Silage - Cost of production
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THE NORTH OF SCOTLAND COLLEGE OF AGRICULTURE

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SILAGE PRODUCTION AND COSTS SURVEY: 1961 SEASON

by

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AGRICULTURAL ECONOMICS DEPARTMENT

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SILAGE PRODUCTION AND COSTS SURVEY - 1961 SEASON

The survey for 1961 was a continuation of those carried out during the three previous seasons. As in previous years, the aim of the 1961 survey has been to try to establish the level of production (i.e. yield of silage and grazing obtained) possible from grassland set aside for silage production under commercial farming conditions. The sample includes a number of farmers who went in for intensive production of one year leys and also farmers who use leys mainly of the three to four years' grazing mixtures and cut them usually in their first or second years, although up to seven year old grass was ensiled.

An estimation of grazing yield per acre was also made, based on the number and types of animals kept and the duration of the grazing periods.

Details of hours worked, the cost of manures, and seeds were supplied by the co-operating farmers with the result that accurate costing records were also obtained.

Two visits were made to each farmer in the survey; one in early spring to measure the dimensions of the silos empty and another later in the year when the silos had been filled. Yield was estimated from the volume of silage made, using density figures of 42 cubic feet per ton on farms where forage harvesters were used and 47 cubic feet per ton on others.

Grazing output was measured in terms of utilised starch equivalent (U.S.E.) based on well known and accepted standards contained in Watson and More. Ready reckoner tables have been compiled by A.B.K. Tracey of this College in order that the starch equivalent requirements can be worked out speedily.

RESULTS OF THE SURVEY

Twenty satisfactory records were obtained. Analysis of these does not show any great degree of correlation between yield on the one hand and manuring or type of ley on the other.

There was a wide variation even within groups and also a wide difference in the amount of grazing attained before and after cutting, although, on the whole, where only one cut was taken, more livestock were grazed for longer periods. Although the summer was generally rather wet and cold the growth of grass was remarkably good and in some cases the silage aftermath was not used to full advantage because of lack of stock to consume it when growth was at its peak. The highest yield was 14.6 tons per acre from a one year ley of Westernwolths

and a little Italian Ryegrass, sown down with 2 bushels of Black Superior Oats. Yields of over 9 tons were also achieved from other four farms growing one year silage mixtures, from four farms cutting three to four years' grazing mixture in the first year, from three farms where a grazing mixture was cut in the second year and from one farm when cut in the third year. All these fields were cut twice but on one farm where a third year and a seventh year of an eighth year mixture were only cut once, a yield of ten tons was recorded. No single reason accounts for the high yields on these farms but it is interesting to note that in each case over 6 cwts. of nitrogenous and/or a concentrated compound manure was applied throughout the growing season.

The yields per acre obtained from the different types and ages of ley are summarised in Table I. In addition to the overall average yield of 8.9 tons per acre, it should be noted that grazing was obtained to the extent of 9.3 cwts. of utilised starch equivalent per acre.

TABLE I

AVERAGE YIELDS FROM DIFFERENT LEYS

Type of Ley 1961	No: of Fields 1961	Average Yield of Silage				
		1961	1960	1959	1958	Four years' Average
		Tons per acre				
1-Year Leys:	7	11.3	9.9	8.9	8.3	9.6
3-4 Year Leys:						
Cut in 1st Year	15	8.1	7.1	7.0	7.8	7.5
Cut in 2nd Year	9	8.3	5.7	6.3	6.6	6.7
Cut in 3rd Year	3	7.2	5.0	-	5.2	5.8
Cut in 4th Year	-	-	6.8	-	-	6.8
Longer Leys:						
Cut in 1st Year	-	-	7.8	10.6	-	9.2
Cut in 2nd Year	-	-	7.8	-	-	7.8
Cut in 3rd Year	1	10.2	-	-	9.1	9.6
Cut in 4th Year	-	-	-	6.0	15.8	10.9
Cut in 5th Year	-	-	-	-	3.7	3.7
Cut in 7th Year	1	10.2	-	-	-	10.2
Average of all Leys		8.9	7.4	8.1	7.9	8.1

From these figures it would appear that the highest yields are to be obtained from one year leys and from three or four year leys cut in their first years. As the sample is small, the results should be approached with caution and wrong conclusions should not be drawn. In some exceptional cases, high yields can be achieved from older leys, and possibly under certain weather and soil conditions and with proper manurial treatment other older leys could give high yields.

The manurial practices varied from farm to farm but in the main, one treatment of a concentrated compound manure was given at the end of March with a possible second treatment of a nitrogenous manure in April. Where grass was cut twice, more nitrogen was applied before the second cut, but in only a very few cases was nitrogen applied before grazing commenced. Some farmers applied lime in the autumn or winter and in three cases dung was spread on the grassland.

Table II sets out the manurial policies adopted by the farmers taking part in the survey divided into high yield and low yield groups. The total amount of manures applied on the average was 8.1 cwts. in the case of the high yielding group, compared with 6.7 cwts. for the low yielding farms. There was much more emphasis placed on the application of nitrogenous manure by the high yielding group than was the case with the low yielding group but the types of manures used by the two groups did not vary much.

TABLE II

MANURIAL POLICIES

Types of Manures Applied	Type of Silage Production			
	High Yield (9 tons or more per acre)		Low Yield (Less than 9 tons per acre)	
	1961	1960	1961	1960
	cwts. per acre		cwts. per acre	
Nitrogenous Manure	3.4	2.6	1.8	1.9
Concentrated Compound	3.7	4.0	2.6	2.8
Ordinary Compound	Nil	0.5	0.3	0.5
Other Manures	1.0	Nil	2.0	0.6
TOTAL MANURES	8.1	7.1	6.7	5.8
Silage Yield per Acre (tons)	12.3	11.2	6.3	5.8
Grazing Yield per Acre (cwts. U.S.E.)	8.0	4.5	10.2	8.3
Number of Fields studied	15	8	21	19

The average quantity of silage produced per acre in the high yield group was 12.3 tons, while the corresponding figure for the low yield group was 6.3 tons. Grazing was obtained in addition to silage to the extent of 8.0 cwts. utilised starch equivalent (U.S.E.) per acre on the high yielding farms and

10.2 cwts. U.S.E. on the other group, i.e. the grazing would be sufficient to keep 4 three-quarter-old cattle or 16 lambs for about one month in the case of the high yielding farms and 5 three-quarter old cattle or 20 lambs for about one month in the case of the low yielding group. Most of the grazing was obtained in the late part of the season after the silage had been cut.

Most of the silage was sampled and average dry matter content was 19.2%, the crude protein content 12.3, pH 4.0, and starch equivalent 9.7. Wide variations in the dry matter content were found even within the same types of seed mixtures, which suggests that the time of cutting is all important because, as has been proved by the grassland specialists, grass should be cut at a certain stage before maximum starch equivalent and protein equivalent can be obtained.

The Average Costs of Production of Silage

Table III shows the average cost of production of silage. The total acreage of silage costed was 429 acres, the average acreage costed on each farm being 21.5. The average cost works out at £19:13:7 per acre and £2:4:8 per ton, the average yield being 8.8 tons per acre.

TABLE III

AVERAGE COSTS OF PRODUCTION

Operation	MAN		TRACTOR		Total
	Hours	£ s. d.	Hours	£ s. d.	£ s. d.
Pre-harvesting	2.68	-:12: 9	2.52	-:10: 9	1: 3: 6
Harvesting	10.52	2:10: -	7.95	1:15: 9	4: 5: 9
TOTAL	13.20	3: 2: 9	10.47	2: 6: 6	5: 9: 3
Contractor Work					-: 2: 4
Seed				1:15: 1	
Rent				1:15: 8	
Manures Applied		6: 9: 2			
Plus R.M.V. b/f.		5: 7: 2			
		11:16: 4			
Less R.M.V. c/f.		4: 8: 6		7: 7:10	
Total Growing Cost				10:18: 7	
Less ¼ to Grazing				2:14: 8	8: 3:11
Other Costs (Equipment Depreciation, etc.)					1:18: 9
Overheads					3:19: 4
Average Cost per Acre					£19:13: 7
Average Yield per Acre					8.8 tons
Average Cost per Ton					£2: 4: 8
Acreage of Silage Costed					429
Acreage Costed per Farm					21.5

There was a very wide range of figures from the average ones given in Table III. The lowest cost per acre was £11:15: 6 and the highest £29:7/- while the corresponding range in cost per ton was from £1:2:3 to £4:19:8. The yield per acre was the main reason for the difference in cost per ton, the yield ranging from 3.83 to 14.61 tons per acre. High costs per acre arise when 2 cuts are taken and when the amount of manure applied is high. Forage harvesters and buck-rakes were used in the main for harvesting although a few use mowers, greencrop loaders and buck-rakes thus giving a higher cost of harvesting but a lower cost in equipment depreciation, etc.

Conclusions

The survey carried out in the 1961 silage making season showed that yields of silage averaging 8.8 tons per acre were obtained on the 20 farms or 36 fields recorded (Table I). In addition, grazing was obtained to the extent of 9.3 cwts. U.S.E. per acre. The highest yield was 14.6 tons, and this result, along with the 14 other fields made up the group of 15 fields with yields of 9 tons or over of silage per acre as shown in Table II. Manuring was heaviest on farms giving high yields but heavy applications of fertilisers were also given to fields which did not respond and had low yields.

The average yield per acre obtained from different types of ley did vary, with one year silage mixtures producing higher yields than leys laid down for three to four years or over (Table I). Some older leys did give fairly high yields but on the whole younger grass did produce better yields. In general, the yield per acre influenced the cost per ton; lower costs per ton tending to be associated with the higher yields per acre although the cost per acre was higher in the high yielding group (Table III).

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