Fodder conservation in the Kimberleys—Part 2

K Fitzgerald
Department of Agriculture

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FODDER CONSERVATION IN THE KIMBERLEYs

By K. FITZGERALD, B.Sc. (Agric.), Agricultural Adviser

Part 2.—UTILISING NATIVE GRASSES

NOT all station managers are fortunate enough to have permanent water suitable for the irrigation schemes discussed in the last issue of the Journal. Where irrigation is difficult or impossible, pastoralists should be interested in the possibilities of conserving native grasses grown under natural rainfall conditions.

The importance of conserving fodder during times of plenty, so that it may be used in times of need has been appreciated since the earliest days of agriculture, and today fodder conservation is an accepted part of all farming or grazing activities in southern areas. Under Kimberley conditions the need for some form of fodder conservation is strongly emphasised by the long dry seasons lasting from about April to November, during which period the feeding values of the dry native grasses reach an abnormally low level.

The wet season lasting from about December to March, provides ideal growing conditions for most of the native grasses because of its high temperatures, humidity and usually adequate reliable rains.

Many of the native grasses are reasonably good in terms of feeding value while in the young stage, but towards the end of the "Wet" the growth rates speeds up as the plants hasten towards maturity. This accelerated growth rate is accompanied by a decline in the relative feeding values while the palatability and digestibility also decline steadily.

Fig. 1.—Extensive areas of Flinders grass at Liveringa Station. Note stack of baled hay in background
—Photo. W. M. Nunn.

Fig. 2.—Grain sorghum grown under natural rainfall conditions of Glenroy Station
—Photo. K. Fitzgerald.
The grasses are at their maximum, in terms of protein, at the early flowering stage, after which they deteriorate rapidly. As they pass from the green stage through the mature stage and thence to a dried condition the food values of the grasses decline progressively in terms of protein, digestibility, mineral content and vitamin A content. Towards the end of the dry season the native grasses are practically worthless as a balanced ration, besides being unpalatable and highly indigestible.

A glance at the following table will indicate how age brings deterioration in the feeding value of several of the well-known native grasses.

**TABLE 1.**

<table>
<thead>
<tr>
<th>Date of Cutting</th>
<th>Stage of Growth</th>
<th>Crude Protein</th>
<th>Crude Fibre</th>
<th>Phosphorus P</th>
<th>Calcium Ca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flinders Grass</td>
<td>Feb. 18</td>
<td>Grass in flower—2ft. high</td>
<td>4-5</td>
<td>38</td>
<td>.11</td>
</tr>
<tr>
<td></td>
<td>Mar. 15</td>
<td>Just past flowering stage</td>
<td>2-5</td>
<td>38</td>
<td>.10</td>
</tr>
<tr>
<td></td>
<td>Apr. 13</td>
<td>Almost dry</td>
<td>2-3</td>
<td>38</td>
<td>.10</td>
</tr>
<tr>
<td></td>
<td>Aug. 5</td>
<td>Quite dry</td>
<td>1-3</td>
<td>36</td>
<td>.08</td>
</tr>
<tr>
<td></td>
<td>Oct. 3</td>
<td>Quite Dry</td>
<td>1-3</td>
<td>36</td>
<td>.08</td>
</tr>
<tr>
<td>Schima (nervosum), (White grass)</td>
<td>Feb. 22</td>
<td>Coming into flower—3ft. 6 in. tall</td>
<td>4-0</td>
<td>40</td>
<td>.08</td>
</tr>
<tr>
<td></td>
<td>Mar. 9</td>
<td>In flower—5ft. high</td>
<td>4-1</td>
<td>42</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>Apr. 9</td>
<td>Mature grass—Still green</td>
<td>3-4</td>
<td>40</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td>Aug. 5</td>
<td>Quite dry</td>
<td>1-1</td>
<td>34</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>Oct. 1</td>
<td>Quite dry (lower leaves selected)</td>
<td>1-4</td>
<td>37</td>
<td>.02</td>
</tr>
<tr>
<td>Sugar Grass</td>
<td>Feb. 18</td>
<td>Pre-flowering—up to 6ft. tall</td>
<td>4-2</td>
<td>40</td>
<td>.15</td>
</tr>
<tr>
<td></td>
<td>Mar. 15</td>
<td>Full flowering—over 8ft. tall</td>
<td>4-2</td>
<td>32</td>
<td>.23</td>
</tr>
<tr>
<td></td>
<td>Apr. 13</td>
<td>Half dry</td>
<td>2-3</td>
<td>43</td>
<td>.15</td>
</tr>
<tr>
<td></td>
<td>Aug. 5</td>
<td>Quite dry—no flag</td>
<td>0-9</td>
<td>46</td>
<td>.18</td>
</tr>
<tr>
<td>Nigger Head</td>
<td>Jan. 22</td>
<td>Flowering</td>
<td>9-1</td>
<td>39</td>
<td>.18</td>
</tr>
<tr>
<td></td>
<td>Mar. 23</td>
<td>Mature grass—drying off</td>
<td>7-8</td>
<td>41</td>
<td>.12</td>
</tr>
<tr>
<td></td>
<td>Apr. 9</td>
<td>Late flowering stage</td>
<td>4-4</td>
<td>40</td>
<td>.18</td>
</tr>
<tr>
<td></td>
<td>Aug. 5</td>
<td>Dry</td>
<td>4-3</td>
<td>39</td>
<td>.15</td>
</tr>
<tr>
<td></td>
<td>Oct. 1</td>
<td>Quite dry—Seed fallen</td>
<td>2-4</td>
<td>35</td>
<td>.08</td>
</tr>
</tbody>
</table>

It will be seen that the protein value decreases rapidly after the flowering stage and reaches a very low level by August. This general trend also applies to the mineral content, especially phosphorus. Vitamin A values are not shown in the table but they decrease rapidly as the plant dries off.

**HAYMAKING.**

If cut at the correct time, native grasses will provide a reasonably good source of stock feed for use later in the season. Where the grass is cured and baled correctly the feeding value can be preserved with but little loss. In this connection it is worth emphasising that the cutting must be done at the right time of the year when the grasses are at or near their maximum feeding value.

As protein is of outstanding importance it is usual to cut hay types at the stage when the protein is at its highest level. However, as quantity is also very important on large properties it may be advisable to cut the grass at the stage when maximum quantity can be combined with near maximum quality.

Experience in the Kimberleys indicates that the best time to cut native grasses is at the early flowering stage. This will vary with the season but it is usually towards the end of February. Cutting at this time of the year however has its attendant risks of interference by further rains and may also present some transport difficulties.

Even more important than the time of cutting is the method of curing and conserving the fodder. High quality grasses can be rendered useless by incorrect hay-making. For many years several stations in the West Kimberleys cut grass for hay each year and stacked it either in the paddocks or at the homestead. Being loose, much of it lost its feeding value before it was fed to the stock.
In later years several stations have purchased hay balers to facilitate the handling of native grasses, and while these machines ensure that the hay is pressed tightly, it is important to remember that the grass must be dried out reasonably well before baling, otherwise it is liable to become mouldy in the bales.

Correct drying calls for the reduction of the moisture content of the material from 60 or 70 per cent. down to 8 or 10 per cent., and of course the time required for this will vary according to the weather and the types of grasses being handled.

For instance, Flinders grass cut at the flowering stage will dry out sufficiently for baling within a few hours; if cut in the morning it can often be baled in the afternoon.

Sugar grass on the other hand has a higher moisture content and may require from one to one and a half days, while Sudan grass cut at the flowering stage may require two to three days.

The practical farmer usually judges the moisture content of the material by examining the nodes of the plants; if these are dried out it is usually safe to bale. Another test is to take several stalks of the plants and twist them in the hands. If no moisture appears, the plants are usually dry enough for baling.

If forced to bale the grass when the moisture content is too high, small, loosely packed bales will be found least liable to overheat and deteriorate in quality, but such bales are more difficult to handle and stack after they have dried out. Baling when the grass is too dry gives a chaffy hay which loses a great deal both in palatability and nutritional qualities.

Where a pick-up baler is used, a side-delivery rake is essential to provide uniform windrows. Turning of the hay in the windrows is desirable to ensure even drying and for this purpose many side-delivery rakes are fitted with a "tedding" attachment.

Once it has been cut and baled, the hay should be stacked and covered with as little delay as possible. Exposure to sun and rain reduces the feeding value of the hay, and bales which become wet are difficult to dry out.

By cutting the material before its nutritional value has declined we can create a really valuable fodder reserve. Such hay is more palatable and more nutritious than it would be if left to dry on the stalk and in addition we have our fodder in a state which is convenient for handling and transport. Baled hay may be fed in paddocks near the homestead, or near the permanent water.

Another advantage of haymaking is that the regrowth from the mown areas provides a much better pasture, later in the
season than the coarse, rank growth on the uncut areas.

Where the station manager has a choice of grass types for cutting and baling, it is worth while to consider the relative feeding values of the species available as there is a wide range of variation, particularly in terms of protein. Obviously the best available types should be selected for cutting and baling, but under Kimberley conditions the soil type which permits the successful operation of machinery at the right time will often prove to be the deciding factor. The blacksoil areas, for instance are very rough when dry and very boggy when wet.

The following table indicates the relative values of some well known grasses and should provide a useful guide to the station manager when he is deciding on the areas to be cut.

<table>
<thead>
<tr>
<th>Species</th>
<th>Crude Protein</th>
<th>Crude Fibre</th>
<th>Phosphorus</th>
<th>Calcium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buffel and Birdwood grass</td>
<td>14.3</td>
<td>27</td>
<td>18</td>
<td>38</td>
</tr>
<tr>
<td>Para grass</td>
<td>9.5</td>
<td>30</td>
<td>26</td>
<td>69</td>
</tr>
<tr>
<td>Kangaroo grass</td>
<td>3.4</td>
<td>42</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Flinders grass</td>
<td>4.5</td>
<td>38</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>Sehima</td>
<td>4.2</td>
<td>42</td>
<td>0.6</td>
<td>34</td>
</tr>
<tr>
<td>Native sorghum</td>
<td>4.2</td>
<td>32</td>
<td>23</td>
<td>17</td>
</tr>
<tr>
<td>Nigger Head</td>
<td>9.1</td>
<td>39</td>
<td>18</td>
<td>59</td>
</tr>
<tr>
<td>Bunch Spear grass</td>
<td>3.0</td>
<td>42</td>
<td>0.7</td>
<td>11</td>
</tr>
<tr>
<td>Mixed pasture (for comparison)</td>
<td>16.0</td>
<td>23</td>
<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>

The relatively high protein figures for Buffel and Birdwood grasses clearly indicate the importance of these two grasses as types suitable for cutting and baling. That they may be cut and baled satisfactorily has been demonstrated by Mr. D. Farrell, on the “Common” at Broome.

Fodder conservation on a worthwhile scale has been undertaken by Mr. K. Rose at Liveringa Station. In 1947 some 3,000 bales (approximately 90 tons) were cut near the homestead. In the wet seasons of 1950 and 1951 a further 10,000 bales of good quality hay was conserved and made a very welcome addition to the diet of the sheep late in the “dry” of 1951. This hay was mainly Flinders grass.

Two bad seasons in a row have been responsible for the curtailment of the fodder conservation work at Liveringa, but with better seasons and using a new pick-up baler, Mr. Rose confidently expects to cut about 20,000 bales a year. Perhaps in years to come the effects of droughts such as those experienced during the last two years, could be cushioned by utilising the fodder conserved during better years.

The true value of any fodder conservation scheme can only be realised when its cost is compared with the cost of purchasing fodder from other sources. Good quality baled hay if cut and handled...
would have a feeding value approximately equal to that of the chaff being shipped to the Kimberleys. Such chaff costs about £40 a ton landed at Fitzroy Crossing so that the value of 90 tons of hay cut at Liveringa must have been considerable when viewed in this light.

An added advantage with locally grown material is that it is readily available when required. Any money spent in purchasing machinery to facilitate fodder conservation in the Kimberleys must be regarded as a sound investment.

Fodder conservation in the Kimberleys makes it feasible to utilise, at a time when it is most needed, valuable fodder that would otherwise deteriorate. Where hay can be cut locally, the present setup whereby baled hay is shipped to the Kimberleys for use both as feed and bedding for livestock being shipped to the south seems ludicrous. Quite apart from the heavy expenditure involved, the valuable shipping space being used to take fodder to the Kimberleys could be put to better use in transporting much needed building and fencing materials to the north.

A NEW WEED MENACE
THE EUROPEAN DOUBLEGEE
(Emex spinosa)

A SPECIMAN of the European doublegee was forwarded to the Government Botanist this year by Mr. G. L. Throssell, Agricultural Adviser at Geraldton, who obtained it from a property at Mendel.

The plant differs from the common doublegee principally in the broad base of the fruit and the strongly recurved spines, the ordinary common doublegee having a fruit which tapers at the base and carries straight spines.

From the agricultural point of view the European doublegee is probably of an even more undesirable nature than the common plant. This is due to its habit of growth which is more erect than prostrate. When growing in crop, it attains a height of up to two feet among the stems of the crop and frequently sufficiently tall for the seeds to be harvested with the grain, thus making it liable to be spread to new areas. The European doublegee is a plant which has nothing to recommend it and merits vigorous control measures before it spreads beyond the present limits.

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