EVALUATION OF PUREBRED AND CROSSBRED CHICKEN UNDER BACKYARD CONDITION

BY

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THESIS

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DECLARATION

I hereby declare that this thesis entitled " EVALUATION OF PURE BRED AND CROSS BRED CHICKEN UNDER BACKYARD CONDITION" is a bonafide record of research work done by me during the course of my research and that this 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.

Signature of the Candidate:

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CERTIFICATE

Certified that this thesis entitled "EVALUATION OF PURE BRED AND CROSS BRED CHICKEN UNDER BACKYARD CONDITION" is a record of research work done independently by Shri. P.M.RADHAKRISHNAN, under my guidance and supervision and that it has not previously formed the basis for the award of any degree, fellowship or associateship to him.

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P. M. RADHAKRISHNAN

Dedicated to

THE LORD GURUVAYOORAPPA

C O N T E N T S

INTRODUCTION

INTRODUCTION

The Poultry Population in Kerala according to 1977 census is 12.9 million which constitute about 10 per cent of total poultry population in India. The census figures also reveal that about 92 per cent of the birds are in rural areas of the State (Anon,1977). The egg production from chicken in Kerala is estimated to be 880 millions per annum and a majority of this comes from the birds reared in the rural areas of the State (Nambiar,1981). Thus, the major contribution to egg production is from the chicken maintained in the rural parts of the country.

Poultry farming in Kerala is unique in the sense that chicken population is distributed among the homesteads. It would not be incorrect to say that there is practically no homestead in the State which does not have 5 or 10 birds and the major egg production is from these smaller units maintained in the backyard of homesteads. This is in striking contrast to the picture in the so called poultry pockets in the country where large flocks are maintained on commercial lines. Thus, in short, the egg production in Kerala can be said to be 'production by massess' in contrast to 'mass production' of eggs seen elsewhere in the country.

This peculiar pattern of poultry farming seen in the State has helped to improve the socio-economic conditions of rural poor. However, there are few bottle necks faced by the farmers who maintain these smaller flocks. The birds maintained in these units are generally Desi or stocks that have been graded up using White Leghorns. The informations gathered from the farmers during seminars and house contacts revealed that the pure bred White Leghorns that have been distributed to the farmers under the different poultry developmental programmes of the State are not able to sustain the strain imposed under the backyard rearing. Consequently their production as well as livability are seriously impaired. Thus, it has become necessary to identify a chicken that is primarily hardy and at the same time capable of fairly high level of production.

Inspite of the implementation of various extension education programme in the State the preference for tinted shelled egg over white shelled egg exist among rural folk. Market enquiries reveal that tinted shelled eggs fitch a premium over white shelled egg. Thus, in the development of a chicken for backyard this aspect of shell colour has also to be kept in mind, if the birds have to find acceptance among rural community.

Poultry rearing has been accepted by planners as one of the means to improve the socio-economic conditions of small and marginal farmers as well as landless labourers. Keeping this in mind the NCA(1976) had suggested establishment of small units of 50 birds for each farmers family. Quite often the economic viability of such units are viewed with suspicion. It should be realized that these units are not meant for providing livilihood to the farmers exclusively from income for these units but is directed only to help in supplementing their income and to indirectly induce the farmers in the consumption of nutritious food.

Considering these aspects a research Project was undertaken to study the productive potentiality both in terms of egg number and livability of nine genetic groups of chicken at the farmers homestead. Developing a bird for backyard based on studies conducted under controlled farm condition will be biased because under such situation to develop a backyard replica in organised farm is difficult and therefore the results obtained cannot be in toto applied to the field environment.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Scanning the literature no reference could be spotted on the productive performance of birds under backyard system of poultry rearing. The research reviewed here are performance of birds under condition of intensive rearing and are intended to have an idea of the performance potential of the breeds involved in the study. Comparison of the performance of birds obtained in the present study with those available in these reports would be erronious too.

Livability

Dickerson _et al._ (1950) observed that cross bred obtained by mating Leghorn males were superior in adult livability to others in a cross breeding experiment with Leghorn, New Hampshire, Rhode Island Red and White Rock.

Warren and Moore (1956) found that adult mortality was 39.4 per cent during 48 weeks in laying house when heavy breeds were mothers and 20.8 per cent for the reciprocal mating. The data obtained supported the recommendation that Leghorn female rather than male be used in mating to reduce adult mortality while crossing with heavy breeds.

Nordskog and Philips (1960) studied the adult mortality of the reciprocal crosses obtained from mating of Leghorn, R.I.R., New Hampshire, hite rock and Egyptian breed Fayovmi. In addition Leghorn strain crosses, heavy breed crosses and pure Fayoumi breeds were also included in the experiment. Total adult mortality of Fayoumi was 15 per cent from all causes compared with 19 and 20 per cent for Leghorn strain crosses and heavy breed crosses respectively. The Leghorn x heavy breed cross showed 24 per cent mortality compared with 13.5 per cent for the reciprocal cross. Similar results were obtained in the case of Leghorn x Fayoumi. The Leghorn x Fayoumi showed 24 per cent compared with 15 per cent for the reciprocal crosses. On the other hand reciprocal cross of Fayoumi x heavy breeds showed little difference (8.6 per cent for Fayoumi x heavy breed and 8.1 per cent for the reciprocal). The result favour the hypothesis that difference in adult mortality of reciprocal crosses involving Leghorn breeds are associated with Leghorn sex chromosome and not due to maternal effects.

Dasilva (1962) reported after analysing the data from 1947 to 1959 that the total mortality in RIR fowls averaged 23.7 per cent varying between 9.7 to 36.5 per cent.

Marais (1965) conducted a cross breeding experiment with White Leghorn, Australorp and Rhode Island Red and the reciprocal two breed crosses between them and reported mortality of 7.33 per cent in cross breds and 6.33 per cent in pure breds. Mortality of cross bred hen were largely determined by the breed of male parent. There was significant difference in mortality between breeds (WLH 12 per cent ALP 5 per cent and RIR 2 per cent).

Kuit (1965) found 23.4 per cent mortality in White Leghorn and RIR cross during laying period (18 weeks to 500 days).

Erasmus (1966) conducted cross breeding with inbred line of Australorp (A7) with two inbred White Leghorn lines L2 and L11. A7 x L2 and A7 x L11 showed notable low mortality of 7.5 and 21 per cent in the two cross breds respectively.

Marais and Joubert (1968) conducted cross breeding experiment in White Leghorn, Australorp and Rhode Island Red and found no favourable heterotic effect in the case of mortality and they also observed that broodiness and mortality were controlled by sex linked genes.

Acharya and Jitendra Kumar (1971) pointed out the possibility of improving the survivability of Rhode Island Red by introducing into them desi inheritance in a study of laying house mortality in Desi, RIR and their crosses.

Lund (1971) observed in a cross breeding experiment that mortality of cross breds were 13.7 per cent and 32.5 per cent in the first and second year of laying respectively and the mortality of pure breds were 18.3 and 36.4 per cent respectively for similar periods.

Sergeev and Sergeeva (1971) found that the survival rate of adult of hybrid exceeded that of the two parent lines involved.

Kumar (1978) studied the performance of Desi, White Leghorn, RIR, Desi x White Leghorn and Desi x RIR fowls and found Desi x White Leghorn had better survival rate than pure breds.

Sexual Maturity

Dickerson <u>et al.</u> (1950) conducted a cross breeding experiment and observed that cross breds by Leghorn males were superior in sexual maturity to pure bred Leghorn, New Hampshire, Rhode Island Red and White Plymouth Rock.

Brunson and Godfrey (1951) found Black cross pullets (Rhode Island Red x Barred Plymouth Rock) to be superior to Rhode Island Red, Barred Plymouth rock and White Leghorn and their crosses in age at sexual maturity.

Glazener _et al._ (1952) found that greatest gain by crossing were in the number of days required for sexual maturity in a cross breeding experiment of different breeds viz. White Leghorn, Barred Plymouth Rock, Rhode Island Red and New Hampshire.

Marais (1965) found that sexual maturity in cross breds to be 180 days and in pure breds to be 182 days in an experiment with White Leghorns, Black Australorps, Rhode Island Reds and their reciprocal two breed crosses.

Kuit (1965) observed early sexual maturity (152 days of age at first egg) in WLH x RIR than WLH, RIR and RIR x WLH.

Kasznica _et al._ (1968) found age at sexual maturity averaged 174.2 days in Leghorn fowls.

Comparing the data obtained from 253 RIR, 131 Desi, 246 Desi x RIR and 151 RIR x Desi, Acharya and Jitendrakumar (1971) observed that, RIR x Desi matured early followed by Desi x RIR.

Dev *et al.* (1971) found age at sexual maturity averaged 182.6, 178.6 and 181.0 days respectively in 112 pure bred White Leghorn, 123 White Leghorns x Rhode Island Red and 140 Rhode Island Reds x White Leghorn respectively.

It was reported that cross bred came to lay earlier than pure breds in a cross breeding experiment involving Rhode Island Red, White Wyandotte, White Leghorn, Brown Leghorn, New Hampshire and Barred Plymouth Rock (Lund, 1971).

Singh *et al.* (1972) found the average sexual maturity of 403 pullets of White Leghorn to be 172.2 days and the average production was 43.57 eggs in first 90 days.

Lal and Chhabra (1975) observed that the age at first egg averaged 182, 168, 187, 180, 185, 175, 174, 177 and 185 days in Australorps, Australorps x New Hampshires, Australorps x White Cornish, New Hampshires x Australorps, New Hampshires, New Hampshire x White Cornish, White Cornish x Australorps, White Cornish x New Hampshires and White Cornish respectively.

Abdel Kader and El-Hossari (1976) found age of first egg averaged 210.5±18.4 and 241.7±16.2 in Fayoumi and Rhode Island Red pullets respectively.

Sarma *et al.* (1977) reported that age at sexual maturity of six strains of White Leghorns were 176, 176, 189, 170, 169 and 174 days.

The age at sexual maturity of White Leghorn Layer strain was reported as 169 to 175 days (Krishnan *et al.*, 1977).

Mishra *et al.* (1978) analysed records of sexual maturity of Rhode Island Red flock at Central Poultry Breeding Farm, Bhuvaneswar. They found that age at sexual maturity of the Rhode Island Red flock to be 197.39 days.

Egg Production

Knox *et al.* (1949) studied the data for Rhode Island Reds, Light sussex Pullets, and cross breds from Rhode Island Red males mated to Light sussex pullets. Data for three way crosses single comb White Leghorns males crossed with F1 pullets from Rhode Island Red x Light sussex cross and Barred Plymouth rock male to Rhode Island Red x Sussex Pullets. Egg production, egg weight and viability were better in all cross breds than standard bred Rhode Island Red and Light sussex.

Dickerson et al. (1950) studied the egg production from 154 to 300 days of cross breds involving 21 families of inbreed lines of Leghorns, six of New Hampshires, Ten of Rhode Island Reds and six of White Rocks. The cross breds were produced in 227 of 462 possible cross breed combination of Leghorns with other breeds and in 133 of 255 possible intrabred combination using first year breeders and found that cross bred advantage was 8 to 9 eggs for Leghorn Hampshires (84) and Leghorn Reds (80) but negligible for Leghorn-Rocks (72).

In a cross breeding experiment with White Leghorn, Barred Plymouth Rock, Rhode Island Red and New Hampshire, Glazeher et al. (1952) observed that cross breds were superior in egg production than pure breds.

Nordskog and Ghostley (1954) found in an experiment that egg produced in three years favor strain crosses and cross breds by 10 per cent and 12 per cent respectively over pure strains among New Hampshire, Rhode Island Red, Barred Plymouth Rock, Australorp and their possible combinations.

Marais (1965) studied the performance of White Leghorn, Black Australorp and Rhode Island Red and their reciprocal crosses. He found the highest egg production was by Black Australorp x White Leghorn (189.1) cross breds exceeded pure breds significantly in egg production (179 Vs 166.2).

Erasmus (1966) studied egg production of pure bred and cross bred pullets. The inbred lines of Australorp (A7), the two inbred White Leghorn lines (L2 and L11) had been used. A7 x L2 and A7 x L11 crosses showed a hybrid advantage above the mid point level of 81 and 74 eggs respectively. The coefficient of variation in egg production was much larger in the inbred lines than in the cross breds.

Marais and Joubert (1968) studied the effect of crossing White Leghorn. Black Australorp and Rhode Island Red. They found egg production higher in crosses than pure breds. The four crosses showed remarkably high egg production. Ranked in order of merit were (a) Black Australorp x White Leghorn, (b) Rhode Island Red x Black Australorp, (c) Rhode Island Red x White Leghorn (d) White Leghorn x Black Australorp.

Aggarwal (1970) reported from data of 52 White Leghorn pullets housed at 20 weeks of age that they produced 36 eggs on an average for the first four months of production.

Doorenball <u>et al.</u>(1970) studied three White Leghorn population, a control and two selected from the control, and observed that their production ranged widely. Egg production to 275 days of age was 66.2±5.6 for the control and 94.5±4.0 and 48.3±4.8 for the two selected groups.

Tijen and Kuit (1970) conducted experiment on cross breeding of White Leghorn and Rhode Island Red and compared their egg production with that of pure strains. The average egg production to 72 weeks of age was 220, 227, 258, 240 in White Leghorn, Rhode Island Red, White Leghorn x Rhode Island, Red and Rhode Island Red x White Leghorn respectively.

Choi (1970) from his studies on three strains of White Leghorn, a White Leghorn line cross and Hamphon (New Hampshire x White Leghorn) cross birds for 500 days of age and found that hen day egg production was 56 to 62, 59 and 65 per cent and hen housed egg production was 182 to 204, 179 and 213 respectively.

Dev et al. (1971) found egg production on hen day basis from 28 to 40 weeks of age averaged 70.1, 71.6 and 63.8 per cent in White Leghorn, WLH x RIR and RIR x WLH respectively.

Singh and Singh (1971) concluded that strain crosses produced the highest number of eggs when compared to the top crosses, cross breds and pure breds.

Kumar *et al.* (1971) studied egg production in Desi, Rhode Island Red, Rhode Island Red x Desi and Desi x Rhode Island Red pullets aged 6 months for 10 weeks. The hen day egg production averaged 19.18±1.41, 47.60±1.40, 29.11±1.50, 36.50±1.50 per cent, respectively.

Mohapatra (1972) reported that average egg production was 57.32 and 32.25 upto 40 weeks of age and 58.81 and 36.69 for the first 100 days of production in White Leghorn and Australorp strains respectively.

Amritlal and Chhabra (1976) observed the average feed conversion for growth and egg production was more in cross breds among nine genetic group obtained by diallel crossing of Australorp, New Hampshire and White Cornish. They further obtained an average of 15.5 per cent lesser feed per dozen of eggs laid as compared to the pure breds.

Swart (1977) compared the performance of White Leghorn and Black Australorp x White Leghorn and he found very little differense in egg production and egg mass between two types.

Sharma *et al.* (1977) studied the hen day egg production and hen housed production of six White Leghorn strains in India and found to range from 52.4 to 68 per cent and 50.7 to 61.6 per cent respectively upto 280 days of age.

Mishra *et al.* (1978) studied egg production upto 280 days of age of RIR flock at Central Poultry Breeding Farm, Bhuvaneswar and found that number of eggs obtained was 55.48.

Kumar (1978) studied the performance desi, White Leghorn, Rhode Island, Desi x White Leghorn and Desi x Rhode Island Red and found that Desi was poorer in production. Desi x White Leghorn had a higher egg production than pure breeds.

Body Weight

Dickerson *et al.* (1950) found that cross breds weighed 4 to 7 per cent more at 8 to 12 weeks but little more at 22 weeks compared with the mean parental intra breed crosses and received higher line scores for fleshing particularly among pullets at 22 week.

Nordskog and Ghostley (1954) studied the body weight of 8 strains representing four breeds (New Hampshires, Rhode Island Red, Barred Plymouth Rock and Australorp) mated in all combinations. The strain cross and cross bred pullets averaged 4 per cent and 7 per cent heavier than pure strains. Adult body weight of strain crosses and cross breds were 5 per cent greater than pure breds.

King (1961) reported an average body weight 4.03 lbs (1.83 kg) at 32 weeks of age in a cornell random bred White Leghorn population.

Kuit (1965) found RIR x WLH cross was somewhat lighter in weight than reciprocal cross at 500 days of age (2?60 g v 2290 g).

Hill *et al.* (1966) found that average body weight at maturity was 1764.5 g in a population of White Leghorn.

Singh and Singh (1971) conducted an experiment for comparing age and body weight at sexual maturity in pure bred White Leghorn, RIR pullets of different strains and strain cross, cross bred, top cross bred and in cross bred and found that body weight at sexual maturity was higher than average in top cross breds and cross breds.

Plessis and Erasmus (1972) observed that there existed close relationship between body weight and egg production in White Leghorn and Australorp. They opined that 2.04 kg was an ideal body for White Leghorn.

Amritlal and Chhabra (1976) found that average feed conversion for growth and egg production was more efficient in cross breds. Cross breds on an average consumed 18.6 per cent lesser feed per kg live weight gain.

Johari *et al.* (1977) reported that overall mean body weight at 20 weeks of age in a strain of White Leghorn was 971.6±7.51 g .

Sarma *et al.* (1977) found body weight at 20 weeks, six strains of White Leghorn varied from 1.20 to 1.47 kg.

Sheriff *et al.*(1978) suggested that birds which attained almost 1 kg at 20th week of age may be of value for best egg production, high livability and for more profit in Mayer strain of White Leghorn.

Kumar (1978) studied the performance of Desi, White Leghorn, RIR, Desi x White Leghorn and Desi x RIR. He observed Desi x White Leghorn had a higher growth rate than pure breds.

Yoo *et al.* (1979) studied the cross breeding performance of White Leghorn and Australorp. They observed 4 to 5 per cent heterosis for body weight.

Egg Weight

Lerner and Cruden (1951) had published the average egg weight of White Leghorn birds from 1943 to 1948. Pooled average egg weights over the years were 43.3, 46.6 and 54.6g in the begining of lay, in November and in April respectively.

Burnson and Godfrey (1951) found Black cross pullets were superior to Rhode Island Red, White Leghorn and Barred Plymouth rock in egg weight.

King (1961) reported an average egg weight of 52.4 at 32 weeks of age from an experiment on Regional Cornell control population of White Leghorns.

Monstageer and Kamar (1961) compared White Leghorn (W), Fayoumi (F) and Rhode Island Red (R) and their reciprocal crosses to determine the factors involved in their inheritance. The average weights of the eggs at 16 months of age were 55.3, 48.3, 48.8, 43.3, 46.8 and 52.0 and 54.6 g in W, FW, WF, F, RF, FR and R respectively.

Marais (1965) found in a cross breeding experiment of White Leghorn, Rhode Island Red and Australorp and their reciprocal two breed crosses, that the egg weight of ALP x WLH had the highest weight 63.6g. Cross breds exceeded pure breds in egg weight (62.1g vs 61.4g).

Marais and Joubert (1968) found ALP x WLH as the best hybrid in respect of egg weight.

Kaszinica *et al.* (1968) found that autumn and spring egg weight were 53.5 and 57.6g respectively in different populations of White Leghorn maintained at five different farms.

Ghany *et al.* (1969) found average annual egg weight as 53.2±0.57, 41.9±0.44 and 42.5±0.29 g for the RIR, Fayoumi and Baladi Breeds respectively. Egg weight of cross breds (two way crosses between RIR and the indigenous breeds) was intermediate between their parents.

Agarwal (1970) reported an average egg weight of 48 ± 0.32g in White Leghorn pullets.

Choi (1970) reported an average egg weight of 54.1 to 55.3g, 58.8 and 54.4g for White Leghorn, White Leghorn line cross and Hamphon (New Hampshire x White Leghorn) respectively.

Dev *et al.* (1971) found the egg weight at 36 weeks of age averaged 56.23, 55.48 and 55.56g in White Leghorn, WLH x RIR and RIR x WLH respectively.

Kumar *et al.* (1971) found that the egg weight averaged 44.99±0.60, 51.96±0.38, 48.47±0.37 and 47.96±0.40g for Desi, Rhode Island Red, RIR x Desi, Desi x RIR respectively in a study of six months aged pullets for 10 weeks.

Al-Rawi and Amer (1972) studied the egg weight of Leghorn, New Hampshire, Iraqi hens and their crosses. They found the egg weights were 54.52, 54.50, 51.73, 59.61, 58.97 and 58.68 in Leghorns, New Hampshires, Iraqi Leghorn x NH, NH x Leghorn and NX x Iraqi respectively.

Kotaiah et al.(1976) studied two strains of White Leghorns, one strain of ALP and observed that ALP were superior to White Leghorns for egg weight.

Hanumaiah et al.(1976) found that egg weight were 55±0.55, 53±0.35 and 51±0.44 g for WLH, WLH x RIR and RIR respectively.

Abdel Kader and ElHossari (1976) found egg weight of Fayoumi and RIR pullets were 42.2±3.59 and 34.7±9.90g respectively.

Mishra et al.(1978) found mean value of egg weight at 38 weeks of age 50.88 in RIR.

Jain et al.(1978) studied the egg size of WLH, RIR and desi and their two-way and three-way crosses and found Desi laid smallest egg among pure bred. RIR x WLH and WLH x RIR laid on an average slightly small sized eggs than either of parents.

Iype (1979) found the egg weight averaged 50g for daughters and 51g for dams at 230 to 240 days of age in a study on egg weight of 988 progeny of 288 dams and 43 sires of the forsgate strain of White Leghorn of Central Hatchery, Kerala.

Yoo <u>et al.</u> (1979) found in a cross breeding experiment involving White Leghorn and Australorp 4 to 5 per cent heterosis for egg weight.

MATERIALS AND METHODS

MATERIALS AND METHODS

Ready to lay pullets of about 20 weeks of age belonging to pure bred White Leghorns (WLH), pure bred Black Austrolorps (ALP) pure bred Rhode Island Reds (RIR) and all possible two breed reciprocal crosses among these breeds, bred at the University Poultry Farm, Mannuthy, were used in the experiment (Fig. 1 to 9).

The experiment was carried out at Kanjicode, a Village 12 km east of Palghat situated in Kerala-Tamil Nadu border. The place has an annual rainfall of 2397mm and the maximum and minimum temperature experienced at Palghat are normally 40°C and 16°C respectively. The meteorological information during the period of the experiment were provided by the Meteorological Centre, observatory, Trivandrum (Personnal communication).

Forty five families who were agricultural or mill labourers were chosen from this area and each genetic group was alloted at random to five families each. Each family was provided with five ready to lay pullets. Before the distribution, the beneficiaries were briefed on the objectives of the project and were enlightened on the

Fig. 1 White Leghorn

Fig. 2 Australorp

Fig. 3 Rhode Island Red

Fig. 4 White Leghorn x Australorp

Fig. 5   White Leghorn x Rhode Island Red

Fig. 6   Australorp x White Leghorn

Fig. 7 Australorp x Rhode Island Red

Fig. 8 Rhode Island Red x White Leghorn

Fig. 9 Rhode Island Red x Australorp

records to be maintained by them and the importance of such records. A layer feed formulated according to ISI (1977) were distributed to each homestead for feeding these birds. The level of feeding was fixed at 60 g per bird per day and the remaining requirement was expected to be met through household waste and agri by-products available in the homesteads. A measure was provided to each homestead to measure out formula feed to be fed daily. The ingredient composition of the feed is set out in Table 1. The recepients were required to maintain the data on daily egg production, mortality, if any, and the mode of disposal of eggs in a proforma prepared for this purpose (Table 2). Each household was visited at least once in three days and the data recorded were verified and transferred to data book.

Postmortem of dead birds were conducted on receiving information on mortality and the cause of death recorded.

Body weights of individual birds were recorded at the time of distribution and also at 280 days of age.

At the termination of experiment (at 290 days of age of birds) eggs from each household were weighed to the nearest gram on three consecutive days and the average egg weight was arrived at.

The data so collected were compiled and were subjected to statistical analysis as per methods described by Snedecor and Cochran (1967). The cost and returns that could accrue, presuming that the birds be maintained through one year production, was also computed.

Table 1. Per cent composition of ration used in the experiment.

Ingredients	Quantity
Groundnut cake	23
Unsalted dried fish	10
Maize, yellow	15
Tapioca chips	20
Deoiled rice bran	30.5
Poultry min*	1.5
Common salt	0.25
Rovimix(g)**	20
Neftin 200g***	25

* Poultry min. Mineral mixture (Aries Agro Vet Industries Pvt.Ltd.) containing 32 per cent calcium, 6 per cent phosphorus, 0.27 per cent manganese, 100 ppm copper and 1000 ppm iron.

** Rovimix AB_2D_3 (Roche products Limited) containing 40,000 I.U. of Vitamin A, 20mg of Vitamin B_2 and 5000 I.U. of Vitamin D_3 per gram.

*** Neftin 200. (Smith Kline and French (India)Ltd., containing Veterinary Furazolidone, BVet.C.20 per cent W/W.

Table 2. Data sheet - field trials with pure breds and cross breds.

Name of person

Genetic group

No.of birds on Ist of the month

Month

Date	No.of eggs obtained	Mortality	Cause* of death	Egg disposed		Remarks
				Used in house	Sold	
1						
2						
3						
4						
5						
-						
-						
-						
31						

No. died
No.of birds at the end of the month
Total eggs produced

SIGNATURE OF INVESTIGATOR

* cause to be recorded by investigator after post mortem.

RESULTS

RESULTS

The informations regarding the temperature and rainfall experienced at Palghat during the period of experimentation are set out in Table 3.

Livability

The livability of the birds belonging to the nine genetic groups involved in the study is presented in Table 4. The causes of mortality are also projected. The highest livability was observed for the genetic group ALP x WLH (96 per cent) while the poorest was for genetic groups WLH x RIR and RIR x ALP (80 per cent). However, the numerical differences seen in per cent livability among different genetic groups were not statistically significant. Of the causes of mortality, 37.5 per cent were due to accidents (predator attack), 31.25 per cent due to worm infestation, 21.88 per cent due to enteritis and 9.38 per cent due to other non-specific causes.

Sexual Maturity

The sexual maturity of the birds belonging to the nine genetic groups were reckoned both in terms of age at first egg as well as on age at 50 per cent production. The age of sexual maturity reckoned from age at first egg and the statistical analysis of the data are presented in Tables 6 and 7 respectively. The earliest age at sexual maturity was 156.2 days and it was observed in WLH x RIR cross whereas the most delayed sexual maturity was recorded in pure bred ALP (182.2 days). The statistical analysis of the data revealed the age at first egg was lowest in WLH, WLH x RIR, RIR x WLH and ALP x WLH groups. It was significantly ($P<0.01$) higher in pure bred ALP and RIR groups whereas the WLH x ALP, ALP x RIR and RIR x ALP crosses were intermediate in age at first egg. The age at first egg of ALP crosses did not vary significantly from othertwo groups.

The earliest age at 50 per cent egg production was observed in ALP x WLH group (171 days). The same with respect to all the other cross breds and WLH pure breds did not vary significantly ($P<0.01$) from this. The age at 50 per cent production of pure bred ALP was significantly higher ($P<0.01$) than that of ALP x WLH, but was of the same order as that of the other cross breds and WLH and RIR pure breds. RIR pure breds had significantly ($P<0.01$) higher age at 50 per cent production than ALP x WLH and WLH x RIR cross breds, but the differences were not significant with respect to the other groups (Tables 8 and 9).

Egg Production

The per cent hen housed egg production for 140 days period obtained for the different genetic groups are presented in Table 10 and the statistical analysis of the data in Table 11. The highest per cent hen housed production was obtained from the group ALP x WLH (52.97 per cent) while the poorest was from pure bred (RIR (22.49 per cent). It was further seen that the differences in per cent hen housed egg production observed among the cross bred groups were not statistically different. Further, the differences in per cent hen housed egg production observed among pure bred WLH, pure bred ALP, RIR x WLH, WLH x ALP, ALP x RIR, RIR x ALP and WLH x RIR were also statistically not significant. Likewise, non-significant difference were also observed in the egg production among all the pure breds as well as RIR x WLH, WLH x ALP, ALP x RIR and RIR x ALP crosses.

The egg production of the different genetic groups calculated as per cent hen-day production is presented in Table 12. The highest egg production of 54.28 per cent was recorded for the group ALP x WLH while the poorest production (23.07 per cent) was obtained from pure bred RIR.

The statistical analysis of the data (Table 13) revealed that the differences observed among all the cross bred and pure bred ALP were not significantly different $(P < 0.05)$. The pure bred RIR and WLH gave significantly $(P < 0.05)$ lower per cent hen-day egg production than ALP x WLH crosses. But, their production did not vary significantly from the remaining six genetic groups.

Body Weight

The body weight of birds at 20 weeks of age and the statistical analysis thereof are present in Table 14 and 15 respectively. The data revealed that all pure breds had significantly $(P < 0.01)$ lower body weight at 20 weeks of age than the cross breds. The body weight data recorded at 280 days of age (Table 16) and the statistical analysis of this data (Table 17) revealed that at 280 days age pure bred WLH had the lowest body weight (1382g) and the highest body weight (1764g) was recorded for ALP x RIR cross breds. The body weight at 280 days of age obtained for pure bred WLH was significantly lower than all the other eight genetic groups. RIR, WLH x ALP, WLH x RIR, ALP x WLH and RIR x WLH were intermediate with respect to 280 days live-weight, their mean weight being significantly higher than WLH, but significantly lower than ALP, ALP x RIR and RIR x ALP.

Egg Weight

The egg weight recorded at 280 days of age of birds belonging to the different genetic groups together with the statistical analysis of the data are set out in Table 18 and 19 respectively. The eggs from the pure bred WLH showed the heaviest weight (53.20g) while the weight of egg obtained from pure bred ALP was the lowest (43.6g).

Egg Utilisation

The utilisation of egg by different homesteads involved in the study is presented in Table 20. It revealed that 75.6 per cent of the eggs produced were used for domestic consumption by the homesteads while only 24.4 per cent of the eggs were sold.

Economics

The cost and returns for one year of production that would be obtained from the nine genetic groups were worked out. The cost included cost of birds at time of distribution (20 weeks of age) supplemental feeding, depreciation of poultry coop, interest on capital investment (cost of bird and coop) and miscellaneous expenditure. The returns consisted of sale of eggs and meat value of bird at liquidation. Computation was made assuming production of average number of layers. The operational statement is presented in Table 21.

Table 3. Meteorological informations relating to Palghat.

	February 1981	March 1981	April 1981	May 1981	June 1981	July 1981
Highest maximum temperature (°C)	40.0	40.0	39.4	37.8	30.8	31.0
Lowest minimum temperature (°C)	16.8	20.2	18.8	19.2	19.0	19.0
Rainfall (mm)	000.0	073.0	049.4	223.2	661.0	411.0

Table 4. Livability of birds reared under backyard system.

Genetic group	Replication 1	2	3	4	5	*Total	Percent livability	Cause of mortality: Accident	Worms	Enteritis	Other non specific causes
WLH	4	4	5	5	4	22/25	88	2	1	..	..
ALP	4	4	3	5	5	21/25	84	2	..	1	1
RIR	4	5	5	4	5	23/25	92	..	..	1	1
WLH x ALP	2	4	5	5	5	21/25	84	1	3	..	..
WLH x RIR	5	4	5	2	4	20/25	80	3	1	1	..
ALPx WLH	5	5	5	4	5	24/25	96	1	..	..	..
ALPx RIR	5	5	4	5	4	23/25	92	..	1	1	..
RIRx WLH	5	5	5	2	2	19/25	76	3	..	3	..
RIRx ALP	5	4	4	2	5	20/25	80	..	4	..	1
						193/225	85.5	12	10	7	3

Note:* The fig re in nominator indicates number of birds surviving and that in denominater the birds available initially.

Table 5. ANOVA on livability

Source	df	SS	MSS	F
Genetic groups	8	4.44	0.56	0.53^{ns}
Replication	4	3.24	0.81	0.77^{ns}
Error	32	33.56	1.05	
Total	44	29.24		

ns: Not significant

Table 6. Sexual maturity (age in days at first egg) of birds reared in backyard

Genetic group	Replication					Mean
	1	2	3	4	5	
WLH	143	161	171	163	151	157.8^{b}
ALP	169	197	179	179	187	182.2^{a}
RIR	172	196	186	172	182	181.6^{a}
WLH x ALP	167	176	170	153	159	165.0^{ab}
WLH x RIR	149	157	145	170	160	156.2^{b}
ALP x WLH	165	160	161	170	149	161.0^{b}
ALP x RIR	185	153	165	172	168	168.6^{ab}
RIR x WLH	149	161	161	158	177	161.2^{b}
RIR x ALP	165	165	159	179	174	168.4^{ab}

Means carrying the same superscript are not statistically different.

Table 7. ANOVA on sexual maturity(age at first egg)

Source	df	SS	MSS	F
Genetic groups	8	3617.7	452.21	4.48**
Replication	4	248.5	62.13	0.62^{ns}
Error	32	3232.3	101.01	
Total	44	7098.5		

** Significant ($P < 0.01$)

Table 8. Sexual maturity (age in days at 50 per cent production) of birds reared in backyard

Genetic groups	Replication					Mean
	1	2	3	4	5	
WLH	164	176	207	190	176	182.6^{abc}
ALP	185	200	191	197	194	193.4^{ab}
RIR	200	191	200	180	216	197.4^{a}
WLH x ALP	187	186	179	177	175	180.8^{abc}
WLH x RIR	175	179	163	176	170	172.6^{bc}
ALP x WLH	167	170	183	175	160	171.0^{c}
ALP x RIR	197	162	186	184	191	184.0^{abc}
RIR x WLH	171	175	184	182	174	177.2^{abc}
RIR x ALP	179	180	175	204	184	184.4^{abc}

Means carrying the same superscript are not statistically different.

Table 9. ANOVA on sexual maturity (age in days at 50 per cent production)

Source	df	SS	MSS	F
Genetic groups	8	3039.20	379.90	3.36**
Replication	4	224.10	56.03	0.49
Error	32	3617.50	113.05	
Total	44	6880.80		

** Significant ($P < 0.01$)

Table 10. Mean hen housed per cent egg production of birds reared in backyard for 140 days

Genetic groups	Replication 1	2	3	4	5	Mean
WLH	23.57	36.14	20.43	21.71	39.64	28.30^{bc}
ALP	39.71	44.71	20.86	24.57	19.82	29.93^{bc}
RIR	25.57	13.57	13.14	38.00	22.14	22.48^{c}
WLH x ALP	20.71	34.29	23.71	38.71	57.71	35.03^{abc}
WLH x RIR	49.14	36.57	65.86	33.14	30.29	43.00^{ab}
ALP x WLH	65.71	43.86	46.86	37.57	70.86	52.97^{a}
ALP x RIR	42.00	51.00	23.56	42.43	34.57	38.77^{abc}
RIR x WLH	52.43	38.00	41.14	30.57	10.71	34.57^{abc}
RIR x ALP	57.57	44.43	34.00	23.86	39.00	39.77^{abc}

Means carrying same superscript are not statistically different.

Table 11. ANOVA on hen housed production (Arc sin transferred data)

Source	df	SS	MSS	F
Genetic groups	8	1225.76	153.22	2.46*
Replication	4	217.82	54.46	0.88
Error	32	1989.02	62.16	
Total	44	3432.60		

*Significant ($P < 0.05$)

Table 12. Mean hen-day egg production per cent of birds reared in backyard.

Genetic groups	Replications					Mean
	1	2	3	4	5	
WLH	24.04	38.57	20.43	21.71	39.64	28.88[b]
ALP	41.19	45.63	26.89	24.57	19.82	31.62[ab]
RIR	26.13	13.57	13.14	40.38	22.14	23.07[b]
WLH x ALP	29.06	42.55	23.71	38.71	57.71	38.35[ab]
WLH x RIR	49.14	37.37	65.86	38.80	32.57	44.75[ab]
ALP x WLH	65.14	43.86	46.86	44.13	70.86	54.28[a]
ALP x RIR	42.43	51.00	25.65	42.43	41.02	80.51[ab]
RIR x WLH	52.43	38.00	41.14	48.53	20.27	40.07[ab]
RIR x ALP	57.57	48.22	37.13	31.10	39.00	42.60[ab]

Means carrying the same superscript are not statistically different.

Table 13. ANOVA on hen day production (Arc sin transformed data)

Source	df	SS	MSS	F
Genetic group	8	1311.3379	163.9172	3.28*
Replication	4	175.4422	43.8605	0.88
Error	32	1595.6612	49.4644	
Total	44	3082.4413		

*Significant (P∠0.05)

Table 14. Mean body weight(g) at 20 weeks of age of birds reared in backyard

Genetic groups	Replication 1	2	3	4	5	Mean
WLH	910	860	850	900	910	886^{b}
ALP	1050	1020	1050	960	910	998^{b}
RIR	1040	1040	1040	860	900	876^{b}
WLH x ALP	1080	1070	1090	990	1090	1064^{a}
WLH x RIR	1030	1140	1130	1010	1240	1110^{a}
ALP x WLH	1120	1160	1190	1050	1190	1142^{a}
ALP x RIR	1040	1110	1250	1310	1190	1180^{a}
RIR x WLH	1130	1160	1130	1150	1100	1134^{a}
RIR x ALP	1060	1090	1150	940	1180	1084^{a}

Means carrying the same superscript are not statistically different.

Table 15. ANOVA on body weight at 20 weeks of age.

Source	df	SS	MSS	F
Genetic groups	8	485920.0	60740.00	4.30**
Replications	4	99791.11	24947.78	1.97
Error	32	405168.89		

** Significant ($P < 0.01$)

Table 16. Mean body weight (g) of birds at 280 days of age reared in backyard.

Genetic groups	Replication 1	2	3	4	5	Mean
WLH	1330	1360	1300	1380	1540	1382[c]
ALP	1830	1930	1820	1640	1540	1752[a]
RIR	1440	1650	1600	1630	1410	1546[b]
WLH x ALP	1550	1380	1660	1340	1650	1516[b]
WLH x RIR	1660	1340	1680	1360	1550	1524[b]
ALP x WLH	1470	1630	1710	1430	1610	1570[b]
ALP x RIR	1560	1860	1760	1760	1880	1764[a]
RIR x WLH	1500	1340	1540	1480	1500	1472[b]
RIR x ALP	1810	1610	1700	1400	1700	1644[a]

Means carrying the same superscript are not statistically different.

Table 17. ANOVA on body weight at 280 days of age

Source	df	SS	MSS	F
Genetic groups	8	633071.11	79133.89	4.98**
Replication	4	109488.89	27372.22	1.72
Error	32	508751.11	15898.47	

** Significant ($P < 0.01$)

Table 18. Mean weight of eggs(g) at 280 days of age from birds reared in backyard.

Genetic group	Replication 1	2	3	4	5	Mean
WLH	53	52	54	54	53	53.20[a]
ALP	43	38	46	46	45	43.60[d]
RIR	43	42	0	49	0	44.67[d]
WLH x ALP	48	48	48	41	46	46.20[cd]
WLH x RIR	50	0	53	48	52	50.75[b]
ALP x WLH	51	48	48	48	49	48.80[bc]
ALP x RIR	43	45	45	45	49	45.40[d]
RIR x WLH	48	45	47	49	48	47.40[c]
RIR x ALP	44	46	43	46	46	45.0[d]

Means carrying the same superscript are not statistically different.

Table 19. ANOVA on egg weight

Source	df	SS	MSS	F
Genetic groups	8	372.7024	46.5878	8.97**
Error	33	171.4167	5.1944	

** Significant ($P < 0.01$)

Table 20. Utilisation of eggs by homesteads involved in the experiment

	Eggs produced	Eggs used for household	Eggs sold	Per cent	
				Used	Sold
WLH	935	902	33	96.47	3.53
ALP	1020	816	204	80.00	20.00
RIR	758	758	..	100.00	..
WLH x ALP	1226	856	370	69.82	30.18
WLH x RIR	1505	547	958	36.35	63.65
ALP x WLH	1854	1322	532	71.31	28.69
ALP x RIR	1360	835	525	61.40	38.60
RIR x WLH	1210	1135	75	93.80	6.20
RIR x ALP	1392	1342	50	96.41	3.59
Total	11260	8513	2747	75.60	24.40

Table 21. Economics of raising different genetic groups of chicken under backyard system for one year.

Genetic group	Income	Expenditure	Profit/ Loss	Income / Expense	Profit x 100 / Capital (fixed)	Profit per unit/ year	Average cost per egg
WLH	1435.01	1387.63	47.38	1.03	5.26	1.48	0.57
ALP	1846.41	1443.26	403.15	1.28	42.44	80.63	0.54
RIR	1420.52	1443.26	-22.74	0.98	..	..	0.74
WLH x ALP	2055.70	1443.26	612.44	1.42	64.47	122.49	0.44
WLH x RIR	2200.84	1443.26	757.58	1.52	79.75	151.52	0.38
ALP x WLH	2738.58	1443.26	1295.32	1.90	136.35	259.06	0.31
ALP x RIR	2209.12	1443.26	765 .86	1.53	80.62	153.17	0.42
RIR x WLH	2111.77	1443.26	668.51	1.46	70.37	133.70	0.43
RIR x ALP	2665.84	1443.26	822.58	1.57	86.59	164.52	0.40

Note:- 1. The expenditure and income relates to 5 units of 5 birds each.

2. The projected egg production was calculated based on per cent H.D.P. (Table 12)

3. The egg production of each genetic group was calculated based on average number of layers i.e. $\frac{25+21}{2} = 23$

4. Egg price was calculated at the rate of Rs.45/- per 100 for white shelled eggs and Rs.50/- per 100 for tinted eggs.

5. Meat value at cull was calculated at Rs.12/- per kg for WLH and Rs.14/- for all others. Live weight of birds at liquidation were based on weight presented in Table 16.

6. Interest on capital was calculated at 11.25 per cent per year at which rate homesteads obtained loan from banks.

7. Depreciation (straight line) for coop has been worked out with 5 year life and scrap value of 10 per cent of capital investment.

DISCUSSION

DISCUSSION

The temperature and rainfall data presented in Table 3 revealed that the locality had experienced the maximum temperature and rainfall during the experimental period. This is the normal trend during these seasons of the year in many parts of Kerala with the exception of high ranges. Therefore, the performance of the birds obtained in this study can reasonably be expected to be repeated in other parts of this State as well, provided, other management practices are similar.

The overall livability of 85.5 per cent recorded (Table 4) in the present investigation is excellent in view of the fact that the birds were reared under backyard system where they are subjected to a variety of stress factors and are also more exposed to possibilities of infections in contrast to confinement rearing. Further, the results also revealed that 37.5 per cent of the mortality was due to accidents. Thus, if the loss due to accidents is discounted the livability was around 91 per cent. The numerical differences observed in per cent livability among the nine genetic groups were not statistically significant indicating thereby that cross breds have no superiority over pure breds in livability under the conditions of this experiment. This is in striking contrast to the observations made by many workers with pure breds and cross breds under intensive system of rearing (Dickerson *et al*. 1950; Marias,1965; Lund,1971 and Sergreev and Sergreev,1971). However, Marias and Joubert (1968) reported no benificial effect on adult mortality by cross breeding.

The results also dispels the common belief that pure bred White Leghorn birds have poorer livability under backyard system of rearing. The so called poor livability expressed by certain farmers could either be due to failure of providing timely vaccination against Ranikhet disease or to breakdown of immunity. Vikraman (1981) opined that worm burden among birds results in break down of immunity. In the present experiment itself 10 birds out of 225 died showed heavy worm burden on autopsy even though the birds were dewormed once during the course of the study. Thus, the possibility of worm infestation and consequent mortality due to break down of immunity are more in backyard system of rearing. Further, of the different breeds of chicken reared by farmers White Leghorn constitutes a very major number and therefore the number of reports of poor livability in Leghorns are more.

The sexual maturity of the birds calculated both from age at first egg as well from age at 50 per cent production revealed that all the cross breds matured earlier in age than pure breds other than White Leghorn. However, this clear numerical distinction between pure breds and cross breds in the age of sexual maturity was not obtained on statistical analysis. These results are in contrast to the observations Dickerson *et al.* (1950), Glasener *et al.* (1952), Marias (1965), Acharya and Jitendra Kumar (1971) and Lund (1971) who obtained earlier sexual maturity among cross bred than pure breds. This differences in results could be due to the differences in the rearing system employed between these studies. Further, in the present study the birds were provided only 50 per cent of their daily ration through compounded feed while the balance 50 per cent was expected to be met from the household wastes. Eventhough pure bred WLH, RIR x WLH, WLH x RIR crosses showed statistically similar age at sexual maturity to ALP x WLH cross when computed based on age at first egg, the latter (ALP x WLH) surpassed all others when age of sexual maturity was calculated based on 50 per cent production. This indicated that ALP x WLH cross not only matured earlier but also had higher rate of lay. Next in order was WLH x RIR cross.

In terms of hen housed production ALP x WLH cross was superior to all the other pure bred and cross bred while pure bred WLH, ALP and WLH x RIR ranked second. The hen day production data also indicated that ALP x WLH cross to be distinctly superior to all other pure breds and cross breds. This trend of result is in close agreement with that reported by Marias (1965) who obtained highest egg production from ALP x WLH cross in a study with pure bred ALP, WLH, RIR and their reciprocal crosses. However, the results of the present study are only in partial agreement with the observations of Marias and Joubert (1968) who employing the same three breeds found that egg production in all cross breds were statistically superior to pure breds.

The initial body weight and body weight at 280 days of age presented in Table 14 and 16 respectively indicated that the birds were not only able to maintain their body weight but were able to gain weights. This factor is of special significance in the present context since the birds were reared under backyard condition where they are subjected to a multiplicity of stress factors coupled with partial feeding with balanced feed. The results of the study also indicated that the presumption that the birds will be able to meet the part of their nutrient requirement through household waste is also confirmed.

The mean weight of eggs recorded at 280 days of age (Table 18) indicated that White Leghorns laid the heaviest egg followed by WLH x RIR cross. The results are intrigueing because the body weight of WLH were lowest among the genetic groups at 280 days of age(Table 16). Like-wise, the egg weight of pure bred ALP which had heavier body weight wasamong the lower egg weight group. This is in striking contrast to the reports on egg weight of these breeds and crosses(Brunson and Godfrey,1951; Marias,1965; Marias and Joubert,1968 and Kotaiah,1976). These conflict in the findings could be due to the fact that in the selection process of pure breds employed in the study egg number was given weightage and egg weight was not considered. A deficiency of essential fatty acids could also be a reason for the overall poor egg weight among all the genetic groups in as much as the birds were offered balanced poultry feed only partially. However, in so far as the consumer market in our country has not yet been oriented to quality of eggs in terms of egg weight this could not be a serious objection in identifying a bird for backyard.

Out of the total 11260 eggs produced during the course of experimentation by all the genetic groups, 75.6 per cent has been used for consumption by the members of homestead and only 24.40 per cent were sold (Table 20). This suggests that households who produced eggs show a preponderante tendency to use it in their menu than sell it. However, such a generalisation in all situation may not be true in as much as the households involved in the study belonged to middle class. The situation could be reverse if the households were from loer income group. None the less, it is reasonable to presume that at leat part of the eggs produced in the homesteads will be used for consumption even by the lower income group homesteads in view of the general psychology that when some products are produced in the home, the chances of using at least part of it for consumption is more than to go to market and purchase the commodity for consumption unless it is a staple food. Viewed in this angle, the study point to the fact that encouraging homestead to have small poultry units will help not only to supplement the income but above all will provide an opportunity to have a source of nutritious food for the members which will have a more lasting national impact.

The economic viability of the system and the birds were assessed and the data are presented in Table 21. The results indicated that all the genetic groups barring pure bred RIR showed profits although of varying degrees. The benefit cost ratio, returns to capital investment and cost per egg showed that a backyard unit of the type used in this experiment could generate supplementing income or could be considered as a cheap source of badly needed animal protein source. The data also revealed that the ALP x WLH cross bred was more promising than other eight genetic groups with a benefit of Rs.1.90 for every rupee spent and the returns over capital for this cross was 136 per cent on capital investment. The trend is similar in all the genetic group barring pure bred WLH and RIR. The per cent returns to capital also revealed that except for WLH and RIR. The per cent returns to capital also revealed that except for WLH and RIR pure breds it far exceeded those that could be expected in related investment. The overall economics of the backyard system clearly point to its economic viability under the conditions of the study.

SUMMARY

SUMMARY

In an effort to identify a suitable bird for backyard system of poultry rearing, a system most prevalent in Kerala, an experiment was conducted in the homesteads of farmers at Kanjicode, Palghat District, using WLH, ALP, RIR and their possible two breed reciprocal crosses. Forty five homesteads were involved in the study and each homestead reared five birds of one of the nine genetic groups. The birds at the time of distribution were about 20 weeks of age and the study was terminated when they attained 280 days of age. The birds were reared under typical backyard condition with the exception that they were provided with balanced feed at the rate of 60g per bird per day (50 per cent of daily feed required) and the balance was assumed to be met from kitchen waste and agricultural by-products available in homesteads. Data on livability, sexual maturity, egg production, egg weight, body weight at 20 weeks and at 280 days of age and egg utilisation trend were collected compiled and were subjected to statistical analysis. The economics of raising the nine genetic groups over one year production cycle was also worked out. The results obtained are summarised in Table 22.

The results indicated the following:

a) The livability among all genetic groups were excellent.

b) The popular belief of poor livability for White Leghorn under backyard condition is not proved.

c) ALP x WLH cross surpassess all other pure breds and cross breds in age at sexual maturity and per cent egg production. WLH x RIR could be ranked as next best in respect of these two traits.

d) The birds under backyard were able to return fair level of production and were able to maintain their body weight inspire of providing only 50 per cent of daily feed required through balanced feed.

e) In terms of cost and returns also ALP x WLH turned out to be exceptionally superior over other genetic groups.

f) Most of the genetic groups recorded profit.

g) The tendency among farmers seen as to utilise a fair portion of the eggs produced for homestead consumption rather than for sale.

h) The strain of RIR used in the study does not seem to be suitable for backyard.

In the light of these findings the following conclusions are drawn:

a) Backyard system of poultry keeping appears to be an economically viable system for providing either supplementary income and/or to provide comparatively cheaper protein food.

b) ALP x WLH cross emerges as promising bird for backyard. Eventhough WLH x RIR is not comparable to the above cross none the less WLH x RIR cross could be rated as second best for backyard.

c) Reasonable level of production from backyard could be obtained by providing 50 per cent of daily feed requirement through balanced feed and the rest being met from household waste.

Table 22. Summary of results

Parameter	WLH	ALP	RIR	WLH x ALP	WLH x RIR	ALP x WLH	ALP x RIR	RIR x WLH	RIR x ALP
Livability (Percentage)	88[a]	84[a]	92[a]	84[a]	80[a]	96[a]	92[a]	76[a]	80[a]
Overall mean sexual maturity (age in days at first egg)	157.8[b]	182.2[a]	181.6[a]	165.0[ab]	156.2[b]	161.0[b]	168.6[ab]	161.2[b]	168.4[ab]
Sexual maturity (age in days 50 per cent production)	182.6[abc]	193.4[ab]	197.4[a]	180.8[abc]	172.6[bc]	171.00[c]	184.0[abc]	177.20[abc]	184.4[abc]
Mean Hen Housed production (%)	28.30[bc]	29.93[bc]	22.48[c]	35.03[abc]	43.00[ab]	52.97[a]	38.77[abc]	34.57[abc]	39.77[abc]
Mean hen day production (%)	28.88[b]	31.62[ab]	23.07[b]	38.35[ab]	44.75[ab]	54.28[a]	40.51[ab]	40.07[ab]	42.60[ab]
Mean body weight at 20 weeks of age (g)	886[b]	998[b]	876[b]	1064[a]	1110[a]	1142[a]	1180[a]	1134[a]	1084[a]
Mean body weight at 280 days age (g)	1382[c]	1752[a]	1546[b]	1516[b]	1524[b]	1570[b]	1764[a]	1472[b]	1644[a]
Mean egg weight at 280 days of age (g)	53.20[a]	43.60[d]	44.67[d]	46.20[cd]	50.75[b]	48.80[bc]	45.40[d]	47.40[c]	45.80[d]
Profit per unit per year (Rupee)	1.48	80.63	-4.55	122.49	151.52	259.06	153.17	133.00	164.52

Means carrying similar superscript are not statistically different.

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EVALUATION OF PUREBRED AND CROSSBRED CHICKEN UNDER BACKYARD CONDITION

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ABSTRACT OF A THESIS

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ABSTRACT

Data were collected from 45 farmers' homesteads at Kanjikode, Palghat District using WLH, ALP, RIR and their possible two breed reciprocal crosses. Nine genetic groups each having five replications of five birds each formed the experimental material. The birds were offered 50 per cent of daily mash requirement through balanced feed and the rest being through household waste. The livability among all genetic groups was excellent. ALP x WLH cross was superior in age at sexual maturity and per cent egg production. WLH x RIR ranked next and RIR the last. The birds were able to maintain the production and body weight with 50 per cent of the ration, in backyard system. All the genetic groups except RIR showed profit. ALP x WLH appears as a promising bird for backyard system.