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Biology, Status and Conservation of the Imperial Eagle *Aquila heliaca* in Hungary

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INTRODUCTION

Hungary and Slovakia form the western limit of the Imperial Eagle's range in Europe (leaving aside the Spanish race *Aquila heliaca adalberti*). Following the Second World War the Hungarian population continuously declined and by 1975-80 had reached its lowest point at 10-15 pairs. We have no precise data regarding the size of the population in earlier times but, based on the records of birds shot or found dead and of a steadily shrinking area of distribution, it can be supposed that there were still about 30 breeding pairs in 1950.

An intensive campaign to protect the species was begun in 1980, combined with an ongoing census of the population. Many data were collected on its breeding biology and nutrition and these enabled us to formulate concrete measures for its protection. By 1984-85 every breeding pair had been located and all nests were continuously controlled.

INCREASE IN POPULATION

Between 1977 and 1992, the number of Imperial Eagles recorded in Hungary was as follows:

Year	*No. of nesting pairs.*	*Year*	*No. of nesting pairs.*
1977	7	86	17
78	4	87	19
79	5	88	21
1980	10	89	26
81	13	1990	29
82	10	91	28
83	12	92	31
84	15		
85	14		

The increase in number from 1985 onwards represents a real increase in the population whilst the fluctuation in earlier years reflects the incompleteness of the survey. Following 1988 a growing number of pairs were taking to nesting on the Hungarian plain - under 300m a.s.l. - using tall trees bordering cultivated fields. These were in all respects newly-formed pairs driven out by the gradually expanding stock in the mountain and hill regions. Conditions in the plain provide potential habitat for a number of additional pairs, which we hope will be formed from the increasing number of young being fledged. This hope is not unjustified, since eagles are being observed in five new areas which we have not yet investigated and which may well contain nests.

BREEDING BIOLOGY

During the study period we have collected data from 187 breeding attempts. In a further 31 cases we have only identified the territory and in 12 cases of breeding we have no exact knowledge regarding success or failure. Out of the 187 monitored breeding attempts, 67 were unsuccessful. Nests were not controlled during the incubation period but only after the chicks were 2-3 weeks old. Out of these, 182 young fledged, averaging 0.97 young per nest, apportioned as follows:-

1 young from 60 nests	60
2 young from 58 nests	116
3 young from 2 nests	6
Total from 120 nests	182

The number of failed breeding attempts was extremely high (67), being 36% of all nests recorded. The causes of failure were as follows:-

Cause unknown	14	cases
Territory occupied but no known nesting	11	"
Eggs infertile	10	"
Human disturbance (forestry, agriculture, etc.)	9	"
Immature female or pair	5	"
Collapse of nest	4	"
Death of adult	3	"
Chick mutilated	3	"
Presumed robbed	3	"
Disappearance of chick*	2	"
Death of chick	2	"
Wild boar using tree as rubbing post	1	"
Total	67	

*In one case a young Imperial Eagle (from the previous year) demonstrably ate its

current year's sibling in the nest.

The number of young fledged annually was:-

Year	Number of successful nests	Number of young fledged	Average no young/nest
1977	4	5	1.25
1978	3	6	2.0
1979	3	4	1.3
1980	4	7	1.75
1981	4	5	1.25
1982	5	6	1.2
1983	2	3	1.5
1984	6	8	1.3
1985	8	11	1.4
1986	13	16	1.2
1987	11	13	1.2
1988	9	13	1.4
1989	12	18	1.5
1990	18	30	1.7
1991	16	30	1.9
1992	24	34	1.41
1993	17	27	1.58

PROTECTION

The Imperial Eagle population in Hungary was particularly threatened by the setting out of eggs poisoned with phosphorus to kill crows. The dying or dead crows were taken up by the eagles, which suffered in turn from secondary poisoning. This reached such a peak that from 1980 onwards this chemical was banned.

Our wardening of nests has shown that most cases of failure to breed have been due to human activity - sylviculture, agriculture, bee-keeping, tourism, etc. Indeed, in spite of our protection measures, nine breeding attempts failed during this period due to such causes. However, we frequently succeeded in taking prior steps to ensure that breeding was not impaired. In three cases we organised round-the-clock guarding of nests at particularly vulnerable sites. We also strengthened nests which were in danger of collapse. We achieved our greatest success in 1991 when we succeeded in attracting a pair of eagles to an artificial nest erected at a site which we ourselves selected - in an agricultural area on the plain - where nesting had never previously occurred.

In the territories of breeding pairs in the mountains (300-700 m a.s.l.) we have introduced susliks (ground squirrels), which provide prey for Saker Falcons as well as for the eagles. In all, we have introduced 1,986 susliks in four new colonies.

The success of our protection measures is borne out by the increasing number of young eagles being fledged and the growing number of breeding pairs. To further promote our efforts a workshop was established in 1990 together with Slovakian, Romanian and Yugoslav colleagues involved in protection of the Imperial Eagle.

BREEDING BIOLOGY

As a precautionary measure, no direct collection or examination of prey remains was made during the period in question. However, observations made during the guarding and control of nests gave the following prey statistics:-

Birds		Mammals	
Anser domesticus	1	*Erinaceus europaeus*	11
Pernis apivorus	1	*Lepus europaeus*	73
Buteo buteo	3	*C.citellus*	45
Falco tinnunculus	1		
Perdix perdix	1	*Glis glis*	1
Coturnix coturnix	1	*Rattus* sp.	1
Ph. colchicus	71	*Ondatra zibethica*	9
Gallus domesticus	20	*C. cricetus*	311
M. gallopavo	1	*Microtus* sp.	5
Columba domestica	12		
Columba palumbus	9	*Canis domestica*	1
Streptopelia decaocto	1	*Vulpes vulpes*	2
Asio otus	1	*Felis domestica*	3
Corvus sp.	7	*Sus scrofa*	1
Pica pica	1	*C. capreolus*	11
Turdus merula	1		
Turdus sp.	2		
Indeterminate	2		
	136		474

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