

Bonin White-eye Meguro (Jpn) *Apalopteron familiare*

Morphology and classification

Classification: Passeriformes Zosteropidae

Total length: Approximately 140mm
 Wing length: 60-72mm Tail length: 59-65mm
 Culmen length: 16-20mm Tarsus length: 23-26mm
 Weight: 13-17g measurements by the author.

Appearance:

Plumage of adult Bonin White-eyes is grayish green on the head, back, tail and wings, and bright yellow from throat to belly (Fig. 1). The bill is black and legs are grayish black. They have a white eye ring around the eye as Japanese White-eyes *Zosterops japonicus*, but they have a pattern of upside-down black triangle, hence the Japanese name "Meguro (Black eye)" (Fig. 2). There is no difference in feather color between male and female. In juveniles, however, the ventral yellow is paler and tinged with gray. The legs are shiny black. Bonin White-eyes have a longer tail and tarsus than Japanese White-eyes.



Fig. 1. An adult Bonin White-eye.



Fig. 2. Head of a Bonin White-eye. It has white eye rings as in Japanese White-eyes.

Vocalization:

The song sounds like "Chi-yo, Cho cho chorrree". It is reputed to resemble the song of Red-flanked Bluetails *Tarsiger cyanurus* (Kabaya & Matsuda 2001). This species most frequently sings just before the sunrise in the breeding season and rarely sings during the daytime (Suzuki 1993). The call note sounds like "Kyooi, kyooi" and "Chieet".

Distribution and Habitat

Distribution:

Bonin White-eyes are endemic to the Bonin Islands. It is recorded that they occurred before WWII in Mukojima and Nakodojima Islands of the Mukojima island group, Chichijima Island of the Chichijima island group and Hahajima, Mukojima, Imotojima and Meijima Islands of the Hahajima island group. At the present time, however, they are distributed only in Hahajima, Mukojima and Imotojima Islands and extinct on the other islands. The last birds were recorded in Chichijima Island 1828 (Kittlitz 1830), Nakodojima Island 1889 (Seeböhm 1890), Meijima Island 1904 (Momiyama 1930) and Mukojima Island 1930 (Yamashina 1930). There was a captive breeding record in Ueno Zoo in 1935.

Habitat:

They occur in a wide variety of habitats, such as tall wet forests, dry scrub forests, agricultural land and settlements. Since they prefer forests, they are densely distributed in tall wet forests, but sparsely in open areas (Kawakami & Higuchi 2003).

Life history

1	2	3	4	5	6	7	8	9	10	11	12
breeding season						non-breeding season					

Breeding system:

Bonin White-eyes usually breed monogamously. The major breeding period is from March to July, but they occasionally breed

twice during the breeding season. Since they are highly territorial in the breeding season, they try to exclude other individuals from intruding their territory. I observed how Bonin White-eyes destructed the nest in which a Japanese White-eye was incubating in the vicinity of their own nest by pulling out the nest materials. They are dangerous neighbors to live with. Juveniles move around in a flock in the non-breeding season. It is not uncommon that they form a mixed flock with Brown-eared Bulbuls *Hypsipetes amaurotis* and Japanese White-eyes. Adult birds, on the other hand, usually spend the non-breeding season with their mates around the breeding grounds. However, they occasionally join the flock. Bonin White-eyes sleep close together with their mates as in Japanese White-eyes (Higuchi et al. 1984).

Nest:

They build a bowl-shaped nest in the fork of the branches of low to tall trees at a height of 1-13 m above the ground. The nest trees include Rhaphiolepis, Ardisia, Calophyllum, Morus, Bischofia, Ficus and Casuarina (Morioka & Sakane 1978, Higuchi et al. 1993, Ueda et al. 1993). Bonin White-eyes do not build a hanging nest, in contrast with many white-eye species including Golden White-eyes *Cleptornis marchei* which are assumed to be closely related to Bonin White-eyes. A single case of nesting in the hollow of *Casuarina equisetifolia* was reported in the past (Kawakami & Higuchi 2002).

Egg:

The clutch size is 2-4 eggs. The egg has brown flecks on a light blue ground. The egg size is about 20 by 16 mm. The eggs are sometimes predated by Brown-eared Bulbuls.

Incubation and nestling periods:

Incubation and nestling periods are a little less than two weeks each. Both male and female incubate eggs and feed chicks. The parent birds continue feeding the fledglings for up to one month. They are overly protective of their young for a small song bird.

Feeding habits and foraging behavior

A field guide usually carries a photograph of Bonin White-eyes eating a papaya. In fact, however, their diet consists primarily of insects, such as Lepidoptera larvae (Kawakami & Higuchi 2003). It occasionally captures geckoes. It is true that Bonin White-eyes eat introduced fruits, such as papaya, ficus and mulberry, but this behavior is considered to be overrepresented because these trees grow in places where everyone can see them. The yellow plumage of this species does not come from eating too much papayas. In addition, Bonin White-eyes frequently ingest ants (Fig. 3), which is a distinguishing characteristic of this species because only a limited species of birds readily eat ants in spite of their defensive poison.



Fig. 3. Fragments of ants are frequently included in the feces of Bonin White-eyes. The photo shows mainly the head of ants (used for identification).

Bonin White-eyes feed on the ground and tree trunks as well as on branches and leaves of a tree (Kawakami & Higuchi 2003). It is assumed that this feeding behavior has evolved due to the absence of ground predatory mammals such as foxes and tree trunk users such as woodpeckers on the islands where Bonin White-eyes occur.

Topics of ecology, behavior and conservation

● How the Bonin White-eye ("Black-eye") became a white-eye?

DNA analysis suggests that Bonin White-eyes are closely related to Zosteropidae (Springer et al. 1995), and they are classified as a species of Zosteropidae in the 7th edition of Check-list of Japanese Birds. The oldest record of Bonin White-eyes was produced in 1675 by Ichizaemon Shimaya whose party explored the Ogasawara Islands and presented "five birds resembling White-eyes" to the Shogunate (Suzuki 2003). In the Meiji era, the species has been referred to as an Island White-eye or Black White-eye by the local islanders, which indicates that Bonin White-eyes were recognized as a bird of the white-eye group. It took quite a while for the taxonomic status of this species to finally settle, after it was classified such families as babblers or Pycnonotidae. It had been classified as a Meliphagidae until the 6th edition of Check-list of Japanese Birds. The classifications of Bonin White-eyes have varied with the times and field guides. You need to be careful when you cite old records.

● Bonin White-eyes do not like the sea although they live in the oceanic islands

The current distribution of Bonin White-eyes is restricted to three islands of the Ogasawara Islands (Hahajima, Mukohjima and Imotojima Islands of the Hahajima island group). Forests habitable for Bonin White-eyes remain in Hirashima, Anejima and Meijima Islands of the Hahajima island group, but Bonin White-eyes do not occur in these islands. They have never been observed even to temporarily move through others except for the three islands mentioned above. We compared the sequences of the control region of mitochondrial DNA from the blood samples taken from the birds of Hahajima, Mukohjima and Imotojima Islands. The result showed that there was almost no genetic exchange between the island populations because the populations of Hahajima and Imotojima Islands had their distinctive sequences (Fig. 4). In addition, morphology, especially a bill shape, is significantly different between the satellite islands. These DNA analysis and morphological study suggest that Bonin White-eyes do not basically move between the islands (Kawakami et al. 2008). These islands are separated from each other by only a few kilometers of the sea, but the sea seems, nevertheless, to be an insurmountable barrier for Bonin White-eyes. It is well known that moving and dispersing abilities decrease in various taxa of both animals and plants in isolated oceanic islands. Bonin White-eyes can be said to be a typical example of the island-adapted birds.

● Are Japanese White-eyes a friend or enemy?

Japanese White-eyes also occur in the Hahajima Islands. Since Japanese White-eyes are not naturally distributed in these islands, it is assumed that they are a hybrid of introduced *Z. japonicus alani* from the Iwo Islands and *Z. j. stejnegeri* from the Izu Islands (Fig. 5). At first the impact of inter-specific competition on Bonin White-eyes was concerned because Bonin White-eyes and Japa-

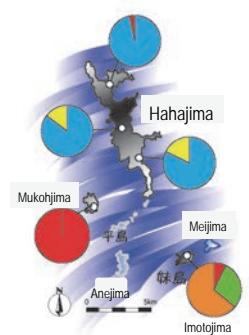


Fig. 4. Differences in base sequence between the Bonin White-eye populations of the three islands of the Hahajima island group. Color pie charts show the proportions of individuals with a different base sequence (haplotype).

nese White-eyes are similar in body size and feeding habit. In spite of the fact that Japanese White-eye population has increased, however, the population density of Bonin White-eyes has not greatly changed, which suggests the impact of competition between the two species has had little or no effect on Bonin White-eyes at population level (Kawakami & Higuchi 2003).

Bonin White-eyes are considered to function as a disperser of small seeds in the Ogasawara Islands. However, they are already extinct in the Chichijima Islands and the Mukojima Islands. It is assumed that introduced Japanese White-eyes have played the role of a seed disperser in place of extinct Bonin White-eyes on these islands (Kawakami et al. 2009).



Fig. 5. Introduced Japanese White-eye. Hybrid of *Zosterops japonicus stejnegeri* and *Z. j. alani*

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Languages of literature cited other than English: [J] in Japanese, [J+E] in Japanese with English summary.

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At last I have reached an pre-climacteric age this year. I don't know whether it is because of my age, but I have spent miserable days, breaking mirrors of two motorbikes, bumping my little finger and suffering from hay fever. At the very least, I hope my latest book "A Reckless Ornithologist Talks about Dinosaurs" (Gijutsuhyoronsha) sells well.
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