COMPARISON OF PRODUCTION AND REPRODUCTION PERFORMANCE OF LOCAL CHICKEN GENOTYPES UNDER DIFFERENT DIVERSIFICATION SYSTEMS

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Introduction

In Sri Lanka the poultry industry is mainly dominated by smallholder free range scavenging systems. This system is characterized by small flocks of native type of chicken such as village and naked-neck chicken (Tadelle and Ogle, 2001). Though these types of chicken perform well under harsh environmental conditions in Sri Lanka, the performance is poor and their population also becomes stagnated due to the lack of improvement and breeding programs. To upgrade the production performance of these local chickens through proper breeding and improvement program, a thorough scientific investigation on their production and reproduction performance under different diversification systems is important. To date there is no thorough investigation done under different diversification systems. In this context, the present study was formulated with the objective of evaluating the production and reproduction performance of selected chicken genotypes under different diversification systems.

Methodology

The study was conducted in different locations in Batticaloa, Ampara and Trincomalee districts of Sri Lanka during the period from January, 2013 to March, 2014. A total of 150 poultry farms were selected for this study. Equal numbers of crop-based, livestock-based and poultry-based farms was considered in gathering data. For crop-based farming system the farms with biennial and annual crops were considered and for livestock-based farming system the farms with ruminant animals such as cattle, buffalo and goat were considered. Poultry-based farming system was selected where that farm has more than two minor poultry species such as turkey, duck, geese, guinea fowl and quail. From each farming system a total of 75 adult birds of each type was randomly selected to gather information. Semi-intensively operated farms were selected for the study. The production parameters measured were live weight of both cockerel and hen at 9 months age, age at first lay, monthly egg production, egg weight, hatchability, and productive period and

life time. The data was analyzed using SAS (Version 9.1).

Results and discussion

Body weight

According to Table 1 the mean body weight of cockerels and hens of village chicken and naked-neck chicken was significantly higher (P>0.05) in crop-based farming system, while it was significantly the lowest (P<0.05) in poultry-based farming system for both sexes of both populations.

Table 1: Mean body weight of village and naked-neck chicken under different management systems (± Standard Error)

Diversification system	Mean body weight (kg)			
	Village chicken		Naked-neck chicken	
	Cockerel	Hen	Cockerel	Hen
Crop based	2.94±0.16[a]	2.11±0.66[a]	2.97±0.14[a]	1.97±0.12[a]
Livestock based	2.51±0.11[b]	1.92±0.14[b]	2.56±0.08[b]	1.79±0.06[b]
Poultry based	2.19±0.38[c]	1.64±0.10[c]	2.11±0.31[c]	1.20±0.15[c]

*Means with the same letters within the column are not significantly different.

Under the crop-based farming system the availability of diverse feed materials such as grains, seeds, green leaves, crop residues and insect pest is comparatively higher than in other farming systems. Therefore, the energy gain is high. Further, under crop-based farming system the energy loss is reduced as the shade is high.

Age at first laying

The average age at first laying was significantly longer (P>0.05) for village and naked neck chicken in crop-based system it was significantly shorter (P<0.05) poultry-based system for both genotypes. The exposure of birds at grower stage to sunlight stimulates the reproductive activity and starts egg production on time under the open growing system. In poultry based system, it was observed that the sheds and highly shaded trees were not there. However, in crop-based system the degree of exposure to sunlight is very low.

Table 2: Some traits of village and naked-neck chicken under different management systems (± Standard Error)

Traits	Village Chicken			Naked neck Chicken		
	Crop-based	Livestock-based	Poultry based	Crop-based	Livestock-based	Poultry based
Age at first laying	6.99±0.13[a]	6.18±0.19[b]	5.77±0.20[c]	7.92±0.21[a]	7.11±0.14[b]	6.06±0.22[c]
Monthly egg production (number)	19.15±2.14[a]	17.64±1.62[b]	15.90±2.11[c]	21.45±1.64[a]	17.94±2.62[b]	15.52±1.89[c]
Egg weight (g)	41.20±1.03[a]	49.64±2.11[b]	48.92±1.99[b]	41.64±1.61[a]	49.33±2.65[b]	49.21±2.46[b]
Hatchability (%)	87.21±1.42[a]	79.42±2.14[b]	82.55±3.78[c]	90.62±4.01[a]	79.38±3.76[b]	86.34±2.72[c]
Productive period (months)	18.15±2.14[a]	15.64±1.62[b]	14.07±2.11[b]	19.11±1.64[a]	17.64±1.62[b]	15.52±1.64[c]
Life time (years)	2.21±0.06[a]	2.09±0.01[b]	1.66±0.02[c]	2.29±0.02[a]	1.89±0.02[b]	1.75±0.01[c]

*Means with the same letters within the column are not significantly different.

Monthly egg production

The mean monthly egg production was significantly higher (P>0.05) for both genotypes in crop-based farming system. The higher egg production in this system may be attributable to availability of more feed and water compared to other systems. Further, the egg production of village and naked-neck chicken in crop-based and livestock-based systems were higher than that of in other Asian and European countries under the semi-intensive system (Tadelle *et al.*, 2003).

Egg weight

The average egg weight was significantly higher (P>0.05) in livestock-based and poultry-based farming systems for both village and naked-neck populations while it was significantly the lowest (P<0.05) in the crop-based farming system in both population.

Hatchability

Hatchability significantly differed (P>0.05) among different diversification systems for village and naked neck chicken in all systems. The hatchability of eggs for village chicken was significantly higher under the crop based system because the availability of diverse nutritious feed and the birds is partially allowed for scavenging and supplemented with commercial feed and additives when housed in a day.

Productive period

The productive period was significantly higher (P>0.05) under the crop based system (18.15±2.14 months and 19.11±1.64 months for village and naked neck chicken respectively) compared to the other management systems for both genotypes. However, it was significantly lowest in these two populations under the poultry based system. The limited movement under poultry based system can cause excess fat deposition on body which may shorten the productive period (Kalita, 2009).

Lifetime

The lifetime was significantly longer (P>0.05) under the crop based system for both village (2.21 ± 0.06^{a} years) and naked-neck chicken (2.29 ± 0.02^{a} years) while it was significantly lowest (P<0.05) in the poultry based system (1.66 ± 0.02^{c} years and 1.75 ± 0.01^{c} years for village and naked neck chicken, respectively). This is because of the faster rate of disease spreading when birds are in the confinement.

Conclusion

The village chicken and naked-neck chicken populations perform well under the crop based system with respect to some production parameters (Age of first laying, egg production, hatchability, productive period and life time). Therefore, performance of village and naked neck chicken could be further improved under this system of management with improved management practices and breeding programs.

References

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