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Source: Acta Ornithologica, 35(2) : 217-221

Published By: Museum and Institute of Zoology, Polish Academy of Sciences

URL: https://doi.org/10.3161/068.035.0205

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ACTA ORNITHOLOGICA
Vol. 35 (2000) No. 2

Can food caching increase frequency of chicks' feeding in urban Kestrels *Falco tinnunculuc*?

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Rejt Ł., Turlejski K., Bronche K., Topczewski A. M. 2000. Can food caching increase frequency of chicks' feeding in urban Kestrels? Acta orn. 35: 217–221.

Abstract. Continuous video camera observations of the Kestrel's nest situated on a building within the city centre showed presence of a surplus prey (mainly untouched sparrows and voles) stored in the nest and its close vicinity. During the first three weeks of the nestling period, chicks were fed this prey, and the frequency of feedings was higher than the frequency of prey delivery. Food storaging was also observed in some other nesting places of Warsaw Kestrels.
Daily pattern of prey deliveries observed in Warsaw did not differ significantly from the available data on Kestrels inhabiting an open landscape.

Key words: Kestrel, *Falco tinnunculus*, urban area, food caching, feeding frequency

Received — Sept. 2000, accepted — Oct. 2000

INTRODUCTION

Caching of surplus food both during breeding season and out of this period has been recorded in a wide range of raptors, amongst others in the Peregrine Falcon *Falco peregrinus*, Eleonora Falcon *F. eleonorae*, Aplomado Falcon *F. femoralis*, Orange-breasted Falcon *F. deiroleucus*, Gyrfalcon *Falco rusticolus*, Goshawk *Accipiter gentilis*, Ferruginous Hawk *Buteo regalis*, African Crowned Eagle *Stephanoaetus coronatus*, Golden Eagle *Aquila chrysoaetos* (Schnell 1958, Vaughan 1960, Brown 1966, Angell 1969, Newton 1979, del Hoyo et al. 1994, Schneider & Wilden 1994, Watson 1997, Cade et al. 1998). In several cases prey that was unfinished at one meal were gathered away from the nest, on an old nest or in the fork of a tree, and brought back on another occasion (Newton 1979).

In Kestrels inhabiting open landscape, whole or partly eaten prey is often cached (hiding) by hunting birds or by incubating females — in most cases on the ground (Leaver 1951, Clegg 1971, Parker 1977, Village 1998). One obvious function of caching is to store prey that has been caught more frequently than is needed to satisfy hunger; due to caching, Kestrels may also continue hunting during times of increased food availability as well as be ensure that food is available for an evening meal (most obvious in winter) (Village 1990).

Despite recent wide Kestrel's occurence in most of European cities (e.g. Cramp 1980, Pikula et al. 1984, Plesnik 1985, 1991, Gillbert 1989, Romanowski 1996, Mizera et al. 1997, Salvati et al. 1999) food storing has been rarely observed in such habitats (Witkowski 1962a, Pikula et al. 1984). Urban Kestrels in Central Europe hunt mainly in the outskirts of towns and therefore voles comprise the bulk of prey. They are caught even several kilometres from the nest (Pikula et al. 1984, Romanowski 1996, Rejt & Romanowski 2000). It cannot be excluded that sometimes it may be hard to deliver enough prey for chicks, especially in a period of time when the long-distance flights are impossible or difficult to manage. It may be crucial during the nestling peri-

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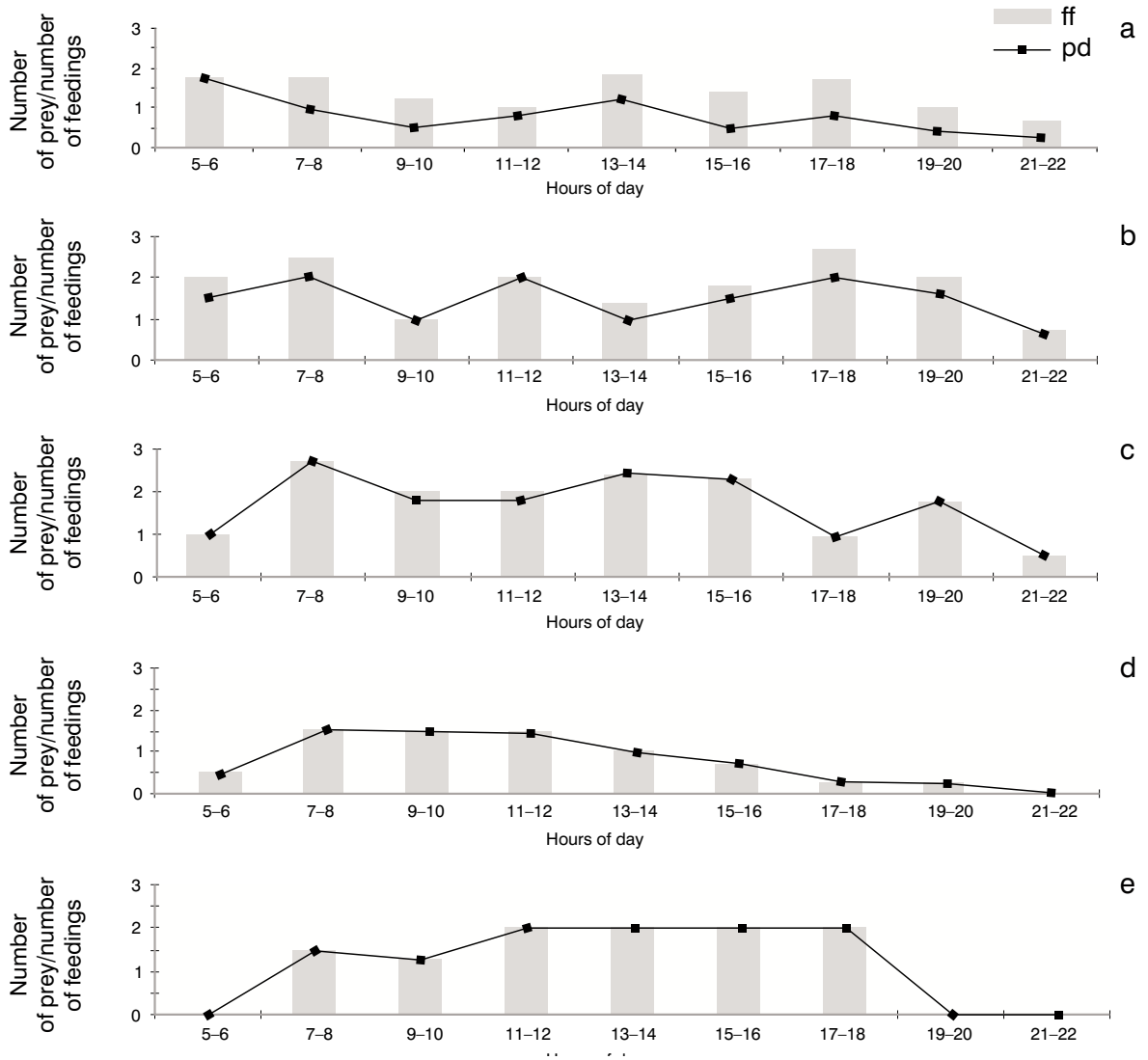

Fig. 1. Daily distribution of prey deliveries to the nest and number of feedings during five weeks of nestling period (a, b, c, d, e). pd — prey delivery, ff — feeding frequency.

od when continuous food delivery could enhance the development of young.

The aims of the present study were to investigate if Kestrels under urban conditions cached the food and how these prey sources were exploited during the nestling period.

MATERIAL AND METHODS

Data were collected in Warsaw (21°E, 5°23'N), central Poland, during the breeding season 2000. A chosen Kestrel's nest (where in previous years food caching was observed) situated in the centre of the city (in the Parlament's building) was observed continuously with the video camera (STEP KPC-400) placed within the breeding niche. In total 424 hours of observations made during the whole nestling period (i.e. period after hatching of the first young) were analysed. The consecutive weeks (I–V) contributed: 88h, 59h, 126h, 108h, 43h of observation, respectively. The number of parents' visits to the nest with prey (defined as number of prey deliveries), and the number of chicks' feedings episodes (feeding frequency) were registered. Additional data concerning presence of prey storage within the Kestrels' nests were completed from 6 other nests during the 1999 and 2000 breeding seasons. All investigated nests were placed on buildings in the centre of Warsaw. Prey found in nests were considered as a food storage if among remains there were at least two untouched items.

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RESULTS

During the first three weeks of the nestling period, prey delivery had a similar pattern — items were brought to the nest throughout the day, but the frequency of delivery was usually lower during the late afternoon and early evening (Fig 1a, b, c). In late stage of the nestling period (IV and V week) deliveries were most frequent during late morning and/or early afternoon and were almost absent in the evening as well as in the early morning (Fig. 1d, e). At the beginning of the nestling period, prey were delivered almost exclusively by male, but starting from the third week also female was bringing kills for chicks.

The average number of prey items brought to the nest by adults changed during the nestling period (Fig. 2). At the beginning, parents delivered over 7 kills daily, then their number increased to over 13 in the second week and to about 15 items in the third week. During the next two weeks delivered prey number changed significantly, decreasing to over 7 specimens and then increasing to almost 11 per day.

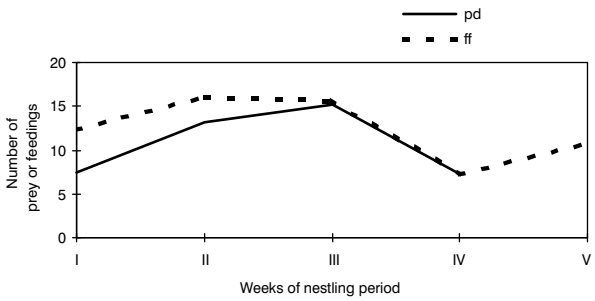

Fig. 2. Rate of prey delivery and feeding frequency during nestling period. pd – prey delivery, ff – feeding frequency.

During the first three weeks of chicks' life numerous events of food caching (i.e. leaving the uneated prey) were observed. There were both untouched and headless prey items. Female exploited this source exclusively for feeding the young. Just after hatching chicks were fed more frequently than the prey were delivered to the nest (Fig 1a), although no connection with time of the day was found. During the next two weeks differences between feeding frequency and delivery frequency gradually decreased (Fig. 1b, c). During the last two weeks of the nestling period there was no difference between the frequency of deliveries and frequency of feedings (Fig. 1d, e).

Among other six Kestrels' nests visited in the first week after hatching, surplus food inside the nest niche was found in four of them. In two cases (one of them was open nest) the storage was placed outside the nest, but in its close vicinity. Number of prey cached varied between 2 and 5 items. Among them sparrows *Passer domesticus* composed almost 80%, while voles *Microtus* spp. were significantly less numerous (about 20%). Headless or injured prey were scarce. Additional controls carried out in subsequent weeks showed absence of cached food.

DISCUSSION

The feeding frequency (i.e. frequency with which adult birds feed their nestlings) being the phenomenon dependent on food availability, is one of the most important limiting factors affecting nestling condition during the early stage of the nestling period (e.g. Brown 1976, Newton 1998). Some authors stated a slightly higher breeding success in urban Kestrels compared with those nesting in an open landscape (Pikula et al. 1984, Plesnik 1990, Plesnik & Dusik 1994). There is no doubt that continuos food supply (from several feedings on the same prey) may positively affect chicks' condition, especially during early stage of their development. Pikula et al. (1984) in their work concerning urban Kestrels stated that setting up food stores within the nest site was probably a synurban adaptation, brought about by the location of nests. In the open landscape a relatively small stick nests occupied by Kestrels could be too small for food storing. Similar phenomenon has been observed in some European cities. In Brno Pikula et al. (1984) found in the nest with six-day-old chicks a food storage comprising 55 specimens: 74% composed voles, but also birds and lizards. In another nest there were 12 items. Females were also observed caching food while incubating.

Experimental supplementation of food during the nestling stage showed an increase of chicks survival in several bird species (Newton 1998). It is also known, that in the years of average vole densities some pairs of Rough-legged Buzzard *Buteo lagopus* hatched their eggs but did not rear their young (see Hagen in Newton 1979). Rural Kestrels due to their trophic flexibility are not so sensitive to fluctuations in the voles' number (Newton 1979, Village 1990, Plesnik & Dusik 1994). In the cities where Kestrels appeared only some decades ago they may apply strategies that allow them to avoid problems with irregular availability of prey more frequently than outside the towns. In an Eleonora

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Falcon untouched carcasses or portions of them rare at first became increasingly abundant after the hatching of chicks (Vaughan 1961). This raptor which feeds from the waves of migrant birds passing its territory may have to rely on the cache on occasional days when the flow of migrants is broken (Newton 1979). In the late stage of the nestling period chicks can tear the prey themselves and they need more items per day. So it is impossible to catch enough to feed them and cache in the same time. The cease of caching has been also observed in Gyrfalcon (Cade et al. 1998). Male's surplus food deliveries probably does not depend on the behaviour of the female although hen may probably influence male's hunting efforts (Petersen in Witkowski 1962b). Chicks' begging can be also rejected as a main factor affecting the frequency of prey deliveries in the early nestling stage (Masman et al. 1988b). In Warsaw fledgled young fed *ad libitum* outside the nest cached a surplus food in various hidding places (unpubl. data). This suggests that caching behaviour is instinctive.

Investigations carried out in Warsaw supported scarce data on the daily pattern of prey delivery known for Kestrels inhabiting open landscapes (Village 1990). Changes in prey delivery rates during the nestling period were generally similar to those observed by Tinbergen (1940) and Masman et al. (1988a), and to those observed in other species of birds of prey (Green 1976, Newton 1979, Watson 1997).

Caching of food by urban Kestrels and it subsequent exploitation can significantly increase the frequency and regularity of feedings during the early stage of the nestling period. It may become a strong factor influencing chicks' survival.

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STRESZCZENIE

[Użytkowanie zapasów pokarmu przez pustułki w Warszawie]

W 2000 r. dzięki kamerze umieszczonej w gnieździe pustułek w centrum Warszawy

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przeprowadzono ciągły monitoring częstotliwości dostarczania pokarmu i karmień piskląt (Fig. 1). W czasie obserwacji stwierdzono, że młode podczas pierwszych trzech tygodni życia są karmione częściej, niż wynika to z częstotliwości dostarczania zdobyczy przez rodziców (Fig. 2). Przyczyną były wielokrotne karmienia piskląt zdobyczą składowaną w obrębie gniazda. W ostatnich dwóch tygodniach przebywania piskląt w gnieździe ofiary były konsumowane przez młode pustułki natychmiast po przyniesieniu przez dorosłe ptaki. Składy ofiar (2–5 wróbli i norników) znaleziono także w innych gniazdach znajdujących się na budynkach w centralnej części Warszawy (kontrole przeprowadzono w 1999 r. i 2000 r.).

PODZIĘKOWANIA

Obserwacje gniazda pustułek były możliwe dzięki wsparciu Kancelarii Sejmu RP. Autorzy składają również podziękowania pracownikom Biura Gospodarczo-Technocznego Kancelarii Sejmu RP i Archiwum Sejmu za wszechtronną pomoc okazaną w trakcie trwania badań.

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