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**A STUDY OF  
SEED PRODUCTION IN DESMANTHUS  
(*Desmanthus virgatus* L.)**



**A thesis  
presented in partial fulfilment  
of the requirements  
for the degree of  
Doctor of Philosophy  
in Plant Science  
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## ABSTRACT

*Desmanthus* (*Desmanthus virgatus* (L.)) is a tropical forage legume of potential use in cattle rangeland. Currently this potential is not realised because of unreliable seed supply. The effect of plant density, chemical weed control, pre-harvest and harvest techniques on plant vigour, seed yield and seed yield components (SYC) were studied in field trials (1994/1995 and 1995/1996) in South-East Queensland on an early ('Marc') and a late ('Bayamo') flowering cultivar.

Potential seed yield per plant of both cultivars was most influenced by inflorescence number. High levels of floret abortion (>50% regardless of pollinator presence) occurred prior to pod expansion. Cultivar differences in flowering pattern and pod dehiscence resulted in differences in presentation seed yield.

Plant density effects on vegetative growth, flowering pattern, SYC and seed yield of 'Marc' were investigated using a Nelder 4.5° radial spacing trial (3 to 160 plants/m<sup>2</sup>). Increasing plant population decreased branching, inflorescences per plant and flowering duration. However increasing plant density over the tested range caused a linear increase in potential seed yield (to 200 g/m<sup>2</sup>) at peak flowering although actual seed yields (120 g/m<sup>2</sup>) did not respond similarly to plant density changes probably because of masking effects caused by insect (psyllid) damage after peak flowering and problems with sampling fallen seed.

Three different pre-harvest treatments were examined to try to improve subsequent seed harvesting efficiency. These included application of pre-harvest (polyvinylacetate (glue), diquat (desiccant) and paclobutrazol (plant growth regulator)) treatments. None of these increased combine harvested seed yields in either cultivar. However desiccation did increase both seed germination percentage and the proportion hard seeds but decreased seed weight. The effects of paclobutrazol on SYC in this trial were inconclusive. However, a further study on the effects of paclobutrazol revealed that it increased branching and inflorescences per plant when applied at the onset of flowering but had no obvious effect when application was delayed until peak flowering.

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Combine and keyhole stripper harvesting systems both resulted in poor (12%) recovery of presentation yield in cv. 'Marc'. Combine harvesting decreased seed germination and the proportion of hard seeds, while unthreshed pods recovered by keyhole harvesting required additional threshing to remove seed. 'Marc' plants recovered poorly after harvest while frost caused premature abscission of 'Bayamo' pods and reduced harvest yields. This suggests 'Marc' may be economically viable as a commercial seed crop only in the first year and that satisfactory yields of 'Bayamo' will only be obtained in crops sown early or grown in delayed frost onset areas.

One pot trial and four field trials assessed the suitability of 28 pre-emergence and 44 post-emergence herbicides for use in desmanthus seed crops. Several new weed control options were identified though legume weeds remain difficult to kill selectively.

Results are discussed with reference to commercial desmanthus seed production practices.

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