

## The potential of different forage combinations for green-chop silage

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**Introduction** On the Canterbury Plains of New Zealand (NZ) there is an opportunity on cropping farms, between summer harvest and autumn/winter sowing, to grow forage crops to make high quality silage. Recently, cereal cultivars have been specifically bred for forage production and suitability for whole-crop silage (de Ruiters *et al.* 2002), and also high legume (e.g. sulla) content forage mixes have resulted in high quality silages with high lactic acid and soluble carbohydrate content (Niezen *et al.* 1998). This trial aimed to determine the yield potential of various cereal/legume forage mixtures summer sown and harvested for silage in autumn.

**Materials and methods** The trial was sown into a cultivated seedbed on 15 Jan 03 at Lincoln, Canterbury, NZ. Binary mixtures of legumes and cereals/grass were created by sowing 7 cereal/grass (15 x 3m) split plots (6 different species plus no cereal) within 4 different legume main plots (replicated 4 times) (Table ). Plots were irrigated as required. Three 1 m row lengths were cut from each plot on 25 Mar 03 and dissected into species, weighed, dried and reweighed. Wilted and chopped herbage from each plot was used to make silage in 20 l plastic bag lined buckets. Buckets were opened in May 03 and assessed for colour, mould and odour.

**Results** Legume and total dry matter (DM) yield from the pea treatments was significantly higher than any of the bean treatments (Table 1;  $P < 0.05$ ). Bean mixtures tended to be dominated by cereals whereas pea mixtures achieved the intended 50:50 split. The yield of triticale, barley and oats were significantly higher than wheat and ryecorn. Individual and total yield for Italian ryegrass was significantly lower than the cereals. Visual and olfactory assessment indicated all species combinations resulted in well preserved silage.

**Table 1** Cultivar, sowing rate and main effect mean yields of legume, cereal/grass and total

Common name	Botanical name	Cultivar	Sow rate kg/ha	Legume kg DM/ha	Cereal/grass kg DM/ha	Total kg DM/ha
<b>Legumes</b>						
Peas	<i>Pisum sativum</i> L.	Magnus	220	3735	2744	6112
Dwarf beans	<i>Phaseolus vulgaris</i> L.	Labrador	150	1210	4435	5006
Runner beans	<i>Phaseolus coccineus</i> L.	Scarlet	190	951	5083	5308
Haricot beans	<i>Phaseolus vulgaris</i> L.	Navy bean	170	1225	4900	5425
LSD ( $P < 0.05$ ) <sup>a</sup>				378	492	560
<b>Cereals/grass</b>						
		No cereal	0	3378	0	3378
Barley	<i>Hordeum vulgare</i> L.	Boss	28	1068	5371	6439
Wheat	<i>Triticum aestivum</i> L.	Sapphire	24	1665	4108	5772
Oats	<i>Avena sativa</i> L.	Stampede	27	1289	5695	6984
Triticale	<i>Triticum (x Triticosecale)</i>	DoubleTake	28	1291	5488	6779
Italian ryegrass	<i>Lolium multiflorum</i> L.	Tabu	7	2271	1660	3931
Ryecorn	<i>Secale cereale</i> L.	Rahu	13	1499	3466	4965
LSD ( $P < 0.05$ ) <sup>a</sup>				363	534	541

<sup>a</sup>LSD ( $P < 0.05$ ) means "Least significant difference" at 5% level of significance.

**Conclusions** In spite of low cereal sowing rates, the bean species did not yield well and therefore are considered unsuitable for the production of high silage yields. Similarly Italian ryegrass produced low yields, compared to the cereals, and has limited suitability. Peas in combination with barley, oats or triticale produced greater than 6 t DM/ha over a 69 day period and therefore offered the greatest potential to make substantial yields of well preserved legume/cereal silage. These silages would be ideally suited to supplement intensive livestock systems such as pastoral dairy farming.

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### References

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