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Palatability of Forage Plants in North-West Sheep Pastures

By R. H. COLLETT, Field Technician, Abydos

A DECLINE in carrying capacity has occurred in large areas of the Pilbara district of the North-West, due to the decrease in palatable plants and the increase in unpalatable ones. The relative palatability of the various species to sheep is therefore a matter of considerable importance to pastoralists.

Observations at Abydos Research Station near Port Hedland have shown that the sheep's grazing year can be divided into approximately four seasons or stages according to the condition of the native grasses. They are:—(1) The growing stage; (2) the mature stage; (3) the drying-off stage; and (4) the dry stage.

1. The Growing Stage.
   At Abydos this stage only lasts for about eight weeks, when the sheep's first preference is for tender young grass shoots and palatable young shrubs.
   Most of the native grasses are palatable at this stage but woollybutt grass (Eragrostis eriopoda) is usually the most favoured by the sheep.

2. The Mature Stage.
   Most grasses become rank and unpalatable once the seed has matured. Generally the palatable shrubs are still the first preference of the sheep, while wind grass (Aristida arenaria) is easily the most palatable of the native grasses. In a dry year, however, porcupine spinifex (Triodia secunda) may be preferred at this time. Even in a normal year this is the second most palatable species. Woollybutt grass is the third preference but it shares this position with soft spinifex (Triodia pungens) in its first year of growth.
   The duration of this period varies with the seasonal conditions and the condition of the paddock.

3. The Drying-off Stage.
   The four species named in the previous stage remain the most popular during the drying-off stage, but with porcupine spinifex becoming at least as palatable as wind grass. Soft spinifex may also become very palatable at this stage, depending on seasonal conditions and soil type. A number of other species are also grazed at this time, the main criterion apparently being the presence of green leaves. These are: Weeping grass (Chrysopogon latifolius), silver top or curly spinifex (Plechtrachne Shinzi), hop-a-long (Neurachne spp.), Aristida hygrometrica (a coarse and stemmy type of wind grass), Eriachne obtusa, lemon scented grass (Cymbopogon spp.), kangaroo grass (Themeda spp.), and native sorghum (Sorghum timorenses). While these species are listed in the
approximate order of preference, variations may occur with the season and soil type.

4. The Dry Stage.

The three palatable spinifex species provide the bulk of the sheep's diet during this stage, the order of preference depending on the condition of soft spinifex. This varies from very palatable to quite unpalatable. Feed is also provided by various Acacias, such as *A. pyrofilia* (kangi) and *A. translucens* (poverty bush.)

THE PALATABLE SPECIES

Soft or Gummy Spinifex (*Triodia pungens*).

This is the most common of all the palatable native species in the North-West and probably the most important. However, its palatability to sheep varies from plant to plant and sheep rarely graze more than one plant in three. The main reason for this is that sheep prefer young growth, and whereas the young growth of native grasses may only last for two or three months, that of soft spinifex may last for two or three years. Thus, soft spinifex in its first year of growth is equally as palatable as woollybutt grass in Stage 2 and decreases in palatability as it grows older. The rate at which this decrease in palatability proceeds depends on seasonal conditions, soil type, amount of competition from other plants, the grazing treatment and the topography of the country.

Dying-off plants and plants that have previously been heavily grazed are also favoured by sheep. This may be due to young growth replacing the dead or grazed leaves.

Again, sheep grazing a pure soft spinifex stand during the growing season, differentiate between the plants more by the degree of grazing applied to each plant than by grazing some plants and ignoring others as they normally do. Thus, during the growing season, only the growing tips of the leaves of most plants are grazed, while plants of the type mentioned above are grazed heavily.

The soft spinifex plant usually grows outwards round the edges and dies off from the centre, so that older spinifex plants

A good mixture of soft spinifex (the larger clumps) and perennial grasses, particularly woollybutt grass (*Eragrostis eriopoda*) and "hop-a-long" (*Neurachne clementii*)
are sometimes grazed on the edges—which are younger than the remainder of the plant. However, some plants appear to become inactive and cease either to spread outwards or die off from the centre. Such plants are invariably unpalatable. They were observed at Abydos by mapping a particular area at regular intervals for three years. In spite of heavy stocking of up to one sheep to two acres, these were never grazed. Such plants are probably quite common in old stands of soft spinifex.

The most palatable of all soft spinifex plants are those that have a wilting appearance, and are brown in colour, with a green tinge. They are usually found on the heavier soils in a dry time, their wilting appearance presumably being due to lack of soil moisture. These plants remain palatable only as long as they have gum on the leaves. If this gum is removed due to natural conditions in the paddock, or artificially with acetone, they rapidly dry off and become quite unpalatable.

In a very dry time, particularly if there has been only light summer rain, fairly dense populations of soft spinifex may dry-off completely (due to excessive competition for soil moisture), and become unpalatable. On the other hand, isolated plants which do not have to compete with other plants for the limited supply of soil moisture may have the wilting, brown appearance described above, and be heavily grazed.

Since sheep select young growth (which is usually very gummy), and the brown wilting leaves which are also covered with gum, but will not graze the dry spinifex from which the gum has been removed, it appears that the presence of gum does not deter sheep from grazing soft spinifex, but its absence does.

**Porcupine Spinifex (Triodia secunda).**

There may be several species which are called porcupine spinifex, but *Triodia secunda* is the only palatable one. It can be recognised by the fact that the leaves break very easily and are extremely soft and succulent. It normally grows on well drained slopes of fairly heavy soil, when it is the most palatable of all the spinifex species. It is also the one most likely to remain palatable through a prolonged drought. However, on creek banks and other damp areas it appears to be unpalatable.

**Curly Spinifex (Plechtrachne Shinzii).**

This species will grow on the same types of soil as soft spinifex or even buck spinifex (*Triodia lanigera*). It is not as palatable as soft spinifex at its best, but because the palatability of that species varies so much, *Plechtrachne Shinzii* is often preferred to it.

**Wind Grass (Aristida arenaria).**

The soft fine leaves of this grass make it the most palatable of all the native grasses when mature. Moreover, the mature leaves green up after rain and it continually produces fresh flowering heads when the soil is moist.

**Woollybutt Grass (Eragrostis eriopoda).**

Like wind grass, woollybutt produces fresh flowering heads when the soil is moist, but the mature leaves do not green up after rain. In the mature stage it is...
approximately as palatable as soft spinifex in its first year. It is more subject to damage by uprooting in the seedling stage than most grasses.

Weeping Grass (Chrysopogon latifolius).
The mature leaves of this grass are generally unpalatable until the drying-off stage. However, the germinating seeds and heavily grazed root butts produce long tender shoots that are very palatable to sheep. These are usually grazed very heavily, thereby preventing the production of seed heads. Sheep will also graze the tips of weeping grass leaves during the growing stage.

Other Grasses.
The remaining grasses named in Stage 3 (the drying-off stage), may be of increased importance if the above species are not available or soft spinifex is in a relatively unpalatable condition. The most palatable of these are hop-a-long (Neurachne Clementii), Aristida hygrometrica, and Eriachne obtusa. Hop-a-long is very susceptible to a virus disease which prevents the production of flowering stems.

SUMMARY
Sheep usually prefer shrubs and the tender young shoots of grasses as long as they are available.

Most of the palatable species may be grazed during the growing stage which, in this district, only lasts for about two months.

For the remaining ten months of the year, wind grass and woollybutt grass are the most palatable of the native grasses; porcupine spinifex, under suitable conditions, is the most palatable of the spinifex species, and soft spinifex in its first year of growth is equally as palatable as woollybutt grass.

Soft spinifex varies so much in palatability that Plechtrachne Shinnzii may often be preferred to it.

Soft spinifex is not grazed by sheep if the leaves have dried off due to the absence of gum, but brown, wilting leaves—usually found on the heavier soils—are very palatable as long as they are covered with gum.

Young growth of soft spinifex is preferred to old growth—which may be completely unpalatable.

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