Session: Human Impacts on Flood Pulsed Systems
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How flooding, competition and grazing influence *Phyla canescens* invasion into floodplain wetlands, Australia

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The disturbance provided by seasonal flood pulses is recognised as a major factor shaping wetland plant community composition. Changes to such an historical disturbance regime in wetland systems can facilitate the invasion of exotic species. However, attempts to revert to a more 'natural' disturbance regime may not necessarily restore native dominance as this will depend upon the competitive interactions with invading species, and other agents of disturbance such as livestock grazing. Indeed, the success of attempts to reinstate an historical disturbance regime will be governed by whether the change causes mortality of the invaders or if the vigour of the native species is increased enabling them to out-compete the invaders. On numerous inland terminal floodplain wetlands in semi-arid regions of Australia's Murray-Darling Basin, water couch (*Paspalum distichum*) meadows are important feeding areas for colonial nesting waterbirds and are also highly valued for cattle grazing. However, these meadows are being transformed as water couch is being replaced by the alien species lippia (*Phyla canescens*), an invasive perennial forb from South America. In recent decades, water resources development for irrigated agriculture has substantially altered the water regime into these wetlands. Altered hydrological conditions are believed to have enhanced the competitive ability of lippia with respect to native species, facilitating its establishment in core wetland areas. In addition, grazing pressure from domestic livestock and native herbivores may be interacting to create conditions favouring establishment of lippia. This study investigated the competitive interactions between water couch and lippia under a range of water levels in both the field and glasshouse conditions to determine the influence of water regime on shaping plant community composition. In addition, GPS trackers on cattle were used to monitor patterns in grazing behaviour. In the field, an abrupt boundary was observed between zones dominated by water couch and those dominated by lippia, separated by a narrow ecotone of approximately 8m in which both species appeared to co-exist. Following flooding, the percent foliar cover of water couch in the ecotone increased but had returned to near pre-flood levels within 12 weeks post-flooding. GPS collar data from cattle showed a high level of grazing pressure on water couch communities. Following the field study, a factorial competition experiment using four inundation levels and six combinations of intra-and inter-specific competition was set up in a glasshouse. The results indicated that the while competitive ability of lippia is reduced with flooding, inundation does not actually cause mortality, while morphological changes in the lippia plant when inundated may assist its dispersal. Both water couch and lippia had similar competitive effects on each other across all water levels. These results indicate that it is unlikely that changes to the water regime that increase the period of flooding will eliminate lippia from these wetlands. Managers may need to reassess the effects of grazing pressure as it is evident that grazing levels are more uneven among wetland plant communities than previously thought.

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