

Salt Tolerant Pastures



Salt tolerant species in Tasmania

Saline land in Tasmania generally occurs in valley floors, localised depressions and along drainage lines. Salinity process in these areas often leads to waterlogging for extended periods too, so management actions generally need to address both saline and waterlogged soils.

A number of pasture and shrub species are suitable to Tasmanian conditions. These species have varying salinity and waterlogging tolerances and importantly, have different establishment and management requirements. Experience in Tasmania and elsewhere shows that establishment of these species is difficult and risky. For successful establishment it is important to understand the salinity and waterlogging conditions of your paddock, carefully choose the most suitable species for the conditions and apply appropriate site preparation and on-going management.

Phalaris is a persistent perennial with good tolerance to drought, waterlogging and pasture pests. It is best suited to heavy clay soil. Phalaris must be grazed hard in spring to avoid accumulating large amounts of unpalatable leaf and stem. Autumn grazing should be managed to reduce the risk of phalaris staggers.

Cultivars; Australian, Sirosa, Holdfast and Uneta
Salinity Tolerance; moderate (<6dS/m ECse)

Persian Clover (sometimes called Shaftal Clover) is an annual. The subspecies *resupinatum* has a good level of hard seeds and is suitable for permanent pastures. The species is intolerant of acid sandy soils, but highly tolerant to waterlogging. If dominant in a pasture there is a risk of bloat in cattle.

Cultivars; Nitro Plus, Prolific
Salinity Tolerance; moderate (<8dS/m ECse)

Balansa Clover is a hard-seeded annual. Regeneration has been unreliable in Tasmania as our mild summers are slow to break hard seed coatings. It is susceptible to red-legged earthmite and has a high bloat risk. Balansa clover is not suited to deep sandy soils and it is highly tolerant of waterlogging.

Cultivars; Bolta, Frontier
Salinity Tolerance; moderate (<8dS/m ECse)

Strawberry Clover is a long-lived prostrate perennial that tolerates poorly drained, moderately alkaline and saline

soil. It is favoured by continuous grazing that reduces competition from grasses as it is not vigorous as a seedling. Establishment in competition with the grass species recommended for saline areas will be uncertain, but it is still recommended in a seed mix for production in the first two years.

Cultivars; Palestine, Onward
Salinity Tolerance; Tolerant (<10dS/m ECse)

Fescue grasses are perennials and persistent once established (seedling vigour is low). Summer active cultivars are well suited to heavy textured wet soils.

Cultivars; Advance, Au Triumph, Demeter, Quantum
Salinity Tolerance; tolerant (<10dS/m ECse)

Winter active cultivars are best suited to sites with extremely dry summers.

Cultivars; Resolute, Prosper, Flecha
Salinity Tolerance; Tolerant (<10dS/m ECse)

Tall Wheat Grass is a drought tolerant, summer active, tussock-forming perennial. It is well suited to areas growing Buck's Horn Plantain and Sea Barley Grass. It will not persist in soils that are waterlogged over spring and into summer. Seedlings are weak, so weed control before sowing is essential. If sown with Balansa Clover, stop grazing at the first sign of flowering of the Clover and then crash graze when seed set is complete. Do not graze waterlogged sites in winter. This species must be grazed heavily in spring to prevent it becoming rank.

Caution must be exercised when using this species in riparian, coastal and wetland areas due to its potential invasiveness.

Cultivars; Dundas, Tyrell
Salinity Tolerance; Highly tolerant (12-25dS/m ECse)

Puccinellia is a winter active perennial grass. It is the most salt tolerant of all commercially available grasses and is suited to areas bare due to salinity. It will grow in areas too waterlogged for saltbush and Tall Wheat Grass. The plant should not be grazed in the first year and only lightly grazed in the second.

Cultivars; Menemen
Salinity Tolerance; Highly tolerant (12-25dS/m ECse)

Saltbush. Trials in Tasmania have shown that Mediterranean Saltbush (*Atriplex halimus*) will successfully establish, potentially providing valuable livestock fodder in very saline environments (even salt scalds). However, persis-

tence under grazing is less certain, except in low to non-saline environments. Plants will establish from seed or seedlings. They are not very tolerant of waterlogging; in very wet sites seedlings should be planted on mounds, in rows 1.5-2.0m apart, with plants spaced at around 2 metres. Rotational grazing is essential. The leaves can have very high protein levels, but high salt concentrations in the leaves limit stock intake. Ensure stock have good quality drinking water.

Salinity Tolerance; Highly tolerant (12-25dS/m ECse)

Paddock preparation

Soil testing is essential to determine salinity levels and fertilizer requirements. Fence areas to be sown as grazing will need to be restricted for a relatively long period as these species are slow to establish. Surface drainage is also likely to assist establishment and production, but discharge of saline water may create difficulties for downstream water users (see Technote 5). Raised beds for permanent pastures in saline areas are being trialed in S.A..

Weed control before sowing is crucial as these species are weak competitors. Blanket spraying or strip application of herbicide should be determined according to the area and severity of the area to be rehabilitated. Strip spraying is recommended for highly saline areas. Direct drilling of salt tolerant pastures in Tasmania has to date not proven highly successful. It is therefore recommended to lightly cultivate the soil prior to sowing. This provides soil tilth and encourages some leaching of salts during the winter months. Seed-soil contact could also be improved in dry soils through rolling.

Sowing the pasture

Saline paddocks generally have variable soil salinity levels, so it is often best to sow a mix of species that will establish in the micro areas they are most suited too. Select only one cultivar per species and mix the seed for sowing.

Seed selection should be based on your soil test results. General mixes can be used however for best results contact your local advisor, NRM organisation or DPIW.

In areas with low pH the seed should be drilled with lime and super. Legumes must be inoculated with the appropriate rhizobia and are often pre-inoculated by local seed merchants (but check the time in storage). Additional amounts of phosphorus and potassium will generally aid establishment and subsequent production. Pasture pests need to be monitored pre and post emergence.

Seed of Tall Wheat Grass and Saltbush must be fresh as germination declines rapidly if the seed is more than two years old. As a general rule, increase sowing rates for the most saline areas, particularly of the most tolerant

species and, consider double-drilling these parts of the area to be sown.

Pasture management

Most of these species recommended for saline areas have low seeding vigour, so weed competition must be reduced by spraying in the lead-up to sowing. Pest control, particularly of red-legged earthmite is also crucial. Grazing must be delayed and perhaps avoided in the first year, to avoid compaction and pugging, allow plants to develop adequate root systems and avoid young plants being pulled out.

These pasture species require top-dressing with fertiliser in the same way as normal pastures. The grasses in particular will respond to both phosphorus and nitrogen applications in autumn and spring. Trials in South Australia showed that nitrogen fertiliser increased carrying capacity of Tall Wheat Grass by 2 dse/ha. Potassium may be needed for legumes; use soil tests to determine requirements.

Balansa Clover is unlikely to persist more than 2 years where grazing is managed to get best performance from the Tall Wheat Grass.

Weed risks

Tall Wheat Grass has established as a weed in some riparian zones throughout Australia, so caution is necessary. Avoid planting in a buffer zone at least 20 metres wide adjacent to waterways, wetlands and stands of native vegetation. The simplest approach is to manage grazing so that plants do not set seed. Once established, graze from spring through summer and into autumn. This has the added benefit of preventing a decline in pasture quality as plants become rank and unpalatable if left to flower. For further information regarding the potential weed risk of Tall Wheat Grass, contact your local DPIW weeds officer.

Puccinellia also has the potential to become invasive like Tall Wheat Grass. Allow buffer zones, particularly to public land and areas of native vegetation.

Further reading. "Saltland Pastures in Australia. A Practical Guide. By E.G.Barrett-Lennard. 2003

* ECse is the Electrical Conductivity of a saturation extract.

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