

5.2 RAISED BED DEMONSTRATION – SOUTH AUSTRALIA

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Aims:

Five raised bed demonstration sites on the major soil types of the South East were established in 1999 by the MacKillop Farm Management Group to evaluate this technology for reducing crop losses caused by waterlogging.

Further Information:

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Soil Description by Site:

Conmurra red to black clay loam over limestone
Frances brown clay loam over clay
Kybybolite brown sand over yellow to brown clay
Mundulla brown clay loam to clay over clay
Pooginagoric red loam to clay loam over clay

Rainfall Recordings 2000:

Location	2000 Rainfall (mm)
Conmurra	729.5
Frances	487.0
Kybybolite	576.9
Mundulla	492.1
Pooginagoric	443.0

Methodology:

In 1999 a surveyor was contracted to survey and design the layout of raised beds and a drainage and surface water management plan. Beds were formed in early 1999 and different crops were grown at the different sites in 1999 and 2000.

Following the crops grown in 1999, most growers attempted to burn stubbles in autumn of 2000 for a number of reasons including weed control, stubble handling and snail control.

A Gessner bed forming machine was used at a number of sites to re-form/re-shape raised beds. This was undertaken at sites where machinery wheels were not confined to the furrows and/or livestock on stubbles had deformed bed structures. Re-forming of the beds was considered important in achieving more accurate seed placement and to clean out in furrows.

The bed widths at all sites were 2 metres, with the exception of the Kybybolite site, which was on 1.7 metre spacings.

Raised bed sites were sown using various machines including modified combines and airseeders. The use of an airseeder increased the efficiency of sowing on raised beds. However, unless using an airseeder designed specifically for controlled traffic the wheels were not confined to the furrows.

All other paddock operations, including spraying and harvesting were carried out with broad acre machinery. The broad acre machinery did not require modifications for use on raised beds providing wheel spacing matched the furrow spacings

Results:

Site Location	Crop Type	Conventional		Raised Beds	
		Yield (t/ha)	Quality Grade	Yield (t/ha)	Quality Grade
Conmurra	wheat	1.1	Feed	1.0	Feed
Frances	oats	3.2	-	3.35	-
Kybybolite	barley	3.8	Malt	4.3	Feed
Mundulla	barley	6.21	Malt 1 – GM1	5.74	Feed No. 1
Pooginagoric	soft wheat	4.86	Soft 1	4.85	Soft 1

Discussion:

Rainfall recordings in 2000 at all sites except Conmurra were below the long term average. Again, with the exception of the Conmurra site, waterlogging was not a limiting factor to crop production.

Conmurra Demonstration Site

Seed placement accuracy was again of concern this season, especially for rows on the shoulder of the beds and in the furrows. However, seed placement accuracy when sowing wheat was less critical than for sowing small seeds such as canola.

Crop establishment on the conventional section of the paddock was poor as a result of seed bursting due to significant rainfall after sowing. The effect of bursting was a thinning of plant numbers. Seed did not burst on the raised beds.

The furrows and drainage system were effective in reducing waterlogging on the raised bed portion of the paddock until the watertable rose to a level that in effect limited water flow into the drainage system.

The yield difference between the two sections of the paddock may be attributed to complete crop failure in the furrows, spoon drains and headlands. The furrows, spoon drains and headlands account for more than 20 per cent of the area within the raised bed section of the paddock. These areas collected the excess water from the raised beds. However, given the high water table levels, lack of slope and very much above average rainfall in the winter period the excess water in the furrows and drains could not be drained from this site.

Pooginagoric Demonstration Site

There was no significant difference (yield or quality) between crops sown on raised beds compared to conventionally farmed crops at Pooginagoric.

Again, as with a number of sites waterlogging was not a major factor limiting crop performance in 2000.

The controlled traffic aspect of the system is seen as important on the red soils where sodicity and poor soil structure are exacerbated by compaction caused by machinery.

Frances Demonstration Site

The crop on the raised beds was very even and only suffered from waterlogging at the end of the beds near the drains. The crop had exceptional yield potential; however, in the late spring the crop suffered a severe infection of stem and leaf rust. The

rust caused the plant to prematurely mature and as a result the grain did not fill thus reducing seed size and hectare-litre weight.

Machinery operations, in particular seeding and harvesting tended to be a little slower compared to conventional farming systems.

Other paddocks and growers in the Frances district also adopted the raised bed technology in 2000. These raised beds have been effective in reducing the effects of waterlogging. In a number of cases the construction of raised beds has meant that paddocks that were not previously considered for cropping can now be cropped due to reducing the risk of waterlogging and crop failure.

Kybybolite Demonstration Site

Waterlogging of the demonstration site at Kybybolite did not occur in 2000. However, there was a yield increase of 0.5t/ha where the crop was sown on raised beds. The barley sown on the raised beds did not make malt quality standards as a result of contamination with triticale grain from volunteer plants growing in the furrows of the raised beds.

Mundulla Demonstration Site

At the Mundulla site that only experienced a very short period of waterlogging, the raised beds yielded less than the conventionally farmed sections of the paddock. It is also interesting to note that the screenings and protein were higher on the raised beds.

Comparison of gross margins between the two sections of the paddock shows that there was a difference of \$85 per hectare as a result of yield and quality grades.

Effective weed control in the drains and furrows was a limiting factor at this site. Weed control in the furrows was not effective because of the inability to get a good hot burn, poor distribution of herbicide and limited cultivation in the furrows.

Summary:

Soil type and topography/drainage will be the major factors that determine the effectiveness of the raised bed system.