ASPECTS OF COUNTING LAPWINGS AND CURLEWS BREEDING ON LOWLAND GRASSLANDS

by R.J. Fuller

Recently there has been an upsurge of interest in the breeding wader populations associated with lowland farmland in Britain (Green 1980 a,b). The loss of old grasslands through drainage and their frequent conversion to arable land is a familiar trend in land-use which undoubtedly has consequences for these waders.

In order to obtain more accurate information on the distribution of breeding waders and their lowland habitats, national surveys are proposed for 1982. This paper addresses methodological questions of relevance to these surveys. A joint British Trust for Ornithology/Royal Society for the Protection of Birds survey will cover mainly alluvial flood-plains in England and Wales while a parallel survey,supported by the Wader Study Group, the Scottish Ornithologists' Club and the BTO, will examine the waders in Scottish straths and glens. The species covered by these surveys are: Oystercatcher Haematopus ostralegus (Scotland only), Lapwing Vanellus vanellus, Snipe Gallinago gallinago, Curlew Numenius arquata and Redshank Tringa totanus.

The primary aims of the surveys are to obtain estimates of breeding pairs of the above species in defined areas of grassland. There are very few published guidelines on the best techniques to employ and the problems of censusing breeding waders. Fuller (1978, 1981), however, summarises the main difficulties of censusing waders on Outer Hebridean machair. In this paper data are presented which give some indication of the problems of obtaining accurate counts of Lapwings and Curlews nesting on grassland in central England. The results of the study also point to some recommendations if accurate population estimates are to be obtained.

Study area and methods

The area chosen for the study was a small valley in central Buckinghamshire. A railway line, carrying both used and disused tracks ran along the valley bottom. For part of its length these tracks were on an embankment. All the fields in the valley bottom were grassland, some of which experienced impeded drainage. A pool of surface water remained in one field until mid-May. Approximately 45%,of the grass was cut for hay; the remainder was pasture, grazed mainly by cattle. Some of the grassland on the slopes had been under-drained and reseeded, and application of artificial fertilisers was widespread.

The fieldwork involved 15 visits to the valley between mid-March and mid-July in 1981. On each occasion the same route was taken, following the course of the railway for approximately 2 miles. The position of all waders seen or heard was plotted on 1:10,560 outline maps using the techniques of the territory mapping method (International Bird Census Committee 1969). For each single visit the number of estimated territory-holding pairs was calculated using the criteria of Fuller (1978,1981). A "pair of territory-holding birds" was regarded as any of the following a) apparently paired individuals b)displaying or singing birds c) birds giving alarm calls or performing distraction display d) individuals in positions isolated from other birds. In the case of Lapwings, small feeding groups were frequently encountered and to obtain an estimate of pairs the total number was divided by two. At the end of the fieldwork, species maps were prepared and the analysis criteria of the territory mapping method were followed (International Bird Census Committee 1969) so that an estimate of the total population of each species was obtained.

No attempt was made to enter the fields and no special searches were made for nests. All visits were carried out between mid-morning and late afternoon. Days with exceptionally heavy rain or high winds were avoided. An unusually late, but short-lived, snowfall at the end of April was not considered to have greatly affected the results. The aim was to simulate the conditions under which many sites were likely to be covered during the proposed surveys in 1982. By comparing estimates of pairs from single visits some indication of seasonal variation in detectability of the waders was possible. The efficiency (that is the proportion of pairs detected) of single visits was judged by comparing the estimates of single visits with the results from the mapping analysis. The efficiency of single visits will be referred to henceforth as the "visit efficiency", following the terminology of Svensson (1979). It should be noted that this is an apparent visit efficiency and not a true visit efficiency because it is based on the ratio of a single visit and the evaluated results of the species maps rather than the true number of territories.

Results

The results of the mapping gave the following estimates of pairs: 19 Lapwing, 8 Curlew and 1 Redshank. All these waders were located on the valley floor. There were no pairs of Snipe and only one individual Snipe was recorded during the fieldwork. It is unlikely that any pairs of waders on the valley floor were overlooked. Some Lapwings nesting on the upper valley slopes were not included in the survey. Curlews, however, appeared to be confined to the valley floor. The estimated populations are equivalent to densities of 8.2 pairs of Lapwing/km^2, 3.5 pairs of Curlew/km^2 and 0.4 pairs of Redshank/km^2. Such density figures need to be treated with caution since they depend very much on the exact boundary chosen for the study plot. In this instance the study area was taken as the level valley floor and this included all those fields which were at least partly situated on the floor.

The number of pairs of Lapwing estimated on each visit is shown in Fig.1. The criteria used in estimating these pairs are given above. Counts during March were lower than subsequent ones. It was also difficult to estimate numbers of pairs at this time because small flocks were sometimes present by the floodwater and these flocks included some birds which were breeding outside the study area. The two highest estimates occurred during mid and late April when most pairs were incubating. Visit efficiency of Lapwings varied between 26 and 74% (mean 56%, SD 13.45.) Visit efficiency of the counts during April and May varied between 53 and 74% (mean 63%, SD 6.48). Mean visit efficiency of the April counts alone was 67% and of the May counts was 58%. It became impossible to count Lapwings after the end of May. This was due to a large influx of Lapwings, presumably mainly of continental origin (Imboden 1974). Total counts of Lapwings for the last four visits, spread in June and July, were 118, 240, c200 and 890.

The estimated pairs of Curlews (Fig.2) followed a rather different seasonal pattern to that of Lapwing. Early in the breeding season detectability of Curlews was high. During March and very early April 5 or 6 pairs were consistently detected (visit efficiency of 63-75%). In mid April, however, the numbers of detected pairs suddenly dropped to just 2 pairs (25% of the estimated population). By early May detectability was much higher and it remained so until the end of the breeding season. The single visit in July produced only one pair and it was assumed that the majority of birds had departed from the study area by this time. The overall mean visit efficiency from the fifteen visits was 58%, SD 21.06. The mean census efficiency excluding the April and July counts was 68%, SD 8.6.

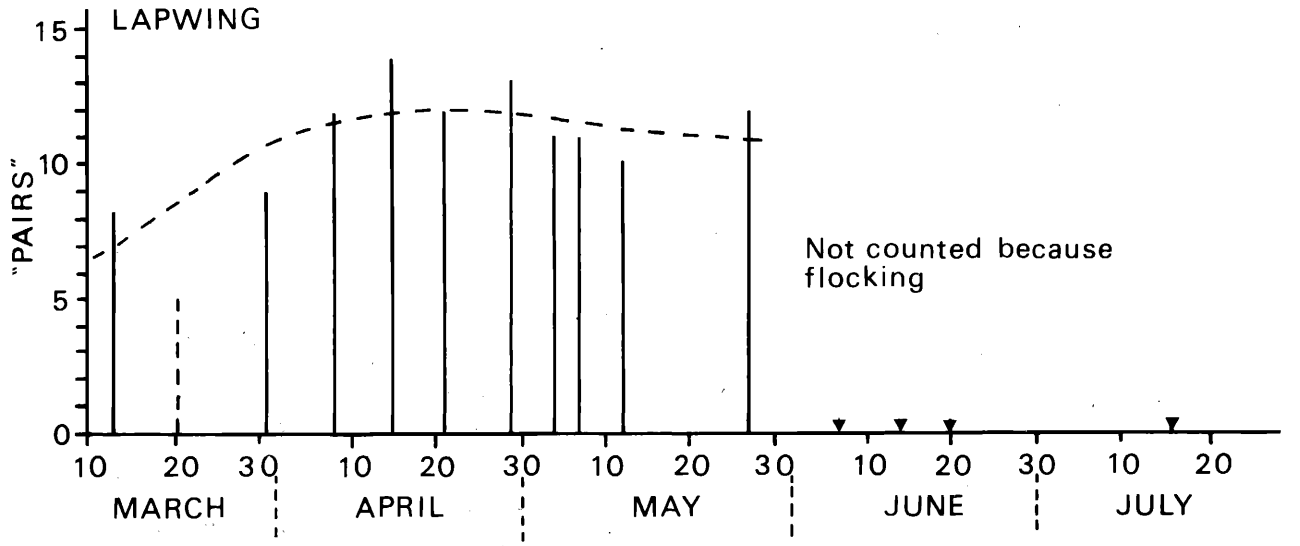

Figure 1. The number of pairs of Lapwings estimated to be present on each visit. The trend line (shown as a broken line) has been fitted to the estimates by eye. The estimate on the second visit is given as a broken line because there was considerable movement of birds into and out of the study area which made it difficult to estimate the number of pairs. Counts were not attempted in June or July because large flocks of Lapwings were present; visits during these months are indicated by triangles.

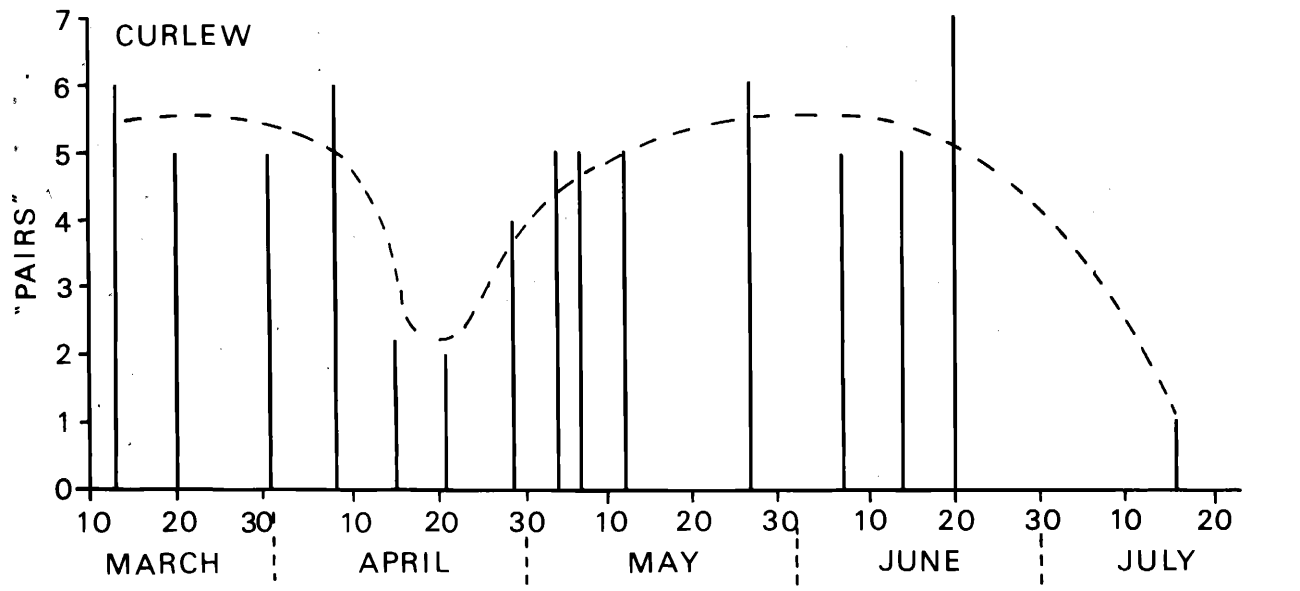

Figure 2. The number of pairs of Curlews estimated to be present on each visit. The trend line (shown as a broken line) has been fitted to the estimates by eye.

Curlews were rather less easy to census late in the breeding season, when they had young, than very early. There was a tendency for the birds to range more widely late in the season and to apparently overfly other territories. Furthermore, by the end of May the grass in hay meadows had grown too tall to allow birds on the ground to be seen.

Discussion

The results of the present study cannot be extrapolated to other parts of Britain because of regional variations in breeding seasons. Nor can they be applied strictly to other habitats because detectability of birds will probably be modified by vegetation structure and possibly the density of the birds themselves. Nevertheless some general conclusions can be drawn. Visit efficiency very rarely approached 100% for any single visit. The maximum was 74% for Lapwing and 88% for Curlew. A word of caution is needed here in respect of the methods used to estimate efficiency. The mapping method is not entirely suitable for estimating densities of non-territorial or colonial birds (Svensson 1980, Tomialojc 1980). On the study area Lapwings showed a discontinuous semi-colonial distribution. Repeated observations of the birds on the plot did, however, suggest that the estimate of 19 pairs was close to the real total. The Curlews behaved territorially and there is no reason to suppose that the estimate of 8 pairs is inaccurate. Whilst intensive and thorough nest finding may be the only solution to obtaining accurate population figures the time involved generally precludes using this technique, when the aim is to cover a large area. With Lapwings, however, counts of incubating birds may be a practical proposition at many sites.

If each of the fields had been systematically walked then census efficiency may have increased considerably. In this way, for example, the detectability of Curlews in April may have been improved. Fuller (1981), Galbraith & Furness (elsewhere in this issue) and Smith (1981) have found that walking through fields is of great advantage in censusing breeding waders because it often flushes the birds, thus making them visible to the observer.

This paper is concerned essentially with the efficiency of single visits when censusing breeding waders. It is probable that overall accuracy of the census could be improved if information was available from more than one visit. Two approaches could be made to the interpretation of such multiple visit data. First the highest estimate obtained on any one visit could be used. However, this would be wasteful because information would be discarded from all but one visit. The second approach would be to plot all the registrations on large-scale maps, distinguishing between the various sites. It would then be possible to perform a modified mapping analysis. For example, if three visits were made to a plot, two registrations could be used as the minimum requirement for substantiation of a territory. Such a technique would make maximum use of the census data available from a small number of visits to the same site.

The following is a summary of the results and conclusions of this study. Single visits probably considerably underestimated the real population. Visit efficiency for both species could probably have been increased by walking through each field, and in the case of Lapwing by attempting to locate incubating birds. At this site in southern England, Lapwings were counted most easily in April and May. Early (March) and late (June and July) counts were of little help because flocking tended to confuse the picture. Curlews were best counted in March and very early April and/or in May and June. Single visits at these times generally produced a high proportion of the pairs present. Curlews were difficult to detect in mid and late April.

Acknowledgements

I am grateful to the landowners who gave me permission to count waders on their property. I would like to thank Hector Galbraith and Dr R.J. O'Connor for helpful comments on the draft. Help with typing and preparing diagrams was provided by Mrs G.Bonham, Miss C.Hunt and Mrs E.Murray. Part of this work was performed under contract to The Nature Conservancy Council.

References

Fuller,R.J. (1978) Breeding populations of Ringed Plovers and Dunlins in the Uists and Benbecula, Outer Hebrides. Bird Study 25: 97-102.

Fuller,R.J. (1981) The breeding habitats of waders on North Uist machair. Scot.Birds, 11L 142-152.

Green,G.H. (1980a) Changing agricultural practice, Scotland and breeding waders. Wader Study Group Bull, 29: 5.

Green,G.H. (1980b) Breeding waders of lowland pastureland in Britain. Wader Study Group Bull, 30: 5.

Imboden,C. (1974) Migration, dispersal and breeding period of the Lapwing Vanellus vanellus in Europe (English title). Orn.Beob., 71: 5-134.

International Bird Census Committee (1969). Recommendations for an international standard for a mapping method in bird census work. Bird Study 16: 249-255.

Svensson,S.E. (1979) Census efficiency and number of visits to a study plot when estimating bird densities by the territory mapping method. J.Appl. Ecol., 16: 61-68.

Svensson,S.E. (1980) Comparison of bird census methods. Bird Census Work and Nature Conservation. Proc. VI Int.Con. Bird Census Work. 13-22.

Tomialojc,L. (1980) The combined version of the mapping method. Bird Census Work and Nature Conservation. Proc. VI Int. Con. Bird Census Work. 92-106.

Smith K.W.(1981) Snipe censusing methods. Bird Study 28: 246-248

R.J. Fuller, British Trust for Ornithology, Beech Grove, Tring, Herts. HP23 5NR.