野鶏,日本鶏および白色レグホーンにおける雄の鳴声の特徴

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Crowing Characteristics of Jungle Fowls, Japanese Native Breeds and White Leghorn Breed of Chicken

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Crowing of Red, Grey, Green and Ceylon Jungle Fowls, 16 breeds of Japanese native chickens and White Leghorn breed was recorded on tape and analyzed by a sound spectrography for the level of pitch, the length of duration and the number of syllable. The pitch was the highest in Grey and Ceylon Jungle Fowls and the lowest in Koeyoshi. Red and Green Jungle Fowls and Chabo had a relatively hight pitch. Duration was the longest in Totenko and longer in Tomaru and Koeyoshi. The number of syllable was 3 to 5 in the Jungle Fowls, 2 to 4 in the breeds of the Japanese native chickens, and 4 in White Leghorn breed.

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Key words : crowing, Jungle Fowl, Japanese native chicken, White Leghorn, sound spectrography

Introduction

Crowing of Japanese native chickens was first described in the two ancient literatures of Japan, Kojiki (712) and Nihonshoki (720). In these books, it was described that many gods gathered at the front of Rock Door of Cave (Amano-iwato) where the President of God (Amaterasu-ohmikami) had been in hiding, and let long crower birds of eternity (Tokoyo-no-naganakidori) crowing. The long crower birds have been thought to be old Japanese native chickens since N. Motoori, the writer of "Kojiki-den" (1798), assumed them to be chickens, although they must be different from the present "long crower" chickens (YAMAGUCHI, 1983). The crowing of chickens is expressed as ko-ke-ko-koh in Japanese, cock-a-doodle-doo in English, cocorico in French, kikeriki in German, kykapeký in Russian and ku-ku-kuh-ku in Chinese (YAMAGUCHI, 1983). Whatever sounds that are heard as crowing, all expressions consist of 4 syllables. On Red Jungle Fowl, COLLIAS and COLLIAS (1967) stated that the crowing consisted 4 syllables distinguishable by hearing. How are the pitch and the duration of crowing has not been demonstrated. The present study was done to elucidate the acoustic characteristics of the crowing such as the pitch, the duration and the syllable of sound in Jungle Fowls, Japanese native chickens and a breed of domestic chicken.

Materials and Methods

The adult male birds used are listed in Table 1. They were kept in various places where the recording was performed. The Jungle Fowls used were Red Jungle Fowl

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Table 1. Birds used for analysis of crowing

Birds[1]	Place of recording[2]
Red Jungle Fowl	Tama Zoo
Grey Jungle Fowl	TUA[#] and Tama Zoo
Green Jungle Fowl	Colombo Zoo (Sri-Lanka)
Ceylon Jungle Fowl	Wilpattu National Park (Sri-Lanka)
Onagadori (Long Tailed Fowl)	Ibaragi Prefecture
Totenko (Long Crower)	Kanagawa Prefecture
Koeyoshi (Long Crower)	Ibaragi Prefecture
Uzurao (Rampless Bantam)[3]	Kanagawa Prefecture
Tomaru (Long Crower)	Niigata Prefecture
Minohiki (Long Saddled Fowl)	Shizuoka Prefecture
Chabo (Japanese Bantam)	TUA
Gifujidori (Japanese Old Type)[3]	TUA
Koshamo (Shamo Bantam)	TUA
Ohshamo (Japanese Game)	TUA
Shokoku (Long Saddle)[3]	TUA
Hinaidori	TUA
Ukokkei (Silkie)	TUA
Kawachi-Yakko	TUA
Satsumadori (Japanese Game)[3]	TUA
Kurokashiwa	Gifu Prefecture
White Leghorn	TUA

[1] : Three birds were used in each species or breed except for Green Jungle Fowl in which one bird was used.
[2] : Two or three times for each bird
[#] : Tokyo University of Agriculture
( ) : English name listed in MITSUI and KINUGAWA (1938)
( )[3] : English name listed in KOYAMA (1983)

(*Gallus gallus spadiceus*), Grey Jungle Fowl (*Gallus sonneratti*), Green Jungle Fowl (*Gallus varius*) and Ceylon Jungle Fowl (*Gallus lafayetti*). The Japanese native chickens (*Gallus domesticus*) used were one 'special' natural monumental breed, Onagadori, and 15 natural monumental breeds of Japan. As a breed of the domestic chicken, White Leghorn breed was used. The crowing was tape-recorded two or three times for each bird and analyzed by the use of a sound spectrography (Rion SG-7, Rion Co. Ltd., Tokyo) setting a filter at 45 nm. The pitch in kilo Hertz of the second syllable which appeared to be a steady syllable, the duration of the sound in seconds, and the number of syllables on the sound spectrogram were examined.

Statistical analysis was made using Duncan's new multiple range test (DUNCAN, 1955 ; HARTER, 1969) after analysis of variance.

Results and Discussion

The results are shown in Table 2. The pitch of crowing was the highest in Grey and Ceylon Jungle Fowls and the lowest in Koeyoshi among the birds analyzed. Red

Table 2. Pitch, duration and the number of syllable of the crowing in four species of Jungle Fowl, sixteen breeds of Japanese native chicken and White Leghorn breed

Birds	Pitch (kHz)[1]	Duration (Sec.)	No. of Syllable
Red Jugle Fowl	1.15±0.03# b##	1.58±0.02 gh	4
Grey Jugle Fowl	1.44±0.03 a	1.35±0.02 h	5
Green Jungle Fowl	1.16	2.11	3
Ceylon Jungle Fowl	1.42±0.02 a	1.52±0.01 gh	3
Onagadori	0.78±0.02 e	3.29±0.21 d	*
Totenko	0.56±0.01 g	13.88±0.65 a	2
Koeyoshi	0.14±0.01 i	11.23±0.85 b	2
Uzurao	1.05±0.03 c	2.78±0.01 de	*
Tomaru	0.52±0.01 gh	11.40±0.18 b	3
Minohiki	0.86±0.05 d	2.33±0.02 efg	3
Chabo	1.17±0.01 b	1.82±0.01 fgh	3
Gifujidori	0.89±0.02 d	2.64±0.07 def	*
Koshamo	0.72±0.01 ef	2.18±0.06 efgh	2
Ohshamo	0.47±0.02 h	1.68±0.07 gh	4
Shokoku	0.67±0.01 f	5.32±0.43 c	*
Hinaidori	0.90±0.02 d	2.37±0.04 efg	*
Ukokkei	0.87±0.01 d	2.39±0.09 efg	2
Kawachi-Yakko	0.89±0.01 d	2.33±0.02 efg	4
Satsumadori	0.73±0.03 ef	1.81±0.11 fgh	*
Kurokashiwa	0.50±0.02 gh	5.80±0.01 c	*
White Leghorn	0.90±0.02 d	1.56±0.02 gh	4

[1] : Of 2nd syllable
\# : Mean±S.E.M. (n=3)
: Means followed by different letter are significantly different ($P<0.05$)
* : Not determined due to unclearness

and Grey Jungle Fowls and Chabo were similar in the level of the pitch, which was relatively high. The level of the pitch was almost the same in Minohiki, Gifujidori, Hinaidori, Ukokkei, Kawach-Yakko and White Leghorn, and also almost the same but at a lower level in Koshamo, Satsumadori, and Shokoku, and at a much lower level in Kurokashiwa, Tomaru and Ohshamo.

The duration of crowing varied among the birds from 1.35 to 13.88 seconds. But most of the birds had the duration of less than 2.5 second. A longer duration of 5-6 seconds was found in Shokoku and Kurokashiwa. In Koeyoshi, Tomaru and Totenko, a much longer duration of more than 11 seconds was found. This verifies the naming of Koeyoshi, Tomaru and Totenko as "Long Crowers". In view of the relationship between the duration and the pitch (Fig. 1), it seems likely to say that the higher pitch crower has short duration of the crowing and *vice versa*, although exceptions exist.

Pattern of the crowing are shown in Plate Figures A, B, C and D, where only typical ones possessing clear syllables are presented. The unmber of syllable varied among the Jungle Fowls and among various breeds of chicken. Three to 5 syllables were

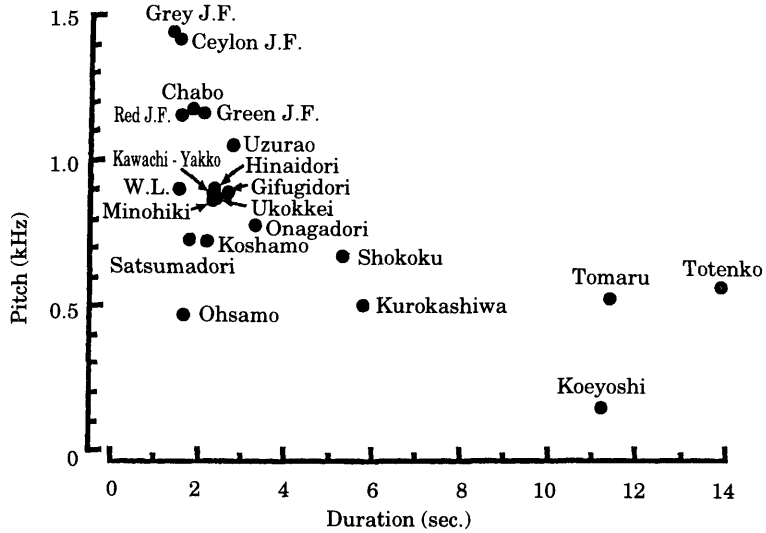


Fig. 1. Relationship between the pitch of 2nd syllable and the duration of crowing of various birds analyzed. The dots were drawn from the data listed in Table 1.
J.F. : Jungle Fowl ; W.L. : White Leghorn

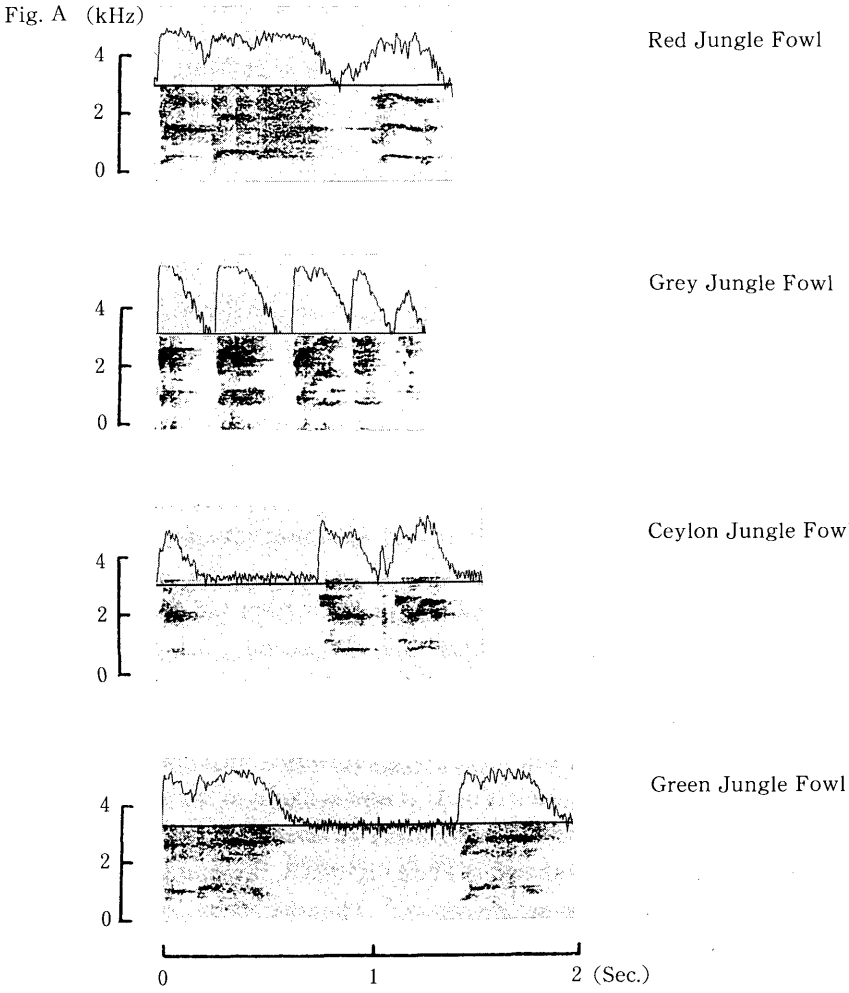


Fig. B

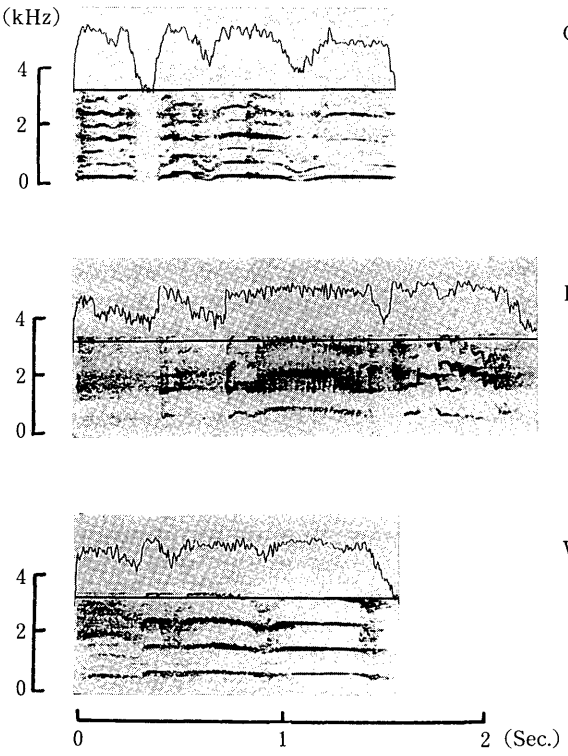
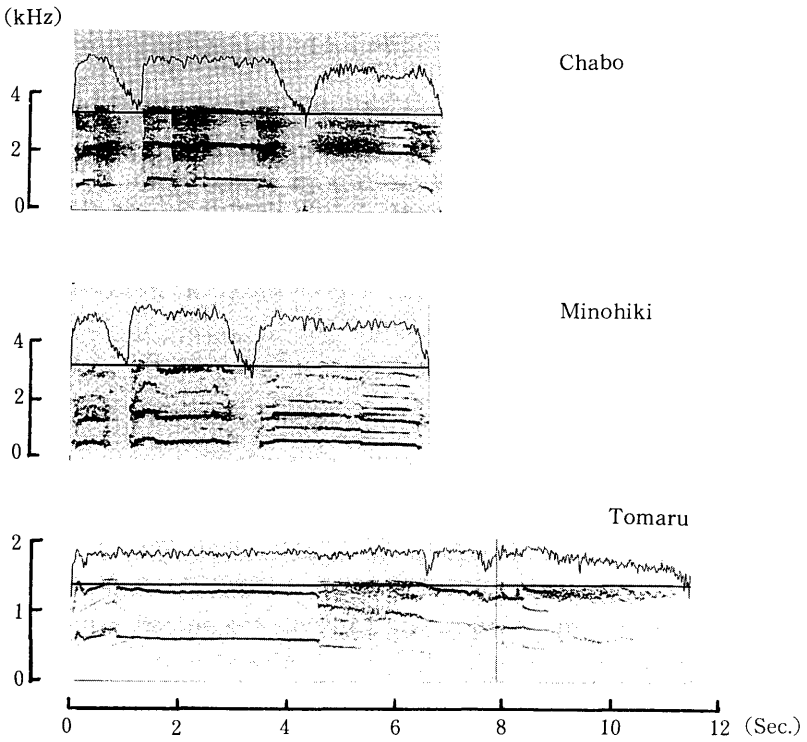

(kHz)
4
2
0
Ohshamo
Kawachi-Yakko
White Leghorn
0
1
2 (Sec.)

Fig. C


(kHz)
4
2
0
Chabo
Minohiki
Tomaru
2
1
0
0
2
4
6
8
10
12 (Sec.)

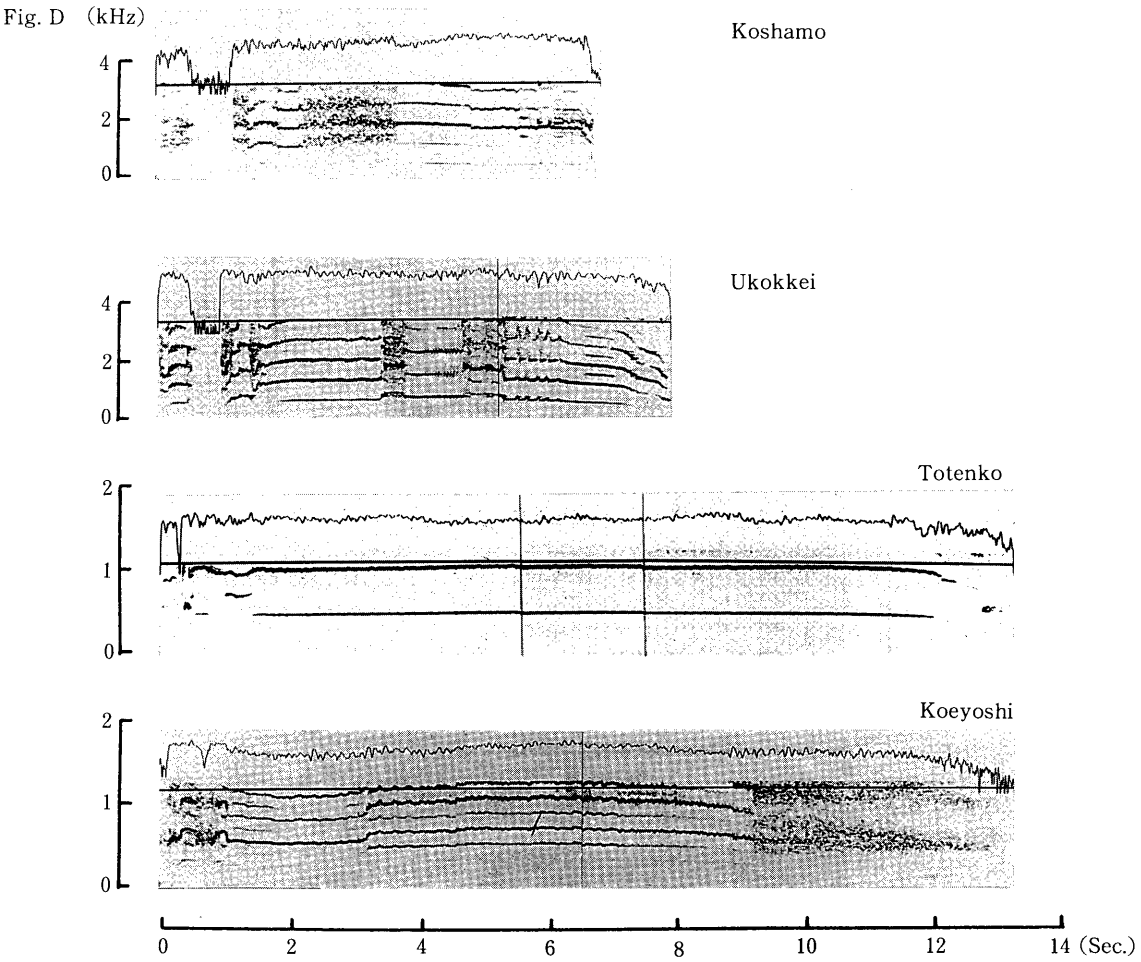


Plate Figures Sound spectrograms of the crowing of various birds. The vertical scale represents the sound frequency expressed as kilo Hertz (kHz), and the horizontal scale represents the time of duration in seconds (Sec.). The top wave shows the tone.

A : Crowing in four species of Jungle Fowl
B : Crowing consisting of 4 syllables
C : Crowing consisting of 3 syllables
D : Crowing consisting of 2 syllables

present in the crowing of Jungle Fowls, 3 in Green and Ceylon Jungle Fowls, 4 in Red Jungle Fowl and 5 in Grey Jungle Fowl. Green and Ceylon Jungle Fowls were different in the position of pause between syllables (Plate Fig. A). In Japnese native breeds of chicken, the number varied from 2 to 4 (Plate Fig. B, C and D). In Totenko and Koeyoshi, which are called "Long Crower", the second syllable lasted for an extremely long time (Plate Fig. D). In White Leghorn breed, 4 syllables were present (Plate Fig. B) resembling Red Jungle Fowl.

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References

COLLIAS, N.S. and E.C. COLLIAS (1967) A field study of Red Jungle Fowl in northern central India. Condor, **69** : 360-386.

DUNCAN, D.B. (1955) Multiple range and multiple F tests. Biometrics, **11** : 1-42.

HARTER, H.L. (1960) Critical values for Duncan's new multiple range test. Biometrics, **16** : 671-685.

KOYAMA, S. (1983) Genshoku Nihonkei (Color Illustrations of Japanese Native Chickens). Ienohikari -Kyokai. Tokyo. (in Japanese).

MITSUI, T. and Y. KINUGAWA (1938) Kakin-Zukan (Illustrations of the Domestic Fowl). Seibido, Tokyo. (in Japanese).

YAMAGUCHI, T. (1983) Niwatori (Chickens), Hosei University Press. Tokyo. (in Japanese).

野鶏，日本鶏および白色レグホーンにおける雄の鳴声の特徴

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赤色野鶏，緑襟野鶏，セイロン野鶏，日本鶏 16 品種，および白色レグホーンの鳴声を録音し，声の高さ，長さ，音節数についてサウンドスペクトログラフィーを用いて分析した。声の高さは，灰色野鶏とセイロン野鶏が最も高く，赤色野鶏，緑襟野鶏および矮鶏では比較的高く，声良鶏が最も低かった。声の長さは，東天紅鶏が最も長く，唐丸鶏および声良鶏が長かった。音節数は，野鶏では 3～5，日本鶏では 2～4，白色レグホーンでは 4 であった。

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