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Grasses

UNIVERSITY OF NOTTINGHAM.

Department of Agriculture and Horticulture



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GRASS ON THE ARABLE FARM

H. W. T. Kerr

Agricultural Enterprise Studies in England and Wales, Economic Report No. 36

JANUARY 1976

UNIVERSITY OF NOTTINGHAM

Department of Agriculture and Horticulture

GRASS ON THE ARABLE FARM

A Descriptive Study of the Role of Grass on
69 Arable Farms in the East Midlands

H. W. T. Kerr

Price 90p

JANUARY 1976

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AGRICULTURAL ENTERPRISE STUDIES IN ENGLAND
AND WALES

University departments of Agricultural Economics in England and Wales have for many years undertaken economic studies of crop and live-stock enterprises. In this work the departments receive financial and technical support from the Ministry of Agriculture, Fisheries and Food.

A recent development is that departments in different regions of the country are now conducting joint studies into those enterprises in which they have a particular interest. This community of interest is being recognised by issuing enterprise reports in a common series entitled "Agricultural Enterprise Studies in England and Wales", although the publications will continue to be prepared and published by individual departments.

Titles of recent publications in this series and the addresses of the University departments are given at the end of this report.

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FOREWORD

For a number of years, this Department has had an interest in studying crops used as a break in cereal rotations. Reports have covered the main arable break crops other than sugar beet and potatoes: oil seed rape, (1969, 1970), vining peas (1971), threshed peas (1972), field beans (1971 and 1975), dry bulb onions (1973), and red beet (1972). The study of the role of grass on the arable farm is a logical extension of this work, but, unlike the other investigations, it was planned as a descriptive study of the physical rather than the financial aspects because of the problems of data collection involved. Even so it was found that only limited information could be obtained about fertiliser applications, the use of concentrate feeding stuffs, stocking rates and the employment of labour and machinery without the backing of a detailed recording system for which resources were not available. It is hoped that the report will assist in directing attention to those areas where more detailed work could be carried out with advantage. The study is complementary to one carried out by Reading University in Southern England.

The report comes at an appropriate time when the Government has recently stated its policy of encouraging better use of grassland. A connection was found between permanent pasture and the inclusion of grass in the rotation on the arable farm so this study also has some relevance to the national study of permanent pasture being carried out by the Grassland Research Institute.

1. INTRODUCTION

1.1 The Sample

The aim of the study was to examine the role which grass plays on the predominantly arable farm in the East Midlands. The sample was chosen from farms classified by the Ministry of Agriculture as cropping farms⁽¹⁾. The average cropping for all farms of this type in the East Midlands in 1973 is shown in Table 1.

TABLE 1 CROPPING ON EAST MIDLANDS ARABLE FARMS⁽¹⁾
1973

Cropping	Total Acreage	Acres Per Holding	Proportion of Total Acreage
			%
Wheat	396434	98.4	27.3
Barley	470624	116.8	32.4
Oats	39300	9.8	2.7
Sugar Beet	81837	20.3	5.7
Potatoes	67771	16.8	4.7
Field Beans	8832	2.2	0.6
Other Cash Crops	66921	16.6	4.6
Other Forage Crops	33860	8.4	2.3
Fallow	5702	1.4	0.4
Total Arable	1171281	290.7	80.7
Total Grass	279842	69.5	19.3
Total Crops and Grass	1451123	360.2	100.0

Source: M.A.F.F. June 4th Returns for 1973.

In drawing the original list from which the sample was obtained, certain lower limits were placed on selection to ensure that the farms included had an acreage of grass sufficient to support viable livestock

(1) A combination of the categories "Cropping, mostly cereals" and "General Cropping".
Cropping, mostly cereals: More than 50% of the standard man day requirement in Cropping of which 50% or more in cereals.
General Cropping: More than 50% of the standard man day requirement in Cropping of which less than 50% in cereals.

enterprises. To be included they had to have at least one hundred acres of crops and grass, over 20 acres of temporary grass and at least 50 standard man days devoted to grazing livestock. The sample finally obtained did, in fact, meet these criteria. The information was collected from the farms in the early months of 1973 and 1974, and therefore spanned a period of two crop years. However, as the data required were of a general physical nature, this was considered to be acceptable.

1.2 Distribution of the Sample

The distribution of the 69 farms in the sample is shown by county in Table 2 and by acreage size groups in Table 3.

TABLE 2 GEOGRAPHICAL DISTRIBUTION

County	No of Farms	Acreage
Derbyshire	2	720
Leicestershire	7	3855
Nottinghamshire	12	6273
Lincolnshire - Lindsey	30	19363 $\frac{3}{4}$
- Kesteven	17	8403
Northamptonshire	1	315
	69	38929 $\frac{3}{4}$

TABLE 3 SIZE DISTRIBUTION

Size Group	No of Farms
Under 249 $\frac{3}{4}$ acres	2
250 - 499 $\frac{3}{4}$ acres	35
500 - 749 $\frac{3}{4}$ acres	18
750 - 999 $\frac{3}{4}$ acres	8
1000 - 1499 $\frac{3}{4}$ acres	5
1500 acres and over	1
	69

Naturally a bias is shown in the geographical distribution towards the arable counties of Nottinghamshire and Lincolnshire. The majority of the farms fell into the range between 250 and 750 acres in size, the smallest being 184 acres and the largest 2103 acres.

1.3 General Cropping

The average acreage of crops and grass was 564 acres, 73.5% being in arable crops including arable forage crops and 26.5% in grass of which a little less than half was permanent (Table 4). The proportion of grass to arable was rather higher in the sample than for all farms in the group from which it was selected (see Table 1), but a comparison between the proportion of the total grass acreage in temporary and permanent grass could not be made because the information for all farms was not available. As the farms were predominantly arable a simple distinction could be made between temporary and permanent grass, temporary grass being grass included in the arable rotation and permanent grass being grass not included in it. Usually land was down to permanent pasture because it was too wet or its topography too difficult for arable cropping. All farms had some temporary grass and nearly all also had some permanent pasture. Several farmers utilised part of their grass acreage in ways other than by grazing livestock such as grass seed production and drying for sale off the farm.

On the arable side the only crop grown by all farmers was barley, which occupied nearly half the arable acreage. Wheat was grown on nearly all farms and occupied a third of the arable acreage. Sugar beet and/or potatoes were grown on well over half the farms, and a variety of other cash crops ranging from vining and threshed peas to daffodils, tulips and raspberries were also grown. Full details of the cropping are given in the notes to Table 4.

1.4 Soil Type

The variation of soil type within farms was such that it was impossible to classify the farms in this way. Most farms lay on several soil types even in areas such as the Lincolnshire Wolds and the Nottinghamshire Sandland, usually considered to be of a reasonably

TABLE 4 AVERAGE CROPPING ACREAGES ON 69 FARMS IN SAMPLE

Cropping	Total Acreage	Acres per Farm	Proportion of Total Acreage %
Wheat	9392½	136.1	24.1
Barley	12645½	183.3	32.5
Oats	844¾	12.2	2.2
Sugar Beet	1939¾	28.1	5.0
Potatoes	1347½	19.5	3.4
Field Beans	552	8.0	1.4
Other Cash Crops	1235	17.9	3.2
Other Forage Crops	482	7.0	1.2
Fallow	184	2.7	0.5
Total Arable	28623	414.8	73.5
Temporary Grass	5607	81.3	14.4
Permanent Grass	4699¾	68.1	12.1
Total Grass	10306¾	149.4	26.5
Total Crops and Grass	38929¾	564.2	100.0

- Notes: (1) 66 farms grew wheat = 142.3 acres per farm growing wheat.
 All farms grew barley.
 45 farms grew oats = 18.8 acres per farm growing oats.
 44 farms grew sugar beet = 44.1 acres per farm growing sugar beet.
 37 farms grew potatoes = 36.4 acres per farm growing potatoes.
 26 of these grew both potatoes and sugar beet.
 23 farms grew field beans = 24.0 acres per farm growing field beans.
 18 farms grew other cash crops = 68.6 acres per farm growing other cash crops.
 Other crops grown: Vining peas, threshed peas, sugar beet seed, french beans for freezing, brussels sprouts for freezing, cauliflowers, onions, carrots, daffodils, tulips and raspberries.
- (2) All farms had temporary grass.
 Of which 2 also produced seed for sale = 18.5 acres per farm growing for seed production.
 62 farms had permanent pasture = 75.8 acres per farm having permanent pasture ranging from 5.2% to 90.1% of total grass acreage.
 4 of these had less than 10% and 7 farms had no permanent pasture.
- (3) Includes 38 acres grown for seed production on two farms.
 40 acres grown for turf on one farm.
 80 acres of lucerne grown for syndicate drying for sale off farm.
 One other farmer dried surplus grass for sale.

homogeneous soil type. This is due not only to variations of soil type within the area but because the relatively large farms found there often extend out of the area onto other soil types particularly as the land is seldom within one ring fence.

1.5 Rotation

The rotations used were also very varied. The only common factor was that winter wheat usually, though not invariably, followed the temporary grass. There was no apparent connection between soil type and the use of grass in the rotation. When farms covered both light and heavy soil, on one farm grass might be included in the rotation mainly on the heavy soil whereas on another it might be used mainly on the light soil.

1.6 The Livestock Enterprises

Five of the 69 farmers carried Dairy Herds (all Friesian), one of whom was in the process of switching from milk to beef production, (Table 5).

TABLE 5 DISTRIBUTION OF MAIN LIVESTOCK ENTERPRISES

	No.	Proportion
Farms having Dairy Herds	5	-
" " Beef Enterprises	65	-
" " Sheep Enterprises	36	-
		%
Farms with Dairy Herds only	1	1.5
Changing from Dairy to Beef	1	1.5
Farms with Dairy and Beef Enterprises	3	4.3
" " Beef Enterprises only	28	40.6
" " Beef and Sheep Enterprises	33	47.8
" " Sheep Enterprises only	3	4.3
	69	100.0

Sixty-five had beef enterprises and 36 sheep enterprises, although one of these was giving up his flock in favour of a beef enterprise because of labour and management difficulties. All the farms carrying

sheep had ewe flocks and in no instance was the fattening of purchased hoggets the only sheep enterprise. Only one farm operated a dairy herd alone and only three ran a ewe flock alone, whereas 28 carried beef enterprises only. However, when the beef enterprises are classified as in Table 6 according to three general systems of production - suckler cows, purchased calves and purchased stores - the situation is seen to be very complex, with enterprises more often than not being run in combination with one another. Furthermore the progeny of nearly all the suckler herds were finished rather than sold as suckled calves. Any further classification of the enterprises, say, by grouping the suckler herds by method of suckling, by allowing for the sales pattern of the beef enterprises or the production systems of the ewe flocks, would have little meaning here. Information of this kind however, is given in the following sections 3 and 4 relating to the Beef and Sheep enterprises respectively, but there were too few dairy herds in the sample to give similar details for them.

TABLE 6

COMBINATION OF LIVESTOCK ENTERPRISES

	No of Farms	Proportion %	Forage Acres	Forage Acres/ Farm	Proportion %
Dairy Herd only	1	1.5	308	308.0	2.9
Changing from Dairy to Beef	1	1.5	120	120.0	1.1
Dairy Herd fattening own Surplus Calves ⁽¹⁾	3	4.3	388	129.3	3.6
Suckler Herds only ⁽²⁾	11	15.9	1597	145.2	14.9
Suckler Herds with Ewe Flock only ⁽³⁾	11	15.9	1886	171.5	17.6
Suckler Herds with Purchased Calves only ⁽⁴⁾	4	5.8	606	151.5	5.6
Suckler Herds with Purchased Stores only ⁽⁵⁾	4	5.8	796	199.0	7.4
Suckler Herds with Purchased Calves & Stores ⁽⁶⁾	1	1.5	93	93.0	0.9
Suckler Herds with Purchased Calves & Ewe Flock ⁽⁷⁾	1	1.5	103	103.0	1.0
Suckler Herds with Purchased Stores & Ewe Flock ⁽⁸⁾	3	4.3	612	204.0	5.7
Suckler Herds with Purchased Calves & Stores & Ewe Flock ⁽⁹⁾	1	1.5	102	102.0	0.9
Ewe Flock only	3	4.3	264	88.0	2.5
Purchased Calves only	1	1.5	116	116.0	1.1
Purchased Stores only	3	4.3	349	116.3	3.2
Purchased Calves & Purchased Stores only ⁽¹⁰⁾	4	5.8	599	149.8	5.6
Ewe Flock and Purchased Calves only	9	13.0	1287	143.0	12.0
Ewe Flock and Purchased Stores only	6	8.7	1103	183.8	10.2
Ewe Flock, Purchased Calves & Purchased Stores	2	2.9	404	202.0	3.8
	69	100.0	10733	155.6	100.0

TABLE 6 : Notes:-

- (1) Of which 1 also purchased calves.
1 also purchased stores.
- (2) Of which 5 single-suckled.
2 double-suckled.
2 multiple-suckled.
1 single and double suckled.
1 single and multiple suckled.
- (3) Suckler Herds:
Of which 6 single-suckled (2 selling weaned calves only).
2 double-suckled.
1 multiple-suckled.
2 single and multiple suckled.
- (4) Suckler Herds:
Which all single-suckled.
- (5) Suckler Herds:
Of which 3 single-suckled.
1 multiple-suckled.
- (6) Suckler Herd:
Which single-suckled.
- (7) Suckler Herd:
Which single-suckled.
- (8) Suckler Herds:
Which all single-suckled.
- (9) Suckler Herd:
Which multiple-suckled.

3 Barley Beef Systems were operated.
1 Dairy Herd fattened own calves.
1 Single-suckler Herd fattened own calves.
1 Purchased calves.

2. THE GRASSLAND

2.1 Types of Grass

The acreage of permanent and temporary grass together with those of the temporary grass in 1 year, 2 year, 3 year leys and leys of over 3 years duration are shown in Table 7.

TABLE 7
ACREAGE OF PERMANENT PASTURE, ROTATIONAL GRASS
AND DIFFERENT LEY TYPES

	Acreage	Proportion of Total Grass Acreage	Proportion of Temporary Grass Acreage
		%	%
Total Grass	10306 $\frac{3}{4}$	100.0	-
Permanent Pasture	4699 $\frac{3}{4}$	45.6	-
Temporary Grass	5607	54.4	100.0
1 year leys	1476 $\frac{1}{4}$	-	26.3
2 year leys	1673	-	29.9
3 year leys	1207	-	21.5
Over 3 year leys	1250 $\frac{3}{4}$	-	22.3

The length of ley is the intended life of the ley and not the length of time that it has been down. Temporary grass, occupying just over half the total grass acreage, was evenly divided between the four different ley types, so the short-term leys of up to three years duration accounted for three-quarters of the temporary grass acreage.

2.2 Seeds Mixtures and Methods of Sowing

Italian ryegrass with clover was the most common mixture used for one year leys sometimes with the addition of perennial ryegrass. Italian and perennial ryegrasses with clover mixtures were the most popular for two year leys. This mixture with the addition of timothy was most often used for three year and longer duration leys. Ryegrasses were therefore commonly used as the basis for all mixtures, Italian predominating in the shorter ley mixture and perennial in the longer. Full details of the mixtures used for each type of ley are given in the Appendix.

The greater proportion of the temporary grass was established by undersowing, nearly all of it under barley (Table 8). Nearly all the acreage direct-seeded was sown in the autumn.

TABLE 8 ACREAGE OF UNDERSOWN AND DIRECT LEYS 1973

	No of Farms	Acres	Proportion
Total Acreage Reseeded	68	3004	100.0
Undersown	56 ⁽¹⁾	2444	81.4
Direct Sown	17 ⁽²⁾	560	18.6
Spring	1	12	-
Autumn	16	548	-

Notes: (1) 53 used barley as nurse crop.
3 used wheat as well as barley as a nurse crop.

(2) Of which 10 sowed directly.
7 both sowed directly and undersowed.

Of the farmers who direct-seeded, 12 applied fertilisers for establishment at an average rate of 26.6 units per acre of Nitrogen, 24.4 units of phosphate and 27.3 units of potash. None of those who undersowed applied fertiliser specifically for the seeds at the time of sowing although some applied a dressing of compound after the cereal crop had been removed.

2.3 Fertiliser Application to Grass

As no detailed recording system was used, only a general indication of the application of fertiliser to the grassland can be given. Farmers were asked to give an estimate of the annual application of units of N, P and K per acre, but, because of differences of application to temporary and permanent pasture and between that for grazing and cutting, the answers were found to be unreliable. Information relating to applications for specific purposes, however, is given in Table 9. Nitrogen was most commonly applied in granular form, but ten farmers used injection, six of them with additional granular applications. Excluding those who injected and those who applied no nitrogen, the average number of applications of nitrogenous fertilisers per season was just under two for grazing and one

and a quarter for cutting.

TABLE 9 FERTILISER APPLICATIONS TO GRASS ON 69 FARMS

	No of Farms	Units Applied per acre
Applied N especially for early bite	22	55.1
Normal N application for grazing	59 ⁽¹⁾	51.0
Normal N application for cutting	48 ⁽²⁾	63.2
Applied N especially for late bite	12	44.2
Applied N by injection	10 ⁽³⁾	183.6
Applied P & K as basal dressing other than as slag	47 ⁽⁴⁾	34.8 P 28.8 K
Applied slag ⁽⁵⁾	30	Not known

- Notes:
- (1) 6 farmers applied no nitrogen specifically for grazing. 4 used injection only. Average number of applications per season by remaining 59 = 1.85.
 - (2) 14 farmers applied no nitrogen specifically for cutting. 4 used injection only. 2 others injecting did not apply additional N for cutting. 1 applied 5 dressings of 100 units each for grass drying. Average number of applications per season by remaining 48 = 1.27.
 - (3) 4 used injection only, the other 6 applied additional N for grazing or cutting.
 - (4) 2 applied P only, the rest applied P & K as compound.
 - (5) 12 used slag only as a basal dressing. Slag was most commonly applied every 3 years. Every farmer applied fertiliser for some purpose during the season. 10 applied no basal dressing of P & K either in compound or slag.

The average basal dressing of phosphate and potash applied as a compound was approximately 30 units of each per acre. In addition some of these farmers also applied slag, most commonly giving a dressing every three years.

2.4 Methods of Grazing and Conservation

The various combinations of grazing and conservation management and the acreage of grass covered by each system are given in Table 10.

TABLE 10 METHODS OF GRAZING AND CONSERVATION

Method of Grazing & Conservation	No of Farms	Acres of Grass	Proportion %
Set Stocking and Hay ⁽¹⁾	27	4063	39.6
Set Stocking and Silage ⁽²⁾	1	450	4.4
Rotational Grazing and Hay	15	1839½	17.9
Rotational Grazing and Silage ⁽²⁾	11	1767	17.2
Set Stocking/Rotational Grazing and Hay	6	724	7.0
Set Stocking/Rotational Grazing & Silage ⁽²⁾	5	1036½	10.1
Grazing only ⁽³⁾	4	389	3.8
	69	10268¾	100.0

- Notes: (1) One Barn-dried hay.
 (2) Of the 17 making silage 13 also made hay and another made dried grass.
 (3) All set-stocked.

Similar information relating to the permanent and the temporary grass respectively is shown in Table 11. The combinations of set-stocking and hay-making was generally the most popular system of management. Four farmers did not conserve grass at all and were content to obtain their winter bulk feed requirements from outside sources. Just over one-tenth of the temporary grass was cut for conservation only and not grazed, whereas one-third of the permanent pasture was only used for grazing.

(a) Grazing Management

Two systems of grazing management were identified - set-stocking and rotational grazing. There is some difficulty in drawing a distinct line between the two. In this study the term "rotational grazing"

implies that a definite cycle of controlled grazing was practised around the grazing area, whereas "set-stocking" is applied to any other form of grazing where no cycle was established.

TABLE 11 METHODS OF GRAZING AND CONSERVATION ON TEMPORARY AND PERMANENT PASTURE

Method of Grazing and Conservation	Temporary Grass			Permanent Pasture		
	No of Farms	Acres	Proportion %	No of Farms	Acres	Proportion %
Set Stocking and Hay	23	1770	31.8	25	2010	42.7
Set Stocking and Silage	-	-	-	3	192½	4.1
Rotational Grazing and Hay	18	1268	22.8	10	793¼	16.9
Rotational Grazing and Silage	14	1669	30.0	4	193	4.1
Cutting only - Hay	7	264	4.7	-	-	-
Cutting only - Silage	3	351	6.3	-	-	-
Grazing only - Set Stocking	4	247	4.4	13	911	19.4
Grazing only - Rotational	-	-	-	7	600	12.8
	69	5569	100.0	62 ⁽¹⁾	4699¾	100.0

Note: (1) 7 had no permanent pasture.

There are several systems of rotational grazing - strip grazing, strip grazing with a back fence, paddock grazing - but it was not possible to identify them clearly. For instance, both strip grazing with a back fence and the use of a single electric fence in a relatively small field are really forms of paddock grazing. All forms of rotational grazing have therefore been placed under one heading except in the specific case of the relationship with the livestock enterprises noted under Table 12.

Rotational grazing was practised on about 60% of the temporary grass acreage, whereas two thirds of the permanent pasture was set-stocked (Table 11). As shown in Table 12 set-stocking was the most common method of management for suckler herds but rotational grazing was used for other beef enterprises and ewe flocks on nearly as many farms as set-stocking.

TABLE 12 METHOD OF GRAZING DIFFERENT CATEGORIES OF ANIMALS

Method of Grazing	Dairy Cows	Sucklers	Other Beef	Ewes
Set Stocking	3	24	37	19
Rotational Grazing	2	12 ⁽¹⁾	27 ⁽²⁾	17 ⁽³⁾
Set/Stocking/Rotational	-	-	1 ⁽⁴⁾	-
	5	36	65	36

- Notes: (1) 5 of whom paddock grazed.
 (2) 12 of whom paddock grazed.
 (3) 10 of whom paddock grazed, 3 forward creep grazing the lambs.
 (4) Purchased calves rotationally grazed.
 Purchased stores set-stocked.

(b) Conservation

Conventional hay was made by nearly two thirds of the farmers. The silage makers however tended to have larger acreages of grass on their farms than the hay-makers (Table 13).

The acreages cut and the quantity of grass conserved by the different methods is shown in Table 14. The majority of the silage makers also conserved some of their grass as hay.

Two thirds of the acreage cut for silage was wilted, most of it was picked up by a double-chop forage harvester (Table 15) and was stored in bunker silos (Table 16).

The bulk of the silage was cut out and carted for feeding to the stock (Table 17). Only two farmers self-fed and one easy-fed their animals all of which were fattening or store cattle in purchased store enterprises.

All those making silage fed it to suckler cows or to other beef enterprises; only one, the farmer making haylage, fed it to sheep and none of the dairy farmers made silage.

TABLE 13

METHOD OF CONSERVATION

	No of Farms	Proportion	Average Grass Acres per Farm
Conventional Hay only	46 ⁽¹⁾	66.6	139.1
Barn-dried Hay only	1	1.5	85.0
Silage only	3	4.3	278.3
Haylage only	1	1.5	126.0
Silage and Conventional Hay	13	18.8	170.3
Dried Grass and Conventional Hay	1	1.5	179.0
No Conservation	4	5.8	97.3
	69	100.0	148.2

Notes: (1) One farmer normally making hay conventionally was equipped to barn dry if necessary.

80 acres of lucerne grown specifically for syndicate drying for sale off the farm are excluded.

TABLE 14

ACREAGE AND QUANTITIES CONSERVED

Method of Conservation	Acres Cut	Quantity	Per Acre
		tons	tons
Conventional Hay	2297	5319	2.3
Barn-dried Hay	40	100	2.5
Silage	846	6920	8.2
Haylage	40	350	8.8
	3223 ⁽¹⁾	-	-

Note: (1) Excluding 80 acres of lucerne grown on one farm for syndicate drying for sale and the acreage used for drying surplus grass for sale on another.

TABLE 15 SILAGE - METHOD OF CUTTING

Method of Cutting	No of Farms	Acreage Cut	Proportion
Direct Cut, Flail	3	124	14.0
Direct Cut, Double Chop	4	165	18.6
Wilted and picked up, Flail	1	20	2.3
Wilted and Double Chop	6	430	48.5
Wilted and Precision Chop	3	147	16.6
Total	17 ⁽¹⁾	886	100.0

Note: (1) Eleven farmers used additives.

TABLE 16 SILAGE - METHOD OF STORAGE

Method of Storage	No of Farms	Acreage Cut	Proportion
Pits only	3	155	17.5
Bunker only	10 ⁽¹⁾	577	65.1
Both pits and bunkers	2	84	9.5
Stack	1	30	3.4
Tower	1	40	4.5
Total	17	886	100.0

Note: (1) Of 6 reporting 4 had open bunkers.
2 had covered bunkers.

TABLE 17 SILAGE - METHOD OF FEEDING

Method	No of Farms	Quantity Made tons	Proportion	Quantity per Farm tons
Taking out and carting ⁽¹⁾	13	5020	69.1	386
Self Feed - 24 hr. access	1	950	13.1	950
Self Feed - Restricted access	1	600	8.2	600
Easy Feed	1	350	4.8	350
Tower loading to forage trailer	1	350	4.8	350
Total	17	7270	100.0	428

Note: (1) 5 used a front-end loader to take out the silage.

Silage was fed to nine of the 36 suckler herds, eight of the 24 units purchasing calves and eleven of the 25 units purchasing stores. The average number of cows in the suckler herds to which silage was fed was about the same as the average number in all 36 herds, but silage was usually fed to the larger purchased calf and purchased store units.

An attempt was made to discover why the farmers chose the method of conservation they employed. The hay-makers all stated that as they already possessed the machinery and as a change to silage-making would involve considerable capital expense, they preferred to continue hay-making. Other advantages of hay mentioned were that it is a more saleable product than silage, a useful benefit in systems likely to produce fluctuations in the quantity of grass conserved, and that it is an easier product to transport around large and fragmented farms. The silage makers on the other hand considered it well worthwhile to spend the money to equip themselves so as to reduce the risk involved in conserving grass as hay and so produce a better product on average.

2.5 Irrigation

Four farmers growing sugar beet and potatoes had irrigation equipment. One irrigated grass when not using it on potatoes, one used it only to establish reseeds and the other two did not use it on grass at all.

3. THE BEEF ENTERPRISES

3.1 Suckler Herds

All methods of suckling - single, double and multiple - were represented in the 36 suckler herds carried on the farms in the sample. Nearly two thirds of the farmers practised single-suckling involving three quarters of the total number of suckler cows. The single-suckler herds with an average of 51 cows per herd were larger than either the double-suckling or the multiple-suckling herds (Table 18).

TABLE 18 METHOD OF SUCKLING

Method of Suckling	No of Herds	Proportion %	No of Cows	Proportion %	Cows per Herd
Single-Suckling	22	61.1	1119	75.5	50.9
Double-Suckling	4	11.1	98	6.6	24.5
Multiple-Suckling	6	16.7	91	6.1	15.2
Mixed	4	11.1	175	11.8	43.8
Total	36	100.0	1483	100.0	41.2

Just over a quarter of the herds calved in the winter period only as defined in Table 19 and the same proportion calved in the spring period only, but only five per cent of the herds calved entirely in the autumn.

All the progeny were sold as suckled calves from only two herds and the majority of calves reared in the suckler herds were taken on for sale as fat beasts (Table 20).

Half the herds were composed of mixed breeds or crosses (Table 21). A quarter of the herds were Hereford/Friesian crosses but a quarter of the cows were pure Lincoln Reds kept in larger herds than the other breeds. As shown in Table 22 this is related to the fact that all but one of the Lincoln Red herds were single-suckled.

TABLE 19

PERIOD OF CALVING

Period	No of Herds	%	No of Cows	%
Autumn only	2	5.5	60	4.1
Winter only	10	27.8	493	33.2
Spring only	10	27.8	401	27.0
Autumn and Winter	2	5.5	175	11.8
Winter and Spring	6	16.8	147	9.9
Autumn and Spring	4	11.1	157	10.6
Autumn, Winter and Spring	2	5.5	50	3.4
Total	36	100.0	1483	100.0

Autumn = September, October, November.

Winter = December, January, February.

Spring = March, April, May.

TABLE 20

METHOD OF SELLING

Method	No of Herds	%	No of Cows	%
Selling Suckled Calves only	2	5.5	64	4.3
Selling Fat	24	66.8	825	55.6
Selling Store	5	13.9	187	12.6
Selling both Store and Fat	2	5.5	65	4.4
Selling part Suckled Calves part Store	2	5.5	310	20.9
Selling part Suckled Calves part Fat	1	2.8	32	2.2
Total	36	100.0	1483	100.0

TABLE 21

BREED OF SUCKLER COWS

Breed	No of Herds	Proportion %	No of Cows	Proportion %	Cows per Herd
Hereford x Friesian	10	27.8	181	12.2	18.1
Lincoln Red	6	16.7	403	27.2	67.2
Shorthorn x Friesian	2	5.5	60	4.0	30.0
Mixed	18	50.0	839	56.6	46.6
Total	36	100.0	1483	100.0	41.2

Other Breeds used: Hereford x Lincoln Red, Charolais x Friesian, Lincoln Red x Friesian, Hereford x Galloway, Aberdeen Angus, Bluegrey, Red Poll x Aberdeen Angus.

TABLE 22

BREED AND METHOD OF SUCKLING

Method of Suckling Breed	Single		Double		Multiple		Mixed	
	No of Herds	No of Cows	No of Herds	No of Cows	No of Herds	No of Cows	No of Herds	No of Cows
Hereford x Friesian	3	68	3	68	4	45	-	-
Lincoln Red	5	373	1	30	-	-	-	-
Shorthorn x Friesian	1	40	-	-	1	20	-	-
Mixed	13	638	-	-	1	26	4	175
Total	22	1119	4	98	6	91	4	175

The two most popular breeds of bull were Hereford and Lincoln Red (Table 23), and most of the farmers with suckler herds owned a bull.

TABLE 23

BREED OF BULLS USED IN SUCKLER HERDS

	No of Bulls
Hereford	13
Lincoln Red	14
Aberdeen Angus	1
Charollais	3
South Devon	3
Shorthorn	1
	35

Notes: 24 of the 36 farmers with suckler herds owned bulls.

Average number of cows per bull = 35.1.

3.2 Other Beef Enterprises

Two other main beef enterprises were identified - purchasing calves and buying stores. Calves were purchased either at a few days old requiring specialist labour for rearing them or as reared calves at about 13 weeks old. The average size of the enterprise was between 75 and 80 calves per year for both systems of purchasing calves and just over 100 beasts per unit in purchased store enterprises (Table 24). Nearly all cattle in both enterprises were sold fat (Table 25).

TABLE 24

OTHER BEEF ENTERPRISES

Enterprise	No of Farms	No of Animals	No of Animals Per Unit
Buying Calves	24	1844	76.8
Of which bought young calves	10	761	76.1
Of which bought reared calves	14	1083	77.4
Buying Stores	25	2649	106.0

TABLE 25

METHOD OF SELLING PURCHASED CATTLE

	No of Animals	Proportion %
Purchased Calves:		
Sold Fat	1589	88.6
Sold Store	204	11.4
	1793	100.0
Purchased Stores:		
Sold Fat	2496	95.8
Sold Store	109	4.2
TOTAL	2605	100.0

In Table 26, all the cattle which were sold fat whether reared in the suckler herds or purchased as calves or store cattle classified into three groups relating to their age at the time of sale. The cattle in the group sold at over 2 years old were finished at a mature stage. Those fattened at 15 to 24 months old were younger cattle fed largely on grass and grass products and the small number in the 12 to 15 months old group were all raised on the barley beef system. The majority of the home-bred cattle and the purchased calves were sold fat at between 15 and 24 months old, but most of the purchased stores were finished at over two years old.

TABLE 26

AGE OF CATTLE SOLD FAT FROM 29 UNITS SELLING ALL THEIR OWN
CATTLE FAT AND 43 UNITS SELLING ALL THEIR PURCHASED CATTLE FAT

Age Group	Homebred Cattle			Purchased Calves			Purchased Stores		
	No of Units	No of Cattle	Proportion %	No of Units	No of Cattle	Proportion %	No of Units	No of Cattle	Proportion %
> 12 mths < 15 mths	2 ⁽¹⁾	40	4.6	1 ⁽¹⁾	260	19.1	-	-	-
> 15 mths < 24 mths	21	765	87.2	15	857	62.9	9	877	38.1
24 mths and over	6	72	8.2	7	245	18.0	11	1423	61.9
	29	877	100.0	23	1362	100.0	20	2300	100.0

Note: (1) Barley beef systems.

4. THE SHEEP ENTERPRISES

4.1 Systems of Production

All the farms in the sample carrying sheep had ewe flocks. The majority of lambs in 33 out of the 36 flocks were sold fat or as stores by the end of the grazing season (Table 27).

TABLE 27 EWE FLOCKS - PRODUCTION SYSTEM

	No of Flocks	No of Ewes
Selling Home-reared Fat Lambs & Stores	33	8105
Of which also:		
bought extra lambs for sale fat	(3)	(638)
retained some for fattening as hoggets	(5)	(940)
purchased additional hoggets for fattening	(3)	(584)
both retained and purchased hoggets for fattening	(1)	(320)
Retained all lambs for fattening as hoggets	3	775
Total	36	8880

Notes:

- No. of ewes per flock = 247 ewes.
- Total number of lambs home-reared 13584
= 1.53 lambs per ewe.
- 8440 sold fat.
- 1584 sold as stores.
- 2708 retained for fattening as hoggets.
- 852 retained for ewe replacements.

Some farmers also bought extra lambs to fatten, and either purchased others for fattening as hoggets or retained some of their own. All the lambs were retained for fattening as hoggets in the remaining three flocks. Nearly double the number of lambs were retained on the farm for fattening as hoggets as were sold as store lambs at the end of the grazing season.

4.2 Period of Lambing and Disposal of Lambs

As shown in Table 28, the majority of flocks containing just over three quarters of the ewes, began lambing in the period late February to the end of March, and two thirds of the lambs born in this period were disposed of fat by the end of the grazing period.

TABLE 28 PERIOD OF LAMBING AND PROPORTION OF LAMBS SOLD FAT

Period in which Lambing Commenced	No of Ewes	Proportion	Proportion of Lambs Sold Fat ⁽¹⁾
		%	%
(1) Early: End of Dec. to mid Feb.	1261	14.2	96.1
(2) Main: End of Feb. to end of March	6779	76.3	66.1
(3) Late: April	840	9.5	26.7
	8880	100.0	-

Note: (1) Excluding lambs retained or sold for breeding.

Fourteen per cent of the ewes distributed in 10 flocks lambed in the early period. Nearly all the lambs born then were sold fat, but about one third of those from two flocks lambing towards the end of the period were sold as stores at the end of the season. In five of the flocks lambing in the early period at least half the ewes were lambed in a later period.

The ewes in the three remaining flocks lambed in the late period. All the lambs were retained for fattening as hoggets in one flock which was lambed late especially to avoid the labour clash with spring sowing and the lambs from a second were also nearly all retained. Three quarters of those from the third flock were sold fat by the end of the grazing season but this was achieved by creep-feeding concentrates to them throughout.

In the other two flocks retaining all their lambs for fattening as hoggets, the ewes began lambing in the main period.

4.3 Breeds

The breeds and crosses used in the 36 ewe flocks are shown in Table 29.

TABLE 29 BREED OF EWES

Breeds	No of Flocks	Proportion %	No of Ewes	Proportion %
Scotch Halfbred	6	16.7	1089	12.3
Suffolk Crosses	14	38.8	1965	22.1
Romney Marsh	1	2.8	610	6.9
Kerry Hill Cross	1	2.8	260	2.9
Mixed: Mules and Mashams	2	5.6	400	4.5
Mules, Mashams & Scotch Halfbred	4	11.1	1156	13.0
Cluns and Clun Crosses	3	8.3	1020	11.5
Other Mixed	5	13.9	2380	26.8
	36	100.0	8880	100.0

More than one third of the flocks were composed of mixed breeds or crosses, comprising over half the ewes. The most common ewe was the Suffolk cross and the Suffolk was the most commonly used ram. No relationship could be established between the breed of ewe carried and the system of production employed.

4.4 Replacements

All replacements were purchased in half the flocks and of the rest the majority both reared some and purchased some of their requirements (Table 30).

TABLE 30 METHOD OF REPLACEMENT

Method	No of Flocks	Proportion %	No of Ewes	Proportion %
Reared own Replacements	6	16.7	1706	19.2
Purchased Replacements	18	50.0	3231	36.4
Both Reared & Purchased Replacements	12	33.3	3943	44.4
	36	100.0	8880	100.0

5. FEEDING OF FOODS OTHER THAN GRASS

5.1 Forage Crops other than Grass

Forage crops other than grass played a small but significant role in supporting the livestock enterprises. They were grown on nearly three quarters of the farms and the acreage of the different crops is shown in Table 31.

TABLE 31 NUMBER OF FARMS FEEDING FORAGE CROPS
OTHER THAN GRASS

Forage Crops	No of Farms	Proportion of 69 Farms %	Acreage	Proportion of Forage Acreage %
Kale	17	24.6	228	42.1
Turnips & Swedes	6	8.7	140	25.8
Kale/Turnips	7	10.1	84½	15.6
Mangolds	17	24.6	44½	8.2
Fodder Roots	1	1.5	1	0.2
Rape	2	2.9	38	7.0
Maize Silage	1	1.5	6	1.1
	51	73.9	542 ⁽¹⁾	100.0

Note: (1) 28 acres used by Dairy Cows, 137½ acres by Beef Cattle and 376½ acres by Sheep.

The difference between the total acreage shown here and that shown in Table 4 is due to catch-cropping. Kale and mangolds were each grown on 17 farms, but a much smaller acreage of mangolds than of kale was grown on each farm. The greater proportion of the acreage - nearly 70% - was fed to sheep.

5.2 Arable By-Products

The most common by-product was sugar beet pulp although just over half the farmers feeding it did not grow sugar beet themselves. Only a quarter of the farmers growing beet made use of the tops, all except one feeding them to sheep. Over half the farmers fed straw to their

stock and just over a third of those growing potatoes fed chats with another three buying in stock-feed potatoes (Tables 32 and 33).

TABLE 32 NUMBER OF FARMS FEEDING DIFFERENT ARABLE BY-PRODUCTS

By-Product	No of Farms
Potatoes	17 ⁽¹⁾
Sugar Beet Pulp	45 ⁽²⁾
Sugar Beet Tops	10
Straw	30

Notes: (1) Including 3 who did not grow potatoes.
 (2) Including 24 who did not grow sugar beet.

TABLE 33 USE OF ARABLE BY-PRODUCTS BY SUCKLER COWS, OTHER BEEF CATTLE AND SHEEP ENTERPRISES

By-Product	Suckler Herds No of Enterprises	Other Beef Cattle No of Enterprises	Ewe Flocks No of Enterprises
Potatoes ⁽¹⁾	6	14	2
Sugar Beet Pulp ⁽²⁾	18	36	15
Sugar Beet Tops	-	1	9
Straw	14	20	-

Notes: (1) Including those not growing potatoes.
 (2) Including those not growing sugar beet.

6. LABOUR

6.1 Employment of Regular Labour on Stock

The farmers taking part in the study were not asked to keep labour records so no detailed figures can be given. However, the data shown in Table 34 indicates that the majority of the men employed for part of their working hours on livestock spent less than half their total time on them and could be described as primarily arable workers.

TABLE 34 EMPLOYMENT OF REGULAR WORKERS ON STOCK

	No of Men
Arable workers spending less than 50% on stock	76
Workers employed half on arable work, half on stock	15
Stockmen spending more than 50% on stock	25
Total regular workers spending some time on stock	116

Note: One of the 69 farmers did not supply this information.

A small proportion worked half on stock and half on arable and of the 25 who spent more than half their time on stock, 14 were employed full-time. Four of the full-time men were shepherds, and workers also employed on other work, acted as shepherds in 13 of the 36 ewe flocks.

6.2 Employment of Farmers and Members of their Family on Stock

The data given in Table 35 show that farmers themselves made a significant contribution to supporting livestock enterprises on their farms.

TABLE 35 EMPLOYMENT OF FARMERS

No. Reporting	68
No. spending some time on stock	49
No. spending no time on stock	19

Nearly three quarters spent some time on stock, five of them assisted by their sons. Of the 19 farmers who did no manual work on their livestock three had sons who did, so that the contribution made by the farmer and his family towards supporting the livestock enterprises on these farms was considerable.

The presence of the smaller ewe flocks on the farm was often dependent upon the willingness of the farmer or one of his family to act as shepherd. They did so on 23 out of the 36 farms carrying a ewe flock.

7. GRASS AS A BREAK IN THE ARABLE ROTATION

7.1 Advantages and Disadvantages of a Grass Break

Farmers were asked to give their opinions of the advantages and disadvantages of grass as a break in the arable rotation, and their answers are summarised in Table 36.

TABLE 36 ADVANTAGES AND DISADVANTAGES OF GRASS BREAK
QUOTED BY 69 FARMERS IN SAMPLE

	Number	Proportion of Total 69 Farmers
Advantages:		
Improvement in fertility	64	92.8
Improvement in soil structure	60	86.9
Control of weeds	26	37.7
Control of disease	44	63.8
Control of pests	12	17.4
Others	10	14.5
Disadvantages:		
Pests	7	10.1
Diseases	4	5.8
Weeds	7	10.1
Managerial	12	17.4
Capital Requirements	20	29.0
Others	27	39.1

Clearly most of the farmers in the sample considered there were more advantages than disadvantages otherwise they would hardly have persisted in growing grass. Almost all thought that grass in the rotation improved the general level of fertility, with almost as many finding an improvement in soil structure an asset. Nearly two thirds cited the control of disease and a little over one third the control of weeds as advantages.

The extra capital requirement involved in having grass in the rotation was clearly seen as the main disadvantage. Nearly half the farmers giving this answer cited specifically the extra capital needed to purchase livestock. Sixteen farmers (23.2%) gave the cost of fencing,

also an additional capital requirement, and another six (8.7%) quoted the labour problems arising from maintaining a livestock enterprise.

A high proportion, 54 out of the 68 reporting, had had grass in their farming systems for 20 years or more or for the whole of their farming life if they had been farming for less than 20 years, and 51 of them indicated that nothing that they could foresee would make them give up the grass break. The problem of labour was the main reason given by those who saw some circumstances which might make them change their system including those who had already cited labour as one of the disadvantages of a grass break.

7.2 The Relationship Between Permanent Pasture and Temporary Grass

Nearly all the farms in the sample had an acreage of permanent pasture and there is little doubt that there is a connection between the existence of an acreage of permanent pasture on the farm and the inclusion of grass in the rotation. Any significant acreage of permanent pasture requires a grazing livestock enterprise to utilise it. If a farmer, therefore, has an acreage of permanent pasture utilised by a livestock enterprise, then temporary grass will seem an attractive alternative to arable break crops if he is considering introducing or extending a break in the arable rotation. The grass break can allow an expansion of the livestock enterprises to a more viable size and can be used to improve performance by, for instance, making better quality conserved grass to produce fat rather than store cattle. The Lincolnshire Wolds, an area of large arable farms, is a case in point. Many farms have significant acreages of steep banks which cannot be brought into the arable rotation, and as the farms are large, they can support quite sizeable livestock enterprises. In these circumstances it is an attractive proposition to include an acreage of temporary grass in the arable rotation.

8. SUMMARY AND CONCLUSIONS

Many of the points noted in this study are undoubtedly already well known and understood by those working in this field. However, the report does quantify the facts in relation to a sample of farms obtained from a randomly selected list, albeit with limitations set to ensure that they had a sufficient acreage of grass to carry viable livestock enterprises.

A feature perhaps not so widely appreciated is the relationship between permanent pasture and the inclusion of temporary grass in the rotation on arable farms. The proportion of the total grass acreage in permanent grass was almost as much as that in temporary grass (46% : 54%). Temporary grass was seen as an attractive alternative or adjunct to arable break crops when the farm had an acreage of permanent grass which could only be utilised by a grazing livestock enterprise. The inclusion of temporary grass in the rotation could provide an opportunity to enlarge a livestock enterprise to make it a more viable unit and/or to improve its quality by, for example, selling fat animals fed on better quality conserved grass rather than store animals. Otherwise the main advantage of the grass break were held to be, firstly, improved fertility and soil structure, followed by disease control and then weed control. The main disadvantage was seen to be the high capital requirement for purchasing livestock and providing adequate fencing in an arable area. Labour problems associated with the livestock enterprise were cited by a minority but this was the most likely reason given for abandoning the grass break.

Three quarters of the temporary grass acreage was down to leys intended to be of 3 years duration or less and ryegrass varieties predominated in the mixtures. The most common system of management was set-stocking associated with hay-making for conservation. Set-stocking was the most common system of grazing management on the permanent grass whereas just over half the temporary grass was rotationally grazed. Hay-making was clearly the most popular method of conservation, the hay-makers being concerned about the capital cost of converting to silage making. On the other hand those who did make silage clearly felt the capital investment to be justified. Other advantages given for hay were that it is more readily saleable than silage and that it can be more easily transported

about the farm particularly if the holding is large and fragmented. Because of the variation in soil type on individual holdings no relationship could be established between soil type and inclusion of grass in the rotation.

The main feature of the livestock section was the numerous combinations of systems of livestock production even when the enterprises were classified simply as dairy, suckler cows, purchased calves, purchased stores and ewe flocks. On the face of it, 19 farms carried single livestock enterprises, but 11 of these were suckler cow enterprises from only two of which the calves were sold directly as suckled calves. This simple classification overlooks different systems of managing suckler herds and ewe flocks and methods of selling the progeny. Such complexity would appear to throw doubt on attempts to produce detailed model farm systems compiled from average data at least for farms of this type. Because of it, it was not possible to relate the livestock systems to the system of grassland management employed except in the very general way shown for grazing methods in Table 12.

Arable farmers who maintain an acreage of grass on the farm clearly see it and the livestock enterprises which it supports as an important, if in many cases, subsidiary part of their activities. Indeed, they and their families supply a considerable part of the manual labour needed to carry them. It is also clear that only a drastic change of circumstance would induce the majority to give up the grass break and its attendant livestock enterprises. Conversely it seems likely that those farmers who have established a satisfactory arable rotation without grass and who have little or no permanent pasture would be reluctant to include grass because of the high capital requirement and the managerial problems associated with a livestock enterprise.

APPENDIX

TEMPORARY GRASS - SEED MIXTURE BY LEY TYPE

TABLE 1 ONE-YEAR LEYS (39 Farms)

Seed Mixture	Acreage	Proportion
		%
Straight Italian Ryegrass	30	2.0
Italian Ryegrass and Perennial Ryegrass	164	11.1
Italian Ryegrass and Clover	577	39.1
Italian Ryegrass, Perennial Ryegrass and Clover	395½	26.8
Italian Ryegrass, Perennial Ryegrass, Clover and Trefoil	34	2.3
Italian Ryegrass, Clover and Sainfoin	46	3.1
Italian Ryegrass, Perennial Ryegrass, Clover and Sainfoin	100	6.8
Perennial Ryegrass and Clover	100	6.8
Not Known	30	2.0
	1476½	100.0

Notes: Sown at an average of 20.45 lbs/acre.
Of the 35 farmers including clover, 18 grew red only, 12 white only and 5 red and white.

TABLE 2 TWO-YEAR LEYS (27 Farms)

Seed Mixture	Acreage	Proportion
		%
Straight Italian Ryegrass	208	12.4
Italian Ryegrass and Perennial Ryegrass	237	14.2
Italian Ryegrass and Cocksfoot	26	1.6
Italian Ryegrass and Clover	142	8.5
Italian Ryegrass, Clover and Trefoil	35	2.1
Italian Ryegrass, Perennial Ryegrass and Clover	399	23.8
Italian Ryegrass, Perennial Ryegrass, Timothy and Clover	375	22.4
Italian Ryegrass, Perennial Ryegrass, Timothy, Cocksfoot and Clover	30	1.8
Timothy, Clover and Trefoil	37	2.2
Clover and Trefoil	184	11.0
	1673	100.0

Notes: Sown at an average of 24.92 lbs/acre.
Of the 18 farmers including clover 3 grew red only, 12 white only and 3 red and white.

TABLE 3

THREE-YEAR LEYS (17 Farms)

Seed Mixture	Acreeage	Proportion
		%
Italian Ryegrass and Trefoil	62	5.2
Italian Ryegrass, Perennial Ryegrass and White Clover	144	11.9
Perennial Ryegrass and White Clover	35	2.9
Perennial Ryegrass, Timothy and White Clover	81	6.7
Perennial Ryegrass, Cocksfoot and White Clover	130	10.8
Italian Ryegrass, Perennial Ryegrass, Timothy, and White Clover	385	31.9
Italian Ryegrass, Perennial Ryegrass, Timothy, Cocksfoot and White Clover	88	7.3
Italian Ryegrass, Perennial Ryegrass, Meadow Fescue and White Clover	185	15.3
Lucerne ⁽¹⁾	80	6.6
Not Known	17	1.4
	1207	100.0

Notes: Sown at an average of 23.86 lbs/acre.

(1) Grown specifically for syndicate grass drying.

TABLE 4

LEYS TO BE KEPT DOWN FOR MORE THAN 3 YEARS (18 Farms)

Seed Mixture	Acreeage	Proportion
		%
Perennial Ryegrass	90	7.4
Perennial Ryegrass and White Clover	71	5.9
Italian Ryegrass, Perennial Ryegrass and White Clover	45	3.7
Italian Ryegrass, Timothy and White Clover	146	12.1
Italian Ryegrass, Perennial Ryegrass, Timothy, Cocksfoot and White Clover	41	3.4
Perennial Ryegrass, Timothy and White Clover	239	19.7
Perennial Ryegrass, Timothy, Meadow Fescue and White Clover	344	28.4
Perennial Ryegrass, Timothy, White Clover and Trefoil	89	7.4
Not Known	145 $\frac{3}{4}$	12.0
	1210 $\frac{3}{4}$ ⁽¹⁾	100.0

Notes: Sown at an average of 25.95 lbs/acre.

(1) Excludes 40 acres grown for turf.

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