

STUDIES OF MACROPODIDAE IN QUEENSLAND

1. FOOD PREFERENCES OF THE GREY KANGAROO (MACROPUS MAJOR SHAW)

BY T. H. KIRKPATRICK, B.Sc.*

SUMMARY

A method for determining food preferences of the grey kangaroo (*Macropus major* Shaw), involving comparisons between frequencies of plant species in the pasture and in the mouths of kangaroos feeding on that pasture, is described. Application of the method in the Greymare-Durikai area of southern Queensland suggests that the grey kangaroo grazes non-selectively in that area.

I. INTRODUCTION

Of the larger native herbivores in Queensland, the grey kangaroo (*Macropus major* Shaw 1800) is probably the most widespread and abundant, but in common with the majority of native Australian mammals, no detailed information is available on the feeding habits of this species.

Previous studies of the feeding habits of Australian herbivores have been made by Storr (1961), who described a method of faeces analysis useful for food studies of the quokka (*Setonix brachyurus* (Quoy and Gaimard)), and Chippendale (1962), who was able to identify and sort plant fragments from the stomachs of red kangaroos (*Megaleia rufa* (Desmarest)) collected in the Northern Territory. Attempts to duplicate these methods in a study of the grey kangaroo were not persisted with because in all specimens examined food materials were masticated so finely that stomach contents were almost unidentifiable, and epidermal fragments in the faecal pellets were too small and in quantities insufficient to justify the time and effort involved in extraction.

*Entomologist, Queensland Department of Primary Industries.

It was found, however, that identifiable plant remains were often retained in the mouth of a kangaroo shot while feeding (Figure 1), and a technique for detecting the food preferences of the grey kangaroo based on such samples has been developed.



Fig. 1.—Grey kangaroo (*Macropus major*) shot while feeding on Greymare-Durikai area. Mouth contains a seed-head of *Eragrostis leptostachya*.

II. METHODS

Study Area.—Biological studies of the grey kangaroo were being undertaken in an area of approximately 30 square miles of forested country in the Greymare-Durikai district of the southern Darling Downs, and for this project data were collected from a fairly uniform section of approximately 6 square miles in the middle of the larger area. Open forest cover was provided largely by a mixture of narrow-leaved ironbark (*Eucalyptus crebra* F. Muell.) and yellow box (*E. melliodora* A. Cunn. ex Schau.). Other species of *Eucalyptus* were present in small numbers. Small areas of undergrowth, largely of species of *Acacia*, occurred in a few places. Pasture was provided principally by pitted blue grass (*Bothriochloa decipiens* (Hack) C. E. Hubbard), a love grass (*Eragrostis leptostachya* (R.Br.) Steud.), and several species of wire grasses (*Aristida* species). Further details are given in Table 1. Observations over several years indicated that the relative abundances of the major pasture components varied little throughout the year, with only some of the minor species appearing to vary noticeably.

Sampling Methods.—Frequencies of food species available in the pasture were measured by a point quadrat analysis (Levy and Madden 1933; Brown 1954). Eight half-mile transects were made through carefully selected parts of the study area; a quadrat carrying five points 6 in. apart was placed at right-angles

to the direction of travel every 20 paces. Any plant part encountered by a point was recorded as a "hit". Transects were made during April 1963, at about the middle of the period during which kangaroo samples were collected.

All kangaroos shot while feeding between October 1962 and September 1963 were examined, and 200 species records were collected from about 400 kangaroos, 180 with mouth contents, during this period.

III. RESULTS

Results of both pasture analysis and collection of plants from kangaroos are presented in Table 1. Percentage frequencies of occurrence of species encountered are given in columns 2 and 4; preferences are detected by comparing these percentages. Numerous other plant species occurred in the pasture, but in amounts too small to be recorded during sampling; some of the more common of these are included in the table.

TABLE 1
FREQUENCIES OF PLANT SPECIES IN PASTURE AND IN KANGAROO MOUTHS;
GREYMARE-DURIKAI STUDY AREA, 1962-63

Plant Species	Pasture		Kangaroos	
	No. of Hits (1640 Points, 647 Hits)	Percentage of Total Hits	No. of Hits (200 Total)	Percentage of Total Hits
Grasses				
<i>Aristida</i> species*	192	30.0	65	32.5
<i>Arundinella nepalensis</i> Trin.	n.r.†	..	..	..
<i>Bothriochloa decipiens</i> (Hack.) C. E. Hubbard ..	138	21.2	36	18
<i>Chloris acicularis</i> Lindl.	n.r.	..	..	..
<i>Chloris divaricata</i> R. Br.	13	2.0	2	1.0
<i>Cymbopogon refractus</i> (R. Br.) A. Camus	6	0.9	..	..
<i>Danthonia purpurascens</i> J. W. Vickery	26	4.0	11	5.5
<i>Dichanthium humilium</i> J. M. Black	n.r.	..	1	0.5
<i>Dichelachne micrantha</i> (Cav.) Domin	n.r.	..	..	..
<i>Digitaria brownei</i> (R. Br.) Hughes	2	0.3	..	..
<i>Digitaria tenuissima</i> (Benth.) Hughes	2	0.3	2	1.0
<i>Echinopogon ovatus</i> (Forst.) Beauv.	3	0.5	3	1.5
<i>Eleusine tristachya</i> (Lam.) Lam.	n.r.	..	..	..
<i>Enneapogon gracilis</i> (R. Br.) Beauv.	2	0.3	..	..
<i>Eragrostis leptostachya</i> (R. Br.) Steud.	107	16.5	35	17.5
<i>Eragrostis elongata</i> (Willd.) Jacq.	3	0.5	..	..
<i>Eulalia fulva</i> (R. Br.) O. K.	n.r.	..	..	..
<i>Leptochloa debilis</i> Stapf ex C. E. Hubbard	n.r.	..	..	..
<i>Microlaena stipoides</i> (Labill.) R. Br.	4	0.6	5	2.5
<i>Panicum effusum</i> R. Br.	13	2.0	2	1.0
<i>Paspalidium gracile</i> (R. Br.) Hughes	7	1.0	5	2.5
<i>Paspalidium radiatum</i> J. W. Vickery	16	2.5	1	0.5
<i>Paspalum dilatatum</i> Poir.	10	1.5	3	1.5
<i>Sporobolus elongatus</i> R. Br.	5	0.8	2	1.0
<i>Stipa setacea</i> R. Br.	7	1.0	4	2.0
<i>Stipa verticillata</i> Nees	n.r.	..	..	..
<i>Themeda australis</i> (R. Br.) Stapf	n.r.	..	..	..
<i>Tripsogon lolitifformis</i> (F. Muell.) C. E. Hubbard ..	n.r.	..	1	0.5

TABLE 1—continued
 FREQUENCIES OF PLANT SPECIES IN PASTURE AND IN KANGAROO MOUTHS;
 GREYMARE-DURIKAI STUDY AREA, 1962-63—continued

Plant Species	Pasture		Kangaroos	
	No. of Hits (1640 Points, 647 Hits)	Percentage of Total Hits	No. of Hits (200 Total)	Percentage of Total Hits
Other Monocotyledons				
<i>Cyperus</i> sp.	9	1.4	..	..
<i>Dianella</i> sp.	5	0.8	2	1.0
<i>Fimbristylis dichotoma</i> (L.) Vahl	2	0.3	1	0.5
<i>Lomandra</i> sp.	1	0.2	..	..
<i>Sisyrinchium micranthum</i> Cav.	n.r.	..	1	0.5
Indet. .. .. .	..	..	1	0.5
Dicotyledons				
<i>Bidens pilosa</i> L.	1	0.2	2	1.0
<i>Dichondra repens</i> Forst.	15	2.3	..	..
<i>Euphorbia drummondii</i> Boiss.	2	0.3	..	..
<i>Goodenia hederacea</i> Sm.	15	2.3	2	1.0
<i>Glycine tabacina</i> Benth.	20	3.1	4	2.0
<i>Helipterum australe</i> (A. Gray) Druce	2	0.3	1	0.5
<i>Medicago minima</i> (L.) Bartal.	3	0.5	1	0.5
<i>Solanum</i> sp.	1	0.2	..	..
<i>Solenogyne bellioides</i> Cass.	9	1.4	2	1.0
<i>Wahlenbergia</i> sp.	1	0.2	3	1.5
Indet. .. .. .	..	..	1	0.5
Ferns				
<i>Cheilanthes sieberi</i> Kze.	5	0.8	1	0.5

* Principally *A. vagans* Cav. and *A. caput-medusae* Domin

† Not recorded by quadrat.

IV. DISCUSSION

The data presented indicate that grazing was confined to the pasture, a fact also suggested by other observations. It is also evident that pasture species were found in the same order of frequency both in the mouths of feeding kangaroos and in the pasture, and, allowing for the limited data available, it is reasonable to suggest that the grey kangaroo was essentially non-selective in its use of this pasture over the period of study. The high usage of the wire grasses (*Aristida* species), all of which were relatively unpalatable to stock, is noteworthy. It is also important to record that for all grasses encountered, including the wire grasses, seed-heads and stems were commonly eaten even when younger leafy growth was abundantly available.

The comparability of the data from the two sources (pasture and kangaroos) is assumed; consideration of both sampling methods indicates a fair degree of similarity, including, significantly, the fact that normally only one species (or nothing) is encountered both at the point of a point quadrat and in the mouth of a kangaroo.

Although confirmation of these findings must await other and more extensive collection of data, the conclusions are not inconsistent with the suggestion that the grey kangaroo could prefer harsher, less succulent vegetation types such as those provided by the pasture in the present study, which has a history of many years of overgrazing by sheep.

V. ACKNOWLEDGEMENT

The Botany Section of the Department of Primary Industries identified the reference collection of plants from which all identifications in this study were made.

REFERENCES

- BROWN, DOROTHY (1954).—Methods of surveying and measuring vegetation. Bull. Commonw. Bur. Past. & Field Crops No. 42.
- CHIPPENDALE, G. (1962).—Botanical examination of kangaroo stomach contents and cattle rumen contents. *Aust. J. Sci.* 25:21-2.
- LEVY, E. B., and MADDEN, E. A. (1933).—The point method of pasture analysis. *N.Z.J. Agric.* 46:267-79.
- STORR, G. M. (1961).—Microscopic analysis of faeces: a technique for ascertaining the diet of herbivorous mammals. *Aust. J. Biol. Sci.* 14:157-64.

(Received for publication July 14, 1964)