THE LAZARUS SYNDROME IN GREY PLOVERS

by D. J. Townshend

Individual consistency in behaviour

The behaviour of individually colour-marked Grey Plovers *Pluvialis squatarola* on the Tees estuary is highly consistent between years (Dugan 1981, Townshend 1981). When on Seal Sands, their main feeding area, many individuals use the same low-water feeding sites and spacing behaviours (territorial or non-territorial) each winter. Also, they arrive on and depart from Teesmouth on similar dates in successive years.

Numbers of Grey Plovers on the Tees estuary change in a predictable way through the year. They increase gradually from July to October; then usually fall again, before increasing rapidly once or sometimes twice in mid-winter, to reach a peak in February or March. Because most individuals are consistent in their time of arrival, and are site-faithful to the Tees estuary, returning every winter, the composition of each influx is very similar each year.

Survival rates

The rate of return of such site-faithful individuals should approximate closely to the true survival rate. A slight underestimate will occur if birds pausing only briefly on passage through the estuary are not identified during their stay. Observations of over 250 colour-ringed birds during seven winters suggest that few birds show this behaviour.

Using year-to-year return rates as estimates of true survival, Evans (1981) investigated whether mortality during the severe winter of 1978/79 was higher than in other, milder winters. The return rate for adults in the winter of 1979/80 (66%) was lower than in previous winters (80%). Evans suggested that this might have arisen through increased Grey Plover mortality on the Tees estuary in the severe winter (perhaps caused by the coincidence of cold weather and gales). Thus, when extremely cold weather persisted in north-east England in December and January of the present winter (1981/82), we anticipated that mortality might again increase. Indeed, the cold, but calm, conditions of 1981/82 provided an interesting comparison with the cold and very windy weather of 1978/79 (see Davidson, this issue). However, to my considerable surprise, instead of evidence of increased mortality, I found, on Seal Sands, birds that were assumed to have died in the 1978/79 winter, since they had not returned in the 1979/80 winter.

The seasonal influxes of Grey Plovers to the Tees in autumn and early winter 1981 occurred at the expected dates, both for the population as a whole, and for individuals. However, the late December/early January influx also included nineteen colour-marked Grey Plovers that were not seen on the estuary during the previous winter (Table 1). Of these, ten had not been seen since the severe winter of 1978/79, i.e. three winters ago.

When these birds, previously assumed dead, are included in revised estimates of survival rates, the minimum survival of adults from 1978/79 to 1979/80 rises to 75%, not significantly lower than in milder winters (overall 79%). Therefore, at least on the Tees estuary, it appears that even the most severe weather of recent years, in early 1979, with both low temperatures and strong winds, which greatly interfere with Grey Plover feeding (Dugan et al. 1981) did not markedly increase Grey Plover mortality there. Instead, it appears that severe winter weather leads to changes in the migratory movements of some Grey Plovers.

Origin of irregular visitors

As none of the marked Grey Plovers seen on the Tees in 1978/79 and then not until 1981/82 have been sighted elsewhere in western Europe, I do not know where they spent the milder winters. Nor do I know which area(s) they left in order to move to Teesmouth in the middle of the two severe winters. Although there is a direct correlation between the appearance of these birds on the Tees estuary and very cold weather in Britain, the weather conditions that are crucial in prompting movement must be those at their point of origin. Presumably these birds were forced off a wintering area where the weather was worse than that on the Tees - probably, therefore, another North Sea wintering area, such as the Wash (eastern England) or the Wadden Sea (Netherlands, Germany and Denmark), rather than a more southerly wintering area, such as France or the western Iberian peninsula, which would not experience such severe weather. The only mid-winter recovery of an adult Grey Plover colour-marked at Teesmouth was found dead and decomposing in the Dutch Waddenzee in early January. Thus, at least part of the late December/early January influx into the Tees may originate in the Wadden Sea.

The irregular movements of certain Grey Plovers in some winters may not be simply a response to cold weather *per se*, but to its timing during the winter. Table 2 shows that, with one exception, the ten birds present on the Tees in the 1978/79 and 1981/82 winters, but not in other winters, were never seen before January. Possibly Grey Plovers move regularly between possible wintering areas in Western Europe each December, with some of these birds coming to the Tees. Perhaps only if the weather is severe (for example on the Wadden Sea) at this time do more than usual move to the Tees (and probably to other British estuaries). On this hypothesis, severe weather in January or February, occurring after this period of regular movement, would be less likely to lead to a change of wintering site by individual birds between years.

Implications and consequences

What are the implications and consequences of the behaviour of these Grey Plovers?

Survival rates. It is already known that survival rates of shorebirds calculated from recaptures and recoveries reported by the public (of birds carrying metal rings only) are lower than those based on visual checking of colour-ringed individuals (e.g. Harris 1967). The behaviour of these ten Grey Plovers "raised from the dead" indicate that, at least for this species and possibly for other shorebirds, even the latter method often underestimates the true rate of survival.

Hard weather movements. These observations suggest that some Grey Plovers may undergo hard weather movements. Such movements were not previously suspected in this species (but are well known in Lapwing *Vanellus vanellus* and Golden Plover *Pluvialis apricaria* and are sometimes made by Redshank *Tringa totanus* (Davidson, this issue)). A distinctive feature is that the same movement pattern has been shown in two severe winters by the same birds.

Use of space on Seal Sands. In past years, mid-winter arrivals on Seal Sands fed away from the main areas on which Grey Plovers had established long-term feeding territories in early autumn. Consequently we have argued (Townshend,

Table 1. Dates of first sighting of marked Grey Plovers during the 1981/82 winter (data up to 31 January 1982).

	Month						
	J	A	S	O	N	D	J
Total No. seen	2	20	8	2	9	12	37
No. not seen last winter (1980/81)	0	1	0	1	0	0	19

Table 2. Dates of marking and first sighting of the 10 marked Grey Plovers present at Teesmouth only during 1978/79 and 1981/82 winters.

	Month						
	S	O	N	D	J	F	M
1978/79							
Totals of Grey Plovers marked	34	1	2	24	27	40	0
Month of marking of birds not then seen until 1981/82	0	0	0	0	4	3	0
Month of first sighting of birds not then seen until 1981/82	0	0	0	1	2	0	0
1981/82							
Month of first sighting	0	0	0	0	10	0	0

Dugan & Pienkowski, in press) that one advantage of occupying a territory in autumn (often the same territory in successive years) was that it ensured a good feeding area for the whole winter. However one of the ten Grey Plovers, returning in January 1982 after several years' absence, acquired a feeding territory by squeezing in between others on one of the main territorial areas. Both of the adjacent territory holders had defended sites there throughout at least 3 previous winters. Thus, occupation of a territory in early autumn does not always ensure sole use of the whole area by the owner through the winter. Furthermore, territorial behaviour does not limit the total number of Grey Plovers which can feed on these main territorial areas of Seal Sands.

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ESTIMATING THE PREFLEDGING MORTALITY OF WADERS: A COMMENT ON YATES' PROPOSAL

by Christopher P. F. Redfern

Yates (1981) has drawn attention to the fact that our knowledge of the mortality of wader pulli is sparse, or non-existent, and proposes that the age and habitat for all wader pulli ringed should be recorded on BTO schedules for later analysis. There should be little difficulty in recording the habitat in which pulli are ringed but such data must be interpreted with caution. It will have to be assumed that the 'ringing habitat' is the same as that used by the young during the prefledging period. From my experience, this is not necessarily so, especially when pulli are ringed soon after hatching. For example, Lapwings *Vanellus vanellus* in one Peeblesshire colony nested largely on blanket bog, but the young tended to move off the nesting habitat onto adjacent pasture soon (1-3 days) after hatching.

Recording the age of a brood or pullus presents a more immediate problem and it might be better to record a measure of the physiological age (i.e. state of development) of the birds, rather than attempting to estimate chronological age in the field. It can then be left to the analyst to interpret mortality in relation to physiological age. Because growth rates may vary geographically and annually (e.g. Jackson & Jackson 1980), it might be more valid to express prefledging mortality in terms of the mortality relative to the proportion of growth completed, rather than as a chronological age-specific mortality. The weight of each pullus ringed is the simplest and most useful measurement to record.

The recording of habitat and weight should be obligatory (as far as is possible) for all wader pulli. These data would, as Yates points out, clearly be of value and it is perhaps hard to justify not collecting them as a matter of routine.

References

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B.J.Yates comments:

I agree with most of the comment, by C.P.F.Redferns, on my proposal. However, I still consider bill length to be most suitable in the Redshank *Tringa totanus* (and probably most long billed birds) for assessing age. It shows no post-hatching decline, and is far less variable (therefore, more accurate) than weight. In estimating chronological age it is the physiological age that is estimated and which is then interpreted, for convenience, as time.