

## Production performance of some local chicken genotypes in Indonesia: An overview

Tike Sartika<sup>1</sup> and Ronny Rachman Noor<sup>2</sup>

<sup>1</sup> Research Institute for Animal Production, PO BOX 221 Bogor, Indonesia.

<sup>2</sup> Faculty of Animal Science Bogor Agriculture University, Bogor 16680 Indonesia

### Introduction

Most Indonesians (60%) live in villages and derive most of their income from agriculture and animal production. The vast and separate geographical areas pose a challenge to the dissemination of new technologies that could be applicable to the farmers. In addition most of the farmers have a low level of education, hence any new technology in animal production should be simple and have a significant effect on their daily income.

For many years local farmers have reared local chicken as a part of their culture in traditional ways. Indonesia has at least 31 breeds or distinct groups of local chickens (Nataamijaya, 2000). Local chickens are important to the livelihoods of many farmers in Indonesia, where they are raised in low input traditional management systems. The chickens scavenge for feed which includes kitchen waste, insects, worms, grasses and vegetables. The scavenging local chicken, in fact, could play a very important role in pest control in rice and corn production (Nataamijaya *et al.* 1996). Local chickens supply meat that has specific texture and taste and contain lower fat and are thus preferred by most consumers. As a result, local chicken meat is more expensive than the broiler meat. Eggs from local chicken are also more expensive than commercial chicken egg and are used as part of traditional herbal medicine called “Jamu” which is very popular in Indonesia.

One of the local chicken types called Merawang chicken is famous as meat producer and is pictured in Figure 1.



Figure 1. Female (left) and Male (right) Merawang Chicken

The productivity of local chicken is still low but with better management and genetic improvement productivity can be improved. There has been indiscriminate crossbreeding of local chickens with exotic breeds in order to get more meat, i.e local chicken crossed to Rhode Island Red (RIR) in several regions of the country but the improvement attained has not been satisfactory, especially in relation to meat taste. There is a tremendous potential for genetic improvement of indigenous chickens due to large genetic variation in production traits. However, accurate estimates of genetic and phenotypic parameters are a pre-requisite for the establishment of any sustainable genetic improvement programme. There is need to evaluate and determine the performance of different chicken genotypes in Indonesia since performance evaluation forms the initial step in any meaningful genetic improvement programmes. In Indonesia, some research work has been done on the local chicken to determine its origin, genetic potential and phenotypic performance in certain traits. The objective of this paper was to give an overview of the production performance of different local chicken genotypes in Indonesia. The results presented in this case study are based on work done by the Research Institute for Animal Production and Bogor Agricultural University, Bogor-Indonesia.

### **Effect of production system**

Table 1 shows the performance of Kampung chicken in different production systems. Under village conditions (extensive system) the productivity of Kampung chicken appears to be extremely low. Presumably, poor nutrition and the absence of disease prevention or control measures contribute to this low production. In this system, the mortality rate upto the age of 6 weeks is very high (50-56%). Mansjoer (1989) reported that the Kampung chicken can lay between 45 and 56 eggs per year within the extensive system. A large number of the eggs produced in this system are used for brooding, the remainder being either consumed by the farmers or sold. In general, under natural condition, the Kampung chicken brood for between 21-23 days. Chicks remain with their mothers for a period of 2-3 months, after which period the hen will start the next egg laying period.

Kampung chicken perform well in intensive systems where the average number of eggs laid is three times more than in the extensive system. . . The average egg weight ranges from 39 to 48 grams while the hatchability ranges from 74% to 84% in all production systems (Table 1).

Table 1. Performance of Kampung chicken kept under extensive, semi intensive and intensive production systems.

Traits	Extensive	Semi Intensive	Intensive
Eggs laid/hen/year	47	59	146
Egg productions (%)	13	29	40
Laid frequency (time/year)	3	6	7
Hatchability of eggs (%)	74	79	84
Egg weight (g)	39-48	39-48	39-43
Daily feed cons. (g)	<60	60-68	80-100
Feed conversion	>10	8-10	4.9-6.4
Mortality < 6 weeks (%)	50-56	34-42	

Source: Diwyanto *et al.* (1996)

Improvement in management practices in the form of better rearing methods and nutritional values of feeds can increase the productivity of the Kampung chicken. In semi intensive systems, Kampung chicken live in a limited area of land where feed resources are also limiting. Occasionally, supplementary feeds and veterinary care are provided. Generally, the productivity of Kampung chicken in semi intensive and intensive systems is better than in extensive system. However, Mansjoer (1989) found that the chicken maintained under intensive system were inefficient in their feed consumption and had higher feed conversion ratios than commercial chicken breeds.

#### **Live weight performance of different types of local chickens**

Table 2 presents live weight performance of five different types of local chickens. These genotypes were raised in confinement and provided with a high level of feeding, management and disease control. Growth rate from one day to 20 weeks of age and egg production for a 44-week period were recorded. The results indicate considerable variability within and between chicken breeds. Live weight at 20 weeks ranged from 1507 to 2290 g. Pelung chicken were significantly heavier and had faster growth rates, especially after week 8, than the other genotypes. The Pelung is a meat type chicken. However, people at the villages, especially at West Java raise the Pelung chicken mainly as singing bird, because it makes a beautiful sound that lasts for a long period of time. In most part of Indonesia people prefer to raise Kampung chicken for both meat and egg production.

Table 2 Live weight performance of five different types of local chickens

	Chicken genotypes				
	Kampung	Black Kedu	White Kedu	Nunukan	Pelung
No. birds (n)	200	200	200	200	200
Mean weight (g) <sup>1</sup>					
1 day	26.2	27.7	25.5	30.2	29.6
4 weeks	180	171	151	168	186
8 weeks	553	602	550	482	589
12 weeks	1036	1087	975	843	1162
16 weeks	1453	1462	1352	1304	1683
20 weeks <sup>2</sup>	1719 <sup>b</sup>	1753 <sup>b</sup>	1575 <sup>b</sup>	1507 <sup>b</sup>	2290 <sup>a</sup>

1) Corrected for unequal sex ratio

2) Values of 20 weeks live weight with different superscripts are significantly different ( $P < 0.05$ ).

Source: Creswell and Gunawan (1982)

### Egg production parameters of different types of local chickens

Table 3 shows the performance in egg production traits of five different types of local chickens. There were differences in egg production parameters among genotypes. Black Kedu had the highest and Pelung the lowest daily egg production. Black Kedu is considered a layer and is younger at first egg than the other genotypes. In addition, the Black Bedu produces 40% of the eggs at a younger age than the other genotypes. They have a lower feed conversion ratio but higher peak production. Based on this result, it can be concluded that the Kedu can be selected further for laying and the Pelung can be selected for meat production.

Table 3. Egg production of five breeds of Local chickens

	Chicken Genotypes				
	Kampung	Black Kedu	White Kedu	Nunukan	Pelung
No. birds (n)	88	88	80	76	76
Age at first laying (days)	151	138	170	153	165
Age to 40% egg production (days)	184	166	202	186	193
Peak Production (%)	55	75	72	62	44
Average egg weight (g) <sup>1</sup>	43.6 <sup>b</sup>	44.7 <sup>b</sup>	39.2 <sup>c</sup>	47.5 <sup>a</sup>	40.6 <sup>c</sup>
Average daily feed cons. (g)	88	93	82	85	93
g feed/g eggs	4.9	3.6	3.8	3.6	7.1

1) Values with different superscripts are significantly different ( $P < 0.05$ ).

Source: Creswell and Gunawan (1982).

### **Implications and Lessons learned**

Local chicken play a major role in food production acting as the main source of protein in the diet of the Indonesian people. In 2001 the population of local chicken in Indonesia was estimated at 263 million comprising 30.23% of the total poultry meat production and 22% of the national meat production (Directorate General of Livestock Services, 2001). The low productivity of local chicken is mainly due to a poor rearing and management system (extensive traditional system). It is evident that if the local farmers can improve their rearing and management systems, they can increase egg and production significantly.

In order to improve the productivity of local chicken mass selection should be carried out, considering the wide phenotypic variation that exists. No systematic selection program to improve the egg and meat of local chicken has been conducted by local farmers. In this case, the government could help the farmers to establish village chicken breeding centres in the areas where the population of local chicken is concentrated. The improved strains of local chicken could then be dispersed to the local farmers in order to improve the productivity. The government could also help farmers in the village get access to credit in the form of soft loans in order to increase the scale of chicken production. In this way, local chicken production systems could help reduce the poverty level in the villages.

The result presented suggest that the Kedu chicken can be selected as egg producer whilst the Pelung can be selected as meat producer. The Kampung chicken could also be selected further as a dual purpose chicken. It should be noted that the majority of local farmers in the villages cannot afford to maintain imported layers and broilers mainly due to a low education level and the high investment required. Selected local chicken can be raised by local farmers as production costs would not be too high.

### **Questions for discussion**

1. Can the productivity of local Indonesian chicken be improve significantly by just changing the production system from extensive to intensive systems?
2. In what ways can the government support local farmers to improve productivity of indigenous chicken?
3. Outline alternative breeding schemes that could be operated to improve the productivity of local chicken, and outline the impact of each scheme on farmer incomes.

### **REFERENCES**

Creswell, D.C and B. Gunawan. 1982. Indigenous chicken in Indonesia: Production characteristics in an improved environment. Research Report. Research Institute for Animal Production.

- Directorate General of Livestock Services. 2001. Statistical Book on Livestock. Direktorat Jenderal Bina Produksi Peternakan, Ministry of Agriculture, Jakarta.
- Diwyanto, K., D. Zainuddin, T. Sartika, S. Rahayu, Djufri, C. Arifin and Cholil. 1996. Model pengembangan peternakan rakyat terpadu berorientasi agribisnis. Komoditi ternak ayam Kampung. Laporan. Dirjennak bekerja sama dengan Balitnak.
- Mansjoer, S.S. 1989. Genetics characters and performance of Indonesian native chickens. Research Report. Faculty of animal Science, Bogor Agricultural University, Bogor, Indonesia.
- Nataamijaya, A.G., Abubakar, Y. Saefudin and Haryono. 1996. Selection for increasing of local chicken in Villages, Research Report. Research Institute for Animal Production. In Indonesia.
- Nataamijaya, A.G. The Native Chicken of Indonesia. 2000. Bulletin Germ Plasm, (6) 1: 1-6. Litbang Pertanian.