

Hi-Grain

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U P D A T E

RAISED BED RENOVATION

Background:

Farmer and research experience suggests that some form of renovation of raised beds used for cropping is beneficial from time to time, due to a number of factors. These include:

- Rounding of beds due to cropping operations and machinery
- Compaction due to grazing and/or other factors
- General wear and height reduction of beds

There appears to be a farmer preference to carry out some form of renovation every two to three years, depending on the severity of the problems.

Why renovate beds?

- To return some of the collapsed soil from the furrows (or gutters) back to the top of the bed and regain the original bed shape, height and rooting depth
- To reduce some of the compaction that may have occurred on the beds
- To address some of the hostile subsoil issues (such as sodicity & compaction) on a regular basis. Bed

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renovation offers an opportunity to address major issues such as subsoil compaction immediately below the current rooting depth while possibly adding soil improving treatments such as gypsum

- d. To facilitate improved water infiltration into beds, especially in soils known for low macro-porosity and therefore poor water movement
- e. To smooth and even out the furrows to allow free water movement

When to renovate raised beds?

When to renovate beds is very much a site-specific decision that the farmer has to make, based on knowledge of local soils and the current shape and physical condition of the beds. If any one or a combination of the above factors is, in the farmers' opinion, beginning to impact on his crop performance, it could be time to set about renovating the beds.

Always pick a relatively dry period to carry out renovations. Experience suggests that late summer to early autumn is about the best time. Avoid periods when the soil is too moist. If soils are too wet, it could do more damage than good!

Experimental Evidence:

During the 2002 cropping season, Southern Farming Systems (SFS) carried out a bed renovation trial involving 3 treatments on a black basaltic clay soil in the 550mm+ rainfall region in south-west Victoria. The rainfall for the growing season was about average. The following treatments were compared:

- Control (no renovation)
- Simple reshape (using a bedding machine that throws the collapsed soil from gutters back on top of beds)
- Shallow cultivation (100mm) followed by reshaping
- Deep-rip to 50cm (two rip lines 50cm apart on 1.7m beds) followed by reshaping

All treatments yielded marginally better than the control. This suggests that some form of renovation could bring about improvement, depending on what and where the problem actually is. The deep ripped treatment produced a significantly larger and deeper mass of roots. There was evidence to



No renovation of beds cropped for 3 years: the shape of bed can interfere with uniform seedling establishment.



Uneven furrows leading to ponding of water.



A combined shallow cultivation and reshaping.



Shallow cultivation and re-shaping in one operation using large machines.

suggest that lack of adequate subsoil moisture during the season may have prevented the crop from using those roots to achieve significant yield responses.

Managing grazed beds:

Grazing; experience shows that if wet weather grazing is properly managed, the damage to beds through pugging and soil displacement can be minimised. On heavy clay soils canola has been direct sown into grazed pastures without any renovation of the beds. On sandy clay loams however, the situation could be different and grazing should be observed carefully to make sure it is not damaging the soil or the beds.

Where to from here?

Investigations into bed renovation and reshaping are continuing across high rainfall southern Victoria to advance our understanding and to provide farmers with a region/soil-specific package on bed renovation. While results from a single season are inadequate to cover all questions on raised bed renovation, the following summary may be used as a guide. If in doubt, contact any agronomist involved in raised bed cropping or SFS.

Renovation options:

Summary based on SFS/DPI field trials and farmer experiences.

- a. In light soils (sandy loams & sandy clay loams), where there are no known problems of water infiltration, a simple reshaping may be all that is required to regain lost bed height and shape, and return the collapsed soil back to the top of the beds. This will help achieve uniform seeding depth and seedling establishment
- b. In heavier soils (>40% clay), a deeper cultivation every 2 to 3 years may be beneficial. To achieve maximum benefit, this cultivation should probably disturb, at least in part, any known impervious layer, plough pan or hard setting layer. The aim should be to increase bed depth each time a renovation is attempted. We do not believe that any cultivation to a depth shallower than the furrow depth will bring about any benefit, except in soils that repel water and cause it to pond on the surface (hydrophobic soils). Such soils also do not drain easily following a waterlogging event. In some soils, normal wetting and drying alone can considerably improve the soil structure in the beds, down to the depth of the furrow



Original shape regained after a shallow cultivation.



Deep ripping (to 50cm) prior to reshaping.



Beds that have been re-shaped after deep ripping.



Renovated and un-renovated beds side by side.

- c. Information generated in Victoria and South Australia suggests that "tillage rotation", which is vertical tillage at progressively increasing depths down to 20 cm at the start of each season, works very well for soils similar to those explained at (b) above
- d. In soils with very high bulk densities (high in clay, low in air space), occasional deep ripping might help to modify structure, and may cause a gradual increase in effective crop rooting depth. Most of these soils have additional problems, such as sodicity. Deep ripping offers the opportunity to address those additional problems while renovation is carried out. An example is the application of gypsum on beds prior to deep ripping, so that some of that gypsum could be worked into the depths while ripping the beds
- e. SFS trial results show that the soil structure under beds is gradually improving with time. In these heavy soils, whatever renovations are undertaken should be directed at assisting that change process. Rather than a vigorous and deep rip the first time, farmers may wish to adopt a practice of gradually increasing the depth of ripping over time
- f. More evidence is needed before firm recommendations can be made. You may wish to adopt your own renovation technique or try a few ideas out yourself. Please keep us posted on your observations

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Machines used in raised-bed renovation.



Satisfactory shape regained from renovation.

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