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# Reproductive Capability of Red Jungle Fowl Offspring in the Community of Seluma District, Bengkulu, Indonesia

Sutriyono<sup>1\*</sup>, Edi Soetrisno<sup>1</sup>, Nurmeiliasari<sup>1</sup>, Dadang Suherman<sup>1</sup>

<sup>1</sup> Department of Animal Science, Faculty of Agriculture, University of Bengkulu, Jl. W.R.

Supratman, Kandang Limun, Bengkulu 38371, Indonesia.

\* Corresponding author: [itrusaryono@gmail.com](mailto:itrusaryono@gmail.com)

## Abstract

Red jungle fowl (RJF) is a biological resource that lives in the wild and has been domesticated by the community. Crosses between RJF and local chickens have occurred and produced offspring. The purpose of this study was to evaluate the reproductive ability of RJF offspring rearing by the community. The study was conducted in Seluma Regency, Bengkulu Province, Indonesia. Respondents were determined by the snowball sampling method, and 50 people were obtained. Data was collected by means of interviews, filling out questionnaires, and observation. The data collected were chicken rearing techniques, egg and chick production, and population. results showed that the population of RJF offspring was 337 consisting of 85 roosters, 67 hens, 63 chicks, and 122 young chickens. The chicken rearing technique is carried out in 3 ways, namely reared in cages during the day and night, chickens are released during the day and night, chickens are housed at night and released during the day. The average egg production was  $10.07 \pm 2.3$  eggs/hen/period, a minimum of 5 eggs and a maximum of 15 eggs, the number of eggs hatched was  $8.6 \pm 1.83$  eggs/hen/period, and the eggs hatched were  $6.17 \pm 1.6$  eggs/hen/period (72.78%). Chicks production was 6.17 chicks/hen/period (61.26% of total egg production). Based on the research, it can be concluded that the offspring of RJF are local chickens that genetically have good reproductive abilities and poor maintenance management causes slow population growth.

Keywords : population, red jungle fowl offspring, reproductive ability

## 1. INTRODUCTION

Red jungle fowl are wild animals and live in several areas in Indonesia, including Bengkulu province (Rahayu, 2002; Sutriyono, *et al.*, 2016) and occupy secondary forests, plantation crops, transitional areas between forest and agricultural land. Some of the favorite places for red jungle fowl are oil palm plantations, tea and coffee plantations, and forest land converted to agricultural land. Red jungle fowl are omnivores. Sources of feed come from plants and animals in the form of seeds, leaves, flowers, fruits, roots, and tubers, nuts (Rahayu, 2002; Collies and Saichuae, 1967) insects, larvae, worms, and grasshoppers (Nishida *et al.*, 1975; Abdullah and Babjee, 1982), beetles, earwigs, spiders, leeches and isopods, termites and ants (Arshad *et al.*, 2000; Medway *et al.*, 1976). In their habitat the red jungle fowl live and breed naturally. Habitat destruction, poaching, and being eaten by predators are thought to have caused a decline in the population of red jungle fowl (Sutriyono, 2016). Domestication of red jungle fowl is a form of gene conservation and utilization of red jungle fowl that provide benefits to the community.

The domestication of red jungle fowl has been carried out by the community in Bengkulu (Setianto *et al.*, 2018). Domesticated chickens are obtained from hunting in forests and plantations and buying from hunters (Setianto *et al.*, 2016). Chickens from hunting are wild roosters, so they need special care to save the chickens. Chickens are kept in closed cages accompanied by tame female red jungle fowl offspring. Chickens are protected from the threat of predators, protected from disease attacks, and protected from changes in extreme weather conditions (Sutriyono *et al.*, 2016; Setianto, 2016). Chickens are provided with feed, medicine, and feed supplements, and chickens are provided with cages. Red jungle fowl are

used by the community for various purposes, namely as a source of food, for crossing, for the production of chicks, and as ornamental animals and hunting wild chickens in the forest. Domesticated red jungle fowl experienced changes in performance, morphology, reproduction, and production (Belteky *et al.*, 2016; Price, 1999). Changes are caused by management, changes in environmental conditions, and crossing with native chickens or other local chickens. Domestication does not produce pure red jungle fowl due to crosses with local chickens or native chickens. A cross between a red jungle fowl and a local chicken in Bengkulu produces offspring of a red jungle fowl called Rejang chicken or burgo chicken, which is a cross between a male red jungle fowl and a female native chicken (Setianto and Warnoto, 2009; Setianto, 2014; Sutriyono 2021). Red jungle fowl offspring is reared and developed by the people in Bengkulu, especially in Seluma Regency. Genetically, the production and growth of red jungle fowl offspring is low (Setianto *et al.*, 2015; Sutriyono *et al.*, 2016). Non-genetic factors that determine production and reproduction are chicken rearing management, feed management, and reproduction management (Hidayat and Asmarasari, 2015; Nataamijaya, 2000; Ketaren, 2010). The red jungle fowl offspring are part of the local chickens kept by the people in Bengkulu. The local chicken rearing system by the community is carried out traditionally and extensively. It is estimated that the production and reproduction of red jungle fowl offspring is low, so population development is slow.

This study aimed to evaluate the reproductive ability of red jungle fowl in Seluma district, Bengkulu province.

## **2. RESEARCH METHODS**

This research was conducted for 3 months in Seluma Regency, Bengkulu Province, Indonesia. The location was chosen as the research location based on information from the community that in that location many people rearing of red jungle fowl offspring. The reproductive performance of red jungle fowl offspring in this location is not yet known, so research needs to be done. The results of this study can be used to improve reproduction and production of red jungle fowl offspring. Respondents in this study were all people who kept the of red jungle fowl offspring, and determined based on the "snowball sampling" method, and obtained 50 respondents. Primary data collected were population, egg production, number of eggs incubated, number of eggs hatched, and production of chicks. The secondary data collected were the characteristics of the respondents, the number of chickens rearing by respondent, the technique of raising chickens, and the general condition of the research site. Data were collected by means of in-depth interviews and filling out questionnaires and observations. The data obtained were tabulated and presented in tabular form, then discussed descriptively.

## **2. RESULTS**

### **3.1. General Condition of Research Sites**

The research has been carried out in Seluma Regency, Bengkulu Province, and is located on the West Coast of Sumatra at 03°49'55.66"SL-04°21'40.22"SL and 101°17'27.57"EB-102°59' 40.54 EB (Seluma Regency in Figures, 2021). The total area is 4,128.44 km<sup>2</sup>. Seluma district has 14 sub-districts, and only 8 sub-districts were selected as research locations. Altitude of the place between 0 – more than 1000 m above sea level, which is 0 – 25 m is 30.67%, 25 –100 m is 29 %, 100 – 500 m is 21.50%, 500 – 1000 m is 15.96 % and over 1000 m is 16%. The rainfall is 4 816 mm/year and the rainy days is 219 days/year (Seluma Regency in Figures, 2021). The agricultural sector plays an important role

in the economy in Seluma Regency. Some activities in agriculture are plantation, agriculture, animal husbandry, forestry, and fishery. The plantation commodities produced include oil palm, rubber, coffee, and others. Some of the livestock that are cultivated by the community are beef cattle, buffalo, goats, sheep, pigs, ducks, broilers, and native chickens. Meanwhile, the forestry sector in Seluma Regency has a land area of 88,963.88 hectares, which consists of: 962.42 hectares of nature reserves, 5,376.78 hectares of Buru Park, and protected forests. 66,892.34 hectares, and limited production forest 15,732.34 hectares.

### 3.2. Respondents Characteristics

Respondents in this study were 50 people from 8 sub-districts in Seluma district, Bengkulu. The age of the respondents was 16 years to 80 years with a mean of  $46.39 \pm 14.07$  years, a median of 45 years and a mode of 40 years. Respondent's education is college graduate (8%), high school graduate (54%), junior high school graduate (16%), and elementary school graduate (22%). The livelihoods of the respondents are civil servants (14% of the total respondents), farming (48%), entrepreneurs (22%), working in the private sector (16%). Respondents raise red jungle fowl offspring for hobbies and ornamental chickens (64% of the total respondents), to produce chicks (64%), to produce chicks (34%), and to produce hunting chickens (44%).

### 3.3 Chicken rearing

The number of respondents who raise chicks is 29 people (58% of the total respondents). Respondents raise chicks in 3 ways: (1) chicks are housed during the day and night (52%), (2) chicks are released during the day and night (14%), (3) chicks are released during the day and caged at night (34%). Respondents who keep the hen are 32 people (64% of the total respondents). Respondents kept the hen in 3 ways, namely: (1) the hen was housed during the day and night (47%), (2) the hen was released during the day and night (15%), (3) the hen was released during the day and caged at night (38%). Likewise for roosters, respondents maintain roosters in 3 ways, namely: (1) roosters are housed during the day and night (66% of total respondents), (2) roosters are released during the day and night (28%), (3) roosters are released during the day and housed at night (36%).

### 4.4. Population Development

The population of red jungle fowl offspring in the study area is shown in Table 1.

Table 1. Population of red jungle fowl offspring at the study site

No	Variable	Value	Percentage (%)
1	Number of RJF offspring breeders	50	100
2	Initial number of chickens	96	
3	Last number of chickens	337	
	a. Rooster	85	25.22
	b. Hen	67	19.88
	c. Chicks	63	18.69
	d. Young chicken	122	36.20
4	Total increase in the number of chickens	241	
5	Average length of rearing of chickens (years)	7.47	
6	Increase in the number of chickens per year	32.26	33.60

The number of respondents in this study were 50 people. The initial population of red jungle fowl breeds in Seluma Regency, Bengkulu Province was 96 chickens and the final chicken population was 337 chickens or an increase of 241 chickens (259.14%). The length of chicken rearing is 7.47 years, so the increase in the number of chickens is 32.26 chickens/year or 33.60% of the initial population. The population of chickens consisted of 85 roosters (25.22%), 67 hen (19.88%), 63 chicks (18.69%), and young chickens were 122 chickens (36.20%). The average population increase was 32.26 chickens/year (33.60%).

### 3.3. Production and Reproduction Capability of Red Jungle Fowl Offspring

The population of the hen in this study was 67. Egg production was 5 to 15 eggs/hen/period and the average egg production was  $10.07 \pm 2.3$  eggs/hen/period (Table 2). The average number of eggs incubated by one hen is 8.6 eggs/hen/period or 85.40% of egg production per hen per period. From the number of eggs incubated by one hen produced 6.17 chicks or 71.74% of the number of eggs incubated or 61.27% of the total egg production per hen per period. The average period of laying hens in a year is 3.98 egg-laying periods/hen/year, so that the production of chicks per hen per year is estimated at 24.56 chicks/hen/year.

Table 2. Production and Reproduction Capability of Red Jungle Fowl (RJF) Offspring

No	Variable	Value	Percentage (%)
1	Number of RJF offspring breeders	50	100
2	Respondents raise hens	32	64
3	The average hen raised per respondent	2.09	
4	Egg production (egg/hen/period)	$10.07 \pm 2.3$	
5	Minimum egg production (egg/hen/period)	5	
6	Maximum egg production (egg/hen/period)	15	
7	Egg laying frequency per year	3.98	
8	Estimated egg production per year (eggs/hen/year)	40.08	
9	Number of eggs incubated (egg/hen/period)	$8.6 \pm 1.83$	85.40
10	Number of eggs hatched (egg/hen/period)	$6.17 \pm 1.6$	72.78
11	Estimated chick production per year (chicks/hen/year)	24.56	

### 3. DISCUSSION

Red jungle fowl have long been domesticated by people in Bengkulu, and produce offspring called Rejang chicken or Burgo chicken. The burgo chicken is the result of a cross between a male red jungle fowl and a female kampung chicken, and is still being maintained and developed by the community. In this study, 50 respondents were used. The maintenance of red jungle fowl breeds is carried out for the purpose of hobby and ornamental chickens, for the production of chicks, for consumption, and for hunting chickens in the forest. Not all respondents keep hen, and only 64% of respondents keep hen with a hen population of 67 chickens, the average hen reared by respondents is 2.09 hen/respondent. The egg production of the hen is 5 to 15 eggs/hen/period and the average value is  $10.07 \pm 2.3$  eggs/hen/period, and the average egg-laying period is 3.98 periods/hen/year (Table 1). Estimated egg production per year is 40.08 eggs/hen/year. The variation in egg production is influenced by several

factors, namely individual chicken factors, management and the environment. Chicken individual factors include genetics, acceleration of sexual maturity, and age of chickens. The low egg production of red jungle fowl offspring is caused by heredity, where the egg production of red jungle fowl and kampong chickens as their parents has low egg production. Rahayu (2000) suggests that red jungle fowl produce 5-6 eggs/hen/period. Meanwhile, Romanov and Weigend (2001) suggested that red jungle fowl produce 10 to 15 eggs/mother/year. Sutriyono *et al.* (2016) reported that the offspring of red jungle fowl produced eggs from 6 to 9 eggs/head/period and the average value was 6.89 eggs/head/period, and the frequency of laying eggs was 2.17 times/year. Another factor that affects egg production is sexual maturity. Chickens that reach sexual maturity quickly produce more eggs than chickens with late sexual maturity. The sexual maturity of chickens at an early age produces a high number of eggs and egg mass (El-Dlebshany, 2008; Zereu and Lijalem, 2016), and late sexual maturity of chickens results in low productivity of local chickens (Moges *et al.*, 2010; Zereu and Lijalem, 2016). Another factor that affects egg production is sexual maturity. Chickens that reach sexual maturity quickly produce more eggs than chickens with late sexual maturity. The sexual maturity of chickens at an early age produces a high number of eggs and egg mass (El-Dlebshany, 2008; Zereu and Lijalem, 2016), and late sexual maturity of chickens results in low productivity of local chickens (Moges *et al.*, 2010; Zereu and Lijalem, 2016). In addition to genetic factors, management factors are thought to affect egg production. The rearing system in this study was carried out in several ways, namely: (1) chickens were caged during the day and night, (2) chickens were released during the day and night, (3) chickens were caged at night and released during the day. Keeping chickens in cages provides several advantages, namely easy to control, avoid the threat of predators, and lay eggs in place, get feed and medicine. This method requires more input resources such as feed, labor, adequate cages and medicines. Therefore, breeders prefer to raise native chickens by releasing them into nature. There are several reasons for keeping chickens released during the day and night, namely (1) chickens can find and choose feed to meet nutritional needs, so that by releasing chickens they will get sufficient feed according to taste, (2) chickens are still wild, chickens more freedom to carry out activities and find food according to their natural habitat, (3) breeders do not have adequate cages. On the other hand, raising chickens by releasing chickens into nature has several threats, namely being preyed upon by predators, susceptible to infectious diseases, difficult to control, fleeing to the forest, and laying eggs outside the place. However, this method requires relatively fewer resources, so some farmers prefer to raise chickens by releasing them into the wild. Predation of chickens by predators Increase in the number of chickens per year, disease and death of chicks, cage system, feed, and health are the main obstacles in the production system of native chickens (Mapiye and Sibanda, 2005).

In conclusion, red jungle fowl (RJF) offspring are local chickens that genetically have good reproductive abilities and poor maintenance management causes slow population growth.

## REFERENCES

- Abdullah Z. and S.M.A. Babjee, 1982. Habitat Preference of the Red Junglefowl (*Gallus gallus*). Malay. Applied Biol., 11: 59-63.
- Arshad M.I., M. Zakarian, A.S. Sajap, A. Ismail. 2000. Food and Feeding Habits of Red Junglefowl. Pakistan Journal of Biological Sciences 3 (6): 1024-1026.

- Belteky J, B. Agnvall, M. Johnsson, D. Wright, P. Jensen. 2016. Domestication and tameness: brain gene expression in red junglefowl selected for less fear of humans suggests effects on reproduction and immunology. *R.Soc.open Sci.*3: 160033. <http://rsos.royalsocietypublishing.org/> on December 5, 2016.
- BPS-Statistics of Seluma Regency. 2021. Seluma Regency in Figures. BPS-Statistics of Seluma Regency Pub. Bengkulu. <https://selumakab.bps.go.id/publication.html?Publikasi%5BtahunJudul%5D=2021&Publikasi%5BkataKunci%5D=kabupaten+seluma+dalam+angka&Publikasi%5BcekJudul%5D=0&yt0=Tampilkan>. Accessed 06 November 2021.
- Collias, N. E. and P. Saichuae, 1967. Ecology of the Red Junglefowl in Thailand and Malaya with reference to the origin of domestication. *The Natural History Bulletin, Siam Society*. Collies, N. E. and P. Saichuae, 1967. Ecology of the Red Junglefowl in Thailand and Malaya with reference to the origin of domestication. *The Natural History Bulletin, Siam Society*.
- El-Dlebshany, AE. 2008. The Relationship between Age at Sexual Maturity and Some Productive Traits in Local Chickens Strain. *Egypt Poult. Sci.* 28(IV):1253-1263.
- Hidayat C. and S. A. Asmarasari. 2015. Native Chicken Production in Indonesia: A Review. *Jurnal Peternakan Indonesia*, Vol 17 (1):1-11.
- Ketaren, P.P. 2010. Kebutuhan gizi ternak unggas di Indonesia. *Wartazoa* 20 (4):172-180.
- Mapiye C and Sibanda S. 2005: Constraints and opportunities of village chicken production systems in the smallholder sector of Rushinga district of Zimbabwe. *Livestock Research for Rural Development*. Volume 17, Article #115. Retrieved November 1, 2021, from <http://www.lrrd.org/lrrd17/10/mapi17115.htm>. Medway, L. and D.R. Wells, 1976. *The Birds of the Malay Peninsula*. Vol. 5, Witherby, London, Pages: 448.
- Moges F, A.Tegegne, T. Dessie. 2010. Local chicken production and marketing systems in Ethiopia: Characteristics and opportunities for market-oriented development. IPMS (Improving Productivity and Market Success) of Ethiopian Farmers Project Working Paper 24 Nairobi, Kenya, ILRI. 55 pp.
- Nataamijaya, A.G. 2000. The native chicken of Indonesia. *Bul. Plasma Nutfah* 6(1): 1-6.
- Nishida, T., K. Tanaka, Y. Fujio, T. Shotake, A.M. Babjee, S.N. Nustaffa, T. Azam and S.M.A. Babjee, 1975. Studies on the Interrelationship between the Malaysian jungle fowl and native poultry and morphological investigations on native livestock in Malaysia Progress Report. University of Tokyo, Japan.
- Price, E.O. 1999. Behavioral development in animals undergoing domestication. *Appl. Anim. Behav. Sci.* 65:245-271.
- Rahayu, I. 2002. Karakteristik dan tingkah laku ayam hutan merah (*Gallus gallus spadiseus*) di dalam kurungan. *Med. Pet.* Vol. 24 (2):45-50.

- Romanov M. & Weigend, S. 2001. Analysis of genetic relationships between various populations of domestic and jungle fowl using microsatellite markers. *Poult. Sci.*, 80: 1057-1063.
- Setianto J., H. Prakoso, Sutriyono. 2015. Performa produksi dan reproduksi ayam burgo pada peternakan rakyat di Kota Bengkulu. *Proc. Seminar Nasional tentang Unggas Lokal V. Universitas Diponegoro, Semarang, 18-19 November 2015.*
- Setianto J, Prakoso H, Sutriyono. 2015a. Domestication of red jungle fowl: A case study of red jungle fowl mpoaching by communities in North Bengkulu. *Pros Sem Nas Masy Biodiv Indon 1 (2): 207-212.*
- Setianto J., H. Prakoso dan Sutriyono. 2014. Kajian domestikasi ayam hutan merah berbasis masyarakat serta strategi pengembangannya di Bengkulu. *Laporan Penelitian. Universitas Bengkulu.*
- Setianto, J., H. Prakoso, Sutriyono. 2015a . Domestikasi ayam hutan merah: Studi kasus penangkapan ayam hutan merah oleh masyarakat di Bengkulu Utara. *Prosiding Seminar Nasional Masyarakat Biodiversitas Indonesia 1(2): 207- 212.*
- Setianto, J., Sutriyono, H. Prakoso, B.Zein. 2016. Identification of the Origin of the Red Jungle Fowl Reared by Community in Seluma District. *Jurnal Sain Peternakan Indonesia. Vol.11 (2). p.141-152.*
- Sutriyono, Setianto J, H. Prakoso. 2016. Production and population of the red jungle fowl domestication in North Bengkulu District and population development scenario. *Pros. Sem. Nas. Masy. Biodiv. Indon. 2 (2): 226-231.*
- Sutriyono, Setianto J., Prakoso H., Zain B. 2016a. Conservation and Utilization of Red Jungle Fowl in the Coastal Areas of North Bengkulu. *International Seminar sustainable utilization of coastal resources in tropical zone, 19-20 October, 2016, Bengkulu, Indonesia.*
- Zereu G. and T. Lijalem. 2016. Production and reproduction performance of local chicken breeds and their marketing practices in Wolaita Zone, Southern Ethiopia. *African Journal of Agricultural Research, 11(17), pp. 1531-1537.*