

## Grasses and Legumes for Erosion Control

### Introduction

On the volcanic ash soils of the Bay of Plenty, pasture species are often the first line of defence against soil erosion, particularly sheet, rill and gully erosion. For sustainable land management dual purpose (forage/ground cover) species should be used for pasture renewal. Ongoing management is also important. Even the most persistent species can be severely damaged by inappropriate grazing regimes and lack of maintenance.

### Pasture Species

To minimise soil erosion in pastures consider the inclusion of mat-forming species (e.g. browntop) in seed mixes as well as species that regrow quickly after grazing. If pastures are subject to a high grazing pressure in winter ensure the pasture mix contains species with good winter growth rates such as hybrid ryegrass, phalaris, grazing broom or prairie grass. (see table overleaf). For coarse textured, droughty soils where many pasture species tend to show low vigour or poor persistence, the following species/cultivars may be considered.

### Grasses

#### Pubescent wheatgrass (*Agropyron tirchophorum*)/ Intermediate Wheatgrass (*A.intermedium*)

Rhizomatous, sod forming, frost and drought tolerant. Slow to establish but persistent and good companion plant for legumes. Seeding rate: 5 kg/ha drilled, 15–20 kg/ha oversown.

#### Tall Oat Grass (*Arrhenatherum elatius*)

Bunch grass with weedy tendencies but very frost hardy and moderately drought tolerant. Too competitive for mixing with legumes. Good winter/early spring forage but nutritive value

declines after seed set. Seeding rate: 3-5 kg/ha drilled, 10-15 kg/ha oversown.

#### Cocksfoot (*Dactylis glomerata*)

'Grasslands Kara' cultivar is best for cold sites, while 'Grasslands Wana' is good for low fertility sites. Good autumn forage in grass mixes but out competes legumes. Seeding rate: 4–6 kg/ha drilled, 8–10 kg/ha oversown.

#### Chewings Fescue (*Festuca rubra*)/Sheep's Fescue (*F.ovina*)

Hardy, low stature bunch grasses. Relatively low productivity but good for revegetation. Seeding rate 2kg/ha drilled, 6 kg/ha oversown.

#### Phalaris (*Phalaris aquatica*), 'Grasslands Maru'

Not suitable for higher altitude cold areas, some toxicity risk so should not be a dominant component in pastures. Seeding rate 1–2 kg/ha drilled, 4-5 kg/ha oversown.

### Legumes

#### Birdsfoot trefoil (*Lotus corniculatus*) 'Grasslands Goldie'

Sow with other species because of winter dormancy, although this can be brief. Seeding rate: 3-5 kg drilled, 6-8 kg/ha oversown.

#### Lucerne (*Medicago sativa*)

Standard dryland forage. Leaves ground bare in winter so best mixed with other species such as wheatgrass or phalaris. Seeding rate: 6–10 kg/ha drilled, 12–20 kg/ha oversown.

#### Sweet Clover (*Melilotus alba*, *M.officinalis*)

Biennial, useful for early flush of growth that can support establishment of more persistent species. Seeding rate: 3–5 kg/ha drilled, 8–15 kg/ha oversown.

#### Subterranean clover (*Trifolium subterraneum*)

Annual species with good seedling vigour. Persists by reseeding, but leaves ground bare in late summer/early winter. Seeding rate: 1–2 kg/ha drilled, 6–8 kg oversown.



Grasses used for erosion control

### Establishment

When preparing seed mixes for sowing, select species which are compatible and have similar management requirements. For example, tall fescue and perennial ryegrass are incompatible, while white clover is too aggressive for mixing with *Lotus* species on fertile sites. Avoid using too many species in a sowing mix as this often leads to wasteful competition. Consult seed merchants and agricultural consultants for the best local knowledge. Inoculate legume seed with an appropriate strain of *rhizobium*.

When oversowing species with small seed, use pelletised seed if available.



Species	Fertility Needs	Drought Tolerance	Seed Mix Compatibility	Ease of		Persistence
				Establishment	Management	
<b>Grasses</b>						
Perennial ryegrass	4	2	3	5	5	5
Hybrid ryegrass	4	1	4	5	3	3
Cocksfoot	3	5	2	5	3	5
Tall fescue	5	4	3	3	4	5
Phalaris	4	5	4	3	3	5
Grazing brome	3	4	3	3	3	4
Prairie grass	4	3	2	3	1	3
Browntop	1	3	3	3	3	5
<b>Legumes</b>						
White clover	4	2	4	3	4	5
Red clover	4	4	4	4	4	2
Birdsfoot trefoil	2	5	1	3	3	2
Sulla	3	4	3	3	3	2
Subterranean clover	3	1	4	4	4	4

Source: The Grasslands Range of Forage and Conservation Plans (1995) AgResearch, Palmerston North

To reduce competition from existing pasture when oversowing, spray with a herbicide beforehand or 'tread up' the pasture with a short period of intensive stocking. Seed can then be broadcast and be worked in under moderate stocking. Sheep are the preferred stock for this operation.

Autumn is generally the best time for pasture establishment/renovation, when soil temperatures are reasonably high and sufficient rainfall can be relied upon. Some specialised forage species (e.g. chicory) are best established in spring. During establishment be alert for insect pests (e.g. slugs) and if required, spray early to control broadleaf weeds.

### Management

Care of pastures will ensure they give good production, have few weed problems and suffer little soil erosion. Avoid overgrazing in summer and heavy or prolonged rotations in winter, which will open up bare ground and expose it to loss of soil (and fertility) or weed infestation. Remember that heavy treading pressure compacts soil, especially when it is wet, reducing

soil aeration and plant growth, while increasing run off and erosion.

To optimise pasture utility while maintaining good pasture health, use of subdivision fencing to separate areas which can withstand heavier grazing (i.e. fertile gully floors or terraces) from areas susceptible to erosion damage i.e. steep sidlings with shallow soils. Apply fertilisers regularly and in the correct proportions to ensure pasture productivity is optimised.

Excess fertiliser application will not be utilised by the pasture and will leach into ground water where it eventually contaminates local water supplies. Make regular use of soil tests to ensure fertiliser is used efficiently and economically.

Also consider stock behaviour. Site troughs, gates and tracks wherever possible to alleviate localised areas of intensive treading, and encourage stock to distribute more evenly throughout paddocks. Take pressure off established camping areas by planting more trees in paddocks, and prune these as they establish to remove the permanent shade zone at the base of trees.



For further information and advice, contact your local land management officer at Environment Bay of Plenty:

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*This fact sheet was last updated July 2004*