

Styan's Grasshopper Warbler Uchiyama-Sennyu (Jpn) *Locustella pleskei*

Morphology and classification

Classification: Passeriformes Locustellidae

Wing length: ♂ 70.0 ± 1.55 mm (n = 253) ♀ 65.4 ± 1.38 mm (135)
 Tail length: ♂ 63.5 ± 2.08 mm (246) ♀ 59.1 ± 1.9 mm (118)
 Culmen length: ♂ 19.5 ± 0.75 mm (186) ♀ 19.2 ± 0.67 mm (109)
 Tarsus length: ♂ 24.5 ± 0.65 mm (251) ♀ 23.9 ± 0.60 mm (137)
 Weight: ♂ 22.8 ± 1.38 g (301) ♀ 22.3 ± 2.30 g (133)

Measurements from the population of Hakata Bay.

Appearance:

Styan's Grasshopper Warblers are similar in plumage color in males and females. They are olive brown with no reddish tinge on the upperpart and grayish white on the underpart. The rectrices are rounded and olive brown with the white tip except for a central pair of feathers. The ridge of the upper mandible is almost black, while the lower mandible is beige. The commissure (gape) is yellowish in juveniles and some one year-olds, which grow gradually darker to become olive in adults.



Photo 1. Singing male of Styan's Grasshopper Warblers [Hidehiko Kinoshita]

Vocalization:

Styan's Grasshopper Warblers have two types of songs. One is a simple "Chichitt, chyr-chyr, chyr-chyr" and the other is with a trill of "shrrrr" at the end of the song. Both have stereotypical song structure but have individual variations in the length of syllables and the way to add trills. They utter "Kirrrrr" in a high-pitched trill as an alarm call, when other birds intrude into their territory or humans approach. This trill is also used as a contact call between the sexes. They usually sing in a tree crown, but frequently sing in flight soon after arriving at the breeding grounds. Males also sing frequently during the night at the time females arrive at the breeding grounds.

Distribution and Habitat

Distribution

Styan's Grasshopper Warblers breed in islands off the Korean peninsula, Primorsky Province (Far East Russia), Kyushu (southern Japan), Shikoku, the Kii Peninsula (western Japan) and the Izu Islands (central Japan). They winter from southern China to the northern part of the Indo-China Peninsula.

Habitat:

They occur in a thicket of *Sasa* spp. (bamboo grass) and a field of *Miscanthus sinensis* in Miyake Island of the Izu Islands, but in the low laurel forests of islands off Kyushu and the Kii Peninsula. Only several to several dozen Styan's Grasshopper Warblers occur in any of these islands except for Miyake and Chikuzen-okinoshima Islands where several hundred birds are found because the others are small islets. The population density is estimated to be 10-25 pairs per ha in islets off the western coast of Kyushu, but lower in their habitats from the Hyuga-nada (eastern area of Kyushu offshore) to the Kii Peninsula.

Life history



Breeding system:

Styan's Grasshopper Warblers are basically a monogamous breeder, but some males (3.4%) breed polygynously (Nagata 1988). Males with a large favorable territory are at an

advantage when attracting females (Nagata 1986). Mated males sing less frequently until their partner begins to incubate eggs because they guard their partner. When females start incubating, however, males begin to sing vigorously again because females build a nest and incubate eggs by themselves. Both males and females feed the nestlings and fledglings. Though most females breed once a season, some (4%) of the females that have fledged the nestlings by June 15 lay the second clutch, leaving it to their partner to take care of the fledglings. Both males and females start molting in July when they have finished breeding. However, the birds that began to breed late start to molt the primaries while they feed the young. Toward the end of the breeding period, males start to leave the breeding grounds, leaving it to their partner to feed the young.

Nest:

They build a cup-shaped nest using bamboo grass and dead leaves, and lay the veins of leaves and the fine roots of *Ophiopogon japonicus* in the inner cup. They place these nests in fine twigs and vines of *Pseudosasa*, *Eurya emarginata* and vines at the height from the base of *Ophiopogon japonicus* near the ground to the canopy of *Machilus thunbergii*. The height of the nest was 2.9m on average with a range of 0.3-7m in Ohtsukuejima Islet. In Okitsujima Islet with a thicket of *Pseudosasa*, 65% of the nests were built on this plant. In Ohtsukuejima Islet where *Pseudosasa japonica* is in short supply, on the other hand, the nests were built in *Euonymus japonicus*, *Eurya emarginata*, *Litsea japonica*, *Machilus thunbergii* as well as *Pseudosasa*.



Photo 2. Female delivering food to the eight-day-old young in a nest built on *Celastrus orbiculatus*.

Egg:

The clutch size is 3.5 ± 0.6 eggs on average with a range of 2-5 eggs (n = 109). The size of the egg is 19-21.5 mm by 14-15.1 mm. The egg has brown flecks on a white or pale pink ground. It weighs 1.8 g.

Incubation and nestling periods and fledging success

The incubation period is about 13 days and the nestling period is also about 13 days with a range of 12-15 days. The fledging success is more than 90% in Ohtsukuejima and Okitsujima Islets with no predators. Unhatched eggs and nest collapse due to bad weather accounted for 5% and nearly 5% of the breeding failure, respectively. Fledglings are provided with food for 19 days on average with a range of 10-29 days, but this period is reduced in the latter part of the breeding season.

Migration:

Styan's Grasshopper Warblers are summer visitors in Japan. Males arrive at the breeding grounds from late April to mid-May. They establish their territory and wait for females to arrive from May to early June. In the latter part of the breeding season, most males have departed from the breeding grounds by the end of August, and fledglings have also left the breeding grounds by early September.

Diet and foraging behavior

Styan's Grasshopper Warblers primarily feed to nestlings large soil invertebrates, such as wood lice, beach fleas, centipedes and chilopods in the first half of the breeding period, but increasingly provide them with insects of lepidoptera, orthoptera, hymenoptera, etc. as the breeding period progresses, and also feed emerged cicadas to them at the end of the breeding period.

Topics of ecology, behavior and conservation

● Strong site fidelity of males to the natal site and previous territories

In Hakata Bay, northern Kyushu, for instance, both males and females have a strong tendency to return to their natal island to breed. Some females, however, settle down in the other islets of the bay (Nagata 1993). Once they have started breeding, both males and females show a strong site-fidelity and 57% of them return to their previous year's breeding grounds. Males have higher site-fidelity and tend to return to the same or neighboring breeding territory every year. The rate of returning to the previous year's breeding site is equivalent to the survival rate of this population. About 21% of fledglings survive by the next year.

● Styan's Grasshopper Warblers and Middendorff's Grasshopper Warblers (*L. ochotensis*)

The tail feathers are longer and the bill is thicker and longer in Styan's Grasshopper Warblers than in Middendorff's Grasshopper Warblers. The culmen length of Styan's Grasshopper Warblers exceeds 18mm. The ninth primary is longer than the sixth one in Middendorff's, while the sixth primary is longer than the ninth one in Styan's Grasshopper Warblers (Williamson 1960, Yamashina 1941). Styan's Grasshopper Warblers were treated as a subspecies of Middendorff's Grasshopper Warblers (the Check-list of Japanese Birds the 5th edition), but now they are generally treated as a separate species because Nazarov & Shibaev (1983) advocated that Styan's Grasshopper Warblers should be a different species from Middendorff's Grasshopper Warblers based on the morphological differences of Styan's Grasshopper Warblers breeding in the Bay of Peter the Great of Primorsky Province, Far East Russia. Recent studies on the base sequence of the mitochondrial DNA have shown that Pallas's Grasshopper Warblers (*L. certhiola*), Middendorff's Grasshopper Warblers and Styan's Grasshopper Warblers rapidly diverged into three different species in the eastern seaboard of the Eurasian Continent (Dovetski et al. 2004). The differences of the mitochondrial base sequence suggest that Styan's Grasshopper Warblers and Middendorff's Grasshopper Warblers diverged in the Riss glacial stage (about 140,000 years ago). Recent study has also shown that there is so great a difference in the base sequence of mitochondrial DNA between Styan's Grasshopper Warblers and the populations of Ulleungdo Island, eastern Korea and Primorsky Province, Far East Russia that they should be treated as separate species. The phylogenetic relationship between Middendorff's Grasshopper Warblers and Styan's Grasshopper Warblers requires reexamination in the future because Nazarov and Shibaev (1983) advocated that *L. pleskei* should be separate from *L. ochotensis* based on some characteristics of the population of Primorsky Province.



Photo 3. Middendorff's Grasshopper warbler (left) and Styan's Grasshopper Warbler (right) Dark and pale lateral bars of the tail feathers are growth bars. They develop one band a day when molting.

● Tail feathers show a nutritional state

The lateral stripes of tail feathers are the growth bars that indicates the daily growth length of a feather when molting. The dark and pale stripes show daytime and nighttime growths, respectively. It is possible, therefore, to estimate a nutritional state during the molting period by measuring the width of a stripe. The tail growth bars were broader in the males that survived into the next year than in the

males that did not survive, which meant that the survival rate was higher in better-nourished males (Takaki et al. 2001). There is a positive correlation between the width of the growth bar and the number of fledglings per year (Fig. 1), which supports that males with broader growth bars, namely males which are better nourished after the breeding, arrive at the breeding grounds and find their partner earlier because the early start of breeding increases the clutch size as well as improves their chances of the second breeding.

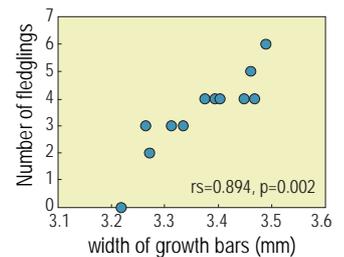


Fig. 1. Relationship between the width of growth bars and the number of fledglings. Males with the broader growth bars have the higher breeding success.

● Intrusion of rats (*Rattus norvegicus*) into a paradise

In Ohtsukuejima Islet where Styan's Grasshopper Warblers used to have a great breeding success, the nest predation of rats has increased in recent years. It is probably because the trees blown down in recent typhoons and overgrown vines have allowed rats access to the nests which they could not otherwise reach. There were 30 or 40 pairs of Styan's Grasshopper Warblers breeding in the 1980s, but the number of breeding pairs has decreased to less than 20 now in Ohtsukuejima islet. Demographic stochasticity also raises the risk of extinction, when the population decreases. Intruder rats (*Rattus norvegicus* and *R. rattus*) have represented a threat to island birds as a nest predator.

Literature

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I studied Styan's Grasshopper Warblers when I was in graduate school. Although I miss those old days when I spent three or four days a week in a tent on the uninhabited islets, I may be no longer strong enough for such fieldwork. I have also studied the avifauna of tropical forests and the breeding ecology of Japanese Marsh Warblers, Japanese Reed Buntings and Great Reed Warblers along the Tonegawa river since I joined the staff of National Institute of Environmental Studies (NIES). I feel I must go back to the starting point and write up the unpublished data on Styan's Grasshopper Warblers in a paper.



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