

8.1.5 RESPONSE TO IRRIGATION OF CANOLA GROWN ON RAISED BEDS AND CONVENTIONAL GROUND (CRESSY, TAS)

Abstract:

The response of canola to irrigation on raised beds and flat ground was compared. Irrigation of canola on raised beds resulted in significantly higher grain yields whereas there was little response on flat ground. Canola yields on raised beds were significantly (15%) higher than on the flat. However when converted to take into account the unplanted furrow area the raised beds yielded lower than the flat ground although this was not statistically significant.

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Growing Season Rainfall (April-Nov): 436mm

Variety: Grace at 6 kg/ha
Sowing Date: 20-21 May 2004
Fertiliser: 250kg/ha 6:11:8:6 + 50kg N/ha
Herbicides: 2L Atrazine 16 Aug 2004
Topdressed N: 50kg N/ha 8 Sep 2004
Harvest Date: 23 Dec 2004

Background/Objectives:

Raised beds have proven very effective in draining excess water and minimising waterlogging damage, particularly over winter. However the lower soil moisture towards the end of the growing season can result in reduced grain-fill compared with conventionally prepared ground. This trial was designed to compare the amount of irrigation water required by canola on raised beds with conventionally prepared ground.

Results and Discussion:

The season was characterised by a wet winter (133mm in June) followed by a dry period with handy rains in mid spring. There was some waterlogging damage over late June and early July, but most plants were able to grow out of this damage.

Irrigation treatments commenced in mid October. However, there were problems with filter blockages in the pump suction line and a power failure so that insufficient water was applied until mid November. Consequently the RB-FC irrigation treatment did not receive additional water over the Flat-FC until after this date.

Average yields on raised beds were significantly higher than on the flat (413g/m² versus 359g/m²).

Site: Cressy Research Station, Cressy, Tasmania

Methodology:

Plots on flat ground consisted of two adjoining 8m long plots. At harvest, one cut (1.9m) was taken through the middle leaving 3 buffer rows on each side of the plot. Raised bed plots consisted of one bed by 8m. Prior to harvest three 0.3m quadrats were cut from each plot to ascertain yield parameters. These have not yet been processed and an estimate of yield in these quadrats was added to plot weight. The trial was a split block design with raised bed treatment as the main effect and irrigation treatment as the subplot. There were five replicates.

Plots were irrigated with Netafim drip tube controlled with an automatic watering system. The aim was to water both raised beds and flat ground to field capacity (FC). It was expected that with watering, the flat ground would reach field capacity before the beds. Consequently two irrigation treatments were imposed see table 1.

Table 1: Treatments

Treatment	Flat	Raised bed
nil	nil water	nil water
Flat-FC	water to FC	= FC of flat (insufficient)
RB-FC	=FC of beds (excess)	water to FC

Gopher moisture meters were installed in four of the replicates to measure soil moisture content.

However this does not take into account all the furrow area and grain yields need to equate to the commercial situation. On a tonne per hectare basis the control plots outyielded RB plots by nearly 8% (3.59 versus 3.32t/ha) but this difference was not statistically significant.

There was a significant difference in response to irrigation on the flat ground and raised beds (Table 2). Grain yields on the flat ground only increased slightly with irrigation and this was not significant. On the raised beds there was a progressive increase in yield with increasing irrigation although there was not statistically significant difference between the two irrigated treatments. Initial examination of data from Gopher tubes shows greater drying of the soil profile on raised beds.

Table 2: Grain Yields (t/ha) of Canola Grown on Raised Beds and Flat Ground with Different Irrigation Treatments

Irrigation Treatment	Grain yields (t/ha)	
	Flat	RB
Nil	3.54	3.18
Flat-Field Capacity	3.61	3.35
RB-Field Capacity	3.57	3.44

LSD = 0.41 but when comparing across raised bed or flat treatments, LSD = 0.15

Overall yields were reasonably good but response to irrigation was not high with only a 7% increase in yield on the raised beds and less than 1% on the flat. Dry conditions (Decile 3) and insufficient irrigation in October caused moisture stress prior to flowering resulting in a lower yield potential being set. Reasonable rainfall in early to mid November may then have removed some of the benefit of irrigated treatments when these were fully watered from mid November onwards.

Most of the irrigated plots lodged which made harvesting difficult. Yield component data from quadrat cuts will soon to be processed and should assist in explanation.

Conclusions:

Irrigation of canola on raised beds resulted in significantly higher yields whereas there was little response on flat ground. This is in agreement with soil moisture measurements showing greater drying of the soil profile with raised beds.

Canola yields on raised beds were significantly (15%) higher than on the flat but when converted to take into account furrow area the raised beds yielded 93% of the flat ground. This was not statistically significant.

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