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# Census-efficiency for breeding Common Sandpipers *Actitis hypoleucos*

D.W. Yalden & P.K. Holland

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The relative efficiency of detecting Common Sandpipers during each week in the breeding season was estimated by repeated observations of a colour-ringed study population. We were most likely to detect territories (78% detection) during the middle of May, but census efficiency was consistently greater than 50% throughout the central nine weeks of the breeding season.

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## INTRODUCTION

In designing any censusing programme, it is useful to know how detectability of the target species varies with time. Thus Reed *et al.* (1985) showed that moorland waders are less detectable during the middle of the day than in the early morning (pre-09.00) or evening (post - 18.00); intensive studies can therefore be arranged to exploit these periods when the birds are more obvious, and extensive moorland surveys avoid them in order to achieve even coverage. Similarly Yalden & Yalden (1991) demonstrated that Golden Plovers *Pluvialis apricaria* are best detected in June, when they are guarding hatched

chicks, but are mostly overlooked in mid-April to mid-May when they are incubating. Common Sandpipers also seem to be rather cryptic during incubation, especially during the fourth week of May, though to a less extreme extent than Golden Plovers. This note is an attempt to quantify that impression.

## METHODS

Our study area and the population dynamics of our study population have been described elsewhere (Yalden 1986; Holland & Yalden 1991). Between 7 (1992) and 22 (1977)

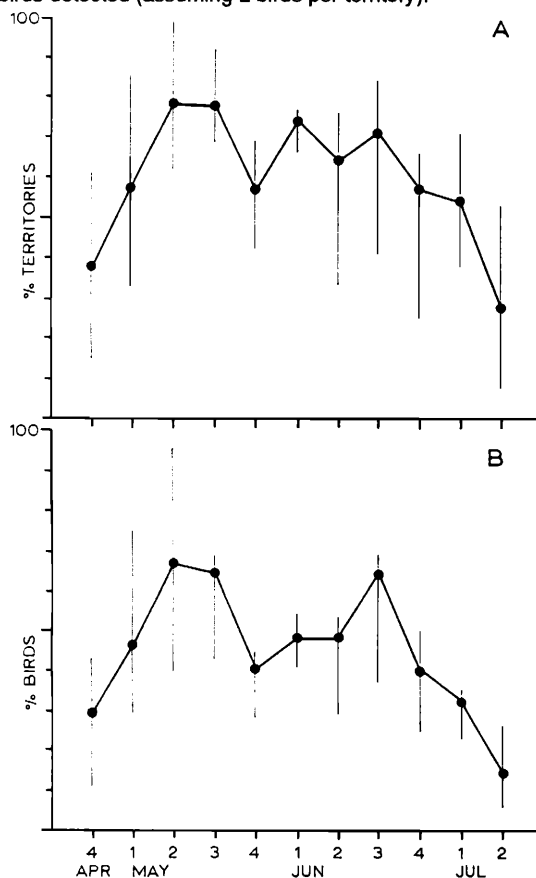


pairs of Common Sandpipers occupy about 10 km of the Rivers Ashop and Alport, Derbyshire, UK (c 53°24'N, 01° 47'W; NGR SK1489). About 75% of the birds are colour-ringed and can therefore be recognised in the field. For this paper, survey results for 1987-1992 have been analysed. Even coverage of the whole study area, from the fourth week of April to the second week of July, was attempted on a weekly basis in these years. The total number of territories occupied each year was assessed at the end of each season; occupation was assumed if a pair was present at least once, or a single bird at least twice. The results of each week's survey were then reassessed to establish whether each territory had been detected on each occasion, and whether both of the pair or only one per bird had been seen. Surveys were assigned to weeks, for comparison across years, the fourth "week" of each month being variably of 9 or 10 days.

## RESULTS

Detectability of Common Sandpipers was quite good throughout the breeding season, with over 50% of the territories being registered, averaged across the years, in all weeks from early May to early July. The best results were achieved in mid May; median values (across the six years) were 78.1% and 77.5% of territories detected (Figure 1), with a range from 62.5% in 1989 to 100% in

Figure 1 (a) Percentage of Common Sandpiper *Actitis hypoleucos* territories detected in successive weeks of the breeding season. Median values and the ranges for the six breeding seasons 1987-1992 are shown. (b) Similar results for the percentage of individual birds detected (assuming 2 birds per territory).



1990. During incubation in late May however, survey efficiency was lower; only 57.5% of territories were found and this drop was statistically significant (Wilcoxon paired sample test between third and fourth weeks of May,  $n=6$ ,  $T=0$ ,  $p<0.05$ ).

Detection of individual birds, rather than territories, shows a more variable pattern (Figure 1B). As with territories, detectability is high in mid-May; assuming that there should be two birds per territory, 67.1% and 64.6% of them were detected in those weeks. Fewer than half of them were detected during the next three weeks, but a second peak of detectability, 64.2%, occurred in the third week of June when many parents were guarding young chicks (Yalden & Holland 1992). Detectability of birds, as of territories, then fell away as failed breeders left and as young fledged and then left their breeding territories with their parents.

Why was survey efficiency so rarely 100%? Detailed records for the best period, the second week of May, are presented in Table 1. Of 98 territory-visits in that period, 76 (77.6%) were apparently occupied, mostly by both of the pair. The 22 (22.4%) failures to detect the occupants are the interesting records. In two cases, the territories had been occupied earlier in the season but birds were not seen on this or any later date; they are scored as failures, and the birds might have died, or moved elsewhere. Eight of the territories were only occupied later in the breeding season - late arrivals. In twelve cases, however, the birds were seen both before and after this date, so were genuinely missed on the occasion in question; even in the period of peak detectability, in a familiar study area and with observers experienced in censusing this species, one must expect to miss 13.6% (12/88) of the occupied territories.

It is interesting to analyse the detailed records for the fourth week of May in the same way (Table 2). Of 117 territory-visits in this period, 69 (58.9%) were detected, but in only 24 were both of the pair seen, a significantly smaller proportion than in the second week of May ( $X^2 = 16.37$ ,  $p<0.001$ ). Where only a single bird was seen, 19 were males, 20 were females and 6 could not be scored (not seen well enough to read the rings, or unringed in a territory where neither bird was ringed). The presence of a single bird in a territory implies that its mate was incubating, and the even numbers of males and females strongly suggests that they share this duty equally, as they do guarding of the young chicks (Yalden & Holland 1992). Of the 48 (41.1%) territories not detected at this time, 19 later had hatched young and another 20 were occupied on later occasions, so these 39 territories escaped detection even though they were (still) occupied. Only nine territories escaped detection because they were in fact, apparently deserted by this date (occupants had been seen earlier in the season, but were not seen on this or any later date).

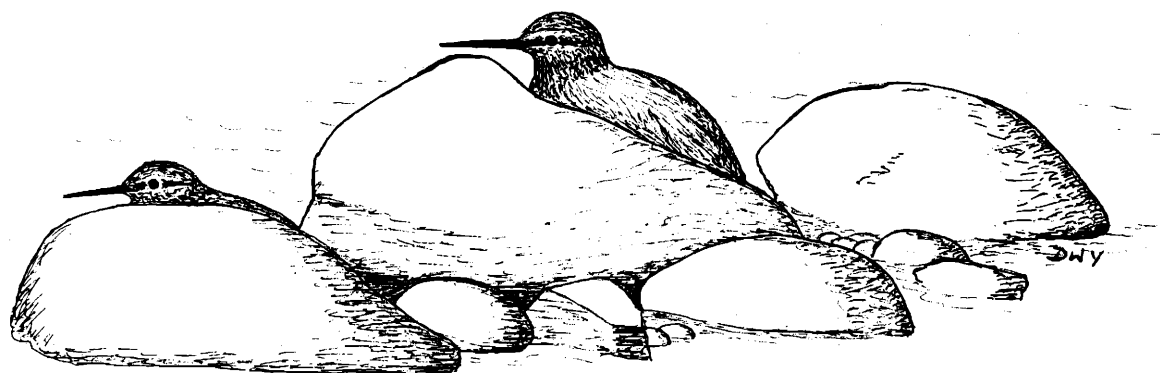


Table 1. Detailed results of censusing Common Sandpiper *Actitis hypoleucos* territories during the second week of May (the "best" censusing week) (n = number of territory visits).

Year (n)	Detected				Missed		
	pair	male only	female only	indet. single	failed?	late arrival	missing
1987 (14)	9	2	1	-	-	2	-
1988 (32)	12	3	5	3	-	1	8
1989 (16)	6	3	-	1	1	3	2
1990 (13)	12	1	-	-	-	-	-
1991 (12)	9	1	-	-	-	2	-
1992 (11)	5	2	1	-	1	-	2
Total (98)	53	12	7	4	2	8	12
	76 (77.6%)				22 (22.4%)		

Table 2. Detailed results of censusing Common Sandpipers *Actitis hypoleucos* territories during the fourth week of May (peak incubation period) (n = number of territory-visits).

Year (n)	Detected				Missed		
	pair	male only	female only	indet. single	failed?	present	yet to hatch
1987 (20)	4	2	4	3	-	2	5
1988 (15)	2	5	4	-	-	2	2
1989 (25)	7	4	1	-	3	4	6
1990 (26)	5	4	8	1	-	7	1
1991 (24)	5	4	2	1	4	5	3
1992 (7)	1	-	1	1	2	-	2
Total (117)	24	19	20	6	9	20	19
	69 (58.9%)				48 (41.1%)		





## DISCUSSION

In many respects, Common Sandpipers should be easy birds to census. They are tied to easily recognised and easily traversed linear habitats, and defend short lengths (150 - 200 m) of these as their territories. During territory establishment in early May, they are quite conspicuous, often vocal, in defence of their territory, and both birds in the pair defend it against their neighbours. Even so, 12% of the territories may be missed by a single-visit census. By late May, when birds are incubating, one of the pair is usually detected in the territory, though 36% of the territories still occupied at this time may be overlooked by a single-visit census. In June, with many of the still-occupied territories having parents noisily guarding their chicks, detectability rises again. By this time, however, early-failed breeders are already leaving their territories, so that overall detection rates are beginning to fall off. By the second week in July, it is no longer worthwhile to attempt to census breeding Common Sandpipers in the Peak District, and our visits after this time are usually targeted at checking the progress of late (second clutch) breeding attempts.

The most important practical points to be made are, firstly, that Common Sandpipers should be censused in terms of territories not birds: a territory may be revealed either because a pair is seen, or by the presence of a single bird. Secondly, censusing any time between early May and the end of June (in British latitudes, at least) should give a reasonable estimate of the population, though the

fourth week of May gives a poorer estimate than the weeks either side. Thirdly, if only a single visit is possible, the second week of May should provide a good population estimate, probably 80% of the true value. Alternatively a visit in the third week of June should locate 70% of the territories, and a visit then would also reveal information on breeding success; records should be differentiated into "alarming" adults (guarding chicks), pairs (probably failed) and single territory occupants (mate still incubating a late clutch).

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