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PROVINCE OF KWAZULU-NATAL

WINTER COVER CROPS FOR MAIZE SILAGE PRODUCTION

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Introduction

Production of silage maize results in little residue for farmers that wish to practice no-till. In 2003 a cover-crop trial was initiated to investigate the consequences of winter cover crops in systems where silage maize is grown every summer season. In the winter of 2010, treatments were altered to include grass-legume combinations of the most promising cover crops. In January 2012, the plots were split for nitrogen.

Materials and Methods

The trial has 9 treatments which are split for N, and 3 replicates. Treatments are: black oat; black oats & grazing vetch; stooling rye; stooling rye & grazing vetch; grazing vetch; white clover; white clover & black oats. There are two control plots per replicate. Split-plots received either zero N or 120 kg N/ha in January.

The cover crops were planted in April 2012, no-till maize was planted in November 2012, and cover crops were planted again in April 2013. Above-ground dry-matter (DM) yield of the maize and cover crops were measured (harvested 18 March 2013). Samples of the maize above-ground dry-matter were analysed for elemental composition.

Results

Cover crops produced much lower yields than in 2012 (Table 1); in 2013 treatments with stooling rye produced 1.44-2.31 t DM/ha (more than 5.8 t DM/ha in 2012) and the grazing vetch produced 1.8-2.1 t DM/ha (4.9 t DM/ha in 2012). The effect of the N applied to the previous maize crop was significant (P=0.012), but the cover crop by N interaction was not significant.

Maize yields show a significant cover crop x N interaction (Table 1): Highly significant responses to N were observed for all cover crop treatments other than those with vetch. At zero N, maize yield following each of the three cover crop treatments including vetch ranged from 9.57 to 14.05 t/ha, whereas maize yield in the other cover crop treatments ranged from 5.59 to 8.82 t/ha. In contrast, at 120 N, maize yields following black oats, black oats and vetch, and stooling rye and vetch had a significantly lower yield than that of the highest-yielding treatment (vetch).

Table 1. Cover crop effects.

Treatment	Cover crop DM yield (t/ha)		Maize DM yield (t/ha)	
	Zero N	120 kg N/ha	Zero N	120 kg N/ha
Black Oats	2.29	2.84	7.80	12.25
Black oats & vetch	3.87	4.55	9.57	11.72
Stooling rye	1.44	1.84	8.82	14.43
Stooling rye & vetch	2.30	2.31	9.68	12.38
Vetch	1.81	2.10	14.05	15.51
White clover	1.18	0.91	7.59	15.16
Clover & black oats	2.08	2.72	6.67	13.51
Control	0.97	0.99	5.59	14.71
LSD (0.05)	0.591	0.591	2.24	2.24

Discussion and Conclusions

The use of vetch as a cover crop, either alone, or planted with a temperate grass, allows N fertilizer savings. At zero N, average above-ground N uptake for the vetch treatment was 115 kg/ha, 82 kg/ha more than the control. This is similar to that of the control at 120 kg N/ha. The vetch-grass mixtures, however, had a much lower effect on above-ground N uptake. This trial will be planted to maize again in spring 2013.