6.3 HIGH RAINFALL CROP AGRONOMY – TOPPING TEN TONNES

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Experimental Sites: Gnarwarre, Hamilton

Aims:

1) Provide recommendations to farmers regarding optimum crop sowing times and crop arrangements on raised beds and on the flat.
2) Examine associations between crop yields and plant growth for wheat and canola on raised beds and on the flat in the high rainfall cropping zone.

Background:
The recent introductions of raised beds and new crop varieties have created very different growth conditions to those from which agronomic recommendations for crop management were initially based. New management packages and recommendations therefore need to be developed to ensure crops can reach potential yields under these altered conditions.

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Trial Design and Management:

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Comparisons of crop growth and yield were made between raised beds and the flat for wheat and canola at 2 different sowing times for 2 varieties of each crop, sown at 3 different densities. The treatments were replicated 3 times.

Treatments:

- 2 crops – wheat and canola
- 2 drainage treatments – raised beds (1.7 m wide) and the flat
- 2 sowing times – Canola - May 18, July 3; Wheat; May 22, July 3
- 2 varieties – canola - Mystic and Charlton; wheat – Tennant and Kellalac
- 3 sowing densities – see table

Sowing rate and target plant densities for canola and wheat at Hamilton and Gnawer.

Crop	Sowing Rate (kg/ha)	Target Plant Densities (plants/m^2)
Canola	2	35
	5	90
	10	175
Wheat	50	125
	100	250
	200	500

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Comparisons in crop growth and yield were made for crops sown at different row spacings and planting densities for wheat and canola. The treatments were replicated 4 times. Crops were sown on May 28.

Treatments:

2 x crops, wheat - Kellalac, canola- Charlton
2 row spacings, 18 and 36 cm
3 x densities (see table)

Measurements taken at both sites

Plots were sampled every 4 weeks for total dry matter (DM) leaf area and plant components. Grain and seed yields, individual grain/seed weight, grains/head, seeds/pod and harvest indices were determined at final harvest.

Results:

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Preliminary results from canola indicate significant interactions occurred between drainage (raised beds and flat) and time of sowing. Highest yields were achieved from canola sown in July on beds (mean all treatments in 2000 and 2001 was 3.0 t/ha compared to 2.2 t/ha for May sown canola on beds). However, canola sown in July on the flats yielded the least (0.5 t/ha). Suprisingly, results were consistent across both years despite quite contrasting seasonal conditions. In 2000, the total annual rainfall was lower than average (583 mm) with an abnormally hot, dry spring with 2001 experiencing higher than average rainfall (824 mm) with spring being abnormally wet and mild. Charlton (late maturing variety) yielded slightly higher than Mystic (early maturity). Due to the late season, harvesting of the wheat had not been completed at the time this report was prepared (February 11).

Hamilton – Canola yields (t/ha)

Sowing Date	Drainage Treatment	*Charlton*			*Mystic*		
		Sowing Rate (kg/ha)					
		2	5	10	2	5	10
May 18	Beds	2.1	1.9	1.9	1.7	1.9	1.0
May 18	Flat	2.8	2.8	2.2	2.5	1.4	2.1
July 3	Beds	3.2	4.0	3.6	4.2	3.3	3.2
July 3	Flat	0.7	0.9	0.8	0.5	0.4	0.6

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Preliminary results indicate that canola sown at the narrower row spacings (18 cm) yielded higher than canola sown at wider row spacings (36 cm). Row spacing had no significant (P>0.05) effect on wheat yields in 2001. Sowing rate had no significant (P>0.05) effect on final yields for either wheat or canola.

Gnarwarre canola and wheat yields (t/ha)

Row spacing	Canola			Wheat		
	Sowing Rate (kg/ha)					
	2	5	10	50	100	200
18 cm	1.9	1.9	1.5	4.4	3.2	3.6
36 cm	1.5	1.4	1.6	3.8	4.0	3.7

Conclusions:

Preliminary results indicate that:

- Raised beds had a greater impact on the yields of later sown crops;
- July sown canola yielded higher than May sown canola in both years on the beds;
- There appears to be an important interaction between time of sowing and raised beds. Hence recommendations developed from time of sowing experiments conducted on the flat may not be transferable to crops sown on raised beds;
- Yields did not appear to be greatly influenced by sowing rate;
- The impacts of row spacing on final yields are inconsistent.