
METHODS OF CUTTING PASTURE FOR SILAGE

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With the advent of the forage harvester, several changes in the accepted practice of silage making become possible if these can be shown to be justified. For instance, it would be a simple matter with most machines to adjust them to cut higher above the ground, or again instead of waiting for the sward to attain silage height it would be feasible to take several cuts over the same period when the pasture reached an optimum height. Or another approach would be to use it to "top" after lenient grazings and in this way gather the material required as silage.

Naturally before any such change could be recommended, one would want to know the effect of it in terms of the amount and quality of silage produced and on the subsequent growth of the sward.

Since there seemed to be very little factual information on this subject we set out at Rukuhia to have a look at the pasture production angle of it.

Briefly this was what was done:

An area of fairly typical perennial ryegrass-white clover pasture which had been under cattle grazing was trimmed to a height of between 1 in. and 1½ in. on 25 September 1959. It was then marked out into a series of plots each 20 ft x 4 ft and the area closed to stock.

Altogether there were nine treatments each replicated six times and the plots were randomised to the satisfaction of the statisticians.

The treatments involved cutting sets of plots each time the pasture reached 4 in., 6 in., 8 in., and 10 in. in height, and a further set was cut when at silage height. This was achieved on 11 November, 47 days after shutting up, when the grass was 12 to 14 in. high. At this time all plots were cut irrespective of whether they had achieved their appropriate height again or not.

Another series of plots was cut as above, except that whereas the first lot were cut to a height of 1 in. to 1½ in. above ground, the second lot were cut only to 3 in.

After the silage period growth was followed for another four months. All cuts in this period were to 1 in. to 1½ in.

All material in cuts taken for silage was analysed for protein. In considering the results, for the sake of brevity and simplicity, only certain of the treatments will be considered.

Firstly the effect of more frequent cutting on yield of pasture for silage:

It will be seen from Table 1 that the total yield from two cuts taken at a height of 6 in. was less (significant 1 per cent) than from one cut at silage height, the relative figures being 3,050 lb of dry matter as the total of two cuts at 6 in. and 5,190 lb of dry matter from the single cut.

This is what would be expected from data presented by Brougham writing in the "Australian Journal of Agricultural Research" in 1956, and also in line with data published by Coop and Sears in 1943 and those of other workers.

Now the effect on the first post-silage or aftermath cut will be considered.

Table 1 shows that regrowth after allowing the sward to grow to silage height was less (significant at 1 per cent) than where successive cuts were taken at a shorter height—1,440 lb of dry matter against 2,250.

However, considering the total of the silage and aftermath cuts, there was an over-all advantage in favour of the single cut, 6,630 lb of dry matter compared with 5,300.

In the succeeding four months, growth was virtually the same from both treatments.

A similar pattern was evident in the plots cut to 3 in. during the silage period.

Excluding quality for the moment, it becomes a matter of deciding whether the extra silage and additional over-all growth is more important than the extra growth as aftermath.

Let us consider now the effect of height above ground of cutting for silage:

Table 2 shows the yields obtained as silage and aftermath where one cut was taken at silage height and cut (a) to 3 in. and (b) to 1 in. to 1½ in.

As would be expected the silage yield was less from the 3 in. treatment (3,950 against 5,190 lb of dry matter), because material was left in the 1 in. to 3 in. zone. Actually this amounted to the difference of these, or 1,240 lb of dry matter. Conversely the aftermath yield was higher, because this material was harvested at this cut in addition to the regrowth. However, considering the total of the silage and aftermath yields, the advantage was in favour of the shorter cut. Remember all plots were trimmed originally to 1 in. to 1½ in. and cut again at this height in the aftermath cut.

The data also show that if the amount left in the 1 in. to 3 in.

zone (1,240 lb of dry matter) is subtracted from the aftermath yield on the 3 in. treatment (2,240-1,240), the actual net regrowth was 1,000 lb of dry matter, whereas on the 1 in. treatment it was 1,440 lb.

Two possible explanations for this suggest themselves:

1. There was considerable loss due to decay or to deprecations of slugs under the longer canopy remaining, or
2. The pasture did not in fact recover so rapidly after the 3 in. cut. This is contrary to what would be expected from Brougham's work.

Obviously, on the basis of the results of one small trial in one season, on one pasture, in one district, one can merely draw attention to the results obtained and perhaps offer the suggestion that more work might well be warranted.

And lastly we come to the question of quality.

No attempt was made to compare the quality of silage made from material obtained in the successive cuts with that of the single cut. However, on the basis of published work it can be assumed ~~that material harvested at the 6 in. to 8 in. height is~~ *capable* of being made into somewhat higher quality silage than that from a single cut at early flowering stage.

This advantage is, however, offset to some extent by the following factors:

1. The lush material is more difficult to make into silage and, for best results, may require wilting, which is not possible with the forage harvester unless it is cut first with the mower.
2. It may require the use of additives, which means additional trouble and cost.
3. Losses of protein may be higher.
4. There is a need to go more times over the paddock.
5. It is necessary to keep adding to the stack, which may offer some problems.

It seems apparent, therefore, that one cut at early flowering stage offers the best compromise between quantity and quality of silage. There is, of course, the point that regrowth is rather less, and this may be important, particularly in some seasons.

The procedure of cutting to a height of 3 in. above ground is sometimes recommended. Usually two reasons are advanced:

1. It yields better material for silage.
2. It gives better regrowth.

I do not know whether there is much real evidence to support the first contention, but I do know that Mr Lancaster, who has done a considerable amount of work on silage at Ruakura Animal Research Station, did query it in replying to a question in the

discussion after a paper given to the Society of Animal Production earlier this year.

The work reported here questions the second reason, at least under some circumstances.

This leads me to conclude by raising two points:

1. There seems an obvious need to get some more factual information in this field, and
2. How are we to use forage harvester to best effect?

At present I feel we are in the position where the agricultural engineer has presented us with a machine which we are rather desperately trying to utilise.

Obviously the machine has a great many merits. It makes the harvesting of silage material very much easier. Mechanically it gives simplicity of operation and in theory trouble-free performance. It will handle short material.

As against this,

It requires a considerable amount of power, especially if it is to handle the taller material; alternatively, one could get a narrower machine, but this would be wasteful for the "topping" type of operation.

It may well be that ultimately it will be used to follow behind a system of lenient grazing. In this way it will assist in giving good pasture control, and at the same time provide the material necessary for silage.

It seems to me that there is a case for careful consideration of how it is to be utilised and whether the outlay of £300 or £400 is justified on many farms. If I were a practical farmer I would do some powerful thinking before I threw away the buckrake.

Finally, I would like to thank those colleagues who carried out the statistical and chemical analyses, my technicians who did the field work, and those who offered helpful comments and criticisms concerning the subject matter of this paper.

TABLE I-LB DRY MATTER PER ACRE AS SILAGE AND IN POST-SILAGE CUTS

	Treatment during silage period :	
	2 cuts at height of 6 in.	1 cut at silage height (12 to 14 in.)
Yields as:		
Silage material, 26/9/59-11/11/59	3,050 (8.0)	5,190 (12.6)
Aftermath, 11/11/59-22/12/59	2,250	1,440
Total	5,300	6,630
Yield next 4 months, 22/12/59-11/4/60	2,850	3,040

Figures in brackets give yield of green material in tons per acre.

TABLE 2-YIELDS IN L.B D.M. PER ACRE FROM PLOTS CUT AT
SILAGE HEIGHT

			Cut to 3 in.	Cut to 1 to 1½ in.
As silage	---	---	3,950	5,190
Aftermath	---	---	2,240	1,440
Total	---	---	<u>6,190</u>	<u>6,630</u>