WINTERING DISTRIBUTION OF THE BALEARIC SHEARWATER (PUFFINUS YELKOUAN MAURETANICUS, Lowe 1921) OFF THE NORTHEASTERN COAST OF SPAIN

Ricard Gutiérrez* & Jordi Figuerola**

Summary.—Wintering distribution of the Balearic Shearwater (Puffinus yelkouan mauretanicus, Lowe 1921) off the Northeastern coast of Spain. The distribution and numbers of the Balearic Shearwater during the November-February period are discussed. Until the 1980's this subspecies seemed to be concentrated along the coast south of Valencia. Since 1991-1992 this pattern has changed, and up to 10465 birds have been recorded northwards, along the Catalan coast. The subspecies is distributed along the Valencian and Catalan coasts in 9 main areas and numbers vary, reaching a total of ca. 8000-11000 birds. The accuracy of these figures and subspecies identification is discussed. An increase in the wintering population of Balearic shearwaters in Catalan waters has been noted. No parallel increase in breeding populations has been reported. Therefore, a northwards displacement of its main wintering area is a possible explanation. A trophic hypothesis is suggested to explain this winter distribution, given that some important changes in clupeid stocks of the extreme western Mediterranean have been noted. Observed numbers match the known breeding population and post-breeding counts, and thus almost the whole population of the subspecies may occur during the winter in the study area.

Key words: Balearic Shearwater, Mediterranean, NE Spain, Puffinus yelkouan mauretanicus, winter distribution, winter population.

Introduction

The taxonomic status of the Mediterranean Shearwater (Puffinus yelkouan) is still under discussion (Altaba, 1993; Vittery, 1994). The species is already clearly separated from the Manx Shearwater (Puffinus puffinus) (Wink et al., 1993), and two subspecies have been described (Bourne et al., 1988; Del Hoyo et al., 1993). However, Walker et al. (1990) have proposed a specific status for both subspecies, and Altaba (1993) treated them in this way. Considering the two forms on a subspecific level, the Levantine Shearwater (P.p.yelkouan), with ca. 50.000 breeding pairs (Catchot, 1991), nests sparsely...
from the easternmost Mediterranean to Corsica and Sardinia (De Juana & Paterson, 1986), with a few localities further west (Yeatman, 1976). The only known colonies of the Balearic Shearwater (*P. y. mauretanicus*) are concentrated in the Balearic Islands (De Juana, 1984), where the most recent estimates give a population of 3300 pairs ($\pm 1174$) (Aguilar, 1991). This concentration in a small area increases the vulnerability of this population (Capellà, 1989; Cachot, 1991).

Both subspecies undertake post-reproductive movements. *P. y. yelkouan* moves through the Mediterranean and Black Seas, returning to the breeding colonies as early as November (Vidal, 1985; Bourne et al., 1988; Yesou, 1991). In the NE Spanish coasts this subspecies is rare (Ferrer et al., 1986; Carboneras, 1987; Gutiérrez et al., 1995). On the other hand, *P. y. mauretanicus* is rarely seen in the Mediterranean after the breeding season, almost the whole population passing through the Strait of Gibraltar from May onwards (De Juana & Paterson, 1986). In the Atlantic they have been recorded during the autumn from southern Morocco (Thevenot et al., 1980), to the Bay of Biscay where the main concentration occurs (ca. 8000-10000 birds), (Yéou, 1986; Le Mao & Yéou, 1993), with scattered observations further north. The return passage through the Strait of Gibraltar occurs after moult completion (Bourne et al., 1988), although the subspecies is not recorded in its breeding grounds prior to February-March (Capellà, 1989).

In this paper we discuss the possible movements and location of what may be almost the whole population of the Balearic Shearwater during the November-February period.

**Material and Methods**

For all Catalan records, identification of the subspecies has been carried out according to Yéou et al. (1990). Six bird carcasses found on the shoreline were examined. Despite some plumage variation, all belonged to this subspecies.

Flocks were counted from the coast during the low activity period of the birds, when they gather in flocks which roost near the shore. The January totals of wintering shearwaters in the study area for 1991-1994 were calculated from simultaneous, or nearly simultaneous, counts to avoid duplication. We have considered all the observations of flocks (> 50 individuals) on the NE coast of Spain, covering both Catalonia and the Valencia coasts (37° 50’-42° 27’ N; 0° 45’-3° 20’ E). Data from the Balearic Islands have also been reviewed.

The Balearic Shearwater, like other marine birds, has never traditionally been counted during wintering waterfowl counts (e.g. ICOSA, 1994). However, in certain areas winter censuses of this species are regularly carried out (Llobregat Delta since 1983 and recently along Valencia coasts, J.I. Dies, pers. com.). All these data have been considered. However, data prior to 1993 for most of the areas are occasional and not the result of an organized study. The relevant literature has been scanned and, for the Balearics and Valencia region, the data published in the respective bird reports have been analyzed (Appendix).

For the years prior to 1994, personal requests for information have been made for the main sites.

Several factors may have affected the accuracy of the figures discussed in this paper. The presence of the uncommon *yelkouan* ssp. in the study area during the winter could have altered an overall estimation of the *mauretanicus* wintering population. Although some *yelkouan* birds have been seen, even in the case of a possible confusion, this will not have affected the overall estimation.

The habit of the Balearic Shearwater of exploiting the continental shelf up to 6 miles off the coast (Carboneras, 1987) and even less than one mile offshore in wintering flocks (pers. obs.) makes us confident of having counted most of the wintering population from the coast. At least during late December-January, flocks were quite stable, and almost no movements occurred between different locations.

**Results**

During the 1980s, the subspecies was not infrequent in Catalonia during the winter, although it had rarely been counted (Martínez-Vilalta & Motis, 1989; Gutiérrez et al.,
The numbers counted in the Llobregat Delta from 1981 to 1991 varied up to 158 birds (Fig. 1). The subspecies was more common during migrations and the breeding season (Ferrer et al., 1986; Carboneras, 1987). In 1986-1989, important winter concentrations occurred off the Valencia coasts (Díes & Díes, 1989), where the Balearic Shearwater was present throughout the winter, both off the mainland coast and off the Columbretes islands (Ferrer et al., 1986). In the Balearics, no important wintering flocks were recorded, and the few birds observed there were assumed to belong to the *yelkouan* subspecies (Catchot, 1991). Important concentrations of birds were also recorded in those years further south, in the extreme southwestern Mediterranean, where at least one flock overwintered in the Torremolinos Bay and others around the Alboran Sea (De Juana & Paterson, 1986).

This pattern changed from the winter of 1991-1992 onwards. Between 7417 and 11406 birds have been recorded in the study area each winter since January 1991 (Fig. 2). The flocks arrive in the Llobregat Delta in late November and stay until late January. The January 1993 total census in this area is the highest count for a single locality. Only the areas mentioned above had important flocks, some of which fluctuated in number throughout the winter. Flocks off Tarragona and Premià additionally included numbers of the *yelkouan* subspecies (160 and 400 respectively, J. M. Arcos, pers. obs.). No important flocks were recorded off the Ebre Delta during these years (A. Martínez-Vilalta, pers. com.) and smaller numbers were seen off the coast in other places. On the Valencia coast, flocks were recorded in four areas (Fig. 2). Smaller flocks of less than 300 birds were recorded irregularly in other areas. No records have been collected from the Balearic islands before February.

**DISCUSSION**

The data suggest that there has been an increase in the wintering population of the Balearic Shearwater in the study area. This increase does not seem to be related to a parallel increase of the Balearic breeding population, which could even be decreasing due to rat predation and/or competition with Cory's Shearwaters (*Calonectris diomedea*) among other factors (De Juana, 1984; Aguilar, 1993), although no detailed censuses have been available until recently (Aguilar, 1991).

Therefore, it seems as if we may be seeing a displacement northwards of the main wintering area of the subspecies. During the early 1980s, important flocks were reported in the
The observed change in wintering distribution could be explained from a trophic point of view, since clupeid stocks in the Alboran Sea have declined markedly during the last decade (García et al., 1994) and there has been a parallel recovery of the Catalan populations (Pertierra, 1992).

The total estimated number of 8000-11000 birds agrees with the number of breeding birds found in the Balearics (Aguilar, 1991), with movements recorded through the Strait of Gibraltar and Atlantic coasts (Bourne et al., 1988), and with the sizes of summering and moulting flocks recorded in the Bay of Biscay (Le Mao & Yésou, 1993). If these estimations are accurate, nearly the whole population of the Balearic race of the Mediterranean Shearwater occurs during the winter in the study area. This puts greater emphasis on the vulnerability of the populations of this subspecies and on the need for further research into the relationships between shearwaters and fishery exploitation.

kindly supplied their personal observations. J. I. Dies provided some unpublished information on the Valencia region and also commented an earlier draft. Dr. Eduardo de Juana kindly reviewed an early draft. Dra. I. Palomera gave us valuable information on fisheries, stocks and elurped biology. Thanks to the observers who collaborated in the Llobregat Delta January censuses. Thanks also to Michael Lockwood, who improved the English version of the draft. The comments of Keith Clum, and an anonymous referee improved the manuscript.

Bibliography


ALTABA, C. R. 1993. La sistemàtica i la conservació de la biodiversitat: el cas de les baldrigues (Phinbus). Anuari Ornitològic de les Balears, 8: 3-14.


evidence for speciation of the Manx Shearater
Puffinus puffinus and Mediterranean Shearwater
——, PATerson, A. M., MACKRILL, E. J., BOURNE,
W. R. P. 1990. Plumage variation and identifica-
tion of the Yelkouan Shearwater. British Birds,
83: 299-319.
[Recibido: 3.3.95]
[Aceptado: 27.6.95]

APPENDIX
Sources of data which are not included in the References. [Fuentes no incluidas en la bibliografía.]

Tarragona, 2500 birds, 5.1.1993. In litteris; Colla ecologista de Castelló. 1994. Peñíscola-Borriana, 750-
Caletrio, J. 1989 (Eds.) Anuario Ornitológico Comunidad Valenciana 1987; Dies, J. I. & Dies, B. 1990 (Eds.)
Anuario Ornitológico Comunidad Valenciana 1989; Dies, J. I. & Dies, B. 1992. (Eds.). Cullera, 3000 birds,
Anuari Ornitològic de les Balears, 7: 75-104; González, J. M., Rebassa, M., Sunyer, J., López-Jurado, C.,
les Balears, 5: 67-104; Parc Natural Aiguamolls de l’Empordà Bird Observatory, Roses Bay-Pals Gulf:
5000 birds, 6.12.1993, 225 birds, 18.1.1993, 1074 birds, 18-23.1.1994, 50 birds, 8.2.1994. In litteris; Prades,
1993. Anuario Ornitològico Comunidad Valenciana 1993; Vázquez, J., Vázquez, A. & Armada, R., Torre-
Comunidad Valenciana 1992: 15.