

Soil conservation waterways – plants for stabilisation

Waterways are used to collect runoff from contour banks in cropped paddocks and to convey the runoff to a drainage line or creek. Plants protect the channel from erosion by reducing flow velocities by providing cover and by binding the soil together. The plants also assist in filtering sediments, nutrients and pesticides out of runoff.

This science note provides guidelines on selecting and establishing plants for waterways in soil conservation layouts. Such plants would also have an application for use in dams by washes, gully control measures, and corridors used for roads, railway lines, pipes and power lines. It should be read in conjunction with the science notes L270 *Soil conservation waterways—construction and management* and L272 *Soil conservation waterways—planning and design*.

Species

The plants listed in Table 1 could be considered for a range of stabilisation projects. They are mostly exotic grasses that are commonly grown in agricultural areas. Local advice should be obtained to determine the most suitable species or cultivar for a particular situation. Issues to consider when selecting a species include:

- a sod-forming grass that has runners (stolons) or rhizomes and a dense root system offers the best erosion protection
- availability and viability of seed
- speed of establishment
- plants with non-viable seed are planted vegetatively
- tall plants retard flows and require regular slashing
- climate and soil type
- tolerance to drought, frost, salinity and shade
- weed potential.

Most native species grow in tussocks and have less resistance to erosion than grasses with stolons or rhizomes. However, native species may be the best option where suitable stands already exist in a drainage line that will be used as a soil conservation waterway. Queensland Blue Grass produces a close growing sward providing good protection from erosion.

Other native species that could have potential for use in waterways are *Chloris divaricatissima* and *Chloris truncata* in southern Queensland and *Calyptochloa gracillima* on poorer soils in Central Queensland. Kangaroo grass (*Themeda triandra* formerly *Themeda australis*) and Black Spear Grass (*Heteropogon contortus*) would also be suitable for much of Queensland.

Planting waterways

Recently constructed waterways with no cover are most vulnerable to erosion during the wettest months from December to March. Depending on seasonal conditions, it could take two to three years before there is sufficient cover to provide a stable waterway that is ready to accept runoff from contour banks.

Most grass species have small seeds that may lead to germination difficulties on the cracking clay soils that are common in many Queensland cropping lands. Moist seedbed conditions, coupled with cloudy and showery conditions give the best results for establishment. Planting in hot, dry conditions should be avoided.

As the area occupied by a waterway is relatively small the best quality seed should be used with planting rates two or three times the recommended rates for pastures. The use of a general fertiliser containing the required plant nutrients is recommended. Some species require planting by runners or sods. If available, irrigation will speed up the rate of establishment

A crop such as millet (summer) or oats (winter) can be planted in a waterway to provide rapid erosion protection. A waterway grass can be planted at the same time or into the crop stubble after it has been slashed. Light sowing rates should be used for the cover crop to provide good cover without providing too much competition for light, water and nutrients for the emerging waterway grasses. Irrigation would speed up plant establishment.

Further information

The following websites provide relevant information:

- www.tropicalgrasslands.asn.au
- www.daff.qld.gov.au
- www.pasturepicker.com.au
- www.nativeseeds.com.au
- www.qtpa.com.au (Turf Queensland)
- www.weeds.org.au

This and other science notes are available from the Queensland Government website www.qld.gov.au – search 'science notes'. For further information about this science notes series phone **13 QGOV** (13 74 68) – ask for science notes – Land series L271. Other science notes related to this topic include:

- L270—Soil conservation waterways – construction and management
- L272—Soil conservation waterways – planning and design

For further information visit < <http://www.qld.gov.au/environment/land/soil/>> or email soils@qld.gov.au.

Table 1: Species to consider for use in soil conservation waterways and other stabilisation projects in Queensland cropping areas

Seek local advice before choosing a species (or one of its cultivars) for a specific situation.

Species	Location					Soils	Stolons/Rhizomes	Comment
	Darling Downs	Western Downs	South East Qld	Central Hgls	North Qld			
African star grass <i>Cynodon nlemfuensis</i>	✓	✓	✓		✓	CL to C	✓	Planted vegetatively. Has not survived dry conditions in the Central Highlands. Weed potential where rainfall >850 mm.
Angleton grass <i>Dicanthium aristatum</i>	✓	✓	✓	✓	✓	L to C	x	Also called Floren bluegrass Has no stolons but provides reasonable ground cover. Especially suited to heavy clays.
Blue couch <i>Digitaria didactyla</i>	✓		✓			S to L	✓	Fine leaved, creeping grass commonly used in lawns. Browns off in drought but responds quickly to rainfall. OK for sandy, low fertility soils.
Buffalo grass <i>Stenotaphrum secundatum</i>			✓		✓	SL to LC	✓	Many varieties including Sir Walter. Also called soft leaved buffalo grass. A common lawn species. Planted vegetatively. Tolerates shade.
Creeping bluegrass <i>Bothriochloa inculpta</i>	✓	✓	✓	✓	✓	L to C	✓	Tolerates drought and low fertility. Hatch variety prefers clays. Bissett Variety prefers clay loams and its runners root better than Hatch.
Green couch <i>Cynodon dactylon</i>	✓		✓		✓	S to C	✓	A low growing species used in lawns, salt tolerant.
Humidicola <i>Brachiaria humidicola</i>					✓	S to C	✓	Also called Koronivia grass or Tully grass. A vigorous creeping grass for high rainfall. Tolerant of waterlogging, salinity and very acid soils.
Indian bluegrass <i>Bothriochloa pertusa</i>				✓	✓	SL to C	✓	The main recommendation for soil conservation waterways in cracking clay soils in the Central Highlands. Can be slow to establish.
Kikuyu <i>Pennisetum clandestinum</i>	✓		✓		✓	L to C	✓	Planted by runners or seed. Dense creeping grass in high fertility soils in subtropical areas or tablelands. Prefers annual rainfall >750mm.
Makarinkari grass <i>Panicum coloratum</i>	✓	✓	✓		✓	C	x	Also called Bambatsi panic grass. Deep fibrous root system, best suited to heavy clays. Drought resistant. Requires regular slashing.
Narrow leaved carpet grass <i>Axonopus fissifolius</i>			✓		✓	S to LC	✓	Previously known as Axonopus affinis. Also referred to as mat grass. Planted vegetatively. Common in low fertility, run-down dairy pastures in South Queensland.
Pangola grass <i>Digitaria decumbens</i>			✓		✓	SL	✓	Planted vegetatively, suitable for light textured soils. May need irrigation to get established.
Paspalum <i>Paspalum dilatatum</i>			✓		✓	S to C	x	Lacks stolons and requires regular slashing. Suitable for wetter conditions but has some drought tolerance. Prefers high fertility.
Pinto peanut <i>Arachis pintoii</i>			✓		✓	S to L	✓	Used as a ground cover in frost free areas but would have suitability for waterways in higher rainfall areas. Requires an inoculant.
Premier Digit Grass <i>Digitaria eriantha</i>	✓	✓	✓		✓	S to CL	x	A tufted species suitable for poorer, light textured soil types, cold tolerant, slow establishment, very persistent..
Queensland Blue Grass <i>Dicanthium sericium</i>	✓	✓	✓	✓	✓	C to HC	x	A native species. Has no runners but provides good cover. Often colonises a waterway after other species no longer persists.
Rhodes Grass <i>Chloris gayana</i>	✓	✓	✓	✓	✓	L to C	✓	Has a number of cultivars. Often used in waterways on brigalow soils on the Western Downs. Does well on sodic soils in the south east. .
Signal grass <i>Brachiara decumbens</i>					✓	S to C	✓	Provides a dense cover. Grows in a wide range of soils in higher rainfall areas but is susceptible to waterlogging. Responds to good fertility.
Strickland grass <i>Digitaria milanjana</i>	✓	✓			✓	S to CL	✓	Also called Tall Finger grass or Jarra digit grass. Suitable for poorer, light textured soil types. May require irrigation in North Queensland.
Sweet smother grass <i>Dactyloctenium australe</i>			✓		✓	S to L	✓	Also called Durban grass. Planted vegetatively. Suitable for shady conditions. Used as a ground cover in orchards and in lawns.
Water couch <i>Paspalum distichum</i>			✓		✓	L to C	✓	High salt tolerance, suitable for poorly drained waterways.
Zoysias <i>Zoysia japonica</i>			✓		✓	L to C		Used in lawns. Slow to establish (the variety Empire is the fastest) but provides good cover, shade tolerant.

Soil abbreviations: S=sand; L=loam; SL=sandy loam, CL=clay loam, C=clay: HC=heavy clay