WATER MOVEMENT RESEARCH

The significant change in land-use from flat pastures and crops to raised beds, in combination with high nitrogen (N) and phosphorus (P) inputs has prompted many concerns relating to the off-site effects of water and nutrient flows from raised beds. Tim Johnston, a PhD student with The University of Melbourne and DNRE/Agriculture Victoria, is currently investigating some of the environmental implications of changes in the volume and quality of water flows. The main experimental site is located on Rowan Peels' property near Winchelsea in SW Victoria and is funded by the Grains R & D Corporation. So far, the majority of runoff events have occurred in high intensity rainfall storm events early in the 2001 and 2002 seasons. In the 2001 event, 160 mm was recorded over a 3 – 4 day period which is particularly unusual for south western Victoria. Also high rainfall events have been in the absence of a growing crop. This data suggests that raised beds remove about 50% more water runoff compared with flat cropping and pasture paddocks in stubble situations, indicating that the beds do their job at alleviating waterlogging. However, in low intensity rainfall events, current data suggests that there is no difference in the volume of runoff from different treatments. Water quality data also suggests that concentrations of total nitrogen (TN) in runoff water have been consistently high in all runoff events and that TN loads (kg/ha/yr) from raised beds are of greatest concern. This project will continue until Dec 2003 to ensure that a range of seasonal conditions are documented.

Tim Johnston collecting sampled water from a run off event in April 2001

Water being automatically sampled in a flume in February 2002.

I hope you enjoyed reading this first edition of "Bed Time Stories". The next edition will concentrate on bed making.

SOUTHERN FARMING SYSTEMS

BED TIME STORIES

A networking newsletter for Australian bed farmers

No 1. March 2002

From this.....

Last season brought its own trying circumstances for many raised bed farmers. Delayed stubble burning and heavy rain in April resulted in very wet paddocks that refused to dry out. Where stubble could be removed and beds were well set up, sowing and establishment progressed well. I did however, feel at this stage that beds were at the crossroads in the minds of many farmers. Well to my surprise, the majority of farmers who experienced problems, plan to forge ahead through the crossroads and develop and refine their bedding programs. Higher beds, deeper wider flatter drains, cross-drains, buffer dams etc are all on the improvement list.

There have been many wonderful success stories again last season. Farmers who managed to install new beds, renovate old beds, or practise furrow cleaning, all have grown excellent crops almost free of waterlogging. One of the most outstanding commercial examples I have seen of how well beds can reduce waterlogging, is that of Peter McGennisken who farms 40km south of Horsham at Brimpaen. Peter began raised bed cropping three years ago and has not looked back. Enthusiasm is his second name and his success is a reflection of the effort he has put in.
Unfortunately the raised bed crop lodged serverely, resulting in harvest difficulties and pinched grain; a problem which can be common where a crop is given excellent growing conditions which results in luxuriant growth.

To this..... BUT!

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Victoria The Place To Be

BED TIME STORIES

FROM THE EDITOR

Bruce Wightman

Welcome to the first edition of 'Bed Time Stories'. I decided on this name because it explains exactly what the newsletter is all about and always brings a smile to those who hear it mentioned for the first time.

I do hope you will enjoy reading this newsletter but more importantly you gain some useful information which can be applied to your raised bed, controlled traffic cropping program.

Going into raised beds can be an extremely exciting venture. For those who take the trip, the mental stimulation can be high. You may stop laying awake at night because of the rain and the fear of waterlogging but you will probably still stay awake thinking of ways to change machinery, improve drains and so on.

Only the other day a farmer told me he had doubled his average cereal yields from 2.5t/ha to over 5.0t/ha over the past five years since he changed to raised beds and improved his rotations. But he said he still had a problem and now his header was not big enough to handle the bulk of grain. Of course I was really sympathetic and told him that these problems were like music to my ears.

Back to the newsletter and at this stage I would hope that there will be a lot more photos than writing. Also I hope to try to make the newletter a vehicle for sharing information between farmers, researchers and everbody else who is interested in this concept of cropping, or for that matter growing pasture on beds.

Although "Bed Time Stories" will not be specifically distributed to, say, cotton growers or vegetable growers, I plan to feature their techniques of handling raised beds.

For information to be shared properly we need to know everything that is happening out there! Therefore we ***need*** you to tell us what you are doing and the results you have been obtaining. As an example, the "mail out" many of you kindly completed for us resulted in over 100 new names of farmers who we did not know were using raised beds.

There's another 100 stories that need to be shared!

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Narrow, steep, drains can lead to erosion in certain soil types.

Drains should run along fence lines and should be permanently vegetated.

Permanent vegetated waterways are a safe and effective method of moving water around the farm.

The waterway (right) two days after the 160 mm rainfall event – no erosion what so ever.

PADDOCK TO PADDOCK WATER

The volume of water moving from paddock to paddock can be extremely large. Extensive planning should take place before installing drains.

Start with small buffer dams and the end of each bedded paddock. Water can be released at a controlled rate between rainfall events. Picture from SFS concept farm of Rowan Peel.

Well constructed drain using laser equipment. This deep vegetated drain runs along a fence line and the water goes through 10 buffer dams before leaving the property.

This water way carried water for three or four days after a 160 mm rainfall event in April 2001.

Gentle, wide, fully vegetated collector drains are very safe and effective.

Where the paddock aspect is suitable then the technique of not having a main collector drain at the end of the beds can be successful. In this paddock, owned by Keith Slee at Lismore in Victoria, the whole headland is permanently vegetated with pasture species. His main drains are vegetated and placed near the fence lines.

HEADLANDS

Headlands can get very wet if their wide raised bed design is not aggressive enough.

A very wet headland at Winchelsea in Victoria last season.

Wide but very well shaped headland. The drain at the end of the beds (left) is vegetated.

Headlands can be totally vegetated with tough species such as ryegrass and phalaris. This provides a stable turnaround area for vehicles. This headland is on the Southern Farming Systems concept farm at Geelong, owned by Rowan Peel.

INTERSTATE HAPPENINGS

Tasmania

Andrew Youl from Perth (near Laurnceston) reports that the area of raised beds seems to have levelled out in his state. He says Tasmanian farmers are increasingly using raised beds as waterlogging insurance for a poppy crop and then levelling the paddock to return to pasture or a crop of green peas.

Andrew has a great love of raised beds and believes they will be a permanent feature of his farm in the foreseeable future. He believes he has witnessed a vast improvement in soil structure, a reduction in input costs and a clear yield benefit in wetter years. In drier years he believes there is a slight yield decline. On the down side he says trafficability is not improved until the second year, when the beds and furrows have consolidated.

New South Wales

Michael Marchant from Temora has been responsible for the raised bed site at the Henty Field Day's for the past few years. Michael reports that interest in raised beds is good and the practice is going ahead well in areas where it has been wet, particularly around Henty. Other drier areas of southern New South Wales have not shown as much interest.

Western Australia

Interest in raised beds appears to be quite high in Western Australia. There have been reports of crops being saved because they were grown on beds. However in flat country around Esperance, beds did not work particularly well unless excellent drainage out of the paddock was available. Also external water running onto bedded paddocks has caused isolated erosion events.

Victoria

Interest in raised bed farming is very high in southern and north eastern Victoria. Southern Victoria experienced wet conditions on and off during 2001 and many flat paddocks became wet enough to reduce, or in some instances, wipe out crop yields – particularly barley and canola. Sales of bedding machines are buoyant, with lots of examples of adjacent paddock benefits stimulating farmers to try this way of farming.

THIS YEARS CHALLENGE

This years challenge for a local farmer, with hopefully some help from myself, will be to change this wheat result of last season into 5t/ha plus cropping country. Without mentioning names, this farmer has large cropping equipment, for example, his 280 HP tractor has 8 wheels and he has a large airseeder – both of which he needs to crop his well drained country. The challenge is going to be to set up raised bed country to 'fit' this existing equipment.

Rex Watson is building a bed former to fit the frame of the airseeder to form the beds and to clean out furrows at the time of pre-drilling urea or sowing. Bed widths will be different, with 2 x 2m beds in the centre and 2 x 1.5m beds on the outside. The tandem wheels of the tractor will travel on top of the beds. I'm quite relaxed about this in the second season, but on fresh beds I will be quite nervous and hoping the autumn break is gentle and the beds don't become too soft. To help overcome our anxiety, we plan to roll the beds with a heavy roller when they first become moist. Of course at this time of rolling the tractor wheels will be on top of the bed. The paddock has depressions so the plan is to install at least 250mm beds.

WATER MOVEMENT

SAFE AND EFFECTIVE IS THE CALL

FURROWS

Let's start with the furrows between the beds. Beds are usually run down the steepest gradient in the paddock and runs should be no longer than 400 metres. Maximum slopes should be less than 1.5% for heavy clay, less than 1.0% for light clays or clay loams and less than 0.5% for loams and sandy loams. Generally the furrows are the safest drain because the catchment for each is small. However water must never be allowed to enter a bedded paddock from an external source.

Where the slopes exceed 400 metres and the slope is steeper than recommended for the soil type, a small amount of soil movement has been observed in the furrows after heavy rain on newly established beds.

Furrows should be sown with crop seed and without fertilizer. Crop plants in the furrows help shade out weeds, reduce any likelihood of erosion and act as a filter strip for nutrients.

In flat safe paddocks some farmers choose not to sow furrows so water can move more easily out of the paddock.

In flat areas high beds maybe required to keep the high tide mark at least 100 mm below bed tops. However, this water then has to be removed from these deep furrows, so the main collector drain needs to be very substantial and lead somewhere so water can run safely.

In uneven paddocks with depressions, humps and hollows, water can easily puddle in the furrows. When a vehicle travels through these puddles the furrow is deepened and very uneven furrow depths can result.

Uneven furrow depth can result in puddles and problem with trafficking the paddock.

Furrow cleaning and smoothing combined with bed reshaping in becoming more popular. This seeder, owned by Neale Seach at Euroa in north eastern Victoria, is front fitted with furrowers and grader boards. Neale sows urea after stubble burning using this seeder for initial furrow cleaning. The furrows and beds are then touched up again at sowing and the end result is great.
Keith Slee from Lismore in Victoria, uses furrowers fitted to the rear of his seeder, while Bill Day from Nagambie in Victoria uses twin disc cleaners. Who else uses furrow cleaners?

Abandon areas of paddocks that are difficult or are in the "too hard basket". Sow these areas to pasture or trees such as red gums or some other suitable tree species

MAIN COLLECTOR DRAINS

Main collector drains run the greatest risk of soil erosion and trafficability problems. They can carry a large volume of water and should be installed with a lot of thought and professional planning.

When water sits in the collector drains, trafficking the paddock can be very difficult.

Acute, narrow main collector drains can quickly lead to soil erosion.