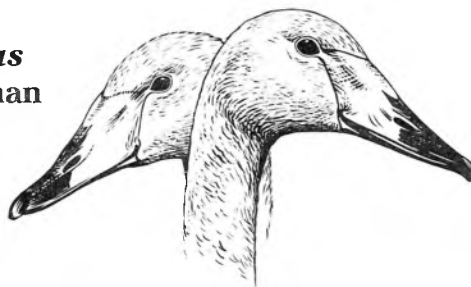


A Whooper Swan *Cygnus cygnus* population wintering at Kilcolman Wildfowl Refuge, Co. Cork, Ireland: trends over 20 years



J. O'HALLORAN, M. RIDGWAY and
C. D. HUTCHINSON

Whooper Swans have been counted daily at Kilcolman Wildfowl Refuge, Co. Cork, Ireland, from 1971 to 1990. An analysis of this 20 years of data, including first arrival and departure dates, duration of stay, and general population trends, is presented. The median number of birds has been increasing over the last 20 years at a rate of approximately 6% per annum. The first arrival date varies by 46 days from 1 October to 15 November with a mean duration of stay of 174 days. The largest numbers occur in Spring in most years. The importance of Kilcolman Wildfowl Refuge for Whooper Swans in Ireland is discussed.

The Whooper Swan *Cygnus cygnus* is the most numerous wild swan in Ireland (Hutchinson 1989). An estimated 62% of the Icelandic population spend the winter in Ireland; the remainder winter in Britain and Iceland (Merne & Murphy 1986, Owen *et al.* 1986, Ruger *et al.* 1986, Salmon & Black 1986). There has been a substantial increase in the number of Whooper Swans in recent years. Summer counts in Iceland have shown an increase since 1982 (Ruger *et al.* 1986) whilst on the wintering grounds in Ireland there has been an increase from an estimated 4000 to 6000 in 1978 (Hutchinson 1979), to over 10,320 in 1985 (Merne & Murphy 1986).

Much of the data on Whooper Swans in the Republic of Ireland have been collected from international mid-January wildfowl counts. These surveys only give an indication of the population level and are likely to miss a proportion of swans in non-traditional sites (Monval & Pirot 1989). At Kilcolman Wildfowl Refuge, Co. Cork, Ireland, daily counting and recording of waterfowl have been carried out for the last 20 years (Ridgway & Hutchinson 1990). Despite the widespread distribution of Icelandic breeding Whooper Swans in Ireland in winter there are few data available on trends over time at individual sites.

This paper outlines initial results of 20 years of study of the population changes of Whooper Swans at Kilcolman Wildfowl Refuge.

Study area and methods

Kilcolman Wildfowl Refuge, established in 1969, lies 5 km northeast of Buttevant, Co. Cork. It is a 53 ha refuge on the southern slopes of the Ballyhoura mountains (Fig. 1). Twenty-three species of wildfowl have been recorded wintering there. Birds present on the refuge are counted daily at 09.00 h. Provisioning of food, particularly for swans, was carried out annually from 1969 until the 1988 season, when it ceased. Whooper Swans, Bewick's Swan *Cygnus columbianus bewickii* (average count of 12, maximum count of 57) and Greenland White-fronted Goose *Anser albifrons flavirostris* (average count of 15, maximum count of 42) also occur at Kilcolman. The following basic data were collected for Whooper Swans over the past 20 years: date of arrival, daily counts, attendance at the refuge and departure date. Arrival and departure dates have been calculated from 1 October = day 1. For an examination of the population trend, count data were converted into population indices after Owen *et al.* (1986).

Results

Arrival, departure and duration of stay

The first arrival date of Whooper Swans at Kilcolman varies from 1 October to 15 November. Whooper Swans spend on average 174

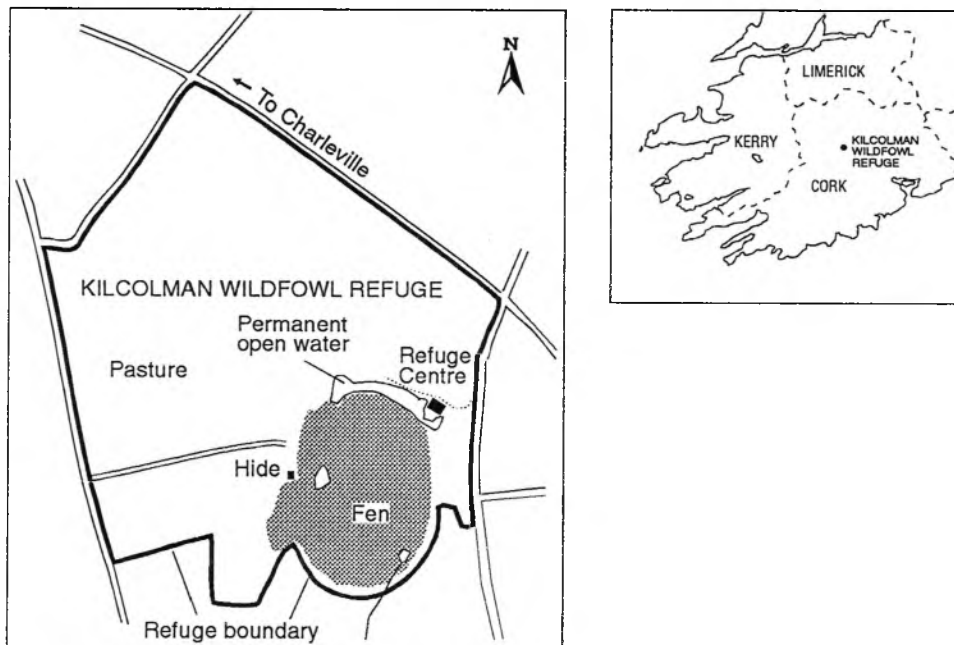


Figure 1. Kilcolman Wildfowl Refuge, Co. Cork, Ireland and the habitats used by wintering Whooper Swans.

days at Kilcolman each winter (range of 138 days in the 1971-72 season to 203 days in the 1981-82 season). The duration of time swans spent at Kilcolman has increased significantly over the first 18 years ($r = 0.817$, $P < 0.001$, $df = 16$). If the 1989-90 and 1990-91 seasons are included, however, the relationship becomes less significant ($r = 0.582$, $P < 0.01$, $df = 18$) (Fig. 2a). In the years when arrival is early, departure is early (for example in 1981 and 1988, Fig. 2b); similarly when birds arrive late, they depart late (Fig. 2b). If arrival date is plotted against departure date the relationship is found to be significant ($r = 0.506$, $P < 0.05$, $df = 18$), but if 1977 is omitted (the year of latest arrival and typical departure time, Fig. 2b) the relationship becomes more significant ($r = 0.670$, $P < 0.01$, $df = 17$) (Fig. 2c).

Build-up of the Kilcolman population

The maximum number of Whooper Swans present at Kilcolman has increased over the years from about 20 in the early 1970s to 120 in the late 1980s. The highest counts were in spring. The median number of swans wintering at Kilcolman has increased ($r = 0.816$, $P < 0.001$, $df = 18$) over the last 20 years (Fig. 3). This increase is consistent with a similar

trend in the population as a whole as measured by an abundance index (calculated after Ruger *et al.* 1986) (Fig. 4). Whooper Swan numbers at Kilcolman show a spring peak in all but two seasons (1980 and 1988) of the 20 years (Fig. 5).

Discussion

The Whooper Swan was very scarce in southern Ireland, particularly in Co. Cork, until about the mid-1940s when it became more widespread and increased in abundance (Kennedy *et al.* 1954). Whooper Swans were first sighted at Kilcolman Wildfowl Refuge in the late 1940s (Ridgway & Hutchinson 1990) and have been recorded there ever since in increasing numbers.

In Ireland before 1900, it was exceptional for the first Whooper Swans to arrive before December (Ruttledge 1975), but nowadays the first immigrants appear in early October and sometimes in September. At Kilcolman the first arrival date has varied by up to 46 days, from 1 October to 15 November (Fig. 3). The first Whooper Swans arrive in northwest Ireland and then move across the country occupying many wetlands en-route

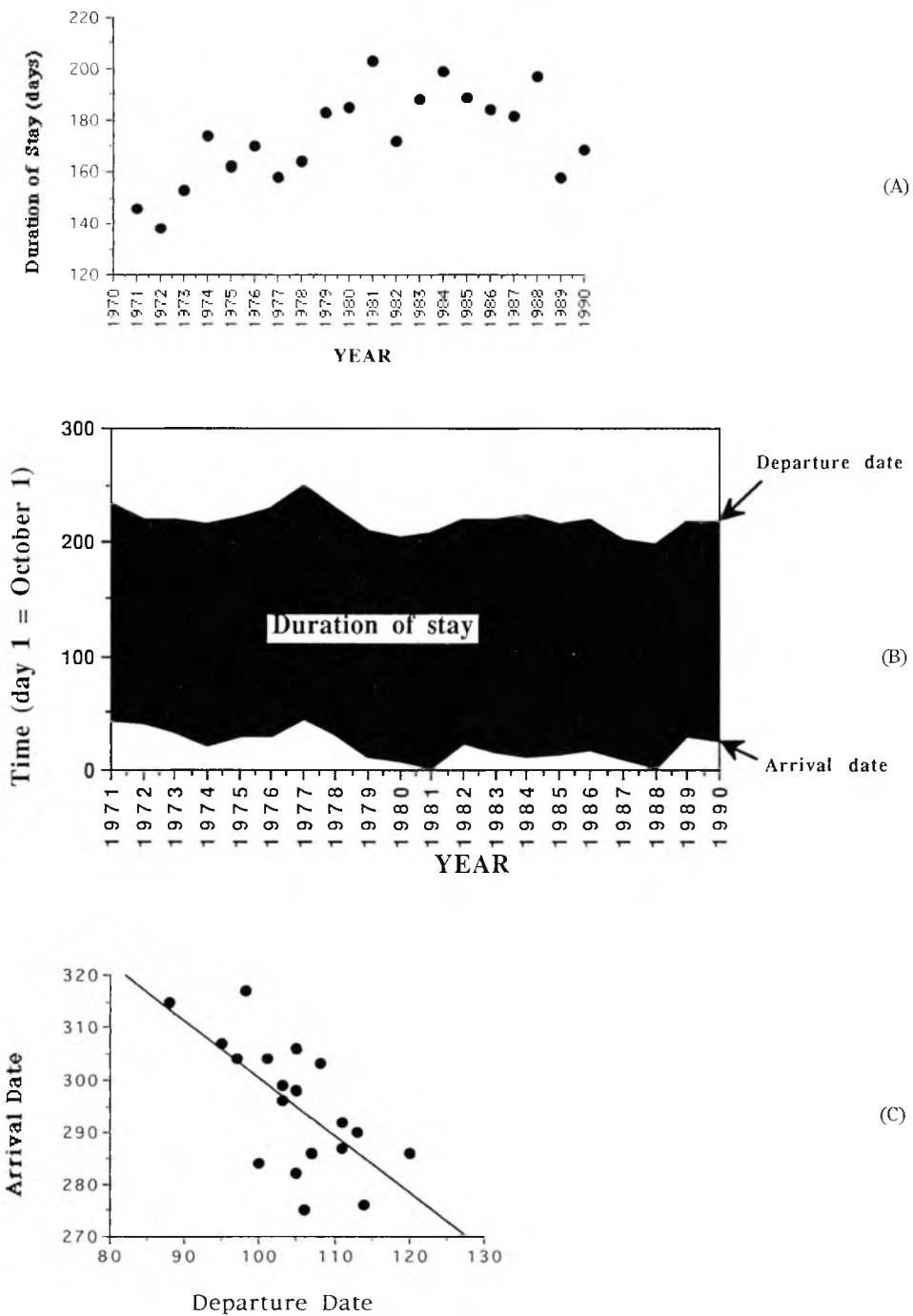


Figure 2. (A) Duration of stay plotted against year, (B) first arrival date (calculated from 1 October = day 1), duration of stay and departure dates of Whooper Swans at Kilcolman Wildfowl Refuge, Co. Cork, Ireland, (C) date of arrival plotted against date of departure, for all years except 1977 (see text for details).

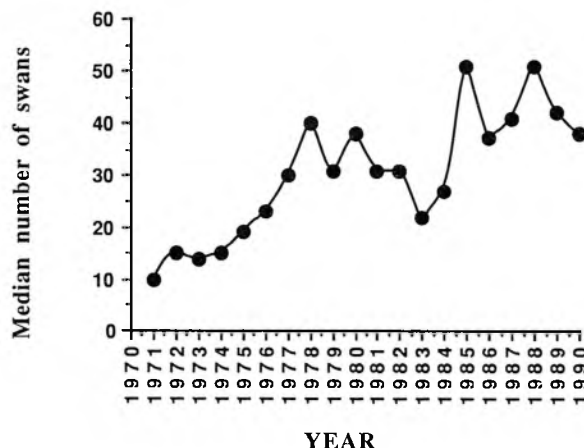


Figure 3. The median number of Whooper Swans at Kilcolman Wildfowl Refuge, Co. Cork, Ireland showing a significant increase over the 20 years of study ($r = 0.816$, $P < 0.001$, $df = 18$).

(Merne & Murphy 1986, Gardarsson 1991) until eventually a small number arrive at Kilcolman Wildfowl Refuge. Cold weather movements of Whooper Swans to Ireland in the 1979-80 season have been reported by Black & Rees (1984) but whether changes in the number of swans at Kilcolman, both within and between season, can be attributed to cold weather movements has yet to be determined.

The duration of stay of Whooper Swans at

Kilcolman has increased during the study period. The average duration (mean = 174 days) of stay reported here is longer than that reported for other studies. For example Black & Rees (1984) reported periods of stay for Whooper Swans at Caerlaverock between 91 and 145 days depending on the social status of the individuals. At Kilcolman, however, it was not possible to examine such patterns since details of different ages (other than cygnets) and family parties were not recorded.

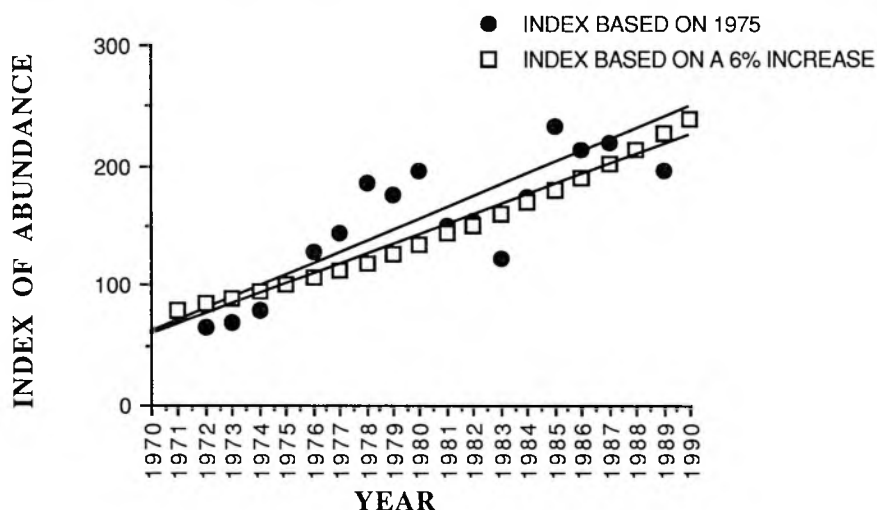


Figure 4. The abundance index of Whooper Swans at Kilcolman Wildfowl Refuge, Co. Cork, Ireland shows a significant increase ($r = 0.848$, $P < 0.001$, $df = 18$) over the 20 years and matching closely a model describing a 6% annual increase in abundance of Whooper Swan populations as a whole ($r = 0.990$, $P < 0.001$, $df = 18$).

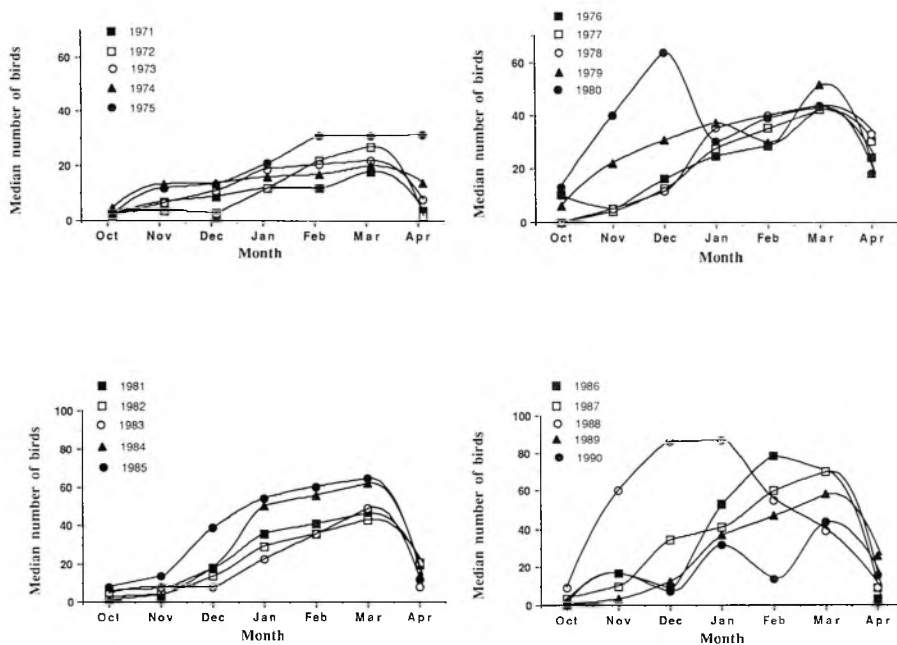


Figure 5. The patterns of abundance of and monthly usage of Kilcolman Wildfowl Refuge, Co. Cork, Ireland by Whooper Swans.

The swans have all departed by the end of April and are generally back in their Icelandic breeding ground by that time (Owen *et al.* 1986).

The increase in the median number of Whooper Swans at Kilcolman is consistent with an increase in the population as a whole. The extent of the population increase can be estimated to conform close to a 6% cumulative increase in the population per year as noted by Owen *et al.* (1986). In their detailed

analysis of British data they suggest that mortality of the Icelandic population of Whooper Swans is very low and could be responsible for a statistically significant increase in the British numbers trend since the mid-1960s (see Owen *et al.* 1986 for further details). This may also be responsible for the increase seen here in the number of Whooper at Kilcolman, which is also seen in the Irish Whooper Swan population as a whole.

We wish to thank Marianne ten Cate and Gordon Young for entering the data and Patrick Smiddy for discussion and comments.

References

- Black, J.M. & Rees, E. 1984. The structure and behaviour of the Whooper Swan population wintering at Caerlaverock, Dumfries and Galloway, Scotland: an introductory study. *Wildfowl* 35:21-36.
- Gardarsson, A. 1991. Movement of Whooper Swans *Cygnus cygnus* neckbanded in Iceland. In: J. Sears & P.J. Bacon (Eds.) 1991. Proc. 3rd IWRB Int. Swan Symposium, Oxford, 1989. *Wildfowl Supplement No. 1*, pp. 189-194.
- Hutchinson, C. 1979. *Ireland's Wetlands and their birds*. I.W.C., Dublin.
- Hutchinson, C.D. 1989. *Birds in Ireland*. Poyser, Calton.

- Merne, O.J. & Murphy, C.W. 1986. Whooper Swans in Ireland, January 1986. *Irish Birds* 3:199-206.
- Monval, J-Y. & Pirot, J-Y. 1989. Results of the IWRB International Waterfowl Census 1967-1968. *IWRB Special Publication No. 8*.
- Owen, M., Atkinson-Willes, G.L. & Salmon, D.G. 1986. *Wildfowl in Great Britain*. 2nd edition. Cambridge University Press, Cambridge.
- Ridgway, M. & Hutchinson, C.D. 1990. *The Natural History of Kilcolman*. Kilcolman Wildfowl Refuge, Co. Cork.
- Ruger, A., Prentice, A. & Owen, M. 1986. Results of the IWRB International Waterfowl Census 1967-1983. *IWRB Special Publication No. 6*.
- Ruttledge, R.F. 1975. *A list of the birds of Ireland*. National Museum, Dublin.
- Salmon, D.G. & Black, J.M. 1986. Results of the January 1986 Whooper Swan census in Britain, Ireland and Iceland. *Wildfowl* 37:172-174.

J. O'Halloran, Department of Zoology, University College, Cork, Ireland.

M. Ridgway and C.D. Hutchinson, Kilcolman Wildfowl Refuge, Research Group, Buttevant, Co. Cork, Ireland.

Correspondence to Dr J. O'Halloran.