

WINTER GRAZING VERSUS SUPPLEMENTS — CHEAPER DAIRYING SYSTEMS

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Abstract

Present economics dictate New Zealand dairy farmers either increase production or reduce expenditure to maintain net farm income. Costs associated with present feed conservation practices are high and so cheaper alternatives for bridging a winter feed deficit are considered.

Making no conservation would mean generating additional feed energy by foregoing some milkfat production. Lower cow conversion ratios of milkfat from pasture in late lactation means it is more economic to create additional feed at the end of the season by drying-off earlier rather than calving later. Utilising additional cow liveweight as a store of energy has high metabolic inefficiencies.

At today's prices, grazing cows off to overcome the deficit is the most economic and practical solution.

Economically, alternatives to traditional supplement systems require a massive reduction of capital farm machinery to be viable.

Management strategies, both to control the spring feed surplus and to increase average farm herbage masses in early winter without loss of growth or quality, need to be developed.

INTRODUCTION

The present economic downturn in the dairy industry has left farmers questioning all areas of expenditure. The cost of conserving supplements including vehicle costs is the largest variable cost faced by New Zealand factory-supply dairy farmers (NZDB Economic Survey 1984-85). However, a no-conservation system, while saving expenses, may result in reduced production.

The Stratford Demonstration Farm is used as an example to compare the present supplement policy with all grass/no-conservation options available.

THE PRESENT SITUATION

The Stratford Demonstration Farm comprises 44 ha (42 eff. ha) at 305m a.s.l. It is presently wintering 140 Jersey cows and 32 yearling replacements. Mean calving date is 25 August and drying-off is in early May. Production has averaged 19700kg MF or 470kg MF/ha over the last three seasons. Both stocking rate (3.7 cow eq. per eff. ha) and milkfat production are about 30% above district average. The farm annually grows about 12.0 tonnes of dry matter (Roberts & Thomson 1984).

Normal district conservation policies are used. Approximately 35,000kg DM (15 bale eq. per cow eq.) is conserved in the ratio of 2 silage : 1 hay.

A summary of average expenditure costs associated with supplements over the last three seasons is detailed in Table 1.

Direct and indirect costs of \$8880 are associated with the growing, collection, storage and reallocation of conserved feed at the Demonstration Farm. This figure is typical of the district and represents \$21 0/ha, \$56/cow eq. or 25c/kg DM conserved. In other terms \$56 per cow at \$3.10/kg MF represents 18kg MF or the production for the last 4-5 weeks of lactation.

While 35,000kg DM is conserved, feed budgets and practical experience suggests 700kg DM/ha or 190kg DM/cow is required to correct the winter feed deficit under current management.

Supplements provide for this deficit, as well as improving herbage quality post harvest (Sheath et al. 1987) and animal production.

Table 1: Associated costs of making supplements for the Stratford Demonstration Farm. Average of 84/85, 85/86 and 86/87 seasons.

	Total	/ha
Silage making	\$1974	\$47
Hay making	\$765	\$18
Tractor expenses ¹	52329	\$55
Tractor/machinery depreciation ²	51784	\$43
Barn/silage pit/races ³	51000	\$24
Additional fertiliser ⁴	5940	\$22
TOTAL	56792	5209

¹ Assumed 80% of tractor costs are associated with supplements

² Assumed 80% of tractor and machinery depreciation is related to supplements

³ Estimated figure for the maintenance of supplement storage facilities

⁴ All supplement paddocks receive an additional 125 kg/ha of muriate of potash
Averages have been calculated at 86187 dollar values.

OTHER WINTERING SYSTEMS

1. Carry supplements into winter in the form of standing hay. Little data is available on the effect of quality and quantity of this type of stored pasture, or resultant changes in composition and persistence.

Work with beef animals suggests the quality will be less than poor hay (G. W. Sheath pers comm.). L'Hullier and Aislabie (this volume) suggest standing hay will enhance autumn and winter growth rates through natural reseeding,

While the economics of such a system are difficult to determine there would be a saving in harvesting costs, while providing a bank of feed — even if of dubious quality — going into winter.

2. Destock the farm during winter to reduce animal demand by 700 kg DM/ha. Thirty-eight days of grazing off the whole herd would achieve this (700 kg DM/ha)/(3.7 cows/ha x 5 kg DM/cow/day).

This assumes the maintenance requirement is 5.0 kg DM per day and this is saved via grazing out.

Grazing out at \$6.00/cow/week sums to a total cost of \$120/ha.

3. Dry-off early and use the grass that would have gone into milk production to lift cow condition. Cows are then fed sub-maintenance throughout the remainder of the winter utilising this additional cow weight.

Using 0.37 as the efficiency of utilisation of metabolisable energy for liveweight gain of a non-lactating cow feed autumn pastures of 10 MJME/kgDM (Holmes and Wilson 1984), a cow will need to consume an additional 514 kg DM to have a pasture sparing effect in winter of 190 kg DM. This would involve putting on nearly two condition scores above normal.

Holmes & McMillan (1982) show late lactation efficiency of conversion of pasture dry matter to milkfat to be 15-24:1. Assuming an average of 20:1, 514 kg DM represents 26 kg MF and at \$3.1 0/kg MF payout, this is equivalent to \$298/ha.

4. Increase winter feed supply by drying-off early and carrying 190 kg DM/cow of autumn feed into winter. At a conversion of 20kg DM/kg MF, 190 kg DM will mean a decrease in production of 10 kg MF/cow. At 3.7 cows/ha and \$3.1 0/kg MF this is a cost of \$115/ha.

5. Use present autumn/winter management, but without supplements and calve later with less average farm herbage mass. Again 190kg DM/cow will be the pasture deficit. Efficiency of conversion of pasture to milkfat in early lactation is 13:1 (Holmes and McMillan 1982). Therefore, there will be a loss of 15kg MF/cow which represents a cost of \$172/ha.

CONTROLLING SPRING SURPLUSES

If a complete management system is to be developed around an all grass wintering there must be some changes in spring management to control surplus feed.

The use of set-stocking or very fast rotations at the time of surplus feed will reduce **herbage** accumulation rates (Bryant & L'Hullier 1986) and increase intake and production of the grazing cow (N. A. Thomson, unpublished data).

Somatotropin injections have been shown to increase animal intakes (Peel et al. 1985) and if administered at the onset of spring **herbage** surpluses, could assist in controlling these.

A reduction in the amount of spring fertiliser applied may reduce peak spring growth rates.

DISCUSSION

Table 2 shows the cost comparisons associated with the various wintering systems described above. Conventional conservation systems not only suffer from high costs, but also high dry matter losses. Losses from harvest to feeding out have been measured at 24% and 42% for hay and silage respectively (Thomson 1986).

Economically the 'dry-off early/carry autumn grass forward' option is good. Although there are problems in achieving this while retaining pasture quality and production. The Stratford Demonstration Farm needs an average **herbage** mass of 2350kg DM/ha at the start of June. This enables a target **herbage** mass of 2050 kg DM/ha at mean calving date to be achieved, given that 700 kg DM/ha is available as supplements. This represents a feed wedge from 1200 to 3500 kg DM/ha (see figure 1a). The feed wedge would need to be from 1200 to 4800 kg DM/ha with an average of 3050 kg DM/ha, to carry an additional 700 kg DM/ha of pasture.

Table 2: The costs associated with different wintering systems

System	\$ per ha
Standing hay system	?
Dry-off early. Carry autumn grass forward	\$115
Graze cows out during winter	\$120
Calve later with less feed	\$172
Present supplement policy	\$210
Dry off early. Increase cow condition	\$298

Brougham (1960) and Piggot et al. (1987) have shown pastures reach a ceiling yield where net **herbage** accumulation is zero. These ceiling yields vary with season. Taranaki ryegrass/clover pastures reach ceiling yields at 4000 kg DM/ha in late autumn (N. A. Thomson pers comm). Obviously it would be impossible to achieve a feed wedge of average **herbage** mass of 3050 kg DM/ha as a high proportion of the farm would be at ceiling yield. This would reduce the overall farm net **herbage** accumulation rate (see figure 1b). There would also be a decline of pasture quality and subsequent animal production (Hoogendoorn et al. 1987).

In late autumn the use of on-off grazing at a trigger **herbage** mass (say 3200 kg DM/ha), to control animal intake at maintenance, may improve net accumulation rates. No paddocks would be at ceiling yield and the bottom end of the feed wedge would be lifted with the resultant feed profile being more of a rectangle (see figure 1c).

Cutting trials have shown higher **herbage** masses do not enhance winter **herbage** accumulation rates (N.A. Thomson, unpublished data). The opposite has been shown under grazing dry cows (Santamaria & McGowan 1982). This would support the need for a feed profile approaching a feed rectangle.

The cost of grazing off will depend on supply/demand. If this practice was adopted district-wide the demand for grazing will increase the price, and reduce the profitability.

There is higher efficiency of conversion of pasture dry matter to milk production in early lactation over late lactation. This results in a greater reduction in **milkfat** in spring compared with autumn, given the same amount of feed being diverted from **milkfat** production to cover

the deficit. Therefore it is more important to investigate management systems to correct winter feed deficits by shortening the lactation at the point where feed conversion efficiencies are lowest.

The metabolic losses of energy in the use of pasture for liveweight gain are high, particularly in the non-lactating cow fed on autumn quality pasture (Holmes & Wilson 1984). The use of the cow to carry a store of energy, in the form of extra condition, to make up a deficit results in poor economics due to these high metabolic inefficiencies.

Nitrogen was not considered as an option to correct the deficit. It is impractical to use nitrogen, at response rates of 7 kg DM/kg N to correct a deficit of 700 kg DM/ha. There would be insufficient area to spread nitrogen at optimal rates given the amount required.

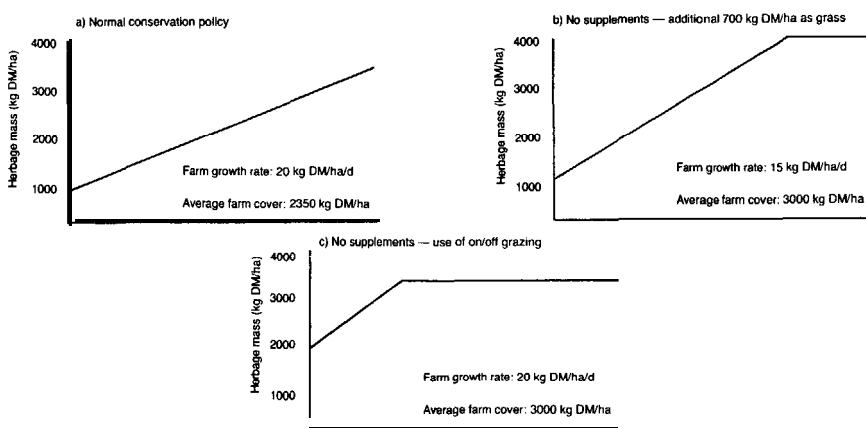


Figure 1. Distribution of feed across farm, average growth rates and average farm pasture covers at the 1st June under different grazing management systems. (a) normal conservation policy; (b) no supplements carrying additional 700 kg DM/ha as grass; (c) no supplements use of on/off grazing.

CONCLUSIONS

More investigation needs to be conducted on alternatives to present conservation systems and the associated pasture and grazing management required. This will ensure New Zealand farmers have systems available to maximise net dollar return.

References

- Brougham R.W. 1960. Pasture growth and grazing management. *Dairyfarmers Annual* 9: 51-62
- Bryant A.M., L'Huillier P.J. 1986. Better use of pastures. Proceedings 1986 Ruakura Farmers Conference. pp. 43-53
- Holmes C.W., McMillan K.L. 1982. Nutritional management of the dairy herd grazing on pasture. In: McMillan K.L., Taufa V.K. (Eds). Proceedings of the Conference on Dairy Production from Pasture. pp. 244-274
- Holmes C.W., Wilson G.F. 1964. Principles of Nutrition. In: Holmes C.W., Wilson G.F. (Eds) Milk Production from Pastures. pp. 107-112
- Hoogendoorn C.J., Holmes C.W., Ryan M.P. 1987. The influence of pasture regrowth interval in winter on sward characteristics and dairy cow performance in early spring. In: Proceedings 4th AAAP Science Congress, p. 143
- Peel C.J., Sandies L.D., Quelch K.J., Herington A.C. 1965. The effects of long-term administration of bovine growth hormone on the lactational performance of identical-twin dairy cows. *Animal Production* 41: 135-142
- Piggot G.J., Baars J.A., Waller J.E., Farrell CA. 1986. Initial development of the 'potential growth rate' concept for estimating pasture growth on farms across Northland. *Proc. 1986 Agronomy Society of NZ* pp. 65-69.
- Roberts A.H.C., Thomson N.A. 1984. Seasonal distribution of pasture production in New Zealand XIV. Central Taranaki. *NZ Journal of Experimental Agriculture* 12: 93-101.
- Santamaria A., McGowan A.A. 1982. The effect of contrasting winter grazing management on current and subsequent pasture production and quality. In: McMillan K.L., Taufa V.K. (Eds) Proceedings of the Conference on Dairy Production from Pasture. pp. 359-360.
- Sheath G.W., Hay R.J.M., Giles K.H. 1987. Managing pastures for grazing animals. In: Nicol A.M. (Ed) Feeding Livestock on Pasture. New Zealand Society of Animal Production. Occasional Publication No. 10. pp. 65-74
- Thomson N.A., 1986. Pasture conservation an aid for balancing pasture with cow requirements and maintaining pasture quality and milkfat production. In: 1986 West Coast Dairy Industry Conference pp. 76-92