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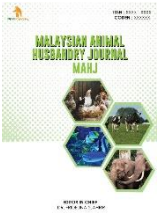

RESEARCH ARTICLE

COMPARATIVE EVALUATION OF NEPALESE INDIGENOUS BREEDS OF CHICKEN IN RELATION TO EGG PRODUCTION PERFORMANCE

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ABSTRACT

Indigenous poultry (*Gallus domesticus)* is one oldest domesticated bird contributing 55% of total poultry production in Nepal. The indigenous breeds of poultry of Nepal are Sakini, Ghanti Khuile (Naked Neck), and Puwakh Ulte. Sakini is the most adapted indigenous breed of Poultry of Nepal, covering more than 50%. At present, various kinds of literature including journals, research reports, annual reports, proceedings, and master thesis regarding the egg production performance of indigenous breeds were reviewed mainly aiming the comparative evaluation of indigenous breeds of chicken of Nepal with respect to the egg production performance. Egg weight (EW), Egg production per year, Clutch per year, Hatchability, and Age at first laying were the parameters compared. The egg production per year of Sakini and Ghanti Khuile was higher than that of Puwakh Ulte. Also, the hatchability of Sakini was significantly higher than that of Naked Neck. This was due to high feathers in Sakini as compared to Naked Neck. Sakini matures earlier than others and start laying earlier. However, there was not much difference in the egg weight of the indigenous breeds. The clutch per year and of Sakini and Ghanti Khuile was also not significantly different. Sakini starts laying eggs earlier than Ghanti Khuile and Puwakh Ulte. There is a need for increased researches in the indigenous breeds besides Sakini and diseases are major constraints reducing the returns to farmers. Government and concerned agencies should step up and help the farmers to maximize the returns.

KEYWORDS

Indigenous breeds, Chicken, Egg production, Nepal

1. INTRODUCTION

Poultry farming is one of the fastest improving sector of the agriculture economy, especially in the developing countries. Various opportunities are created by the poultry sector throughout the value chain in poultry production as well as in grain production. The world egg production has undergone a drastic shift from Europe and the Americas, to Asia which accounts for over 60% of world egg output (Shaw et al., 2019).

In Nepal, people depending on agriculture are more than 60% and the agriculture sector contributes 33% of Gross Domestic Product (GDP). And the livestock sector of agriculture contributes 26.8% of GDP and sub-sector of livestock, poultry accounts for 8% of Agriculture Gross Domestic Product (AGDP). The poultry products, egg and meat, help to uplift the standard of small farmers and also the total GDP of the country (Kattel, 2016). The poultry industry is more advantageous than other enterprises because of cheap protein source, low generational interval, and complementary role in other farming practices. Substantial expansion of the poultry industry is possible because of the low per capita consumption of meat and eggs along with unemployment prevailing in the country(Acharya & Kaphle, 2015). Poultry egg production is considered a profitable business because it increases with an increase in the size of the farm (Osti et al., 2016). There are 12,526,979 laying hens in Nepal and total egg production is 1,543,680,000. Province 3 is the largest producer of hens and eggs while Province 6 is the lowest producer of poultry and eggs. (MOLD, 2017). Dhakal (2019) observed that the benefit-cost ratio of family poultry was 1.72. Similarly, the study stated that family poultry provided, the rural women and youth in income generation, great opportunity and it is possible to achieve socio-economic development with family poultry farming. As rural women have enough time to rear family poultry, there is great scope for the development of family poultry farming. Poultry farming in Nepal can help in income generation, women empowerment, and nutritional improvement of farm family (Dhakal, 2019).

Indigenous poultry is one of the oldest domesticated birds and is widely prevalent contributing 55% of the total poultry population (Kattel, 2016). According to him, it is not known when exactly the backyard chicken started but it is believed that wild chickens were kept by the people in past and later it transformed as an indigenous breed. Backyard poultry (BYP) is most popular in the hilly region followed by terai and in the terai Tharu and Muslim community is at first to own BYP and Magars in hill (Kattel, 2016). To meet the demand for meat and eggs in urban areas, commercial poultry is growing more than three times in recent years (Acharya & Kaphle, 2015). In comparison to the meat and eggs of commercial chickens, people favor the taste of native chicken meat and eggs (Bhurtel, 1993). In most developing and underdeveloped countries, indigenous breeds of chicken are playing important role in rural economics. For the rural poor and marginalized population, it is playing a major role with respect to their subsidiary income along with nutritious eggs and meat for their own consumption (Padhi, 2016). In the above study, he stated that native breed chickens are the reservoir of genomes and major genes, for tropical adaptability and disease resistance help in the improvement of high yielding exotic germplasm. This was supported by Islam & Nishibori (2009) as they observed that indigenous Naked Neck chicken has a heat

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dissipation system and is highly resistant to disease, and well adaptive to harsh tropical environment and nutrition.

"Sakini, Naked Neck and Frizzle feathers are three indigenous chicken breeds of Nepal. These breeds represent the huge reservoir of the poultry genome. These breeds were reported to perform better in low input and scavenging conditions. They are hardy, adaptable to harsh conditions, and have tasty egg and meat (Parajuli, 2008) "(as cited by Uddhav et al., 2016). Among the indigenous breeds, Sakini covers more than 50% making it the most adapted indigenous breed of poultry of Nepal (Sapkota, Gorkhali, & Bhusal, 2013). Several bottlenecks have constrained indigenous chicken production including; unimproved genotype, diseases, and increased mortalities resulting in low production. Thus, the present paper includes the egg production performance of the indigenous chicken breeds of Nepal. For instance, this paper has tried to show the egg weight of the Sakini, Ghanti Khuile, and Puwakh Ulte and also the egg production per year of these indigenous breeds. Broadly, the present review aims to comparatively evaluate the egg production performance of the indigenous breeds of Nepal.

2. Materials and Methods

Various kinds of literature including journals, research reports, annual reports, master and doctorate thesis regarding the egg production performance of indigenous breeds of Nepal were reviewed mainly aiming at consolidating comparative evaluation of their egg production within a single paper. The conclusions of this study were made based on the findings of the previous studies conducted by different individuals and institutions of Nepal.

3. Results and Discussion

3.1 Egg Production Performance of Indigenous breeds

3.1.1 Egg weight

The egg weight was found to be 40-45 in Sakini, 40-45 in Ghanti Khuile, and 40-45 in Puwakh Ulte (Table 1). With respect to egg weight, it could be noticed that there was no difference between the indigenous breeds (Poudel & Paudel, 2018). Similar results were found by Uddhav et al., (2016), their study revealed that the egg weight of Sakini was 41.96±0.41 and of Naked neck was 43.28±0.59 (Table 2) respectively. They concluded that these two indigenous breeds had no significant difference in egg weight (Uddhav et al., 2016). Sapkota et al., (2017) in their study found t3hat the eggs of Sakini from the high hills were better in terms of egg weight. The study indicated that as compared to normally feathered ones, the frizzled hens significantly produced heavier egg weight (El-dein et al., 2009)

3.1.2 Egg production per year per hen

The average egg production per year per hen of Sakini was found to be 68±4.0, of Ghanti Khuile was 75±2.8 and of Puwakh Ulte was 52±2.9 (Table 1) (Poudel & Paudel, 2018). According to this report, Sakini and Ghanti Khuile had higher egg production per hen per year as compared to the Puwakh Ulte while there was not much difference between Sakini and Ghanti Khuile. Neupane et al., (2019) found that adding probiotics to the feed significantly improved egg production, egg quality, and weight gain of Sakini and Giriraja breeds($P<0.05$). El-dein et al., (2009) in their study observed that, in comparison to normally feathered ones, the frizzled hens significantly produced higher egg number.

3.1.3 Clutch per year

Uddhav et al., (2016) in their study found no significant difference in clutch per year of Sakini and Ghanti Khuile (Table 2). The study stated that Sakini from high hills can be selected and can be used to improve the native Sakini breeds in other regions of Nepal because of their high genetic potentiality of egg-laying and egg parameters.

3.1.4 Hatchability

Uddhav et al., (2016) in their experiment found the hatchability of Sakini to be 80.54±1.4 while of Naked neck to be 68.50±2.55 (Table 2). From Table 2, it can be observed that the hatchability of Sakini was significantly higher as compared to the Naked Neck (Uddhav et al., 2016). From the study they concluded that the higher hatchability of Sakini than Naked Neck was due to the availability of more feathers in Sakini, as a result, it can take more eggs and can trap more heat which leads to more hatchable eggs. Under the experiment of selective breeding, indigenous *Sakini* chicken performed better concerning survivability, fertility, and hatchability in later generations (Saroj Sapkota et al., 2020).

3.1.5 Age at first lay

Sakini matures earlier and produces eggs earlier than the others (Table 1) (Poudel & Paudel, 2018). Uddhav et al., (2016) observed that Ghanti Khuile first lays eggs at the age of 162.30±0.50 while Sakini first lays eggs at the age of 160.94±0.52 (Table 2), there was a significant difference in age at first lay of Sakini and Ghanti Khuile. Their study also revealed that the Sakini of hilly region matures earlier because of their small size and as a result, lays egg earlier too. Similarly, from the above study, it was found that, Sakini performed better in inner Terai, while Naked Neck performed better in the hilly region.

Table 1: Some production performances of indigenous chicken (means ± standard errors)

Parameters	Breeds		
	Sakini	Ghanti khuile	Puwakh ulte
Body weight at 8 weeks (gm)	400-600	400-600	400-600
Age at 1st lay (days)	170±4.5	162±5.1	176±3.9
Body weight at 1st lay (kg)	1.04±0.02	1.14±0.06	1.0±0.04
Egg production/hen/year (no)	68±4.0	75±2.8	52±2.9
Egg weight (gm)	40-45	40-45	40-45

Source: (Poudel & Paudel, 2018)

Table 2: LS Mean ±SE of clutch/year, Hatchability, Age at first lay, and Egg weight of Local hem

	Factors			
Breeds	Clutch/year	Hatchability	Egg wt. (gm)	Age at first lay
Sakini	2.90±0.41	80.54±1.4	41.96±0.41	160.94±0.52
Naked neck	2.89±0.74	68.50±2.55	43.28±0.59	162.30±0.50
Level of significance	NS	***	NS	*

Source: (Uddhav et al., 2016)

4. Conclusions

From the present review, it can be concluded that the egg production per year of Sakini and Ghanti Khuile was higher than that of Puwakh Ulte however the egg weight of these indigenous breeds was not significantly different. The hatchability of Sakini was significantly higher than that of Naked Neck mainly because of high feathers in Sakini as compared to Naked Neck. The clutch per year of Sakini and Naked Neck was not significantly different. Sakini starts laying eggs earlier than Ghanti Khuile and Puwakh Ulte. Also, Sakini of the hilly region matures early and gives better eggs in terms of egg weight. There were few researches related to the other indigenous breeds besides Sakini. It is recommended that more researches are needed in Ganti Khuile and Puwakh Ulte. Diseases are a major constraint of poultry production which reduces the output. Selective breeding and use of Probiotics, both seem to improve the egg production performance of Sakini, so these practices can be implemented on other indigenous breeds too, to improve their egg quality and number. Farmers' knowledge about the practices of poultry farming is poor and the management practices followed by them are also poor. This leads to more loss in the production. The government and concerned agencies should step up and help the farmers to maximize the returns.

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