

SHORT COMMUNICATION

Seasonal variation of plumage color in Japanese Light-vented Bulbul *Pycnonotus sinensis orii* in the Yaeyama Group, Southern Ryukyus

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The Light-vented Bulbul *Pycnonotus sinensis* is widely distributed in East Asia. This species is divided into five subspecies (Rand & Deignan 1960). Among them, the Japanese subspecies, *P. s. orii*, was first described from Yonagunijima, the Yaeyama Group by Kuroda (1923) (Fig. 1). This subspecies was characterized by having a narrow white nape patch and a dark brown chest band (Fig. 2A, B). Later, Kuroda (1930) found another color morph with a wide white nape patch and a faint brown chest band on Ishigakijima, also in the Yaeyama Group. This he described as a new subspecies, *P. s. kobayashii* (Fig. 2C, D), however, in 1936 the same color morph was also collected from Yonagunijima (Fig. 2E, F), and subsequently the Ornithological Society of Japan (1942) regarded *P. s. kobayashii* as a junior synonym of *P. s. orii*.

Nakamura and Hanawa (1987) investigated museum specimens of *P. s. orii*, and considered that the appearance of “kobayashii” color morph might result from invasion of the Taiwanese *P. s. formosae*, which has a wide white nape patch, into the Yaeyama Group and subsequent hybridization with Japanese *P. s. orii*. It has been shown, however, that the width of the white nape patch changes seasonally in the continental subspecies *P. s. sinensis* and *P. s. hoyi*. According to Traylor (1967), and Mauersberger and Fischer (1992), the white nape patch becomes wider as a result of a partial pre-nuptial molt in spring, and becomes narrower as a result of a complete post-nuptial molt in late summer. The same might also be true of the Japanese subspecies *P. s. orii*.

The type specimens of *P. s. orii* and *P. s. kobayashii* were collected during different seasons; that of *P. s. orii* in September and that of *P. s.*

kobayashii in April. It seems plausible therefore that the two color morphs may in fact correspond to winter and summer plumage as observed in the continental subspecies. In order to investigate possible seasonal change in plumage color, I examined the plumage variation of specimens of *P. s. orii* in museum collections.

MATERIALS AND METHODS

A total of 26 adult specimens of *P. s. orii* were examined. The specimens were collected from Yonagunijima, Iriomotejima, Haterumajima, Kuroshima, and Ishigakijima in the Yaeyama Group (Fig. 1). A population established on Okinawajima in the mid 1970s was tentatively identified as *P. s. orii* by the Ornithological Society of Japan (2000), but its taxonomic status has not been confirmed yet. Therefore, I did not include Okinawajima sample in the present analyses.

The following specimens were used for the present study: 17 specimens from Yonagunijima (Kanagawa Prefectural Museum of Natural History (KMNH) 11–16; Kyoto University Museum (KUZ) 18, 25; Yamashina Institute for Ornithology (YIO) 24181, 24193, 24194, 24203, 24214, 24217, 24219, 24224, 24225); three specimens from Iriomotejima (National Science Museum (NSMT) 9046, 9058; YIO 88.0343); two specimens from Haterumajima (Okinawa Prefectural Museum (OPM) uncatalogued); three specimens from Kuroshima (NSMT A15067–A15069); and one specimen from Ishigakijima (YIO 12740).

For each specimen, two characters were examined: the width of the nape patch (NP), and the darkness of the chest band (CB). The width of the NP was classified into five categories (I–V), along a continuum from narrow (I) to wide (V). The color of the chest

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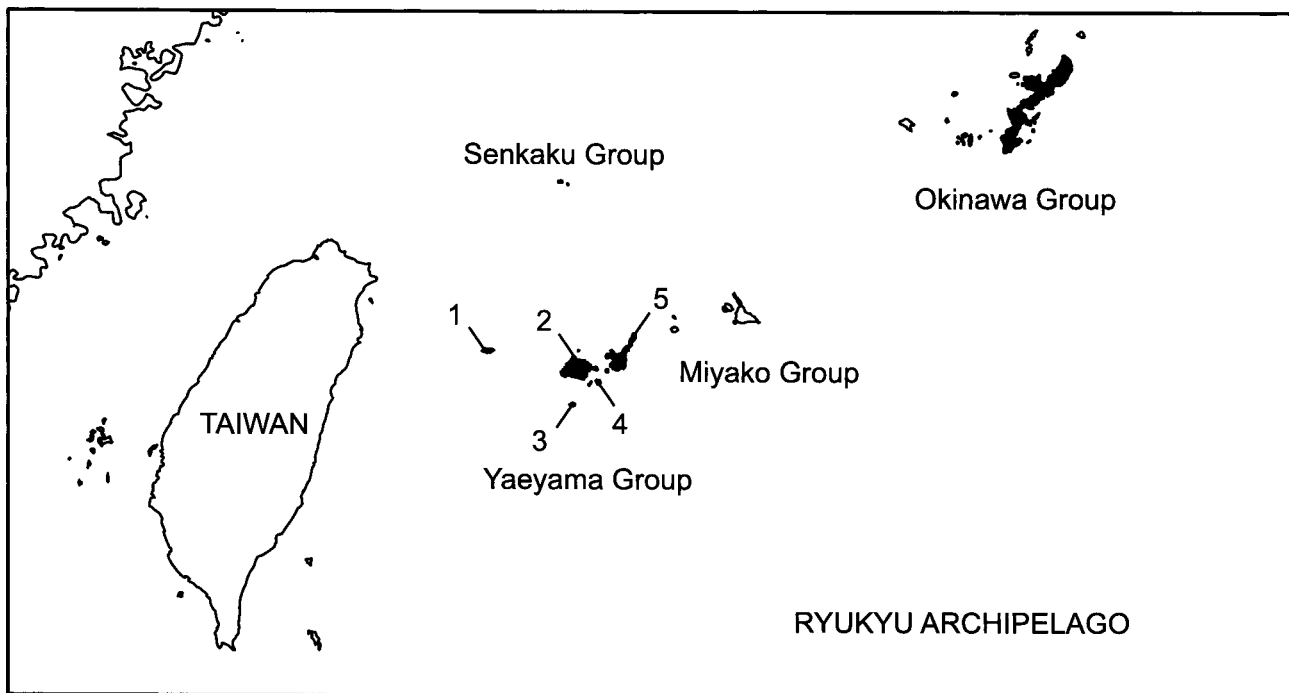


Fig. 1. The distribution of *Pycnonotus sinensis orii* (shaded islands). Localities of specimens used in the present study are: 1 Yonagunijima, 2 Iriomotejima, 3 Haterumajima, 4 Kuroshima, and 5 Ishigakijima.

band was classified as ranging from dark (I) to faint (III). Preliminary analysis of the largest sample, from Yonagunijima, revealed no significant sex-related variation in these two characters ($P > 0.05$: Mann-Whitney's U-test). Therefore, data for males and females were pooled for the analyses.

RESULTS

The width of the nape patch and the coloration of the chest band varied from II to V and from I to III, respectively. Out of the 26 specimens, five exhibited characteristics reported in the original description of *P. s. orii* (a narrow NP (I–III) in combination with a dark CB (I)), while eleven showed characteristics given in the original description of *P. s. kobayashii* (a wide NP (IV–V) in combination with a faint CB (II–III)). The remaining ten specimens had a narrow NP combined with a faint CB. I have named these three color morphs as *orii*-type, *kobayashii*-type and intermediate-type. No specimens were found to have a wide NP in combination with a dark CB. All three color morphs occurred in the western part (Yonagunijima) and in the eastern part (Iriomotejima, Haterumajima, Kuroshima, and Ishigakijima) of the Yaeyama Group. The proportions of the three color morphs did not vary significantly between these two

areas of the Yaeyama Group ($P > 0.05$: Fisher's exact test).

There was, however, seasonal variation in the numbers of the three color morphs (see Table 1). The *orii*-type was found only from September through December, while the *kobayashii*-type was found only from April through August. The intermediate-type bridged the appearance of the other types, being found only from December through June. The nape patch of the specimens collected from September through March was significantly narrower than that of specimens collected from April through August ($P < 0.01$: Mann-Whitney's U-test). The chest band became significantly fainter from September through August ($P < 0.001$: Kendall's rank correlation test).

DISCUSSIONS

The present results strongly indicate that *P. s. orii* undergoes a seasonal plumage change, just as the continental subspecies *P. s. sinensis* and *P. s. hoyi* do. It seems that two color morphs, the *orii*-type and the *kobayashii*-type, which were originally described as different subspecies by Kuroda (1923, 1930), actually correspond to winter and summer plumages.

This seasonal change in plumage color may result from molting in spring and autumn and from feather

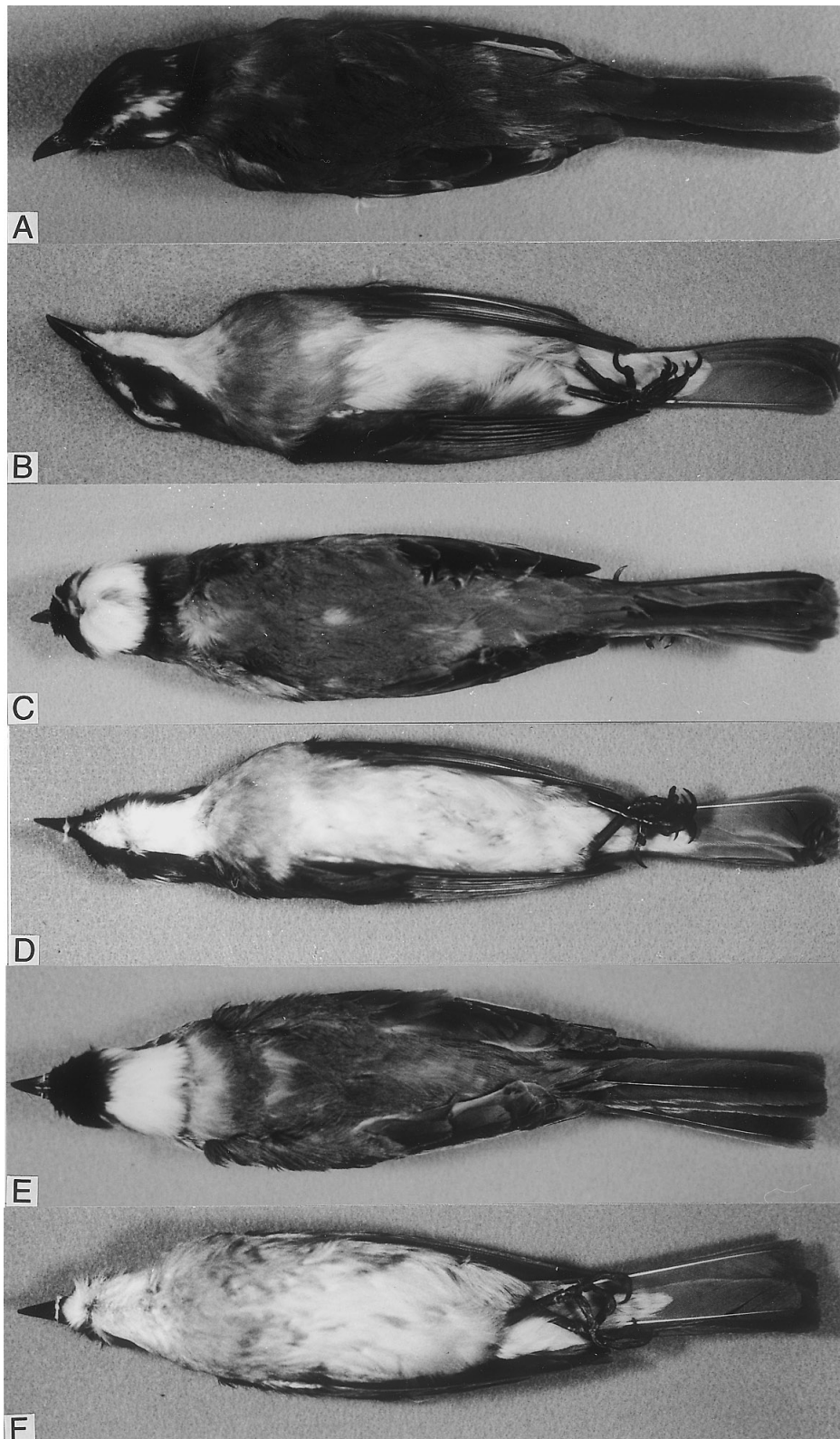


Fig. 2. Dorsal (A,C,E) and ventral (B, D, F) views of *Pycnonotus sinensis orii*. A, B: *orii*-type from Yonagunijima (KMNH 16). C,D: *kobayashii*-type from Ishigakijima (YIO 12740, holotype of *P. s. kobayashii*). E,F: *kobayashii*-type from Yonagunijima (YIO 24194).

Table 1. Seasonal changes in NP width, CB intensity, and the number of color morphs in *Pycnonotus sinensis orii*.

Month	N	NP				CB			Color morph		
		II	III	IV	V	I	II	III	<i>orii</i> -type	intermediate-type	<i>kobayashii</i> -type
September	3	1	2	0	0	3	0	0	3	0	0
December	6	0	6	0	0	2	4	0	2	4	0
March	2	1	1	0	0	0	2	0	0	2	0
April	4	0	2	2	0	0	4	0	0	2	2
June	9	1	1	5	2	0	1	8	0	2	7
August	2	0	0	1	1	0	0	2	0	0	2

wear. The color change patterns identified in the present study suggest that *P. s. orii* molts its nape feathers in spring and autumn, and its chest feathers only in autumn. The chest feathers may gradually become worn over the period from autumn to the next summer. Future direct observations of molt and feather wear will, it is hoped, confirm the present conclusion.

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