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Drought and the mulga lands of Queensland

by

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Abstract. A comparison in western Queensland of pasture yields and stocking rates indicate that the latter are similar on mulga (*Acacia aneura*) rangelands to those on the Mitchell grass (*Astrebla* spp.) rangelands despite large differences in pasture biomass. The theme is developed that the maintenance of stock numbers on mulga country during extended dry periods, and restocking too rapidly at the end of a drought is biologically unsound. An alternative approach outlines the need for financial incentives to encourage sound biological practices and for government assistance in the search for, and finance of, additional areas for small land-holders.

Introduction

Drought is a frequent occurrence in the mulga (*Acacia aneura*) rangelands of south west Queensland. The shires of Murweh, Paroo and Quilpie for example have been declared drought striken for 40 to 48% of the time between September 1964 and March 1981. Since the commencement of the most recent drought in 1979, road transport subsidies of $1.98 million have been paid to graziers in the south west while loans totalling $7.33 million and rail transport concessions of *c.* $2 million have been made statewide.

Droughts are expensive, but not only in terms of hard cash. They are also at the expense of the natural resources - soil and vegetation. In this paper, I look briefly at some biological consequences of maintaining stock on drought affected property in south western Queensland by feeding pushed mulga.

Stocking rates and pasture production

Stocking rates in a pastoral area with a substantial amount of shrub or tree cover would be expected to be considerably lower than on an open grassland with a similar climate because of the lower pasture production (Beale 1973). A further reduction in stocking rate could be expected where the potential pasture production is lowered due to a combination of low soil fertility and poor soil-water holding capacity. The number of stock which could be carried in a mulga community would be expected to be less than one

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half that in a Mitchell grass (Astrebla spp.) community, On the basis of forage yields (Figure 1) and assuming that the nutritional value of the two pasture types and their utilization levels are similar. In practice, this is not the case. The mean stocking rates employed in western Shires over a period of thirty years are shown in Table 1. Stocking rates of two of the shires dominated by mulga are in fact similar to those of the two shires dominated by open Mitchell grass downs. Quilpie shire, the most western of those with mulga, has the lowest rainfall and the least mulga, so stocking rates employed there are considerably lower than in the more eastern shires.

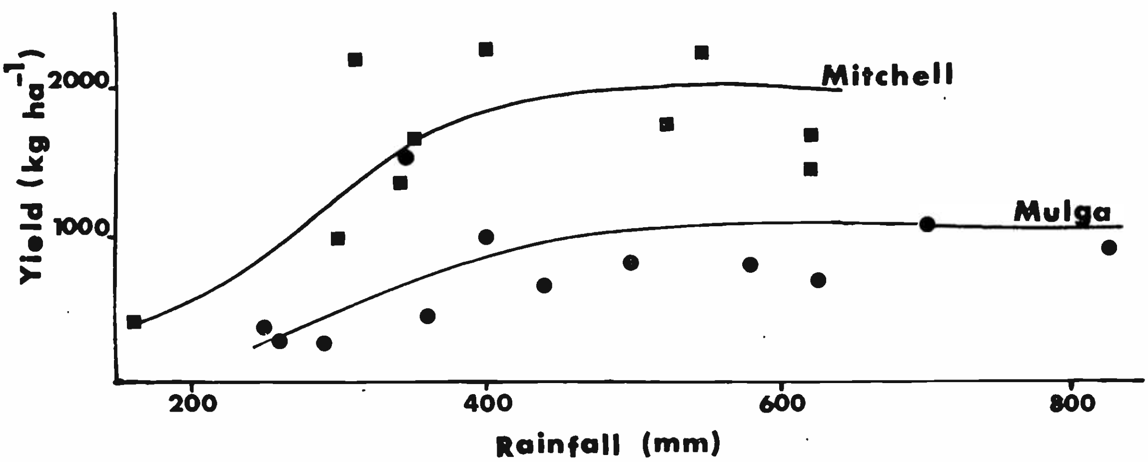

Figure 1. Mitchell grass and mulga pasture yields related to annual rainfall. Mean yields were 1600 ± 190 kg ha^{-1} and 740 ± 110 kg ha^{-1} for the former and latter respectively. An additional 50 kg ha^{-1} of mulga leaf maybe available to stock grazing mulga pastures. (Source of data: Ebersohn 1970, Orr 1975, Christie 1978, unpublished data of staff at the Charleville Pastoral Laboratory.).

The apparent ability of mulga country to support many more stock than would be indicated by the pasture yields is probably due to underestimating the quantity of mulga available to stock on standing trees, or on trees cut or pushed by the grazier. It is unlikely that the pasture yield data are greatly in error as they came from a range of sources. Further, the mean rainfall which produced the mulga pasture yields (460 mm ± 50 mm) was slightly higher than the geometric mean* (GM) of the long term annual rainfall for Charleville (446 mm) but almost identical to the GM for the period over which the stocking rates were calculated (465 mm). Thus these yields are probably representative of those which could be expected in these rangelands.

Table 1

Stocking rates[1] on 11 western Queensland shires together with the dominant vegetation

Shire	Vegetation[2]	Stocking Rates		
		Sheep ha/sheep	Cattle ha/cattle	Sheep & Cattle ha/DSU
Murweh	M	4.4 ± 0.2	40.1 ± 0.3	2.2 ± 0.3
Paroo	M	3.2 ± 0.1	126.8 ± 9.8	2.6 ± 0.4
Quilpie	M	6.7 ± 0.2	100.1 ± 5.4	4.3 ± 0.7
Bulloo	S	33.7 ± 1.1	91.4 ± 4.0	8.5 ± 1.8
Barcoo	MG/H	16.5 ± 0.6	76.3 ± 4.7	5.9 ± 1.3
Diamantina	H	0	103.5 ± 5.2	12.9 ± 3.6
Barcaldine	D/G/MG	2.0 ± 0.1	104.0 ± 17.1	1.6 ± 0.3
Blackall	WMG/BG	2.2 ± 0.3	86.2 ± 12.1	1.7 ± 0.3
Tambo	WMG/G/BG	2.5 ± 0.6	36.5 ± 2.2	1.5 ± 0.2
Isisford	MG	2.7 ± 0.1	153.7 ± 15.7	2.2 ± 0.7
Longreach	MG	2.6 ± 0.1	99.7 ± 8.2	2.0 ± 0.4

[1] Mean ± S.E. for the years 1945, and 1952 to 1980 inclusive. These are the only records available for these shires.

[2] M mulga; S spinifex sandplains, channel country and herbfields; MG Mitchell grass; H herblands; D desert country - _Eucalyptus_ spp. woodland; G gidyea; BG buffel grass; WMG wooded Mitchell grass.

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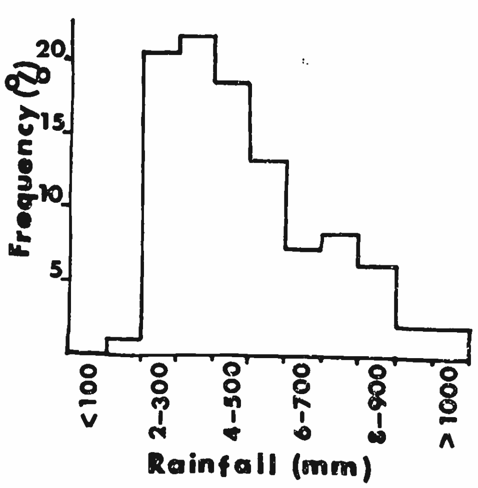
* The geometric mean is a more useful statistic than the arithmetic mean rainfall (e.g. 486 ± 21 mm for Charleville) because of the skewed nature of the data (see figure below).



Frequency of six classes of annual rainfall for Charleville.

Consequences of high stocking rates in mulga during drought

The implication of maintaining stock on mulga country when there is little ground flora on offer is that not only is mulga pushing or cutting necessary for stock survival, but any response to rain of the ground flora will be rapidly consumed by the stock. Thus, there will be little decomposition of detritus or subsequent release of nutrients for further growth. But, the stability of these rangelands largely depends on the maintenance of surface litter, and the first few centimeters of soil (Charley and Cowling 1968). Further, in an area in which light falls of rain predominate, and where annual rainfall is low and has no clear pattern of seasonal distribution, the opportunity for biological activity is slight. This is exacerbated by the small nutrient pool of the soils, and the concentration of nutrients in the surface soil.

Thus, when the opportunity for pasture regeneration does arise, stocking rates should be reduced so that individual plants have the chance to seed, and seedlings have the chance to establish. But, how often do we hear the comment 'due to rain this week stock have been withdrawn from today's sale'? In other words, the decision has been made not to decrease stock numbers just at the time when, biologically, this would be the best action.

Post-drought strategies

One further aspect of stock numbers, biology and drought in south western Queensland is the debilitating impact on the natural resource of re-stocking too soon after a drought is broken. Before 1960, restocking following drought was a gradual process. For example, the dry years from 1898 to 1903 caused a massive reduction in stock numbers in south western Queensland (Mawson _et_ al. 1974). Sheep and cattle numbers were reduced from 1.56 million and 424500 respectively in 1897 to 0.51 million and 33100 respectively in 1902. It was not until seven years later in 1909 that sheep numbers recovered to the pre-drought numbers (1.47 million), but cattle numbers have not since reached the high figures of 1897. Similarly, it was not until 1956 that sheep numbers recovered completely from the dry years 1943 to 1947.

The 1965 drought saw a change in stocking policy in the mulga country of south west Queensland. The number of sheep held in 1964 in the shires of Murweh, Paroo and Quilpie has not been exceeded in the ensuing 16 years. On the other hand, the number of beef cattle in these shires is now double that before 1965. The speed at which restocking took place following the 1965 drought also increased and may be assessed from the sheep numbers for the combined shires of Murweh, Paroo and Quilpie: predrought 1963/64: 4.35 million; mid-drought 1965/66: 2.73 million; post-drought 1967/68: 3.54 million. The latter figure has not since been exceeded. Cattle restocking occurred at a similar rate. There is no reason to expect that restocking following the present drought will be less rapid. What then is the answer?

Rather than ceasing mulga pushing/cutting as soon as reasonable rains occur, graziers should be encouraged to keep it up for an extra four to six weeks so that stock have access not only to the regenerating ground flora but also to the mulga. It may also be practical to move stock to one paddock where mulga is pushed for them so that plants in other paddocks may have a chance to recover from the drought. After four to six weeks stock are spread more evenly over the property while the 'sacrifice' paddock is destocked for at least one summer period.

Future options

The object of management in the mulga lands should be to reduce to the absolute minimum the necessity to push mulga for stock feed. This can only be done by either decreasing the number of stock per unit area, or increasing the reliability of summer rainfall, or increasing pasture productivity. While the latter aspect has received considerable attention in the mulga lands (e.g. O'Donnell et al. 1973) only small areas have been improved and the effects are insignificant overall. We can do little about the unreliable rainfall despite considerable expenditure by various national governments. We can, however, manipulate stock numbers.

Large properties have a greater ability to have a flexible stocking policy than do smaller ones, and it seems that from a biological viewpoint, amalgamation of small properties, or the purchase of additional areas, should be actively encouraged. In addition, survey work of Childs (1974), Holmes and Mills (1978) and Holmes (1980) indicate that returns and management efficiency are higher on larger properties in the Queensland mulga lands, and expansion from small areas should be encouraged providing additional areas can be purchased at reasonable cost.

In terms of a government drought policy for the mulga lands there are three main points which require consideration. Firstly, graziers who reduce stock numbers in response to deteriorating seasonal conditions could be rewarded financially. Secondly, restocking in the first post-drought growing season could be made financially unattractive to the grazier. Thirdly, graziers could be assisted more in their search for, and ability to finance, additional areas. This may however, require some degree of government supervision to ensure that stocking rates are not increased. Biologically, these three proposals are sound. The evidence available suggests that they are also economically viable.

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