Research Article

THE MEAT PRODUCTION PERFORMANCE OF F1 CROSS BETWEEN INDIGENOUS AND GIRIRAJA CHICKEN BREEDS REARED UNDER INTENSIVE MANAGEMENT SYSTEM

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Abstract

This research was conducted at Institute of Agriculture and Animal Science (IAAS), Livestock Farm Lamjung from July 2013 to November 2013. The main objective of the study was to assess the best compatibility of indigenous chicken to female Giriraja breeds for the meat production of f1 bred reared under intensive management system. Parent stocks were managed for fertile egg production, which were used to hatch the offspring. The offspring was reared from a day old brooding till the ten weeks of age. Data on management practices of feeding, behavior of feed intake, and body weight gain were collected during this period. Economic analysis as well as feed conversion ratio (FCR) was conducted to access the best compatible hybrid offspring of different genetic group of poultry. A day old chicks' weight of crossed progenies of Sakini and Naked neck was 36 g and 35 g respectively. The highest body weight of chicks at ten week of age was observed in the case of F_1 progenies of Sakini crossed with Giriraja (1,831 g). On the basis of FCR, the progenies of Sakini crossed with Giriraja (2.69) was observed good performer. Hence, F_1 progenies of Sakini crossed with Giriraja is the best for meat production on the basis of all the aspects of their body weight gain at ten week of age as well as the maximum price fetching progenies. However, this finding need to be validated through a farmer's field test in different locations before implementing these results to the farmer level.

Introduction

Nepal is predominantly an agricultural country. The agriculture sector dominates the economy of Nepal, accounting for about 31.3 percent of the Gross Domestic Product (GDP) in 2014/15 and providing employment opportunity to about 65.6 percent of the economically active population in the country (MoAD, 2015). The integrated agriculture is one of the main characteristics of Nepalese agriculture. Livestock is an indispensable part of Nepalese agriculture. In recent years, some livestock species are adopted as a monoculture in livestock business. Poultry is one among them. It has emerged as one of the attractive and encouraging agribusiness in Nepal. Poultry keeping in Nepal has increased drastically in recent years. Chicken remains virtually is a sole bird in Nepalese poultry industry. It has reached forty two of the seventy five districts of Nepal. In Nepal, it is growing at a rate of about 15 per annum involving over 30,000 farm families directly or indirectly. There are about 2.5 to 2.7 million layers and about 16 million broilers are produced annually. The total investment in this sector amounts to about NRs. 10 billion (Nakarmi, 2001). It contributes about 8.3% of the livestock GDP (DLS, 2000) and 4% of the Agricultural GDP (Dhakal, 2005).

Total meat production in Nepal during 2001/02, 2006/07, 2011/12 and 2015/16 was 198,895, 227,105, 287,930 and 322,059 m. ton, respectively, indicating the annual growth rate of 3.5 percent. Out of that chicken alone contributed 14,118, 16,126, 40,346, and 55,041 m. ton respectively, indicating the annual growth rate of 10.21 percent (MoAD, 2017). This justifies the scope of chicken farming to increase the meat production in Nepal, thereby contribute in the food security by increasing national per capita meat consumption, which otherwise is was quite low (456 g. in comparisons to the world of 6.849g.) (FAO, 1999).

This success has been achieved at the cost of millions of rupees to import large numbers of synthetic

chicken breeds, having a high standard quality feed conversion ratio (FCR), from neighboring countries and beyond, which has. This is aggravating the high dependence on the import thereby the negative trade balance situation in the country. There is scope of increasing the meat productivity of indigenous dual purpose chicken, which is supposed to be domesticated since 2000 BC (Banarjee, 1998). Such indigenous breeds raised under scavenging systems is still prevalent and preferred by meat consumers, hence plays a vital role in economy of rural poor fetching higher price. However, meat productivity of indigenous dual purposed chicken is still poor due to negligence on breeding program. Limited work has been carried out to explore the productive and breeding performance of the local breed in context of Nepal. Nepalese rural farmers are still unknown about the economic potentiality of commercial farming of improved cross breed of local chicken breed for meat purpose.

The breeding and productive performances under low input conditions needs to be studied in order to know the genetic potentiality of various well adapted poultry breeds. The economic characters are the function of genotype and its environment. So the genetic manipulation is necessary for the increment the performance potentiality of low producing local breed of poultry. The effect of genetic manipulation with improved high producing Giriraja breeds on the indigenous breed has not been studied yet. Before initiating any breed improvement program, the first most step is an assessment of productive and breeding performances. Hence, this study aims to recognize the alternative cross breed for the significant improvement in growth and breeding performance of local indigenous poultry of Nepal to support the livelihood of the rural people. Subsequently, the followings are the specific objective of this research.

- Find out the best F1 cross bred progeny with respect to meat production
- Compare FCR of the different F1 cross bred progenies

Literature review

2.1 Chicken breeds in Nepal

2.1.1 Indigenous breed (Sakini)

According to Bhurtel (1993) the indigenous chicken, commonly known as "Sakini", might have been evolved from the inter-se mating of red jungle fowl (*Gallus gallus*) in Asia. There are four recognized species of wild fowl, namely; the red jungle fowl (*Gallus gallus* Linnaeus 1758), the grey jungle fowler (*Gallus sonnerati* Temminck 1831), the Ceylon jungle fowl (*Gallus lafayettei* Lesson 1831), and the green jungle fowl (*Gallus varius*, Shaw and Nodder 1798), available in Indian Sub-continent (Singh *et al*., 1993). The indigenous chickens in Nepal are similar with that of the South-Asia in terms of body size, shape, and plumage and shank color (Neshida, 1988). Nevertheless, in some cases differences were observed in body confirmation (Bhurtel, 1995). Indigenous chicken in Nepal may have originated from the Red jungle fowl, which is still common in the wild. Probably domestic breeds of chicken originated from the intermitting of wild jungle fowl in Asia (Bhurtel, 1994) and distributed throughout Nepal. The indigenous breeds represent a huge reservoir of chicken genome. Their continued use in a low input small scale village production systems serve as a cheap in-situ conservation technique that needs to be encouraged and supported (Olori, 2009) and utilized for improving their productivity. The frizzling and the naked genes in particular have been described as adaptability genes acting as sex marker and disease resistant factor (Islam and Nishibori, 2009).

The performance of indigenous chickens was not homogenous because of their natural condition of rearing and high genetic variability that exist in different populations. Basnet (1989) reported that egg laying performance of indigenous chickens ranged between 30-100 eggs per annum with their maturity age at 5-8 months. Sometimes they laid the eggs at the age of less than 20 weeks in the first clutch. Their hatchability ranged from 60-80% having variation with the change of seasons. Further, Basnet (1989) stated that indigenous hens usually hatched eggs for 2-3 times per year. Sah *et al.* (2000) also reported, based on the study in Morang and Sarlahi district of

Nepal, the weight of local chicken were: 390.1, 900.1, 1480.4 and 1775.1 grams (gm) at the age of 8, 14, 22 and 32 weeks, respectively for male birds were as in the case of female, they were 350.1, 830.2, 1200.1 and 1250.3 gm, respectively. Similarly, Gorkhali and Bhushal (2015) reported the bodyweight in the range of 133.42-168.1, 439.39-657.16, 804.77-924.37 and 898.09-1046.21 gms at the age 4, 8, 12 and 16 months respectively among the three line of Sakini poultry breed raised under intensive management system. Males in all cases were reported to have significantly higher body weight (Gorkhali and Bhusal, 2015). The meat production of indigenous adult male and female Sakini breed of poultry is 2.4±0.05 (1.8-3.0) and 1.8±0.05 (1.5-2.4) respectively (Bhurtel, 1998, Neopane, 2004, Neopane, 2006).

2.1.2 Commercially popular meat purpose breeds of chicken in Nepal

Pure and commercially developed breeds of poultry had been introduced in Nepal since couple of decades ago (Shrestha *et al*., 1988). Neshida (1988) reported that introduction of Barred Plymouth Rock, Brahma, Brown Leghorn, Rhode Island Red, Sussex, White Cornish and some Indian breeds in Nepal during 1970's. Similarly, New Hampshire, Black Australorp and White Leghorn were heavily introduced in Nepal. Heifer International donated 1700 pure parent-stock of New Hampshire to the then HMG/Nepal during 1960, and the chicks of them were reared at Parawanipur Regional Agriculture Research Station, Nepal (Shrestha *et al*., 2005).

Literature have revealed that indigenous chickens take long to reach maturity and lay fewer clutches of eggs per year compared to modern breeds (Safalaoh, 1997). According to Sah *et al.* (2000), poultry raisers now-a-days adopted the New Hampshire with high popularity for backyard farming due to good fertility (96.7±0.28%) with higher percentage of hatchability (83.26±0.93% total egg set) and livability (87.90%) in addition to their resistant qualities to adverse climatic condition. In hilly and mountain areas of Nepal, the introduction of the New Hampshire cockerels to upgrade indigenous chicken was focused for improving egg and meat production capability of local chicken.

The commercial Hybrid Broilers introduced in Nepal are: Arboracres, Cobb 100, Ross, Hubbard, Starbro, Vencobb and Tatum (Parajuli and Thakur, 1988) while commercial layers, on the other hand, were: Keystone Brown, Hyline Brown, Ross Brown, Shaver Starcross 578, Babcock and Hi-sex Brown (Parajuli and Thakur, 1998). The Australorp is an Australian chicken breed. It is a large, soft-feathered bird which has two recognized colors according to the Australian Poultry Standard; black and blue. The black Australorp is the most common, and has glossy black feathers and a lustrous green sheen. The Australorp is a hardy, docile, and a good egg-layer as well as meat bird. The bird's single comb is moderately large and upright, with five distinct points. Primarily, private hatcheries have been introducing many new meat type and egg type chicken breeds and producing the commercial layers and broiler in and around the urban areas of Nepal. The most popular breed for meat are Cobb 500, LIR, and Giriraja whereas the layers breed is Lohmann Brown.

2.2 Feeding management and growth rate of chicken in Nepal

Karki (1984) stated that local chickens were less likely to suffer from nutritional deficiency, if a small amount of cereal by-product was supplemented. However, Basnet (1989) argued that the performances of indigenous (local) chickens are not homogeneous, because of their natural condition of rearing and high genetic variability that exists in different population.

Growth, defined simply as an increase in size, consists in animals of increase not only in hypertrophy, but also in hyperplasia, and in extra cellular fluid (Widdowson, 1980). Chambers (1990) had noted that heritability for body weight of broilers tended to increase with age. Greater environmental influence (particularly those resulting from maternal influences) on body weight is expected at earlier ages. Energetic efficiency of broiler breeders may affect growth and development of their progeny in 2 main ways: first, through heritable factors affecting efficiency and second, through egg size and composition. The size and metabolic activity of visceral organs and muscle mass are the main variables that affect breeder metabolic rate (Spratt et

al., 1990) and broiler growth and development (Konarzewski et al., 2000).

The poultry production in rural area to fight against the curse of poverty, hunger and malnutrition and system is designed to utilize the local resources effectively for nutritional needs, gainful employment and income generation (Panda et. al., 2006). Kadigi (1996) reported that live weight and weight gain in Black Australorp and local chicken under village management did not differ significantly ($p<0.05$). However, local chickens were superior to Black Australorp in terms of live weight and weight gain. Black Australorp fed in intensive system was 14.20% and 6.12% superior to Black Australorp and local chickens on free range system, respectively at the age of 20 weeks. The trend continued with time where Black Australorp fed under intensive system were 18.5% and 17.7% superior to Black Australorp and local chickens on free range at 20^{th} week. Khadigi (1996) also reported that within that age, Black Australorp performed better than local chickens when properly managed, as was the case with intensive system. However, live weights of indigenous chickens in Malaysia under intensive systems of management showed lower live weights compared to those reported by Jalaludin *et al.* (1985). Those weighed 380 g at 8 weeks and 1170 g at 15 weeks. This could be attributed to the level of protein in the feed (Yeong, 1992). Results also revealed that males had higher growth efficiency than females. The average weight of male and female chickens, were 1.67 and 1.42kg, respectively (Bhurtel, 1994). Growth and growth rates varied as per system, feed, breed at different ages of the birds (Timothy *et al.*, 2003). The performance of indigenous chickens - Sakini (Basnet, 1989) cannot be predict with any degree of certainty.

Chambers (2003) reported that body weight and growth of chickens was also related to genetic factor as reflected in differences among breeds and strains. The heritability based on additive genetic effects of the trait was around 0.4. Most meat production traits were highly heritable (0.4 or higher).

3 Research methodology

3.1 Research design

The breeding combination was made by separating two female groups. The conception of the male to the female was made by the natural mating in order to produce fertile eggs for

Attributes		**Female**
		Giriraja (GR)
Male	**Naked Neck (NN)**	GR x NN
	Sakini (SK)	GR x SK

hatching a day old chicks. The female parent stock was grouped in two distinct groups of 50 individuals in each group and the male parent of Sakini was mixed in one group and male parent of Naked Neck in another for the production of fertile eggs to hatch day old chicks.

3.2 Population and sample size

A group of fifty female chicken of Giriraja and five male of Naked neck local breed; and another breeding flock of fifty female chicken of Giriraja and five normal feathered Sakini male chicken were kept as a breeding flock for the production of fertile eggs in breeding farm of Tamang Breeders located at Rampur, Shardanagar-8, Chitwan. Seventy six and 68 a day old chicks with a hybrid vigor as a first filial (F_1) generation was obtained as a sample size for this study.

3.3 Experimental site and time

The experiment was conducted from third week of July to last week of November, 2013 at Institute of Agriculture and Animal Sciences (IAAS) Livestock Farm, Sundarbazar, Lamjung, Nepal.

3.4 General management before the arrival of the parent stock

The research farm managed birds of a same age (that was managed on the principles of ‘all-in, all-out’). So all the birds were removed from the research farm and replaced by the day old chicks. Before replaced, the utensils such as feeders' drinkers were removed from the poultry shed for cleaning and disinfections. Similarly, floor areas, interior and exterior of the wall were scrubbed, and previous litter was removed from

poultry house; then shed was swept by broom without leaving single particle of them. The shed was washed with water mixed with 5 percent caustic-soda, followed by spraying of 3 percent Safeguard (disinfectant) solution inside and outside the shed. Lime dust was also evenly dusted simultaneously all around the shed. Rice husk was used as litter by maintaining 5 inch thick on floor. The litter was disinfected with dust lime and spray of Safeguard solution before they are spread in the floor. The litter was stirred once a week to prevent caking. Wet was replaced with dry and new litters. Lime dust was put at entrance of the poultry shed to check the infection. Diluted Virkon solution was also kept in the entrance gate for foot and hand wash. Subsequently, management systems were in place to prevent pathogens entering the research building. Before entry, equipment and people were disinfected with safeguard.

Feeding: The parent birds were fed the layers palate feed containing 2800 Kcal/Kg energy and 17.6% CP. The male and female parents are fed 160 and 120 g of feed per day. The F_1 progenies were fed with the broiler B0, B1, B2 and B3 ration containing high energy and protein level of 23%, 21%, 20% protein and 2900 Kcal, 3000 Kcal, 3150 Kcal and 3200 Kcal energy respectively.

Vaccination of the birds: All vaccines were regularly vaccinated to the parents and the F_1 progenies from the day old age to their finisher stage. Marek's vaccine was vaccinated to the day old F_1 chicks. The day old F_1 chicks were raised on intensive care and housing system and preventive care was taken in account to minimize mortality due to various diseases. Hence, the chickens were vaccinated against Ranikhet at the required schedule. After that, IBD intermediate vaccine against Gumboro disease was vaccinated at the schedule on the eye. Additionally, these chicks were vaccinated against Gumboro at the schedule using intermediate (IBD) strain. Twelve-gram skimmed milk powder was dissolved along with intermediate (IBD) strain in 2.5 liters water for this purpose. After that, last vaccine was given against Ranikhet and Infectious Brussels Disease with IB-Lasota strain, orally on the 25th day.

3.5 Selecting and storing chicken eggs for hatching

The laid fertile eggs were collected frequently. Only clean eggs were selected and soiled eggs were cleaned with 10% Dettol mixed water. And they were placed in the storage room where the room temperature was maintained at 12-13^{o}C and 70-75% relative humidity. The over and underweight, irregular surfaced, discolored, cracked and thin celled eggs were discarded while selecting the fertile egg for storage and incubation for production of a day old chicks of F1 progenies.

3.6 Experimentation

3.6.1 Comparative evaluation of feed consumption on weight gain

The daily feed consumptions are recorded and the individual chicken was weighted in every end day of the week. The comparative study was done to find out the effect of the average feed consumption on the body weight gained.

3.6.2 Comparative study on feed conversion ratio and economics of F_1 progenies

The input and output incurred to the different treatments from the day old stage till to the ten week of age were recorded and their feed consumption and the body weight gained were recorded and the economically observed the net return. Because of other cost of production and the management cost were similar, only the cost of feed consumed and weight gained within eight week of age were used to analyze economic return. On the basis of economic analysis, the best compatible progeny was identified.

3.7 Management systems

3.7.1 Intensive (Deep litter) system

Deep litter system was used to rear the parents as well as the offspring for this research. Birds were fully confined in open house with 3 to 4 birds/m^2 area. The floor was covered with a deep litter (around 5 inches deep layer) of rice husks.

3.8 Data collection

3.8.1 Growth

Birds were weighted from day old age up to eight weeks at weekly interval using electronic balance. Growth rate was obtained by differences of body weight (g) between each week divided day old body weight (g).

3.8.2 Feed consumption and feed conversion ratio

Total feed consumed was recorded by subtracting total refusal feed from the total feed allowed to each treatment groups. Feed conversion ratio (FCR) was calculated from weight of feed that are used to produce one kilo of live weight of chicken.

3.8 Data analysis

The records of F_1 progenies of different breed interaction were statistically and economically analyzed by using Microsoft Excel and SPSS Software.

4. Results and discussion

4.1 Feed consumption and body weight gain

Feed was allowed in the equal amount, however, the consumption differed specially after the 4th week. Feed consumption is consistently higher for the F_1 cross progenies of female Giriraja and male naked neck (GRxNN) after the 3rd week consumed higher The performances of F_1 cross progenies of male Sakini and Naked neck crossed with female Giriraja breed chicken is shown on table 1.

Table 1 Feed consumption and body weight gain of F_1 cross progenies of Sakini and Giriraja chicken

Week	Feed /bird/day (gm)		Feed/bird/week (gm)		Body weight (gm)		Weekly body weight gain (gm)		FCR	
	GR x SK	GR x NN	GR x SK	GR x NN	GR x SK	GR x NN	GR x SK	GR x NN	GR x SK	GR x NN
Day old	0	0	0	0	36	35	36	35	-	-
1	11.4	11.4	79.5	79.52	102	91	66	56	1.20	1.42
2	19.0	19.0	133.3	133.28	192	175	90	84	1.48	1.59
3	30.4	30.4	212. 5	212.45	315	276	123	101	1.73	2.10
4	38.7	43.5	270.8	304.71	465	421	150	145	1.81	2.10
5	47.6	54.7	333.1	383.18	635	578	170	157	1.96	2.44
6	56.6	66.5	396.3	465.22	815	753	180	175	2.20	2.66
7	64.6	76.1	452.0	532.7	1007	940	192	187	2.35	2.85
8	75.7	88.0	529.6	616	1251	1165	244	225	2.17	2.74
9	88.3	93.1	618.2	651.42	1577	1343	326	178	1.90	3.66
10	97.5	98.6	682.3	689.92	1831	1530	254	187	2.69	3.69

4.2 Comparative evaluation of feed consumption on weight gain

Figure 1 shows that the cross progenies of Sakini and Giriraja was observed comparatively low feed consumption than the cross progenies of Naked neck and Giriraja. Beside this, the offspring of Sakini and Naked neck was recorded 97.47 and 98.56 g per bird per day respectively at tenth week of age.

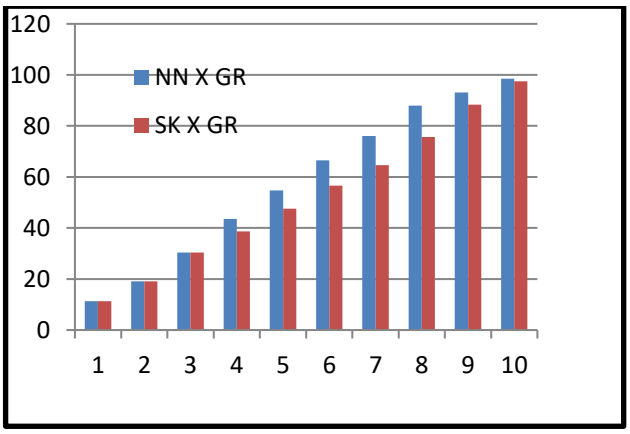

Figure 1: Total feed consumption of crossed progenies of female Giriraja mated with males of Sakini and Naked neck chicken

4.3 Average weight of F_1 crossbred progenies

4.3.1 Average weight day old chicks of F_1 crossbred progenies

The overall average weight of day old chicks of progenies of Naked neck and sakini crossed with Giriraja females were considered for this study was observed 36 g. and 35 g. respectively (Table 1 and 2). The results of this study revealed that the weight of day old chicks obtained from sakini were higher than the progenies obtained from the male line of Naked neck local chicken.

Sklan *et al.* (2003) reported that additional phenotypic effects affecting broiler growth were relationships between egg size and early muscle development and Entiting *et al.* (2007) reported that growth were relationships between albumen proportion and embryonic growth.

Thus, Sakini is the best compatible with Giriraja than the Naked neck for the weight trait of day old chick.

4.3.2 Average weight of F_1 crossbred progenies within ten weeksz

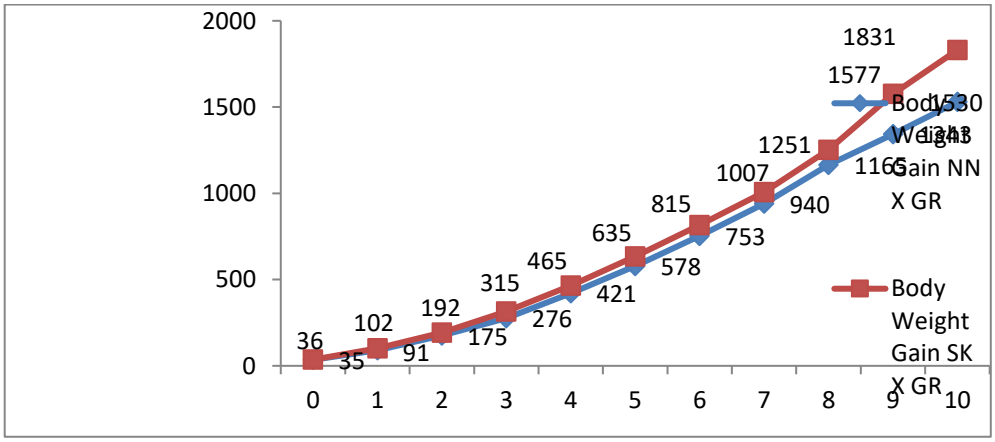

Figure 2: Body weight gain of crossed progenies of female Giriraja mated with males of Sakini and Naked neck chicken

The average body weight of one week weight of chicks of progenies of Naked neck and Sakini were recorded for this study was observed 91 g. and 102 g. (Table 1 & 2). Not only in body weight of first week, but also the body weight on every week up to tenth week of age, the performance of body weight gain seem to be higher in the progenies of Sakini than the progenies of Naked neck, and the body weight on tenth week were recorded as 1831 g. and 1530 g. respectively. The body weight of first week, Sharma (2008) also reported that the body weight of the pure breed of hybrid broiler Cobb-100, pure breed New Hampshire and indigenous breed sakini were observed 148.4 g, 54.9 g and 46.1 g respectively under intensive management system. Jammarkattel (2004) reported that the body weight of broiler (Cobb100) was 159.2 g in the first week of age in intensive system. Thus, Sakini is the best compatible with Giriraja than the Naked neck local chicken on the basis of body weight gain.

4.4 Feed consumption behavior

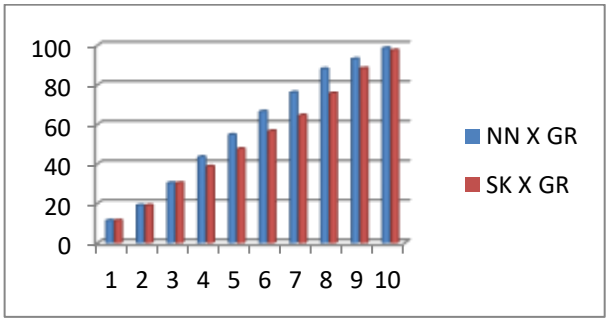

Figure 3 Total feed consumption of crossed progenies of female Giriraja mated with males of Naked neck and Sakini

Figure 3 shows that within the progenies of Giriraja crossed with different local chickens males, Sakini and Naked neck, the lowest average feed consumption was observed in the progenies crossed with Sakini than compared with the progenies of Naked and recorded 97.47 g and 98.56 g average feed consumption per day per day at the age of tenth week

4.5 Evaluation of feed conversion ratio (FCR) of F_1 cross bred progenies

4.5.1 Comparative study on feed conversion ratio and economics of groups of F_1 Progenies

Within the comparison on progenies of two local breeds, Sakini and Naked neck, the best compatible progeny was found to be the progenies of Sakini on the basis of average feed conversion ratio. The average feed conversion ratio of Sakini, was observed lower in every week and the feed conversion ratio of cross progenies of Sakini and Naked neck was recorded 2.69 and 3.69 at the age of tenth week (Table 1 & 2). Timothy *et al.* (2003) also found that the growth efficiency for local chicken was higher in early ages while the reverse was observed after 15 week of age. Yeong (1992) reported that live weights of indigenous chickens in Malaysia under intensive systems of management showed lower live weights compared to those reported by Jalaludin *et al.* (1985). Those weighed 380 g at 8 weeks and 1170 g at 15 weeks which could be due to attributed to the level of protein in the feed. Khanal (2002) reported that the 8th week body weight of locally raised chicken could be 400-600 g in Nepal with average feed consumption of 3.2 kg for one kg body weight.

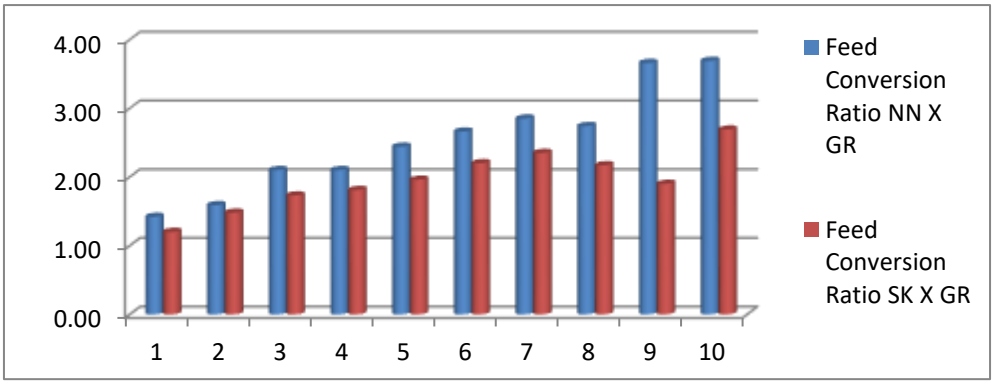

Figure 4: Feed Conversion Ratio of crossed progenies of female Giriraja mated with males of Naked neck and Sakini

Among the all progenies, the offspring obtained crossing Sakini male with Giriraja female was found to be the best compatible one on the basis of their feed conversion ratio, which the average feed conversion ratio value was observed 2.69 at the end of 10th week of age (Table 1).

4.6 Correlation analysis

4.6.1 Correlation between the body weight and FCR for Naked neck X Giriraja

The correlation coefficient between the body weight and FCR of the Naked Neck x Giriraja is significant (r = 0.965**)

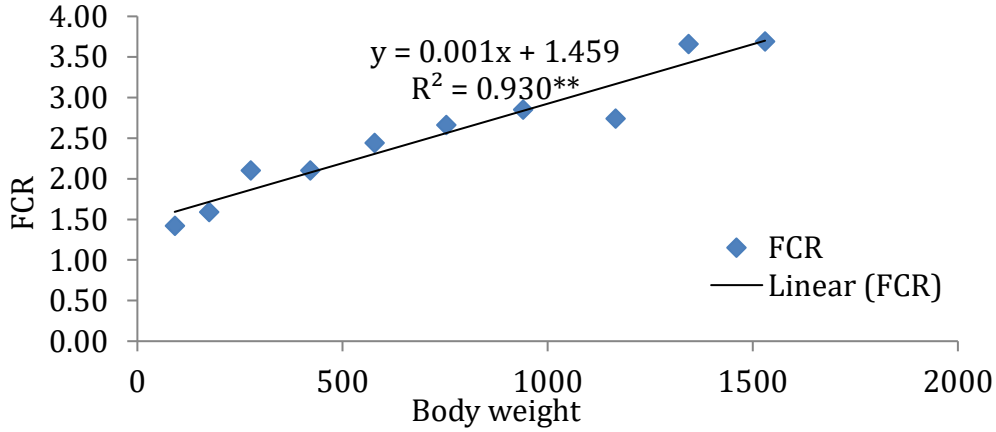

Fig 5: Correlation between the body weight and FCR for Naked neck X Giriraja

4.6.2 Correlation between the body weight and FCR for Sakini X Giriraja

The correlation coefficient between the body weight and FCR of the Naked Neck x Giriraja is significant (r = 0.816**)

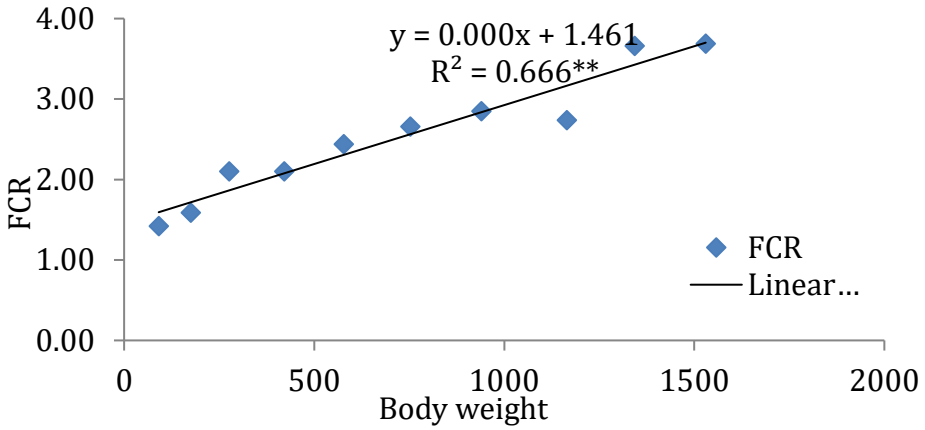

Fig 6: Correlation between the body weight and FCR for Sakini X Giriraja

4.7 Economic analysis of F_1 hybrid progenies

Table 19 indicates the economics of raising different groups of F_1 hybrid progenies under improved feed management. During this poultry breeding research for the best compatible breed for crossing to each other, most of the offspring were observed male dominant in feather colour. Feather colour plays important role in market price return, so it was advised to mate in such a way that the offspring should have different coat colour except white which in not preferable in Nepalese society. Economically the best compatible breed were observed the hybrid progenies of Sakini crossed with Giriraja because the higher net income (Rs. 638.00) was observed compared with cross progenies Naked neck, on the basis of feed consumption and body gained within ten week of age.

Table 2 Economic analysis of different cross bred F1 hybrid progenies at 10th week of age raised under intensive system at IAAS, Livestock Farm, Lamjung Campus

Breed	**SK x GR**	**NN x GR**
Feed Consumption (Kg.)/Bird	3.71	4.68
Feed Price (Rs.)/Kg.	50.00	50.00
Total Feed Cost (Rs.)/Bird	185.50	234.00
Weight gained (Kg.)/Bird	1.83	1.53
Selling Price (Rs.)/Kg Live wt.	450.00	450.00
Total Return (Rs.)/Bird	823.50	688.50
Net Income (Rs.)/Bird	638.00	454.50

Conclusion and Recommendations

5.1 Conclusions

This research was conducted at IAAS Livestock Farm Lamjung form July, 2013 to November, 2013 to observe the best compatibility of local male chicken with the available synthetic females of Giriraja for their meat production in their F_1 hybrid offspring reared under intensive management system. The purpose of the economic analyses of this research was to find out comparatively profitable best compatible hybrid offspring of different genetic group of poultry. On this research, the male feather colour was observed dominant over the female feather colour. Although the research was conducted successfully, it was realized that if the offspring of Sakini crossed with Giriraja for commercial meat production, the offspring would fetch good market price because of their feather colour and easy to manage breeding practice under natural mating system and under intensive housing system for production.

In this research study, the crossed progenies of Sakini (1831 g) appeared the best performer with respect to Naked neck (1530 g) on the basis of body weight gained at tenth week. On the basis of average FCR value, the progenies of Sakini crossed with Giriraja (2.69) was observed good performer, but the feed consumption behavior was observed little bit poor which indicated that if the feed consumption could increased, there would be no doubt to say that progenies of Sakini crossed with Giriraja will be the best compatible breeds for meat production for meat production in commercial scale among other available breeds.

5.2 Recommendations

Although in different aspects, the compatible progenies varies with their own characters of mortality, feed consumption, body weight gain, feed conversion ratio, hatchability and fertility. But the aim should be target to the chicken rearing farmers for upgrading their level of income. On the basis of all the aspects of their genetic performance, the maximum price fetching progenies crossed in between Sakini and Giriraja was found the best compatible progeny for meat production. However, for the detail study to verify these results should be carried out for as a field test in different breeds and locations before implementing these results to the farmer level.

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