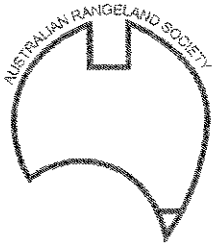

The Australian Rangeland Society

RANGE MANAGEMENT NEWSLETTER
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Freed

Range Management Newsletter

Official newsletter of the Australian Rangeland Society

Editor – Mr G. Tupper, CSIRO, Private Bag,
P.O., Deniliquin, N.S.W. 2710

No. 76/4 December 1976

GENERAL MEETING OF THE SOCIETY

Council will hold a meeting of the Society at Broken Hill on July 8, 1977. It is being organised to follow the meeting of the Fowlers Gap Consultative Committee which will take place on July 7, 1977.

The venue for the meeting will be the W. S. Robinson College at Broken Hill.

The meeting will be in three parts:

1. A business meeting.

2. Two invited papers concerned with the social, economic and administrative milieu of past, present and future pastoralism.

   It is expected that these papers will be each of 30 minutes and will be followed by 15 to 20 minutes of discussion.

3. Submitted papers.

   This section will deal with contributed papers from the membership on any theme consistent with the aims of the Society.

Form of the meeting

Papers will be presented in natural groupings by a reviewer who will be instructed to chair a discussion period dealing with the papers pertinent to his group. If insufficient papers are received authors will be asked to present their papers in person or by proxy arranged by the author.

Length of papers

Papers should not exceed 2,000 words and should be accompanied by clear graphs and tables, where necessary, presented in a form suitable for reproduction in the working papers.

Papers should be submitted no later than February 28, and should be sent to the Hon. Sec. A. L. Payne, Department of Agriculture, Jarrah Road, South Perth, Western Australia, 6151.

Working papers

Council will collate the papers received and have them available as working papers for the meeting. They will be available to the reviewing chairman one month prior to the meeting.

Publications

The Editorial Committee will be pleased to view papers for the Journal from those who submit them to the meeting. However, publication will be a matter for the Committee to arrange with authors.

Things to do now

Fill in the attached form and return it with a summary of your paper if you intend to present it. The summary need only be two or three sentences, sufficient to enable the Council to allocate papers to the appropriate section for the meeting.

PUBLICATIONS OF THE SOCIETY

Copy for the next issue of the Newsletter is required in Deniliquin by 28th February 1977

The first volume of the Journal of the Australian Rangeland Society has now been printed and distributed to members. Any non-members interested in subscribing to the Journal should write to the Business Manager, Australian Rangeland Society, 54 Broome Street, Cottesloe, Western Australia, 6011.

Individuals writing to join the Society, and individuals and institutions wishing to subscribe to the Newsletter only, should contact Mr. K. M. Howes, Australian Rangeland Society, CSIRO, Private Bag, Post Office, Wembley, Western Australia, 6014.

ECOLOGICAL SOCIETY OF AUSTRALIA SYMPOSIUM

Adelaide, May 19-22, 1977

Theme: Exotic species in Australia; their establishment and success.

Further information and application forms may be obtained from:

Dr. G. Garf,
c/- The Department of Botany,
University of Adelaide,
G.P.O. box 489, ADELAIDE,
South Australia, 5001.

VISITING SCIENTISTS - CSIRO

The CSIRO Rangeland Laboratories at Alice Springs and Deniliquin accommodate visiting scientists from overseas on an occasional basis. Some people may have met Fred Gifford from Utah, who worked at Alice Springs for a year, or John Ludwig from New Mexico, who worked at Deniliquin and Perth, both of whom were in this category.

CSIRO would like it known that while this practice will continue, similar visits by Australian research workers are also welcome. These are usually of 6-12 months duration and involve research on subjects of mutual interest. Some assistance of a non-salary nature may be available.

Enquiries should be directed to either Mr. R. A. Perry, CSIRO Division of Land Resources Management, Private Bag, Post Office, Wembley, Western Australia, 6014, or Dr. A. D. Wilson, CSIRO Division of Land Resources Management, Private Bag, Post Office, Deniliquin, New South Wales, 2710.

CHARLEVILLE PASTORAL LABORATORY NEWS

It has been a year of change at the Charleville Laboratory in facilities, personnel and programmes. Most importantly two additional office blocks have been erected. This has enabled extension and research staff to be accommodated at the one site. It is anticipated that this should be of mutual benefit to both research and advisory work. The Lab. now also possesses a $60,000 glass-house (Taj Mahal?) so it can claim to have 'arrived' as a research centre. However, benefits of the glasshouse have yet to be demonstrated.

Several staff movements have taken place. Following Brian Roberts' move to the Darling Downs C.A.E. his position as Officer-in-Charge was taken over by Bill Burrows who returned to Charleville following three years R & R leave in Canberra. Ambrose Christie takes up a lecturing appointment with the School of Environmental Studies at Griffith University in January. A new appointment at the Lab. is Bob Brown. He is a plant physiologist who recently finished Ph. D. studies at Queensland University. Bob will be examining defoliation effects on native pasture communities. Three staff members are currently studying for higher degrees. Richard Silcock at Aberystwyth, Tony Pressland at the University of New England and John Childs at the University of Melbourne.

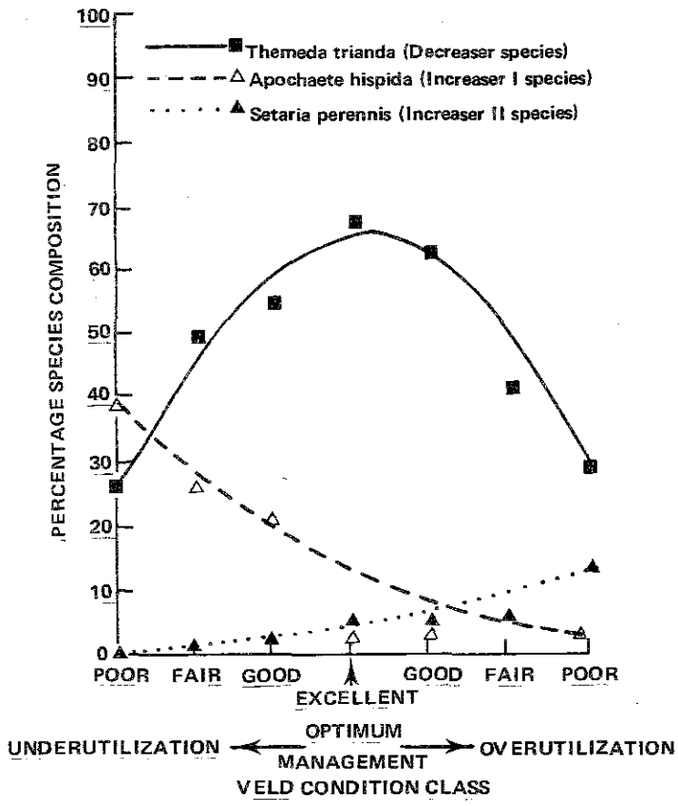
Emphasis in the Charleville research programme has shifted towards applied management and paddock studies. The applicability of adjusting stock numbers to the feed available at the end of summer is being tested on Mitchell grass pastures in the Augathella district. Five levels of use are being studied - 10, 20, 30, 50 and 80% of summer production. On two of the treatments detailed studies of dietary intake and nutritive value of the pasture are being carried out by Ian Beale and Neil McMeniman. This work will be expanded later in 1977 to a mulga site in which both sheep and cattle diets will be examined.

Definite vegetation shifts have been observed in western Queensland with the swing to cattle in the 1970's on pastures grazed solely by sheep for say the previous 20-50 years. Most changes have resulted in a more desirable species composition, particularly a decrease in Aristida spp. Reasons for this are under investigation. We would welcome an exchange of information from colleagues who have observed similar phenomena elsewhere in Australia.

AUSTRALIAN RANGELAND SOCIETY, ALICE SPRINGS GROUP

Colin Lendon, CSIRO Division of Land Resources Management, Alice Springs.

The Alice Springs group of the Australian Rangelands Society met on Thursday, 9th December to hear Barney Foran talk on the rage condition research which he carried out in Natal Province, South Africa from 1974 to 1976. His work led to a method of assessment which includes a measure of basal cover used in point apparatus. His approach is an interesting variant of the Quantitative Climax method, witness the following graph of the behaviour of major species types to different classes of condition.



Barney emphasised that the three veld types which he studied, were developed under a long history of both fire, and grazing by game; hence his "Dyk-type" graph shows not only a deterioration in condition from over grazing but also the same result from a lack of grazing and fire (under-utilization). This approach led to a modification of the classical "Dyk-type" species definitions to include Increaser I plants - plants which increased with under-utilization as the grassland moved towards a scrub or scrub-forest climatic climax; and Increaser II plants as those which increased under over grazing.

In these grassland types the manager must tread the fine line between under-utilization and over-utilization and maintain a Themeda triandra dominant sward. It was suggested that this approach may have a place in Australian rangelands where the ungrazed (nee pristine) site is not the one most suitable for animal production.

COMMENT

CONDITION AND TREND - WHERE TO NEXT?

From: Barney Foran, CSIRO Division of Land Resources Management, Alice Springs, Northern Territory, 5750.

Graham Harrington's impassioned pleas for action in the September newsletter warrant some comment. He may be heartened to know that the Range Management Section of the Department of the Northern Territory have set up 85 monitoring sites on six properties to the North-West of Alice Springs since September this year. These are selected at set distances from watering points (usually 3 km), on or near station roads, and in the more palatable and/or sensitive land types. Permanent photo points are established. In this way a broad picture of the condition of the most important rangeland types for each property is obtained, using the STARC method of assessment, developed locally by the Department and CSIRO. It may be possible to obtain more precise estimates of range condition by more sample numbers, and by increasing the sophistication of both resource mapping and sample site selection, but, what happens then?

Under our extensive pastoral system the major management ploy to counter drops in range condition would be to reduce stocking rates, but, what is the relationship between condition and stocking rate? Several ideas are being tried for some local types of country, e.g. Figures 1 and 2.

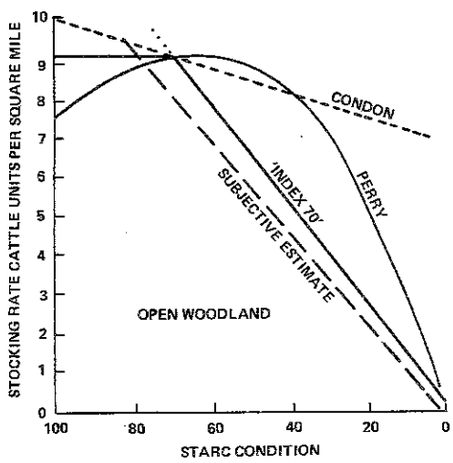


Figure 1.

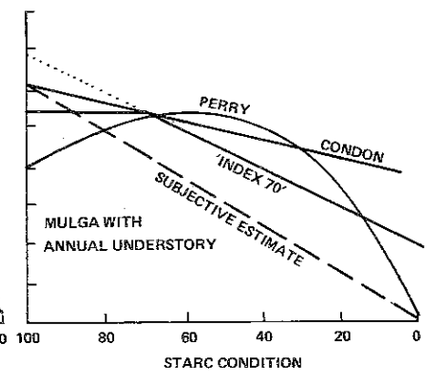


Figure 2.

Four estimates of stocking rate at different condition levels.

The relationship being used at present, i.e. INDEX 70, aims at maintaining condition in the 70-100% area, where the stocking rate remains unchanged at the level suitable for country in good-excellent condition. In the range of 69-0% condition the relationship becomes linear but the slope depends on the type of country and its inherent stability in response to overgrazing. The nature of this straight line response is due to a mathematical ignorance on our part rather than a biological fact - perhaps a relationship in the form of a curve (see Figures 1 and 2) is more realistic in the biological sense.

COMMENT

The rub comes when these condition/stocking rate relationships must be put in the context of the total carrying capacity of a station. The consequences for both land administrators and property managers can be pretty unpalatable e.g. stock numbers in relation to safe carrying capacity can be excessive

even in normal to good years; or managers will require double the areas of medium and good carrying capacity country to maintain a viable enterprise (as distinct from just large pastoral leases the majority of which is low carrying capacity country). Stocking numbers elicited from a program of this nature can have the effect of producing profound distrust of the agency by the producer, and can also tempt the agency into acting on purely biological grounds without sufficient attention being given to the social and economic needs of the producers. A compromise must be reached and it must be one that maintains a satisfactory condition of the country in the long term.

If the condition story and its relationship with stock rate/productivity are basically correct, where are we going wrong? Present indications may suggest that some stations cannot carry the numbers they do in normal years without some mining of the "pasture bank." Stocking rates could be our problem - are our base stocking rates too low compared to what country can really carry in good-excellent condition? Some of the rangeland areas now have rainfall/biomass production "models" and these dispel the old bogey of being able to deal with rainfall variability, at least in the planning and talking stages, if not in practice where markets and cost of transport limit to some extent the management option of variable stocking rates. With such mathematical aids available, the basic question is "how much of the yearly Feed production is utilized under extensive pastoral conditions?" In the Alice Springs district, working on a 1000 kg/ha production of feed in a "normal" summer rainfall year, stocking rates on a fairly productive rangeland type in good-excellent condition can vary from 4 to 10 Cattle Units per square kilometre as the utilization of palatable species is altered from 10 to 40%. This means a great deal when the SAFE CARRYING CAPACITY of a property could vary from 3000 to 6000 Cattle Units depending on what utilization you aim for. Does anyone have any ideas?

I would like to support Graham Harrington's plea of "doing" but I would like to emphasise that when the condition is done, the land administrators still have to make some difficult decisions, and I wonder if the political atmosphere in which they breathe will allow them to act?

SOME OBSERVATIONS BY A "VISITING SCIENTIST"

John A. Ludwig, Associate Professor of Biology, New Mexico University, U.S.A.

In a newsletter contribution, there is an expected assumption, that one is to say, something new-sy. However, I may violate, if not annihilate, this assumption, since I have little new information, that has not already been said before, by those who know more.

Of course, as an American 'visiting scientist' (my official knighted title given me by my fine host, CSIRO, Division of Land Resources Management), I could fall back on y 'ole' (silent h I think) standby of comparing Australian/U.S.A. rangeland problems, e.g. our Coyote is your Giant Devil Dingo; but it may be of greater interest (at least to me) to reflect (or is it refract, I never was good at physics) on those aspects of rangelands, particularly the vegetation, which I find more uniquely Australian.

Firstly, even with limited travel, the vastness of Australian arid-lands is truly staggering. The homogeneous expansiveness (some say monotonous) of the Nullarbor is most impressionable (some say depressionable). The adaptive expansion (clear across the entire arid interior) of a species like Acacia aneura is, I think, unparalleled. After a few days travel north and west of Kalgoorlie on a field trip (so expertly manned or personned by the W.A. Department of Agriculture's Rangeland Management Section), and following the excellent Arid Zone Research Conference (except for this one adjective, I will not dwell on the Conference since it has been dealt, if not knealt, with by other contributors), one apt comment heard was 'sure is a lot of Mulga.'

The tremendous adaptive radiation of a single genus like Eucalyptus is

remarkable; from white-barked alpine snow gums to white-barked desert ghost gums. Perhaps even more amazing is that all this radiation has not significantly changed the basic sclerophyllous evergreen and tapered leaf form. In fact, the parasitic mistletoes occurring on specific Eucalyptus species, have evolved the same leaf form; and many species of other genera, such as Acacia, have also evolved this leaf form. This is particularly peculiar to one used to Acacias with pinnate leaf forms. This may suggest that there was a period, perhaps extending to the present, where there was very strong selective pressure for this leaf form, or, perhaps better, against other leaf forms.

I also find the great distribution of sharp-pointed or pungent leafed bunch grasses, e.g. spinifex, of considerable interest. In New Mexico and Arizona the only successful spiny bunch grass, one Muhlenbergia pungens, occurs on deep sands in areas of intense sheep grazing (I said I wasn't going to make comparisons, didn't I; well forget that). Is the success of spinifex related to grazing, or its survival of frequent burning? Interestingly, fire does not appear to play much part in our southwestern U.S. desert grasslands, only in more temperate prairies.

I find the Australian semi-arid woodlands, not only quite unique, but also strikingly beautiful; especially certain Mallee types and in particular, the Salmon Gum woodland, with a chenopod shrubland understory. This combination I find new to my experience; yes, woodlands with grassland understory, i.e. savannahs, but not shrublands. The occurrence, and even spread of aromatic shrubs, e.g. Eremophila sp., into the understory of other woodland types, e.g. the poplar box woodlands of New South Wales and Queensland is not a particularly unique phenomenon; but the lack of a concurrent or parallel 'invasion' by thorny shrubs, viz. our Mesquite, is noteworthy. Perhaps this suggests that most species in Australian arid and semi-arid plant communities did not evolve under strong grazing pressures, relative to those in the Southwest U.S.A. and in Mexico, the source of many of our thorny Legumes, i.e. Mesquites and Acacias; who knows?

Editor's note (actually written by the contributor): Great Liberties in grammar and prose have been allowed here due to the notorious "improperitivity" of American English.

RESEARCH IN PROGRESS

Control of shrubs by fire - Peter Walker and Daryl Green, Soil Conservationists, Soil Conservation Service of New South Wales, Cobar.

The growth of inedible woody shrubs, to the exclusion of pasture species, is a major problem on the lands of the Cobar District, New South Wales. Following the bushfires of the 1974-75 summer season, observations of shrub regrowth were carried out and preliminary results indicated that hopbushes (Dodonaea species) and punty bush (Cassia eremophila) had a high mortality rate after the fire.

This result, plus the strong regrowth of the Eremophila species, prompted the setting up of a trial on "Yarranvale," the property of Mr. Bruce Harland, near Nymagee. The basic aim of the trial is to determine the effectiveness of repeated fires on the control of hopbush and to determine if repeated fires will reduce the density of Eremophila species.

Four areas were designated at the experimental site and the following treatments allocated to them. 1. Control - No Burn. 2. Single Burn. 3. Double Burn, and 4. Three or More Burns. All the burn sites were burnt this year and the double and triple burn areas will be again burnt when fuel and conditions are adequate. Within each treatment there are two grazed plots (5m x 40m) and two enclosed plots (15m x 15m) in which all shrubs are tagged. This amounted to over 2800 shrubs being tagged on the total trial area. The species and height of the tagged shrubs were recorded.

In addition, pasture cover, species composition and pasture bulk were measured; by the use of step-point transects to determine species cover and composition, and by pasture cuts to obtain pasture (fuel) bulk.

Soil erosion on the trial area is not envisaged due to the near level site, however, 16 erosion measurement plots have been installed on each treatment to assess erosion.

All sites were selected as being visually similar with regard to shrub growth. However, after tagging of the plots was carried out, it was found that shrub densities on plots varied from 2850 shrubs/ha to 28100 shrubs/ha with the average around 8000 shrubs/ha. The variation was due to large numbers of seedling shrubs occurring on small favoured sites. The significance of the variation in shrub numbers is reduced when it is realised that a high mortality of the dense seedlings can be expected to occur during a fire or dry spell. The favoured sites of dense seedling growth also produced good pasture (fuel) growth so it is expected that fires in these areas would be severe.

At the conclusion of this trial it is hoped that some indication of the usefulness of fire as a range management tool will be forthcoming.

REPORT OF COMPLETED RESEARCH

(Normally detailed research results will not be included in the Newsletter. However, this report is very brief and should be of interest to a large number of members who are involved in vegetation measurements - Ed.)

Recording of point quadrat data - Guy Robinson, Agricultural Research Station, Glen Innes, New South Wales.

The point quadrat method is regarded as one of the most trustworthy and objective methods of measuring pasture composition (Cunningham, 1975). Yet workers are often criticised on the methods of using the equipment. Because of just such a criticism a test was conducted to compare three methods of using a standard 10 pin frame.

Methods:

Six hexagonal sampling areas were pegged in natural pasture paddocks which had been subjected to various combinations of grazing intensity and superphosphate application (Robinson and Lazenby, 1976) and in which six basically different pastures could be identified.

Observations were made at 42 sitings of a standard ten pin point quadrat frame (Levy and Madden, 1933) on each of these hexagons using all sides and diagonals. For each siting of the quadrat three possible observations were recorded for each pin. These were (a) the first live vegetation touched or bare ground (b) plant crown at ground level or (c) if no plant at ground level then nearest plant.

The data were compiled as percentages and the resultant composition compared for each method of recording, i.e. first touch ((a) above), ground strike ((b) above) and nearest plant ((b) and (c) above).

Results and Discussion:

The greatest differences between the recording systems occurs in the amount of bare ground recorded (Table 1). There naturally being more area bare at ground level than when the canopy is also recorded.

A comparison of the botanical composition of species recorded between each system (Table 1) showed there to be very little variation between all systems. Neither could any major bias towards erect or prostrate species (as suggested by Goodall, 1952) be detected in the data for first touch.

Table 1: Mean percentage of bare ground and of the most frequent 13 species recorded in six natural pastures by three systems of recording.

	1st Touch	Ground	Nearest Plant
Bare ground	17.1	79.6	
Sporobolus elongatus (e)	25.0*	24.6*	22.8
Themeda australis (e)	9.0	9.3	5.2
Danthonia spp. (e)	10.4	15.7	14.5
Panicum spp. (e)	9.7	8.7	8.4
Fimbristylis (e)	1.8	1.2	3.7
Aristida ramosa (e)	1.6	1.4	0.9
Eragrostis spp. (e)	9.2	13.9	8.9
Digitaria spp.	1.0	1.2	1.6
Hypochoeris radicata	15.7	11.3	13.2
Rumex acetosella	2.0	1.4	2.7
Paronychia braziliana	3.8	3.0	4.3
Oxalis spp.	1.0	1.2	2.0
Trifolium repens	3.4	2.0	5.1

(e) erect species * ignoring bare ground

These results suggest that if botanical composition is the prime object of measurement then all the systems are equally able to record percentage presence and would be quite satisfactory to detect any botanical change over time.

The first touch method appears to be adequate for the New England environment and may in fact have some advantage since in addition to composition it also provides an estimate of soil surface directly exposed to the elements. However, the main advantage of recording the first touch is the speed of operation, which proved nearly twice as quick as ground level recording and approximately four times faster than when the nearest plant to a bare point was determined.

Naturally the selection of method depends on the objective of the study but for studying pasture change in a grazing situation where relatively dense pastures are concerned recording of the first touch appears to be as effective as any other system and considerably quicker. This is not to say that alternative systems are not better in more sparse vegetation where ground strikes and identification could be much more easily determined.

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A. L. Payne,
Hon. Secretary,
Australian Rangeland Society,
Department of Agriculture,
Jarrah Road,
SOUTH PERTH, W.A., 6151.

I will be attending the A.R.S. meeting at Broken Hill on July 8 next.

I will / will not be contributing a paper.

Abstract _____

_____

_____

I will / will not arrange my accommodation at Broken Hill.

I want single / shared accommodation at Broken Hill.

Signed _____

Name _____
(please print)

Address _____

_____