Cereal Silage – a review of its use in the South Island

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Abstract
A sample of growers and users of cereal silage in the South Island of New Zealand were surveyed in 2005 to quantify results and perceptions. Most users perceived they had positive animal responses with 92% reporting that stock performance improved when cereal silage was used as a supplement to grazed pasture. Feedback from growers indicated that cereal silage had potential as a high yielding crop but growers estimates of crop yield varied widely. The majority of growers and users were getting results that met or exceeded their expectations.
Keywords: cereal silage, whole-crop, green-chop, survey, yields, quality, South Island, performance.

Introduction
Cereal silage (CS) has been used in New Zealand since at least the early 1990s, but its use increased significantly between 2000 and 2004 following the introduction of new triticale varieties bred by Crop and Food Research specifically for cereal silage use. Research and extension activities by various parties have contributed to the increase in popularity.

Whole-crop cereal silage (WCCS) is harvested at the soft grain stage, while green-chop cereal silage (GCCS) is made before seed heads appear (boot stage). Silage is stored in pits, bunkers, or plastic-wrapped bales. The main use is with dairy cows, particularly in late and early in their lactation. WCCS has high levels of digestible carbohydrate and is used to substitute for pasture, add condition to animals, or balance high protein and water contents in pasture.

Initial interest in cereal silage was fueled by the desire of South Island dairy farmers to obtain a cost-effective high-carbohydrate supplementary feed, which could allow them to increase milk production from the same land area (Fraser *et al.* 2004). At the same time, arable farmers were looking for an alternative to grain crops, due to their decline in real prices (Stevens *et al*. 2004). Arable farmers began growing cereal silage for sale to dairy farmers, and some dairy farmers grew their own, mainly on run-off blocks. In recent years, other livestock farmers have begun using silage for sheep, beef and deer production.

In 2005, Agricom and Crop and Food Research wished to gather information on how cereal silage was now perceived by growers and users, to enable them to predict its future popularity. They had received anecdotal reports that some growers were disenchanted with yields and quality achieved, and that some users were disappointed with the palatability and animal response when fed to animals. To help decide whether these reports were representative of the majority of users, they commissioned a survey of growers and users.

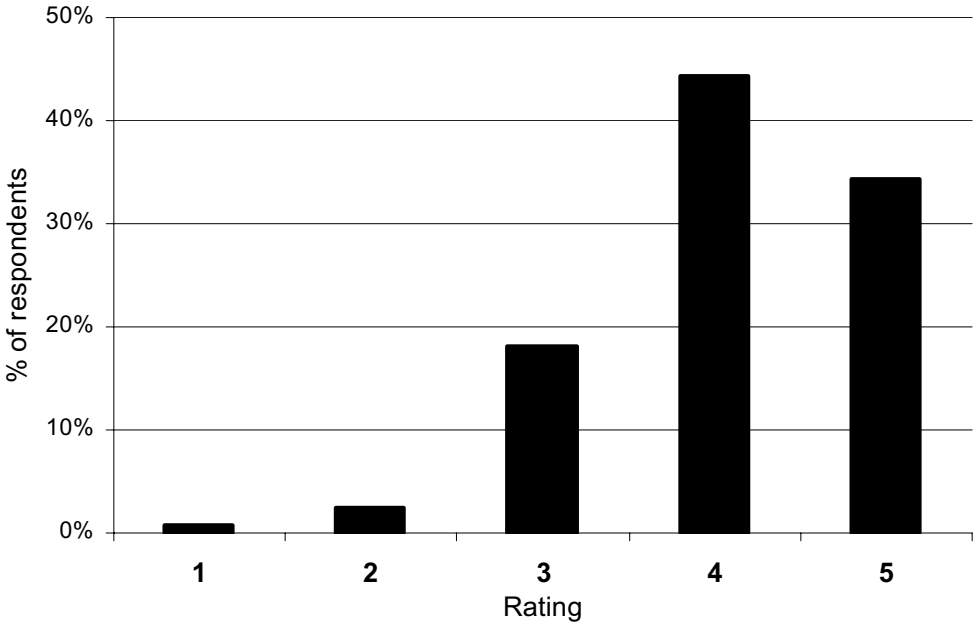
Methods
In March 2005, 340 survey forms were distributed to CRT (Combined Rural Traders) clients throughout the South Island who had purchased forage cereal seed between July 2004 and July 2005. A total of 113 (33%) were completed and returned. Users of cereal silage in this survey were also purchasers of seed and therefore likely to be growers. Users who did not purchase seed were not surveyed. Separate forms and questions were supplied to both growers, and users, of cereal silage. Questions covered a range of topics, including area grown, amount fed out, yields, how silage was used, perceived animal response and economics. Answers were given as either an actual amount or rated on a scale from 1 to 5. Responses to questions were averaged. Answers to open questions were recorded, with totals made for common answers. A statistical analysis was not conducted.

Results
Users of cereal silage
Users of silage were asked a special set of questions, distinct from growers of the crops. The number of users who responded was unable to be recorded. Respondents indicated that 70% of the silage used was whole-crop and 30% green-chop. Of silage used, 62% was stored in pits and the balance in wrapped bales.

The most common stock class that respondents said silage was fed to were dairy cows (38%), followed by sheep (30%), and cattle (25%), with only a few using it for deer and horses.

Users of the cereal silage were asked for their perception of the feed quality and animal response as a result of its use. The majority (63%) said the quality was very good or excellent, with 22% finding it to be good, 11% okay, and just 3% poor. Most farmers said that stock performance improved as a result of feeding the silage, with a mean response of 4.3 on a scale from 1 to 5 where 1 = performance dropped, 3 = no change, and 5 = performance improved (Fig.1). These responses are

Figure 1 Rating of animal performance fed cereal silage 2003 to 2005 (1 = performance dropped, 3 = no change, 5 = performance improved) given by survey respondents.



consistent with research that has shown milk responses equal or superior to good quality pasture silage (Platfoot & Stevens 2002; Stevens *et al.* 2004; Slater & Redditt 2005).

On average, 9.5% of the silage was estimated by respondents to be wasted. This is consistent with research that has shown 10% losses from cereal silage when fed out at more than 4 kg/m of row (Stevens & Platfoot 2005). The survey did not collect information on the method of feeding the cereal silage.

When asked if cereal silage met their expectations, users gave a mean score of 3.59 on a scale from 1 to 5 where 1 = failed, 3 = met, and 5 = exceeded. Of the respondents, 93% said that they would continue to use it, and 28% that they would also use a greater amount, giving an indication that the use of cereal silage is unlikely to decline.

Growers of cereal silage

A separate set of questions was asked of farmers who grew the crops, with 98 growers (87%) responding. They tended to grow either modest areas (less than 9 ha) of crops (48%), or larger areas (more than 20 ha) (43%).

Of the respondents, 25% indicated they achieved yields of 15-19 tonnes of dry matter per hectare, 23% with yields over 20 tonnes, and 25% with less than 10 tonnes. Their method of the assessment was not requested, so this could have been based on weighing, volume, or estimate. This yield feedback highlighted both the high yield potential of the crops, but also the wide range due to a number of possible variables. These variables could include climate and irrigation differences, accuracy of yield measurements, and that crop husbandry skills may still be lacking with many growers. Climate may have had an impact on yields, with 28% achieving between 15 and 20+ tonnes in 2004, but 45% in 2005. Rainfall in 2003 (when the yield for 2004 harvest was influenced) was lower than normal on the east coast (e.g. Christchurch annual rainfall was 71% of average and particularly low in early-summer), and in 2004 was 102% (Salinger 2005). This could have brought down the average for the whole island in 2005.

The average yield that farmers expected to get (15.0 tonnes dry matter per hectare) closely matched average yields they said they achieved (14.7).

Most (61%) of crops were planted in spring, and the majority (61%) harvested in January.

Many crops harvested for whole crop cereal silage were also grazed (66%), mostly using the multi-grazing variety DoubleTake (80% of grazed crops). On average, farmers grazed crops 2.3 times, with very good comments about stock acceptance and performance.

The most common source of information or advice on growing the crop was from CRT Technical Field Officers (24%), followed by other farmers (16%), booklets and handouts (14%), and newspapers/magazines.

In response to a question about the disappointing or frustrating aspects of growing cereal silage, the most common answers were; the weather; nothing; timing of harvest; and the price of seed. The rewarding aspects

most commonly reported were; getting a large volume of quality silage off a small area of land, being easy to grow, having reserve feed, good income, and harvesting early so another crop/pasture could be grown before winter.

Of the respondents, 90% said cereal silage was profitable and worthwhile to grow, and 95% indicated they intended continue to grow it. A MAF Sustainable Farming Fund project also concluded that the high yields and good quality of whole cereal crop silages, coupled with dairy cow performance should lead to a continuing role for these crops in southern dairy farming in the future (Slater & Redditt 2005).

Conclusion

This survey has indicated that on average, farmers in the South Island believe that the growing and using of cereal silage has been successful for them. The majority of growers and users are getting results that meet or exceed their expectations. The use of cereal silage is likely to continue to increase because those farmers who have tried it intend to continue to grow and use it, with some using it in larger amounts.

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