

## Short Communication: The type and sound diversity of *Kukuak Balenggek* chicken (*Gallus gallus domesticus*) reared in West Sumatra, Indonesia

FIRDA ARLINA<sup>1,\*</sup>, RUSFIDRA<sup>1,\*\*</sup>, DICKY ANDRIANO<sup>1,\*\*\*</sup>, CECE SUMATRI<sup>2,\*\*\*\*</sup>

<sup>1</sup>Faculty of Animal Science, Universitas Andalas. Jl. Unand, Limau Manih, Padang 25163, West Sumatra, Indonesia. Tel.: +62-751-71464,  
\*email: farlina@ansci.unand.ac.id; \*\*rusfidra@ansci.unand.ac.id; \*\*\*dickyandriano@gmail.com

<sup>2</sup>Faculty of Animal Science, Institut Pertanian Bogor. Jl. Agatis Kampus IPB Darmaga, Bogor 16680, West Java, Indonesia. Tel.: +62-251-8622841,  
\*\*\*\*email: cecesumantri21@gmail.com

Manuscript received: 16 November 2019. Revision accepted: 11 April 2020.

**Abstract.** *Arlina F, Rusfidra, Andriano D, Sumatri C. 2020. Short Communication: The type and sound diversity of Kukuak Balenggek chicken (Gallus gallus domesticus) reared by the association of Kukuak Balenggek Chicken Lovers in West Sumatra. Biodiversitas 21: 1914-1919. Kukuak Balenggek is one of the rare indigenous chicken in Indonesia. The number of population and genetic quality of Kukuak Balenggek Chicken (KBC) in in-situ has been decreasing from year to year. This encourages Kukuak Balenggek chicken lovers to found an association, namely Kukuak Balenggek Chicken Lovers, in order to conserve the germplasm native to West Sumatra. This study aimed to identify the type and the song diversity of Kukuak Balenggek Chicken. A total of 180 adult males of Kukuak Balenggek chicken used in this study came from 32 members of the Association of Kukuak Balenggek Chicken Lovers. The survey method used in this research was purposive sampling. The analysis of data was carried out by descriptive statistical analysis. The parameters observed were the type of sound, number of crowing, number of crowing syllables, and duration of crow. The analysis of Kukuak Balenggek sound used the Cool Record Edit Pro computer software. The result showed that the percentage of sound type of Rantak Gumarang, Sigegek Angin, Alang Babega, Riak Iliia Aia, Ginyang, Ginyang Mataci, Gayuang Luluah were 37.78%, 26.67 %, 7.78%, 13.33%, 3.33%, 5.56%, and 5.56%, respectively. The highest of average, the number of crowing and syllable crowing based on the type of KBC sound was Sigegek Angin sound with an average of 9.48 crowing and 12.48 crowing syllable. While the longest average of Kukuak Balenggek chicken crowing duration was the Gayuang Luluah sound type with an average of 3.33 seconds.*

**Keywords:** Chicken lovers, diversity of sound, germplasm, *Kukuak Balenggek*, type of sound

### INTRODUCTION

The native Indonesian chicken has species physical characteristic which differentiates them into at least 31 breeds or distinct groups of local chicken (Nataamijaya 2003). At least four breeds of chicken i.e., *Kukuak Balenggek*, *Pelung*, *Gaga*, and *Bekisar* are known as ornamental chickens because of their voice. *Kukuak Balenggek* chicken (KBC) is unique because it produces a melodious sound like a crow, has syllabic diversity, each portion of the call can be composed with different pitches and vocalizations. This chicken deserves to be conserved and developed as indigenous germplasm (Arlina et al. 2014).

KBC is one of the national genetic resources in Indonesia (Indonesia Ministry of Agriculture, 2011). This chicken is well-known as song fowl, which has a high economic commodity for Minangkabau peoples (Rusfidra and Arlina 2014). KBC is a local Indonesian chicken originating from Payung Sekaki Subdistrict (Tigo Lurah), Solok Regency, West Sumatra Province. The Indonesian Ministry of Agriculture issued Decree number 2919 / Kpts / OT.140 / 6/2011 concerning the determination of KBC strain that (this chicken needs to be developed and

preserved as germplasm wealth to improve the welfare of the local community and the nation (Arlina 2015).

Based on its type there are two types of sounds in poultry, namely song (singing voice) and call (voice call). Song sound type is a sound type as a statement of the territory (territory declare) and as an attraction to attract female poultry to be married. KBC crowing sounds have a beauty that causes interest among the people particularly for the people of West Sumatra. This is evidenced by the frequent society to put on KBC voice contest every year.

KBC has quite high potential in terms of unique crowing and *balenggek* sounds. Its economic value is largely determined by the number of crowing, the type of crowing and the success to win the contest. The more the number of crowing *lenggek* and has a unique crowing sound, the more expensive the KBC price. Similarly, KBC that won the contest has a high selling price. However, at this time, the existence of various types of KBC voices continues to decline. Even at this time one of the various types of KBC sounds is rarely heard (rare). KBC which has a rare type of voice will be an added value during the contest, the scarcity of sound types is one of the points to win the KBC contest. The rarer the KBC type of sound will add the KBC selling value.

## MATERIALS AND METHODS

The total of 180 adult roosters KBC used in this study obtained from 32 respondents who were members of the association of *Kukuak Balenggek* Chicken Lovers. The members of this group live spread throughout the western Sumatra region. This study used a survey method by observing adult male KBC in the Association of *Kukuak Balenggek* chicken Lovers in West Sumatra. Data collection is done by recording the sound in the morning and directly observing the type of sound.

The variables measured in this study were: (i) Number of crowing. Calculation of crow's crowing is based on the number of syllables subtracted by three points (Rusfidra et al. 2014). (ii) The number of crowing syllables. The number of crowing syllables is the crowing sounds that group together in a tight sound group, and among syllables, there is clear fragmentation. (iii) The duration of crowing. Crowing duration is the time needed in a crowing period (iv) Crowing sound type.

Based on public opinion through the results of interviews with Mr. Nardi Sumadi as observers of KBC in central areas, as mentioned by Prasetyo et al. (2014), there are seven types of *Kukuak Balenggek* chicken sound types, as follows: (i) *Ginyang*: a sound of crowing unstable, changing, and irregular is a combination of two or more sounds that give a cheerful impression so that people who hear it can laugh, (ii) *Rantak Gumarang*: a clear sound with the same intonation and a clear beat, such as the sound of horses rushing to reach the finish with regular distance, (iii) *Gayuang luluah*: long strains of sound touched the heart with a very clear boundary between the bars, (iv) *Sigegek angin*: the sound of the trembling voice was restrained with the sound of the restrained sound and limped like a propeller in the holding back strong winds, (v) *Riak ilia aia*: strains of sound such as the flow of river water from high to low distances, the pitch of the sound from high to low notes to the final limit, (vi) *Alang babega*: the sound of the groove can be heard clearly and can be heard from a distance, (vii) *Ginyang mataci*: the sound issued is like being directed down (rhythmically).

The research data were analyzed using descriptive statistics by calculating the mean, standard deviation (Kurnianto 2009) *Kukuak Balenggek* chicken software. *Kukuak Balenggek* chicken crowing sounds are recorded using a zoom h2n audio recorder. The computer program

used in Cool Record Edit Pro, this software can be used in the sound analysis (sound visualization), printing (sound printing), sound illustration (spectrogram), sound waveforms (waveform), time measurement, and frequency of crowing sounds

## RESULTS AND DISCUSSION

### *Kukuak Balenggek* chicken sound type

There are seven types of sound types of KBC crowing, namely *Rantak Gumarang*, *Sigegek Angin*, *Alang Babega*, *Riak Iliia Aia*, *Ginyang*, *Ginyang Mataci*, and *Gayuang Luluah* (Prasetyo et al. 2014). The name and type of the KBC sound are based on public opinion in the central area in accordance with natural conditions. The number and percentage of KBC based on the type of sound in the association of *Kukuak Balenggek* Chicken in West Sumatra can be seen in Table 1.

The results show that the dominant type of *Kukuak Balenggek* sound type was *Rantak Gumarang* 37.78%. This is caused by the KBC descendants in this association, mostly from the *Kukuak Balenggek* chicken sound type of *Rantak Gumarang*. This is caused by the origins of the KBC in this Association, mostly from the *Kukuak Balenggek* sound type were *Rantak Gumarang* type. Bird song like human speech is a learn vocal behavior that requires auditory feedback to compare their own vocalization with an internal model of a target song (Solis et al. 2000) while the least sound type was *Ginyang* sound type.

**Table 1.** Number of *Kukuak Balenggek* chicken based on the sound type maintained in the association of *Kukuak Balenggek* chicken lovers in West Sumatra, Indonesia

Type of crowing sound	Crowing number	Frequency (%)
Rantak gumarang	68	37.78
Sigegek angin	48	26.67
Alang babega	14	7.78
Riak ilia aia	24	13.33
Ginyang	6	3.33
Ginyang mataci	10	5.56
Gayuang luluah	10	5.56
Total	180	100

**Table 2.** Mean, deviation standard of KBC song Performa that raised by the Association of *Kukuak Balenggek* Chicken Lovers based on the type of KBC crowing

Sound type	Mean ± Standard deviation		
	Number of crowing	Number syllables	Crowing duration (second)
Rantak gumarang	5.78 ± 2.09	8.78 ± 2.09	2.87 ± 0.45
Sigegek angin	9.48 ± 3.58	12.48 ± 3.58	2.91 ± 0.48
Alang babega	5.36 ± 1.45	8.36 ± 1.45	2.95 ± 0.55
Riak ilia aia	5.42 ± 2.19	8.42 ± 2.19	3.02 ± 0.46
Ginyang	7.50 ± 2.43	10.50 ± 2.43	3.23 ± 0.91
Ginyang mataci	8.00 ± 1.41	11.00 ± 1.41	3.03 ± 0.32
Gayuang luluah	3.30 ± 1.06	6.30 ± 1.06	3.33 ± 0.28

The average and the standard deviation of *Kukuak Balenggek* chicken performance crowing that maintained in the association of *Kukuak Balenggek* Chicken Lovers in West Sumatra based on the sound type can be seen in (Table 2). The different types of *Kukuak Balenggek* chicken sound have a different number of crowing, number of crowing syllables, and crowing duration. Based on the results, the highest number of crow was *sigegek angin* sound type ( $9.48 \pm 3.58$  crows). *Sigegek Angin* crowing sound type has a fast beat. The distance between syllables and syllable volume is very tight, so the number of syllables produced can reach 24 syllables. The type of sound that has the lowest average number of crowing was the *gayuang luluah* type ( $3.30 \pm 1.06$  crows). This is because the type of sound *gayuang luluah* has a long sound, even in one syllable kokok, can reach 1.75 seconds.

Comparing to the previous studies by Prasetyo (2014) and Rohman (2016). The amount of KBC crowing for the type of *gumarang*, *sigegek angina*, *alang babega*, *riak ilian aia*, *ginyang* and *ginyang mak taci* are higher. Whereas the sound type of *gayuang luluah* was not found from previous studies. Rohman (2016) stated that the number of KBC crowing ranged from 2-7 (4.28) crows, while Rusfidra et al. (2014) stated that the number of KBC crowing ranged from 3-9 (5.07) crows and Prasetyo (2014) states that the number of KBC crowing in the Kinantan Bagombak Farmer Group ranges from 2-14 (4.07) crows.

Likewise, the highest number of crowing syllables in a sound type is *sigegek angin* ( $12.48 \pm 3.58$ ), whereas the *gayuang luluah* type has the lowest number of crowing syllables ( $6.30 \pm 1.06$ ). This is because the number of syllable *kokok* is calculated based on the number of *kenggek* crowing plus the initial three crowing syllables. The number of crowing syllables in the results of this study is higher than that of Rohman (2016), Rusfidra and Arlina (2015). Rohman (2016) states the number of KBC crowing syllables ranges from 5-10 syllable *kokok* with an average of 7.29 crowed syllables, while Rusfidra (2015) states the number of KBC crowing syllables ranges from 5-11 syllables with an average of 8.07 syllables crowing and

Prasetyo (2014) states the number of KBC crowing syllables in the Kinantan Bagombak Farmers Group ranges from 5-17 crowing syllables with an average of 7.07 crowing syllables.

The diversity of the KBC sound is caused by several factors, namely genetic factors, environmental factors, maintenance systems, and disease control. The West Sumatra KBC Lover Association has conducted a targeted selection and marriage system that caused the high rate of KBC kokok syllables. Selection is intended to increase the number of crowing and crowing syllables. Besides that, breeders who are members of the association always hold joint exercises every week to train and improve sound performance. Marler and Doupe (2000) stated that the birds singing nature is a cultural inheritance practice. Breeders also provide vitamins, additional food in the form of tomatoes, honey, ginger, eggs to increase KBC stamina.

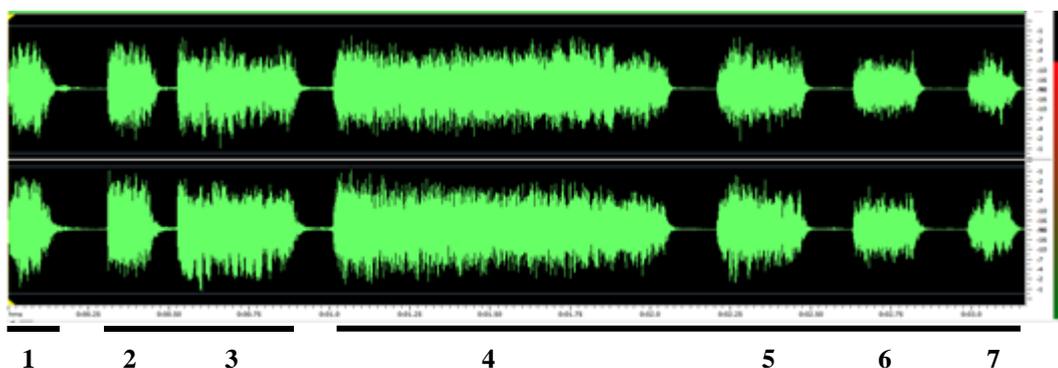
Although the *sigegek angin* sound type has a high number of crowing and crowing syllables, the duration of crowing is lower than the sound type of *gayuang luluah*, Where the average duration of the crowing of *sigegek angin* was  $2.91 \pm 0.48$  second whereas *gayuang luluah* was  $3.33 \pm 0.28$  second.

#### Analysis of *Kukuak Balenggek* chicken sound type

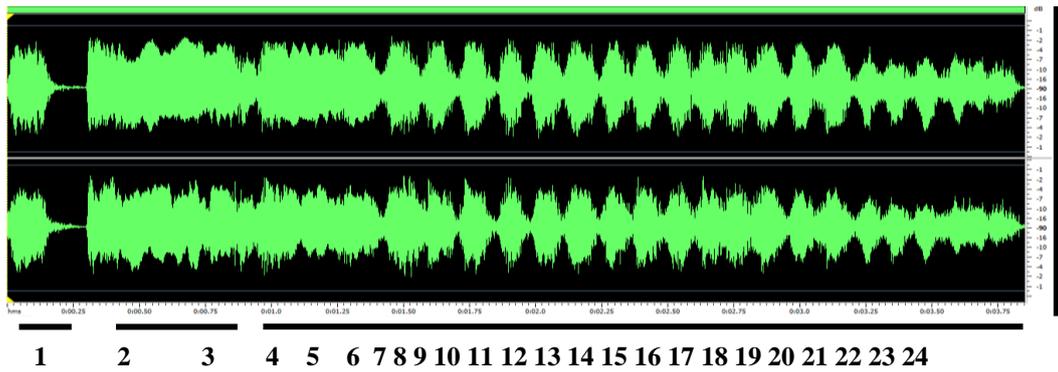
Based on the results, the type of KBC crowing form a waveform pattern. The visualizations of each sound type are presented below:

##### *Rantak Gumarang* sound type

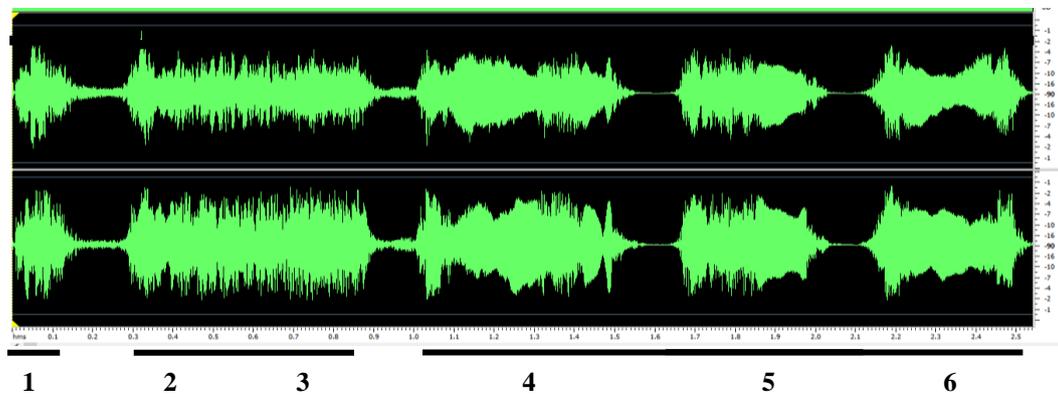
A clear sound with the same intonation and a clear beat like the palm of a horse racing to reach the finish with regular distance. The details on the waveform pattern of *Rantak Gumarang* type can be seen in Figure 1. According to the visualization, the KBC crowing sound has seven-syllable crowing and four crowing numbers with a crowing duration of 3.16 seconds (Figure 1). This indicates the number of crowing and the number of crowing syllables is lower.



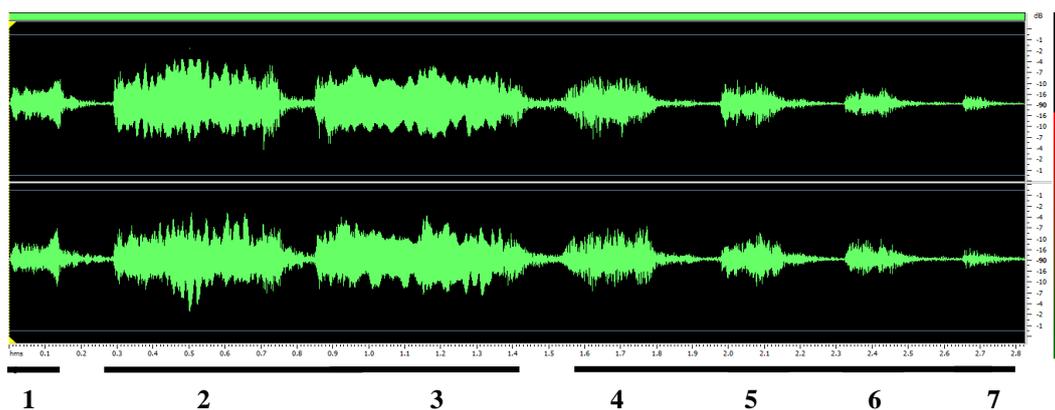
**Figure 1.** Waveform pattern of KBC with *Rantak Gumarang* sound type. 1. front crow, 2-3. middle cro, 4-7. back crow. Crowing syllable: 7; Crowing number: 4



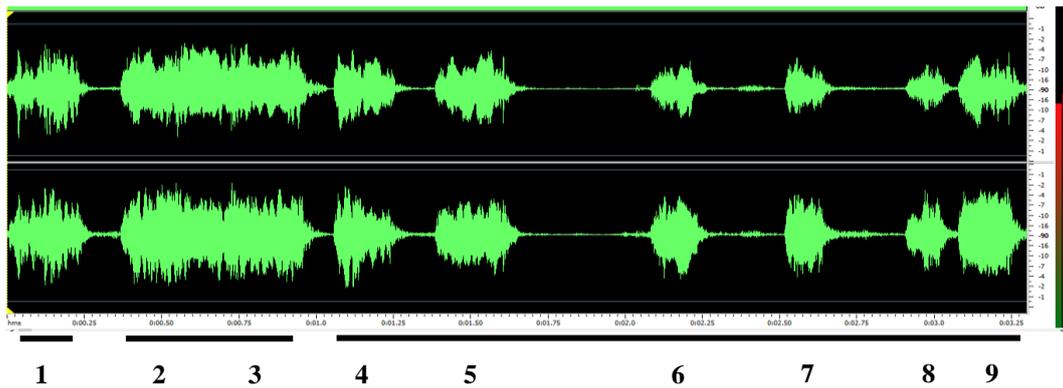
**Figure 2.** Wave form pattern of *Sigegek Angin* sound type. 1. First crow, 2-3. Middle crow, 4-24. Front crow. Syllable number: 24; Crowing number: 21, *Alang Babega* sound type



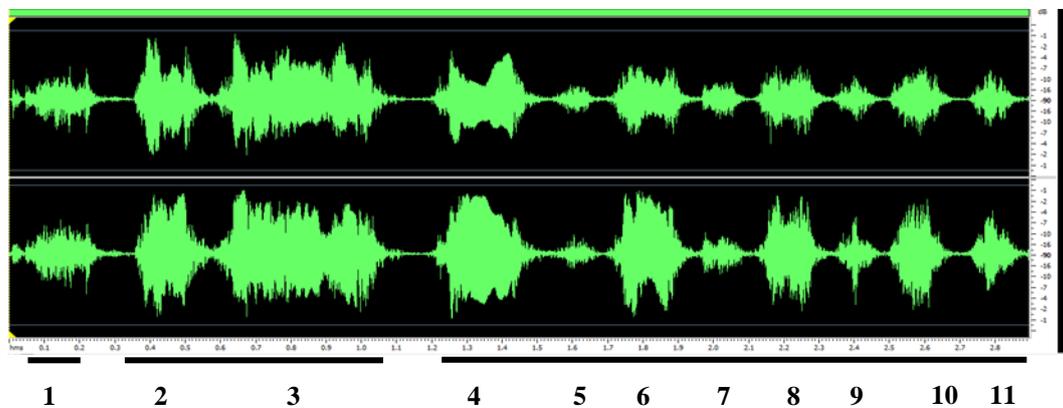
**Figure 3.** Waveform pattern on *Alang Babega* sound type. 1. First crow, 2-3. Middle crow, 4-6. Front crow. Syllable number: 6; Crowing number: 3



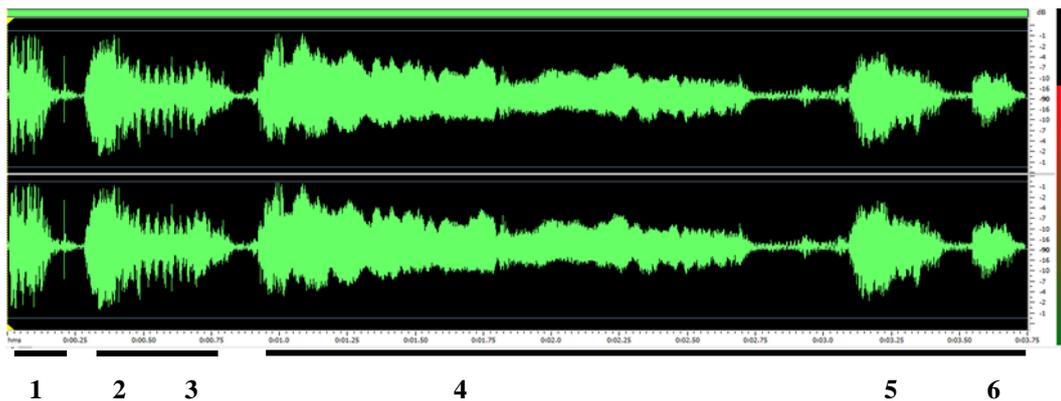
**Figure 4.** Waveform pattern of *Riak Iliia Aia* sound type. 1. First crow, 2-3. Middle crow, 4-7. Front crow. Syllables number: 7; Crowing number: 4



**Figure 5.** Waveform pattern of *Ginyang* sound type. 1. First crow; 2-3. middle crow; 4-9. Front crow. Syllable number: 9; Crow number: 6



**Figure 6.** Waveform pattern of *Ginyang Mataci* sound type. 1. First crow, 2-3. Middle crow, 4-11. Front crow. Syllable number: 11; Crow number: 8



**Figure 7.** Waveform pattern of *Gayuang Luluh* sound type. 1. First crow, 2-3. Middle crow, 4-6. Font crow. Syllable number: 6; crowing number: 3

*Sigegek angin sound type*

The sound of the trembling voice was quickly muffled like a propeller in the wind. The details on the Sigegek Angin sound type waveform patterns can be seen in Figure 2. The visualization of KBC crowing sounds has 24 crowing syllables and 21 crowing number, with a crowing

duration of 3.85 seconds. In the waveform pattern, we can see that from the fourth syllable to the last syllable. Furthermore, there is a sound beat with a distance so close and tight. The sound type of *sigegek angin* is very fast, vibrates restrained like a propeller hit by strong winds.

*Alang babega* is the type of sound inherited from his ancestors, namely red jungle fowl, which the crowing sounds like the eagles sound, a thin but sharp and shrill voice so that it can be heard in the long distance. The *Alang Babega* sound type patterns can be seen in Figure 3. The visualization of the sound of the KBC has six crowing syllables and three crowings number with a crowing duration of 2.54 seconds (Figure 3). KBC with the type of sound *alang babega* has a shorter crowing duration when compared to Pelung and Gaga chicken. The average duration of the crowing of Gaga chicken was 30.83 seconds for long *dangdut* sound type, short class 4.20 seconds, and slow type 93.68 seconds (Bugiwati and Ashari 2013). The difference in the crowing duration of several types of chickens is influenced by several factors, namely genetic, how to care, care, health conditions, and the type of feed provided.

#### Riak Ilia Aia sound type

This sound type is like the sound of the river flows from a higher level to lower level. In other words, the *Kukuak Balenggek* chicken basic tone with the type of *riak ilia aia's* sound from high notes to low notes until the final limit. For more details, the form wave type of the *riak ilia aia* sound can be seen in (Figure 4). Based on the waveform pattern of each crow, syllable looks a pattern from long tones to short tones. So that if you listen to the sound of the *Kukuak Balenggek* chicken with *riak ilia aia* sound type from the 4th syllable to the last syllable is heard clearly and then it seems to disappear.

#### Ginyang sound type

Based on the waveform pattern in this sound type seen from the distance of the fourth syllable to the last syllable, unstable changeable and irregular, It is a combination of two or more sounds so that the listener can laugh is a type of *ginyang* sound.

#### Ginyang Ma'taci sound type

The sound produced is like a sound that is sung in a directional (rhythmic) manner. The visualization of the KBC crowing sound shows that waveform pattern of *Ginyang Mataci* sound type has eleven-syllables crowing and eight crowing numbers with a crowing duration of 2.89 seconds (Figure 6). Based on the waveform pattern from the fourth syllable to the last syllable the tone is like going up and down in an orderly fashion so that if you listen to the sound of this KBC it is like being sung in rhythm. It makes people happy to hear this sound.

#### Gayuang Luluah sound type

Based on the type of KBC sound, *Gayuang Luluah* sound type has a longer crowing duration compared to other sound types (Figure 7). This is caused by the length of the crowing sound on each crow. The crowing starts with the first crow which is more duration than the second row and so on. This sound type has long strains of sound

that touched the heart with clear boundary between two *lenggek*.

In conclusion, the most varied types of KBC crowing sounds were maintained at the KBC Lovers Association of West Sumatra were 68 tails for the type of *Rantak Gumarang* sound with a percentage of 37.78% and the least sound type of *Ginyang* was 6 tails with a percentage of 3.33% . The highest average number of crowing and syllables based on the type of crowing KBC highest sound type is *Sigegek Angin*  $9.48 \pm 3.58$  crowing,  $12.48 \pm 3.58$  syllables. While the average duration of crowing based on the highest KBC crowing sound type is *Gayuang Luluah's* sound type with a duration of  $3.33 \pm 0.28$  second. The Cool Record Edit Pro computer program can be used to analyze the KBC crowing properly

## ACKNOWLEDGEMENTS

We sincerely thank the Directorate General of Higher Education, Ministry of Technology, Higher Education of the Republic of Indonesia, for the funding in conducting this research under the program of *Skim Penelitian Pasca Doktor* with contract no.: 051/SP2H/LT/DPRM/2019.

## REFERENCES

- Arlina F, Abbas H, Anwar S, Jamsari. 2014. Variability of external genetic characteristics of Kokok Balenggek Chicken in West Sumatera, Indonesia. *Intl J Poul Sci* 13(4): 185-190.
- Arlina F. 2015. Keragaman Fenotipe dan DNA Mikrosatelit Ayam Kokok Balenggek Untuk Strategi Awal Konservasi di Sumatera Barat. [Disertasi]. Program Pascasarjana Universitas Andalas, Padang. [Indonesian]
- Bugiwati SRA, Ashari F. 2013. Crowing sound analysis of Gaga Chicken, local chicken from South Sulawesi Indonesia. *Intl J Plant Anim Environ Sci* 3: 164-168.
- Indonesia Ministry Agriculture. 2011. SK Menteri Pertanian No: 2919/Kpts/OT.140/6/2011. About Kokok Balenggek chicken as the National Animal Genetic Resources. [Indonesian]
- Kurnianto E. 2009. Ilmu Pemuliaan Ternak. Graha Ilmu. Yogyakarta. [Indonesian]
- Marler P, Doupe AJ. 2000. Singing in the brain. *Proc Natl Acad Sci USA* 97 (7): 2965-2967.
- Nataamijaya AG. 2003. The native chicken of Indonesia. *Bull Plasma Nutfah* 6 (1): 1-6.
- Prasetyo K, Rusfidra, Arlina F. 2014. Karakteristik Suara dan Analisis Suara Kokok Ayam Kokok Balenggek di Kelompok Tani Kinantan Bagombang Ampang Kualo Kota Solok. [Hon. Thesis]. Fakultas Peternakan, Universitas Andalas, Padang. [Indonesian]
- Rohman A. 2016. Performans Suara Kokok Ayam Kokok Balenggek yang Dipelihara di UPTD BPPMT Dinas Provinsi Sumatera Barat. [Hon Thesis]. Fakultas Peternakan, Universitas Andalas, Padang. [Indonesian]
- Rusfidra YY, Tumatra NM, Abbas H, Heryandi Y, Arlina F. 2014. Characterization of number of crow and qualitative marker of kokok Balenggek Song Fowl inside a captive breeding farm in Solok Regency, West Sumatra Province, Indonesia. *Intl J Poul Sci* 13 (6): 343-346.
- Rusfidra, Arlina F. 2014. A review Kong Crower Chicken as poultry genetic resources in Indonesia. *Intl J Poul Sci* 13 (11): 665-669.
- Solis MM, Brainard MS, Hessler NH, Doupe AJ. 2000. Song selectivity and sensorimotor signal in vocal learning and production. *Proc Natl Acad Sci USA* 97 (22): 11836-11842.