CENSUSING BREEDING WADERS ON AGRICULTURAL LAND IN SCOTLAND

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(Optimal methodology for the WSG/SOC/BTO survey 'The breeding waders of Scottish agricultural land')

The survey 'The breeding waders of Scottish agricultural land' was established in November 1980 as the result of a growing realisation among ornithologists that important populations of waders which nest on Scottish farmland are being put at risk by changes in land use. As one of the aims of the survey is to provide estimates of the sizes of these populations, suitable census techniques had to be devised. A pilot study with the objective of refining methodology was carried out in 1981. This note presents the results of that study.

Methods

The data and comments from 13 observers who censused 17 sites have been combined with results from the authors study areas to produce a set of recommendations. Our main study areas were Glen Fruin, Dunbartonshire; Caplaw, Renfrewshire; and the Yarrow Valley, Selkirkshire. Glen Fruin comprised 140 ha and consisted of 109 ha of undulating unfenced rough grazing, 22 ha of improved dry pasture and 9 ha of arable land. Caplaw (which held only Lapwings) consisted of 15 ha of rough grazing, and the Yarrow Valley consisted of small fields and fenced parcels of rough grazing, totalling 110 ha of arable land, 385 ha of rough grazing, 802 ha of dry pasture and 146 ha of damp pasture. 18 census visits were made to Caplaw, 10 to Glen Fruin and 4 to the Yarrow Valley. On each, the locations of nests and birds were recorded on 10 inch to 1 mile (1:6336) or 2.5 inch to 1 mile (1:25000) maps, and later processed as Common Bird Census data (International Bird Census Committee 1969). Count units were: nests with eggs, incubating or brooding birds, displaying or agitated birds or obvious isolated pairs. Single birds were watched to determine whether they were only feeding or were locally resident. This was an important distinction as birds were often seen feeding in dry pasture areas but when disturbed they flew off into rough grazing or arable areas where they showed signs of nesting.

Results

Counts of Oystercatchers Haematopus ostralegus, Curlews Numenius arquata and Snipe Gallinago gallinago in Glen Fruin are shown in Table 1. Counting Oystercatchers was not difficult after incubation had begun. If one pair nesting on the edge of the study area had not occasionally been missed a greater consistency would have been achieved. The Oystercatchers' habit of noisily mobbing intruders and their conspicuousness when incubating in arable farmland make this the easiest species to census. Although in Glen Fruin Curlews were equally detectable throughout the study period, Rob Fuller (elsewhere in this issue) found that once incubation had begun Curlews in his study area in S.England became less obvious and their detectability showed a bimodal distribution with peaks before laying and after hatching. This apparent difference is probably because his survey was made exclusively from field perimeters. By walking through each field this bias appears to be eliminated.

Snipe counts were highly variable (Table 1). They were greatly affected by weather conditions. Winds above force 4 depressed display activity (Table 1), but consistent results were obtained in relatively calm weather. The count unit used was drumming or chipping birds on the ground or in flight. Tuck (1972) showed that in the early part of the season both sexes display. Ken Smith BTO/RSPB organiser of England/Wales survey (in litt.) found that in his study area on the Ouse Washes, E.England, the numbers of displaying Snipe fell by about half when incubation began. For routine survey assessment a single count of numbers of chipping or drumming Snipe on a fine evening during the incubation period (ie early May) should provide the best population estimate for this species. Again it is important to walk thoroughly through the study area to flush birds which might be overlooked from a distance.

Redshank Tringa totanus - where they occur at high densities (as in Glen Fruin) - are difficult to census due to their lack of territoriality (Hale 1956). In most areas of farmland, however, their densities are low and this difficulty does not arise. Redshanks are least apparent during incubation and are most easily counted just around the time of hatching, as can be seen from Table 1, where the highest counts were obtained in Glen Fruin in early to mid-May.

Unlike Redshank, Lapwing Vanellus vanellus are best counted during incubation. Counts made before laying are affected by the presence of non-breeders while counts made after hatching are likely to be underestimates due to rapid local movements of family parties out of nesting fields, high chick losses and the increasing height of vegetation. Local differences in timing of breeding affect the best time for counts in different areas. For example, although Caplaw and Glen Fruin are only 30 km apart, at similar altitudes and have similar habitats, there was a three week difference in mean laying date resulting in different seasonal patterns of census counts (Figure 1). In most areas time for the most accurate census of Lapwings should occur somewhere between mid-April and early May.

A general difficulty which applied most to Curlew and Oystercatcher, and to a lesser extent to Redshank and Lapwing, was the presence of off-duty birds feeding in dry pasture fields some distance from the nesting area. Frequently the habitat was obviously not suitable for nesting, but these birds could most easily be identified as local residents or off-duty visitors by their behaviour when flushed.

The accuracy of a single visit count was determined by both authors censusing each others sites on our first visit to these areas, and comparing the results with the figures obtained by repeated visits. Table 2 shows the results of this cross-check. Stormy weather conditions during HG's visit to the Yarrow Valley resulted in Snipe numbers being underestimated and a pair of Oystercatchers being overlooked, but these figures suggest that a single count is satisfactory. In order to obtain the best results, a single count should be made in good weather conditions, and between early April and mid-May (preferably between mid-April and early May). While this may result in wader numbers being slightly underestimated, the opportunity to cover much larger areas would offset this very slight loss in accuracy.

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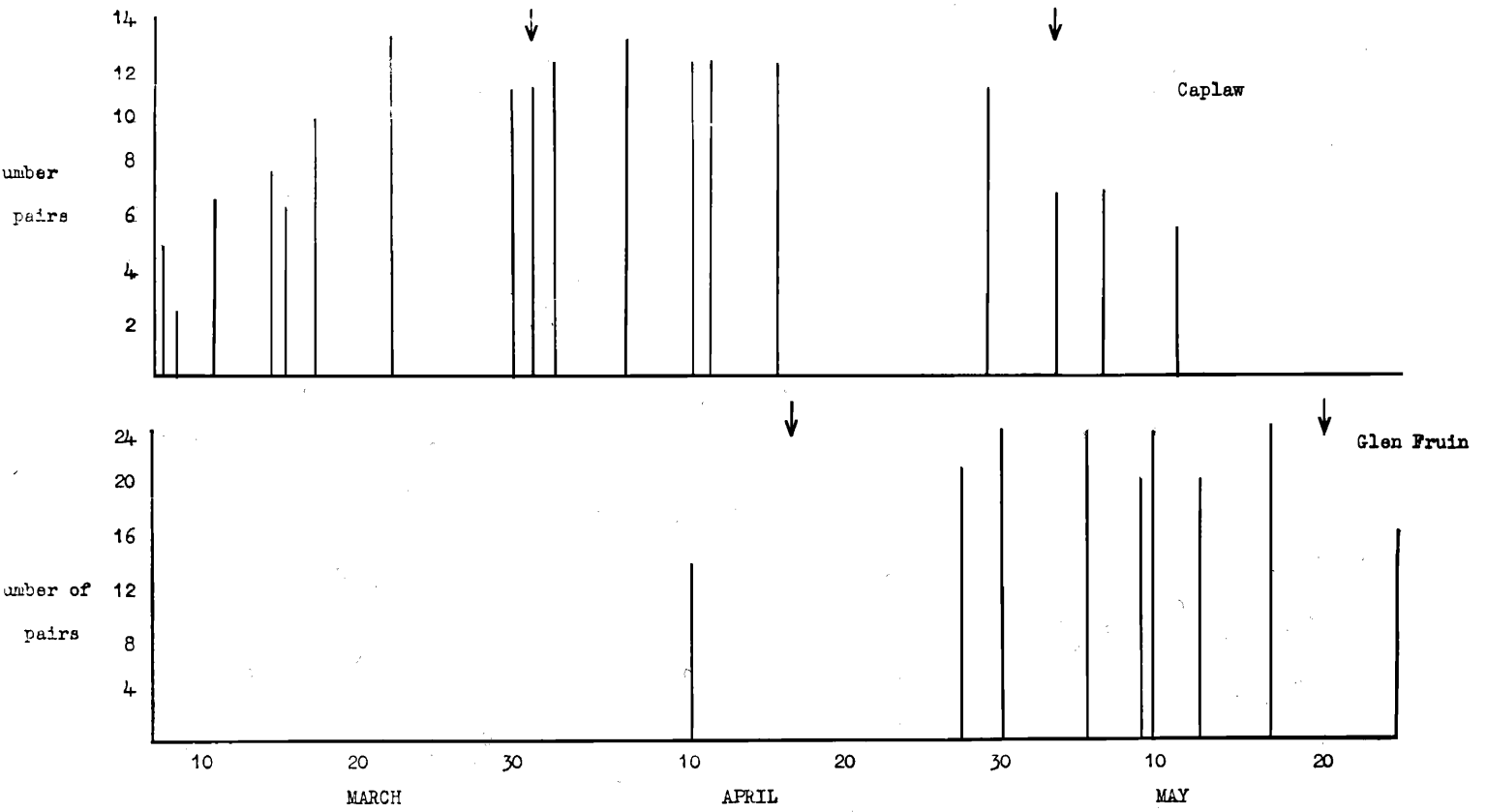

Figure 1. Counts of breeding Lapwings in Caplaw and Glen Fruin study areas. Arrows mark the beginning and end of incubation in the two areas.

	Visit no. and date										
	1(g)	2(g)	3(p)	4(p)	5(g)	6(g)	7(g)	8(p)	9(p)	10(g)	estimated number
	10/4	19/4	27/4	29/4	4/5	8/5	9/5	13/5	17/5	25/5	of pairs
Oystercatcher	2	3	4	3	4	4	5	4	4	5	5
Redshank	12	4	8	4	16	15	19	12	15	9	13-16
Curlew	2	3	4	4	4	2	5	4	4	4	4
Snipe	6-7	NC	3	2	9	9	11	1	2	9	9-11

TABLE 1. Estimated populations and numbers of each species located on each visit to the Gleb Fruin study area. Visits 1,4,5,6,8 and 10 were evening visits. (g) = good conditions ie. dry with little wind, (p) = poor conditions. NC = not counted.

a) Glen Fruin.	Estimated number of pairs (based on 9 visits by H.G.)	Number of pairs found by H.G. during check (10th visit; 25 May)	Number of pairs found by R.W.F. during check (1st visit; 25 May)
Oystercatcher	5	5	4(80)
Lapwing	25-28	17	21(75-84)
Curlew	4	4	4(100)
Redshank	13-16	9	9(56-69)
Snipe	9-11	9	7(64-78)

b) Yarrow Valley (part of study area)	Estimated number of pairs (based on 3 visits by R.W.F.)	Number of pairs found by R.W.F. during check (4th visit; 9 May)	Number of pairs found by H.G. during check (1st visit; 9 May)
Oystercatcher	3	3	2(67)
Lapwing	31	29	28(90)
Curlew	3	NC	4(133)
Redshank	3	2	2(67)
Snipe	4	NC	2(50)

TABLE 2. Check on accuracy of single visit census. () = % of known pairs that was found by visiting census worker. NC= not counted.

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