

NEST OCCUPATION AND PREY GRABBING BY SAKER FALCON (*FALCO CHERRUG*) ON POWER LINES IN THE PROVINCE OF VOJVODINA (SERBIA)

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Abstract — Research on nest occupation and prey grabbing by saker falcon (*Falco cherrug*) on power lines in Vojvodina (Serbia) was done in the period from 1986 to 2004. During three specially analyzed periods, saker falcon took the nests of raven (*Corvus corax*) in 91% of a total of 22 cases of nest occupation, and those of hooded crow (*Corvus corone cornix*) in only 9%. Saker falcon regularly grabs prey from different birds that occasionally or constantly spend time around power lines [Kestrel (*Falco tinnunculus*), hobby (*Falco subbuteo*), hooded crow (*Corvus corone cornix*), jackdaw (*Corvus monedula*), marsh harrier (*Circus aeruginosus*), hen harrier (*Circus cyaneus*), buzzard (*Buteo buteo*), and raven (*Corvus corax*)]. One year a studied pair of saker falcons on a power line in Donji Srem, Serbia grabbed prey from five different species of birds. Out of a total of 40 cases of prey grabbing in the period from January to December, as much 70% of the grabbed prey was taken from kestrel (*Falco tinnunculus*). During the winter and early spring, prey was grabbed predominantly by males; after May, prey was sometimes grabbed by females as well. Most of the grabbed prey was common vole (*Microtus arvalis*).

Key words: *Falco cherrug*, nest occupation, prey grabbing, power lines, Vojvodina, Serbia

UDC 598.24(497.113):591.5

INTRODUCTION

Power lines represent a new structural element in the habitat of birds. Owing to their special characteristics and significant alteration of the areas where they are erected, power lines have forced birds to adapt to new living conditions (Ferrer and Janss, 1999; Puzović and Krnajski, 2007). The adaptation of birds to using power lines has led to changes in seasonal or permanent living, behavior, nesting biology, size and shape of nesting territory, ecology, and kinds of prey (Jalkotzy et al., 1997; Negro, 1999; Janss, 2001).

Several previous studies treat the reproduction of saker falcon (*Falco cherrug*) on power poles in agricultural areas, occupation of vacant or taking of inhabited nests from corvids (birds of the *Corvidae* family), and the phenomenon of prey grabbing from other birds of prey (Cramp and Simmons, 1980; Snow and Perrins, 1998; Bagyura et al., 2003, 2003a).

Before the appearance of power lines, saker falcon (*Falco cherrug*) lived in steppe and forrest-steppe habitats, where it nested in lonely trees or on the edges of forests, as well as on rocks and loess outcrops (Snow and Perrins, 1998; Galushin, 2004). This species has significantly changed its nesting places and nourishment in the second half of the 20th century in countries of the Pannonian Plain, especially in Hungary, Slovakia, and Serbia (Obuch and Chavko, 1997; Bagyura et al., 2003a; Puzović, 2000). Because of environmental changes (plowing of steppe land, deforestation, disappearance of traditional prey), this species in many countries of Central Europe and Ukraine has begun to frequent agricultural areas near smaller settlements (Demeter and Nagy, 2005; Karyakin, 2005). Saker falcon is one of the most endangered birds of prey in the world: in 2006 BirdLife International put it in category EN (endangered). In Serbia it was proclaimed a natural rarity in 1993 (Official Gazette of the Republic of Serbia, 50/93).

The nesting habitats of saker falcon in Serbia are mostly in Vojvodina (95% of the total number), and almost all pairs nest on power poles (Puzović, 2000, 2007). It is most numerous in South Banat, East Srem, and Southeast Bačka. Nesting usually begins in the second half of February. Its food predominantly consists of mammals and middle-sized birds. The given species mostly hunts small rodents, ground squirrels, and hamsters among mammals, and pigeons and starlings among birds. It attacks prey both on the ground and in the air (Bağyura et al., 2003).

The total world population is estimated to be 5,000 to 8,000 nesting pairs, while in Europe there are 450 to 600 pairs distributed in 16 countries, which represents approximately 7% of its total in the world (Burfield and Bommel, 2004; Dixon, 2006; Demeter and Nagy, 2005). The most important nesting places are in Ukraine, Hungary, Serbia, and Slovakia. The total population in Serbia was estimated to be 55-60 nesting pairs in 1994-1996 (Puzović et al., 2003). In the period of 1994-2006, the total was estimated to be 52-64 pairs, which means that it has stagnated in the last decade, although locally it has increased in some places and decreased in others.

MATERIAL AND METHODS

Facts about the content, size/density of the nesting population, and the distribution and kinds of nesters that nest on power poles in Vojvodina were collected in the field during the period of 1986-2004. Observations were conducted along power lines partly modified versions of the minimal and limited transect methods and on-the-spot censuses (Matvejev, 1988; Ham, 1986; Bibby et al., 1992) in conjunction with detailed mapping of the birds' nests at the beginning of reproduction and their regular checking. The work covered all high-voltage power lines in Vojvodina, and special attention was paid to the region of Srem, where there are about 730 km of power lines (110, 220, and 400kV) with a total of 2,450 metal power poles.

For mapping of nesting pairs of birds of prey on power lines, two methods were used according

to Vorišek (1995): 1) entering of nests on a map (the nest-mapping method); and 2) census of territories where pairs were spotted on their wedding flight (the displaying pairs method). In more than 90% of cases, the first method was chosen because of terrain clarity. Census-taking was done by walking under power poles in the direction of the conducting cables regardless of the type of soil below. An all-terrain vehicle was sometimes used for this purpose. Both the species which occupied a nest and the species which made it were recorded. The years of detailed census-taking were 1986, 1994, and 2004.

Facts about prey grabbing from other birds by saker falcon were collected throughout the whole research period. Detailed monitoring of a saker falcon pair was conducted on a chosen power line near the locality of Preka Kaldurma in Donji Srem throughout a calendar year (1994) and involved 28 equally distributed all-day recordings/censuses on the spot. Appropriate photographs were taken, and samples of food under the nests were collected.

RESULTS AND DISCUSSION

Changes in the lifestyle of saker falcon (*Falco cherrug*) as a consequence of permanent or temporary residence on power lines in the middle of intensely cultivated agricultural areas and near settlements and traffic arteries in Vojvodina include changes of behavior, nesting biology, and feeding ecology.

Nest occupation by saker falcon

One of the especially important specificities of nesting on power lines by saker falcon is its dependence on other species of birds, which is manifested in occupation of nests made by corvids (birds of the *Corvidae* family). Different species of falcon usurp/occupy nests on power lines from other birds, above all from raven (*Corvus corax*), but also from hooded crow (*Corvus corone cornix*) and sometimes even from the European magpie (*Pica pica*).

In Vojvodina saker falcon (*Falco cherrug*) predominantly occupies the nests of raven (*Corvus corax*), which is the best nest builder on power lines, and rarely those of hooded crow (*C. corone cornix*).

Crow's nests are also occupied by hobby (*Falco subbuteo*) and kestrel (*Falco tinnunculus*). However, these species usurp fewer nests and often occupy ones that are abandoned or unoccupied.

Falcons are forced to usurp nests in deforested agricultural areas for several reasons, above all because environmental conditions favorable for nesting or alternative nesting places do not exist. More than 70% of all nests on power poles from the previous building season do not survive until the next season, so falcons directly depend on whether ravens and crows build their nests on power lines again.

During three specially analyzed periods (1986, 1994, and 2004), there were no significant changes in the phenomenon of usurpation/occupation of raven's and crow's nests by saker falcon. In all three periods, saker falcon took the nests of raven (*Corvus corax*) in 91% of a total of 22 cases of nest occupation, and those of hooded crow (*Corvus corone cornix*) in only 9%. This shows a stable tie of this large bird of prey with raven's nests. There were recorded only two cases involving occupation of the nests of hooded crow in 1994. In one of those cases, it was the first nesting of a young saker falcon pair near the Voika settlement.

Saker falcon (*Falco cherrug*) usually does not occupy a raven's nest while the ravens are forming a brood, but after nest building. This is significant from the aspect of maintenance of the raven population on power lines because this species then builds a new nest and forms a brood faster and more successfully. During research in Poland, when some nests of raven (*Corvus corax*) with eggs and a brood in them were destroyed and predation was simulated, pairs exposed to such circumstances often left the nesting location (Tryjanowski et al., 2004).

Installing artificial nesting platforms and boxes on high-voltage power poles and development of cooperation with power companies can help saker falcon become significantly independent of the need to occupy or usurp the nests of other birds. In Hungary and Slovakia, saker falcon nowadays nests mainly on installed nesting platforms and boxes

(Bagyura et al., 2003, 2003a).

Prey grabbing by saker falcon from other bird species

On power lines saker falcon (*Falco cherrug*) regularly grabs prey from different birds that occasionally or constantly spend time on the lines. In Vojvodina saker falcon grabs prey from other species of falcon which nest on power poles or close to them (kestrel *Falco tinnunculus* and hobby *Falco subbuteo*); from nesters of the crow family (hooded crow *Corvus corone cornix* and jackdaw *Corvus monedula*); and from species which migrate over the area (marsh harrier *Circus aeruginosus* and hen harrier *Circus cyaneus*) (Puzovic, 2007a).

Although group hunting is known for some other large falcons, there is very little information about such behavior in saker falcon (Bagyura et al., 2003a). Baumgart (1991) mentions that, like other birds of prey, saker falcon has 'the will for cooperation' when it hunts and that will is not reduced in nesting pairs. Cramp and Simmons (1980) characterized saker falcon as an unsocial and solitary species that most of the year hunts prey on its own.

There is very little information about parasitism of saker falcon on other birds that hunt their prey, usually small rodents ('joined parasitism'). One described case involved grabbing of prey from a kestrel (*Falco tinnunculus*) that had caught a mouse, and another was when falcon chased a sparrowhawk (*Accipiter nisus*) that had caught a blackbird (*Turdus merula*) (Baumgart, 1991, 1994). Bagyura et al. (2003a) were the first to consider the propensity of this species to grab prey from other birds during the non-nesting period. In Hungary it took prey from buzzard (*Buteo buteo*) (53%), hen harrier (*Circus cyaneus*) (20%), kestrel (*Falco tinnunculus*) (16%), rough-legged hawk (*Buteo lagopus*) (5%), goshawk (*Accipiter gentilis*) (4%), and sparrowhawk (*Accipiter nisus*) (2%). The authors emphasized that the male has the main role in more than 90% cases of prey grabbing, and that cases of prey grabbing were few during the nesting period. Cramp and Simmons (1980) and Snow and Perrins (1998) do not mention such a phenomenon in the

Table 2. Analysis of seasonal prey grabbing by a saker falcon (*Falco cherrug*) pair from other species of birds on power lines near Karlovčić, Srem area, 1994.

Species robbed	Month												Total
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
<i>F. tinnunculus</i>	1	3	4	6	4	5	1	0	0	0	2	2	28 (70%)
<i>B. buteo</i>	1	1	0	1	0	0	0	0	0	0	1	0	4 (10%)
<i>C. cyaneus</i>	0	2	1	0	0	0	0	0	0	0	0	0	3 (7%)
<i>C. aeruginosus</i>	0	0	2	2	0	0	0	0	0	0	0	0	4 (10%)
<i>C. corax</i>	0	0	0	1	0	0	0	0	0	0	0	0	1 (3%)
All five species	2	6	7	9	5	5	1	0	0	0	3	2	40
%	5%	15%	17%	23%	12%	12%	3%	0	0	0	8%	5%	100%

behavior of saker falcon.

As can be seen from Table 2 and Fig. 1, a saker falcon (*Falco cherrug*) pair grabbed prey from five different kinds of birds on a power line near Preka Kaldurma (Karlovčić) in Donji Srem in the course of a year (1994). Out of a total of 40 recorded cases of prey grabbing in the period from January to December, most of them (70%) were from kestrel (*Falco tinnunculus*). Prey grabbing in the period of winter and early spring was done predominantly by the male, while after May it began to be done by the female, too. At the beginning of the reproduction period, the saker falcon pair did almost no hunting of living prey, but concentrated on prey grabbing from other birds of prey.

Success in prey grabbing is significantly greater than when the falcon hunts living prey on a wider area. To conserve energy, the pair focused on prey grabbing from species that frequent power lines. Prey was grabbed from migrating hen harriers (*Circus cyaneus*) during February and March, and from marsh harriers (*Circus aeruginosus*) in March and April. The male falcon successfully grabbed prey from buzzards (*Buteo buteo*) throughout the winter and early spring, but it tried to do so from a raven (*Corvus corax*) only once, the raven being one that nested on a nearby power pole. On the basis of results of research on feeding ecology of saker falcon in Donji Srem and in other parts of Central Europe,

it can be ascertained that common vole (*Microtus arvalis*) represents a large part of the grabbed prey.

The female saker falcon behaved in a rather reserved and peaceful manner: it seldom flew away from the male, hunted less, and mainly stayed on power lines around the nesting place. It prepared for incubation in that way. In most cases, the female was given food by the male, food which it had grabbed or hunted by itself. During that period, the prey consisted mostly of small rodents and much less of birds. It was not before the middle of April that the pair's diet started to include many more domestic pigeons, which were hunted by the falcons in the nearby villages and over cultivated land. Then prey grabbing from other species of birds became much less present. From the beginning of May to the end of June, the falcons brought an average of two pigeons a day back to the nest, sometimes even three. There is a special ritual of prey giving and feeding. During the early spring, falcons eat their prey mainly on clods of nearby plowed fields or on bare soil, but from May to June they eat on power poles because then the vegetation below them is much higher.

The phenomenon of prey grabbing by saker falcon is probably present throughout most of the year, yet it is extremely seasonal. Of all cases of prey grabbing during the year by the couple analyzed in Srem, 15% were recorded in February, 17% in March, and 23% in April. Then the phenomenon decreases in

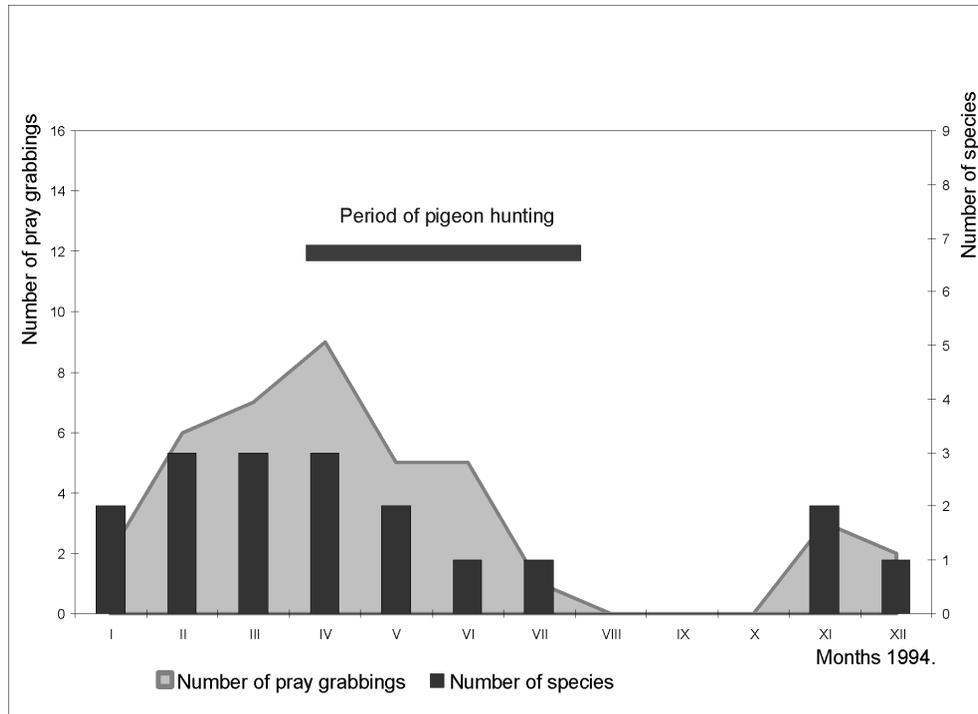


Fig. 1. Yearly dynamics of prey grabbing from other species of birds and period of significant participation of domestic pigeons in the feeding ecology of saker falcon (*Falco cherrug*) on a power line near Karlovčić, Srem area, 1994.

May and June to 12% each month, seems to stop during the summer, gradually intensifies again and in late autumn. However, it is possible that even during the late summer and early autumn months there were occasional prey grabbings, as noted by Bagyura et al. (2003a), especially from kestrel (*Falco tinnunculus*) and buzzard (*Buteo buteo*), but they were not recorded because the falcons moved around a much wider area which could not be controlled adequately. In keeping with prey grabbing and occupation of the nests of other species, saker falcon (*Falco cherrug*) has significantly reduced its vocal communication on open areas with power lines. The birds have become quieter because of better terrain visibility, to be less noticed by man, and to be able to surprise other hunting species and grab prey from them.

CONCLUSION

Power lines offer birds certain benefits by offering them power poles for nesting and at the same

time satisfying several needs related to reproduction, retention of territory, resting, and hunting.

Saker falcon significantly modified its behavior and feeding ecology in countries of the Pannonian Plain during the second half of the 20th century, largely as a result of life on power lines.

During three analyzed periods (1986, 1994, and 2004), saker falcon occupied raven's nests in 91% of a total of 22 cases and the nests of hooded crow in only 9%. This indicates a close connection of this bird of prey with raven's nests on power lines. In 1994 only two cases of occupation of hooded crow were recorded.

Saker falcon occupies the nest of a raven after the nest has been built, which is significant from the aspect of preserving the population of raven's on power lines, where raven is the main nest builder. By installing artificial nesting platforms and boxes on

high-voltage power poles and by developing cooperation with power companies, saker falcon can be weaned from exclusive dependence on occupation of raven's nests.

Saker falcon regularly grabs prey from different birds that occasionally or constantly frequent power lines. Prey is grabbed from other species of falcon which nest on power poles or nearby (kestrel *Falco tinnunculus* and hobby *Falco subbuteo*), from nesters of the crow family (hooded crow *Corvus corone cornix* and jackdaw *Corvus monedula*), and from species which migrate over the area (marsh harrier *Circus aeruginosus* and hen harrier *Circus cyaneus*). The male saker falcon grabs prey from buzzard (*Buteo buteo*) during winter and early spring, and very occasionally tries to do so from ravens (*Corvus corax*) as well.

A pair of saker falcons grabbed prey from five different species of birds on a power line in Donji Srem in the course of a year. Of a total of 40 cases of prey grabbing during the period of January-December, as many as 70% were from kestrel. At the beginning of the reproduction period, the observed saker falcon pair did not hunt living prey very much, but rather focused on prey grabbing. In winter and early spring, grabbing was performed predominantly by the male, while after May it was sometimes

done by the female, too. Results of research on the feeding ecology of saker falcon in Srem and Central Europe indicate that a large portion of the grabbed prey consists of common vole (*Microtus arvalis*).

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ЗАУЗИМАЊЕ ГНЕЗДА И ПРЕОТИМАЊЕ ПЛЕНА ОД СТРАНЕ СТЕПСКОГ СОКОЛА (*FALCO CHERRUG*) НА ДАЛЕКОВОДИМА У ВОЈВОДИНИ (СРБИЈА)

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Истраживање заузимања гнезда и преотимања плена од стране степског сокола (*Falco cherrug*) на далеководима у Војводини (Србији) вршено је у периоду 1985-2007. Током три посебно анализирана периода, степски соко је од укупног броја заузетих гнезда (22), у чак 91% случајева заузео гнезда гаврана (*Corvus corax*), а свега у 9% случајева гнезда сиве врне (*Corvus corone cornix*). Степски соко врши редовно преотимање плена од различитих врста птица које се повремено или стално задржавају око далековода (ветрушка *Falco tinnunculus*, ластавичар *Falco subbuteo*, сива

врана *Corvus corone cornix*, чавка *Corvus monedula*, еја мочварица *Circus aeruginosus*, пољска еја *Circus cyaneus*, мишар *Buteo buteo*, гавран *Corvus corax*). Пар степског сокола (*Falco cherrug*) на далеководу у Доњем Срему у току једне године отимао је плен од 5 различитих врста птица. Од укупно 40 случајева преотимања плена у периоду јануар-децембар, чак 70% се односило на ветрушку (*Falco tinnunculus*). Преотимање је у периоду зиме и раног пролећа вршио пре свега мужјак, а од маја повремено и женка. Знатан удео у преотетом плену чини пољска волухарица (*Microtus arvalis*).