Grey-Headed Lapwing Keri (Jpn) *Vanellus cinereus*

Morphology and classification

Classification: Charadriiformes Charadriidae

Total length:	♂ 341.7 ± 12.1mm (n=14)	♀ 336.3 ± 12.1mm (12)
Wing length:	♂ 236.9 ± 7.5mm (14)	♀ 235.5 ± 4.6mm (12)
Tail length:	♂ 109.4 ± 3.7mm (14)	♀ 109.8 ± 2.8mm (11)
Culmen length:	♂ 42.02 ± 2.91mm (14)	♀ 41.37 ± 3.00mm (12)
Tarsus length:	♂ 76.90 ± 2.70mm (14)	♀ 76.26 ± 3.45mm (12)
Wing claw:	♂ 5.08 ± 1.35mm (14)	♀ 3.69 ± 0.54mm (12)
Weight:	♂ 280.1 ± 15.9g (13)	♀ 266.6 ± 19.7g (10)

Measurements after Wakisaka et al. (2006).

Appearance:

Males and females are similar in plumage coloration. Adult birds are bluish gray from the head to the upper chest with a black band on the chest. They are ashy brown on the upperpart and white on the underpart. The primary flight feathers are black and the secondary flight feathers are white, which makes a striking contrast when in flight. The tail has a black band on a white ground. The feet, the mouth wattles and the eye-rings behind the wattles are yellow. The iris is reddish orange. The bill is yellow with a black tip. They also have black or pale brown wing claws at the bend of a wing, which tend to be greater in males (Wakisaka et al. 2006). Juveniles, on the other hand, are light brown from the head to the back without a black band on the chest. The iris is reddish brown.

Photo 1. Grey-Headed Lapwing adult (above) and juvenile (below)

Vocalization:

They call like "Keritt", "Kiriri" or "Krurr".

Distribution and Habitat

Distribution:

Grey-headed Lapwings are distributed from northeastern China to Southeast Asia. In Japan, they sporadically occur from northeastern to western Japan (Sonobe & Robinson 1985, Nakamura 1995). In the 1950s, they were confirmed to breed only in the northern Kanto to the Tohoku Regions (Kiyosu 1966). But since the 1970s, they have gradually expanded their breeding range south primarily along the Pacific seaboard to western Japan, and in recent years, they have bred in the Kyushu Region, southern Japan as well.

Habitat:

Grey-headed Lapwings are found principally in farmland and riverbeds in the lowlands, and feed in short meadows and marshes. The diet consists mostly of small invertebrates on or under the ground. They usually form a breeding colony with densely-established territories of several pairs in the breeding period, but some of them nest alone.

Life history

Breeding system:

Grey-headed Lapwings are monogamous. They breed from March to August. A pair hold a 2.1ha territory on average and defend it together. It is unknown whether the male and female build a nest together, but both sexes incubate the eggs alternately. The hatchlings soon leave the nest and start to forage for food by themselves following their parent birds in the territory. Parent birds incubate and defend their hatchlings if necessary. When the young learn to fly, the family flock leaves the territory. They usually breed once in a breeding season, and the second breeding is rare. When they failed in the first breeding attempt, however, they try to re-nest up to two times (Takahashi 2007).

Nest:

They build a nest in wet habitats, such as paddy fields and low grass and bare areas around them, such as ridges, cropland, fallow fields and dry riverbeds. They dig a several-centimeter- deep hole in the ground and line blades and stems of grass collected from the surroundings. The nest is about 20cm in diameter and about 2cm in height. When they build a nest in a marsh, they pile up nest materials higher so that the nest may not be filled with water.

Photo 2. Parent bird incubating in the nest.

Egg:

The clutch size is mostly four eggs, with a range of 1-5 eggs. The egg is 42.0-51.9mm by 29.9-36.6mm in size and 19.2-43.0g in weight. It is pale green or pale brown with dark brown or black speckles all over.

Photo 3. Nest and eggs of Grey-Headed Lapwings

Incubation and rearing periods and fledging rate:

The incubation period is about 28 days and the young leave the nest within two days after hatching. The juvenile plumage begins to grow about 15 days after hatching, and small wattles and wing claws become discernible at this time. The young can fly about 44 days after hatching, when they leave the natal territory. The hatching rate was about 45%, the fledging rate was about 65% and the breeding performance was about 30% in the study site.

Ecology of the non-breeding period:

After late July, the pairs and families that finished breeding form a small flock of about ten birds and molt. After October most of the population breeding in snowy regions head south, but some of them stay and winter in the breeding grounds. The birds that went south return to the breeding sites around late February.

Topics of ecology, behavior and conservation

● Collective defense behavior

The behavior of mobbing predators in defense of the nest and young is known in many birds. The genus *Vanellus* is especially noted for their vigorous defense behavior among others (Elliot 1985a, b, Ohno 1996, Kis et al. 2000). Neighboring two or more pairs sometimes form a defensive flock (Walters 1990). When a

Photo 4. Threat behavior to the research worker.

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Haruo Kuroda

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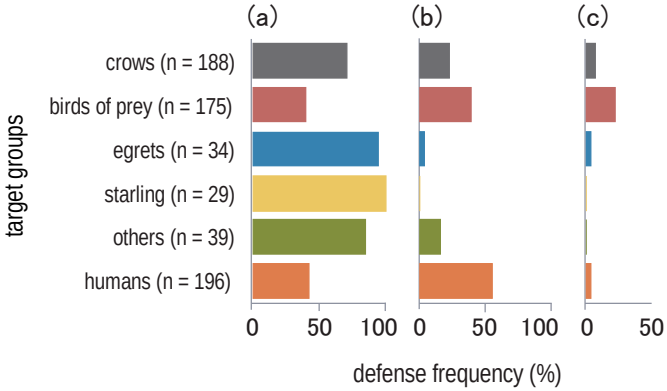

Fig. 1. Defense frequency against six groups by (a) one bird, (b) two birds and (c) more than two birds. Especially, collective defense was greater in frequency against birds of prey.

predator intrudes into one of the territories in a breeding colony of Grey-headed Lapwings, neighboring pairs help the intruded territory pair to drive the predator out, uttering an alarm call. If they cannot chase the predator away, however, they start to circle over the predator to threaten it and further launch an attack risking a direct contact against it. Up to 16 birds participated in the collective defense in the study site. The collective defense was closely related to the types of territory intruders and the distance between nests (Takahashi et al. 2007). The targets of lapwing attack ranged from possible predators, such as large birds and snakes to harmless small birds and humans. They frequently used a collective defense against birds of prey in particular (Fig. 1). The collective defense was more frequently adopted in a densely-nested colony (Fig. 2). In addition, the collective defense was effective in the expulsion of predators. When a greater number of birds participated in the defense, they repelled predators more successfully (Takahashi 2007). It is assumed, therefore, that Grey-headed Lapwings repel predators effectively by using a collective defense with a great defense capacity acquired through forming a densely-nested colony.

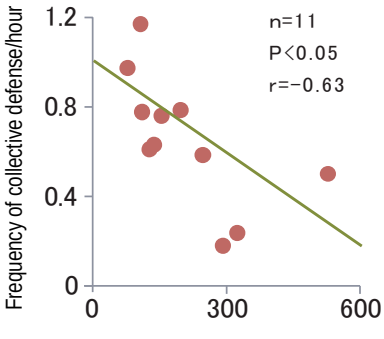

Fig. 2. Relationship between the nest distance and collective defense frequency in different breeding colonies. Collective defense was greater in frequency in a densely-nested colony.

Profound impact of humans on the reproductive success of Grey-headed Lapwings

Although many bird species use farmland such as a paddy field in the breeding season in Japan, few of them nest right in agricultural fields as Grey-headed Lapwings do, which are one of the species that depend most heavily on farmland. Therefore, humans have a great impact on their reproductive performance (Takahashi et al. 2007). In the study site, for instance, half of the nests was destroyed by farming, such as plowing and rice planting in the incubation period. About 10% of the nests fell victim to the predation of mammals, crows and snakes because predation pressure is great in farmland (Andren 1992). The breeding failure resulted from human disturbance occurred more frequently in nests built in rice and crop fields, while the predation-related failure was greater in frequency in nests on a ridge between paddy fields. The breeding failure of Grey-headed Lapwings is closely related to nesting habitats.

Other effects on the reproductive performance of Grey-headed Lapwings

In addition to disturbance due to farming, defense behavior and territory size have effects on the reproductive performance of Grey-headed Lapwings, depending on their breeding stages (Takahashi et al. 2007). Defense behavior greatly contributed for the survival of eggs in the incubation period in the study site because the eggs were safer and hatching success (hatchlings per nest) tended to be greater in a colony where defense behavior occurred more frequently. In addition, collective defense was remarkably effective in defending the eggs (Takahashi 2007). On the other hand, territory size played a major role in the rearing period. The growth rate of chicks and fledging success (number of the young that grew up to fly) were greater in a larger territory (Takahashi 2007). Excluding the impact of humans by farming, their defense behavior is highly instrumental during the incubation period because the survival of eggs depends on predation frequency and the defense capacity of parent birds. During the rearing period, on the other hand, the territory size which represents a supply of food has a greater effect on the survival of chicks than defense behavior because the young can forage for food by themselves.

Literature

Andren H. 1992. Corvid density and nest predation in relation to forest fragmentation: a landscape perspective. Ecology 73:794-804.
Elliot R.D. 1985a. The effects of predation risk and group size on the anti-predator responses of nesting lapwings *Vanellus vanellus*. Behavior 92:168-187.
Elliot R.D. 1985b. The exclusion of avian predators from aggregations of nesting lapwings (*Vanellus vanellus*). Anim. Behav. 33:308-314.
Kis J., Liker A. & Szekely T. 2000. Nest defense by Lapwings: observations on natural behavior and an experiment. Ardea 88:155-163.
Kiyosu Y. 1966. Encyclopedia of Wild Birds. Tokyodo Pub., Tokyo. [J]
Nakamura T. 1995. Nakamura T. & Nakamura M. eds. Birds' Life in Japan with Color Pictures (Birds of marsh, shore and ocean). Hoikusha, Osaka. [J]
Ohno Y. 1996. Effects of nesting Grey-headed lapwings *Microsarcops cinereus* on the intensity of the artificial nest predation by Carrion crows *Corvus corone*. Jpn. J. Ornithol. 45:91-99.
Sonobe K. & Robinson J.W. (ed) 1985. A field guide to the birds of Japan. Kodansha international, Tokyo.
Takahashi M. 2007. Ecology of the Grey-Headed Lapwing *Vanellus cinereus* that lives in the Hokuriku region—on the colonial breeding and the communal defense -. Master's thesis at the Graduate school of Natural Science & Technology, Kanazawa University, Master's program. [J].
Takahashi M. & Ohkawara K. 2007. Breeding behavior and reproductive success of Grey-headed Lapwing *Vanellus vinereus* on farmland in central Japan. Ornithol. Sci. 6:1-9.
Walters J.R. 1990. Anti-predatory behavior of Lapwings: Field evidence of discriminative abilities. Wilson Bull. 102:49-70.
Wakisaka H., Nakagawa M., Wakisaka K. & Itho M. 2006. Molecular sexing and sexual difference in carpal spur length of the Grey-headed Lapwing, *Vanellus cinereus* (Charadriidae). Ornithol. Sci. 5:133-137.

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

Author

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I studied the breeding ecology of Grey-Headed Lapwings in Ishikawa Prefecture for three years in a master's course. But I completely changed my study topic, when I enrolled in a doctoral course. Now I am studying the breeding ecology of Japanese Marsh Warblers (*Locustella pryeri*) in my hometown of Aomori Prefecture. I expect the study of Grey-Headed Lapwings to be useful for the conservation of Japanese Marsh Warblers because both species unexpectedly share common ecological features, such as adaptation to a flood plain, the use of fallow fields and coloniality.

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