In summary, Collared Pratincoles look for big flat, or slightly hilled, open areas. In these areas, they establish colonies in unvegetated areas, or where the vegetation is mostly shorter than 15 cm or, where it is higher than this, it has very little cover. Many parts of the marshes in the study area met these conditions during the time of the colony settlement. Since the area of marshes was not sufficient for the whole Collared Pratincole population, the surplus searched for other places to establish colonies. The fallow land was the major alternative, probably because they offered an open terrain. Only seldom did they establish colonies in poorly developed crops. There was also a clear tendency to place colonies in areas that are currently marshes or were so before.

As we said before, the losses of natural habitat on the marshes of Guadalquivir river have exceeded 70%. In spite of this, the population of Collared Pratincole is still the largest in Europe. We estimate that from 2 500 to 3 000 pairs bred in the province of Sevilla in 1989 without taking into account those breeding in the area of Donana National Park that belongs to this province.

ACKNOWLEDGEMENTS

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POPULATION TRENDS OF SELECTED WADER SPECIES IN PORTUGAL, 1975-1989

Rui Rufino

INTRODUCTION

Wintering wader counts have been carried out in Portugal since 1975 on a relatively regular basis and always in January. For the first two years they were done by A.J.Prater and A.Grieve on behalf of the IWRB, and from 1977 onwards they were organized by CEMPA, with A.Grieve still participating in 1977.

No accurate counts are, however, available for 1985 and only one site was surveyed in 1983 and 1984.

There are four major estuarine areas on the Portuguese coast, Aveiro, Tejo, Sado and Faro (Figure 1). These were not covered every year and the degree of coverage for each site was not the same for every count. The count figures which have been published yearly in the annual winter reports by CEMPA (CEMPA 1979,1980,1981, Rufino 1979,1982,1988, 1989, Rufino & Neves 1986, Rufino & Araújo 1987) are, therefore, not always comparable .

In this paper I establish which counts are readily comparable and analyze the wader population changes based on that comparability.

For most of the species counts from 1975 were not used as this was the first time that most of the sites were visited by the observers.

The paper deals only with those species which have regular and not too small wintering populations. In general, those species with populations below 500 birds per site and per year are not further considered in this analysis. Two exceptions are made to this rule:

1. the Black-winged Stilt *Himantopus himantopus*, which winters regularly, although in small numbers; and
2. the Black-tailed Godwit *Limosa limosa* which although abundant will not be considered here because its numbers have shown very great variation throughout January.

METHODS

The comparability of counts was established based the degree of coverage of the site, the number and experience of the observers, and the weather conditions during the counts.

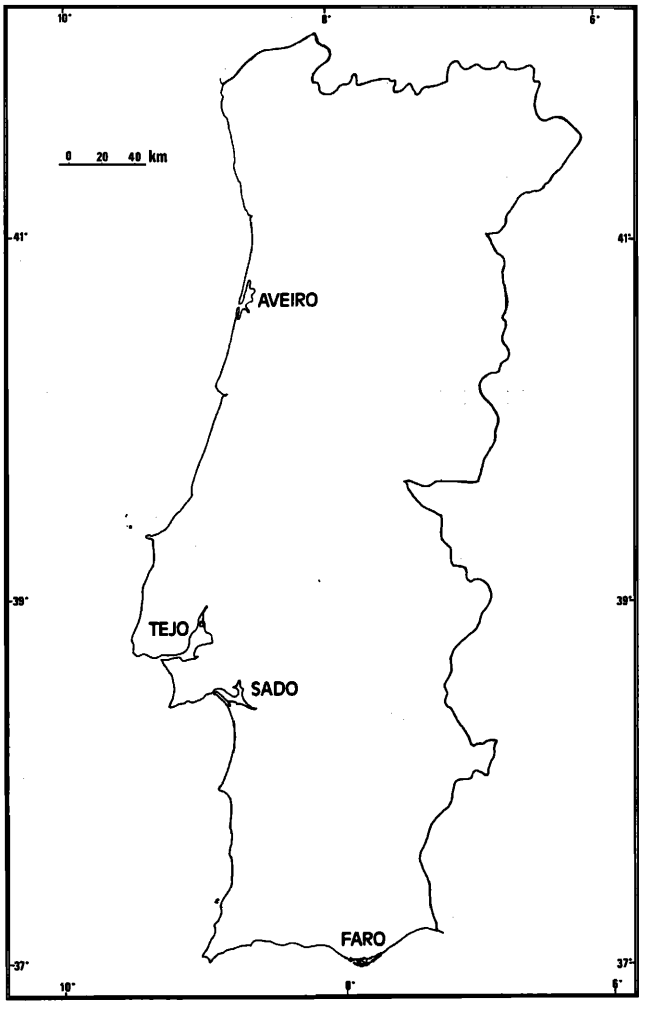


Figure 1. Locations of the 4 estuarine sites where counts were carried out.

The following series of counts were considered as comparable:

Aveiro: 1981,1982, 1987 & 1988;
Tejo: 1976-1982, 1986-1989;
Sado: 1977-1982;
Faro: 1976, 1977, 1979-1982; 1986-1989.

Although for the Faro 1983 and 1984 are comparable with each other counts from these years are not used for most species, since it would mean using a single count for the index calculation during a 4 year period.

For three species, Black-winged Stilt *Himantopus himantopus*, Oystercatcher *Haematopus ostralegus* and Avocet *Recurvirostra avosetta*, counts from other years were also included in the analysis. These counts were considered as comparable for those species as their main roosts are normally surveyed, even when the counts were incomplete.

A Population Index was calculated for each species using paired counts as proposed by Owen *et al.* (1986). This index is the best that can be calculated from the available data for only 4 sites, but must be used cautiously. Thsi population index was not calculated for the Black-winged Stilt, as the data refers to only one site, the Faro lagoon. For this species the analysis was based on total numbers.

1982 was chosen as the baseline year for two reasons. It coincided with the end of one series of counts, and several species had their lowest population levels on that year.

RESULTS AND DISCUSSION

Oystercatcher *Haematopus ostralegus* (Figure 2)

The Population Index for Oystercatcher was calculated with data from only the Sado estuary and the Faro lagoons. The two other sites held very small and rather irregularly occurring wintering populations. There is clearly a trend of increase, although with some amount of variation. This is due mainly to the changes in the population wintering in Faro lagoon.

This increase in the Oystercatcher population is further confirmed by local clam *Venerupis decussata* farmers. There are nowadays many more complains from those farmers about increased predation upon their clams by Oystercatchers.

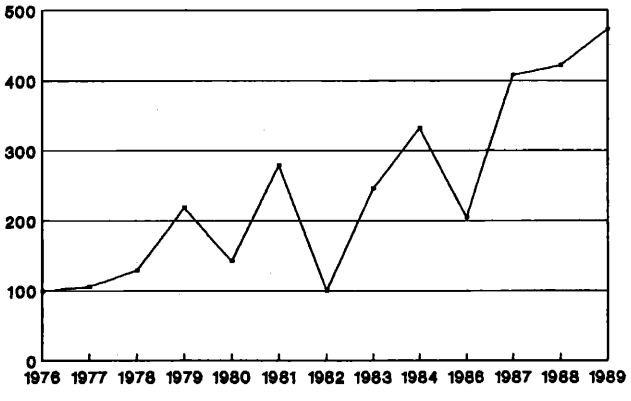


Figure 2. Population index for Oystercatchers wintering on Portuguese estuaries. 1982 is set to 100.

Kentish Plover *Charadrius alexandrinus* (Figure 3)

The wintering population of Kentish Plovers has varied considerably from 1976 until now.

After an increase up to 1979 followed by a decrease until 1982, the population recovered to higher levels in 1989.

Most of the population is concentrated at Faro and Tejo. The two other sites hold much smaller and more irregular populations.

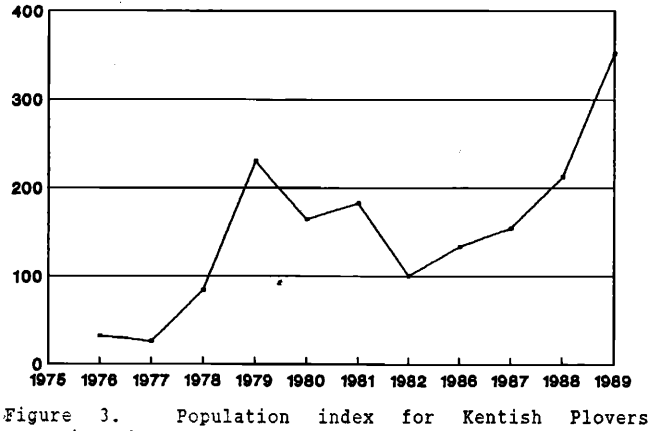


Figure 3. Population index for Kentish Plovers wintering on Portuguese estuaries. 1982 is set to 100.

Ringed Plover *Charadrius hiaticula* (Figure 4)

Rather stable on average from 1976 to 1980, but the wintering population of Ringed Plovers has been increasing since then. The sharp increase from 1988 to 1989 is due to the Faro lagoon population where numbers increased from 681 to 1785 birds. All the four sites can hold considerable numbers (>1000) of this species but numbers show a great variation, from year to year, both within and between sites. More data is needed to support the trend shown in Figure 4.

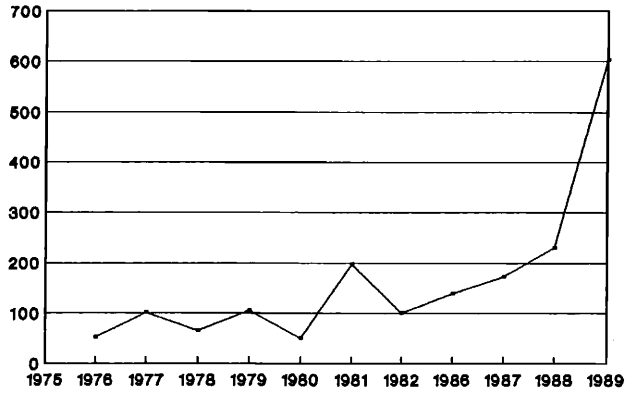


Figure 4. Population index for Ringed Plovers wintering on Portuguese estuaries. 1982 is set to 100.

Grey Plover *Pluvialis squatarola* (Figure 5)

The Grey plover wintering population seems to follow an irregular pattern. Numbers have reached a peak in the 1978 and 1987 counts, while lowest numbers occured in 1976 and 1981. The bulk of the population winters at Tejo

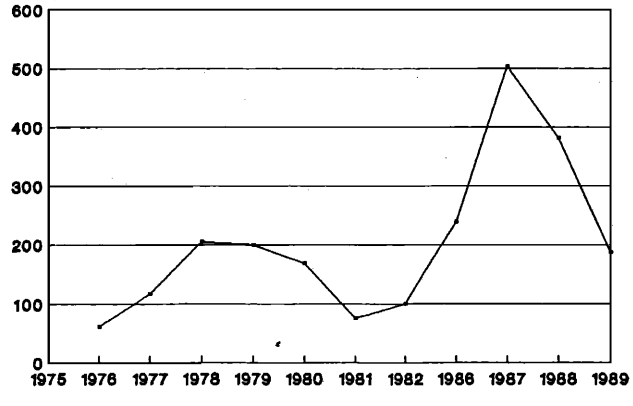


Figure 5. Population index for Grey Plovers wintering on Portuguese estuaries. 1982 is set to 100.

estuary which strongly influences the changes in the national index.

Dunlin *Calidris alpina* (Figure 6)

The Dunlin population increased slowly until 1979. Numbers then dropped to their lowest level in 1981. From then on numbers showed a very modest recovery, until a rapid rise in 1989. This was due largely to a major increase in numbers at Faro lagoons, from 7,400 to 14,000 birds. There was no similar increase at the other sites surveyed. The Tejo estuary holds about 50% of the national population while the remainder is shared in similar proportions between the three other sites.

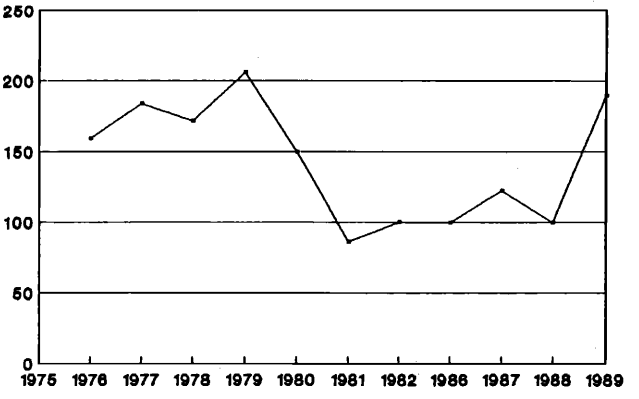


Figure 6. Population index for Dunlins wintering on Portuguese estuaries. 1982 is set to 100.

Curlew Numenius arquata (Figure 7)

The Curlew index decreased from 1978 until 1986, mainly as a result of the reduction in the Tejo population. In the last four years there has been a recover of the national population back to 1978 levels. The index shows a rise above that level because no 1978 count is available for Faro. This depressed the annual index in that year, because Faro generally holds a large proportion of the Curlew in the national wintering population.

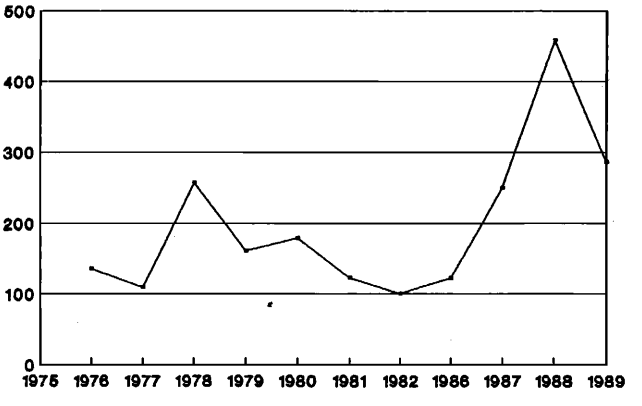
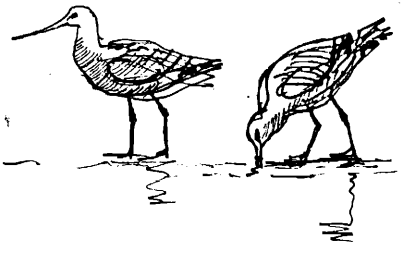


Figure 7. Population index for Curlews wintering on Portuguese estuaries. 1982 set to 100.

Bar-tailed Godwit *Limosa lapponica* (Figure 8)

The wintering population of this species decreased until 1986, mainly due to sharp decreases both at Tejo estuary and Aveiro lagoon. On average, numbers at Faro are more stable. During the last four years the wintering population seems to have stabilized but at a much lower level than in the late 1970's. Tejo and Faro are the two major sites for Bar-tailed Godwit, with Faro now holding the largest proportion of the national wintering population.



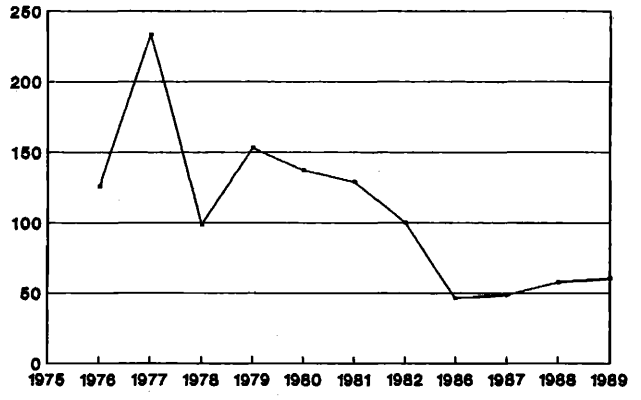


Figure 8. Population index for Bar-tailed Godwits wintering on Portuguese estuaries. 1982 is set to 100.

Redshank *Tringa totanus* (Figure 9)

Numbers of Redshank remained rather stable from 1976 to 1980 followed by a small decrease until 1982. From then until 1988 there was an increase, but this trend was reversed in 1989. The population trend for Redshank is mainly determined by the Tejo estuary. Good numbers also winter at Faro lagoons while at Sado and Aveiro numbers are smaller and more irregular.

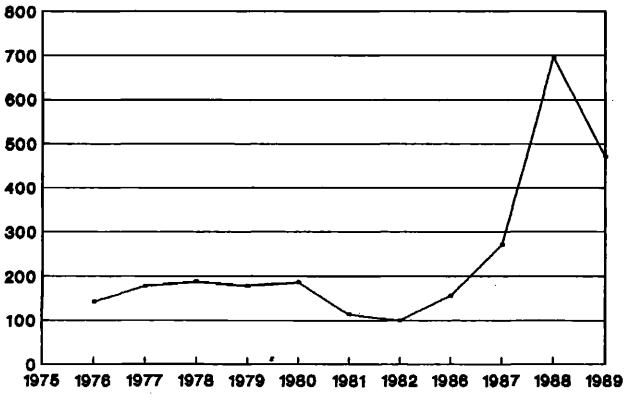


Figure 9. Population index for Redshanks wintering on Portuguese estuaries. 1982 is set to 100.

Avocet *Recurvirostra avosetta* (Figure 10)

Avocet population changes in Portugal are mainly those of the Tejo estuary population which is *c.* 60% of the national total. Although the Sado estuary and the Aveiro lagoon hold good numbers of this species, the Tejo numbers largely determined the index variation. From 1975 until the present no obvious trend could be identified. Numbers have varied considerably in these twelve years of counts, with peak numbers in 1979, 1980, 1986 and 1989. In all these years numbers at Tejo estuary exceed the 10,000 with the larger number being 17,600 birds in 1980.

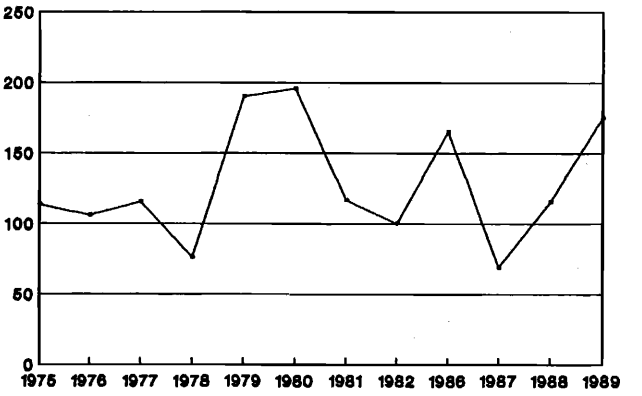


Figure 10. Population index for Avocets wintering on Portuguese estuaries. 1982 is set to 100.

Black-winged Stilt *Himantopus himantopus* (Figure 11)

Although Black-winged Stilts winter in only small numbers, numbers are surprisingly regular, considering the irregularity of the breeding population.

In winter Black-winged Stilts in Portugal are confined to central and eastern Algarve (south Portugal) and occur only in one of the sites considered here (Faro). Over the whole period from 1975 to 1989 there was no clear trend. If numbers from only the last ten years are considered, however, there is a statistically significant population increase ($r=0.685$, $P<0.05$).

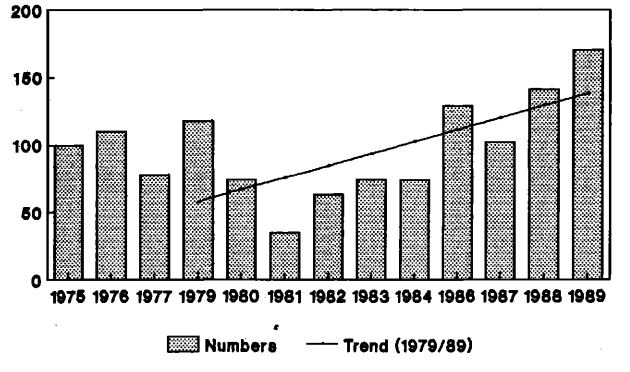


Figure 11. Numbers of Black-winged Stilts wintering on the Faro estuary between 1975 and 1989.

CONCLUSIONS

No one general trend was found for the wintering populations of these ten wader species. The populations of several species (Kentish Plover, Grey Plover, Dunlin, Curlew and Redshank) did, however, reach their lowest levels in 1981 and 1982. The population indices for Kentish Plovers, Grey Plovers, Dunlins and Bar-tailed godwits, were highest in 1979. Considering that both the 1979 and 1982 winters were very cold in northern Europe, this difference in pattern of index in Portugal in 1979 and 1982 is unexpected. It seems that only in 1979 may there have been a southward cold-weather movement of birds from northern Europe, but further investigation is needed to confirm this.

Although there have been increased industrial and urban waste discharge during the last 15 years on each of the four estuaries there have as yet been no major changes in habitat.

One type of habitat common to all these sites, the 'salinas', which play an important role for the wintering wader populations (see Rufino *et al.* 1984) is, however, presently under strong pressure. Many of the Portuguese complexes of 'salinas' are being turned into fish or shrimp farms or even just left abandoned. Both of these changes are bad for the wader populations as they mean loss of safe roosting places and feeding opportunities at high tide. If this trend is not reversed, considerable numbers of waders will be affected and the January counts are likely to reflect this in future years.

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I wish to thank all those who were involved in the wader counts throughout these years. Without them this paper would never had been written.

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WEIGHTS AND DURATION OF STAYS IN RUFFS *PHILOMACHUS PUGNAX* DURING SPRING MIGRATION: SOME DATA FROM ITALY

Lorenzo Serra, Ariele Magnani & Nicola Baccetti

This paper was presented at the 8th International Feeding Ecology Symposium, Ribe, September 1989.

INTRODUCTION

The spring migration of large numbers of Ruffs *Philomachus pugnax* is a particular feature of most Italian wetlands.

Some important night-roosts usually form inside protected marshlands and these roosts are often reoccupied in different years. A wide range of the surrounding habitats (*e.g.* cultivated fields, salt-pastures, and salinas) is usually visited by foraging birds during the day.

The Comacchio wetland system is exploited by Ruffs for particularly long periods. For example the roost at Valle Zavelea (= Fossa di Porto) is visited by birds between at least late February and late April (Baccetti *et al.* 1985). Here we assess the importance of this site as a refuelling area in the Ruff migration system by investigating the weights of ringed birds on different dates and by observations on the duration of stay of dye-marked birds.

STUDY AREA

The Valle Zavelea roost is located at one side of the lagoon of Comacchio in the Po Delta area of north-west Italy (Figure 1). The site is a small dammed marshland (70 ha), with a mixture of low reedbeds, mudflats covered by glasswort *Salicornia* and with some open water.

The importance of this site for roosting Ruffs was very great some years ago. There were, for example, 10,000 birds in 1983, and up to 2,000 birds in 1985 (Baccetti *et al.* 1985). Numbers

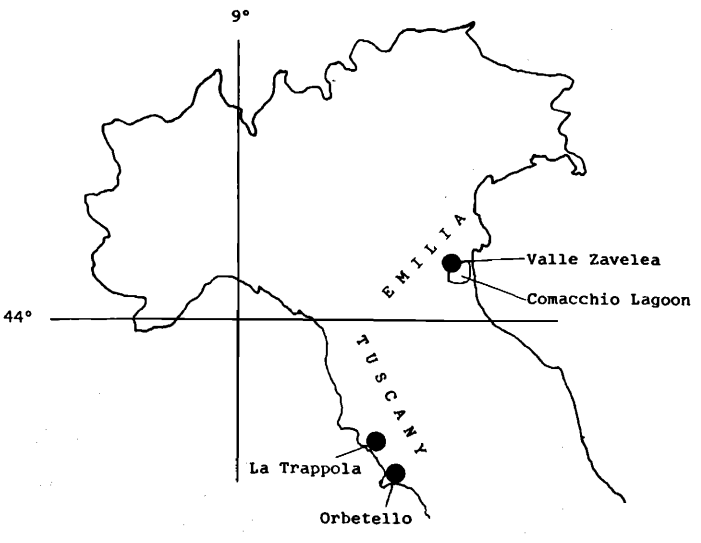

Figure 1. The location of the study areas in Italy.

have, however, been steadily decreasing in recent years due to incorrect habitat management aimed at improving fisheries. The maximum number in 1989 was, for example, only 600 birds). This management which has increased the water level also badly affected our work,