Korean J. Ecol., 21(4):401~403, 1998

# Body Size of Russet Sparrow (*Passer rutilans*) in Two Different Habitats

**Chae, Hee-Young**

*Department of Forest Resources, Seoul National University, Suwon 441-744, Republic of Korea*

# 서로 다른 서식지에서 섬참새의 외부형태

**채 희 영**

서울대학교 농업생명과학대학 산림자원학과

## ABSTRACT

Body size of the Russet Sparrow (*Passer rutilans*) was investigated during the breeding seasons of 1994 to 1996, in south-eastern Hokkaido, Japan. Both male and female arrived slightly earlier in isolated forests than in shelter belts during the study. Wing lengths of males and females were significantly longer in isolated forests than those in shelter belts, but the other body size characteristics were not differ significantly. The results indicate habitat selection of the birds depended on their body constructions, in which wing length as an indicator, body size may be an important factor. Large-sized birds select the better quality habitat than birds of small size.

*Key words*: Body size, Different habitat, Russet Sparrow, Wing length.

## INTRODUCTION

Body size is one of important features that certainly determine habitat selection (Greenberg 1979, Cody 1985). Body size is known to have a relationship with habitat selection and is used as an indicator for the quality of the habitat (Ficken & Ficken 1967, Murray Jr. 1969, Ebenman & Nisson 1981, Ulfstrand *et al.* 1981, Alatalo *et al.* 1984). I examined the body size of Russet Sparrow (*Passer rutilans*) breeding in two different type of habitats, whether morphological data could help to explain the reasons of habitat selection.

The study was conducted in shelter belts and isolated forests surrounded by agricultural lands in Obihiro, south-eastern Hokkaido, Japan, during the breeding seasons of 1994 to 1996. Study areas information as described in previously Chae (1997).

A total of 255 nest boxes were examined. Adult birds in both habitats were captured by using "in-open out-lock system"and net method (Chae 1997). Since the nest hole entrance of "in-open out-lock system"was prepared by a U-wire installed, birds can come in the nest-box, but can not get out the nest-box. Twenty males and thirty five females were captured and measured for (1) wing length (2) tarsus length (3) bill length, to the nearest 0.1mm using vernier caliper. Birds captured in 1994 and 1995 were measured for wing length only.

Russet Sparrows arrive at study areas in late April. Females arrive 1 to 3 days later than males (Table

**Table 1.** The first sighting date of Russet Sparrows in shelter belts (SB) and isolated forests (IF)

| | SB | | IF | |
|---|---|---|---|---|
| | Male | Female | Male | Female |
| 1994 | Apr. 23 | Apr. 25 | – | – |
| 1995 | Apr. 24 | Apr. 26 | Apr. 21 | Apr. 24 |
| 1996 | Apr. 26 | Apr. 27 | Apr. 23 | Apr. 25 |

1). Both males and females arrive slightly earlier in isolated forests than in shelter belts during the study (Table 1). Wing lengths of males and females were significantly longer in isolated forests than those in shelter belts, but the other characteristics did not differ significantly between habitats (Table 2). In shelter belts, wing length and tail length of males were significantly longer than those of females (Mann-Whitney's U test, wing length, $Z=-4.24$; tail length, $Z=-3.43$, both $P<0.01$), while the other characteristics were similar between sexes (Mann-Whitney's U test, tarsus length, $Z=-0.74$; bill length, $Z=-0.17$, both $P>0.05$). In isolated forests, males had significantly longer wing length than females did ($Z=-3.26$, $P<0.01$), however, the other characteristics were similar between sexes (tarsus length, $Z=-0.61$; bill length, $Z=-0.10$; tail length, $Z=-0.20$, all $P>0.05$).

The results show that Russet Sparrows inhabiting in two different habitats differs in wing length. However, males have longer wing length than females in both habitats.

Van Balen (1967) found that Great Tit (*Parus major*) inhabiting in deciduous forest in winter had longer wings than birds inhabiting in coniferous woodland. Cody (1985) recorded that a similar pattern in Pied Flycatcher (*Ficedula hypoleuca*) in which males were larger in deciduous than in coniferous habitats. Similarly, Ebenman & Nilsson (1981) found a positive correlation between body size and habitat suitability in the Willow Warbler (*Phylloscopus trochilus*). The longer wing of males in deciduous forest than in coniferous habitat may be due to their social dominance that the larger males are able to take up the optimal habitats (Ulfstrand *et al.* 1981). Habitat selection of the birds depends on their body constructions, in which wing length as an indicator of body size could be an important determinant factors. Foods were more abundant in isolated forests than in shelter belts (Chae 1997). Therefore, dominant birds may have preferred to inhabit in isolated forests rather than in shelter belt.

In conclusion, large-sized birds can select the better quality habitat than birds of small size.

I wish to express my sincere thanks to Professor Y. Fujimaki for revising the manuscript, and Dr. K. Onoyama, Dr. H. Yanagawa and the students of Laboratory of Wildlife Ecology, Obihiro University of Agricltture and Veterinary Medicine for encouragement during the study.

**Table 2.** Morphometric measurements of Russet Sparrow, males and females in shelter belts (SB) and isolated forests (IF)

| Characteristic | SB | | | IF | | | u-test | *P* |
|---|---|---|---|---|---|---|---|---|
| | Avg. | S.D. | n | Avg. | S.D. | n | | |
| Males | | | | | | | | |
| Wing (mm) | 73.36 | 1.50 | 14 | 75.00 | 1.41 | 6 | u=−2.1 | P<0.05 |
| Tarsus (mm) | 17.25 | 0.52 | 8 | 18.00 | 2.19 | 3 | u=−0.1 | NS |
| Bill (mm) | 8.81 | 0.91 | 8 | 9.07 | 0.25 | 3 | u=−0.6 | NS |
| Tail (mm) | 48.63 | 1.69 | 8 | 46.33 | 2.08 | 3 | u=−1.5 | NS |
| Females | | | | | | | | |
| Wing (mm) | 69.83 | 1.62 | 18 | 71.59 | 1.50 | 17 | u=−2.9 | P<0.01 |
| Tarsus (mm) | 17.25 | 0.80 | 11 | 18.06 | 1.32 | 8 | u=−1.6 | NS |
| Bill (mm) | 8.89 | 0.60 | 11 | 9.06 | 0.20 | 8 | u=−0.6 | NS |
| Tail (mm) | 45.09 | 0.94 | 11 | 46.13 | 1.64 | 8 | u=−1.3 | NS |

## 적 요

섬참새의 체형에 관하여 1994년부터 1996년까지의 번식기에 일본 동남북해도의 방풍림과 고립림의 2개 다른 서식지에서 연구되었다. 조사기간 중 암수 모두 방풍림보다 고립림의 개체가 빨리 번식지에 도착하였다. 암수의 날개길이는 방풍림보다 고립림의 개체가 유의적으로 길었다. 본 연구 결과로부터 서식지 선택의 하나의 요인으로서 체형이 관계하고 특히 날개길이는 중요한 요인으로 작용한다는 사실을 알 수 있었다. 체형이 큰 개체는 작은 개체보다 서식지 조건이 좋은 곳을 선택할 수 있다.


## LITERATURE CITED


Alatalo, R.V., L. Gustafsson and A. Lundberg. 1984. Why do young passerine birds have shorter wings than older birds?. Ibis 126: 410-415.

Cody, M.L. 1985. Habitat selection in birds. Academic Press, Orlando, San Diego, New York, London, Toronto, Montreal, Sydney, Tokyo.

Chae, H.Y. 1997. Variations in fledging body weight and wing length of Russet Sparrow (*Passer rutilans*) in two different habitats. Jap. J. Ornithol. 45: 215-223.

Ebenman, B. and S.G. Nilsson. 1981. Size patte군 in Willow Warblers (*Phylloscopus trochilus*) on islands in a south Swedish lake and the Nearby mainland. Ibis 123: 528-534.

Ficken, M.S. and R.W. Ficken. 1967. Age-specific differences in the breeding behavior of the American redstart. Wilson Bull. 79: 188-199.

Greenberg, R. 1979. Body size, breeding habitat, and winter exploitation systems in Dendroica. Auk 96: 756-766.

Murray Jr. B.G. 1969. A comparative study of the Le Conte's and Sharp-tailed Sparrows. Auk 86: 199-231.

Ulfstrand, S., R.V. Alatalo, A. Carlson and A. Lundberg. 1981. Habitat distribution and body size of the body size of the Great Tit (*Parus major*). Ibis 126: 494-499.

Van Balen, J.H. 1967. The significance of variations in body mass and wing length in the Great Tit (*Parus major*). Ardea 55: 1-59.


*(Received June 23, 1998)*