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Decline in land condition in *Astrebla* grassland during prolonged drought in Australia

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Key words : *Astrebla* grassland , pasture condition , sustainable use , monitoring

Introduction Mitchell grasses (*Astrebla* spp.) are arid tropical tussock grasses endemic to Australia which become dormant during drought to escape desiccation and death . Drought is a regular feature of these grasslands . The Mitchell grasslands of Queensland , Australia , cover 33 ,800 ,000 ha , support 15% of the cattle herd , more than 40% of the Merino sheep flock and provide employment to 2500-3000 people . The short-term productivity of these grasslands declined as pasture yield was reduced in association with prolonged drought from 2001 to the present . Many Mitchell grass tussocks failed to respond to reasonable rains during the 2003-04 summer and this created concerns about extensive tussock death and hence reductions in long-term productivity and land condition . This paper presents preliminary results from surveys undertaken to quantify the extent of tussock death and resultant reduction in land condition .

Materials and methods A rapid appraisal technique (Hassett *et al.* 2000) was modified to assess pasture condition in western Queensland during winter 2005 and again in the same area in 2006 . Nearly 6000 observations of live and dead *Astrebla* tussock density (number/m²) and response (growth relative to the average) together with pasture species abundance were used to classify 1 ha sized roadside areas into A (good) , B (moderate) , C (poor) or D (degraded) condition classes .

Results and discussion Less than 10% of observations of condition were assessed as being in A (good) condition in 2005 and 2006 (Figure 1) . In 2005 , 60% of observations were in B condition but this declined to 41% in 2006 in association with continued drought and in conjunction with the frequency of C condition observations increasing from 32% to 53% . D condition was less than 5% in each year . This decline in overall condition was associated with a reduction in live *Astrebla* spp density and an increase in undesirable forbs and annual grass species . Orr and Phelps (this volume) provided evidence that plant species diversity analyses would strengthen the assessment of land condition in *Astrebla* grassland . Historically , land condition in these grasslands has improved through seedling recruitment associated with improving summer rainfall . However , predictions of greater rainfall variability and increased incidence of drought associated with climate change may restrict future recovery .

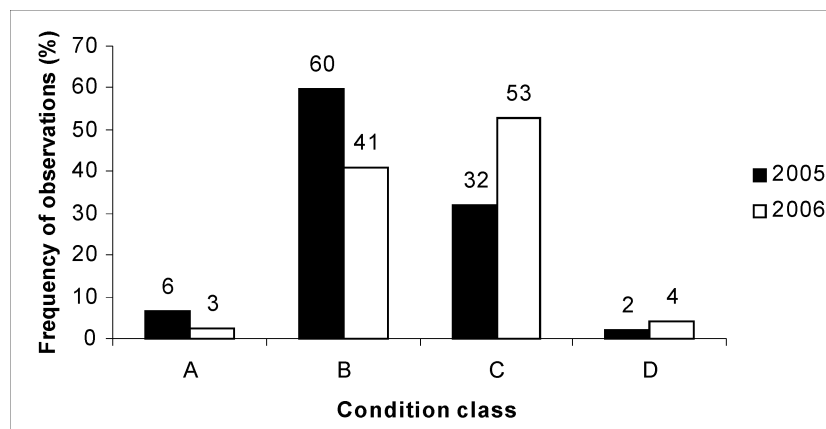


Figure 1 The frequency (% of total observations) of A (good) , B (moderate) , C (poor) and D (degraded) condition classes in Queensland's Mitchell grasslands in 2005 and 2006 .

Conclusions *Astrebla* spp . are generally drought tolerant , but the severe drought conditions of 2001-2006 resulted in tussock death and hence reduced land condition . Recovery may be limited under climate change scenarios of increasing droughts .

References

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