

Food of the Egyptian Vulture (*Neophron percnopterus*) in Biscay

Potrava supa mrchožravého (*Neophron percnopterus*) v Biskajské oblasti

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ABSTRACT. We studied the diet of the Egyptian Vulture in Biscay, northern Iberian Peninsula, between 2000-2003. We monitored adults in territories, searched for nests, and collected food remains in nest and platform. We collected and identified a total of 143 prey remains, and classified them into 32 categories. 51.1% of prey where birds, whilst mammals accounted for 48.3%. Regarding source 41.3% of prey where wild birds and 9.8% domestic poultry. The bulk of mammals, 29.4%, had its source in domestic species, and wild mammals only accounted for 14% of prey remains. This variability in the diet is due to the capability of the species to exploit different food resources. Our study, along with several other works, points out the importance of feeding points and their management for the persistence and productivity of the species.

INTRODUCTION

The Egyptian Vulture (*Neophron percnopterus*) is a medium sized migratory scavenger raptor, whose nesting area spreads over southern Europe, north western Africa and some areas of near Asia and India (CRAMP & SIMMONS 1998). The Egyptian Vulture reaches Europe in February and its reproduction takes place there during April-May. It leaves to Africa in September. The European numbers of the species suffered a severe decline since the middle 20th century (CEBALLOS & DONÁZAR 1989, DONÁZAR et al. 1997, DONÁZAR et al. 2002, SARÁ & DI VITTORIO 2003), including the populations present in the Iberian Peninsula, which has lead to its inclusion in the red catalogue as Endangered in Europe, and in Spain its status has recently been changed from Vulnerable to Endangered (DEL MORAL & MARTÍ 2002). More locally in the Basque Country it is considered as Vulnerable (GAINZARAIN 1998). Causes for the decline range from direct loss of effectives due to collisions, poisoning and human harassment, to habitat loss. However, several studies invoke the effect of reduction of extensive cattle rear practices, and elimination of feeding points or changes in their management (CEBALLOS & DONÁZAR 1988, CEBALLOS & DONÁZAR 1989, DONÁZAR 1993, DONÁZAR et al. 1997, DEL MORAL & MARTÍ 2002, DONÁZAR et al. 2002). Regarding the latter, the outbreak and spread of Bovine Spongiform Encephalopathy (BSE) in Spain in 2000 brought about law modification in management of slaughterhouse refusals, carrion and feeding points, which in turn affected scavenger species that relied on them (TELLA 2001).

Diet and food intake is a basic issue of animal ecology, ruling most ecological aspects of wildlife biology, and therefore, knowledge of diet and food is a key to understanding regression patterns, productivity, density and habitat selection of species (DONÁZAR & CEBALLOS 1988, LITVAITIS 2000, SONERUD et al. 2001, SONERUD et al. 2002, ZUBEROGOITIA et al. 2001, MARGALIDA & BOUDET 2003, NAVARRO et al. 2003, SARÁ & DI VITTORIO 2003, ZABALA & ZUBEROGOITIA 2003, ZDUNIAK & KUCZYNSKI 2003a,b). In this paper we give first information on diet of Egyptian vulture in Biscay, an Atlantic area hitherto unrepresented in studies on the species.

STUDY AREA AND METHODS

This study was conducted in Biscay (2384 km²), in northern Iberian Peninsula by the Cantabric seashore (Fig. 1). Climate is oceanic with warm temperatures and annual average rainfall ranging from 1000 mm by the sea to 1900 mm in the inner mountains. Landscape is rugged and more than 60% of the area is devoted to forestall cultures (mainly exotic *Pinus radiata* and *Eucalyptus* spp.). The other 40% is a mosaic of urban areas, small forests and small traditional cattle exploitations. Valley bottoms are occupied by densely populated urban areas and a dense net of roads link them with small hamlets (DEPARTMENT OF ENVIRONMENT AND LAND ORDINATION 2001).

The study period spans four years from 2000 to 2003, reporting data from 19 different Egyptian Vulture nests, ranging from 5 to 10 nests each year (Table 1).

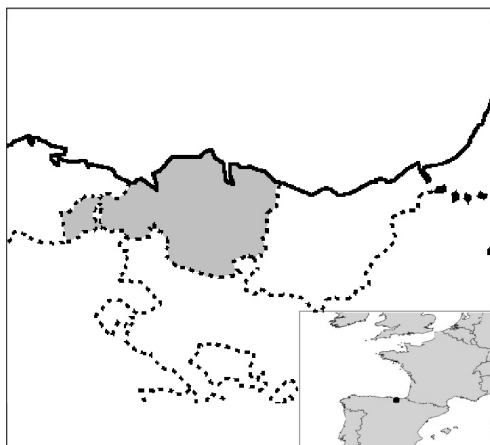


Fig. 1 – Study area location.

Obr. 1 – Umístění studované plochy.

We observed known nesting sites since arrival of the species (February) until young left the nest (September). In early stages of the reproductive period we confirmed presence of the species by observing known territories. Once presence was confirmed, we monitored the adults in each territory until we found the nest. During the two first weeks of July, when chicks are 40-50 days old, we visited the nest to ring and measure

chicks and collect every food remain in the nest and the platform. All the procedure was done putting most attention to the safety and proper handling of chicks.

We identified collected food remains by comparison with reference to a local collection of feathers and bones, as well as using specialized guides (BAKER 1993, FORSMAN 1999). We identified prey remain to species, and we estimated the minimal number of individuals of each species per sample based on the number of skulls, feathers, feet or other recognizable parts. We used the same methodology that studies on the issue conducted so far as a means to enhance comparison of the results (DONÁZAR & CEBALLOS 1988, CEBALLOS & DONÁZAR 1990, TELLA 1991, LITVAITIS 2000, ZUBEROGOITIA et al. 2001, GOUTNER & ALIVIZATOS 2003).

RESULTS & DISCUSSION

We collected a total of 143 prey remains (Table 2) and classified them into 32 different categories. 51.1% of identified prey where birds, whilst mammals accounted for 48.3%. Regarding source 41.3% of prey where wild birds and 9.8% domestic poultry. The bulk of mammals (29.4%) had its source in domestic species, and wild mammals only accounted for 14% of prey remains. Studies in near areas reported quite different results, being diet based on free raging cattle or wild rabbits, most of them stricken by haemorrhagic viral pneumonia (DONÁZAR & CEBALLOS 1988, TELLA 1991). In contrast, rabbits were scarcely represented in prey remains in the study area (3.5%) and most likely they where taken from rubbish dumps where slaughterhouse refusals are thrown, since the species is fairly uncommon in the study area (CASTIÉN & MENDIOLA 1985). Domestic cattle, in turn, accounted for 29.4% of the remains, very similar to the results reported by DONÁZAR & CEBALLOS (1988) in the neighboring Pyrenean area. However the source of cattle is quite different, in the Pyrenean area vultures taking corpses of free ranging cattle whilst in our area the most likely source are slaughterhouses' rubbish dumps. Birds are very scarcely represented in other areas whilst we found as many as 16 different species accounting for more than the half of the remains (Table 2). The fact that most identified birds were subadults or yearlings suggests that Egyptian Vultures in the area might not only actively seek across their territory for corpses but also prey upon small, weak or ill individuals (DONÁZAR & CEBALLOS 1988, 1990, DONÁZAR 1993)

Other food items, such as insects, were negligible. We also detected coprophagy by Egyptian vultures in the area, not only through remains at nest but also by direct observations.

According to their methodological procedure methods used in diet studies can be classified in two mayor groups, depicting each different aspects of trophic ecology of the studied species (CIUCCI et al. 1996, ZABALA & ZUBEROGOITIA 2003). On one hand, methods based on frequency of apparition indicate the number of individuals of a given prey category consumed, and in some cases temporal patterns on their consumption. On the other hand, volumetric methods give information on the total amount of food of each category consumed and its relative importance. Although trophic ecology of a species is best depicted by a combination of both methodological approaches (ZABALA & ZUBEROGOITIA 2003), the lack of conversion factors for the species and specially the lack of information on highly digerible food items and those that do not leave conspicuous or identifiable remains in the nest prevent the volumetric

approximation (RATCLIFFE 1997, LITVAITIS 2000, DONÁZAR & CEBALLOS 1988, TELLA 1991, BLACHE 2001). Therefore, our results probably overestimate the importance of medium sized birds that not only leave conspicuous and easily identifiable remains but also are readily transportable to the nest, whilst other food items such as cattle are not, and probably are being underestimated.

Another interesting result is the origin of food consumed. 65.1% of remains were wildlife, probably from naturally dead animals, road kills and predation upon ill or immature individuals. Other 39.2% were domestic animals most likely taken from feeding points and rubbish dumps, where we observed Egyptian Vultures feeding several times.

Table 1 - Number of nests visited and remains collected per year.

Tab. 1 - Počet kontrolovaných hnízd a počet nalezených zbytků kořisti na hnízdech v jednotlivých letech

Year	2000	2001	2002	2003
Nests visited	5	6	10	5
Remains collected	30	31	57	25

In north western Biscay there is the sole feeding point of the study area and two rubbish dumps, and there are 9 out of 19 Egyptian Vulture territories (47% of the population). As a consequence of the more restrictive law after the BSE outbreak the abandon of dead cattle in the wild was forbidden and carcasses must be incinerated. This might have severe effects on breeding pairs in areas where extensive cattle rearing occur by limiting food supply, and pull Egyptian Vultures to rubbish dumps or to other food, limiting the productivity of nests afar such areas. Even if this paper shows the capability of the species to exploit different food resources, several works point out the importance of feeding points and their management for the persistence and productivity of the species (CEBALLOS & DONÁZAR 1988, 1990, DEL MORAL & MARTÍ 2002, DONÁZAR & CEBALLOS 1988, 1993, DONÁZAR et al. 1997, DONÁZAR et al. 2002, MARGALIDA et al. 2003, MERETSKI & MANNAN 1999, SARÁ & DI VITTORIO 2003, TELLA 1991, 2001). In this sense, although the reported diet may be enough for the animals to persist it may have an effect on productivity and the regression of the species in the area that should be studied. Besides, limited availability of dungheaps may pull Egyptian Vultures towards energetically less rewarding prey such as the important amount of medium-small sized birds reported in this study.

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SOUHRN

Zjišťovali jsme složení potravy supa mrchožravého (*Neophron percnopterus*) v Biskajském zálivu, severní Španělsko. V průběhu let 2000-2003 byla potrava sbírána na hnízdech nebo odsedávkách dospělých jedinců. Získaný materiál pochází z celkového počtu 19 hnízd. V potravě jsme determi-

Table 2 – Identified remains and number per category (N) and percentage they represent of the total (%). Others include bread, fish, insects, dung.

Tab. 2 – Složení potravy ze zbytků kořisti nalezené na hnízdech, počty a procenta celkového zastoupení v potravě. Položka ostatní zahrnuje chléb, ryby, hmyz a trus.

Species	N	%
BIRDS		
Hen-chicken (<i>Gallus gallus f. domesticus</i>)	14	9.8
Blackbird (<i>Turdus merula</i>)	15	10.5
Song Thrush (<i>Turdus philomelos</i>)	6	4.2
Rock Dove (<i>Columba livia</i>)	3	2.1
Turtle Dove (<i>Streptopelia</i> sp.)	1	0.7
Great Spotted Woodpecker (<i>Dendrocopos major</i>)	1	0.7
Green Woodpecker (<i>Picus viridis</i>)	1	0.7
Raven (<i>Corvus corax</i>)	3	2.1
Crow (<i>Corvus corone</i>)	9	6.3
Magpie (<i>Pica pica</i>)	5	3.5
Eurasian Jay (<i>Garrulus glandarius</i>)	7	4.9
Chough (<i>Pyrrhocorax</i> sp.)	4	2.8
Tawny owl (<i>Strix aluco</i>)	1	0.7
Griffon vulture (<i>Gyps fulvus</i>)	1	0.7
Common Kestrel (<i>Falco tinnunculus</i>)	1	0.7
Black-headed Gull (<i>Larus ridibundus</i>)	1	0.7
TOTAL BIRDS	73	51.1
MAMMALS		
Sheep (<i>Ovis ammon f. aries</i>)	10	7.0
Goat (<i>Capra aegagrus f. hircus</i>)	11	7.7
Horse (<i>Equus caballus f. caballus</i>)	4	2.8
Cow (<i>Bos primigenius f. taurus</i>)	2	1.4
Pig (<i>Sus scrofa f. domesticus</i>)	3	2.1
Dog (<i>Canis lupus f. familiaris</i>)	1	0.7
Cat (<i>Felis silvestris f. catus</i>)	6	4.2
Rabbit-Hare (Lagomorphs)	5	3.5
Rat (<i>Rattus</i> sp.)	1	0.7
Mole (<i>Talpa</i> sp.)	3	2.1
Garden dor mouse (<i>Eliomys quercinus</i>)	1	0.7
Fox (<i>Vulpes vulpes</i>)	5	3.5
Badger (<i>Meles meles</i>)	1	0.7
Hedgehog (<i>Erinaceus europeus</i>)	8	5.6
Stone marten (<i>Martes foina</i>)	1	0.7
TOTAL MAMMALS	62	43.4
Others	7	4.9
TOTAL	143	

vali 143 položek, které byly rozděleny do 32 kategorií. Ptáci tvořili 51,1 %, savci 48,3 %. Domáci drůbež tvořila 9,8 % a divocí ptáci 41,3 %. U savců byl podíl domácích zvířat větší, celkem 29,4 %. Savci z přírody tvořili pouze 14,0 %. Výsledky studie zdůrazňují význam stálých újeďů pro přežití a reprodukci supů mrchožravých ve volné přírodě.

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