

Pasture species distribution in ponded pasture on an acid-sulphate-soil scald site

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Acid-sulphate soils (ASS) are a problem in coastal areas when low-lying coastal land is drained, water tables fall, and acid-sulphate layers are exposed to the air. Acid-sulphate soils is the general term given to naturally occurring sulphur-rich soils, mainly iron pyrite. From 10,000 years ago to the present, ASS have formed in coastal estuaries and waterways. These areas now form the coastal floodplains of Australia. Left undisturbed, ASS are neutral pH and are known as potential ASS (PASS). However, if exposed to air by disturbance or over-drainage, they become acidified and are known as actual ASS (AASS). When exposed to air, sulphuric acid is formed, leaching iron, aluminium, and other metals from the soil. The impacts to the land include slumping, changes in vegetation, and acid and salt scalding. The resulting leachate pollutes waterways, destroys aquatic habitat, and kills fish.

In the scald areas, the extreme acidity of the soils (pH water, 2.9), formation and accumulation of sulphidic metal salts, and elevated aluminium make these sites extremely hostile environments for plants. In a large scald area (125 ha) in the Clybucca area on the Mid North Coast of New South Wales, drains were dug in the 1950s; crops were grown; and accumulated peat layers were burnt, further exposing the soil. The soil was further removed by wind erosion. With the use of a weir and drop boards in drains, ponding has been used to rewet the soils, in an attempt to reduce the further acidification and to contain acid on site. Native pasture

species established in the ponded area and showed a natural ability to cope better with the extreme conditions. It is presumed that the seed came in flood water as it seems unlikely, given the loss of peat and top soil, that the seed was *in situ*. Anecdotally, it is known that pasture species change with elevation across ponded areas.

A botanical strata survey was conducted at the Clybucca site in March after rain in the catchment had led to the ponds being refilled after 2 years of drought. Small scald areas had started to reform. This back-swamp country is very flat and low, between 1 m and -0.2 m AHD. (AHD is the Australian Height Datum that represents the mean sea level, approximately half way between high and low tide.) The survey showed that small differences in elevation did make a large difference to species composition (Figure 1). In the higher edges of the pond, couch (*Cynodon dactylon*) is the dominant species. As the slope falls by 20 cm and the area is slightly wetter, the native slender mudgrass (*Pseudoraphis paradoxa*) is the predominant grass, but any slight hump in this strata is still couch-dominated. In slightly deeper scalded areas, the presence of dead *Eleocharis* tussocks was noted, with new *Eleocharis* growth occurring. Going deeper into the pond, the predominant grass is water couch (*Paspalum distichum*) (Figure 2). Further trial work will monitor growth and feed quality of water couch in comparison to couch.

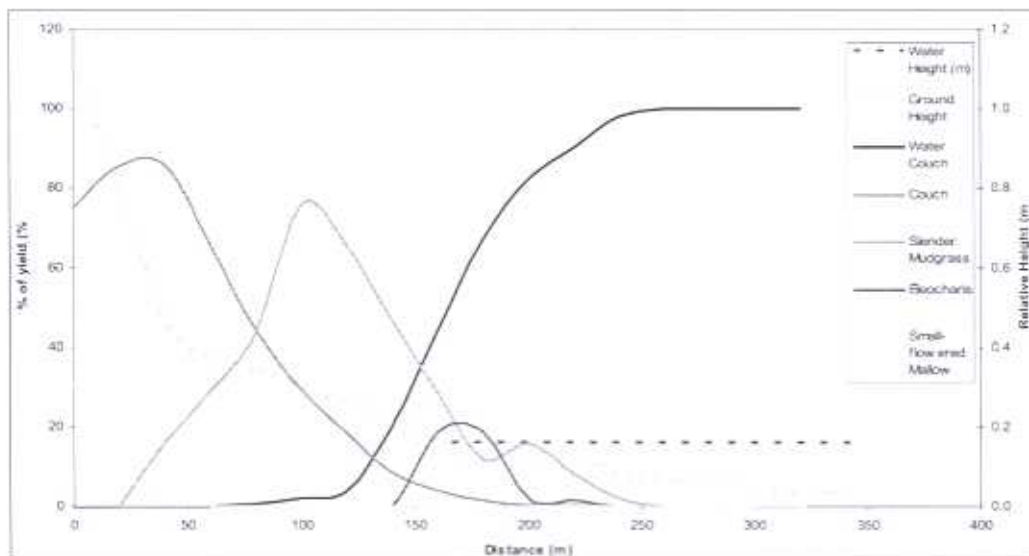


Figure 1. Generalised species trends with height, Clybucca ponded pasture, March 2003.



Figure 2. This is our trial site with pasture cages in ponded water couch. And, yes, the water is just below Michael's gumboot tops.