短 報 Short Communication

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Predation on Grey Starlings *Sturnus cineraceus* by
Peregrine Falcons *Falco peregrinus* in downtown Sapporo

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During winter, more than 2,000 Grey Starlings *S. cineraceus* roosted in downtown Sapporo (TAKENAKA 1992). They generally entered the roost site, an advertisement tower, from pre-roosting assembly posts in the evening, and flew out of it in the morning towards several directions at once. During the winters of 1989 to 1993, we observed and video-taped their roosting behavior. Our observation was made from the car in order not to disturb the behavior of the starlings.

Since 1991, Peregrine Falcons *F. peregrinus* have been observed near the starling roost (Fig. 1). They appeared near the roost in the evening and morning. We observed actual attempts by the falcon to prey on the starlings only in the evening. In the morning, the falcons perched near the roost and watched the starlings disperse, and then departed.

In all the years when the Peregrine Falcon was observed, we found a few starling heads, legs and wings, believed to have been predated by the peregrines, on the roof of the building where the starlings roosted. On 9 March 1993, we observed a Peregrine Falcon catching a starling in the air and consuming it on an advertisement tower. On the same day and on 17 March, we confirmed that at least 2 peregrines, one considerably larger than the other, existed in the downtown area. Since they vocalized to each other and flew together, they were thought to be a pair.

Fig. 1. A Peregrine Falcon perching on the advertisement tower next to the Grey Starling roost.

Table 1. The dates on which *F. peregrinus* was observed near the Grey Starling roost.

Date	Time	No. of falcons observed	Behavior
15 Dec 91	16 : 18	1	Soaring above roost
24 Feb 92	17 : 17 - 17 : 18	1	Perching on tower
3 Dec 92	16 : 10	1	Soaring above roost
26 Feb 93	16 : 15 - 17 : 27	1	Chasing starlings perching on tower
4 Mar 93	17 : 20 - 17 : 32	1	Soaring and chasing starlings
9 Mar 93	17 : 20 - 17 : 56	2	Catching and consuming a starling
17 Mar 93	17 : 41 - 17 : 57	2	Soaring, chasing and perching on tower
21 Mar 93	05 : 23 - 05 : 31	1	Perching on tower
1 Apr 93	17 : 27 - 17 : 46	1	Chasing and perching on tower
4 Apr 93	18 : 13 - 19 : 19	1	Chasing starlings

Fig. 2. Movement patterns of the Grey Starlings in the presence of the falcon. The square and L-shaped structures are advertisement towers. The major starling roost site is indicated with an "R" and the major pre-roosting assembly post with a "P". The star indicates the position of the falcon and lines with arrows are the flight courses of the starlings. The broken line indicated in Fig. 2 (a) is the segment along which the flight speed of the starlings was measured.

The starlings occupied the roost site from 7 Nov. to mid-June in 1991-92, and from 8 Nov. to mid-June in 1992-93. During these periods, Grey Starlings showed a strong tenacity to the roost site and did not abandon the roost, even when sporadically hunted by the peregrines. The dates on which we observed the peregrines near the roost are shown in Table 1.

We analyzed the movement patterns of Grey Starlings in the presence of the falcons,

based on video tape recordings: examples are shown in Fig. 2. When starlings entered the roost site from pre-roosting assembly posts, they avoided attack by the falcon by flying behind advertisement towers which served as shield against the falcon that perched on the embossed letters (Figs. 1 and 2). When a peregrine perched on the pre-roosting assembly post, the starlings avoided flying near it, flew around less frequently and stayed densely packed on the diagonally opposite side from the falcon. They flew along the broken line indicated in Fig. 2-a in 1.77 ± 0.37 seconds in the presence of the falcon and in 2.95 ± 0.39 seconds in its absence. The flight speed of starlings in the presence of the falcon was significantly faster than in its absence ($P < 0.05$, $n = 15$, MANN-WHITNEY U test). They showed characteristic sudden dives during flight in the presence of a predator, and seldom engaged in the typical swirling flight over the roost site, when the falcon was near the roost. FEARE (1984) observed a Peregrine Falcon chasing European Starlings *S. vulgaris* near the roost in England. He pointed out that shorter entry time into the roost was effective in avoiding attack by a predator. Our observation shows that Grey Starlings did not necessarily abandon a roost site as long as most of them were able to "outsmart" the predator, even if the predators attempted to attack them near the roost.

In the past few years, Peregrine Falcons have been observed in several parts of Sapporo in the other seasons as well (Hoshiko, the Wild Bird Society of Japan, Sapporo Branch, Nasu, Sato (per. comms)). In 1993, we also observed a Peregrine Falcon twice near the downtown area in July and once in Minami-ku in September. These observations may be the evidence that Peregrine Falcons stay regularly around Sapporo. Small-sized falcons, including *F. peregrinus*, are known to have advanced into the other urban areas (OBA 1993, RATCLIFFE 1993). It is highly probable that Peregrine Falcons will come back to this Grey Starling roost in downtown Sapporo to prey on them year after year.

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Literature Cited. ●FEARE, C., 1984. The Starling. Oxford, Oxford University Press. ●OBA, K., 1993. Zenkokushuyotoshi no Toshicho 1990 no Matome-Mokinrui. *Urban Birds* 10: 2-7 (in Japanese.) ●RATCLIFFE, D., 1993. The Peregrine Falcon. London, T & AD Poyser. ●TAKENAKA, M., 1992. A flock of Rosy Finch *Leucosticte arctoa* feeding on Gray Starling *Sturnus cineraceus* feces in downtown Sapporo. *Jap. J. Ornithol.* 40: 77-79.

札幌中心街でハヤブサに捕食されるムクドリ. 札幌の中心街で越冬するムクドリの塒周辺で、1991から1993年にハヤブサが観察され、ムクドリを襲撃するのが観察された。塒の広告塔には捕食されたムクドリの頭や脚、翼が落ちていた。1993年3月にはハヤブサがムクドリを捕らえるのを観察し、番と考えられる2羽の存在を確認した。ムクドリはハヤブサの襲撃にも関わらず塒に強い執着を示し、1991-92と1992-93の両期とも、塒を放棄しなかった。ハヤブサが近くにいるときはムクドリは、広告塔のかけから塒入りし、より速い速度で飛行した。急降下や群が1カ所にかたまりあう行動も観察された。このことから、多くの個体が捕食者を避けて安全に塒入り出来れば、捕食者の存在は必ずしもムクドリの塒放棄にはつながらない事が明らかになった。近年、札幌周辺でもハヤブサの目撃が増えており、ムクドリの冬塒での捕食はこれからも続くことが予想される。——竹中万紀子・竹中 践

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