

Ground foraging behavior on seeds of *Mallotus japonicus* and fruits of *Cornus controversa* by the Siberian blue robin, *Larvivora cyane*, observed during the autumn migration

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Abstract

Siberian blue robin, *Larvivora cyane*, has been treated as an insectivore, which mainly forages on insects and spiders. Regarding plant prey items for this species, previously there has been only one report that a juvenile male fed on *Gamblea (Evodiopanax) innovans* fruits on the ground. Here, foraging behavior of this species on two kinds of plant prey items during the autumn migration was reported based respectively on photographs provided by a collaborative birder and on field observations by the author in the Rokko mountains, Hyogo Prefecture, Japan. In the photographs, a juvenile male fed on a seed of the Japanese mallotus, *Mallotus japonicus*, on the ground under the tree. In the field observations, a juvenile male fed on a fruit from the giant dogwood, *Cornus controversa*, under the tree. Furthermore, another juvenile male and an adult female were both observed holding a fruit in their bills. Therefore, when combined with previously reported findings of foraging on *G. innovans* fruits, five individuals of this species have been observed to forage on three kinds of plant prey items. This is one of the few documented instances of frugivory and seed consumption in this species.

Keywords: autumn migration, *Cornus controversa* fruits, foraging, *Larvivora cyane*, *Mallotus japonicus* seeds

(Received: 11 June, 2025 / Accepted: 22 October, 2025 / Published: 31 January, 2026)

INTRODUCTION

The Siberian blue robin, *Larvivora cyane* (Pallas, 1776), belongs to the family Muscicapidae of the order Passeriforme (Ornithological Society of Japan, 2024). This species breeds in north-eastern Asia, mainly Russia and Japan, and winters in southern China and South-east Asia (Reeve et al., 2015; Gassah and Ismavel, 2019; Ornithological Society of Japan, 2024). The breeding area in Japan is mainly northern Honshu and Hokkaido (Nakamura and

Nakamura, 1995). The area around Kobe city forms a temporary stopover site on the way to more northern areas during the spring migration and on the way to the south during the autumn migration (Kitano, 1999; Aoyama, 2024). This species has been treated as an insectivore (Kiyosu, 1952; Nakamura and Nakamura, 1995; Saad et al., 2012; Ivanitskii, 2017; Gassah and Ismavel, 2019) and mainly forages on insects and spiders on the forest floor or in dense undergrowth (Kiyosu, 1952; Nakamura and Nakamura, 1995). In addition, both the Blue-and-white Flycatcher, *Cyanoptila*

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cyanomelana (Temminck, 1829), and the Narcissus Flycatcher, *Ficedula narcissina* (Temminck, 1836), which belong to the same family Muscicapidae as the Siberian blue robin migrate to Japan to breed, and these two species are reported to feed on insects in summer (Murakami, 1998; Ueta et al., 2011; Kaneko, 2018). They are also reported to feed on seeds and fruits in autumn before migration to the wintering grounds (Sato and Sakai, 2005; Kaneko et al., 2012; Fujitsu et al., 2016; Kato and Koike, 2018). Moreover, even in both Asian Stubtail, *Urosphena squameiceps* (Swinhoe, 1863), and Eurasian Wren, *Troglodytes troglodytes* (Linnaeus, 1758), which have been treated as insectivores in general (Nakamura and Nakamura, 1995), plant seeds are observed by fecal analysis (Kaneko et al., 2012). Therefore, the Siberian blue robin might also feed on seeds and fruits during the autumn migration. It was observed that a juvenile male of Siberian blue robin fed on *Gamblea (Evodiopanax) innovans* (Siebold and Zuccarini) fruits on the ground (Aoyama, 2025). Here I report an observation of a Siberian blue robin consuming a plant species that has not previously recorded as part of its diet.

MATERIALS AND METHODS

I investigated the foraging behavior of Siberian blue robin on seeds or fruits of plants by two methods in August and September during the autumn migration. Firstly, I reported the foraging behavior of Siberian blue robins based on photographs that were taken by a collaborative birder in the Rokko mountains. Secondly, I investigated the behavior of Siberian blue robins on the ground according to the previous study (Aoyama, 2025). The behavioral observations were conducted during a total of 43 days between 2 August to 27 September 2024 in the Rokko mountains in Kobe city. Because this species is listed as an endangered species by the Hyogo Prefecture (category: A rank, an equivalent of Critically Endangered) (Hyogo Prefecture, 2025), the observation sites are not described here in detail to protect its habitat. When I identified this species in the field, I recorded the video with a digital camera (Nikon, Coolpix P950, recording size: 4K, 3840×2160/30p). Because this species often forages in shaded sites beside dense

shrubs (Aoyama, 2024), I could not follow their movements in the viewfinder whilst zooming in using the excessive telephoto function. I therefore recorded the video using wide-angle images: subsequently, the images of the birds were somewhat small in the recorded video. During the recording, I appropriately turned on and off the camera so as to avoid increasing too large a capacity of video. On replaying the recordings, I checked and zoomed in on pecking movements on the ground using the freeze-frame function of Microsoft Photos for Windows. When the species held something in its bill, freeze-frames were trimmed and further zoomed in to check what they were holding. I replayed the rapid movements of this species using the one-tenth speed slow-motion function in Microsoft clipchamp, once (one-tenth speed) or twice (one-hundredth speed). To identify sex and age, individuals were classified following Kiyosu (1952), Kanouchi et al. (2014) and Mizutani and Kanouchi (2017).

RESULTS

I recognized five cases of foraging behavior on plant prey items by the above two methods: Case 1 by the photos of the collaborative birder and from cases 2 to 5 by the videos taken by the author.

Case 1

On 5 September 2017, 10:43 AM, a juvenile male in first-winter plumage held a seed of Japanese mallotus, *Mallotus japonicus* (L.f.) Müll. Arg., in its bill, adjusted its orientation, and then fed on it. A torn piece of the inflorescence of the tree, which was seen under the tree (Fig. 1A), disappeared (Fig. 1B), indicating that the inflorescence was moved by the pecking action of the juvenile male.

Cases 2 to 5

The behavior of Siberian blue robins was video-recorded over 16 days (a total duration of 30 minutes and 31 seconds) in August and September 2024. During the recordings, the birds were observed to peck at something 159 times. Although the majority of the pecked objects were hardly recognizable, I detected what birds pecked in the following four cases.



Fig. 1 A juvenile male Siberian blue robin, *Larvivora cyane*, feeding on a seed of *Mallotus japonicus* on the ground in Case 1 (5 September 2017; 10:43 AM; time when photos were taken). A: a white arrow indicates a *M. japonicus* leaf and a yellow arrow indicates a torn piece of inflorescence of the tree; B: the juvenile male held the seed in its bill and the inflorescence disappeared; C: the juvenile male fed on the seed after orienting it in its bill.

In case 2, on 23 August 2024, 2:43 PM, a juvenile male Siberian blue robin in first-winter plumage held a fruit of giant dogwood, *Cornus controversa* Hemsl. var. *controversa*, in its bill (Fig. 2A), oriented the fruit with its head slightly tilted upward (Fig. 2B), and then swallowed it with the tip of its bill raised further upward.

In case 3, on 23 August 2024, 2:23 PM, the same juvenile male pecked at a giant dogwood fruit, held it in its bill (Fig. 2C), and then dropped it. The male then pecked the dropped fruit again and quickly raised its head. The fruit disappeared as it raised its head, even when replayed at one-hundredth speed in slow motion, suggesting that the bird fed on it.

In case 4, on 27 August 2024, 3:05 PM, another juvenile male Siberian blue robin in first-winter

plumage, whose back was a darker blue than the juvenile male in cases 2 and 3, held in its bill a giant dogwood fruit that it had taken from a small puddle while foraging (Fig. 2D). Because the video recording ended at that point, it is not clear whether the bird fed on the fruit.

In case 5, on 5 September 2024, 3:13 PM, an adult female Siberian blue robin was observed at a small stream about 5 m downstream from the case 2 observation point (Fig. 2E). The female lowered its bill into the stream, attempted to hold a giant dogwood fruit in its bill, but dropped it (Fig. 2F), and then walked away.



Fig. 2 Foraging behavior on *Cornus controversa* fruits by a juvenile male (A-B: Case 2, C: Case 3), another juvenile male (D: Case 4), and an adult female (E-F: Case 5) of *L. cyane*. A-B: a juvenile male held a fruit and oriented it in its bill; C: the same juvenile male, and D: another juvenile male, both holding a fruit in its bill; E-F: a female attempted to hold the fruit in its bill but dropped it. A white arrow indicates a fruit that the female attempted to peck at, and a yellow arrow indicates a torn piece of inflorescence. Some fruits are clearly visible within a circle.

DISCUSSION

In the present study, four individuals in five cases of foraging behavior of Siberian blue robin on two kinds of plant prey items were observed during the autumn migration. In Case 1, a juvenile male fed on the Japanese mallotus seed in 2017. In Cases 2 and 3, a juvenile male fed on giant dogwood fruit in 2024. Then, in Case 4, another juvenile male, and Case 5, an adult female each held a giant dogwood fruit at the same site as Cases 2 and 3. A previous study report that a juvenile male foraged on *G. innovans* fruits on the ground during the autumn migration in 2023 (Aoyama, 2025). Therefore, in total, five individuals of different sexes and ages were observed feeding on

three species of seeds and fruits. Based on these results, however, it could not be determined whether the Siberian blue robin is an omnivore during the autumn migration. Further research is needed to elucidate the proportion of plant prey items to total ones.

In the present study, the Siberian blue robin foraged on seeds and fruits on the ground. In the observation site, there were trees where many birds came to forage on seeds or fruits on those crowns. Many birds such as Large-billed Crow, *Corvus macrorhynchos* Wagler, 1827, Varied Tit, *Sittiparus varius* (Temminck and Schlegel, 1845), Japanese Tit, *Parus cinereus* Vieillot, 1818, Brown-eared Bulbul, *Hypsipetes amaurotis* (Temminck, 1830), Japanese

White-eye, *Zosterops japonicus* Temminck and Schlegel, 1845, Red-billed Leiothrix, *Leiothrix lutea* (Scopoli, 1786), Japanese Thrush, *Turdus cardis* Temminck, 1831, and Narcissus Flycatcher, etc. were found in the trees (Aoyama, unpublished data). Although the seeds and fruits fall by themselves, they might also have fallen due to the foraging activities of other birds. Approximate sizes of the Japanese mallotus seeds, *G. innovans* fruits and the giant dogwood fruits are 4 mm, 5-6 mm and 6-7 mm in diameter, respectively (Murata et al., 2004). When the Siberian blue robin forages on the ground, further observation will be needed to check the activity of surrounding birds, and the size of available seeds and fruits to determine if they are suitable for the foraging of the Siberian blue robin. It will also be required to examine more carefully if the Siberian blue robin pecks them for foraging purposes.

Acknowledgements

The author deeply thanks KK who requests anonymity and is the collaborative birder residing in Kobe city for providing graphics and information of foraging on seeds of Siberian blue robin. The author also thanks Dr. Toshio Doi for reading the manuscript.

Competing of interests

There are no conflicts of interest with any specific company in conducting this study.

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渡りの時期のコルリによる地面に落ちたアカメガシワの種子とミズキの果実への採食行動

コルリ *Larvivora cyane* はこれまで昆虫食とされている。植物性の餌については、幼鳥雄によるタカノツメ *Gamblea innovans* の果実への採食行動が 1 例報告されているのみである。本報告では、秋の渡りの時期に六甲山系にて、さらなる植物性の餌に対する採食行動を、画像と野外調査によって調べた。画像データでは、幼鳥雄が地面に落ちたアカメガシワ *Mallotus japonicus* の種子を採食するのが 1 例確認された。野外調査では、幼鳥雄がミズキ *Cornus controversa* の果実を採食するのが 2 例、別の幼鳥雄と雌成鳥が果実を地面から咥え上げるのが各 1 例ずつ確認された。前述のタカノツメに対する観察例を合わせると、5 個体による 3 種の種子または果実への採食行動が確認されたことになる。これは、本種における種子摂取と果実食に関する数少ない報告例である。

キーワード:アカメガシワの種子、コルリ、採食行動、秋季渡り、ミズキの果実