

Healthy Country

managing the land for healthy waterways

Sustainable horticulture production

FarmFLOW
growth through good practice

Vetiver grass trial

The risk of soil erosion and sediment transfer into waterways is high for intensive horticulture crops unless well managed.

To minimise erosion, sediment fences and hay bales have been used with limited success. Besides being costly and time consuming to install, they require regular maintenance for efficient operation and have a limited life span. Landholders require other, long-term options for stream-bed erosion control. Vetiver grass offers landholders another method of stabilising stream banks and beds and has potential for nutrient removal from nutrient-rich water.

Vetiver grass

The Monto vetiver (*Vetiveria zizanioides* L.) cultivar is sterile and non invasive. It works like this: the stiff stems of the vetiver 'hedge' slow water and trap silt behind it, reducing runoff velocity and erosion. CSIRO-funded trials found that bank stability and sediment capture were evident five months after planting. Other successful uses include:

- gully, slope and drainage channel stabilisation
- rehabilitation of degraded and disturbed lands
- spreading and diverting of runoff water
- lowering of watertable.

Recently two strawberry farms had earthworks to improve their present drainage, providing ideal demonstration sites to measure sediment capture and find out if vetiver can successfully establish in heavy clay and marine clay soils. A local nursery also trialed rafts of floating vetiver in their tail water/irrigation recycling dam.

The Monto vetiver cultivar is sterile and non invasive. In this trial it was successfully established in heavy marine clay soils containing acid sulphates.

How has the vetiver performed?

Establishment in clay soils

The drains on both farms carry rainfall runoff and are built in marine clay soils containing acid sulphates. These are common soils in the Pumicestone region and require careful management.

Plantings were done in December 2006 (farm 1) and May 2007 (farm 2). The May plantings were slow to establish, lying dormant until spring.

When plants from the May 2007 planting (farm 2) were measured in April 2008 they ranged in height from 1.12 m to 1.64 m, with an estimated average height of 1.35 m. This represents just eight months of growth as the plants were dormant over the first winter.

At farm one the vetiver has successfully established on the heavy clay soil after 13 months. The tallest plants measured over 2 m and the smallest 1.32 m. The average height of this vetiver planting was 1.85 m.



Healthy Country partners:



Farm	Position	No. of samples	Mean (cm)	Median (cm)	Range (cm)	Sediment trapped (m ³)
One (planted Dec '06)	Drain floor	28	24.3	30	14 - 45	56.1
	Bank top	42	3.62	3	1 - 10	0.3
Two (planted May '07)	Drain floor	16	11.9	18	7 - 32	35.2
	Bank top	42	3.2	3	1 - 12	0.3

Sediment trapping

Initial results are encouraging with an estimated 56 m³ of sediment trapped in the drain on one farm and 35 m³ on the other farm. The depth of trapped sediment varied across the two sites with a range of 14-45 cm and 7-32 cm respectively. While it is difficult to determine how much sediment would have settled on the drain floor without the vetiver barrier, these results indicate that a large amount has remained on-farm rather than being transported into local waterways.

Sediments were also trapped against the vetiver barrier on the bank edges of the drain. While far less sediment was captured in these barriers (0.3 m³) compared to the drain floor, they were nevertheless effective. Both top bank plantings captured sediment to a depth of 1-12 cm, with a mean depth of around 3.4 cm.

Vetiver pontoon

The vetiver pontoon used in the nursery pond has successfully established. The operator has since divided the vetiver up into another two pontoons for use in another detention/irrigation pond. One of these pontoons has successfully established while the other is struggling a little due to the constant visitation by local ducks who felt it made an ideal nesting site.

The operator plans to link all the pontoons to see if there is a nutrient removal benefit for the main irrigation pond. While not determined in this trial vetiver has been shown to have remarkable nutrient removal capabilities in nutrient rich waters.

What have we learned?

The demonstration indicates vetiver grass has a high potential to stabilise banks built using marine clays. These soils commonly contain acid-sulphates making vetiver an important option for landholders with these difficult-to-manage soils on the Pumicestone floodplains. Vetiver also has been shown to have a strong sediment trapping ability and can establish very quickly, within a production cycle, if the environmental conditions are right.

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Vetiver hedges planted across the drain and along its banks have slowed the movement of water and trapped sediment on the drain floor (above).

Vetiver pontoons show potential for the removal of nutrients from nutrient rich water storages (below).



The Healthy Country Project is a three-year partnership project between SEQ Catchments, DPI&F, scientists from Healthy Waterways and indigenous representation through the SEQ Traditional Owners Alliance. The other project partners are coordinating river restoration works and water quality monitoring in three 'focal' case study areas in the Lockyer, Bremer and Logan-Albert catchments.

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