




NyPa Forage Productive Uses; Costs and Establishment in the Moora Region

Making something from worthless land

For discussion at a meeting on the
31st of March 2015

Objectives of discussion



To outline the potential uses of **NyPa Forage**  in the Moora region to:

- **Utilise saline ground water productively while improving soils**
- **Reduce the pressure in the paleochannel** threatening the road, railway and farm land in the catchment,

To discuss the background and options for:

- **Establishment methods and costs**
- **Pricing** of the rights to use the plants based on large scale and coordinated planting.

Gives value to degraded land

deep root structure uses salty water and improves soil



NyPa Forage second year at Wickepin 2003

Groundwater about 16,000 ppm

- **Water use is significant**, say 1500mm pa including rain. Impact on ground water level depends on aquifer below,
- Action of roots **takes salt out of the root zone** and exudes it through its leaves to wash away or back into the aquifer
- May enable '**companion cropping**' on land being impacted by salt
- **Provides good feed** when managed correctly

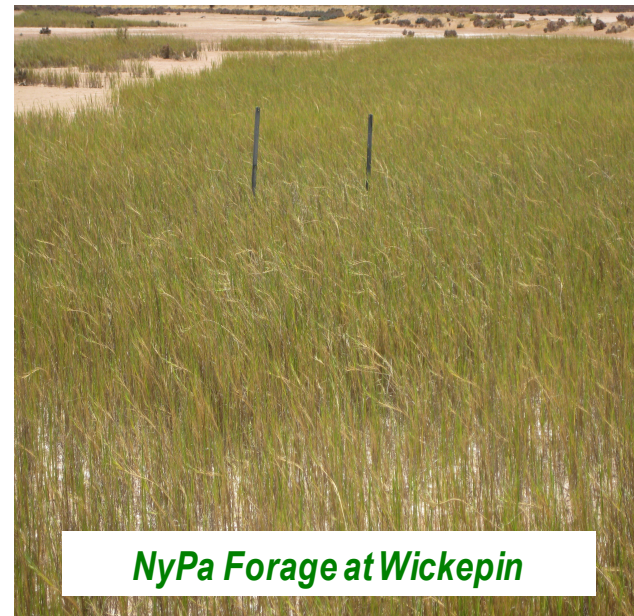
Slowly spreads and is durable



- 2004 Establishment 10 years; the sign has worn out, the NyPa thrives



- 2007 NyPa spreading



NyPa Forage at Wickepin

Salinity of groundwater 20,000 ---- 40,000 ppm, Plants spread into saltier areas. It took 20 years for salinity to take over this formerly prime wheat land, it takes time to fix

How does it work?

Salt and water logging



- Salt exuded from NyPa Forage leaf salt glands
- Roots with air gaps for gas drainage (*aerenchyma*)
- Improved soil structure
- Soil health, carbon

Dry Land Use



NyPa Forage at Wickepin



NyPa Forage at Wickepin

- Summer autumn reserve
- In drought can fertilize and graze
- Right side of bottom photo was fertilized with N)
- Recovers well after fire- Left side of top photo was burnt

Grazing in South Aust.



NyPa Forage at South Australia, Coorong



NyPa Forage at South Australia, Coorong

- Green NyPa forage in the summer on a former salt flat,
- dry hills in the background
- Cattle grazing NyPa rotationally on a gypsum flat, properly fertilized

Irrigation greatly improves production



NyPa™ Forage baled as cattle feed USA

- NyPa Forage, utilising 90% + of nutrients in saline effluent from land based Aquaculture, (now used at Morawa Western Australia)

Lymbery et al 2009

Irrigation from The Paleochannel



- Irrigation with Paleochannel water is ok on sandy soils but possibly damaging to heavier soils due to salt build up (R Speed, DAFWA)
- The NyPa forage will grow well in both soil types and reduce salt impacts in clay soils by moving salt out of the root zone and will use ground water approaching the surface
- Alternate 'companion cropping' may become possible, forage/ lucerne, crops, then forage etc

Nutritional Value;

Management (Fertilizer & rotational grazing)



- **Energy and protein values vary widely with age, grazing treatment and fertilizer,**
- **Best values with 3 clippings (grazing) a year, 100 kg DAP, CP 8% to 11% (13% with higher N) Meadow hay quality 9.6 mgJ/kg**
- **Other benefits; Improved soil health,**
 - **hydraulic conductivity (drainage), soil structure**
 - **no salt accumulation in root zone**
 - **Improved organic matter,**
 - **Carbon sequestration 8.5 t p ha 9 years,**
(Sargeant 2009)

Marketing



- Each district and application is different, hence we need regional representation, for productive and environmental uses
- Marketing actions
 - NyPa Australia grants rights, receives payment
 - A Regional Representative arranges contracts and supply of plants
 - Moora catchment council or equivalent may advise and promote to NRM uses the region

Establishment Systems

Small Scale



- **Most small areas have been established by vegetable or tree planters - labour intensive**
- **Plants can spread about a metre a year depending on soils and moisture, common spacing** (Experience in SA and Wickepin)
- **Cost depends on plant spacing**
- **Moora 3 metre rows with one metre centres**
- **Kelly experience strongly suggests irrigation at planting for Moora district**

Establishment Systems

Large scale



- **A mechanical system can work with larger areas; spreading tops and roots onto ploughed wet land and rolling it in**
- **Kelly experience still indicates having the capacity for one subsequent watering if soils dry after planting**

References

More than 20 research papers have been produced on NyPa; references for this talk include

Leake JE, Barrett-Lennard EG, Sargeant MR, Yensen NP, Prefumo J (2002)
NyPa *Distichlis* cultivars: Rehabilitation of highly saline areas for forage, turf and grain.
Rural Industries Research and Development Corporation Publication number 02/154.

Barrett-Lennard EG (2003b) 'Saltland Pastures in Australia: A practical guide.'
(Land, Water and Wool Sustainable Grazing on Saline Lands Sub-program: Canberra).

Leake J E. Salinity Seminar Speaker. Hydrological Society of South Australia, Australian Geomechanics Society, South Australian Chapter, and International Association of Hydrogeologists, Australian National Chapter. *The role of NyPa Distichlis spp. Cultivars in altering groundwater & soil conditions – a work in progress July 2003(refereed)*

Sargeant M.R PhD thesis The agronomy of *Distichlis spicata* cv. yensen-4a (NyPa Forage) and its potential role as a forage plant on saline land 2009

Ghazi Abu Ruman, Ed Barratt Lennard, Tim Colmer Australian Turfgrass Management UWA, Under the WA Rural Towns program 2009

Elders on several Grape rootstock trials SA

New Technologies for Sustainable Commercial Finfish Culture Partridge G.J., Sarre G.A., Lymbery A. J., Jenkins G.I., Doupe R. G., Kay, G.D, Michael, R. J., Willett, D and Erler D.

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