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NESTLING DIET OF URBAN KESTREL (*Falco tinnunculus*) IN ESKİŞEHİR, TURKEY

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Özet
Kerkenezlerin üreme dönemindeki beslenme alışkanlıkları 2018 yılında, Osmangazi Üniversitesi Meşelik kampüsü, F5 blokta çalışılmıştır. Çalışmanın amacı, kerkenezlerin üreme döneminde yavrularını hangi avlarla besledikleridir. Kamera kayıtlarından toplamda 67 av tanımlanmış ve görüntüler dahilinde tanımlanamayan av olmamıştır. Belirlenen yuvadaki kerkenez çiftinin detaylı üreme biyolojisi Sony XR520VE video kamera ile takip edilip analiz edilmiştir. Ayrıca, başka bir açıdan Canon EOS 7D ve Canon 500 mm II ile hangi besinlerin getirildikleri tespit edilmiştir. Sonuç olarak çok bacaklılar (Myriapoda) en baskın av grubu olarak ortaya çıkmıştır.

Anahtar Kelimeler: Yuva İzleme, Kerkenez, Üreme, Türkiye

Nestling Diet of Urban Kestrel (*Falco tinnunculus*) in Eskişehir, Turkey

Abstract
The diet of the urban Common Kestrel (*Falco tinnunculus*) was studied in F5 building on Meselik campus in Eskisehir Osmangazi University in breeding season year 2018. Our purpose was to identify what kind of preys they hunted and fed their nestlings during breeding season. 67 prey items were identified by the analysis of camera records. Kestrel couple were captured and followed by Sony XR520VE high definition camera and we had and analyzed video to determine the details of the incubation biology of kestrels and what kind of foods were fed by the parents during the breeding season. Also, we observed that couple with Canon EOS 7D and Canon 500 mm II lens for what foods were fed by parents during the breeding season. As a result, Myriapoda, mainly represented by order Chilopoda, was found to be most plentiful prey.

Keywords: Nest Monitoring, Kestrel, Breeding, Turkey

1. INTRODUCTION

Most of the raptors stay out of city center due to limited food supply. However, kestrel have adapted to live in urban. For this reason, it's critical to find what do they eat in the most important life cycle of them. So, differences in eating habits from other raptors can be determined.

Video monitoring which is the partially new way of following nests of birds has to let collection of datum on prey deliveries at raptor nests. Breeding season of the common kestrel ensures discovering new nests. Incubation time of birds also has attracted researchers' attention for years. So, it was a great opportunity to find incubation behavior and feeding ecology of these small raptors.
Behavior of the post and pre ovulation of the kestrel colonies was studied in Spain and fledging behavior is linked beginning of the hovering flight (Bustamante, 1994). Another study (Boileau and Bretagnolle, 2014) explained that beginning time of the fledgling needs enough body condition. Also, urbanization has influenced breeding success since the landscape began to change but kestrels have adapted to live near human (Charter et al., 2007). Insects are extremely important food supply for areas near the urban (Kečkéšová and Noga, 2008). Furthermore, these raptors prefer to find small mammals and birds when they hunt out of urban to increase biomass of the prey which ensures more energy (Korpimäki, 1985a). Swifts and bats also can be a prey for kestrel (Mikula et al., 2013). As it can be guessed, there are many differences in diets between Africa and Europe for kestrels (Van Zyl, 1994).

Diet in breeding season studied in different countries and ecosystems. In China, mammalians were observed significantly and findings changed by periods of breeding (Geng et al., 2009). In Finland, Vole was the most abundant prey group in different nests and other small birds were intense (Korpimäki, 1985b). In Berlin, Germany, Sparrow was the most common prey there was no suburb gradient in prey groups (Kübler et al., 2005). In Spain, due to earlier breeding period than Europe, most abundant prey group was insects and small mammals were seen at end of the breeding period (Gil-Delgado et al., 1995). All of these works and others (Uttendorfer, 1952; Korpimäki, 1986; Uttendorfer, 1997; Plesník,1992; Romanowski, 1996) studied by pellet analyzes and contain complex information about diet of kestrels. Impacts of hunting success, food variation on breeding success also analyzed detailed (Reigert & Fuchs 2004, Reigert et. al. 2007). Feeding ecology of the Common Kestrel was of a no interest to authors in Turkey. We haven't founded any published about diet of Common Kestrel in Turkey.

2. METHOD

This study was conducted in the Eskisehir Osmangazi University Campus at Eskisehir located between Ankara and Bursa at 2600 feet at the sea level. The average annual rainfall is 367.1 kg/m^2. The daily temperature mean minimum of -27.8 °C in 2016 to a mean maximum of 38°C in 2016.

The kestrel couple were captured and followed by Sony XR520VE high definition camera and we had and analyzed the 1- Terabyte video to determine the details of the incubation biology of Kestrels and what kind of foods were fed by the parents during the breeding season (Figure 1).

Figure 1: Position of the camera provides good angle for monitoring the nest. Lacertidae family was the common prey for nestlings. It can be seen that parents throw the prey completely to large nestlings.

Also, that couple was observed by Canon EOS 7D and Canon 500 mm II lens for what foods were fed by parents during breeding season (Figure 2). All videos studied frame by frame on The KMPlayer. Our Sony camera was settled near the nest. All power of camera was taking from building. Also, all recordings were written to external HDD by Sony XR520VE camera. We used Canon 7D and Canon 500 mm II lens ourselves. All videos were recorded from opposite of the nest. With this method we identified 20 different prey that we couldn't identified with Sony cause of angle. All videos were taken from sunrise to sunset.

Figure 2: Second angle of the camera provides to determine prey which is undetermined due to shape of the nest and movements of the nestlings.

3. RESULTS

Male was bringing foods to their mate at least one week before ovulation and the male continued to this until the nestlings are two weeks old. It was observed that the female ate the hunted animal in the nest or in the window next to the house. Also, after babies came out from their eggs both male and female kestrels hunting and brought the preys directly to nestling, was observed. The hunted foods were given shattered by their parents at the first time. When they got 2 weeks older, the offspring were seen as their parents threw their preys among them. As a result of video analysis, it is determined that parents feed their nestlings according to their density levels lizards, small mammalians, grasshoppers, centipedes and small birds especially house sparrows (Table).

Table: Number of total findings and distribution by genders.

Prey Species or Groups in Total	Number of Hunting	Hunted by Male Kestrel	Number of Hunting	Hunted by Female Kestrel	Number of Hunting
Lacertidae	17	Lacertidae	11	Lacertidae	6
Insecta	17	Insecta	10	Insecta	7
Aves	7	Aves	3	Aves	4
Chilopoda	25	Chilopoda	16	Chilopoda	9
Rodentia	10	Rodentia	5	Rodentia	5

Results showed that Chilopoda was dominated all breeding season. Especially late of season, Chilopoda picked up to top. At the first Lacertidae and Insecta were counted more than others. According to this situation when female kestrel waited for nestlings, male kestrel found them. We thought that this time, early breeding season, Lacertidae reproduction was very high. Also, at this time it was extremely easy to find insect. After first period of breeding season, female kestrel left their nestlings in the nest. Female Kestrel hunted Aves more than male. It looks very small differences between them but 1 more is important in 7 prey items. In our opinions, cause of this situation was Female Kestrel didn't want to leave their nestlings for a long time and she generally attacked to nearest prey.

4. DISCUSSION

Kestrels are really active in breeding season thanks to nice aerodynamic specification. They can be seen while thermalling, hovering or flapping flight in that season. However, they

generally were spotted near building where the nest was settled in. In our study area, there was no agricultural area but there was enough wild herbs and little forest provide food supply. Therefore, vole wasn't spotted as a prey in contrast Korpimäki's study (Korpimäki, 1985b). Nearest results to our results are work was conducted in Spain (Gil-Delgado et al., 1995), invertebrates are dominant in both studies.
The method of video recording is easier and more useful way for researchers. Sometimes, it's hard to determine species from pellets due to damaged bones and etc. Also, lost pellets are another problem. With video monitoring, determination at least family level is possible and with external batteries and solar power systems, cameras can be installed out of urban and non-electric zones.

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