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THE GRASSLAND OF EAST SCOTLAND —A SURVEY 1976-78

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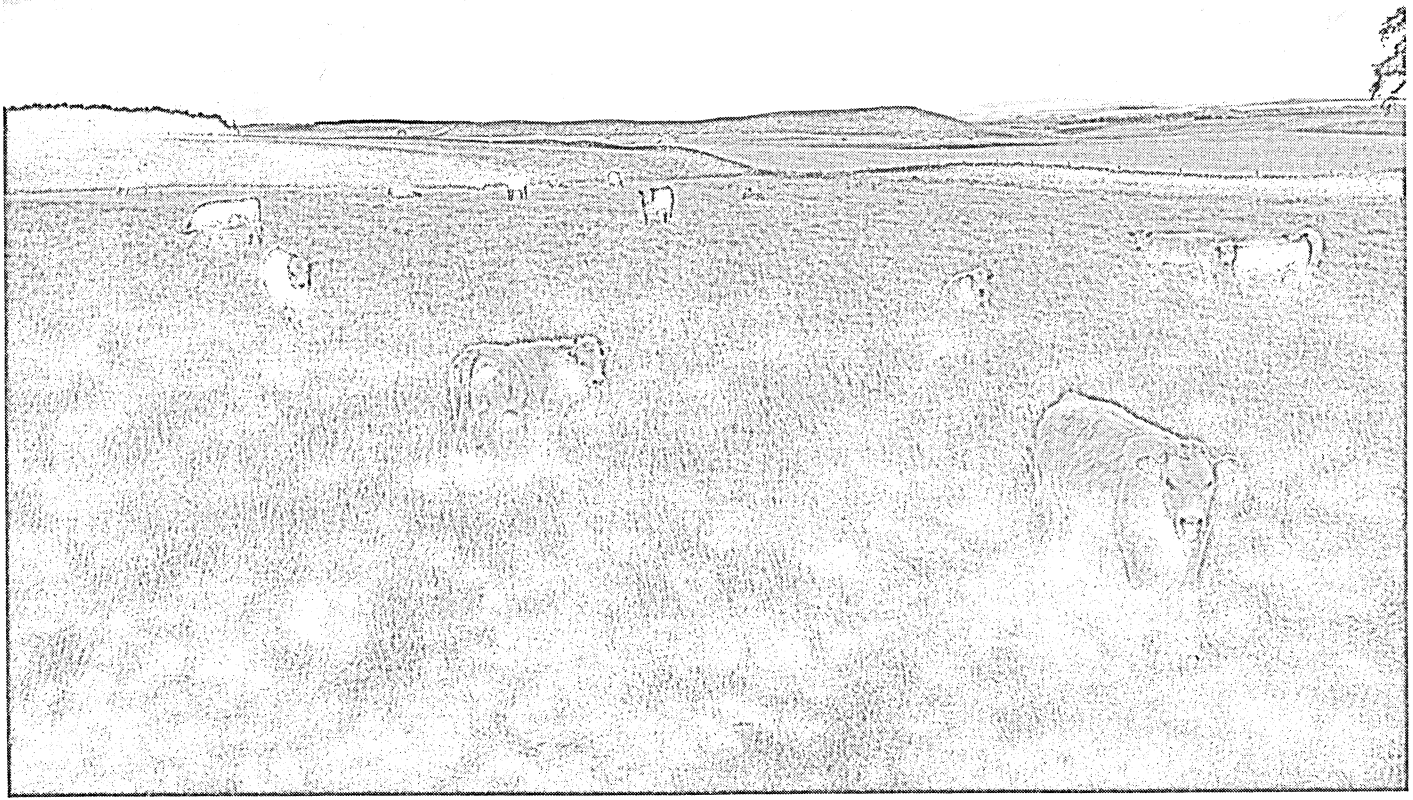

The East of Scotland College of Agriculture
Agricultural Research Council Unit of Statistics

The Grassland of East Scotland — A Survey 1976-78

by

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SUMMARY

A survey was made in 1976-1978 to obtain information on the grassland of East Scotland, in order to identify factors limiting output from grass and to provide advisory and development priorities. A total of 5,300 ha of enclosed rotational and permanent grass was surveyed on 89 stock rearing farms, whose main outputs were store cattle, fat and store lambs and barley.

Nearly two-thirds of the grass was under 7 years (rotational grass); 30 per cent was 10 years and over. Few fields of rotational grass, but just over half of the permanent grass, had less than 65 per cent of 'sown' species, on a herbage cover basis which excluded bare ground. Half of all fields surveyed had under 15 per cent of white clover. A quarter of the fields in rotational grass were below pH 6.0 or very low in phosphate and potash. One third of the fields used mainly for hay or silage were very low in potash. Forty per cent of the permanent grass fields were below pH 6.0 or very low in phosphate. 'Sown' species content increased up to a soil pH in the range 6.0 - 6.4 and in soils up to a moderate P status (6 - 10 mg/kg). At this soil P status, permanent grass averaged 77 per cent 'sown' species.

Grazed rotational grass was given an average of 104 kg N/ha (range 0 - 312 kg N). Phosphate and potash averaged just over 20 kg/ha. Most hay and silage crops received recommended rates of fertiliser, but only a quarter of the farmers applied a compound fertiliser to the aftermaths to replace the phosphate and potash removed in the hay and silage crop. Permanent grass was mostly grazed and was given on average 63 kg N and 15 - 18 kg P_2O_5 and K_20 per hectare.

There were few physical limitations of topography or drainage to the reseeding of permanent grass low in 'sown' species content. It was estimated that 20 per cent of the permanent grass, which had less than 45 per cent of 'sown' species including a low content of white clover, could benefit from reseeding. A further 20 per cent would benefit from the use of more lime and phosphate.

The average stocking rate on grass and forage crops was 1.7 livestock units (LU) per hectare (range 0.8 - 3.5 LU). Forty per cent of farms carried less than 1.5 LU/ha but most of these used less than the average 100 kg N/ha on the grazed grass. The only factor clearly affecting stocking rate was input of fertiliser N on the grazed grass. This input was used as the best available guide to total fertiliser N usage on the grass. The farmer's knowledge of grass had a small but significant influence on stock carry. Together these accounted for 34 per cent of the variation in stocking rate between farms, in a multiple regression analysis. High output was also obtained where swards were young and/or high in 'sown' species content and where soil pH, P and K levels were satisfactory. Some low stocking rates and generally low fertiliser N usage, together with a two-fold range in stocking rate within similar N inputs, suggest considerable scope for intensifying stocking rates.

INTRODUCTION

Scotland's agricultural land totals 6.8 M ha, of which 5.0 M ha is rough grazings, 1.0 M ha is in grassland and 0.8 M ha in crops. Grassland in the East of Scotland College area amounts to nearly 0.3 M ha. With forage crops this supports a livestock population giving an annual output of £200M.

The aims of this survey were to obtain information on the quality of the grassland, field and soil characteristics and grassland management practices on stock rearing farms in the East College area; and then to identify from this information the main problems or barriers to improved productivity. This would be used to provide advisory and development priorities.

THE FARMS

FARM TYPE

The survey was carried out on 'rearing with arable' farms. These are defined by the Department of Agriculture and Fisheries for Scotland (DAFS) as "farms having a smaller proportion of permanent grass and rough grazings than upland farms, and with crops which may account for up to 55 per cent of the total man-days, but with the proportion of cash crops below 25 per cent." They are found on the fringes of hill and upland areas and in lowground situations. They share many of the characteristics of upland farms, but climate and soil allow more cropping and more intensive stocking. Main outputs are store cattle, fat and store lambs and barley.

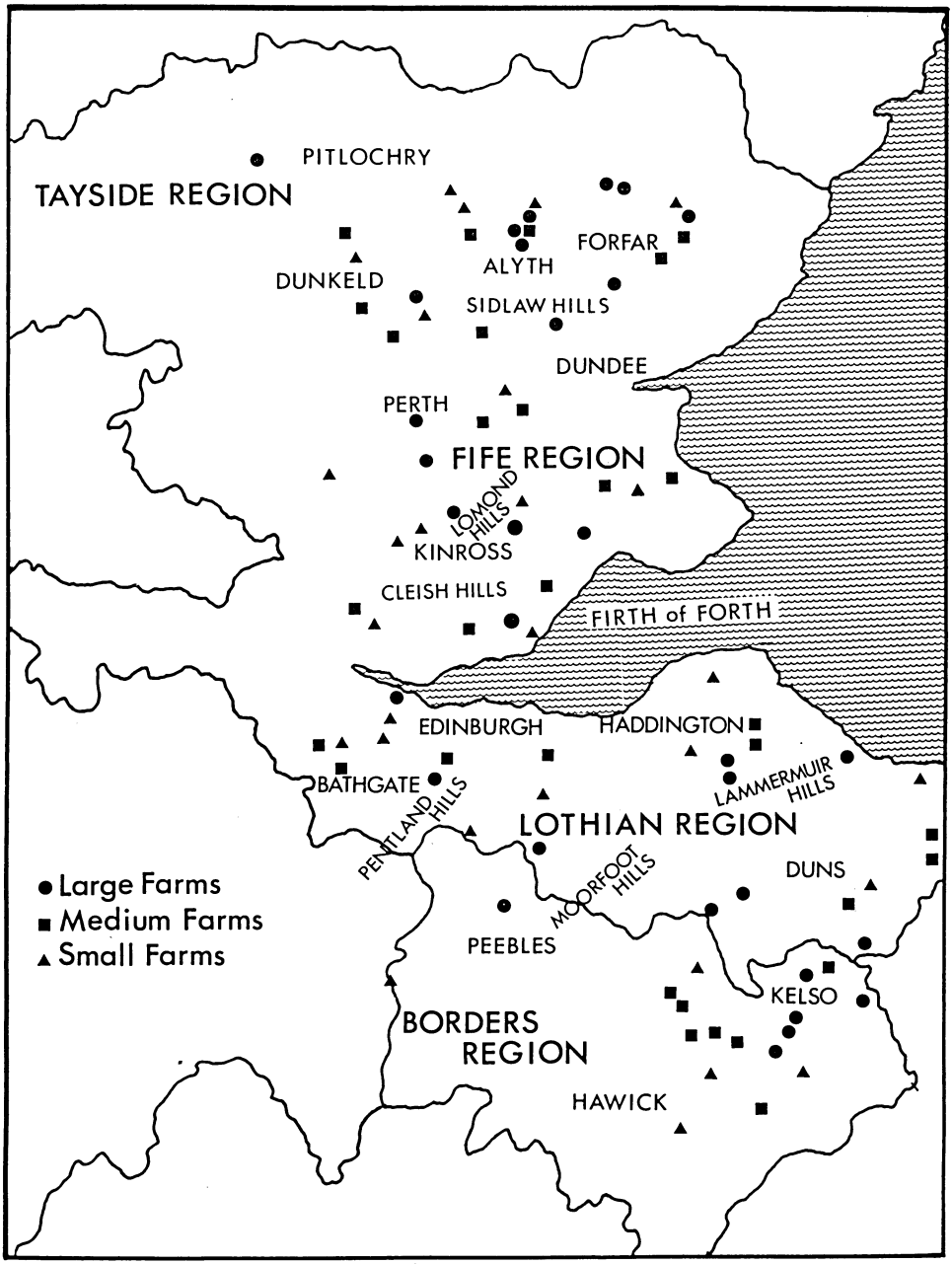
SELECTION OF FARMS

The farms were stratified by enterprise size, into small, medium and large (250 - 599, 600 - 1199 and 1200 + standard man-days) and by location, north of the Forth, in the regions of Tayside and Fife, and south of the Forth in the Lothian and Border regions. Thirty farms within each farm size, divided equally north and south of the Forth, were selected at random to give a total of 90 farms. Thirty were surveyed in each of the three years 1976 - 78. One changed hands during the survey and was withdrawn.

LOCATION OF FARMS

The distribution of the farms is shown in Figure 1. Half of the farms lay between 100 m and 200 m altitude, a quarter below 100 m and a quarter between 200 m and 300 m. The twenty or so at the higher altitudes were mainly farms in hilly regions of Angus and around Blairgowrie, in the Border hills south of Melrose, and the Lammermuirs.

FIGURE 1. Distribution of Farms



DATA COLLECTION AND ANALYSIS

Data were collected from three sources. Grassland specialists in the Crop Production A and D Department surveyed the grassland and obtained information on each field; the Soil Science Department collected soil and topographic data, while agricultural advisers completed questionnaire forms. The data were prepared for computer analysis and processed by the ARC Unit of Statistics in Edinburgh.

THE GRASSLAND SURVEY

After the farmer had provided information on the size, age, intended duration, past management and other details of each field, sward composition was assessed. The method involved random sampling using a 30 cm x 30 cm subdivided quadrat. Per cent herbage cover of the various species was estimated for each of 10 samples per field. The following species or group of species were recorded:—

'Sown'	'Unsown'
Italian ryegrass	Annual meadow grass
Perennial ryegrass	Rough-stalked meadow grass
Cocksfoot	Yorkshire fog
Timothy	Bent species
Other sown grasses	Fine-leaved fescues
Red clover	Other grasses
White clover	Broad-leaved weeds
Other sown legumes	

The level of infestation of particular weeds—creeping/spear thistle, ragwort, dock and rush—was estimated separately.

Bare ground was graded as 0 - 10%, 10 - 20%, 20 - 50% and over 50% for the whole fields. The coding used for herbage cover and weed infestation is based on the England and Wales survey (Forbes *et al* 1980) and is given in Appendix 1.

The survey was carried out from May to October. Since clover and broad-leaved weeds are less prominent early in the season, an adjustment was made for fields surveyed in May: where the clover or broad-leaved weed content came near the top of a category, the next higher code was recorded.

THE SOIL SURVEY

The soil survey began with an assessment of the physical features of the fields—average slope, relief and aspect. Soil restrictions to ploughing were also noted, along with natural drainage, topsoil and

subsoil texture and the dominant soil series. Soil data were completed for only 68 farms, but the soil series were obtained for seven other farms from soil survey maps. Ordnance survey maps were used to estimate field altitude.

THE QUESTIONNAIRE

The greater part of the questionnaire dealt with the grassland policy of the farm to supplement the field data. Information was sought by interview, on cropping and livestock enterprises, seed mixtures, grassland management, conservation methods, manuring and annual livestock numbers from June and December statutory returns. Other questions covered the wintering of stock, housing and turn-out dates, and time of top dressing in the spring for grazing, silage and hay.