

The Predicted Distribution of Javan Munia (*Lonchura leucogastroides*) in Indonesia based of Behavior Analysis in Kalibaru, Banyuwangi, East Java

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ABSTRAK

Bondol Jawa adalah salah satu spesies yang umum ditemukan di area barat Indonesia (*Sunda land*). Spesies ini endemik Indonesia (Lombok, Bali, Jawa, dan Sumatra Selatan). Besarnya populasi, terutama saat musim panen membuat burung ini menjadi hama utama bagi pertanian. Penelitian ini bertujuan untuk menentukan sifat-sifat adaptif Bondol Jawa yang menjadi penyebab utama persebarannya yang luas dan pengaruhnya terhadap persebaran. Pengamatan dilakukan di Kalibaru, Banyuwangi, Jawa Timur, yang sebagian besar merupakan wilayah pertanian. Segala bentuk perilaku di daerah teritori (*nesting* dan berpasangan) dan daerah jelajah (tempat berkoloni dan makan) diamati secara berkala pada jangka waktu 12 bulan. Berjemur diketahui sebagai aktivitas yang dilakukan sebagian besar burung, termasuk Bondol Jawa. Bondol ini memiliki aktivitas kawin dan membangun sarang yang spesifik. Perkembangan Bondol Jawa sangat cepat. Hanya dalam 40 hari, anak akan segera menjadi burung dewasa. Bondol Jawa sangat mudah beradaptasi dengan lingkungan sekitar, termasuk penggunaan serat Sawit (*Elais guineensis*) dan sisa kertas sebagai material sarang. Terdapat sebuah kemungkinan terjadinya invasi spesies ini terhadap seluruh Pulau Sumatra. Hal ini sangat mungkin karena pembukaan lahan sawit dan pemukiman baru terus meluas hingga Aceh. Persebarannya pada ujung timur (Lombok) dapat terus terjadi hingga Pulau Nusa Tenggara, karena pendeknya jarak antara kedua pulau dan kesamaan jenis vegetasi yang dimiliki.

Kata kunci: Bondol Jawa, perilaku, dan persebaran

ABSTRACT

Javan Munia is one of the common species of birds that found in west area of Indonesia (*Sunda land*). This species is endemic to Indonesia (Lombok, Bali, Java, and South Sumatra). The large population, especially during the harvest season makes this bird became a major pest for agriculture. This research aims to determine the adaptive behaviors of Javan Munia that become major reasons of widely spreads and the influence of these factors to the distribution. Observations made in Kalibaru, Banyuwangi, East Java, which is a mostly agricultural area. Any form of behavior in the territorial area (*nesting* and courtship areas) and range area (where colonize and feed) were observed periodically in the past 12 months. Sunbathing is known as a activity that undertaken by many species of birds, including the Javan Munia. This munia has specific mating and nest construction behaviour. The development of Javan Munia is very quickly, in 40 days, child will become a new adult. Javan Munia is very easy to adapt to the surrounding environment, including the used of oil palm (*Elais guineensis*) fiber and paper receipts as nest material. There are a possibility of invasive occurrence to the entire island of Sumatra by this species. It is quite possible because of the opening of oil palm plantations and settlements continue, until Aceh. The spread possibilty to east end of distribution (Lombok) can occur up to Nusa Tenggara Island, because of short distances between the islands and similiar vegetation circumstances.

Key words : behaviour, distribution, and Javan Munia

PREFACE

Javan Munia is one of the common species of birds that found in west area of Indonesia (*sunda land*). This species is endemic to Lombok, Bali, Java, and South Sumatra. [1]. A strong suspicion that this species has spread from Java to other islands, including introduced to Singapore in 1920's. [2]. The food is combining of seeds from Poaceae familiy, especially rice (*Oryza sativa*)

and young leaves. [3]. The large population, especially during the harvest season to make this bird a major pest for agriculture . [2].

It's distribution is very fast and has the potential to become invasive species to other area. Interestingly, Javan Munia allegedly can find adaptive behavior to explore new areas without any man-made introduction. This research aims to determine the adaptive

behaviors that become major reasons of widely spreads and the influence of these factors to the distribution.

RESEARCH AREA AND METHODOLOGY

Identification and Nests Finding. Observation area in Kalibaru, Banyuwangi, East Java (8°17'42.07"S and 113°59'42.78" T) which mainly consists with agricultural land. Javan Munia has a characteristic in morphology: small size (± 10 cm), with dark brown body in the back, wings, and tail. [4]. Chest up to a white belly. Juvenile has a color similar to adult individuals, but rather pale. [1].

Nest searches conducted by exploring the edge area of rice fields, within a radius of 100 meters. Javan Munia has spherical nest with grasses construction materials, and a hole in the side. [5]. Nest searches conducted during the breeding season of Javan Munia, which is based on observation, a lot happened in February and March, so that the nest search easier by tracking parents carrying nest material. [6]. Nesting sites have been found recorded and marked for sustained observations.

Behavioral Observations. Behavioral observations made during 12 months that began at the time of mating of Javan Munia (February). The observations were made by recording all forms of behavior in territorial (nesting and courtship areas) as well as the range area (where colonies and foraging). Observations on the same locations performed by marking a favorite place for the individual and put a plastic rivet in foot. The observed behavior in the form of common and unique behaviors that performed by Javan Munia.

RESULTS AND DISCUSSION

Javan Munia has a lot of behavior in each phase of his life. Some of them have in common with other birds, but not a reason to greater success in adapting. Sunbathing is known activity undertaken by many species of birds, including the Javan Munia. It's functions are to repel ectoparasites and increase the body's vitamin D. [7].

Child care is common in birds, especially when they are in the maturation period. A Javan Munia children's unique character is always guarded by a parent, until they are adults (Table 1). This is very important because a intensive maintenance can reduce the risk of injury and death in children. This is the reason for a very intense territorial custody by the parent. [8].

Table 1. Type of activity (recorded at range area)

Type of Activity	Time	Percentage on a day
Calling	(05.00)	5%
Sunbathing	(06.00)	20%
Bribery	(07.00)	30%
Parents go to other places	(08.00)	5%
Parents back	(09.00)	10%
Parent and child go to other places	(10.00)	10%
-	(11.00)	0%
-	(12.00)	0%
-	(13.00)	0%
Parent and child back	(14.00)	5%
Bribery	(15.00)	5%
Bribery	(16.00)	5%
Bribery	(17.00)	5%

When Javan Munia entering a breeding season, they make pairs. Pair formed by selecting females to the attractive behavior of 2 or more males. The selected males with females cooperate to build a new nest or repair the nest had been abandoned in the previous breeding season. At the mid of the reconstruction process, males will perform a dance that will attract females. Furthermore, copulation events occurred.

Javan Munia generates 4-5 eggs in 1 year and almost all hatched successfully, but in some nests can be found in more than 5 eggs (figure 1). Children cared by the parent alternately until 15-17 days of age, before they finally came out of the nest and join the colony. Maturing process continues on to range/colony area (figure 2).



Figure 1. Javan Munia maturation (in territories region): eggs at the age of 12 days(A), children at the age of 3 days (after hatching) (B), children at the age of 10 days (C), and initial juvenile at the age of 17 days (D)

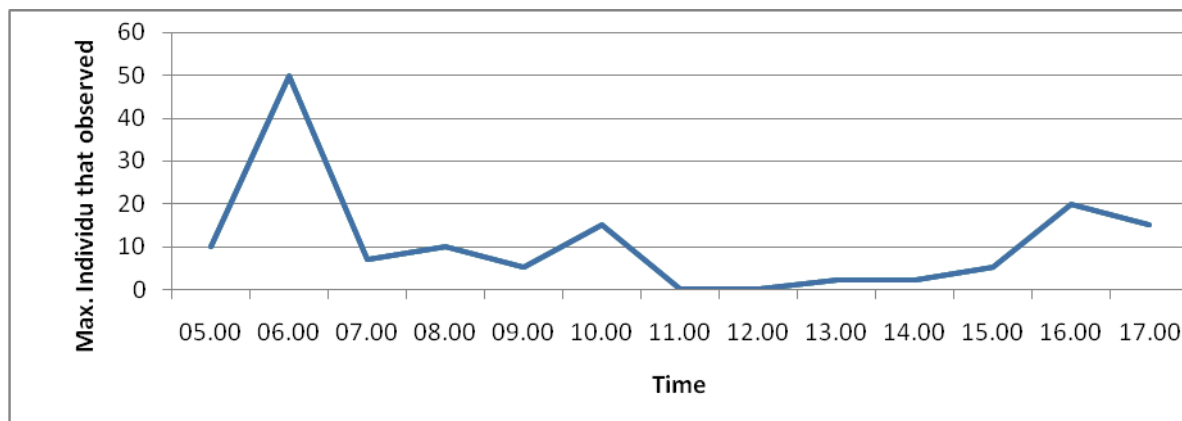


Figure 2. The activation during a day

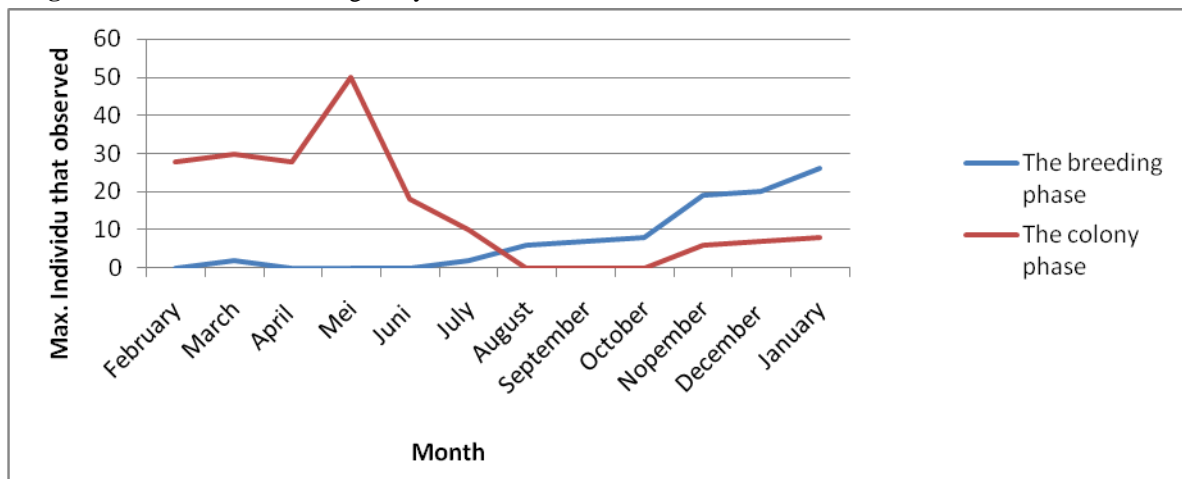


Figure 3. The activation during a year

In less than 20 days of age, the child of Javan Munia still has a yellow dash in its beak. This is a sign for the parent to facilitate bribery (Figure 1.D). After 20 days, signs began to disappear from the mouth and indicates that it does not depend anymore on the food from bribery, but have combined their food by young leaves around it. Children at 27 days has been clear in color, but the degradation is less clear. These child have been able to fly in short distances. At 32 days, the child has had a clear color, with striking degradation limit. However, it appears matted fur and still receive bribes from the mother. In this phase, the birds learn to fly with a parent at a longer distance. At 40 days, the individual is no longer receiving bribes from the parents and become a mature individual.

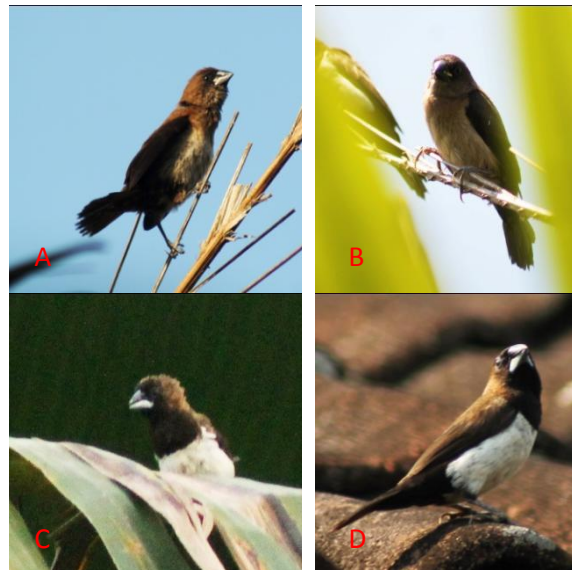


Figure 4. Maturation of the Javan Munia (Range /colony area): (A) Children at 21 days, (B) Children at 27 days, (C) Juvenile at 32 days, and (D) Adult at 40 days

The adaptive behaviour. Nest site selection is very random and not affected by the height and the type of trees, or the distance to land rice as the main food source. In addition, some findings indicate Javan Munia able to utilize urban materials as nest material, such as tissue paper.

Several findings indicate the use of palm oil fibers as nest material (Table 2). Decoy nest is a nest of deception used by some birds to outwit predators. However, it seems useless decoy nest completely for Javan Munia.

Javan Munia is very easy to adapt to the surrounding environment (Table 2). Nesting location is never specifically determined by the parent, both on agricultural land, plantations, and even residential areas. Some findings show that nest of Javan Munia using tissue paper and palm oil fiber (*Elais guineensis*) (Figure 5). The use of both urban objects is likely the result of adaptation that has done this munia. [9]. Javan Munia is never / rarely recorded visiting primary forest. [10]. Land clearing, transition of functions on agricultural land to residential is likely to support the spread of this species. Adaptive properties that are owned by Javian Munia is a process of quality child care: the parent keeping only his son, and in the process take the distance to the colony, until the maturing process over.

Table 2. Types of adaptive behavior in Javan Munia

No	Type of behavior	Adaptive properties
1	Lay the egg	4-5 in 1 year
2	Custody	Performed by one parent against the child (per family)
3	Selection of nest material	Used in a variety of widely material in habitat
4	Nest site selection	It does not depend on access to agricultural areas (including in plantations and residential areas).
5	Decoy nest building	They make decoy though not last long and there are so few



Figure 5. Adaptive response to the environment: the use of (A) tissue paper and (B) palm fiber (*Elais guineensis*) as nest material

The influence of adaptive behaviour to the distribution. There is any possible occurrence of invasive this endemic species to the entire island of Sumatra, the same as the bird began to attend the Karimun Jawa National Park and Singapore in the 1920's. [2].[3]. The occurrence of this munia in Singapore almost certainly the result of artificial introduction, where recorded the most northerly distribution only reached the South Sumatra. [11]. Although many other factors, the success in reaching the Karimun Jawa islands probably same with Javan Munia who have reached the southern tip of Sumatra island. [3]. The main issues that make it as a concern is the possibility of this species spreads overland from southern Sumatra to the north. It is quite possible that the opening of the settlements and oil palm plantations continue until Aceh (northern tip of Sumatra). [12].

The possibility of widespread of this species in the east end distribution (Lombok) can occur up to Nusa Tenggara, because the distance that can be reached in case of Karimun Jawa is ± 70 km, while the nearest distance of Lombok and Nusa Tenggara is only 18 km. It is also strongly supported by the state of the vegetation of the islands is almost the same. [13].



Figure 6. The distribution map of Javan Munia (red: distribution according Birdlife int (2012)., Including Singapore, yellow: the estimated distribution in the future)

Some of the findings need to be confirmed more carefully. One of the alleged discovery as a result of introduction is in Borneo. It is reported by Villena, which has got Javan Munia's gene data taken from Borneo, but the area was not specifically mentioned. [14].

The widespread of Javan Munia distribution also means the possibility of new pests and increase the role of competition occurring between species. Javan Munia is very well known as a pest for rice farming from South Sumatra to the Lombok. In fact, the spread of

Javan Munia follows the expansion of rice land. [2].

CONCLUSION

Javan Munia has adaptive behaviors that appear during regeneration in large and intensive child care. In addition, the Javan Munia does not depend on specific locations for nesting and specific material as nest construction. This adaptive nature has a great potential spread of this species on mainland Sumatra following the oil palm clearing and settlement, as well as the possibility of the spread of this species across the narrow straits to Nusa Tenggara.

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REFERENCES

- [1]Mackinnon, John, Karen P., dan Bas v.B. 2010. The birds in Sumatra, Java, Bali, and Borneo (including Sabah, Sarawak and Brunei Darussalam). Burung Indonesia. Bogor
- [2]Hails, Christoper. 1995. Birds of Singapore. Illustrated by Frank Jarvis. Times Edition
- [3]Susanto, Hary. 2012. Jenis Burung Taman Nasional Karimunjawa. Balai Taman Nasional Karimunjawa. Semarang
- [4]Winnasis, Swiss, Sutadi, Achmad T., and Richard N.. 2011. *Birds of Baluran National Park*. Direktorat Kawasan Konservasi dan Bina Hutan Lindung. Indonesia
- [5]Semarang Bird Web (SBW). 2009. *L. leugastroides*, *L. maja*, *L. punctulata* . [Http://bio.undip.ac.id](http://bio.undip.ac.id). Access date May 31, 2012
- [6]Winter, Maiken, Hawks, S.E., Shaffer J.A., and Johnson D.H. 2003. Guidelines for Finding Nests of Passerine Birds in Tallgrass Praire. USGS Northern Praire Wildlife Research Center. Paper 160
- [7]Cade, T.J. 1973. Sun Bathing as A Thermoregulatory Aid in Birds. The Condor 75: 106-133
- [8]Davies, N.B. 1980. The Economics of Territorial Behaviour in Birds. Ardea 68:63-74
- [9]Zoothera. 2012. Diary Observations at Malang. Bird Observer Community. Malang
- [10]Oey, Eric. 2001. A Photographic Birds of Indonesia. Periplus. Singapore
- [11]Birdlife International. 2012. Javan Munia. [Http://birdlife.org](http://birdlife.org)
- [12]Setiadi, Bambang, Kusuma D., Wisri P., I.G.A.P Mahendri, and Bess T. 2011. Peta Potensi dan Sebaran Areal Kelapa Sawit di Indonesia: Sistem Integrasi Sapi-Kelapa Sawit (SISKA). Pusat Penelitian dan Pengembangan Peternakan. Bogor
- [13]Kacial . 2011. The discovery of Javan Munia. Field diary. Bird Observer Community Kacial. Lombok
- [14]Villena, A.A., Valentin R., Pablo G.P., Raquel R., Carlos P., and Ignacio S. 2009. *Estrildinae* Finches (*Aves*, *Passeriformes*) from Africa, South Asia and Australia: a Molecular Phylogeographic Study. The Open Ornithology Journal, 2: 29-36