BIODIVERSITAS
Volume 20, Number 2, February 2019
Pages: 532-536

ISSN: 1412-033X
E-ISSN: 2085-4722
DOI: 10.13057/biodiv/d200232

Short Communication: Phenotypic diversity of male Burgo chicken from Bengkulu, Indonesia

JOHAN SETIANTO[1,2♥], SUTRIYONO[1], HARDI PRAKOSO[1], BASYARUDDIN ZAIN[1], RIFKY ADWIYANSYAH[1], AMIR HUSAINI KARIM AMRULLAH[1]

[1]Department of Animal Science, Faculty of Agriculture, Universitas Bengkulu. Jl. WR Supratman, Kandang Limun, Bengkulu 38371, Bengkulu, Indonesia. Tel./fax.: + 62-736-21290.♥email: jsetbkl@gmail.com.

[2]Program of Natural Resources and Environment, Faculty of Agriculture, Universitas Bengkulu. Jl. WR Supratman, Kandang Limun, Bengkulu 38371, Bengkulu, Indonesia

Manuscript received: 23 October 2018. Revision accepted: 29 January 2019.

Abstract. *Setianto J, Sutriyono, Prakoso H, Zain B, Adwiyansyah R, Amrullah AHK. 2019. Short Communication: Phenotypic diversity of male Burgo chicken from Bengkulu, Indonesia. Biodiversitas 20: 532-536.* Burgo chicken is the result of a crossbreed of Red Junglefowl (*Gallus gallus gallus*) with Kampung chicken (*Gallus domestica*). This study aimed to describe the diversity of colors found in male Burgo chickens. The study was conducted in the city of Bengkulu, Indonesia. The method used in this study was a direct observation of the 50 male chickens on the breeders. The breeders belonging to the Burgo chicken community were determined by random sampling method. The breeders who did not join the community were determined by the snowball sampling method. This method was carried out because the presence of breeders who keep Burgo chickens was unknown. The data in this study consisted of the color of chest feathers, neck feathers, wing feathers, tail feathers, saddle feathers, and the number of wing and tail feathers. The data obtained were analyzed descriptively. The number of colors ranges 4 to 11 with the high diversity is mainly found on the feathers of the chest, neck and, saddle.

Keywords: Bengkulu, Burgo, chicken, diversity, *Gallus-gallus*

INTRODUCTION

Junglefowls are native chickens spread from South Asia and Southeast Asia, from East India and South China to Malaysia and Indonesia. There are 4 junglefowl species, namely; Javanese Green Junglefowl (*Gallus varius*), Ceylon Junglefowl (*Gallus lafayetii*), Indian Gray Junglefowl (*Gallus sonneratii*), and Red Junglefowl (*Gallus gallus*) (Subhani et al. 2010; Hassaballah et al. 2015). Indonesia has genetic resources of red junglefowl (*Gallus gallus gallus*), whose natural habitat is tropical rainforests in Indonesia. Economically, red junglefowls are hunted animals for local people to fulfill their daily needs (Setianto et al. 2015a; Sutriyono et al. 2015). In the process of its development, red junglefowls are not only consumed but also maintained and mated with Kampung chickens (Setianto 2009a; Setianto 2009b). From the crossbreed, the offspring is named Burgo chickens. Burgo chicken is currently maintained by the people of Bengkulu (Setianto and Warnoto 2010; and Setianto 2013). This makes red junglefowl a vital asset to get new breeds for ornamental chickens (Setianto et al. 2015a; Setianto et al. 2015b; Setianto et al. 2017a; Sutriyono et al., 2016; Widodo et al. 2014).

Burgo chickens in Bengkulu Province are wide-spread in several regencies, Lebong, Rejang Lebong, Kepahiang, North Bengkulu, Central Bengkulu, and Bengkulu City (Putranto et al. 2017). According to Setianto et al. (2013), the total of Burgo chicken population in Bengkulu city is 275 chickens consisting of 81 males, 83 hens and 111 chicks. Burgo chicken for the people of Bengkulu City is no longer seen as a consumption chicken both meat and eggs, but is seen as ornamental chicken because it has the diversity and the beauty of the feather colors. The distinctive sound of male Burgo chicken is also a special attraction for the breeders who maintain it. This makes Burgo chickens as livestock with high economic value because they can be categorized as ornamental and contest chickens.

There has been a little research on the diversity of feather colors. This study aimed to describe the diversity of colors found in male Burgo chickens.

MATERIALS AND METHODS

Research sites

The study on the diversity of Burgo chicken phenotypes was carried out from January to August 2017 in the city of Bengkulu, Indonesia. Bengkulu City is placed on the west side of Sumatra island, between 3^0 45' and 3^0 59' S and between 102^0 14 and 102^0 22' E. This area has the largest Burgo population compared to other regions in the province of Bengkulu. Burgo chicken breeders in Bengkulu city are the members of a community called Burgo Chicken Lovers Community. This study was conducted to Burgo chicken breeders who were incorporated and did not belong to the community.

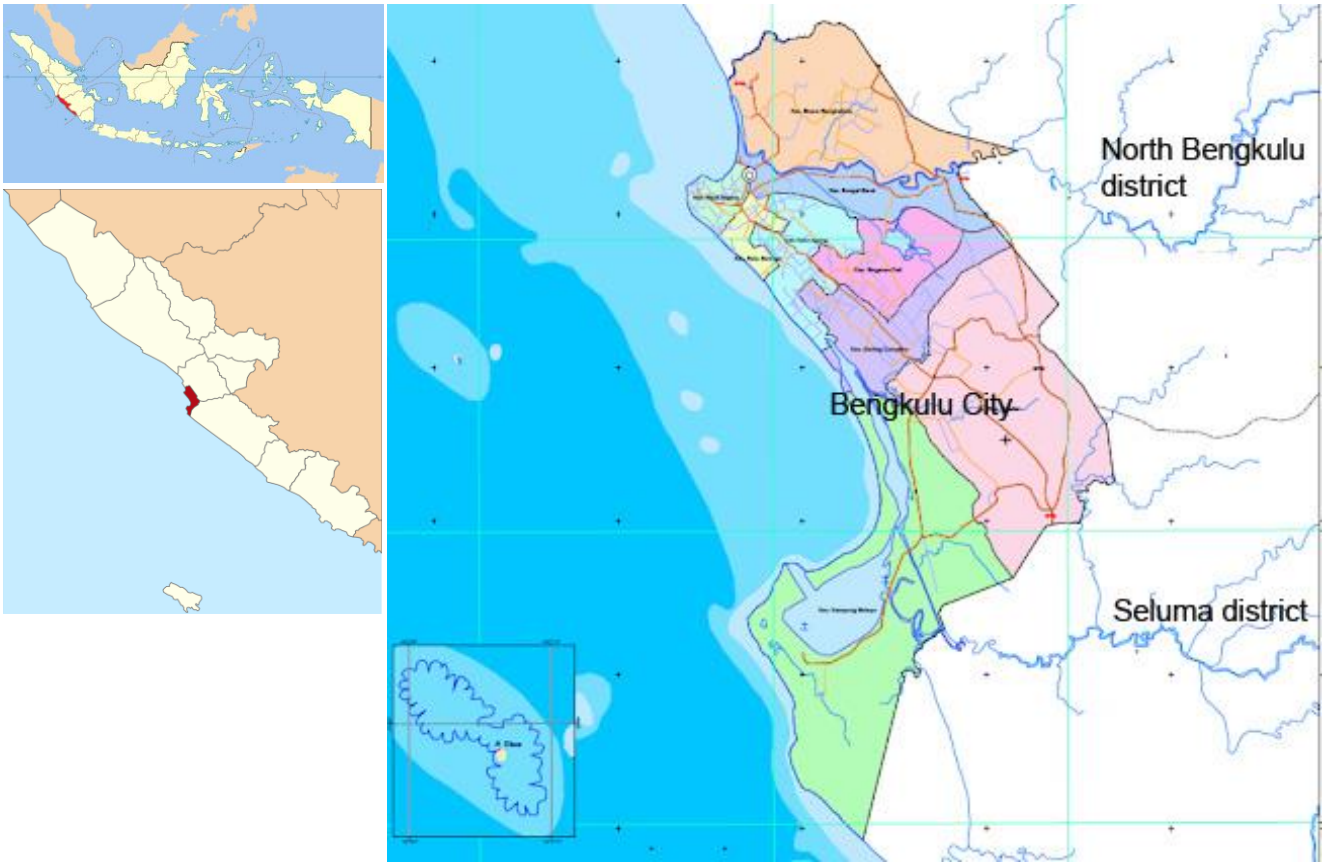

Figure 1. Map of the research location in Bengkulu City, Bengkulu Province, Indonesia

Data collection

A total of 50 adult male Burgos on the breeders were observed directly. The breeder who was a member of a community was determined by random sampling method, while who was not associated was determined by the snowball sampling method. The first stage of the snowball sampling method was to find a Burgo chicken breeder then conducted an interview to get information for other breeders. The next stage was to gather the respondents for the coordination and time agreement. The data in this study consisted of the color of chest feathers, feathers on the neck, wing, tail, saddle and the number of wing and tail feathers.

Data analysis

The data obtained were displayed in the form of tables and images, and analyzed descriptively.

RESULTS AND DISCUSSION

Results

The results show that the chest feathers and feathers on the neck, wing, tail, and saddle of Burgos in Bengkulu City have a high diversity color. Each observation subject has different number of color, ranging from 4 to 11 variations. The highest variety of color is found on the neck feathers, with 11 colors, while the lowest is found in the color of tail feathers, with 4 colors. The color variety of each research subject is shown in Table 1-5 and Figure 2. However, the variety of the number of feather on each subject is presented in Table 6-7.

Table 1. Color of chest feathers

Color of chest feathers	Number of chickens	Percentage (%)
Black	32	64
Barring	2	4
Black-white red	1	2
Black and white combination	4	8
Golden red	2	4
White	6	12
Golden yellow	1	2
Black and golden yellow combination	2	4
Total	50	100

Figure 2. The diversity of male Burgo chicken colors seen from the color of the feathers of the chest, neck, wings, saddle, and tail

Table 2. Color of neck feathers

Color of neck feathers	Number of chickens	Percentage (%)
Yellowish red	14	28
Pink	4	8
Chestnut	13	26
Red and white stripes	2	4
Yellow and red stripes	1	2
Black and white combination	1	2
Golden red	1	2
White	6	12
Yellowish white	2	4
Golden white	3	6
Yellow and white	3	6
Total	50	100

Table 3. Color of wing feathers

Color of wing feathers	Number of chickens	Percentage (%)
Black and red combination	30	60
Brown and white combination	1	2
Black brown white	1	2
Black and white combination	2	4
Golden red	2	4
White	6	12
Black	2	4
Black white brown	2	4
Black golden brown	1	2
Yellow white black	3	6
Total	50	100

Table 4. Color of saddle feathers

Color of saddle feathers	Number of chickens	Percentage (%)
Yellowish red	15	30
Yellow	5	10
Chestnut	7	14
Golden red	4	8
Black	1	2
Yellowish white	3	6
Red and black stripes	7	14
White	6	13
Golden yellow	2	4
Total	50	100

Table 5. Color of tail feathers

Color of tail feathers	Number of chickens	Percentage (%)
Black	46	92
Black and white stripes	2	4
Black and white combination	1	2
Greenish black	1	2
Total	50	100

Table 6. Number of wing feathers

Number of wing feathers	Number of chickens	Percentage (%)
18	7	14
22	4	8
19	18	36
15	1	2
21	11	22
16	1	2
20	7	14
24	1	2
Total	50	100

Table 7. Number of tail feathers

Number of tail feathers	Number of chickens	Percentage (%)
18	22	44
12	19	38
16	4	8
21	1	2
14	1	2
15	1	2
22	1	2
24	1	2
Total	50	100

Discussion

Burgo chicken is one of the genetic resources of chickens in Bengkulu, Indonesia. Burgo chicken is the result of a crossbreed between red junglefowl (*Gallus gallus gallus*) and Kampung chicken (*Gallus gallus domesticus*). Setianto et al. (2015a) stated that Red junglefowls raised by the community in Bengkulu Province were from wild chickens caught from the forests in Bengkulu Province using a variety of equipment (Setianto et al. 2016; Wahyudi et al. 2017). Previously, Red junglefowls were caught for consumption and pleasure (Setianto et al. 2017[b]). Red junglefowls that were caught then nurtured and mated with Kampung chickens. The existing of Kampung Chickens is also the result of the process of domestication of Red junglefowl in a long time carried out by the community. So that the ancestor of Kampung chicken is Red junglefowl.

Subekti and Arlina (2011) explained that the feather colors of Kampung chicken are very diverse. The diversity consists of white, black, gold, silvery white, wild feathers, columbian, and bar. The color of feathers dominating native chicken is wild feather. With the high diversity of feather colors of Kampung chickens, the results of the crossing between Red junglefowl and free-range chickens which in this case produce Burgo chickens are becoming increasingly diverse. Based on the observations on Burgo chickens (Table 1-5), there are 14 color variations of Burgo chickens. The diversity of colors is in the chest, neck, saddle, wing and tail feathers. Based on the observations, the colors that dominate Burgo chickens are brick red and yellowish red on the feathers of the neck, wings and saddles and black on the chest and tail feathers. Salces et al. (2015) stated that the dominance of red in roosters is influenced by Red junglefowl genes and natural selection. Naturally, the red color of Red junglefowl helps chickens to disguise their body color with dry leaves when threatened with predators.

Previous research by Hanh et al. (2015) recorded that the dominant color between Red junglefowl and Fayoumi chicken offspring was blackish yellow color followed by black and dark brown. The color of the feathers of the Red junglefowl will begin to be seen at the age of 5 weeks (teenage chicks). The discoloration of feathers that occurs from DOC to adult shows that many genes are responsible for determining the color of Red junglefowl and its crossing. The effect of feather characteristics on their offspring is not always dominated by roosters. Daryono et al. (2010) who observed the characteristics of Pelung and Cemani chicken's offspring stated that female cemani chicken gives dominant effect in the inherited traits in the phenotypic characters in their offspring.

Brisbin and Petterson (2007) suspect that Red junglefowls that are in the wild today, especially those in Africa, may have contaminated with the local chicken genes. The current genetic purity of Red junglefowls ranges from 92% to 93.75%. Gering et al. (2015) stated that there is a chicken invasion of Kauai's genes on Red junglefowls. The same thing can happen to Red junglefowls in Bengkulu Province. External features that appear in Red junglefowls and the offspring cannot be used as an indicator to show the purity of gene. Gene purity will be more precisely observed by molecular genetics (Brisbin et al. 2005). On the other hand, Rotimi et al. (2016) state that the diversity of phenotypes is caused by genetics and the environment.

From this study, it can be concluded that, the high number color of Burgo chicken feathers especially on the feather colors of the chest, neck and saddle. The diversity of colors in Burgo chickens ranges 4 to 11 colors diversity.

REFERENCES

Brisbin IL, Peterson AT. 2007. Playing chicken with Red Junglefowl: Identifying genetics markers of genetic purity in *Gallus gallus*. Anim Conserv 10 (4): 429-435.

Brisbin IL, Peterson AT, Okimoto R, Amato G. 2005. Characterization of the genetic status of populations of Red Junglefowl. J Bombay Nat Hist Soc 99: 217-223.

Daryono BS, Rosdianto I, Saragih HTS. 2010. Phenotypical characters in hybrids chicken of crossbreeds between Pelung and Cemani. Jurnal Veteriner 11 (4): 257-263.

Gering E, Johnsson M, Willis P, Getty T, Wright D. 2015. Mixed ancestry and admixture in kauai's feral chickens: invasion of domestic genes into ancient Red Junglefowl reservoirs. J Mol Ecol 24: 2112-2124.

Hanh NTH, Thuy LT, Han J, Silva P, Ibrahim MNM, Okeyo AM. 2015. Morphological characteristics and growth performance of F1 hybrids of Red Junglefowl cock crossed with Fayoumi or H'mong hens. Trop Agric Res 26 (4): 655-665.

Hassaballah K, Zeuh V, Lawal RA, Hanotte O, Sembene M. 2015. Diversity and origin of indigenous village chickens (*Gallus gallus*) from Chad, Central Africa. Adv Biosci Biotechnol 6: 592-600.

Putranto, H.D., G.P. Hasibuan., Y. Yumiati., J. Setianto., B. Brata., N. Kurniati., and F.F. Hakiki. 2017. The estimation of dynamical distribution of domesticated Burgo chicken population in Bengkulu coastal area, Indonesia. Biodiversitas. 18 (2): 458-464.

Rotimi EA, Egahi JO, Adeoye AA. 2016. Phenotypic characterization of indigenous chicken population in Gwer-West, Benue State, Nigeria. World Scientific News. 53 (3) : 343-353.

Salces AJ, Yebron MGN, Salces CB, Dominguez JMD. 2015. Phenotypic and genetic characteristics of Boholano genetic group of Philippine native chicken (*Gallus gallus domesticus* L.). Philipp. J Vet Anim Sci 41 (1): 1-11.

Setianto J**.** 2009[a]. Burgo Chicken: Buras Chicken Bengkulu. PT Penerbit IPB Press, Bogor. [Indonesian]

Setianto J. 2009b. Increasing the egg weight of Burgo chicken offspring through cross-mating between Burgo chicken with native chicken. Proceeding the 1st International Seminar on Animal Industri "Sustainable Animal Production for Food Security and Safety. IPB Bogor. [Indonesian]

Setianto J. 2013. Potential and Strategy for Developing Burgo Chickens. Proceeding National Seminar of Livestock: Potential of Local Animal Resources to Build Independence of Animal Food and Community Welfare, Padang. [Indonesian]

Setianto J, Warnoto. 2010. Reproduction and Production Performance of Burgo Chicken UNIB PRESS, Bengkulu. [Indonesian]

Setianto J, Prakoso H, Sutriyono. 2013. Burgo Chicken Population Dynamics and Development Strategy in Bengkulu. Research Report. Faculty of Agriculture. Bengkulu University. [Indonesian]

Setianto J, Prakoso H, Sutriyono. 2015[a]. Production and Reproduction Performance of Burgo Chicken at Small Farmer in Bengkulu City. Proceeding The 5th National Seminar of Local Poultry: "The Role of Local Poultry in Supporting the Poultry Industry in Indonesia." The Indonesian Poultry Society collaborates with the Faculty of Animal Science and Agriculture, Diponegoro University. Semarang. 18-19 November 2015. [Indonesian]

Setianto J, Prakoso H, Sutriyono. 2015[b]. Domesticated Red Jungle Fowl: Case Study of Catching Red Jungle Fowl by the Community in North Bengkulu. Pros Sem Nas Masy Biodiv Indon 1 (2): 207-212. [Indonesian]

Setianto J, Sutriyono, Prakoso H, Zain, B. 2016. Identify the Origins of Red Jungle Fowl that are Kept by Community in Seluma District. Jurnal Sain Peternakan Indonesia. 11 (2) : 141-152.

Setianto J, Sutriyono, Prakoso H, Zain, B. 2017[a]. Red junglefowl development scenarios for poultry farmers in Bengkulu coastal communities. Proceeding International Seminar and Expo: Sustainable Utilization of Coastal Resources in Tropical Zone. University of Bengkulu.19-20 October 2016.

Setianto J, Zain B, Sutriyono, Prakoso H. 2017[b]. Domestication of red jungle fowl: A case study of the red jungle fowl chicks procurement by the communities in Central Bengkulu, Indonesia. Biodiversitas. 18 (1) : 183-189.

Subekti K, Arlina F. 2011. Eksternal genetic characteristics of Kampung Chickens in Sungai Pagu Subdistrict Solok Selatan District. Jurnal Ilmu-ilmu Peternakan. 14 (2) : 74-86.

Subhani A, Awan MS, Anwar M, Ali U, Dar NI. 2010. Population status and distribution of Red Junglefowl (*Gallus gallus murghi*) in Deva Vatala National Park, Azad Jamnu & Kashmir, Pakistan: A pioneer study. Pakistan J Zool 42 (6): 701-706.

Sutriyono, Setianto J, Prakoso H. 2015. Production and population of domesticated Red Jungle Fowl in North Bengkulu District and development strategy of population. Pros Sem Nas Masy Biodiv Indon 1 (2): 207-212. [Indonesian]

Wahyudi, Setianto AJ, Prakoso H. 2017. Study of catching Red Jungle Fowl in Lubuk Linggau City, South Sumatra. Jurnal Sain Peternakan Indonesia. 12 (4): 360-371. [Indonesian]

Widodo J, Setianto, Sutriyono. 2014. Production and reproduction performance of Burgo Chickens at in controlled environment in purpose supporting biodiversity conservation. Naturalis 3 (1) : 90-98.