



The Place of NyPa *Distichlis* spp. in Wet Saline Landscapes of Australia

Summary: *Distichlis* spp. are *perennial*; *rhizomaceous*, *euryhalic*, *eurythermic* salt grasses occurring in the inter-tidal zone from Canada to Argentina, Australia and Sudan. Because *Distichlis* spp are highly variable, selections and breeding have been undertaken in the US over some 20 years for traits useful to humans with certain varieties patented by NyPa Incorporated, a US based corporation. These have since been introduced into Australia, North Africa, Spain and Central and South America for evaluation purposes¹. Three different cultivars, NyPa Forage™, NyPa Wild Wheat® and NyPa Turf™ have shown themselves to be able to produce fodder, grain or amenity benefits respectively and environmental services by improving soil structure, drainage and using saline groundwater in a wide range of Australian conditions once established².

Plant Growing Characteristics: Being adapted for *inter-tidal* living, the plants produce highly in saline waterlogged conditions. The plants grow well over a range of soil types with the fastest spread being achieved in sandier textured soils at the Wickepin site.

Perennial: they need planting only once to produce a dense year round cover.

Rhizomaceous: they establish and spread strongly through their roots, which via a *rhizocanicular* effect, facilitate percolation and improve soil structure and organic content. Their roots follow the saline water table down greater than a metre, effectively utilising saline water for production while tending to depress saline water tables. The roots have pronounced *aerenchyma*, inner ‘tubes’, providing gas exchange from the leaves to the roots enabling growth in anaerobic conditions. The plants naturally regenerate, older rhizomes die off after several years whilst new rhizomes establish, providing new drainage lines; a so called ‘swiss cheese’ effect, greatly improving the organically active carbon store.

Euryhalic: they tolerate a wide range of salinities, and are true halophytes (salt loving) so that production increases as salinity increases up to peaks below seawater. Having bi-cellular salt glands they do not store salt in their tissue or seed cells, but exude it at the leaf surface, to blow away or drop onto the ground, and then to either drain away or back to the water-table after rain.

Eurythermic: they tolerate a wide temperature range, however being a C4, they produce best at high temperatures (30°C - 50°C), tending towards dormancy in lower temperatures.

Conclusion: The place of *Distichlis* spp. is at the bottom of the saline land profile where it can 'anchor' saline scalds, tending to reduce saline water tables to the benefit of up-slope crops while improving soil structure, drainage and organic matter. The NyPa Forage has produced 14 tonnes dry matter/ha and achieved protein concentrations up to 17%, the NyPa Wild Wheat can produce grain yields of 2 tonnes/ha (overseas results) and the NyPa Turf, a soft green mat. They produce during the summer and tolerate salt-water inundation and water logging in winter. They may be able to grow as companion crops to annual cereals in moist flats, tending to drain the cereal root zone of saline water in the summer and autumn leaving the cereal to grow in the winter and spring. They may also be productive while providing environmental services utilising oil field soaks, sodic mine dumps or industrial wastewater. Other suggested uses for Australia include extracting salts from water columns, concentrating saline irrigation drainage water for more economical disposal and producing feedstock for aquaculture.

¹ Yensen N A. Review of *Distichlis* spp. for Production and Nutritional Values, in: *Arid Lands; Today arid Tomorrow, and, Proceedings of 'Saline Agriculture and new Halophyte Crops' Conference*. UA Tucson, Arizona, Oct 1985.

² Leake J E, Barrett Lennard E G, Sargeant M, Yensen N A & Prefumo J. *NyPa Distichlis Cultivars: Rehabilitation of highly saline areas for forage, turf and grain*. RIRDC (with DAWA, SARDI & NRE support) 2002 (in press).