

Feeding Biology of the Saker Falcon *Falco cherrug* in Hungary

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ABSTRACT

The Hungarian Ornithological and Nature Conservation Society operates a special project for protecting the Saker Falcon. This provides opportunities to collect food remains from individual monitored nests, and over the past six years more than 1,000 prey items have been collected.

In Hungary the Saker Falcon breeds in two separate regions, in the low mountains on the one hand, in the plains and lowland forests on the other.

Each region has a very different food spectrum, and comparisons between the two are of considerable interest. The list of different prey is considerably greater in the lowlands. The current literature states that the suslik (ground-squirrel) is the principal food of the Saker Falcon, but our findings show that it constitutes less than 25% of the total.

INTRODUCTION

The feeding biology and diet composition of the Saker Falcon in Hungary has so far been little studied; occasional references to it are to be found in the literature (Boroviczeny 1958; Tapfer 1968; Bécsy 1978).

The first publication covering this theme was presented by Jánossy (1983), who collected together the scattered data derived from our 1977-1981 project, as described in this paper. True, we have data from Austria (Bauer 1955; Frey & Senn 1980), and also from northern Yugoslavia (Suetens & van Groenendad 1968), but these refer to analogous populations which, like ours in Hungary, are closely dependent on what their environment is able to provide. Whereas observations in Slovakia (see Svehlik & Šimák 1977) give pigeons as the preferred food of several pairs, the Suslik (Ground-squirrel *Citellus citellus*) is nevertheless regarded there as the principal prey.

Baumgart (1977) considered the distribution of the Suslik and the Saker to be mutually interdependent. Unfortunately it is not possible for us to-day to accurately reconstruct the true composition of the bird's diet at a time when the populations of both Saker and Suslik were at a considerable level.

METHODS

Throughout Europe all populations of the Saker Falcon are considered threatened, and from a number of regions it has been extirpated. As a result of protective measures, already initiated in 1975, the Hungarian population had almost quadrupled by 1991. If our efforts to protect this falcon

were to succeed, it became a matter of prime importance for us to understand its specific food requirements. Between 1986 and 1991 we accordingly analysed the data from 89 breeding attempts by 43 pairs.

The overwhelming majority of these data (1,940 prey items) were acquired while the young were being ringed and from prey remains collected after fledging. A further 332 prey items were identified by direct observation during round-the-clock nest wardening. These could be only partial, since on the one hand such observations were only occasional, so as to avoid undue disturbance at the nest site, whilst on the other hand prey brought by the adults to the nest was not always clearly identifiable. With small birds, only fragments are visible, whereas a Suslik is generally quite easily recognised; also, since the adults bring larger birds to the nest already plucked, these too can scarcely be identified with any certainty.

Identification of the bone remains collected from individual nests was made with the generous help of Prof. Dénes Jánosy, and we take this opportunity to express our indebtedness to him. One of the basic shortcomings in research of this kind has to be mentioned: since only very few bone remains of small prey survive, these prey are for the most part not detectable.

RESULTS

Highland region

During the study period we compiled data from altogether 56 successful breedings by 21 different pairs and covering 1,236 prey items.

From these data it became clear that, for the Saker Falcons that breed in the mountain regions, the principal prey are pigeons (up to 67%) as against Susliks (up to 22%). We concluded two different reasons for this: on the one hand, over the past thirty years the meadowland in this region has been widely developed for cultivation and buildings (in 1991 *ca.* 51% of the land surface in Hungary was under cultivation), with the consequent loss of habitat suitable for Susliks, so that the falcons have had to turn to new sources of food; on the other hand, there are ever greater numbers of homing pigeons crossing these mountains, many of which fly over our study area in a state of exhaustion and are easily taken by the falcons - a fact amply borne out by the heaps of pigeon rings which we found in the eyries.

Substantial populations of starlings and crows also contribute to the diet in some degree; these manifestly come from nests in the close neighbourhood and from newly-fledged, inexperienced young birds. In contrast with the lowland-dwelling Sakers, the proportion of pheasant and partridge in the prey is small, indicating on the one hand that the Saker does not necessarily have to hunt these larger birds, otherwise not so well suited to their needs, and on the other that our falcons do not hunt over areas developed for agriculture, being spared this necessity by the large numbers of pigeons passing through.

Table 1. Prey of Saker Falcons in the highland region.

<i>Rana</i> sp.	1	<i>Cornus frugilegus</i>	29
<i>Perdix perdix</i>	4	<i>Sturnus vulgaris</i>	43
<i>Phasianus colchicus</i>	2	Other	30
<i>V. vanellus</i>	16	<i>C. citellus</i>	262
<i>Streptopelia</i> sp.	17	<i>C. cricetus</i>	16
<i>Columba</i> sp.	812	Other mammals	4
		Total	1236

Significant differences in the consumption of Susliks in an analysis pair by pair reflect the fact that our falcons can only prey on the Suslik where substantial populations of the latter are available. Wherever such a Suslik colony exists, these by far outstrip the number of pigeons taken. Table 2 shows the food composition of a pair of "Suslik specialists" and Table 3 that of a pair of "pigeon specialists". (The data in Table 1 cover both Tables 2 and 4). The category "other birds" in Table

1 refers to the following species: Teal, Greater Spotted Woodpecker, Jackdaw, Jay, Blackbird, Song Thrush, other *Turdus* spp. and Hawfinch.

In addition to collecting prey remains fallen from the nest, we also obtained data from nest wardening. A comparison of the same falcon pair's diet identified by observation and bone analysis respectively leads to further interesting results (Table 4). While it is acknowledged that identification by observation is often impossible, nevertheless the list of items becomes larger and the number of Susliks even increases. The reason lies in the fact that whilst the young falcons digest the Susliks almost entirely, leaving very few remains, they barely attempt to eat any of the larger pigeon bones, which therefore remain more surely in the nest. The same phenomenon is to be found with all other, smaller prey.

Table 2. Collected prey items of a “Suslik-specialist” pair in the highlands.

<i>V. vanellus</i>	4
<i>L. ridibundus</i>	4
<i>Columba</i> sp.	17
<i>Corvus</i> sp.	13
<i>Turdus</i> sp.	1
<i>Sturnus vulgaris</i>	2
<i>C. citellus</i>	65
<i>C. cricetus</i>	7
Total	113

Table 3. Collected prey items of a “pigeon-specialist” pair in the highlands.

<i>Anas querquedula</i>	1
<i>V. vanellus</i>	2
<i>L. ridibundus</i>	1
<i>Columba</i> sp.	233
<i>Columba palumbus</i>	2
<i>C. oenas</i>	2
<i>C. frugilegus</i>	2
<i>C. monedula</i>	1
<i>G. glandarius</i>	1
<i>Turdus</i> sp.	2
<i>St. vulgaris</i>	7
<i>C. citellus</i>	27
<i>C. cricetus</i>	2
Total	283

2. Lowland region

This category includes all pairs breeding in the Great Plain of Hungary below 250m a.s.l. in small or large patches of woodland, floodplain forest, etc. During the study period we collected data from 33 successful nestings by 22 pairs, including 704 prey items which we analysed. Although we organised the wardening of nests in the lowlands, it was not possible to observe what prey the adults brought without causing undue disturbance, so that we were limited to an analysis of bone remains, the results of which are set out in Table 5. This clearly showed that in the lowlands the consumption of Susliks was substantially higher (30%), whilst that of pigeons was lower (47%). Pheasants and partridges also formed an important part of the diet here: among pheasants we recorded two each fully-grown cocks and hens, 12 poults and 24 indeterminates.

Interestingly, although there are widespread colonies of Rooks on the Great Hungarian Plain, we record only one instance of a Rook being taken by our falcons. Other bird prey consisted of 6 Ring-doves, 7 Thrushes, 1 Crested Lark and 1 other unidentifiable species.

Here in the lowlands we also found “pigeon specialists” in areas where no Susliks were readily available (see Table 6).

CONCLUSIONS

So far as the Hungarian population is concerned, the rather sweeping assertion in the literature that the Saker chiefly preys on Susliks has been only partly confirmed by our researches during the breeding season.

It is very difficult to be sure whether the high level of pigeon consumption first developed during the past thirty years, due to the increasing shortage of Susliks, or whether it has always been an important element in this region.

Table 4. Prey items identified by both observation and bone analysis.

Observation			Bone analysis			Observation			Bone analysis		
Pair A						<i>St. vulgaris</i>					
<i>A. querquedula</i>			-	1		Unidentified birds			4	-	
<i>V. vanellus</i>			-	2		<i>Talpa europea</i>			1	-	
<i>Columba</i> sp.			31	233		<i>Lepus europeus</i>			3	-	
<i>C. palumbus</i>			1	2		<i>C. citellus</i>			87	59	
<i>C. oenas</i>			1	1		<i>C. cricetus</i>			3	5	
<i>Streptopelia</i>			5	5		<i>Microtus</i> sp.			20	-	
<i>C. monedula</i>			-	1		<i>Mustella</i> sp.			1	-	
<i>G. glandarius</i>			2	1		Pair C					
<i>Turdus</i> sp.			19	-		<i>Reptile</i> sp.			1	-	
<i>T. merula</i>			2	-		<i>P. perdix</i>			-	2	
<i>A. trivialis</i>			1	-		<i>V. vanellus</i>			-	2	
<i>St. vulgaris</i>			2	7		<i>Columba</i> sp.			9	189	
<i>Passeriformes</i> sp.			3	2		<i>Streptopelia</i> sp.			1	3	
<i>Lepus europeus</i>			3	-		<i>Corvus</i> sp.			-	8	
<i>C. citellus</i>			52	27		<i>P. pica</i>			-	1	
<i>C. cricetus</i>			-	2		<i>Turdus</i> sp.			3	-	
<i>Microtus</i> sp.			22	-		<i>T. merula</i>			1	-	
Cockchafer			8	-		<i>St. vulgaris</i>			1	5	
Pair B						Unidentified birds					
<i>V. vanellus</i>			-	4		<i>T. europea</i>			-	1	
<i>L. ridibundus</i>			-	4		<i>Lepus europeus</i>			1	-	
<i>Columba</i> sp.			-	21		<i>C. citellus</i>			10	48	
<i>Streptopelia</i>			1	-		<i>C. cricetus</i>			2	5	
<i>Corvus</i>			2	9		<i>Microtus</i> sp.			8	-	
<i>Turdus</i> sp.			12	1							

Table 5. Collected prey items of lowland-dwelling Saker Falcons.

<i>P. perdix</i>	25
<i>Ph. colchicus</i>	45
<i>V. vanellus</i>	28
<i>Columba</i> sp.	330
<i>Streptopelia</i>	7
<i>Corvus</i>	1
<i>St. vulgaris</i>	25
Other birds	15
<i>C. citellus</i>	210
<i>C. cricetus</i>	13
Other mammals	5
Total	704

Table 6. Collect prey of lowland-dwelling A pigeon, and B Suslik specialist Saker Falcons.

	A	B
<i>P. perdix</i>		1
<i>Ph. colchichus</i>	14	-
<i>V. vanellus</i>		1
<i>Columba</i>	61	-
<i>Streptopelia</i> sp.		1
<i>Galerida cristata</i>	1	-
<i>St. vulgaris</i>	3	1
<i>Talpa europea</i>	1	-
<i>C. citellus</i>	13	35
<i>C. cricetus</i>	5	
<i>Lepus europeus</i>	3	-
Total	101	39

Since the Saker Falcon population in Hungary is continually and significantly increasing (25 pairs in 1975; 100 pairs in 1991), there is presumably a strong bias towards pigeons as more pairs lack available Suslik colonies. Even so, the visual observations made in parallel with the analysis of prey remains testify that the chances of pigeon bones surviving are substantially greater than those of Susliks or other small mammal or bird prey.

Our observations have also shown that the parent birds often remove prey remains from the nest,

simply dropping them some distance away.

All the data presented here derive from the breeding season when, for three weeks after the chicks hatch, only the male hunts whilst the female feeds them. After the fourth week both parents go hunting in order to meet the growing demands of the young for food.

Our observations have also established the fact that the parents "store" captured prey temporarily. This occurrence is demonstrated by the fact that, only a few minutes after leaving the nest, the male will return with a fully-plucked pigeon (sometimes no longer fresh).

The analysis of bone remains and visual observations combined, covering 2,272 identifiable prey items, are presented in Table 7. Where identification cannot be positively made by visual observation, these data have naturally been omitted.

Table 7. Total of prey items recorded in the diet of Saker Falcon in Hungary 1936-1991.

<i>Coleoptera</i>	8	<i>Streptopelia</i>	31
<i>Reptilia</i>	1	<i>Corvus</i>	32
<i>Rana</i> sp.	1	<i>St. vulgaris</i>	71
<i>P. perdix</i>	29	Other birds	98
<i>Ph. colchicus</i>	47	<i>C. citellus</i>	622
<i>V. vanellus</i>	44	<i>C. cricetus</i>	34
<i>Columba</i>	1186	Other mammals	68
		Total	2272

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