can reasonably be concluded that the most economic slaughter weight of White Leghorn cockerels is around

1 kg live weight. This finding is in agreement with the observations of Tilgner and Janicki (1952) who reported that the most economic slaughter weight of cockerels was about 1 kg live weight. In the present experiment this weight was obtained for White Leghorn cockerels fed with ordinary starter and grower rations and broiler starter and finisher rations at 14 weeks and 12 weeks respectively.

The findings of the present study that it would be economical to raise White Leghorn male chicks on broiler diets upto 12 weeks of age is in close agreement with the observations of Taylor et al. (1975) who opined that it would be economical to raise male hybrid chicks of egg producing strains upto 75 days of age. Perez (1970) observed that the use of White Leghorn male chick for meat production was not a practical proposition. His conclusion was based on studies with male chicks upto 10 weeks of age only. The observations in the present study also suggests that it is not economical to raise White Leghorn males to 10 weeks of age only. On chick starter and grower mashes the chicks continue to gain weight upto 14 weeks of age reaching approximately 1 kg live weight on an

average and return Rs. 1.20 per chick over feed and chick costs. The pattern of growth in these chicks clearly suggests that they have to be reared at-least upto 14 weeks on chick starter and grower mashes in order to be economical.

SUMMARY

SUMMARY

The result of an experiment designed to study the economics of raising White Leghorn male chicks for meat is reported in this thesis.

Two hundred one-day old White Leghorn male chicks were raised on two dietary treatments namely, chick starter, grower, and broiler starter, finisher diets. Each treatment group had two replicates with fifty chicks each. They were raised in deep litter pen for fourteen weeks.

Data on weekly body weight, feed consumption and feed efficiency ratio were recorded. Twenty birds from each treatment were randomly subjected to slaughter studies using conventional techniques.

The following conclusions were drawn based on the results obtained.

The economic weight of slaughter of White Leghorn males raised for meat is around 1 kg.

White Leghorn males on broiler ration attained this weight at 12 weeks of age while those on chick starter and grower attained this weight at 14 weeks.

Feed efficiency at 12 and 14 weeks of age for the broiler and grower type ration fed groups were 3.39 and 4.64 respectively.

The returnsper chick were Rs. 1.20 and Rs. 176 on chick starter-cum-grower and broiler rationsrespectively at 14 and 12 weeks.

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ABSTRACT

ECONOMICS OF RAISING WHITE LEGHORN MALE CHICKS FOR MEAT

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ABSTRACT

With a view to determine the economics of raising White Leghorn male chicks for meat, the present study was undertaken. Two hundred one-day old White Leghorn chicks were divided randomly into four groups of fifty chicks each to form two treatments with two replicates. Chick starter, grower; and broiler starter, finisher diets were fed.

Weekly body weights, feed consumption and feed efficiency were recorded. At fourteen weeks of age, twenty birds from each treatment were subjected to slaughter studies. The results of the study indicated that it is economical to raise male chicks of White Leghorns for meat purpose. With broiler type ration it is better to slaughter the birds at twelve weeks of age, while with chick starter and grower ration fourteen weeks was found to be the optimum age for economic meat production.