

**PRESENT STATUS OF LOCAL CHICKEN AND ITS  
GENETIC IMPROVEMENT IN THE EASTERN  
PROVINCE OF SRI LANKA**

**BY**

**ARULANANDAM CHRISHANTHAN VICTOR**



FAG351  
  
Project Report  
Library - EUSL

**FACULTY OF AGRICULTURE  
EASTERN UNIVERSITY**

**SRI LANKA**

**2013**

PROCESSED  
Main Library - EUSL

## ABSTRACT

Local chicken population play a major role in socio-economic status of rural farmers in Sri Lanka. However, lack of attention have been made on the improvement of this group of chicken. Though these local chicken groups are the major component of mixed farming system in Sri Lanka, the productivity is very low. In this context, a study was formulated to investigate the present status of local chicken and its genetic improvement in the Eastern province of Sri Lanka. The Eastern Province is one of the major province of having huge population of local chicken. Pre-tested structured questionnaire was administered to gather information on socio-economic role, management system, nutrition, resources, facilities available to the farmers and level of production of existing flock.

Further, different cross breeding programmes were developed using exotic breeders such as Giriraja, dual purpose breed and Cobb, meat strain. Giriraja X Naked-neck, Giriraja X Village chicken, Cobb X Naked-neck and Cobb X Village chicken were the crossings used in this study. From each crossings 50 fresh eggs were collected for analysis of egg quality parameters. The hybrids eggs were kept under natural incubation to produce F1 progeny. Growth traits of F1 progeny also separately analyzed. Statistical Package for Social Sciences (SPSS) and Statistical Analysis Software were used to analyze the data.

The results of the study revealed that the local chicken population such as village chicken and naked-neck were reared mainly under a resource-driven management system with commercial objectives. Among the farmers rearing local chicken half was

female with the average of 6.2 years experience in farming and 66% was young farmers of less than 40 years. Most of the farmers were Hindus (39%) and rest were Muslims, Christians and Buddhists. Further, majority of the farmers were involved in livestock farming (51%). There was a potential role of local chicken in integrated farming system and the farm yard manure was used as fertilizer in the own farms of farmers. Local chicken farming was the secondary income source among majority of the farm holdings (90%). Predominant management system of local chicken was semi-intensive system with moderate management conditions. Kitchen refuse, rice bran and broken rice were the major components of feed. Availability of feed ingredient was moderate and feed additives were adequate across the survey areas. In case of facilities only few farmers (19%) get veterinary facilities and extension and marketing facilities were not efficient. According to the flock size majority of the farms (69%) were fallen into small farm category. Farmers didn't maintain any records of diseases and mortality. Easiness, pleasure and less management cost were the predominant reasons for rearing local chicken in the survey areas.

The results of the study further revealed that the body weight of cockerel of village and naked-neck chicken at 7 months old was  $2.32 \pm 0.21$ kg and  $2.23 \pm 0.16$ kg respectively, while it was  $1.71 \pm 0.09$ kg and  $1.77 \pm 0.07$ kg for village chicken and naked-neck chicken, respectively. Age at first lay, monthly egg production, egg weight, hatchability, productive period and life time of village chicken was  $6.14 \pm 0.21$  months,  $16.86 \pm 2.34$ ,  $46.31 \pm 2.11$ g,  $84.64 \pm 4.61$ %,  $21.64 \pm 0.21$  months and  $26.03 \pm 0.33$  months, respectively while these traits of naked-neck chicken were  $7.91 \pm 0.24$  months,  $18.72 \pm 2.64$ ,  $49.76 \pm 1.77$ g,  $90.01 \pm 6.24$ %,  $22.01 \pm 0.38$  months and  $24.97 \pm 0.24$  months, respectively.

Moreover, the quality traits such as egg shape index ( $77.00 \pm 2.04\%$ ), egg weight ( $53.15 \pm 1.01$  g) and specific gravity  $1.07 \pm 0.602$  were significantly high ( $P < 0.05$ ) in hybrid eggs from Giriraja X Naked-neck chicken. Albumen weight ( $29.24 \pm 1.67$ g) was also significantly higher ( $P > 0.05$ ) in Giriraja X Naked-neck chicken. However, yolk weight ( $18 \pm 1.54$ g), yolk: albumen ratio ( $0.74 \pm 0.01$ ) and shell thickness ( $0.51 \pm 0.03$ mm) were significantly higher in Cobb X Naked-neck cross. The body weight of day old chick ( $58.31 \pm 1.3$ g), body length at birth ( $5.8 \pm 0.9$ g), weight gain ( $55.1 \pm 1.9$ g) and mature live weight ( $1.7 \pm 0.05$ kg) were significantly higher ( $P > 0.05$ ) in Giriraja X Naked-neck cross. From the study it was concluded. that, though the local chickens are of little value for commercial production, they will remain valuable as sources of meat and egg and secondary income to the rural household economy in the surveyed areas. Further the cross between Giriraja X Naked-neck express the desirable qualities in terms of egg parameters and growth traits of F1 progeny. Therefore, to improve the naked-neck population, Giriraja will be the best sire. Further, there should be a planned breeding programme is necessary for village chicken with other existing chicken breeds in Sri Lanka.

Keywords: Cobb, Giriraja, Local chicken, Naked-neck chicken, Village chicken

# TABLE OF CONTENTS

<b>ABSTRACT</b> .....	I
<b>ACKNOWLEDGEMENT</b> .....	IV
<b>TABLE OF CONTENTS</b> .....	V
<b>LIST OF TABLES</b> .....	X
<b>LIST OF FIGURES</b> .....	XI
<b>CHAPTER I - INTRODUCTION</b> .....	01
<b>CHAPTER II – LITERATURE REVIEW</b> .....	06
2.1 Origin of Chicken .....	06
2.2 Population of Chickens.....	07
2.2.1 Global Distribution.....	07
2.2.2 Status of Chicken Industry in Sri Lanka.....	08
2.3 Importance of Chickens.....	08
2.3.1 Genetic Research.....	09
2.3.2 As a Source of Food .....	09
2.3.2.1 Nutrient Composition.....	10
2.3.3 Other Importance.....	11
2.3.4 Significance of Chicken Products.....	12

2.4 Classifications of Chickens.....	13
2.5 Characteristics of Local Chickens .....	14
2.6 Improvement of Local Chickens.....	16
2.7 Farming Systems.....	16
2.8 Breeding of Local Chickens.....	17
2.9 Genetic Improvement of Local Chicken.....	17
<b>CHAPTER III - MATERIALS AND METHODS.....</b>	<b>19</b>
3.1 Field Survey to Investigate Socio-Economic Role of Local Chickens.....	19
3.1.1 Duration of Field Study.....	19
3.1.2 Survey Areas.....	19
3.1.3 Data Collection.....	21
3.1.4 Gathered Parameters.....	21
3.1.5 Study the Productive Performance of Existing Flocks.....	22
3.1.6 Data Analysis.....	22
3.2 Developing Breeding Programmes.....	22
3.2.1 Location.....	22
3.2.2 Duration.....	22
3.2.3 Breeding Design .....	23
3.2.3.1 Sire–Dam Combination in Breeding Programme .....	23
3.2.4 Breeding Technique and Method.....	23
3.2.5 Flock Management.....	23

3.2.6 Analysis of Hybrid Eggs.....	24
3.2.6.1 Egg Parameters .....	24
3.2.6.2 Methods of Measuring Egg Parameters.....	25
3.2.7 Analysis of the Performance of F1 Progeny.....	25
3.2.8 Statistical Analysis.....	26
<b>CHAPTER IV - RESULTS AND DISCUSSION.....</b>	<b>27</b>
4.1 Socio Economic Role of Local Chicken.....	27
4.1.1 Gender.....	27
4.1.2. Religion .....	27
4.1.3 Occupation .....	28
4.1.4 Role of Local Chicken in Integrated Farming.....	28
4.1.5 Economic Role of Local Chicken Farming .....	29
4.2 Management System.....	30
4.2.1 Management Condition .....	31
4.3 Nutrition.....	31
4.3.1 Availability of Feed and Feed Additives.....	32
4.3.2 Feed Ingredients.....	32
4.4 Facilities .....	33
4.5 Flock Size.....	33
4.6 Disease and Mortality.....	34

4.7 Reasons for Rearing Local Chicken.....	34
4.8 Constraints and Suggestions.....	35
4.8.1 Constraints.....	35
4.8.2 Suggestions.....	35
4.9 Productive Traits.....	35
4.9.1 Body Weight.....	35
4.9.2 Age at First Lay.....	37
4.9.3 Monthly Egg Production.....	37
4.9.4 Egg Weight.....	38
4.9.5 Hatchability.....	38
4.9.6 Productive Period.....	38
4.9.7 Life Span.....	39
4.10 Genetic Improvement of Local Chicken.....	39
4.10.1 Evaluation of Quality Traits of Hybrid Eggs.....	39
4.10.1.1 Egg Shape Index.....	40
4.10.1.2 Egg Weight.....	40
4.10.1.3 Specific Gravity.....	41
4.10.1.4 Fertility.....	41
4.10.1.5 Albumen Weight.....	42
4.10.1.6 Yolk Weight.....	43
4.10.1.7 Yolk: Albumen Ratio.....	43



4.10.1.8 Egg Shell Weight.....	43
4.10.1.9 Shell Thickness.....	43
4.11 Analysis of the Performance of F1 Progeny of Different Crossings.....	44
4.11.1 Weight of Day-Old Chick.....	45
4.11.2 Body Length at Birth.....	46
4.11.3 Weight Gain.....	46
4.11.4 Feed Conversion Efficiency.....	46
4.11.5 Mature Body Weight.....	46
4.11.6 Mortality.....	47
4.11.7 Non –Metric Traits of F1 Progeny.....	47
<b>CHAPTER V - CONCLUSIONS.....</b>	<b>50</b>
<b>SUGGESTIONS.....</b>	<b>51</b>
<b>REFERENCES.....</b>	<b>52</b>
<b>APPENDIX</b>	