ECOLOGY AND STATUS OF THE BLACK-SHOULDERED KITE IN EXTREMADURA, WESTERN SPAIN

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ABSTRACT

In this paper we give data on the breeding and wintering habitat of the Black-shouldered Kite in Extremadura, together with notes on feeding ecology, breeding success, juvenile dispersal and sexual maturity. An increase in the numbers of *Elanus caeruleus* in Extremadura has resulted from an expansion of suitable breeding and wintering habitat, rich in prey.

INTRODUCTION

The biology and ecology of the Black-shouldered Kite (*Elanus caeruleus*) in Extremadura (the core of its Spanish range) was the subject of the doctoral thesis of Francisco Carbajo (1953–80), in whose memory this report seeks to extend knowledge of this species in Europe.

From the late 1960s, this kite has often been reported as present in Extremadura (Carp & Fdez. Cruz 1969; Carro 1971; Fdez. Cruz & Pérez Chiscano 1971; Pérez Chiscano 1973, 1974; Garzón 1974; Fdez. Cruz 1975; Carbajo & De Lope 1975; Aguilar & Carbajo 1978) and on several occasions breeding has been proved (Araujo, Fdez. Cruz & Lopez Gordo 1974; Suetens & Van Groenendael 1975, 1977; A. Amat 1979; Aguilar, Carbajo *et al.* 1978). The species has now been seen at more than 100 probable breeding sites in the region, and the number grows as more areas are investigated. We ourselves have studied 41 breeding attempts. In this paper we summarize aspects of the ecology of this kite which help to explain its expanding status in Extremadura.

HABITAT

Breeding habitat

In Extremadura the species breeds in partially cleared *Quercus* woods which have been planted with crops (mainly wheat, barley and oats). In all the breeding sites studied, the trees were Holm Oak (Q. rotundifolia), the predominant species on the plain, sometimes mixed with Cork Oak (Q. suber). In some northern parts of the region, the kite lives in semi-open woodland, with Q. pyrenaica as the

predominant species. However, the Holm Oak woods, owing to their widespread distribution, form the most usual habitat.

This kind of habitat was developed by the partial clearing of the closed Holm Oak woods and the replacement of natural pasture (or undergrowth) by cereal crops. The density of the trees has been reduced to half or one-third of the original. Every year a portion of the cleared wood is sown, while the remainder is left fallow to provide a rotating cycle of crops. In this way, the sown plots are interspersed with fallow areas, unchanged segments of pastured wood and open fields, giving a mosaic environment with a fragmentary farming pattern. Pairs of kites establish their territories each spring in a sown plot of cleared wood adjacent to that occupied in the preceding year. Three breeding pairs studied for three consecutive years have nested within a radius of about 1km.

The extent of this habitat has been much increased during the past two decades in Extremadura, where at least ten million Holm Oaks were uprooted during 1957–81, mainly through the clearing of the oak woods. The cause of this has been a profound change in land-use resulting from the imposition of modern methods of cattle-raising and aggravated by an endemic African fever affecting pigs (the basis of the traditional rural economy). This situation has induced the cultivation of the oak woods, and hence the spread of an environment well suited to *Elanus caeruleus* and similar to that used elsewhere: open grassland with scattered woods of a pseudo-savannah nature. No doubt this change has also favoured small rodents, the main food source of the kite (see below). All these conditions seem to favour the expansion of the kite in our study area.

Wintering habitat

With their dependence on small rodents, Black-shouldered Kites outside the breeding season may stay near their nesting territories or wander in search of food. In Extremadura the kites have been seen during winter near their breeding sites where, under favourable conditions, they gather in small flocks (up to nine birds seen together), exploiting a given hunting area. Nevertheless, land under irrigation is the most usual wintering habitat of *Elanus* in this region (Pérez Chiscano & Fdez. Cruz 1981; Pérez Chiscano 1973; Aguilar, Carbajo *et al.* 1978), and individuals or pairs often remain for several months in such food-rich sites.

Over the last 30 years, more than 200,000ha of irrigated land have been created in the basins of the larger rivers (Guadiama, Tietar, Alagón, etc.), where summer crops grow (mainly corn, rice, vegetables and irrigated pasture). Such cultivation maintains high rodent populations throughout the winter and consequently a stable food supply for the kites.

FEEDING ECOLOGY

From analysis of more than 2000 pellets, we have assessed the diet of this kite, hitherto little known in Spain (Garzón 1974; Pérez Chiscano 1973; Heredia 1981; A. Amat 1979; Suetens & Van Groenendael 1977; Aguilar, Carbajo *et al.* 1978).

The species is a specialized predator on small rodents. Its diet, both in terms of numbers and biomass, is formed mainly of three species: *Apodemus sylvaticus*, *Mus musculus* and *Crocidura russula*, with the addition of others such as *Pitymys duodecimcostatus*. The contribution of other prey varies according to locality and season, but in general is not great. The presence in the pellets of invertebrate remains (Orthoptera, mainly G. gryllotalpa) increases considerably when the

grain is harvested. Similarly, birds of cultivated lands (Galerida cristata, Emberiza calandra, Cisticola juncidis and—occasionally—Streptopelia turtur) become frequent in the diet at the end of the breeding season, when the fledglings of these species are numerous in the fields. Reptiles (mainly Lacertidae: Psammodromus algirus and Lacerta lepida; are less important. The predominant hunting method of Elanus caeruleus in Extremadura is to hover and then gradually swoop down on prey.

Four other species of raptor of similar size co-exist with Elanus in the cultivated Holm Oak woods: Circus pygargus, Falco tinnunculus, Athene noctua and Tyto alba. Most of these other species have broader diets than Elanus. In Southwest Spain, Montagu's Harrier feeds on any prey from beetles to young rabbits, but mainly takes birds (Heraldo et al. 1975); in Extremadura, Pérez Chiscano (1971) remarked on the high proportion of birds and reptiles in its diet. This harrier frequently breeds in the same sites as *Elanus*, but prefers to hunt over open crops. From our data, the diet of the Kestrel in the cultivated Holm Oak woods is based on invertebrates. This kind of prey is also important to Little Owls in this habitat (own data), although elsewhere in Spain rodents provide the bulk of the diet, which includes a wide variety of taxonomic groups and species (Mañez 1981). In addition, Athene is at least a partially nocturnal hunter. The Barn Owl is the only one of these raptors whose diet is as specialized on small mammals as that of Elanus (cf. Herrera 1973 for Southwest Spain), and the different hunting times of the owl and the kite help to reduce potential competition between them (Margalef 1980). In conclusion, therefore, overlap of the trophic niche of Elanus with that of the other raptors breeding in the same habitat is slight. It is tempting to think that the kite has filled an unoccupied, or at least incompletely filled, niche in the habitat. This, together with the efficacy of its hunting method in the open environment, may in our view be interpreted as the determining factors in the expansion of Elanus in this region.

BREEDING SUCCESS

During 1979/80, we studied 38 pairs of *Elanus caeruleus* breeding in Extremadura, and to *Table 1* could add published data on two broods studied in 1978 and an obvious family with three juveniles observed in June of that year (Aguilar, Carbajo *et al.* 1978). According to these data, the kite breeds in Extremadura with high (first clutch) success. On three occasions a pair produced two clutches in one season, and another pair built three nests in the same season. All these attempts failed, however.

Negative factors in breeding success are the climate (spring storms have spoilt at least three clutches) and predation on eggs (Magpies (*Pica pica*) have eaten one clutch). We suspected several cases of cannibalism on the weakest nestlings, a phenomenon already cited in the literature (Suetens & Groenendael 1977; Aguilar, Carbajo *et al.* 1978).

Number of fledglings:	0	1	2	3	4	Mean
1978			1	2	_	2.66
1979	5	2	3	4	2	1.75
1980	3	4	8	2	5	2.09
Total:	8	6	12	8	7	2.00

Table 1: Breeding success of Black-shouldered Kites in Extremadura.

JUVENILE DISPERSAL AND SEXUAL MATURITY

The only recoveries obtained by us were of a nestling ringed at Cheles (Badajoz) and shot one year later at Vimieiro (Alto Alentejo, Portugal) 70km to the north-west, and another nestling ringed in July 1980 at Membrío (Cáceres) and recovered in October 1981 at Sousel (Alto Alentejo). This leads us to think that some young kites may disperse from their native localities and colonize new areas where they could establish themselves on reaching sexual maturity.

The age of first breeding is still unknown for this species (Cramp & Simmons 1980). Eisenmann (1971) suggested that the closely related *Elanus c. leucurus* may reproduce the year following hatching, and this was later confirmed (Eisenmann, pers. comm.). Although there is no proof, it seems likely that such early breeding also occurs in *Elanus c. caeruleus*. When Dr Suetens (together with P. van Groenendael) filmed one of our study broods in 1979, he told us that he believed he had seen inconspicuous traces of juvenile plumage in one of the adult birds. This points to the possibility of the bird having hatched the previous year.

NEGATIVE HUMAN PRESSURE

Direct human influence on the breeding of the kite in Extremadura must be slight, due to the nature of the habitat: while the grain is growing, human presence among the crops is unusual. Besides, mechanized harvesting reduces harvest time and the number of workers, and thus diminishes the risk of nest destruction. In fact, no brood or clutch that we have studied was disturbed by man. Added to this, the kite is completely unknown by farmers and this saves it from the persecution suffered by other birds of prey. Outside the breeding season, human pressure is greater: we have known more than 20 cases of birds shot by hunters in the period 1978–80 in Extremadura.

To judge from breeding success, the effects of pesticides cannot be great, but we have no data on egg residues. Relative immunity from the effects of insecticides such as DDT ('not likely to accumulate in lethal quantities' in a raptor which 'feeds chiefly on herbivorous rodents') has been proposed as one of the possible causes of increase of *Elanus c. leucurus* in North and Central America, 'but there is no evidence to support this' (Eisenmann 1971). The damaging effect on *Strix aluco* and *Tyto alba* of poisons used in Spain to combat harmful micromammals (*Pitymys, Talpa, Microtus*) has been documented (Garzón 1975). *Elanus caeruleus*, due to its diet, is probably also susceptible to such poisons.

CONCLUSION

The expansion of the Black-shouldered Kite in Extremadura has been encouraged by the increase in area of suitable breeding habitat (cultivated Holm Oak woods) and wintering habitat (irrigated lands). These habitats provide a plentiful supply of food for *Elanus*, with little or no competition from other birds of prey. To some extent the kite seems to have filled a vacant niche, particularly in the breeding habitat. Breeding is highly successful.

Clearly, estimates of the population of this kite given for Spain as 100 (Garzón 1975) and for the Mediterranean region as 100 pairs (Meyburg 1981) need revising. Although we will not suggest a figure here, there is no doubt that the Extremaduran population of *Elanus* well surpasses these numbers. At the present time the species is one of the few birds of prey on the increase in this country.

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Dedicated to Dr J. K. Pérez Chiscano, our master.

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NOTE: El Vol. 1 de *ALYTES* Revista Extremeña de C. Naturales contiene los 'proceedings' de las VI Jornadas Ornitologicas Españolas (Cáceres 1981) Publicado en 1983.