Winter behaviour of wild Whistling Swans: a comparison with Bewick's Swans

D. K. SCOTT

Introduction

Among waterfowl, parent-offspring relationships that continue beyond fledging are found only in the Anserinae and some Tadornini (Kear 1970). But the functions of such prolonged relationships are not obvious, since the adults neither feed the young nor continue to brood them.

Recent work on Bewick's Swans *Cygnus columbianus bewickii*, in Norfolk, UK, supports the suggestion that cygnets gain protection from feeding competition by remaining with their parents (Scott 1978). This may be necessary because of the slow growth rate of such large birds: the young do not reach adult weight in their first winter. The study reported here formed part of a programme to investigate the generality of this theory.

Study site and methods

Seven days were spent on the eastern shore of the Chesapeake Bay, Maryland, USA, between 24 February and 3 March, 1979. Whistling Swans *Cygnus c. columbianus* were observed feeding on agricultural land, including corn (maize) stubble with complete cobs lying on the surface, and winter wheat (as a cover-crop over corn stubble). The largest flocks were observed near the towns of Denton and Ridgely in Caroline County, Maryland. For each flock observed, a count of adults and cygnets was made. For those that were within 150 m, observations were made on parent-cygnet relationships using a ×45 power Bushnell telescope. Individual cygnets were selected and observed for ten-minute periods, during which time their behaviour to other individuals (e.g. threats, avoidances, head-bobs to parents, following of parents) was recorded continuously and their activity, estimated distance to parents and to other neighbours were recorded at the ends of minutes. (Distances were estimated in swan lengths: 1 s.l. = c. 0.67 m.)

Individual cygnets were selected successively from left to right across the flock (though only one of each brood). Parents were identified as being individuals that moved consistently with the cygnet; their identity was usually soon confirmed when they became involved in encounters with the cygnet against other birds or by greeting behaviour.

Results

Cygnet behaviour with and away from parents

As in winter flocks of Bewick's Swans, most cygnets remained close to their parents. Overall the median distance to the nearest parent was 2 swan lengths (1·3 m). However, 13 of the 46 cygnets observed were completely alone for the duration of the record. Lone cygnets were displaced from food sources much more often than those with their parents (Figure 1). In addition, cygnets were significantly less successful in aggressive encounters when away from their parents (>4 s.l.) than when with them ($X^2 = 30{\cdot}4$, df = 1, $p < 0{\cdot}001$: Table 1). This was also true when the data were not lumped across cygnets ($n_1 = 14$ records of cygnets with parents, in which encounters were observed, $n_2 = 14$ records of cygnets alone, in which encounters were observed, $U = 7{\cdot}5$, $p < 0{\cdot}002$, Mann Whitney U Test).

Table 1. Success of cygnets in aggressive encounters when with or away from parents.

		With parents (<4 s.l.)	Away from parents (>4 s.l.)	Total
Aggressive encounters	Won	30 (35·7)	19 (35·7)	49
	Lost	1 (17·7)	64 (47·3)	65
	Total	31	83	114

$X^2 = 30{\cdot}4$, df = 1, $p < 0{\cdot}001$.

Table 2. % Time spent feeding by cygnets when with or away from parents.

		With parents (<4 s.l.)	Away from parents (>4 s.l.)	Total
No. of minutes	Feeding	151 (138·8)	70 (82·2)	221
	Not feeding	70 (82·2)	61 (48·8)	131
		221	131	352

$X^2 = 7{\cdot}74$, df = 1, $p < 0{\cdot}01$.

The proportion of all occasions when cygnets were away from their parents when they were also feeding was significantly lower than when they were with their parents ($X^2 = 7{\cdot}74$, df = 1, $p < 0{\cdot}01$: Table 2). As with Bewick's Swans, cygnets appeared to gain protection not only by the parents' presence, which forestalled attacks by other birds, but the parents also actively intervened in 33% of a cygnet's aggressive encounters with other birds.

Comparison of behaviour of birds feeding on corn stubble and on wheat

From 32 records of cygnets on corn stubble, the median distance to 3 nearest neighbours was 3 s.l. (c. 2 m), while from 14 records of cygnets on winter wheat the median distance was rather greater at 4·1 s.l. (2·75 m). The difference was significant ($z = 2{\cdot}55$, $p < 0{\cdot}01$, Mann Whitney U test).

Associated with this, the frequency of aggressive encounters per minute was higher among birds feeding on corn than wheat ($U = 97$, $z = -3{\cdot}03$, $p < 0{\cdot}003$, Mann Whitney U Test). When the effect of density is removed by considering only records where the cygnet's nearest neighbour distance was between 3 and 4 s.l., there was still some evidence that encounters were more frequent on corn than wheat, though the sample sizes were severely restricted ($n_1 = 4$ records on wheat, $n_2 = 7$ records on corn, $U = 4$, $p < 0{\cdot}1$).

On the basis of this potential difference in degree of competition on the two foods, it could be predicted that cygnets might remain relatively closer to their parents on corn than on wheat, in the same way that Bewick's cygnets stay relatively closer to their parents when feeding on waste potatoes, where there is more competition, than on winter wheat. However, this was not the case. There was no significant difference in the distance to the nearest parent relative to that of the nearest unrelated bird in the two situations. Despite this the index for responsibility for maintaining proximity (% approaches to within 3 m due to cygnet—% leaves due to cygnet: see Hinde 1970), was +40% on corn and only −25% on wheat (data for all cygnets lumped), indicating that cygnets were more responsible on corn and parents on wheat for maintaining proximity. The samples were too small for statistical testing.

Similarity in behaviour of Bewick's and Whistling Swans

Most aspects of the behaviour of Whistling Swans were extremely similar to those of Bewick's Swans feeding on the fens in Norfolk, UK. Communicative behaviours including contact signals (head-bobs and vocalizations), threats, avoidance posture and aggressive displays (ranging from neck-stretching through to spread wing displays) were all apparently indistinguishable. It is possible that the pitch of vocalizations produced by Whistling Swans is lower than that of Bewick's, in accordance with their greater body size.

Quantitative aspects of behaviour were also similar. As with Bewick's Swans, cygnets maintained relative distances to their parents (i.e. distance to nearest parent/distance to nearest unrelated bird) of around 1·0 or less. Mostly cygnets were closer to their parents than to unrelated birds although sometimes, especially in dense flocks, relative distance increased to 2·0.

Frequencies of aggressive interaction among Whistling Swans were comparable to those among Bewick's Swans feeding on the fens in Norfolk. The difference in interaction rates on corn and wheat is paralleled in Bewick's Swans by a difference on waste potatoes and wheat. While flocks of Whistling Swans on corn were

more dense than on wheat, Bewick's Swans were less dense on potatoes than on wheat. In addition, Whistling cygnets did not stay closer to their parents on corn although Bewick's cygnets did stay closer to their parents on potatoes. One possibility is that there are differences between fields of potatoes and corn stubble in the distribution of food items across the field and in the nutritive value per item, which affect the benefits of parental protection.

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Summary

A brief study of the behaviour of Whistling Swans *Cygnus c. columbianus* feeding on agricultural crops was made in Maryland, USA. In the absence of their parents, cygnets suffered increased harassment by other individuals and spent less time feeding. In most aspects of behaviour Whistling Swans were apparently indistinguishable from the conspecific Bewick's Swan *C. c. bewickii*.

References

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Dr D. K. Scott, Edward Grey Institute, Department of Zoology, South Parks Road, Oxford.

A flock of Whistling Swans *Cygnus columbianus columbianus* feeding on farmland near Chesapeake Bay, Maryland. (*Philippa Scott*)