

# Bull-headed Shrike Mozu (Jpn) *Lanius bucephalus*

## Morphology and classification

**Classification:** Passeriformes Laniidae

Bull-headed Shrikes are classified into two subspecies of *L. b. bucephalus* (Japan) and *L. b. cicarius* (China). It is said that in *L. b. cicarius* the bill is black from the tip to base, and the upperpart is darker in males than in females. Wave-shaped specks on the flank are distinct in females.

Total length:	20.1cm (18.5-21.2)	
Wing length:	♂ 84.6mm (80.7-89.5)	♀ 83.5mm (80.2-88.4)
Tail length:	♂ 88.4mm (79.6-96.0)	♀ 85.5mm (79.4-93.4)
Culmen length:	♂ 16.4mm (14.4-18.7)	♀ 16.2mm (13.8-17.8)
Tarsus length:	♂ 26.1mm (24.2-28.3)	♀ 26.1mm (24.1-27.8)
Weight:	♂ 40g (35-46)	♀ 41g (34-52)

Total length after Enomoto (1941) and the others are the mean (range) measured in the breeding period in the Ishikari region of Hokkaido.

### Appearance:

Bull-headed Shrikes have distinct dimorphism which is rare in true shrikes. A black eye stripe, a gray back and a white patch at the base of primary flight feathers characterize



Photo 2. Female Bull-headed Shrike. [H.Uchida]



Photo 1. Male Bull-headed Shrike. [H.Nagashima]

ry flight feathers characterize males. In females, on the other hand, the eye stripe is dark brown and the wave-shaped speckles from the flank to the belly are more distinct than in males. There is no white patch in the primary flight feathers. It is possible to distinguish between one-year-old birds (with flecks) and birds of more than one year old (fleckless), based on brown flecks at the tip of proximal primary wing coverts.

### Vocalization:

In the breeding period, Bull-headed Shrikes advertise their territory, calling "Gyun, gyun" at the top of a tall tree and a utility pole. They sing a "subsong", mimicking the songs of other bird species, such as Brown-headed Thrush, Oriental Greenfinch, Japanese White-eye, Brown-eared Bulbul, and Latham's Snipe. But Bull-headed Shrikes cannot faithfully reproduce their vocalization. In autumn they utter "Kich-kich-kich" continuously in a high-pitched voice to claim their winter territory, which is called "Takanaki (high-pitched singing)" and familiar to Japanese people as a special feature of autumn.

## Distribution and Habitat

### Distribution:

Bull-headed Shrikes breed in southern Sakhalin Island, the seaboard of the Japan Sea from Primorsky Province of Russia to the Korean Peninsula, the coastal area of the Yellow Sea and Japan. In Japan they breed from Hokkaido to Kyushu including small islands around the mainland, such as the Izu Islands, Chichijima of the Bonin Islands, Nakanoshima, Kikaijima, Minami-daitojima and Kitadaitojima. In the Nansei Islands south of the Ryukyu Islands, however, they are not confirmed to breed. Though the breeding population in the northern regions moves to the south in winter, some birds still remain in the suburbs of Sapporo, Hokkaido in midwinter. They started to breed in the two Daitojima Islands and Chichijima Island in the 1970s and the 1980s, respectively and have increased in number.

### Habitat:

Bull-headed Shrikes prefer open habitats, such as farmland, meadows, riverbeds and suburban parks. They breed in habitats with shrubs and hedges. Electric wires, fences and forest edge-

es play an important role as a perching post in foraging. The home range in the breeding period varies depending on the distribution of perching posts, ranging from 1 to 4ha. They breed at an elevation of 0-1,800m (asl) in central Honshu (the largest main island). They usually begin to breed in late February and fledglings become independent by May in the lowlands of Honshu, where they leave the breeding grounds when they have finished breeding. In highlands, on the other hand, they start to breed in May. There is a theory that Bull-headed Shrikes breed once again in highlands after the first breeding attempt in lowlands because the departure from the lowland breeding grounds corresponds to the breeding start in highlands.

## Life history



### Breeding system:

Bull-headed Shrikes are monogamous breeders, but nestlings by extra-pair fertilization are confirmed in about 17% of the nests.

### Nest:

The site and height of a nest varied according to available vegetation in the Ishikari region near Sapporo, Hokkaido. Bull-headed Shrikes primarily used as a nesting plant *Vitis coignetiae*, *Pleioblastus chinensis*, *Malus baccata* and *Hydrangea paniculata*. They mostly built a nest at a height of 86cm (range 30-279cm). In Minami-daito(-jima) Island, on the other hand, they built a bowl-like nest principally in *Calophyllum inophyllum* and *Garcinia spicata* planted as a field partition at a height of 252cm on average above the ground. They made the exterior shoddily using grass leaves and stalks, but lined the interior elaborately with ears of *Miscanthus sinensis*. The nest was 10-15cm in outer diameter and 7-10cm in inside diameter with a depth of 5-8cm.

### Egg:

The clutch size is 2-6 eggs, but two- or three-egg clutches are rare. The most common clutch size varies between regions. For instance, it is six eggs in the Ishikari



Photo 3. Brown and red types of Bull-headed Shrike eggs

region and five eggs in Minami-daito Island. The clutch size also varies depending on the season and the year. The mean egg size is 23.6mm (21.0-25.9mm) by 17.9mm (16.2-19.3mm). The egg is brown with dark brown flecks more dense around the blunt end. It rarely has reddish brown flecks on a reddish white ground (Photo 3).

### Incubation and nestling periods:

Nestlings hatch 15 days after the last egg was laid. Eggs generally hatch synchronously except for the last-laid egg, which hatches one day later. The hatching rate is higher in the Ishikari region (ca. 95%) than in Minami-daito Island (ca. 70%). In Ishikari, however, the breeding success rate is as low as about 40% due to the nest predation of red foxes (*Vulpes vulpes*), Japanese rat snakes (*Elaphe climacophora*) and Large-billed Crows (*Corvus macrorhynchos*), though this rate varies from one year to another. Once eggs have survived predation, their chances of fledging are improved, but the mortality of nestlings rises as rainfall increases in the nestling period (Fig. 1). In the late breeding period, some

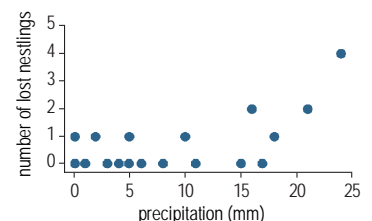


Fig. 1. Relationship between the number of nestlings that disappeared from the nest in the study site in a day and the precipitation from the previous day. Lost nestlings are assumed to have died.

nests are parasitized by Common Cuckoos (*Cuculus canorus*). The breeding success varies from 20% to 50% depending on weather and the density of predators.

## Feeding ecology

Bull-headed Shrikes perch on a high place and stoop at beetles and spiders prowling on the ground in an open habitat. They may also flycatch flying insects and snatch insects from leaves on the wing. They depend heavily on orthopteran insects in Minami-daito Island. They occasionally capture small mammals and small birds including even thrushes that are larger than themselves. They may also eat fruits in winter when their staple food is in short supply.

They have a habit of keeping their captured prey impaled on a thorn or barbed wire, which is called "Hayanie" (Photo. 5). The habit of "Hayanie" peculiar to shrikes is assumed to have several functions, such as caching against a food shortage and the sign of a territory boundary. It is reported that Loggerhead Shrikes (*Lanius ludovicianus*) keep a toxic grasshopper impaled on a thorn until detoxicated before ingesting it. It is also said that Loggerhead Shrike males with more pierced prey are at an advantage when attracting a mate, which suggests that "Hayanie" has an adaptive value.



Photo 5.  
"Hayanie":  
A *Fejervarya*  
frog  
impaled on a  
barbed wire.

## Topics of ecology, behavior and conservation

### ● Does a clutch size depend on a male's ability?

Reproductive performance is generally better in adult birds than in juveniles. Females play a major role in this age-dependent breeding performance in many bird species. In Bull-headed Shrikes, however, juvenile females paired with an adult male lay more eggs than adult females paired with a juvenile male (Fig. 2). In other words, the age of males has a greater effect on a clutch size than that of females in Bull-headed Shrikes. In Bull-headed Shrikes, the courtship feeding from males to females is concentrated from pre-egg laying to the egg-laying period. Courtship feeding generally occurs from courtship to mating period. In Bull-headed Shrikes, however, courtship feeding is not followed by copulation, which suggests that the feeding serves as the nutritional supplementation of females. Since adult males fed their mate more frequently than juvenile males, females are assumed to receive an adequate supply of nourishment. As a result, females paired with an adult male can lay more eggs. In addition, adult males tended to feed larger items of food to the young in the nestling period. The result suggested that Bull-headed Shrike females lay eggs depending on the availability of food that is assessed by the food-providing activity of paired male.

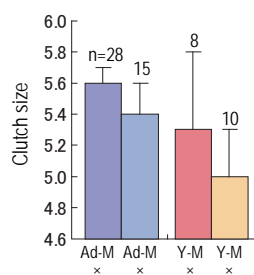


Fig. 2. Relationship between clutch size and the age structure of a Bull-headed Shrike breeding pair. (Takagi 2003)

### ● How best to ensure paternity

Bull-headed Shrike nestlings near fledging open and shut their wings repeatedly, calling "Gee, gee, gee" loudly when they beg their parents for food. This behavior is called food-begging. Females also beg their mate for food in this way in the breeding period, but males sometimes show food-begging behavior as well. Bull-headed Shrikes usually copulate in the early morning and the evening in the vicinity of the nest. Males show food-begging be-

havior first, when their mate approaches them in response to this behavior and copulates. Copulation is repeated several times consecutively. After males were away from their mate for a while in the pre-egg laying which can be the fertilization period, however, males sometimes copulate without food-begging behavior. I have observed this type of copulation in the egg-laying period. A male territory owner dashed about 150m toward a male intruder and chased him out of the territory in 30 seconds or so. And just after that the territorial male copulated with his mate without food-begging behavior. It is possible to interpret this copulation without food-begging behavior in terms of guaranteeing paternity. In Bull-headed Shrikes, extra-pair fertilization occurs at a rate of about 10%. In other bird species, females are inseminated with sperms from the male they last copulate with, or when the copulation frequency is higher. If Bull-headed Shrike females are also inseminated with sperms from the last copulation, the purpose of urgent copulation without ceremony would be to guarantee paternity. When eggs fertilized through extra-pair copulation hatch, males will feed the nestlings of a stranger male for more than 30 days. Breeding efforts reduce the survival rate of breeders. In short, guaranteeing paternity can be important in terms of a life history strategy.

## Literature

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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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I started to study the life history of Bull-headed Shrikes in the Ishikari region, Hokkaido. I have been still studying it from a long-term point of view in Minami-daito Island, a subtropic oceanic island with my students. I will aim at the study that treats their life-long reproductive success by pursuing the population dynamics. In addition, I am engaged in researches on the individual identification of a subspecies of Ryukyu Scops Owls based on the vocalization as well as its mechanism for avoiding inbreeding in Minami-daito Island. I would also like to clarify the environmental adaptation of the vocalization of Ryukyu Scops Owls widely distributed in the Nansei Islands. I enjoy fishing in my spare time.



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