CEREAL PRACTISE FOR PROFIT ON SANDY SOIL

Peter Carlton, Research Agronomist, Kalyx Agriculture

AIM

To examine the effect of increasing inputs for crop varieties representing APW wheat, oats, triticale and a new wheat investigating the prospects for ethanol production from wheat, on profitability for growers on a sandy soil with a highly acidic subsoil in the Liebe Group area.

BACKGROUND

This trial was designed to investigate the responses of a range of cereal types to increasing seeding rate, fertiliser, disease management and weed management strategies. Low Input and District Input, with and without grazing, strategies that ranged in cost from $204-$340 /ha were applied to each variety, and crop growth, disease infection, yield and gross margin were measured. Management practices are shown below:-

- **Low input** treatments are based on a farmer delivering grain to the bin at the lowest possible cost, regardless of seasonal conditions ($204-$208/ha).
- **Low input + grazing** treatments will attempt to increase the value of the crop by grazing (simulated) prior to Z30 and then take the crop through to harvest ($204-$207/ha).
- **District input** is based on what is considered common farm practice for the area as determined by growers via Liebe R&D Committee ($320-$340/ha).
- **District + grazing** will attempt to increase the value of the crop by grazing (simulated) prior to Z30 and then manage the crop according to common farm practice through the season ($332-$338/ha).

Analysis in this report is based on estimated 2009 input prices and returns calculated from current cash grain prices.

TRIAL DETAILS

Property	Alex Keamy
Plot size & replication	8.8m x 12m x 3 replicates
Soil type	Yellow sandplain
Sowing date	31/05/2009
Seeding rate	As per protocol
Fertiliser (kg/ha)	As per protocol
Paddock rotation	2008- Pasture
Herbicides	As per protocol
Growing Season Rainfall	278.6mm April-October

TREATMENTS

Crop Protection

No.	Date	Product	Timing/Placement	Rate
1	31/05/2009	Roundup PowerMAX Chlorpyrifos	IBS	1.5 L/ha 1 L/ha

Treatments

Input	No.	Variety	Treatment	Rate	Timing		Date
Low	1	Wyalkatchem wheat	Trifluralin (wheat, triticale)	1.5 L/ha	IBS	A	31/05/2009
	2	Kangaroo oats	Dual Gold (oats)	400 mL/ha	IBS	A	31/05/2009
	3	Ethanol wheat (RAC 1505)	Flexi N	30 L/ha	IBS	A	31/05/2009
	4	Pacific Falcon triticale	Seed Rate	50 kg/ha		B	31/05/2009
			MacroPro Plus	30 kg/ha	banded	B	31/05/2009
			2,4-D Amine	1 L/ha	Z22	C	06/08/2009
			Lontrel	40 g/ha	Z22	C	06/08/2009
District	5	Wyalkatchem wheat	Trifluralin (wheat, triticale)	1.5 L/ha	IBS	A	31/05/2009
	6	Kangaroo oats	Dual Gold (oats)	400 mL/ha	IBS	A	31/05/2009
	7	Ethanol wheat (RAC 1505)	Logran (wheat)	30 g/ha	IBS	A	31/05/2009
	8	Pacific Falcon triticale	Flexi N	40 L/ha	IBS	A	31/05/2009
			Seed Rate	70 kg/ha		B	31/05/2009
			MacroPro Plus	75 kg/ha	banded	B	31/05/2009
			2,4-D Amine	1 L/ha	Z22	C	06/08/2009
			Lontrel	40 g/ha	Z22	C	06/08/2009
			Flexi N (wheat, oats)	20 L/ha	Z22	C	06/08/2009
			Flexi N	45 L/ha	Z37-Z45	D	26/08/2009
Low	9	Wyalkatchem wheat	Trifluralin (wheat, triticale)	1.5 L/ha	IBS	A	31/05/2009
+	10	Kangaroo oats	Dual Gold (oats)	400 mL/ha	IBS	A	31/05/2009
Grazing	11	Ethanol wheat (RAC 1505)	Flexi N	30 L/ha	IBS	A	31/05/2009
	12	Pacific Falcon triticale	Seed Rate	50 kg/ha		B	31/05/2009
			MacroPro Plus	30 kg/ha	banded	B	31/05/2009
			2,4-D Amine	1 L/ha	Z22	C	06/08/2009
			Lontrel	40 g/ha	Z22	C	06/08/2009
			Simulated Grazing		Before Z30		
District	13	Wyalkatchem wheat	Trifluralin (wheat, triticale)	1.5 L/ha	IBS	A	31/05/2009
+	14	Kangaroo oats	Dual Gold (oats)	400 mL/ha	IBS	A	31/05/2009
Grazing	15	Ethanol wheat (RAC 1505)	Logran (wheat)	30 g/ha	IBS	A	31/05/2009
	16	Pacific Falcon triticale	Flexi N	40 L/ha	IBS	A	31/05/2009
			Seed Rate	70 kg/ha		B	31/05/2009
			MacroPro Plus	75 kg/ha	banded	B	31/05/2009
			2,4-D Amine	1 L/ha	Z22	C	06/08/2009
			Lontrel	40 g/ha	Z22	C	06/08/2009
			Flexi N	20 L/ha	Z22	C	06/08/2009
			Simulated Grazing		Before Z30		
			Flexi N	45 L/ha	Z37-Z45	D	26/08/2009

RESULTS

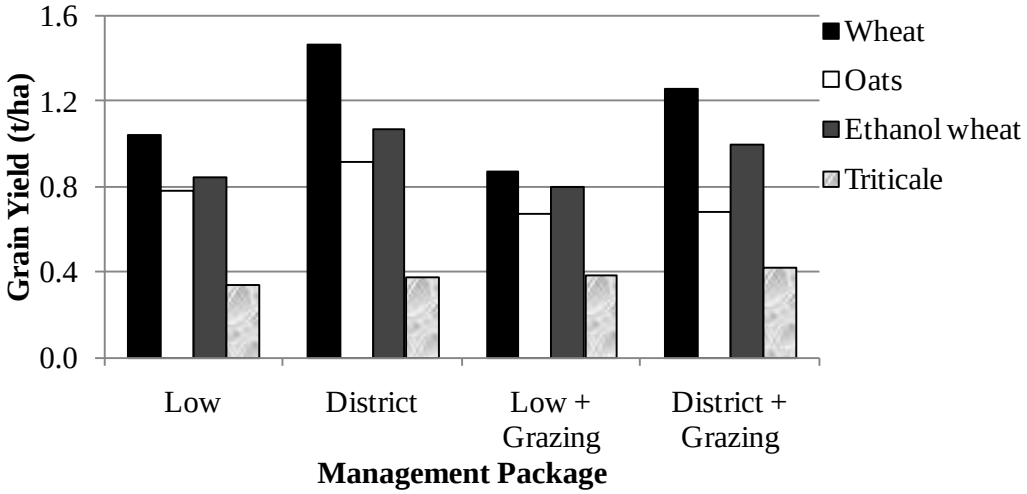

Figure 1. Yield (t/ha) for each cereal variety relative to management practice at 203 DAS (LSD = 0.17 t/ha).

Table 1. Crop density and vigour (51 DA-S), leaf disease and crop head number (123 DA-S) and yield (203 DA-S), quality and gross margin for each crop variety and management treatment.

No.	Input	Variety	Crop density (/m2)	Crop vigour (1-9)	Leaf disease (1-9)	Crop head density (/m2)	Grain yield (t/ha)	Protein (%)	Screenings (%)	GM $/ha
1	Low	Wyalkatchem	92 f	5.0 cde	3.7 a	120 ef	1.04 cd	7.5	5.5	-26
2		Oats	117 de	6.7 a	3.3 a	130 ef	0.78 de	7.2	18.1	-104
3		Ethanol wheat	116 de	4.3 ef	3.0 a	120 ef	0.85 cde	7.0	8.1	-69
4		Triticale	104 ef	4.0 f	2.7 a	139 def	0.35 f	-	-	-159
5	District	Wyalkatchem	115 de	5.7 bc	4.3 a	143 c-f	1.47 a	9.1	4.4	-60
6		Oats	138 ab	6.7 a	2.3 a	198 ab	0.92 cde	8.5	21.5	-216
7		Ethanol wheat	147 a	5.0 cde	2.3 a	194 ab	1.07 c	8.5	9.8	-165
8		Triticale	127 bcd	4.0 f	2.3 a	178 bc	0.38 f	10.4	10.1	-271
9	Low + Grazing	Wyalkatchem	94 f	5.0 cde	2.3 a	112 f	0.87 cde	7.6	6.7	-64
10		Oats	117 de	6.0 ab	2.3 a	134 def	0.67 e	7.5	17.3	-118
11		Ethanol wheat	127 bcd	4.7 def	2.7 a	134 def	0.80 de	7.2	10.2	-87
12		Triticale	115 de	4.3 ef	2.3 a	149 cde	0.38 f	9.8	5.9	-154
13	District + Grazing	Wyalkatchem	119 cde	5.3 bcd	4.3 a	146 c-f	1.26 b	9.3	6.0	-118
14		Oats	153 a	6.7 a	4.0 a	218 a	0.68 e	9.0	23.3	-246
15		Ethanol wheat	148 a	5.0 cde	3.3 a	185 ab	1.00 cd	8.7	12.3	-203
16		Triticale	137 abc	4.3 ef	2.0 a	168 bcd	0.42 f	-	12.7	-118
LSD (P=.05)			**19.1**	**0.8**	**2.7**	**35.8**	**0.172**			
CV			**9.3**	**9.2**	**55.2**	**13.9**	**12.740**			
Replicate F			**10.565**	**2.888**	**1.225**	**3.645**	**0.144**			
Replicate Prob(F)			**0.000**	**0.071**	**0.308**	**0.038**	**0.867**			
Treatment F			**7.605**	**11.528**	**0.680**	**6.605**	**29.782**			
Treatment Prob(F)			**0.000**	**0.000**	**0.783**	**0.000**	**0.000**			

Means followed by same letter do not significantly differ (P=.05, LSD)

Table 2: Factorial analysis for crop density and vigour (51 DA-S), leaf disease and crop head number (123 DA-S) and yield (203 DA-S).

No.	Variety	Crop density (/m2)	Crop vigour (1-9)	Leaf disease (1-9)	Crop head density (/m2)	Grain yield (t/ha)
TABLE OF A MEANS						
1	Low	107.1 b	5.0	3.2	127.1 b	0.754 bc
2	District	131.8 a	5.3	2.8	178.3 a	0.959 a
3	Low + Grazing	113.1 b	5.0	2.4	132.2 b	0.679 c
4	District + Grazing	139.1 a	5.3	3.4	179.1 a	0.839 b
		9.6	**NSD**	**NSD**	**17.9**	**0.086**
TABLE OF B MEANS						
1	Wyalkatchem wheat	104.9 c	5.3 b	3.7	130.2 b	1.159 a
2	Kangaroo oats	131.1 ab	6.5 a	3.0	169.9 a	0.762 c
3	Ethanol wheat	134.6 a	4.8 c	2.8	158.2 a	0.928 b
4	Triticale	120.6 b	4.2 d	2.3	158.4 a	0.382 d
		9.6	**0.4**	**NSD**	**17.9**	**0.086**

Means followed by same letter do not significantly differ (P=.05, LSD)

COMMENTS

- Increasing inputs from Low to District Practice significantly increased crop emergence for all four varieties, reflecting the increased seeding rate. This has set the crop up for a high yield potential, but has also increased the risk of yield loss from infrequent rainfall events and drying soil early in the season. Kangaroo oats had the highest establishment, a reflection of lighter grain, but it was not significantly different to the Ethanol wheat. There was also a trend to increased plant vigour under the District Input strategy, but the increase was not significant.

- Crop head density was higher under the District Input Practice, reflecting the higher seeding rate and crop nutrition, and was positively correlated with seedling establishment. Crop head density was not much higher than crop establishment, indicating that most plants did not tiller well, with an accompanying limited yield potential. Grazing had no effect on head number and grazed plots had similar head density to the ungrazed treatment under both Low Input and District Input practices.
- Grain yield was quite low, varying from 0.35 to 0.42 t/ha for triticale to 0.87 to 1.47 t/ha for Wyalkatchem wheat. Significant differences existed between varieties and crops although this mainly reflected the lack of adaptation of the long season oat and triticale varieties. The poor yield did not warrant District Input (0.96 t/ha) and the increase in yield compared to the Low Input of 0.21 t/ha was at an additional cost of about $125/ha.
- Simulated grazing reduced grain yield with a significant reduction in the District Input practices of about 12%. However, because of the low yields at this site it is difficult to identify the implications of this reduction. Much of the reduction in yield under High Input was attributed to reduced yield of Wyalkatchem wheat and oats of 14 and 26% respectively.
- Grain quality reflected the poor yield and can be considered marginal with, for example, protein in Wyalkatchem wheat of 7.5% under Low Input. Screenings varied 4.4 to 12.7% for wheat and triticale and 17.3 to 23.3% for oats. District Input increased protein to 9.1% in Wyalkatchem and there was a tendency for screenings to increase slightly in the wheats following grazing.
- No wheat, oat or triticale under any management practice produced a positive return on investment. Losses were as high as $246 /ha under the District Input Strategy and the Low Input Practice resulted in the smallest loss with Wyalkatchem returning a loss of only $26 /ha under the Low Input Strategy although costs and value adding associated with grazing have not been considered.
- An Active Management strategy, where the aim is to establish a reasonable yield potential early and then play the season with remaining inputs, has appeared to be the most reliable strategy, producing the highest, or close to the highest, margin over several years, even in the dry season of 2007. In 2009, with yields of 1.47 t/ha and lower, the District Input turned out to be high risk with losses of $60 to $246/ha. On the yellow sandplain, with acidic subsoil, the Low Input Practice resulted in the lowest yield but it was also the smallest loss but otherwise it is not possible to draw any definitive conclusions from this trial. However, too low inputs, demonstrated in earlier years, that opportunities can be missed. Seasonal conditions, risk management, weed control, weed seed set and nutrient depletion strategies must be managed across and evaluated season by season.
- It is worth noting that in years in which a crop has established well but the outlook for the remainder of the season is poor, then grazing may be a valid option to consider if it is thought that the value from grazing offsets a possible reduction in yield. There was no quantification of the value of grazing in this trial.
- It must be remembered that the Liebe Group's membership comprises a wide and varied region. In the end, this trial was conducted under poor seasonal conditions. The data generated from this trial needs to be evaluated in light of the season, soil type, variety choice and inputs and compared with similar trials from previous years.

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CONTACT:
Name: Peter Carlton
Email: pcarlton@kalyx.com.au