

Revised distribution and status of diurnal birds of prey in Portugal

LUÍS PALMA¹, NUNO ONOFRE² and EDUARDO POMBAL³

¹ Universidade do Algarve-UCTRA, Campus de Gambelas, P-8000-810 Faro

² Estação Florestal Nacional-Posto Apícola, Tapada da Ajuda, P-1349-018 Lisboa

³ Rua das Areias 807, P-4435 Rio Tinto

Abstract - Until 1982, when the first comprehensive reports on the status of the Portuguese birds of prey were published (Palma 1985, Rufino *et al.* 1985) only some anecdotal and partial accounts from the first half of the century were available (Coverley no date, Tait 1924, Reis Júnior 1934). The present report presents a revision of the information on the distribution and status of diurnal raptors in the country.

Thirty species of diurnal birds of prey occur in Portugal. Twenty-three are breeding species, one is a winter visitor (Merlin) and 6 are vagrants or accidental. The most remarkable issues which concern threatened and some rarer species are: 1) the first breeding attempts of the Cinereous Vulture in Portugal since the 70's; 2) the confirmation of a small and scattered population of Golden Eagle in the South; 3) the detection of a formerly almost unnoticed Bonelli's Eagle population in the wooded hills of the South, mostly nesting in trees; 4) the population increase of Peregrine Falcon and Griffon Vulture, species which were considered with delicate conservation status till 1990; 5) the probable extinction of the Imperial Eagle and near extinction of the Osprey, and 6) the notorious decline of the Red Kite and the Lesser Kestrel.

Introduction

The last reports on the status of diurnal birds of prey in Portugal were presented at the II World Conference on Birds of Prey in 1982 (Palma 1985, Rufino *et al.* 1985). Since then, the situation changed notoriously both in terms of quantity and quality of the available information as well as of the species themselves. Therefore, we felt the need for a new appraisal on the subject, in an attempt to update the knowledge on the situation of this problematic group.

The current paper is an updating and review of an unpublished revision of the diurnal raptors status in the country prepared in 1993 for the third edition of Benny Génsbøl's *Birds of Prey of Europe, North Africa and the Middle East*. This explains why some of the distributions, population estimates and trends presented here differ somewhat from those concerning Portuguese raptors shown in that edition (Génsbøl 1995).

Methods

The method used to obtain the population estimates varied accordingly with the degree of knowledge on each species. For some species we believe to have a

quite accurate estimate based on repeated wide-range census. This is the case of Griffon and Egyptian vultures, Golden and Bonelli's eagles. In other cases, such as Booted and Short-toed eagles or Honey buzzards, long-term point-counts and nest searches carried out in areas as large as 100 km² and larger, allowed quite satisfactory basic data for extrapolations to the whole geographical sectors of the corresponding habitat and condition. However, this was only done on a subjective basis because defining the geographical limits of a particular habitat type and condition through a quantitative analysis at the national level was impracticable and beyond the scope of this paper.

Therefore we simply extrapolated the densities observed within study areas to the whole available area of similar habitat. These extrapolations were further extended to other regions through subjective comparisons between their apparent densities. In the remaining situations, where quantitative data was not available, we were forced to achieve the estimates by performing comparisons between species in terms of abundance ratios.

If no regional densities were available for a particular species, we achieved the desired estimate by multiplying the known numbers of another species of assumed similar detectability in the same area by the observed

Table I. Summary of the current status of diurnal raptors in Portugal.

| COMMON NAME | SCIENTIFIC NAME | ESTIMATE (No. pairs) | TREND |
|---------------------|--------------------------------|----------------------|-------------------------------|
| Honey Buzzard | <i>Pernis apivorus</i> | 100-150 | probably stable |
| Black-winged Kite | <i>Elanus caeruleus</i> | 100-150 | probably stable |
| Black Kite | <i>Milvus migrans</i> | 650-950 | decreasing |
| Red Kite | <i>Milvus milvus</i> | 25-40 | strongly decreasing |
| Egyptian Vulture | <i>Neophron percnopterus</i> | 105-123 | slightly decreasing |
| Griffon Vulture | <i>Gyps fulvus</i> | 415-422 | increasing |
| Cinereous Vulture | <i>Aegypius monachus</i> | 3 | increasing |
| Short-toed Eagle | <i>Circus gallicus</i> | 250-300 | stable |
| Marsh Harrier | <i>Circus aeruginosus</i> | 38-49 | stable or slightly decreasing |
| Hen Harrier | <i>Circus cyaneus</i> | 10-20 | locally decreasing |
| Montagu's Harrier | <i>Circus pygargus</i> | 900-1200 | decreasing |
| Goshawk | <i>Accipiter gentilis</i> | 200-300 | possibly decreasing |
| Sparrowhawk | <i>Accipiter nisus</i> | 500-1000 | probably stable |
| Common Buzzard | <i>Buteo buteo</i> | 2000-4000 | stable |
| Golden Eagle | <i>Aquila chrysaetos</i> | 51-61 | increasing |
| Imperial Eagle | <i>Aquila adalberti</i> | probably extinct | |
| Booted Eagle | <i>Hieraaetus pennatus</i> | 250-350 | stable |
| Bonelli's Eagle | <i>Hieraaetus fasciatus</i> | 77-79 | slightly decreasing |
| Osprey | <i>Pandion haliaetus</i> | 1 individual | nearly extinct |
| Peregrine Falcon | <i>Falco peregrinus</i> | 55-90 | increasing |
| Hobby | <i>Falco subbuteo</i> | 250-500 | unknown |
| Kestrel | <i>Falco tinnunculus</i> | 1000-1500 | possibly decreasing |
| Lesser Kestrel | <i>Falco naumanni</i> | 155-165 | marked decrease |
| Ruppel's Vulture | <i>Gyps rueppelli</i> | accidental | |
| Long-legged Buzzard | <i>Buteo rufinus cirtensis</i> | common vagrant | |
| Saker | <i>Falco cherrug</i> | accidental | |
| Gyr Falcon | <i>Falco rusticolus</i> | accidental | |
| Lanner | <i>Falco biarmicus</i> | uncommon vagrant | |
| Eleonora's Falcon | <i>Falco eleonorae</i> | common vagrant | |
| Red-footed Falcon | <i>Falco vespertinus</i> | uncommon vagrant | |
| Merlin | <i>Falco columbarius</i> | winter visitor | |

abundance ratio between the two species. Taking for example an observed ratio of 1:3 between the known abundance of species *a* and the unknown abundance of species *b* in a particular region and habitat type, then the abundance of species *b* should be around 3 fold higher. Naturally, the results are often approximate because several starting "known" densities are also not accurate. A relative abundance procedure was similarly performed within each species to obtain estimates for regions lacking detailed studies.

Figure 1 shows the country's administrative subdivision (NUTs II) and the areas where intensive surveys have been carried out. These include point-counts during raptor community studies or exhaustive nest counts of a particular species that further allowed recording the relative abundance of other species. Hence, data obtained were the basis for the determination of abundance ratios between different species or areas, and the extrapolation of numbers to areas where detailed information was not available. For each particular species, the final estimate for the whole country was the sum of all regional estimates. In the course of comparisons and extrapolations, the

country was divided into sectors of relatively homogeneous landscape patterns or preservation condition. However, the number and limits of these subdivisions varied for each species considered, according to its distribution and the range of the correspondent type or types of habitat.

Figure 2 shows the distribution of the main habitats in Portugal (adapted from the map of the Distribution of the Portuguese Forest in the web page of Direcção Geral das Florestas - <http://www.min-agricultura.pt>).

Species Accounts

HONEY BUZZARD *Pernis apivorus*

Discrepancy between current and the 1982 estimates (5-10 pairs, partial estimate: Rufino *et al.* 1985) is thought to result from a much better coverage of suitable habitats in the appropriate season. In the major distribution area, in the lowlands of western Alentejo, the species remained undetected until recently (Onofre and Palma 1986).

In the South, where the largest numbers are found,

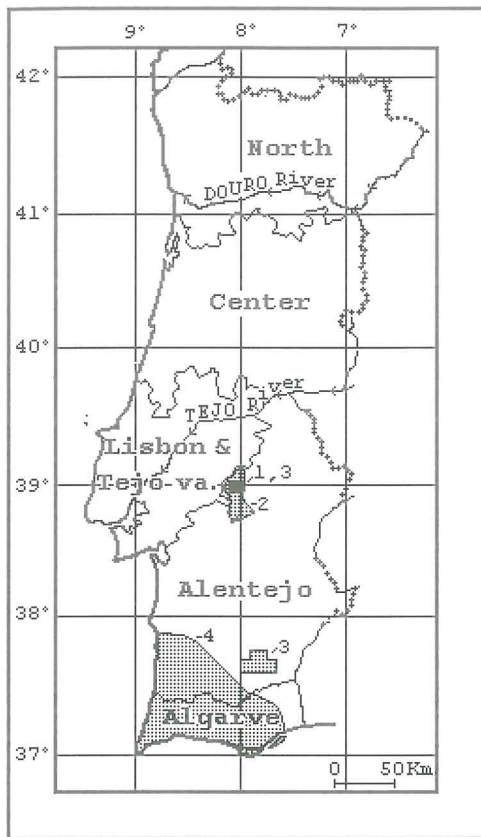


Fig. 1. Administrative subdivisions and intensive study areas. NUTs II limits ~~~~; Main rivers - - - -; Intensive study areas: 1) Onofre (1986) and Onofre *et al.* (1986); 2) Onofre (unpub); 3) Onofre (1986); 4) Pereira (1993) and Palma (1994).

the habitat is cork-oak woodland with clearings spreading out over rolling or flat country. Densities here can be up to 4 - 5 pairs/100 km² based on a nest count made during raptor community studies in an area of 150 km² of cork-oak woodland (Onofre unpub). Farther north the habitat is a "typical" deciduous woodland (e.g. Pimenta 1986), or a combination of both habitat types, and the species is more irregularly distributed (Fig. 3).

In the northern and central Portugal the number of pairs was estimated by extrapolating densities from 1-2 to 2-4 pairs/1000 km² obtained in some areas by direct observation, to the remaining habitat of the similar type. We then added information on scattered pairs and small nuclei provided by collaborators.

BLACK-WINGED KITE *Elanus caeruleus*

The widespread upward trend in numbers and distribution quoted in earlier reports on the species in Iberia (e.g. Palma 1985) may be no longer true, at least in

what concerns Portugal, but significant annual fluctuations may occur.

The species is largely associated with parkland- or savannoid-type woodlands (mainly holm- and cork-oak) with an understorey of cereal. Birds clearly prefer this combination - open canopy plus cereal - probably for trophic and security reasons. Cereal crop acreage has suffered a reduction of over 60% since the 60's and the EC Agriculture Policy is currently inducing further abandonment and conversion (Onofre and Rufino 1993 and 1995). Unless the species adapts to the shrinking of its preferred habitat, decline is likely.

The current estimate is based on extrapolated regional densities obtained in several intensively surveyed areas of the southern lowlands: 0,4-0,8 pairs/160 km²

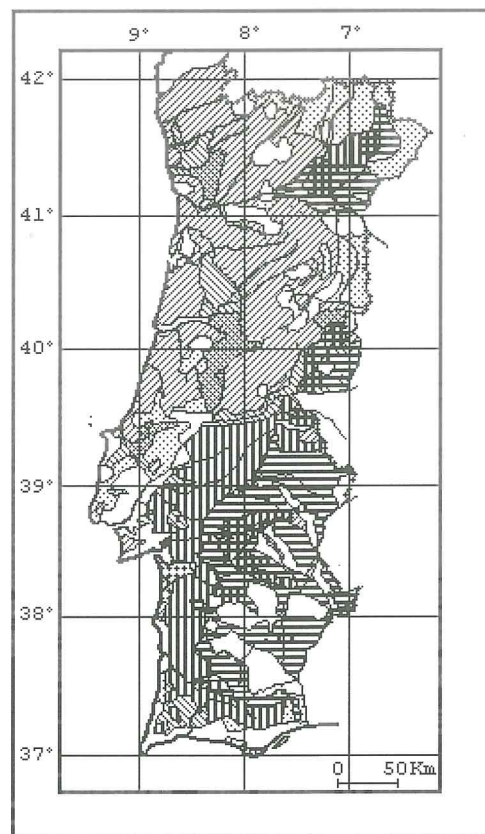


Fig. 2. Main habitats in Portugal

- ▨ Cork-oak (*Quercus suber*) woodland;
- ▩ Green-oak (*Q. rotundifolia*) woodland;
- ▧ Maritime pine (*Pinus pinaster*) plantation;
- ▦ Umbrella pine (*P. pinea*) plantation;
- ▨ Eucalyptus (*Eucalyptus globulus*) plantations;
- Agriculture and pasture;
- ▩ Agriculture and woodland (oaks, chestnut, other).

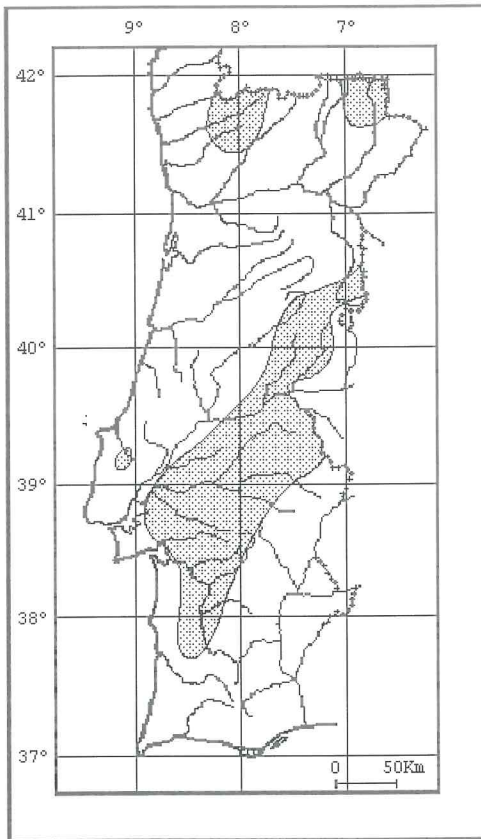


Fig. 3. Honey Buzzard *Pernis apivorus*.

in a rather treeless region (Onofre 1996), and 5-8 pairs/160 km² or 4-8 pairs/200 Km² in typical parkland woodlands (Onofre 1996 and unpub). It may either reflect an overestimation in Rufino *et al.* (1985) figures (150-200 pairs) or natural fluctuations in population density (Fig. 4).

BLACK KITE *Milvus migrans*

Direct persecution of raptors had been steadily decreasing since the 70's and certainly had a negligible effect on summer visitors (*e.g.* black kites) until a few years ago, when the old-fashioned practice of predator "control" was restored in many private game preserves. The secretive and uncontrolled persecution of protected predators by poisoning and shooting was thus brought back with the compliance and sometimes even the complicity of authorities putting at serious threat all raptor species. The black kite is one of the commonest victims and as a result is apparently decreasing over large areas (Fig. 5).

The number of pairs was calculated in two ways. First we applied an estimate to each breeding concentra-

tion known to the South of the Tejo river. Secondly, we extrapolated the numbers obtained in some intensive study areas with no breeding concentrations in the Alentejo lowlands (Onofre *et al.* 1986, Onofre 1996 and unpub), to the area of available habitat of similar type, minus the approximate area that we considered within the range of breeding concentrations. Finally, we added the estimates for the northern part of the species range supplied by our collaborators.

RED KITE *Milvus milvus*

About 20 years ago, red kites were still widespread yet uncommon in the wooded areas of the South and East. They also occurred locally in the central-western river basins (Rufino *et al.* 1985, Rufino 1989), but this seems no longer true (A. Carvalho, pers. comm.). The species also became almost extinct in the South and rather rare elsewhere. Compared to the estimate presented by Rufino *et al.* (1985), current numbers suggest an enormous decrease of about 80% in c.15 years, that is by no means unduly pessimistic.

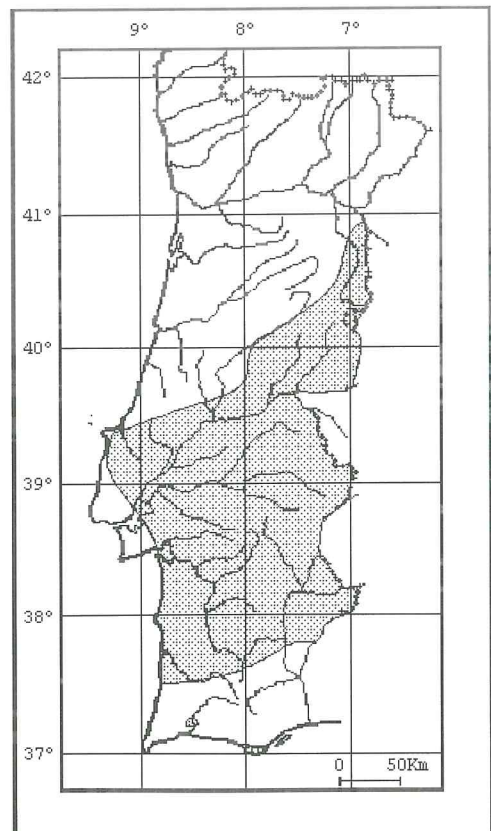


Fig. 4. Black-winged Kite *Elanus caeruleus*.

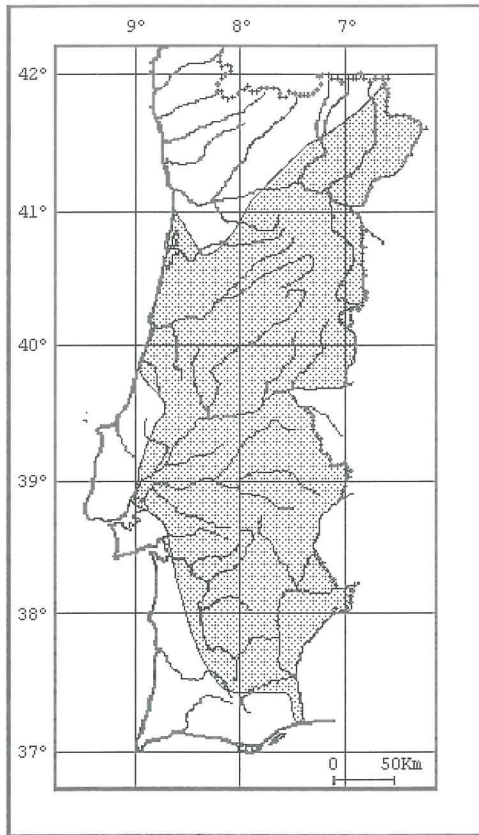


Fig. 5. Black Kite *Milvus migrans*.

The kite's high vulnerability to shooting and poisoning, persecution by farmers, cattle breeders and hunters has certainly played an important role in its decline since the 60's (Palma 1985). Moreover, private game preserves have recently occupied many traditional kite areas hence resuming intentional illegal persecution, whilst wildfires and replacement of pine woods by eucalyptus plantations have deeply changed the habitat in central Portugal (Fig. 6).

Due to the present rarity of the species, the estimate was reached by simply summing up the number of pairs incidentally recorded by us or our collaborators during several field studies.

EGYPTIAN VULTURE *Neophron percnopterus*

The species seems stable and reaches high densities (up to 1.05 pairs/km) in its main haunts in the Douro river watershed (Monteiro 1995, Monteiro *et al.* 1996a). Nevertheless some decrease has been reported at the northwestern and southern margins of the range according to the number of nests abandoned and the lower number of observations (Abreu

1984, Monteiro 1995, Monteiro *et al.* 1996a) though the causes have not yet been fully identified. The current estimate includes the pairs nesting on the Spanish side of the border (possibly c. 45%) and was reached during systematic surveys carried out in the main areas of the distribution (Monteiro *et al.* 1996a).

Besides the incidental poisoning and shooting in game preserves, disturbance of breeding sites on river banks caused by an increase in recreational activities such as boat trips is an additional risk. Habitat alteration by the projected construction of dams in several important areas so far left untouched, is an even greater menace (Fig. 7).

GRIFFON VULTURE *Gyps fulvus*

After a continuous decline (Palma and Rufino 1981, Abreu 1984, Palma 1985) griffons are presently increasing in Portugal. The population was estimated as 100-150 pairs in 1982 (Rufino *et al.* 1985) and 210 pairs in 1989 (Araújo *et al.* 1994). Although the 1982 census did not thoroughly cover the whole distribution area, some upward trend was believed

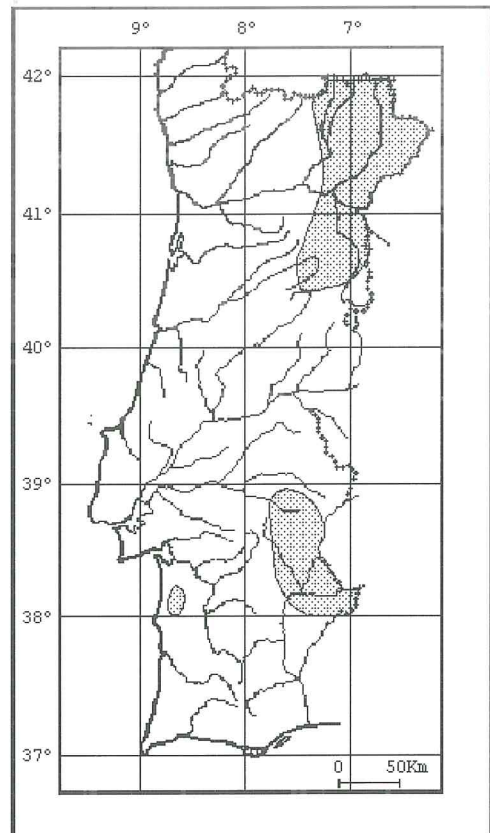


Fig. 6. Red Kite *Milvus milvus*.

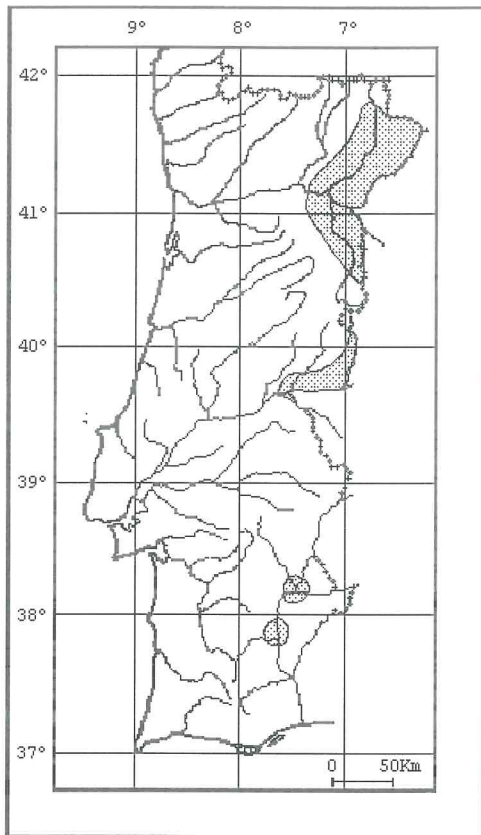


Fig. 7. Egyptian vulture *Neophron percnopterus*.

to have already taken place between both census. Further surveys (Monteiro *et al.* 1996b) revealed a stronger population increase up to the present and also a enlargement range though smaller. Breeding density increased in some areas, with new colonies reoccupying former abandoned breeding sites in 1985 and 1995 and appearing at new sites in 1996, leading to the prediction that other locations will be occupied thereafter. The above estimate includes the pairs nesting on the Spanish side of the border (c. 61% of the total population) (Monteiro *et al.* 1996b) (Fig. 8).

CINEREOUS VULTURE *Aegypius monachus*

The Cinereous vulture was seen breeding in the country for the last time in the early 70's near the Spanish border (*cf.* Palma 1985). More recently increasing numbers of paired vultures have been seen foraging and resting with greater regularity in a few areas of suitable breeding habitat near the border. In two of these areas artificial feeding has been provided for black vultures and nesting platforms have been built to induce nesting. It therefore appeared predictable

that cinereous vultures would nest again, which eventually happened in 1996 (Silva *et al.* 1996). Unfortunately, breeding did not succeed but new attempts are expected in the next years and this may well be the beginning of a notable recovery in the country (Fig. 9).

SHORT-TOED EAGLE *Circaetus gallicus*

Current estimates result from the extrapolation of densities obtained in long-term and/or intensive studies in some areas of higher density - e.g. 5 and 2-3 pairs/100 km² in the lowlands of north-central Alentejo, respectively, in extensive cork-oak woodlands in flat country, and in green and cork-oak woodlands in gently undulating terrain with small hills (Onofre *et al.* 1986, Onofre unpub); 3.3 pairs/100 km² in the mountainous areas of the Southwest (Pereira 1993; unpub) - and adjacent areas with lower density e.g. 0.5 pairs/100 km² in the rather treeless sectors of southern Alentejo (Onofre 1996). Thus, differences between present and former estimates most likely reflect a better ground coverage and not necessarily an increase, which may

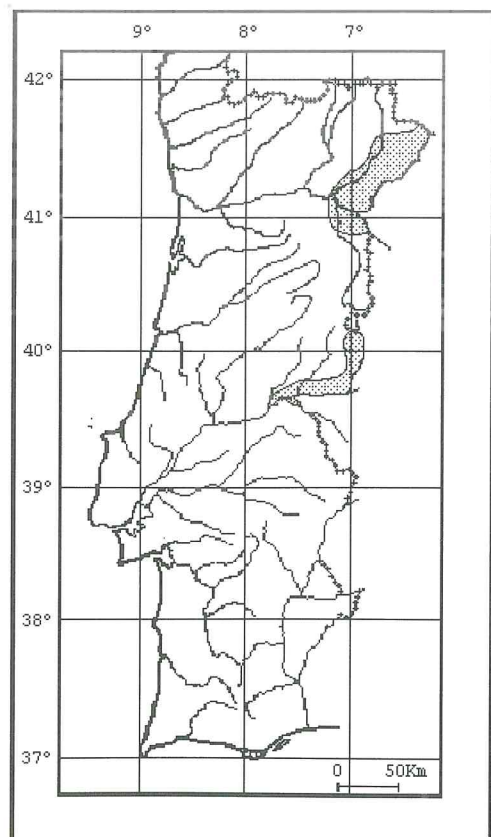


Fig. 8. Griffon Vulture *Gyps fulvus*.

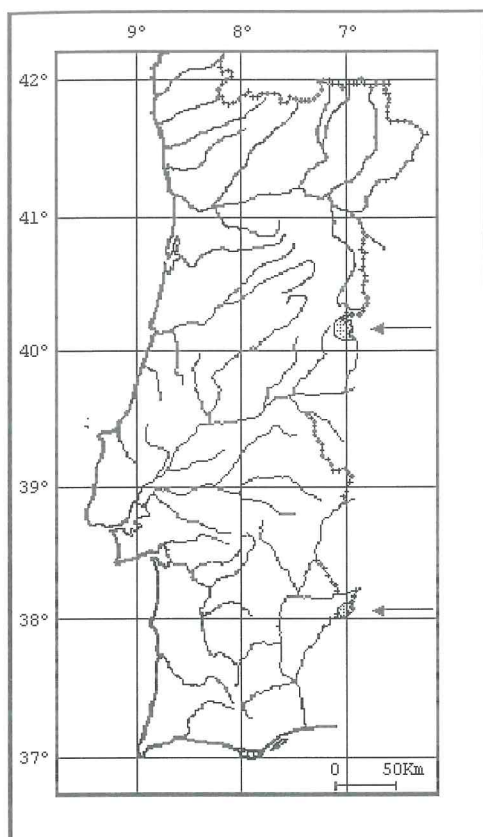


Fig. 9. Cinereous vulture *Aegypius monachus*.

have occurred only at a local level, namely in the northwest sector (Fig. 10).

MARSH HARRIER *Circus aeruginosus*

The species situation is now rather well known as a result of studies carried out recently (Reis 1986, Costa *et al.* 1993a, Fernandes *et al.* 1995, Leitão *et al.* 1996). Population shows a strong fluctuation in numbers though recent census did not reveal any significant change in numbers of breeding pairs since the 80's (Palma 1985, Rufino 1989), although some secondary breeding locations were abandoned (Leitão *et al.* 1996).

Despite the majority of the species distribution already receiving some form of protection, degradation or destruction of the breeding habitat is still a considerable threat, specially in unprotected areas such as the Ria de Aveiro - the second more important area for the species (Fig. 11).

HEN HARRIER *Circus cyaneus*

This is a marginal and little known species in the

country (Palma 1985, Onofre and Palma 1986, Rufino 1989, Onofre *et al.* 1995). Its distribution is almost totally restricted to a narrow fringe in the extreme north of the country, an expanse of its range in northern Spain.

The breeding of the species in the southern lowlands (mentioned in the past by Coverley n/d) may be only occasional or irregular. Although no breeding has been observed in the south during recent raptor surveys carried out in presumably suitable areas, adults are occasionally spotted during the breeding season (M. Pais, pers. comm.) (Fig. 12).

MONTAGU'S HARRIER *Circus pygargus*

Reasons for decline are the same that affect the black-winged kite (loss of habitat), perhaps with worse effects hereafter, as a consequence of a predictable sharp drop in the cereal cropland acreage resulting from the new EC Agricultural Policy (Onofre and Rufino 1993 and 1995). Nest destruction through mechanized harvest may be an important additional cause and the suspected persecution within game

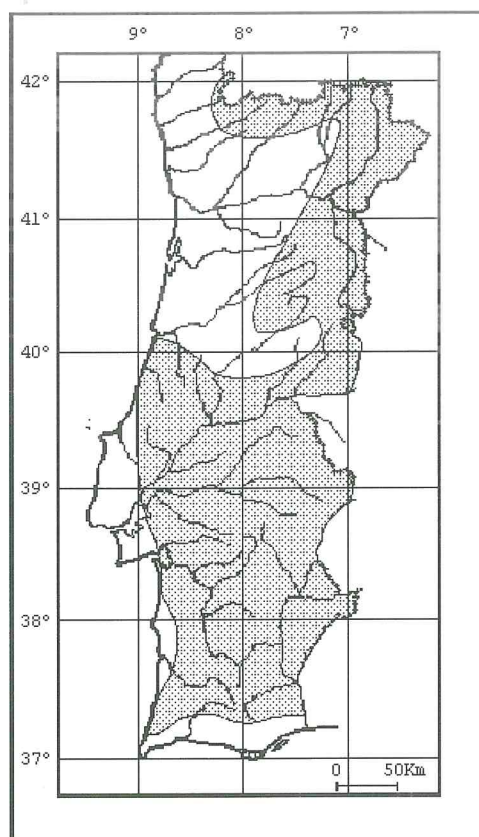


Fig. 10. Short-toed Eagle *Circaetus gallicus*.

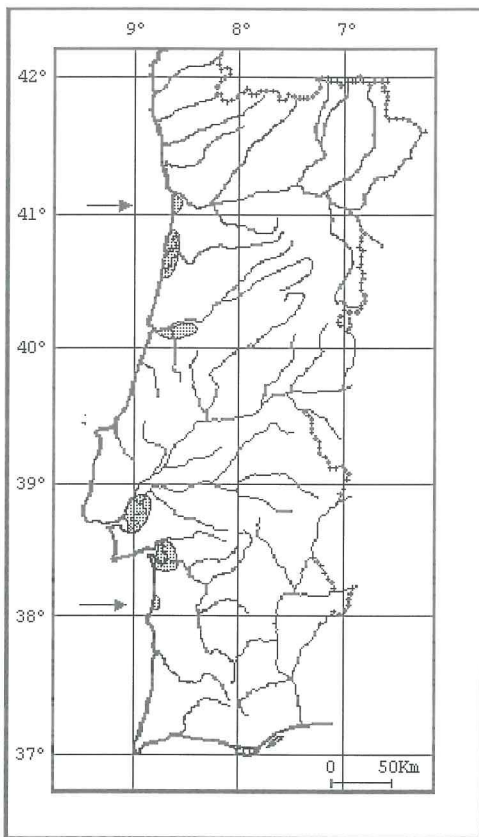


Fig. 11. Marsh Harrier *Circus aeruginosus*.

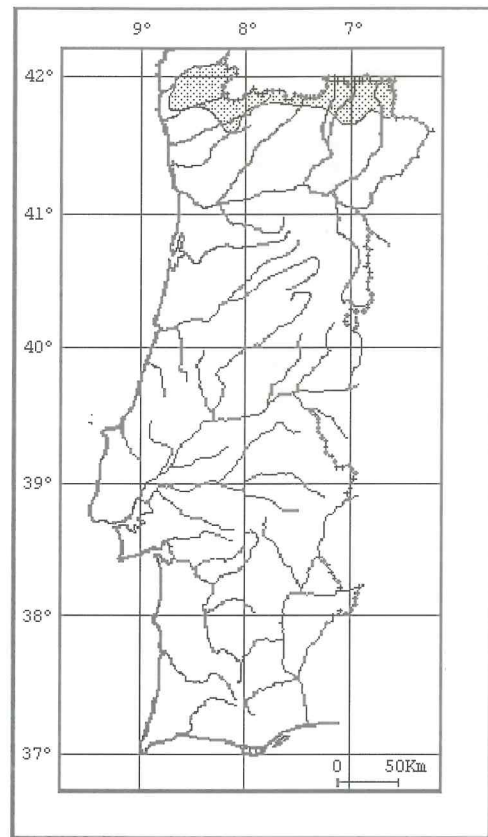


Fig. 12. Hen Harrier *Circus cyaneus*.

preserves may lead to further pressure on the species (Fig. 13).

The estimate was obtained considering partial estimates for three main regions: North (North of Douro river), Center, and South (South of Tejo river) (Onofre and Rufino 1993). The northern estimate took in account local estimates which covered almost half of this region and the figure for the Center region was achieved solely on personal knowledge of the region. The southern estimate was based on local estimates and subsequent extrapolation to potential habitat plus the estimated numbers in some areas of higher densities, whose acreage were not previously considered (Onofre and Rufino 1993).

GOSHAWK *Accipiter gentilis*

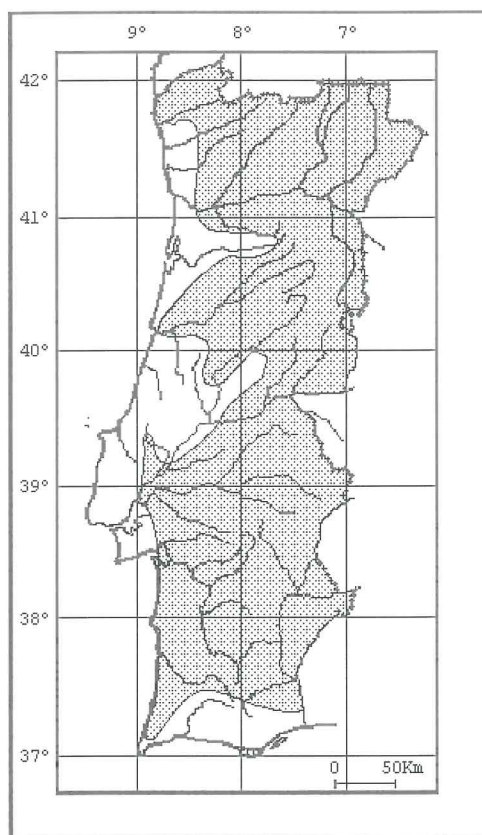
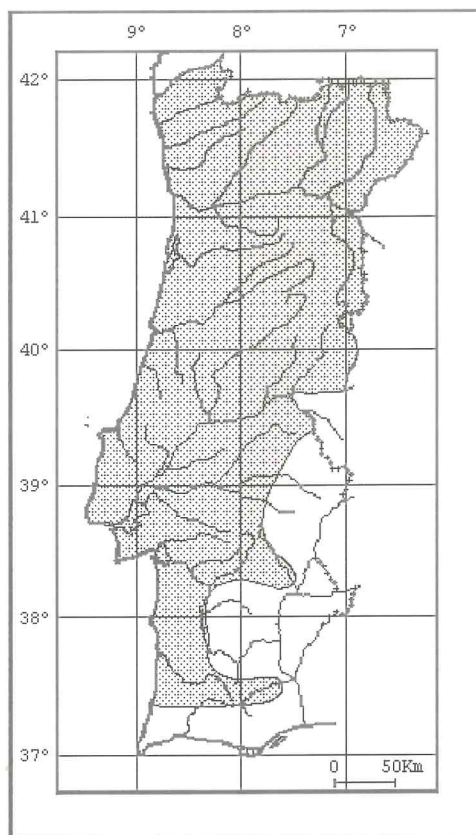
The major distribution area spreads across the formerly extensive pine woods and also some eucalyptus plantations in central and northern Portugal. These areas have suffered multiple fires throughout the whole region in the last 20 years leading to a reduction of the available habitat and possibly causing a drop in goshawk numbers, yet impossible to quantify

due to the lack of reference data. In the remaining areas, namely lowlands and hilly country in the South, goshawks occur in much lower densities and are irregularly distributed (Fig. 14).

The estimate is necessarily rough and was obtained by joining up regional estimates of different sources and accuracy. In the northern half of the country distances of 6 km between occupied nests are known. In the larger part of this region we hypothesized a relatively homogeneous distribution with an average density of about half the above one, arriving to a number of c.130 pairs to which we added a further 50% to obtain an upper limit. In the remaining areas, of lower density and irregular distribution, we used observational data to attain a reasonable number of 40-65 pairs. Furthermore, a 3:1 north-south abundance ratio, consistent with intuitive perception from casual observation, and numbers from specific survey areas, were used to estimate the whole population size.

SPARROWHAWK *Accipiter nisus*

The species is notoriously more common and widespread than formerly thought. Although no specific

Fig. 13. Montagu's Harrier *Circus pygargus*.Fig. 14. Goshawk *Accipiter gentilis*.

search has ever been done, better data is available today as a by-product of studies on other species carried out in several areas (Onofre *et al.* 1986, Pereira 1993, Palma 1994). Particularly in the South, where the species is comparatively scarce, we have now a much clearer idea of its relative abundance as compared to well-assessed densities of other raptor species. A minimum of 150 pairs may be found in this region. In the northern half of the country where the species is much more common and widespread its number is probably 3 to 5 fold higher. Altogether this significantly rises the previous estimate (*cf.* Rufino *et al.* 1985) (Fig. 15).

COMMON BUZZARD *Buteo buteo*

Recent studies in the cork - and green-oak woodlands in the South of the country – north-central Alentejo –, both in flat or in gently undulating terrain revealed rather higher densities than previously thought (*e.g.*, Onofre *et al.* 1986, Onofre 1996, Onofre unpub). Depending on the method used, estimates vary considerably and a clear picture is difficult to assess. However, the minimum estimate is 2000 pairs, the

actual number likely to be closer to the upper estimate (Fig. 16).

To obtain the population estimate we first ascribed different densities (5-20 pairs/100 km²) to the areas of cork-oak woodland of the South, based on the above referred studies and the observed abundance ratios between different areas, and then we summed all up. We added a rough estimate for the northern part of the country, using density estimates of 5 to 10 pairs/100 km², according with the perceived north-south abundance ratios. This seemed to raise the final estimate beyond a reasonable limit, particularly at its upper level, probably because the species is less regularly distributed or less abundant in the North than considered in this approach.

To try an alternative approach, we estimated population on the basis of an abundance ratio between the buzzard and the sparrowhawk. The comparison is necessarily rough and fallible, namely because this species is less conspicuous than the buzzard but it is the only one with a comparably wide distribution. To each regional estimate of the sparrowhawk we applied subjective ratio between the two species to obtain the

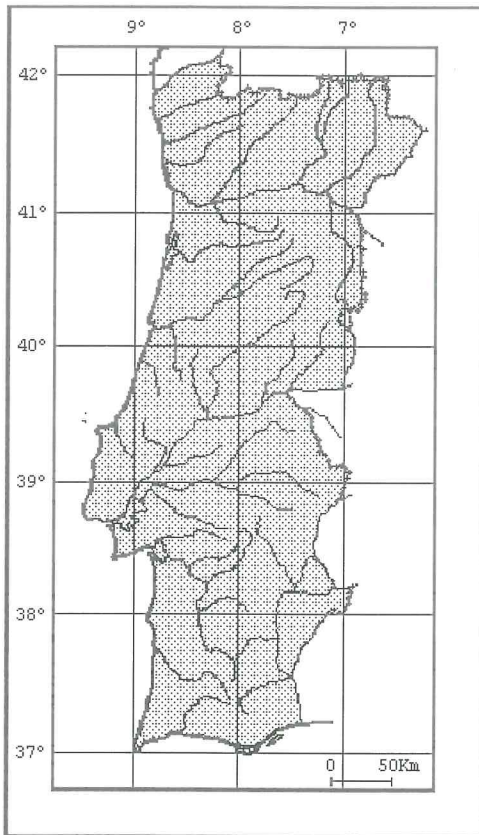


Fig. 15. Sparrowhawk *Accipiter nisus*.

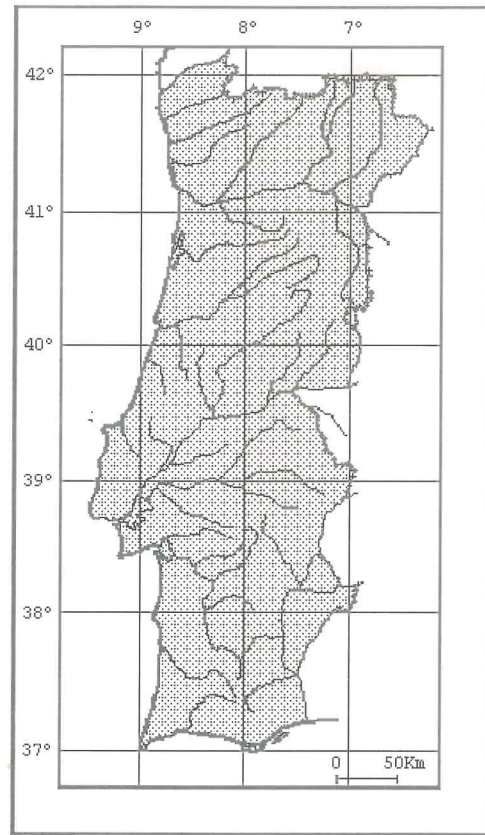


Fig. 16. Common Buzzard *Buteo buteo*.

corresponding buzzard density. This afforded a more conservative yet apparently more reasonable final number.

GOLDEN EAGLE *Aquila chrysaetos*

The species situation is presently quite well known (Pombal 1989 and 1996, Monteiro 1995, Monteiro and Berliner 1996, M. Pais and A. Carvalho, pers. comm.), being relatively common in the Northeast and much scarcer and local elsewhere. The species may be slowly increasing as new territories have been recently established. As for the majority of raptors, illegal persecution and poisoning in game preserves is a serious risk to the welfare of golden eagles in certain areas. In border areas, the estimate comprises the pairs breeding on the Spanish side. In all, 25 pairs share the border between both countries (Fig. 17).

IMPERIAL EAGLE *Aquila adalberti*

There is no present indication of any territorial pair surviving in any of the few areas where the species was presumed to have been breeding recently (Palma and

Onofre 1986). The last known breeding was observed at the Portuguese/Spanish border in 1991 by a Spanish ornithologist. The area is now occupied by golden eagles and only old decaying nests could be found in 1996 (G. Rosa, pers. comm.). Degradation of breeding habitat and food resources, as well as loss of safety and tranquillity were presumably responsible for the sharp decline (Palma 1985), and ultimate disappearance, of breeding imperial eagles in Portugal.

Re-establishment of the species within its traditional range only seems likely in large private game reserves, owing to their relative isolation and high prey abundance. However, disrespect of legal statements in many of these estates may preclude that possibility for a long time irrespective of the species recovery in Spain (González 1990).

BOOTED EAGLE *Hieraetus pennatus*

Discrepancy between previous (130-150 pairs: Rufino *et al.* 1985) and present estimates probably results from a better knowledge of the species, thoroughly studied in the cork-oak woodlands of southern Portugal (its main range in the country) and does not necessarily reflect an

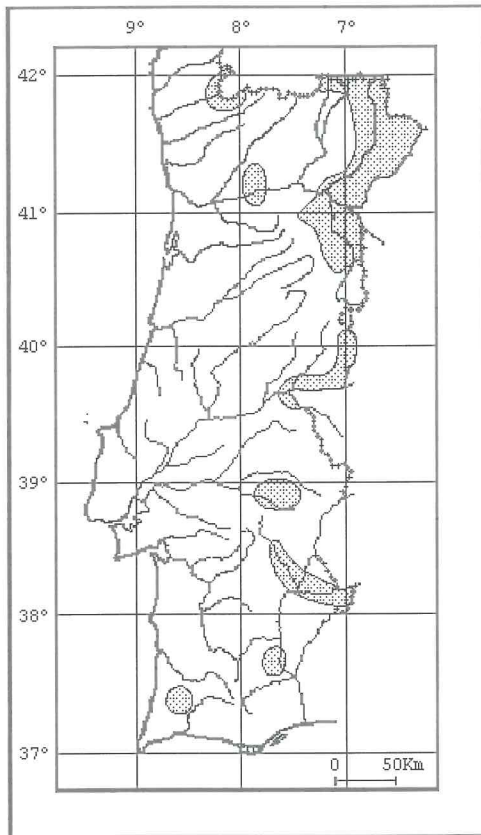


Fig. 17. Golden Eagle *Aquila chrysaetos*.

increase. The species thrives best in the extensive plain cork-oak woodlands of the Tejo basin, where it may reach up to 20-25 pairs/100 km², according to intensive surveys of breeding pairs carried out during long-term community studies (e.g. Onofre *et al.* 1986, Onofre 1996, Onofre unpub). Densities of 10-15 pairs/100 km² are not unusual in other areas with similar types of habitat (Fig. 18).

BONELLI'S EAGLE *Hieraetus fasciatus*

As a result of large-scale surveys (Parellada *et al.* 1986, Granado and Rocha 1987, Fráguas 1996, Pais 1996) we know the situation much better now than in 1982 when the first estimate was made (Rufino *et al.* 1985). Bonelli's eagle is rather secretive hence easily remaining unnoticed in wooded areas, as shown by a study in an area of cork-oak woodland located in the mountainous areas of the Southwest which revealed 23-24 pairs almost completely unknown before (Palma 1994, Palma unpub). All but one of these are tree-nesters, which is exceptional in Europe yet rather common in southern Portugal where about half of the pairs nest in trees.

The species has disappeared from at least 15 nesting sites during the last 10 years, most at the eastern part of the range. In turn it is increasing in the southwest regained 2 long deserted territories and established at least new one in the mountainous areas of central West, resulting in a global decrease of about 15% (Fig. 19). About 24 pairs have their territories along the Portuguese-Spanish border.

OSPREY *Pandion haliaetus*

The formerly much larger population (Palma in press) was reduced to three pairs in 1978, two pairs between 1979 and 1990 and one remaining pair until March 1997, when the female of this pair died by accident in their own nest. This remnant population was restricted to the Southwest coast. Recent decline was due to depressed recruitment and growing disturbance. The excessive presence of anglers on breeding cliffs during the critical periods of nest occupation and incubation has precluded the re-occupation of vacant territories in recent times, as inferred from the observation of several frustrated attempts by newly paired birds, the last one in 1989 and 1990. The area has been a

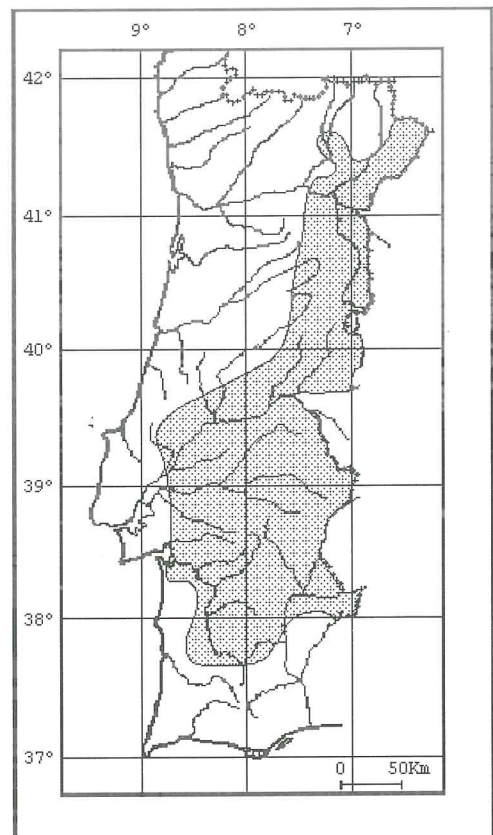


Fig. 18. Booted Eagle *Hieraetus pennatus*.

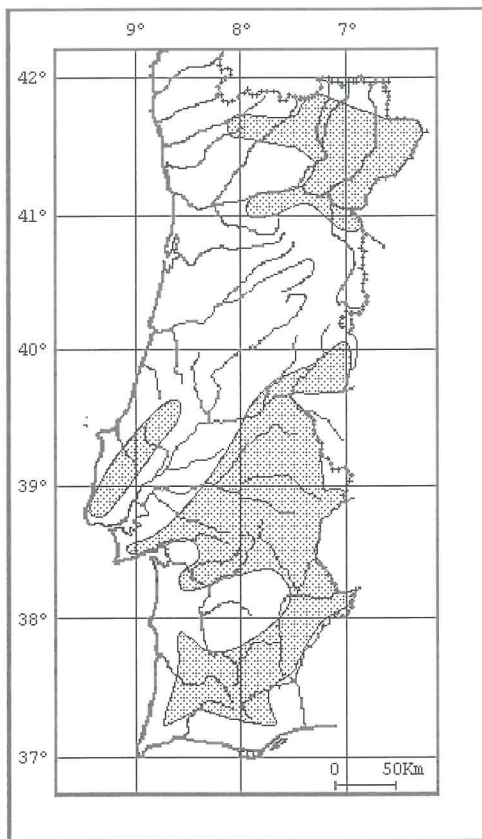


Fig. 19. Bonelli's Eagle *Hieraetus fasciatus*.

Protected Landscape Area since 1988 and a Natural Park since 1995 but the species recovery seems highly questionable without management actions (Palma *et al.* 1986, Palma in press) (Fig. 20).

PEREGRINE FALCON *Falco peregrinus*

Noticeably increasing at least in coastal areas where most suitable sites have been occupied, including vacant eyries of other birds such as Bonelli's eagles, ospreys, ravens (*Corvus corax*) and shags (*Phalacrocorax aristotelis*). Oliveira (1994) who estimated the breeding population as 37-59 pairs in 1992 had already referred to an increase of over 50% since the beginning of the 80's. This upward trend is probably associated with an increase in survival rates and greater food availability that followed the hunting ban in a 1 km-wide belt along most of the rocky coast in 1983, one of the most effective measures to protect coastal fauna (Fig. 21).

HOBBY *Falco subbuteo*

A difficult species for assessing breeding numbers unless a directed search is carried out or as a by-prod-

uct of long-term or intensive studies (Onofre *et al.* 1986, Pereira 1993). The minimum number previously given in the literature (300 pairs: Rufino *et al.* 1985) may therefore be over- or under-estimated. The present estimate seems a reasonable compromise between different possible approaches (Fig. 22).

In the cork-oak woodlands of the southern plains we reached a rough estimate through the extrapolation of the 1-2 pairs/100 km² obtained in intensive field studies (*e.g.* Onofre *et al.* 1986, Onofre unpub), to the whole area of available habitat of the corresponding type. We added the number similarly obtained for the mountainous areas of the Southwest. We then considered that in the northern half of the country the species occurs in a density 2-4 times higher. Altogether we got 150-300 pairs. Due to the species inconspicuity, we believed this could be a rather conservative estimate, possibly only c. 60% of the actual number, so we decided to raise the final estimate accordingly.

KESTREL *Falco tinnunculus*

We maintain the former estimate (Rufino *et al.* 1985)

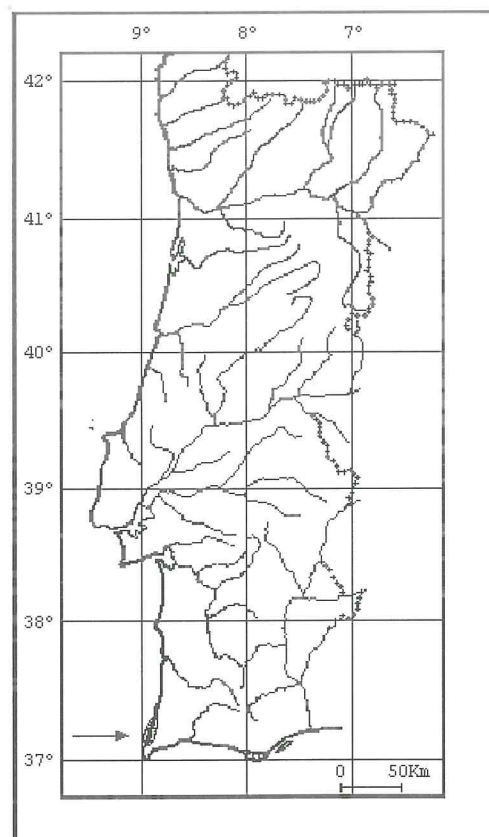
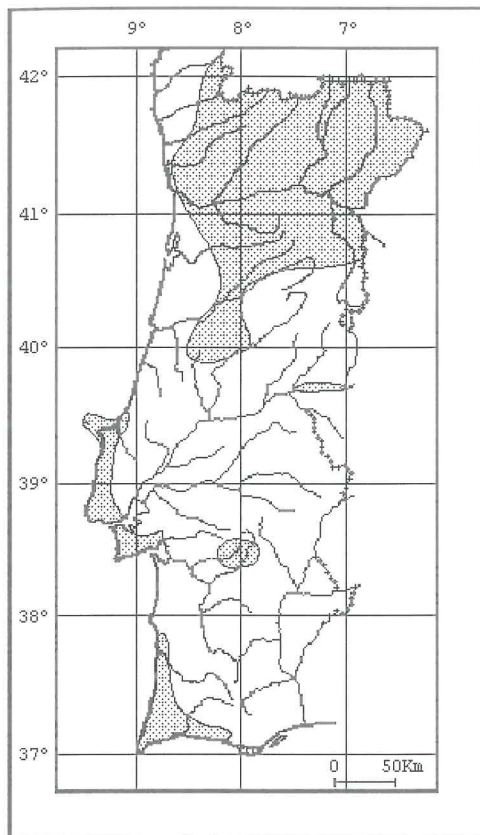
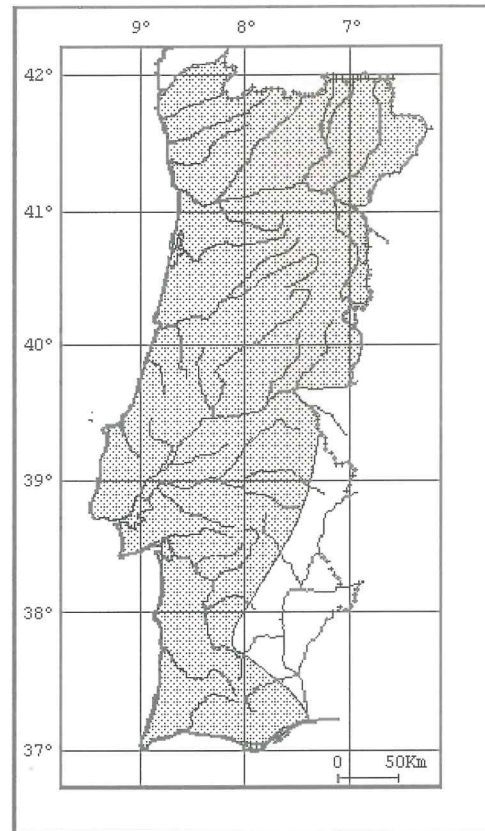


Fig. 20. Osprey *Pandion haliaetus*.

Fig. 21. Peregrine Falcon *Falco peregrinus*.Fig. 22. Hobby *Falco subbuteo*.

as data are lacking to enable a correction. It seems quite likely however that some decrease has taken place due to changes in agricultural practices (Fig. 23).

LESSER KESTREL *Falco naumanni*

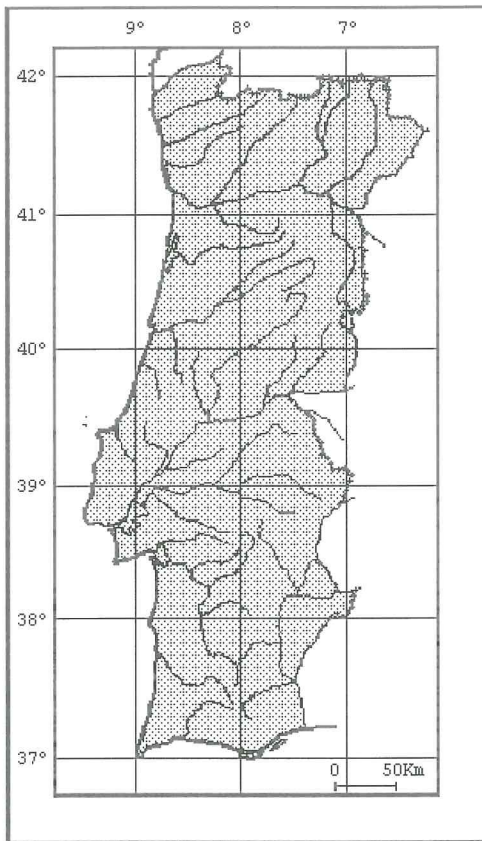
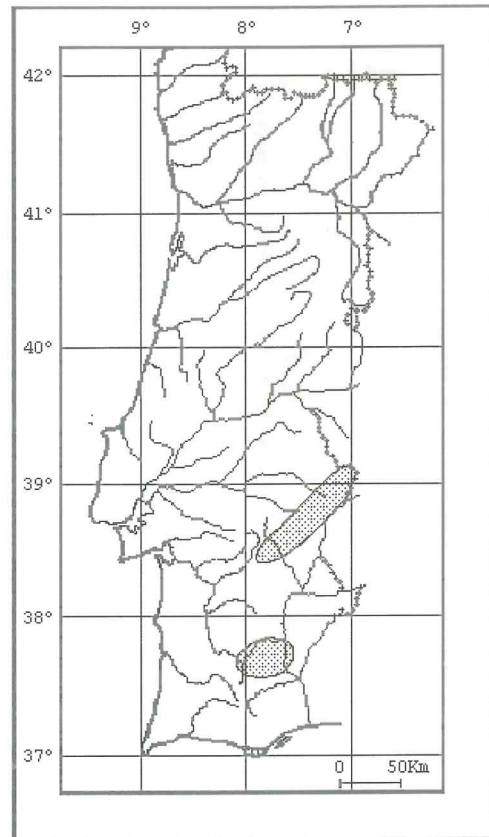
The species showed a serious decline in the country since the decades of the 50/60 (Araújo 1990, Rocha *et al.* 1996). Only one medium/large urban colony remains today, whereas all other important colonies in towns were deserted during the last 50 years. The repair of old buildings, mainly churches and castles, may be partly responsible. For the rest, the species persists only in small colonies (up to 28-29 pairs) or isolated pairs thinly distributed in non-urban areas (Rocha *et al.* 1996). However, since a complete national census has never been made some other small colonies and isolated pairs could remain undetected (Rocha *et al.* 1996). The decrease also affects colonies breeding in natural habitats. A whole population of about 50 pairs made up of several colonies and solitary pairs suddenly disappeared in 1993 in the SW coast and apparently did not reappear thereafter (Fig. 24).

RUPPEL'S VULTURE *Gyps rueppelli*

A rare accidental: an adult was twice reported from the Portuguese/Spanish border in 1992 (J. Hernández, J. Otano, V. Pizarro and others *in* Costa and Farinha 1994) and probably the same bird was sighted some weeks later in a *Gyps fulvus* colony at a relatively short distance (Carvalho 1993). The species has also been observed in several sites in Spain from 1990 onwards (Pizarro 1994). Finally in 1993 a debilitated first year juvenile was picked up also not far away from the previous locations and subsequently rehabilitated. The specific status of this bird was later confirmed by electrophoretic analysis and by Gerhard Verdoom of the Vulture Study Group to whom the recent increase in the number of observations in Iberia, Zimbabwe and South Africa may result from an expansion of the species range (Pimenta 1995).

LONG-LEGGED BUZZARD *Buteo rufinus cirtensis*

A common vagrant: Long-legged buzzards have been frequently sighted in some southern coastal locations (Onofre and Palma 1986, Bolton 1987, Palma and

Fig. 23. Kestrel *Falco tinnunculus*.Fig. 24. Lesser Kestrel *Falco naumanni*.

Beja 1994), not only during autumn and winter but also as late as April, when apparently paired birds have been seen. All birds seem to be of the smaller north-african form *cirtensis*. Probably, they are mostly immatures (one positively identified as a second-year bird) though some could be adults or sub-adults. Yet, the hypothesis that the species occasionally breeds in some areas of apparently suitable habitat could not be confirmed so far.

SAKER *Falco cherrug*

A very rare accidental with one confirmed sighting in September 1996 in the Southwest Coast (H. Blanco, C. Noivo and P. Wallis, pers. comm.).

GYRFALCON *Falco rusticolus*

A rare accidental: last two sightings, in March 1986 - an immature gray-morph observed near the Sado estuary (Onofre and Palma 1986) and twice in March 1991 - an adult whitish-grey-morph observed and photographed in the Southwest Coast (J.M. Pereira, C. Conde and J. Costa in Farinha and Costa 1993).

LANNER *Falco biarmicus*

An irregular vagrant (Onofre and Palma 1986, Costa *et al.* 1993b). Recent sightings of free birds (presumably adults of the *erlangeri* sub-species) were two on April 1988 (unpub, P. Harris, pers. comm.), four on September-October 1990 (Palma and Beja 1994) and one on February 1995 (J.M. Pereira, pers. comm.) all at or near the Southwest Coast. Another juvenile was seen in the same area on September 1996 (H. Blanco, C. Noivo and P. Wallis, pers. comm.). Still in 1996, an immature of the *erlangeri* sub-species in bad condition was retrieved from a coastal location north of Lisbon and sent to a rehabilitation center. There is no indication of any breeding attempt in the country.

ELEANORA'S FALCON *Falco eleonora*

A regular vagrant (Onofre and Palma 1986, Costa *et al.* 1993b) along the western coast from April to November and accidental inland. Annually observed in small numbers in the Southwest coast from August to late October - 6 to 17 sightings annually (*e.g.* Palma and Beja 1994). At least some of the birds observed in

that area remain stationary from some days to weeks hunting birds and insects over the coastal plateau. Birds in adult or sub-adult-like plumage pattern seem dominant over clearly immature-types and possibly are unsuccessful or non-breeders that wander off their breeding grounds (D. Ristow, pers. comm.). No evidence of recent breeding. The species may have bred in a sea-cliff north of Lisbon up to 1982 (Onofre and Palma 1986) although it could not be confirmed at the time.

RED-FOOTED FALCON *Falco vespertinus*

An irregular vagrant (Onofre and Palma 1986, Costa *et al.* 1993b). Last confirmed records were in Autumn 1992 (2 immatures) and June 1996 (1 male in adult plumage pattern).

MERLIN *Falco columbarius*

Scarce winter visitor, occurring mainly from October to April (Costa 1995, Costa *et al.* 1996). It has been more often observed in the lower Tejo valley and inner Alentejo province but during migration it can also be seen along the western coast (Costa 1995, Costa *et al.* 1996).

Acknowledgments - We are specially indebted to our close collaborators António Araújo, António Monteiro, Armando Carvalho and the *Quercus* Association, Bárbara Fráguas, Hugo Blanco, Jacinto Diamantino, Luis António Ferreira, Luis Reino, Miguel Pais, Miguel Pimenta, Paulo Catry, Paulo Tenreiro, Pedro Rocha and Pedro Soares who provided us with important unpublished information. We would like to thank also those regular or occasional observers who generously allowed us to "complete the picture". We also thank the helpful comments of an anonymous referee, and Pedro Beja and Gareth Pearson for the revision of the manuscript.

References

- Abreu M.V. 1984. Le statut des rapaces au Tejo Internacional. In: Alamany O., de Juan A., Parellada X., Ramón J. and Ticó J., Eds. Rapinaires Méditerranais, II. C.R.P.R. Barcelona, Spain pp. 203-208.
- Araújo A. 1990. Datos sobre la evolución de las poblaciones de cernícalo primilla *Falco naumanni* en Portugal, con especial referencia al período 1975-1990. In: González J.L. and Merino M., Eds. El cernícalo primilla (*Falco naumanni*) en la Península Ibérica. Situación, problemática y aspectos biológicos. ICONA, Série Técnica, Madrid, Spain pp. 71-81.
- Araújo A., Renato N. and Rufino R. 1994. Evolução e situação actual das comunidades nidificantes de grifo *Gyps fulvus* em Portugal. In: 1ª Conferência Nacional sobre Aves de Rapina. Parque Biológico Municipal de V. N. de Gaia. Vila Nova de Gaia, Portugal pp. 209-221.
- Bolton M. 1987. An atlas of wintering birds in the western Algarve. A ROCHA, occasional publications No.1.
- Carvalho A. 1993. Projecto Protecção do Rio Tejo Internacional. Unpubl. report. Vol. XIII. Associação Quercus, Coimbra, Portugal.
- Costa, H. 1995. Onde observar o Esmerilhão em Portugal. *Pardela* 1 (2):10.
- Costa H. and Farinha J.C. 1994. Lista das observações de aves de ocorrência rara ou accidental em Portugal homologadas pelo Comité Ibérico de Raridades. *Airo* 5 (1): 37-40.
- Costa H., Santos B., Leitão D. and Catry P. 1993a. Contribuição para o conhecimento das populações de Tartaranhão-rui-vos-paúis *Circus aeruginosus* nos estuários do Tejo e do Sado. *Airo* 4 (1): 1-6.
- Costa H., Farinha J. C., Moore C.C., Neves R. and cols. 1993b. Lista sistemática de espécies de aves de ocorrência accidental, rara ou pouco comum em Portugal Continental. *Airo* 4(1): 28-33.
- Costa H., Leitão D., Catry P. and Santos B. 1996. O Esmerilhão *Falco columbarius* em Portugal Continental. *Airo* 7(1): 21-25.
- Coverley, H., no date. Bird notes. *Portugal*. DGF, Lisbon
- Farinha J.C. and Costa H. 1993. Lista de observações de aves de ocorrência rara ou accidental em Portugal, homologadas pelo Comité Ibérico de Raridades. *Airo* 4 (1): 34-37.
- Fernandes C., Leitão D. and Costa H. 1995. Situação actual das populações de Águia-sapeira *Circus aeruginosus* em Portugal. *Alytes* VII: 93-100.
- Fráguas B. 1996. Distribuição e situação actual da população da Águia-de-Bonelli *Hieraaetus fasciatus* no Nordeste de Portugal. In: Farinha J.C., Almeida J. and Costa H., Eds. I Congresso de Ornitologia da Sociedade Portuguesa para o Estudo das Aves. SPEA. Vila Nova de Cerveira, Portugal p. 102.
- González, L.M. 1990. Situación de las poblaciones de Águila Imperial y Buitre Negro en España. *Quercus* 58: 16-22.
- Granado A. and Rocha J. 1987. Projecto Águia-de-Bonelli: resultados do segundo ano de actividade. In: I Congresso Luso-Galego de Conservação e Ambiente. Braga, Portugal pp. 157-160.
- Génsbøl B. 1995. Rov Fuglene i Europa, Nordafrika og Mellemøsten. 3. udgave. G.E.C. Gads Forlag.
- Leitão D., Fernandes C. and Costa H. 1996. O Tartaranhão-rui-vos-paúis *Circus aeruginosus* em Portugal. *Pardela* 2 (1): 6-8.
- Monteiro A. 1995. Situação populacional, biologia da reprodução e ecologia do Abutre do Egípto *Neophron percnopterus* na região do Alto Douro. BSc. Hons. thesis. Faculty of Sciences, University of Lisbon.
- Monteiro A. and Berliner A. 1996. O regresso do Alcaforro?. *Liberne* 55: 6-9.
- Monteiro A., Carvalho A. and Fráguas B. 1996a. Demografia e distribuição do Abutre-do-Egípto *Neophron percnopterus* em Portugal. In: Farinha J.C., Almeida J. and Costa H., Edits. I Congresso de Ornitologia da Sociedade Portuguesa para o Estudo das Aves. SPEA. Vila Nova de Cerveira, Portugal pp. 90-91.
- Monteiro A., Berliner A., Carvalho A. and Araújo A. 1996b. Situação populacional e distribuição do Grifo *Gyps fulvus* em Portugal no ano de 1996. In: Farinha J.C., Almeida J. and Costa H., Eds. I Congresso de Ornitologia da Sociedade Portuguesa para o Estudo das Aves. SPEA. Vila Nova de Cerveira, Portugal pp. 92-93.
- Oliveira L. 1994. A situação do falcão peregrino (*Falco peregrinus*) em Portugal. In: 1ª Conferência Nacional sobre Aves de Rapina. Parque Biológico Municipal de V. N. de Gaia. Vila Nova de Gaia, Portugal pp. 198-206.
- Onofre N. 1996. Aves de rapina de uma região predominantemente desarborizada, dos concelhos de Castro Verde e Mértola. Abordagem à estrutura da comunidade e às suas relações com o habitat. *Silva Lusitana* n° especial: 65-92.
- Onofre N. and Rufino R. 1993. The present situation of the Montagu's Harrier (*Circus pygargus* L.) in Portugal. In:

- Clemens C., Coord. International Montagu's Harrier (*Circus pygargus*) Conference. Kiel-Raisdorf, Germany pp. 72-79
- Onofre N. and Rufino R. 1995. Situação actual da Águia caçadeira *Circus pygargus* em Portugal. *Alytes* VII: 481-494.
- Onofre N., Reino L., Pimenta M. and Costa H. 1995. Situação actual do Tartaranhão azulado *Circus cyaneus* em Portugal. *Alytes* VII: 151-159.
- Onofre N. and Palma L. 1986. Sobre o estatuto de algumas rapinas diurnas localizadas, raras ou acidentais em Portugal. In: V Conferência Internacional sobre Rapinas Mediterrânicas. Évora, Portugal (1986).
- Onofre N., Palma L. and Andrade F. 1986. Primeiros dados sobre uma comunidade reprodutora de rapinas de um montado de sobre de planície. In: V Conferência Internacional sobre Rapinas Mediterrânicas. Évora, Portugal (1986).
- Pais M.C. 1996. A Águia-de-Bonelli (*Hieraaetus fasciatus*) no sul de Portugal. Situação da espécie, biologia da reprodução, ecologia e conservação da população. BSc. Hons. thesis. Faculty of Sciences, University of Lisbon.
- Palma L. 1985. Present situation of birds of prey in Portugal. In: Newton I. and Chancellor R.D., Eds. Conservation Studies on Raptors. ICBP Technical Publication No.5. Cambridge, England pp. 3-14.
- Palma L. 1994. Nidificación de águilas perdiceras sobre árboles en Portugal. *Quercus* 98: 11-12.
- Palma L. in press. Osprey *Pandion haliaetus* in the Portuguese coast: past, present and recovery potential. *Volgelwelt*.
- Palma L. and Rufino R. 1981. I censo de Buitreras (1979). Informe sobre Portugal. *Ardeola* 26-27: 273-276.
- Palma L. and Beja P. 1994. Autumn migration of raptors through Sagres (SW Portugal). In: Meyburg B.-U. and Chancellor R.D. Edits. Raptor Conservation Today. WWGBP/The Pica Press: 179-185.
- Palma L. and Onofre N. 1986. A águia imperial *Aquila adalberti* em Portugal - síntese dos conhecimentos actuais. In: V Conferência Internacional sobre Rapinas Mediterrânicas. Évora, Portugal.
- Palma L., Cancela da Fonseca L. and Beja P. 1986. A população residual de *Pandion haliaetus* em Portugal (1979-1986). Produtividade, fenologia, regime trófico e conservação. In: V Conferência Internacional sobre Rapinas Mediterrânicas. Évora, Portugal.
- Parellada X. and cols. 1986. Primera encuesta sobre el estatus del águila real (*Aquila chrysaetos*) y el águila perdicera (*Hieraaetus fasciatus*) en la Península Ibérica. In: V Conferência Internacional sobre Rapinas Mediterrânicas. Évora, Portugal.
- Pereira J. M. 1993. Actualização do status da Águia cobreira *Circaetus gallicus* e Bufo real *Bubo bubo* no Algarve. Unpubl. report to the Institute of Nature Conservation (ICN), Lisboa, Portugal.
- Pimenta M. 1995. Abutre de Rüppel em Portugal. *Correio da Natureza* 20: 18-19.
- Pimenta M. 1986. Nota sobre a ocorrência e nidificação do Falcão-abelheiro (*Pernis apivorus*) no Parque Nacional da Peneda-Gerês. In: V Conferência Internacional sobre Rapinas Mediterrânicas. Évora, Portugal.
- Pizarro V.M. 1994. Buitre moteado *Gyps rueppellii*. In: De Juana y Comité de Raridades. Observaciones homologadas de aves raras en España. *Ardeola* 41: 108.
- Pombal E. 1989. A necessidade de áreas protegidas para a conservação da Águia-real (*Aquila chrysaetos*) em Portugal. In: II Congresso de Áreas Protegidas. SEARN, Serviço Nacional de Parques, Reservas e Conservação da Natureza. Lisboa, Portugal pp. 143-151.
- Pombal E. 1996. Situação populacional e distribuição da Águia real (*Aquila chrysaetos*) em Portugal. In: Farinha J.C., Almeida J. and Costa H., Eds. I Congresso de Ornitologia da Sociedade Portuguesa para o Estudo das Aves. SPEA. Vila Nova de Cerveira, Portugal pp. 93-96.
- Reis, A. 1986. A população de águia sapeira *Circus aeruginosus* na ria de Aveiro. In V Conferência Internacional sobre Rapinas Mediterrânicas. Évora (1986).
- Reis Júnior, J.A. 1934. Aves de Portugal. XV Acciptriformes. Araújo and Sobrinho Eds. Porto, Portugal.
- Rocha P. A., Araújo A. and Cruz C. 1996. A evolução das populações portuguesas do Francelho-das-torres *Falco naumanni*. In: Farinha J.C., Almeida J. and Costa H., Eds. I Congresso de Ornitologia da Sociedade Portuguesa para o Estudo das Aves. SPEA. Vila Nova de Cerveira, Portugal pp. 97-98.
- Rufino R. 1989. Atlas das Aves que nidificam em Portugal Continental. CEMPA, Lisboa.
- Rufino R., Araújo A. and Abreu M.V. 1985. Breeding raptors in Portugal: distribution and population estimates. In: Newton I. and Chancellor R.D., Eds. Conservation Studies on Raptors. ICBP Technical Publication No.5. pp. 15-28.
- Silva L., Pais M.C. and Safara J. 1996. Recent data on the situation of the Black vulture in Portugal. R. R. F. 2nd International Conference on Raptors. Urbino, Italy.
- Tait, W.C. 1924. The Birds of Portugal. H.F. and G. Witherby (ed.). London.