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Feeding Behavior of the Russet Sparrow *Passer rutilans* in Two Different Habitats

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다른 두 서식지에서 섬참새의 채식행동

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ABSTRACT

Feeding behavior of the Russet Sparrow *Passer rutilans* was studied in two different types of habitats, shelter belts and isolated forests, in south-eastern Hokkaido, Japan, during the breeding seasons of 1995 and 1996.

Predominant foods were determined as Caterpillar, Coleoptera, Diptera, Ephemeropera, Odonate and some other insects. The composition of the nestling foods were not the same by season, region, and year. Larger foods in size were used by birds in isolated forests more frequently than in shelter belts. Amount of food per feeding was significantly larger in isolated forests than in shelter belts. Although food supply were more abundant in isolated forests than in shelter belts, the feeding frequency did not significantly differ between these two habitats. The nest density was higher in isolated forests than in shelter belts.

Results of this study indicate that when the feeding condition is poor, birds tend not show specific food selection behavior, the feeding range is therefore larger, and the feeding interval is longer. Contrarily, the birds show a specific food selection behavior when they are in good feeding condition, the feeding range is therefore smaller and the feeding interval decreases.

Key words: Feeding behavior, Habitat, Isolated forests, Russet Sparrow, Shelter belts.

INTRODUCTION

In many bird species, the number and quality of young produced depends in large degree on the availability of food (Gibb and Betts 1963, Lack 1968, Van Balen 1973, Martin 1987, Lundberg and Alatalo 1992, Dias and Blondel 1996). Feeding habits of the bird allow to understand the life cycle of a given species. Feeding conditions during the breeding season are affected by various fact ors (Kluyver 1951, Gibb and Betts 1963, Lack 1967) in which food supply available in environmental conditions is one of important factor (Lack 1967, Van Balen 1973).

Russet Sparrows *Passer rutilans* migrate to Hokkaido at the last week of April (Fujimaki 1984),

and inhabit various forest types including isolated woods in agricultural lands (Fujimaki 1984, 1986, 1994, 1996, Fujimaki and Takami 1986). In deciduous forest foods for nestling is more abundant than in coniferous forest (Van Balen 1973, Lundberg and Alatalo 1985, Chae 1997a, 1997b). Krebs *et al.* (1977) described that food selection is related to the amount of food available to the birds within their habitats. Thus, it is expected that feeding habits of adult birds may be affected by the difference in their habitats.

The purpose of this study is to compare the feeding behavior of Russet Sparrows in the two different habitats, and to derive the cause of differences in feeding behavior of Russet Sparrows.

STUDY AREAS AND METHODS

This study was conducted in three wooded areas surrounded by agricultural lands in Obihiro, south-eastern Hokkaido, Japan during the breeding seasons of 1995 and 1996. A total 213 nest boxes were examined in 1995 and 1996. Of which 107 nest boxes were used by the sparrow in both habitats (shelter belts, 57; isolated forests, 50). Nest boxes were visited every day from late April to late July in both study areas.

Fifty-eight feed samples were obtained from 6 nests in shelter belts, and 50 samples from 6 nests in isolated forests. Collected insects were preserved in 70% alcohol, dried at 100℃ for 24hr., and then weighed nearest to 0.1 mg. The insects were identified the taxonomic Order level with a binocular microscope.

The number and interval of feeding times per hour during the nesting period were recorded by 8 mm video camera and time laps video camera (EVT-820) positioned the inside and in front of twenty nests for a duration of 280 hours. Video photographs were taken for 10 nests in each habitat with the same brood size (3, 5 and 6 brood sizes) and the same age (3 and 8 days after hatching) in two study areas. Amount of food per feeding visit was determined by collar (Summers-Smith 1995) and net method (Chae 1997a).

Adult birds in both study areas were captured using "in-open out-lock system" and net method and were individually marked with three colored plastic leg bands and numbered leg bands. Furthermore, attached the dyed feather of chickens was also attached on the back. Since the entrance of "in-open out-lock system" of the nest hole were installed by a U-wire, the birds can come in the nest-box but can not get out the nest-box. In the net method, the nest was coverd by a mist net, which allows the bird enter the nest-box for feeding nestlings (Chae 1997b). During the nestling period, feeding ranges of marked adults were located on a 1:5000 map.

Weather data was obtained from the Farm of the Obihiro University of Agriculture and Veterinary Medicine, which is in the study area.

RESULTS

The total samples of insects obtained by collar and net methods in both habitats were 232 and 210 for shelter belts and isolated forests respectively. Predominant foods were determined as Caterpillar, Coleoptera, Diptera, Ephemeroptera, and Odonate and some other insects (Table 1). Caterpillar and Coleoptera decreased in the diet from 1995 to 1996, while Diptera, Hymenoptera and Ephemeroptera increased. The food composition of nestlings changed considerably during the breeding season. Ephemeropteras were not recorded in the nestling diet in 1995, but comprised a substantial portion in 1996. Caterpillars were the most important food of nestlings in May and June but decreased in July in the two years. Coleopteras were not found in the nestling diet in May, a few in June, but a large proportion to the total food volume in July in the two years (except for isolated forests in 1996). In 1995, 41.0% of all prey items in shelter belts was Caterpillar, and 55.3% of those prey items in isolated forests was Caterpillar. In 1996, 29 samples or 34.9% contained Caterpillar, and 20 samples or 20.8% contained Diptera (Table 1). In the early-May mean temperatures