

# PERSECUTION OF RAPTORS IN EUROPE ASSESSED BY FINNISH AND SWEDISH RING RECOVERY DATA

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## ABSTRACT

On the evidence of Finnish and Swedish ringing and recovery data the persecution of migrating raptors seems to have decreased dramatically in the second half of the 1960s in many European countries (i.e. in Central Europe, France and the USSR). In Italy a decline did not begin until ten years later. These data do not suggest any changes in persecution of raptors in Africa.

## INTRODUCTION

The intensity of legal persecution can be estimated from official game statistics (Bijleveld 1974). In contrast, there are no exact methods by which to estimate the intensity of illegal persecution. The only potential sources of information are: (1) direct observations in the field (carcass studies etc.), (2) information from taxidermists, and (3) ring recoveries (cf. Newton 1979). In this paper I describe the changes (not absolute levels) of persecution of raptors in Europe on the basis of Finnish and Swedish ringing and recovery data. The Swedish data were made available to me by Sten Österlöf and Bo Sällström.

## MATERIAL AND METHODS

The grand total of raptors ringed in Finland and Sweden is about 100,000, out of which about 10,000 have been recovered. Especially in Finland, the ringing of raptors has increased greatly during the last ten years (*Figure 1*).

To measure the changes in persecution and other causes of mortality, the first-year recovery rates of birds killed and all birds found dead have been calculated (cf. Henny & Wight 1972; Saurola 1980):

$$\text{persecution rate} = \frac{K_t}{R_t} \times 1000$$

$$\text{total recovery rate} = \frac{T_t}{R_t} \times 1000$$

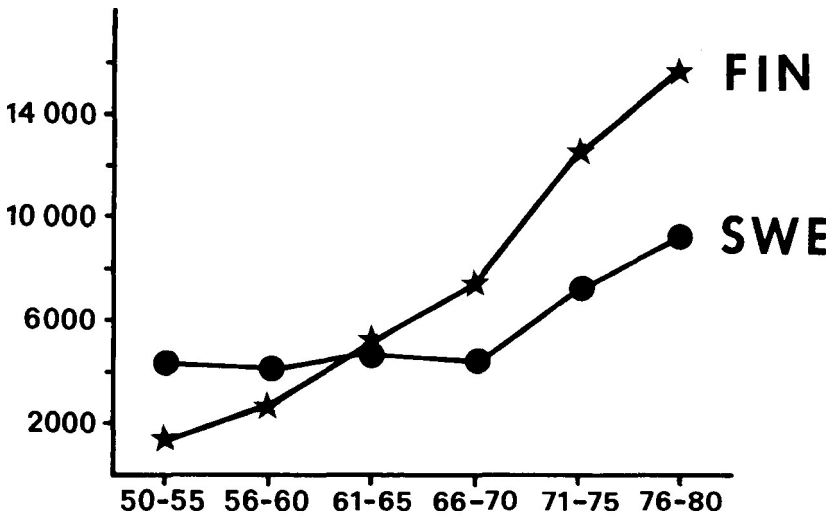


Figure 1: Total numbers of raptors ringed in Finland (FIN) and Sweden (SWE) in the period 1950-80.

where:

$K_t$  = number of birds ringed as nestlings during the five year period (t) and reported as killed during the first year of life (from 1 August to 31 July).

$R_t$  = number of birds ringed during the five year period (t).

$T_t$  = total number of birds ringed as nestlings during the five year period (t) and reported as dead during the first year of life.

The arguments for calculating the persecution rate as above (and reducing the amount of data) are: (1) in order to eliminate the effect of annual variation in ringing activities, the actual numbers of recoveries must be related to the numbers of birds ringed, and (2) in order to use the most recent data, only the recoveries of birds that died during their first year of life are included.

## RESULTS

Areas where raptors (excluding Goshawk *Accipiter gentilis*) ringed as nestlings in Finland or Sweden have been killed are shown in Figures 2 and 3. (Note: these maps include *all* reports of killed raptors and not only those recoveries defined before and used in later figures.) The Finnish and Swedish data cannot simply be combined, because Finnish raptors take a more easterly migration route than the Swedish ones (e.g. Österlöf 1977). Ringing of raptors was also much more extensive in Sweden during World War II and immediately after it, resulting in temporal heterogeneity. Accordingly, most of the remaining graphs are based on data either from Finland or Sweden.

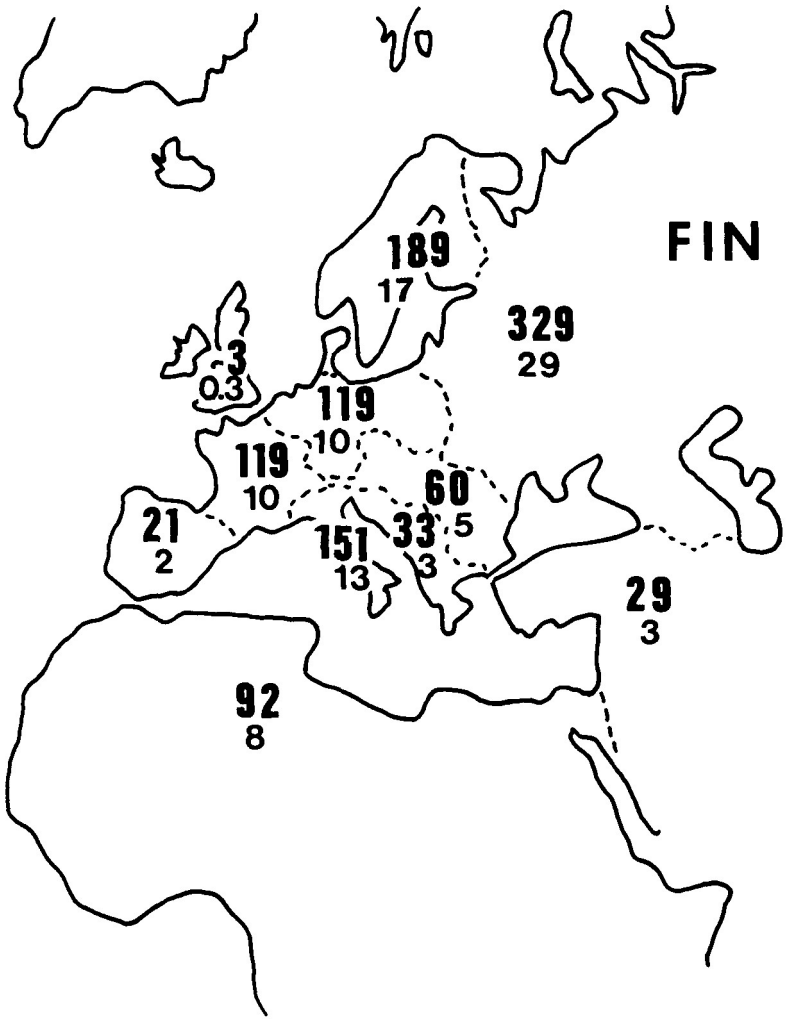


Figure 2: Distribution of all reports of killed raptors (excluding Goshawk) ringed in Finland. (Upper figures absolute and lower figures percentage numbers of recoveries.)

Changes in persecution rates during the last 25 years in different parts of Europe (and Africa) are shown in Figures 4 to 9. Because the data on the Osprey (*Pandion haliaetus*) and the Common Buzzard (*Buteo buteo*) are the most representative, these species were used as indicator species for all areas except Fennoscandia. For Italy, recoveries of the Honey Buzzard (*Pernis apivorus*), Marsh Harrier (*Circus aeruginosus*) and Kestrel (*Falco tinnunculus*) have been used as supplementary data.

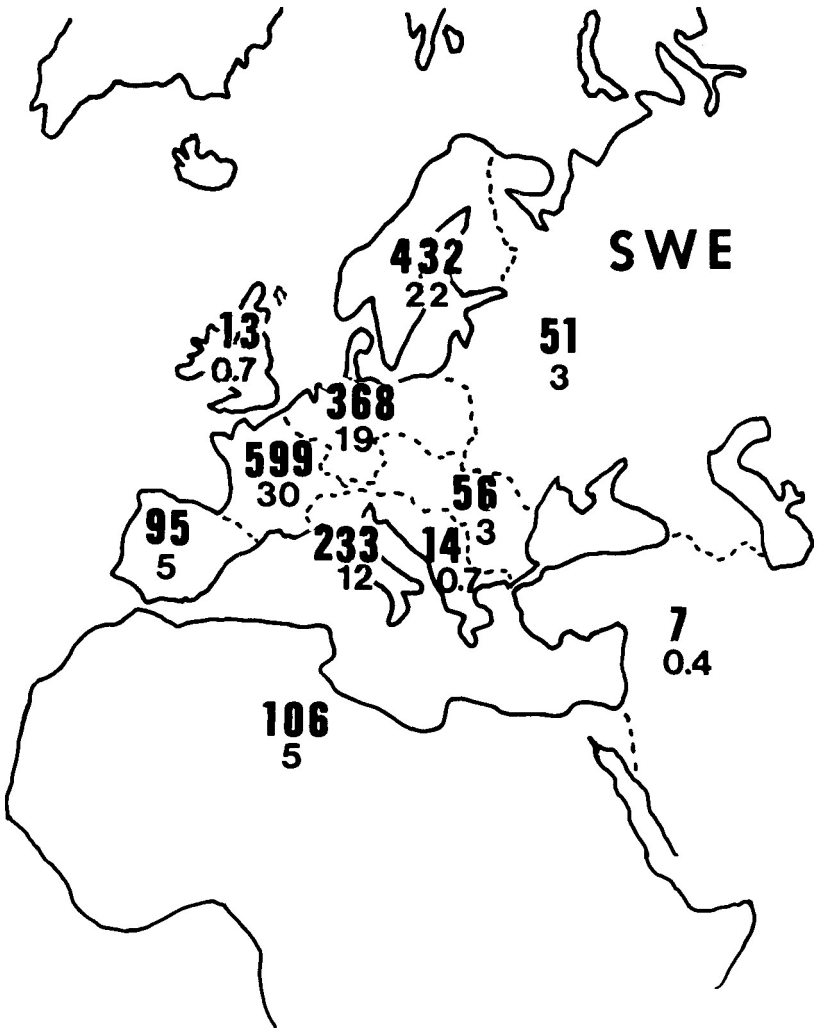


Figure 3: Distribution of all reports of killed raptors (excluding Goshawk) ringed in Sweden. (Upper figures absolute and lower figures percentage numbers of recoveries.)

**Fennoscandia (Figure 4).** The only raptor still persecuted on a significant scale in Fennoscandia is the Goshawk. In Finland this species has been protected during the 'breeding season' (from 1 May to 15 July) since 1979. Persecution of the Goshawk in Fennoscandia has decreased remarkably (by 50 percent according to Figure 4) during the last 15 years, but still in 1976–80 some seven percent of ringed nestlings were reported as killed during the first year.

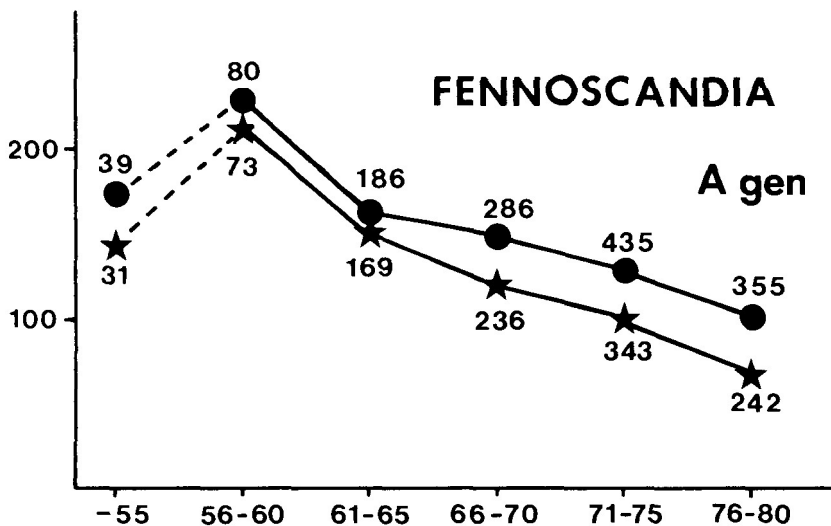


Figure 4: Persecution rate (asterisks) and total recovery rate (dots), in five year periods, of Goshawks ringed in Finland and reported from Fennoscandia.

**Central Europe (Figure 5).** This area includes The Netherlands, Belgium, FRG, DDR and Poland. Persecution of the two indicator species decreased greatly in the 1970s, although the Common Buzzard has been only partly protected in both German republics (Conder 1977).

**France (Figure 6).** Large raptors (including eagles, vultures and Osprey) were protected in France from 1964 and all the other raptors from 1972 (Roux, pers. comm.). According to ringing recoveries, the hunting pressure on raptors decreased by more than 50 percent during the second half of the 1960s.

**USSR (Figure 7).** According to Galushin (1977), no bounties for killed raptors have been paid in the USSR since 1964 and all species have been protected since 1974. Although it is known that many raptors still have been killed in recent years in the USSR, I believe that the impression given by recovery data (Figure 7) is correct: that persecution has decreased following protective legislation.

**Italy (Figure 8).** This area includes the nearby islands (e.g. Malta). In these areas persecution of raptors remained at the same level, at least up to the early 1970s (see also Lovari 1973; Chiavetta 1977). Assuming that all possible recoveries from the last five years have been reported, a change towards less persecution can be expected.

**Africa (Figure 9).** Reports of raptors ringed in Finland or Sweden and killed in any of the African countries are too few for detailed analysis (Figures 2 and 3). However, a graph of combined African data on the Osprey shows no change in persecution during the last 25 years.

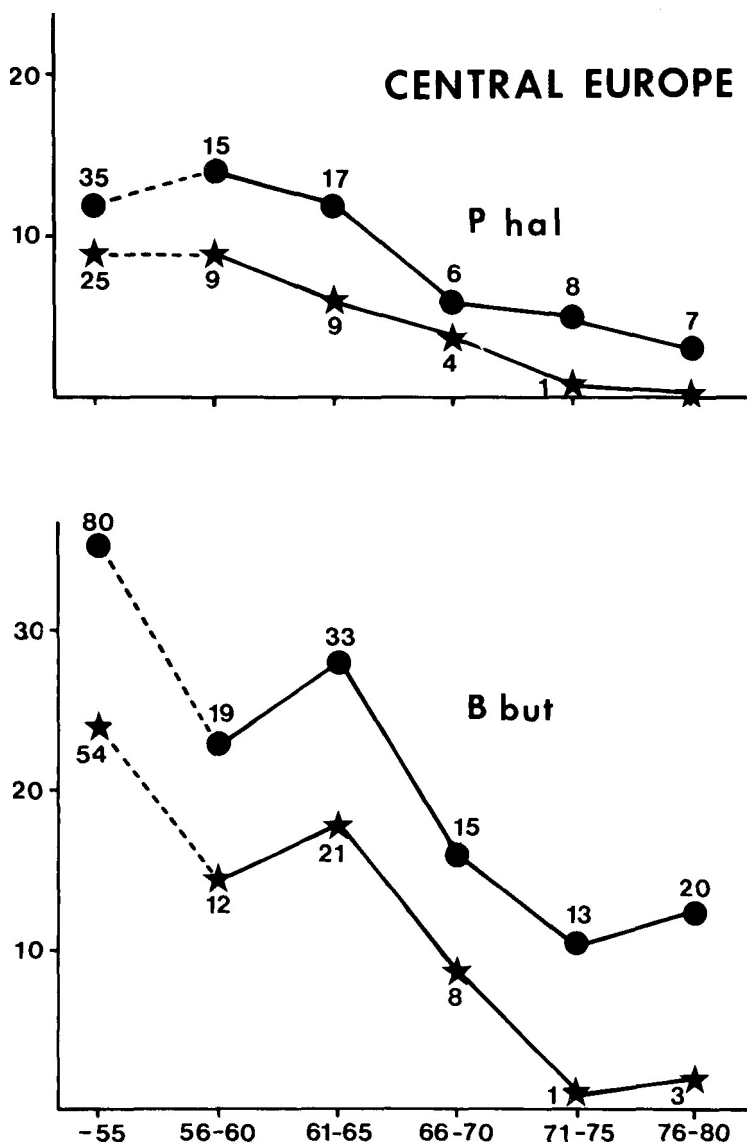


Figure 5: Persecution rate (asterisks) and total recovery rate (dots), in five year periods, of Ospreys (P hal) and Common Buzzards (B but) ringed in Sweden and reported from Central Europe (see text).

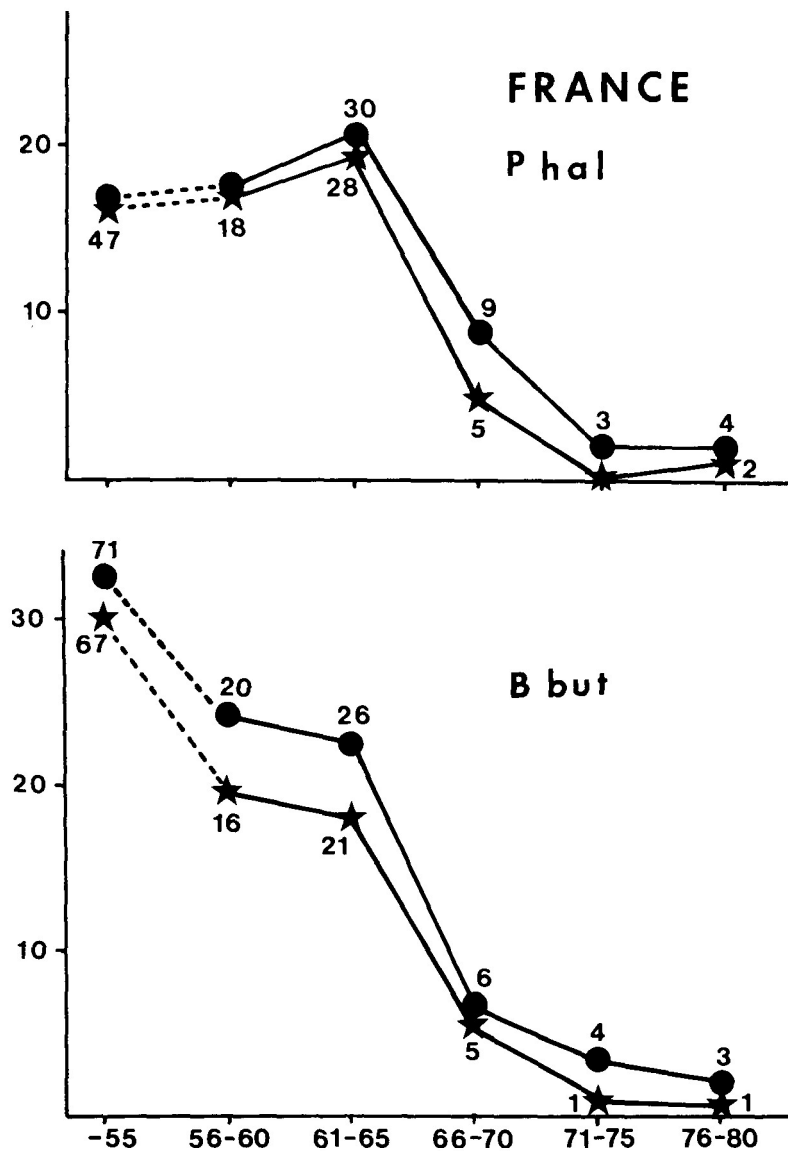


Figure 6: Persecution rate (asterisks) and total recovery rate (dots), in five year periods, of Ospreys (P hal) and Common Buzzards (B but) ringed in Sweden and reported from France.

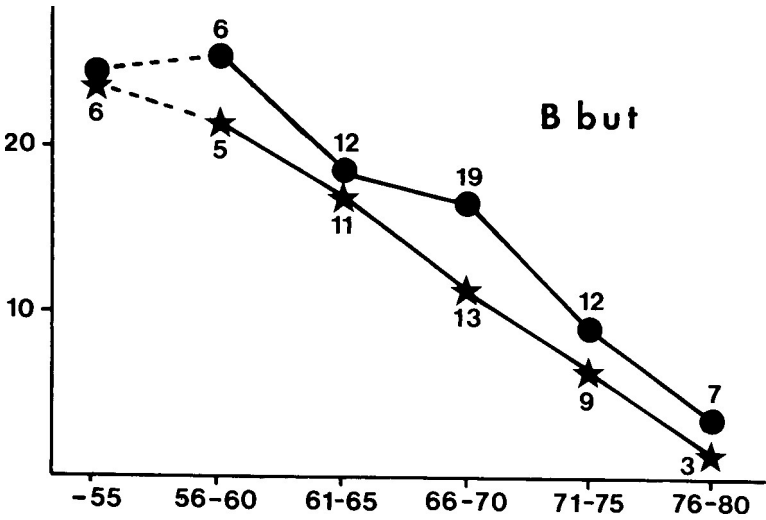
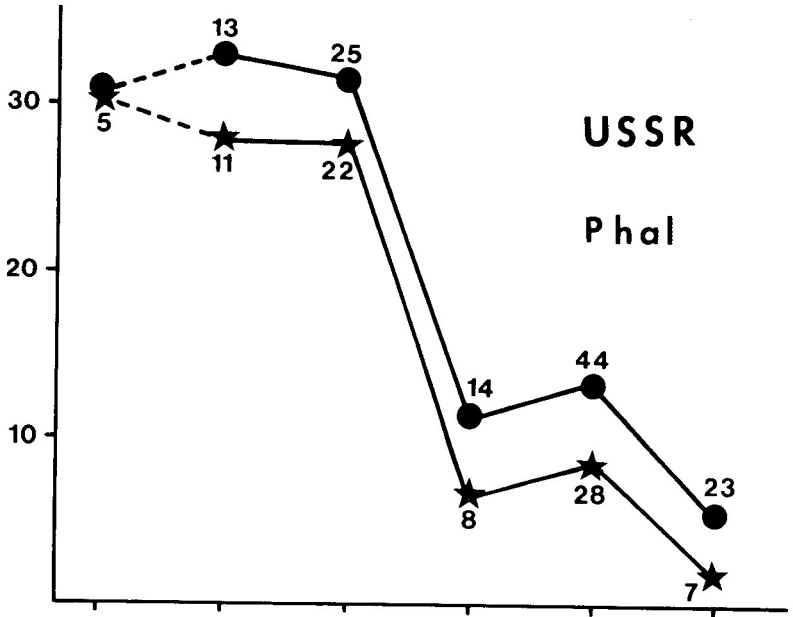


Figure 7: Persecution rate (asterisks) and total recovery rate (dots), in five year periods, of Ospreys (P hal) and Common Buzzards (B but) ringed in Finland and reported from the USSR.



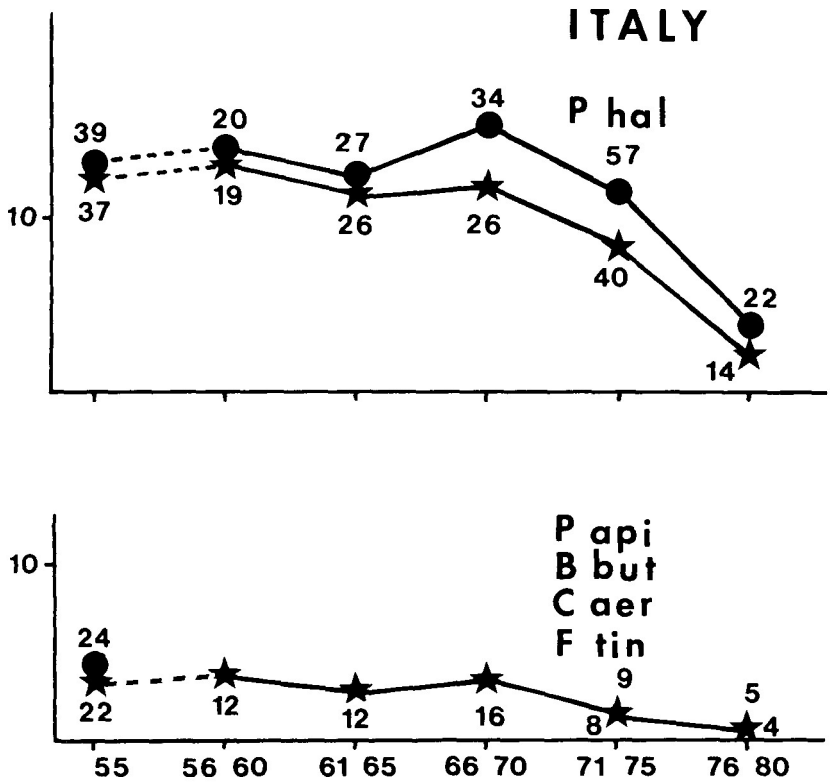


Figure 8: Persecution rate (asterisks) and total recovery rate (dots), in five year periods, of Ospreys (P hal), Common Buzzards (B but), Honey Buzzards (B api), Marsh Harriers (C. aer) and Kestrels (F tin) ringed in Finland and Sweden and reported from Italy (see text).

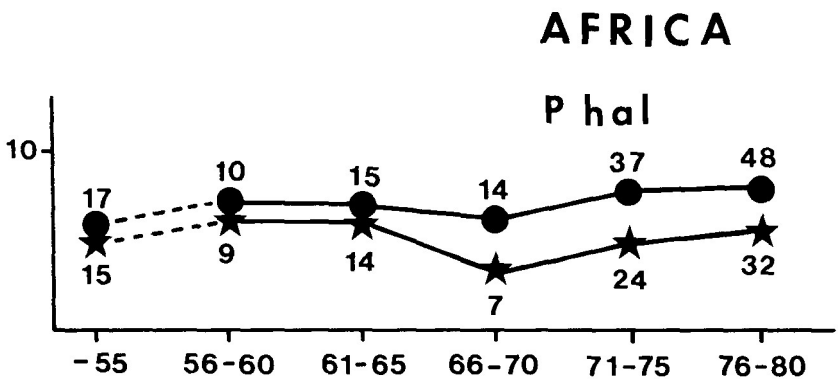


Figure 9: Persecution rate (asterisks) and total recovery rate (dots), in five year periods, of Ospreys ringed in Finland or Sweden and reported from Africa.

## DISCUSSION

The recovery rate of a killed bird is a function of both the real hunting pressure and the reporting rate of rings. The motivation to report rings from a killed protected bird is certainly lower than from an unprotected one, and regulated by two opposing forces: the fear of punishment, and curiosity. After killing a ringed protected raptor, the hunter can either: (1) report correctly, (2) report, but falsify the cause of death, or (3) not report at all. If many of the birds killed are reported as found dead, an increase in the recovery rate of the birds 'found dead' should be observed. No such increase was found (*Figures 4 to 9*) so there is no reason to suspect that more reports have been falsified in recent years than before. It is impossible to assess how many birds were killed and not reported, and hence whether this factor has increased in recent years. I have no option but to leave this question open.

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