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First sighting of a pair of Ryukyu robin *Larvivora komadori* Temminck, 1835 (Aves, Passeriformes) during breeding season on Jeju Island, Republic of Korea: a nesting attempt?

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Abstract. The Ryukyu robin (*Larvivora komadori* Temminck, 1835) is an endemic inhabitant of the Ryukyu Archipelago, Japan. In 2018, we made several birding excursions to Jeju Island, Republic of Korea. Within the 1100 Altitude Wetland protected area on May 28 and May 30 we encountered a pair of birds, which, according to reference literature and bird guides we identified as *Larvivora komadori.* That was the first visual sighting of the Ryukyu robin during the breeding season on Jeju Island, which is separated from the nearest breeding site by more than 200 kilometers of open sea. This fact can be regarded as a potential ability for this endemic island species to spread to new islands. Possible pathways for natural introduction of the Ryukyu robin to Jeju Island are discussed in the context of human activity as a factor influencing regional biodiversity.

Key words: Ryukyu robin, Jeju Island, Hallasan National Park, regional species diversity.

Первый случай наблюдения пары рюкюйской зарянки *Larvivora komadori* Temminck, 1835 (Aves, Passeriformes) в период размножения на острове Чеджу, Республика Корея: попытка гнездования?

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Аннотация. Рюкюйская зарянка (Ryukyu robin) *Larvivora komadori* Temminck, 1835) – эндемичный обитатель архипелага Рюкю, Япония. В 2018 г. мы совершили несколько орнитологических экскурсий на о-ве Чеджу, Республика Корея. В пределах охраняемой природной территории “The 1100 Altitude Wetland Protected Area” 28 и 30 мая мы неожиданно встретили пару птиц, которых согласно справочной литературе и определителям по птицам региона и мира идентифицировали как *Larvivora komadori*. Это первое визуальное наблюдение рюкюйской зарянки во время сезона размножения на о-ве Чеджу, отделённого от ближайшего места гнездования более чем 200 километрами открытого моря. Данный факт может быть расценен как потенциальная способность этого островного эндемика к расселению на новые островные территории. Обсуждаются возможные пути естественной интродукции рюкюйской зарянки на остров Чеджу в контексте проблемы деятельности человека как фактора, влияющего на региональное биоразнообразие.

Ключевые слова: Рюкюйская зарянка (Ryukyu robin), о-в Чеджу, Национальный парк Халласан, региональное видовое разнообразие.

Introduction

The main problem in the study of regional biodiversity is concentrated now on dynamic processes in bird populations, partly caused by transformations of the natural environment by human economic activity.

In the 21st century the transformation of the natural face of the Earth by the economic activities of mankind has reached a global level (Williams 2003; Ellis 2011). For this reason global biodiversity responds in an alternative way. The “species gains and losses”

problem (Wardle et al. 2011) appeared as a result of new emerging environments that could be either favorable for specific species populations or otherwise. The most typical occasion is the transformation of the forest cover of the Earth (Williams 2003).

As a result, the scientific paradigm of regional biodiversity studies has changed radically: from the study of what is there to the study of what is changing. The era of regional biodiversity monitoring started (Moores 2016, pp. 1–16; Nazarenko et al. 2016, pp. 211–219; Check-List of Japanese Birds, 7th Revised Edition 2012, pp. 404–408). The paper touched on the problem of human activity as a factor of regional biodiversity. The studied species probably demonstrated positive population trends.

The Ryukyu robin (see cover photo), *Larvivora komadori* Temminck, 1835 (del Hoyo J. & Collar N. J. 2016, pp. 644–645) is a typical inhabitant of small marine islands within territorial waters of Japan to the south and west of the Kyushu (Check-List of Japanese Birds, 7th Revised Edition 2012, p. 322). The species, together with The Okinawa robin *Larvivora namiyei* (Stejneger 1887) is the member of the Ryukyu robin species complex, endemic to Ryukyu Archipelago. The Ryukyu robin *Larvivora komadori* occupies a small range, has a small population size and is listed as Near Threatened species under Criteria C2a(ii) (Kirwan et al. 2022a) (fig.1). Quite a sufficient bibliography is devoted to this species (Seki 2006, 2012, 2023; Seki and Ogura 2007, pp. 26–27; Kirwan et al. 2022a). The biology and ecology of this species is elaborated by Dr. Shin-Ichi Seki (2012, pp. 4–5), collaborator of Forestry and Forest Product Research Institute, Kumamoto, Japan.

Here are some significant and interesting points in recent publications (Kirwan et al. 2022a).

Ecological plasticity in habitat selection. This species inhabits habitats ranging from evergreen forests with well-developed undergrowth to shrub woods at 800 m. a. s.l., preferring localities and biotopes near small streams. It also inhabits secondary forests and groves around human residence.

Breeding season. The breeding season lasts from April to June, the main activity is observed from mid-May to mid-June.

Ecological plasticity in nest location. The nests are built in a wide variety of sites: from bases of bamboo branches and upper sides of palm leaves, in tree cavities, ledges on rocks and so on, including nest boxes.

Migrations and dispersal. The populations from the north islands Tokara and Danjo are migratory, while the populations of Okinawa Island and most of the populations of the Amami-Oshima and Tokushima islands are sedentary. Passage migrants have been recorded on Okinawa and on ships close to the latter island. Dispersal to the north (including Kyushu) and south was observed only during non-breeding time.

Ryukyu robin *Larvivora komadori* is absent in the List of Birds of Korea, and Japanese robin *Larvivora akahige* Temmink, 1835 was only reported as a rare migrant or visitor species (Moores et al. 2014; Moores et al. 2018). Nevertheless, there is no clear information about a single ♂ specimen stored at the Yamashina Institute (Japan), obtained on the Korean peninsula (N. Kawaji and H. Higuchi 1989, p. 225, Fig. 1, locality 21).

In this paper we report the first sighting of a Ryukyu robin *Larvivora komadori* pair during the breeding season on Jeju Island, Republic of Korea and discuss possible routes of its appearance on Jeju Island.

Study area and methods

The study area is the Ramsar Site No. 1893, 1100 Altitude Wetland (33°21′25″ N, 126°27′43″ E) (Ramsar. The Convention on Wetlands 2024). The site is located on Jeju Island, Republic of Korea, within the Hallasan National Park at 1100 m altitude of Halla

Fig. 1. Distribution range of Ryukyu robin *Larvivora komadori* (after Brazil 2009 and Kirwan et al. 2022a with some changes) and place of our visual observations in 2018–2019 in the Hallasan National Park, Jeju Island, Republic of Korea.
Рис. 1. Распространение рюкюйской зарянки Ryukyu robin *Larvivora komadori* (по Brazil 2009 и Kirwan et al. 2022a с некоторыми изменениями) и местоположение наших наблюдений в 2018–2019 гг. в национальном парке Халласан, о-в Чеджу, Республика Корея.

Mountain (Hallasan), near the road 1139 connecting two towns: Jeju-si and Seogwipo-si through the west base of Hallasan (fig. 2). This mountain wetland with many pools and marshes is part of a UNESCO world heritage site, as well as a biosphere nature reserve (fig. 3). The locally low gradient promotes water recharge and storage that supports a number of animal populations only found on Jeju Island. Visitation to the site is managed by the Mt. Halla Visitor Centre. Walkways are built in the wetlands allowing visitors to move around. Due to the overlapping management, the site is managed as a World Heritage Site, a Man and the Biosphere Site, and a Ramsar Site.

There has been almost no human interruption by land use, as the area is nationally and publicly owned. However, this area was partially disturbed in previous years, as livestock grazing was allowed, which led to a partial succession of vegetation. The road 1139 was constructed in the surrounding area, and visiting decks were installed within the wetland, separating some of the vegetation.

For our field observations we used 10x42 binoculars, Hawke Nature Trek Waterproof, Sony IC Cassette recorder TCM-IC100 with microphone MKE600 (fig. 3), Sennheiser.

Fig. 2. Panoramic view of the Protected Area 1100 Altitude Wetland and the trail, demonstrating a variety of environmental conditions. Photo by M. V. Pavlenko.
Рис. 2. Панорамный вид охраняемой природной территории ”1100 Altitude Wetland” и экскурсионная тропа, демонстрирующие разнообразие природных условий. Фото М. В. Павленко.

Pictures were obtained using a CanonPowerShot Sx200 IS camera, and a smartphone Samsung Galaxy A50. To identify the birds, we played recordings of songs and calls from xeno-canto.org (Ishida 2014; Boesman 2015; Kirwan 2018).

Results and discussion

In late May of 2018, during a private visit on Jeju Island, we took quite a number of ornithological excursions into various parts of this island. One of those sites was The 1100 Altitude Wetland Protection Area.

Visitors move around this protected area via a trail (the visiting way), a wooden walkway on stilts with required handrails, elevated above surface from 1.0 to 1.5 meters. It extends for about two kilometers, and crosses both wetlands and thickets and edges of forest. Patches of low conifer (pine) trees are scattered everywhere within broad-leaved forest, including at the visiting way. Dwarfish bamboo thickets are present throughout (*Sasa quelpaertensis* Nakai).

This small territory represents a combination of a vast and lengthy horizontal stony wet plot on the site of a former lake or stream encircled by low tree thickets (fig. 2–4).

We visited this area on May 28, when the weather was foggy and cool, and on Sunday, May 30, when the day was mild and sunny. There were many visitors on the visiting decks. We walked along these trekking routes at about midday for two hours on the first

Fig. 3. Alexander Nazarenko with equipment at the beginning of the excursion trail in the protected area 1100 Altitude Wetland. Photo by M. V. Pavlenko.
Рис. 3. Александр Назаренко с оборудованием для наблюдения в начале экскурсионной тропы охраняемой природной территории ”1100 Altitude Wetland”. Фото М. В. Павленко.

Fig. 4. The site of direct visual observation of Ryukyu robins on May 30, 2018 within the Protected Area 1100 Altitude Wetland. Photo by M. V. Pavlenko.
Рис. 4. Место непосредственного визуального обнаружения рюкюйских зарянок 30 мая 2018 г., в пределах охраняемой природной территории “1100 Altitude Wetland”. Фото М. В. Павленко.

day and four hours on the second day. This allowed us to get acquainted with the local bird community. It was obviously dominated by the loudly-voiced Japanese bush warbler *Cettia*, now *Horornis diphone cantans* Temm. et Schleg., 1847 (del Hoyo, Collar 2016, pp. 494–495). Naturally, we heard the voice of the lesser cuckoo *Cucculus poliocephalus* (Latham, 1790), its brood parasite. Furthermore, in the central part of the visiting way, after playing a Japanese bush warbler song we heard the rhythmical sounds of some other bird.

On this part of the trail, Marina Pavlenko suddenly saw a small orange colored bird on May 28. It flew out from bamboo, crouched on a branch, shook its tail, then unfolded her tail feathers, and immediately dived into the bush, but without any sound.

Almost at this section on May 30, an orange bird flew out from under the bridge (fig. 4), literally from under the legs of Alexander Nazarenko, and set down near the ground, so that the back part of its body was covered with the tree trunk. From above at a distance of 6–7 meters, the bird was seen distinctly in the binoculars. It was lit up with sun and represented a spectacular sight: the upper part of its head and back was orange, a large jet black patch on forehead, throat and breast, and a shiny black bill.

After a minute another bird, presumably female, flew out from under the bridge, and together they flew into the bamboo, instantly hiding in the thickets. And, as in the first case, the birds did not make any sound! It could have been possible that there was a nest under the bridge (see: Seki 2012, p. 4), but we did not dare to break the rules for staying on the territory of Wetland Protection Areas.

It should be noted that birds within the Wetland Protected Area are very trusting. Probably, the constant presence of people on the visiting way made the birds on those sites less fearful. After clarification of the reference literature (Brazil 2009, pp. 414–415) it became obvious that they were the Ryukyu robin. At present its scientific name is *Larvivora komadori* Temmink, 1835 (del Hoyo, Collar 2016, pp. 644–645). What are the known features of the external appearance of the Ryukyu robin which allowed us to conclude that we visually observed this species? According to the field identification guide (Kirwan et al. 2022a), birds of this species are bright and attractive. Males have bright orange upperparts, a black face, throat, breast, and flanks, and otherwise whitish-gray under parts. Females are duller orange above, and have grayish-brown underparts with some whitish scaling (fig. 5A). They are easy to identify by comparing with a similar species, Japanese robin (*Larvivora akahige*) (Kirwan et al. 2022b) that has a much duller buffy upperparts and an orange throat in both sexes (fig. 5B). In comparison with formerly conspecific Okinawa robin (*Larvivora namiyei*) (Kirwan et al. 2022b), the male Okinawa robin exhibits a rufous (not black!) forehead, more gray underparts (not white with black blotches on the flanks (fig. 5C). So, this comparison gave a reason to believe that we in fact observed the birds of this species, the Ryukyu robin on May, 30, 2018 during our excursion at The 1100 Altitude Wetland Protection Area.

This case as we proposed was the first visual observation of a pair of Ryukyu robins during the breeding period on Jeju Island. The pair of birds we observed clearly demonstrated some elements of nesting behavior. The birds stayed in the thickets near the ground, one of them fluttered out from under the wooden platform, where there might have been a nest; they flew away together as a pair from the place of our observation and did not show vocal activity. Thus, there is a reason to believe that *Larvivora komadori* is a new species for the Republic of Korea, and is not only an accidental visitor, but may be attempting to breed on Jeju Island. Previously this species was not found on Jeju Island, including in the 1100 Altitude Wetland territory where long-term (2009–2018) studies of the avifauna were carried out. The list of birds recorded for this small protected area

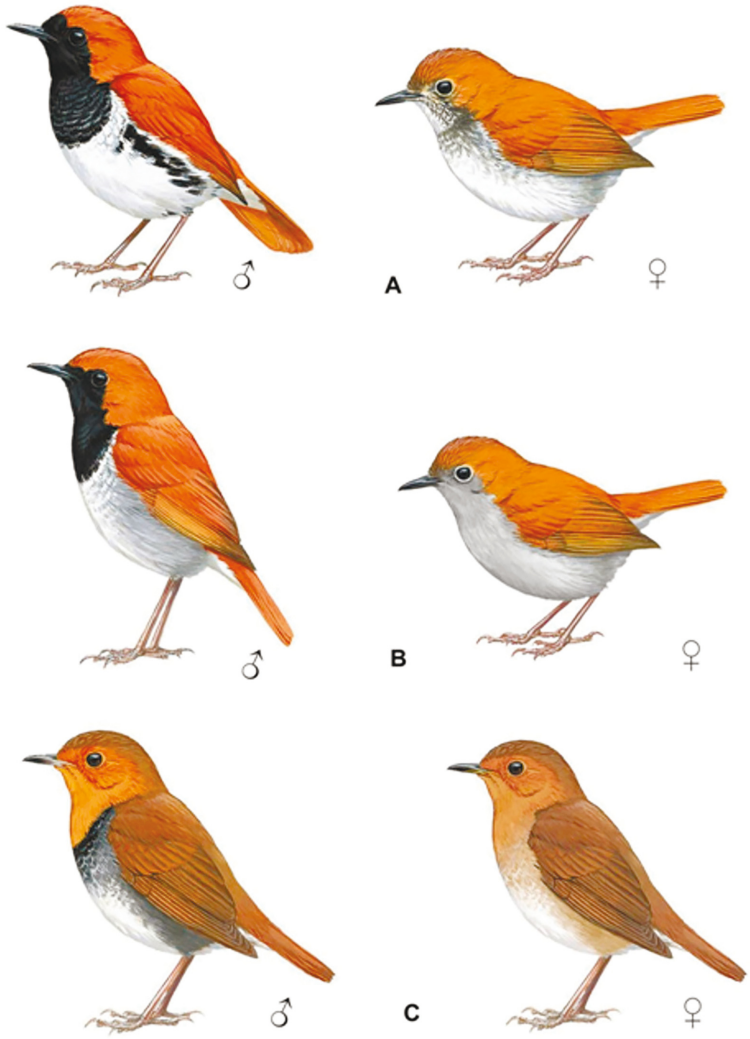

Fig. 5. External appearance of three species of the genus *Larvivora*, showing each species' plumage coloration features. A: Ryukyu robin *Larvivora komadori;* B: Okinawa robin *Larvivora namiyei;* C: Japanese robin *Larvivora akahige.* After Hilary Burn, illustrations from open sources.

Рис. 5. Внешний облик трех видов рода *Larvivora* с характерными для каждого вида особенностями окраски оперения: A – рюкюйская зарянка *Larvivora komadori;* B – окинавская зарянка *Larvivora namiyei;* C – японская зарянка *Larvivora akahige.* Иллюстрации Хилари Бёрн (Hilary Burn) из открытых источников.

includes 47 species, including varied tit *Sittiparus varius,* Japanese paradise flycatcher *Terpsiphone atrocaudata,* fairy pitta *Pitta nympha* (Banjade et al. 2019). Similar species, the Japanese robin *Larvivora akahige* was recorded on Jeju Island as a rare occasional species, passage migrant, summer and winter visitor (Moors et al. 2018).

Taking into account the ecological preference of this species (forest with well-developed undergrowth near the small streams and secondary forests and groves around residence) it can be proposed that The 1100 Altitude Wetland Protection Area within Hallasan National Park territory is quite suitable for this species.

The nearest breeding point of this species is located on the uninhabited Danjo Islands (Kawaji and Higuchi 1989; Seki and Ogura 2007, fig. 1, p. 22; Check-List of Japanese Birds 2012, pp. 321–322). The Danjo Islands (32°1′26.09″ N, 128°23′6.7″ E) are about 170 km from the Kyushu Island, and over 200 kilometers from the Jeju by open sea (fig.1). The population of Danjo Islands is completely migratory, the birds only spend the breeding season there, migrating to the southern islands of Ryukyu Archipelago for the winter (Seki 2006; Seki et al. 2007; Seki, Ogura 2007). And although the species as a whole does not belong to long-distance migrants (Yong et al. 2021), the natural migration potential of this population is probably significant. It should be noted that the area of East China Sea is a very important migration region on the East Asian-Austalasian migration flyway where songbird migration fronts are concentrated (Yong et al. 2015: Yong et al. 2021). It is also known that small islands are very important for passerine birds for rest after sea crossing during spring migration (Ferretti et al. 2021). According to Nial Moores (Moores 2016) there are two main migration corridors across the Yellow Sea and East China Sea into Korea and beyond: northern and southern. Since 1950 about ten species have become new breeding colonists in Korea. Some of these recent colonists are tolerant to disturbed habitats and have the core of their breeding range to the south and east of Korea, in southern China and Japan (Moores 2016).

There is intense marine traffic in this area of East China Sea (East China Sea Traffic Density Map 2024) It is known that small land birds can use sea vessels for resting during crossing the open sea as shown, for example, in Black Sea-Mediterranean Flyway where some birds of different species migrate across the Mediterranean Sea using ships as stopovers depending on weather conditions (Sarà et al. 2023).

Therefore it cannot be ruled out that birds incidentally reached the large Jeju Island during spring migration because they landed on a sea vessel sailing in that direction. For this species, there is data on observation of passage migrant birds on sea vessels in the Okinawa region (Kirwan et al. 2022a). For the more northern part of the Pacific region and Caspian Sea there are some cases of observation of small land birds on ships in the open sea (Korobov et al. 2021; Mischenko et al. 2021). In the Sea of Japan region, movement of separate individuals of some small land songbirds from the Japanese archipelago to the mainland are sometimes observed, for example a Japanese endemic Ryukyu minivet *Pericrocotus tegimae* (Moores et al. 2018), which suggests the possibility of them overcoming the vast sea area, as was proposed for the Siberian redstart (Valchuk, Irinyakov 2023).

We had an opportunity to work in the 1100 Altitude Wetland Protection Area only for two days in 2018, at midday. Morning and evening times were omitted. And that was the motive to come back to Jeju Island in 2019. We worked in the 1100 Altitude Wetland from May 25 to May 30, 2019 in the morning, one time during midday and in the evening. To our regret, we did not see the birds, albeit playing the records of song and alarm calls of this species on the evening of May 30. But one “evening” call was heard! We heard a voice similar to fragments of evening vocalization of the pale thrush *Turdus pallidus* at dusk, outside the visiting way from the other side of the road. We have not ever seen and heard any thrushes in this place during our excursions before. Although the pale thrush is listed in the list of species of this protected area (Banjade et al. 2019).

Later, a detailed audition of recordings selected by Tatiana Gamova from the website (https://xeno-canto.org/species/Larvivora-komadori) allowed us to conclude that it could be an evening call of *Larvivora komadori.*

Unfortunately, our visits to this place happened mostly during daytime, while these birds sing early in the morning at dawn and late in the evening. Calls can also be heard during the day. Songs are mainly heard during the breeding period from March to June. Calls can be heard year-round (Kirwan et al. 2022).

It should be noted that the 2019 field season on the island was rather atypical: the number of all birds, including Japanese bush warbler and warbling white-eye was lower than the previous year; the weather was more chilly and windy during our birdwatching. It is possible that that's how the abnormally dry and snowless winter of 2018–2019 manifested itself within all East-Asian regions. But it is possible that the birds might have found a more suitable location somewhere at a lower elevation.

On the other hand, it seemed unlikely to observe two occasional birds during two short random days. It is theoretically possible (see: Seki 2012) that the vast territory of Jeju Island and its present ecological diversity, including The 1100 Altitude Wetland may represent an environmental analogue to the initial environment for *komadori* population. It is desirable to continue the search for these birds within the whole Jeju Island, including lower elevations. For example, Dongbaekdongsan wetland could be a suitable place (33°31′02.12″ N, 126°42′26.88″ E) (Ramsar. The Convention on Wetlands 2024) as a unique part of biodiversity-rich Gotjawal forested area, where dominant vegetation remains evergreen throughout the year and with 78 recorded species, compared to only 47 species at the 1100 Altitude Wetland (Banjade et al. 2019). The presence of different residential and migratory birds represents these areas as suitable breeding, resting and feeding ground.

To our regret, our field plans for visiting Jeju Island in 2020 and 2021 were canceled due to the Covid-19 pandemic.

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