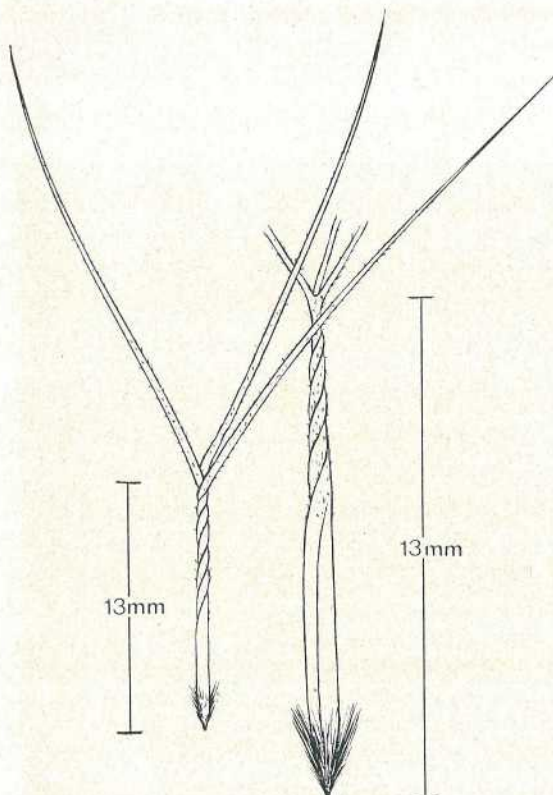


The feathertop problem in Mitchell grass pastures

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The sharp-pointed, three-awned seed of feathertop (adapted from 'Flora of Western Australia' by C. A. Gardner).

MITCHELL grass (*Astrebla spp.*) pastures are the most extensive and productive native pastures of semi-arid western Queensland.

They support half of the State's sheep and one-tenth of the cattle population. Wool production from these grasslands is over 40% of the State's clip.

From time to time, the value of the wool clip has been lowered by heavy infestations of grass seed (shive) in the wool. Badly infested wool can be reduced in value by as much as 10% because additional processing, which could involve a carbonizing treatment, is required to remove the vegetable fault. This processing can reduce the strength of the wool fibres and also their suitability for dyeing.

Seed of feathertop grass (*Aristida latifolia*) is the main cause of vegetable fault in wool in the Mitchell grass country. Besides contaminating the wool the sharp-pointed, three-awned seeds can quickly penetrate the skin of sheep causing severe irritation and infected abscesses in subcutaneous tissues. Badly infested animals cease feeding and lose condition. Deaths, particularly in young sheep, can occur.

Observations and experiments suggest that grazing management can be used to prevent a feathertop build-up and thus reduce a grass seed problem.

Description and distribution

Feathertop, sometimes called feathertop wiregrass, is a perennial summer-growing tussock grass. Plants grow to a height of 40 to 100 cm and most leaves originate from the base. The leaves curl and bleach as the plant dries off in winter.

Feathertop is widespread in western Queensland, occurring from the Gulf country in the north to the New South Wales border in the south. It is most common on heavy cracking clay soils, particularly the Mitchell grass downs, and usually favours better watered locations such as run-on areas, depressions and gilgais, and areas which are periodically flooded. However, it cannot survive prolonged and deep flooding (7 days at up to 1.5 m).



A heavy infestation of feathertop in a Mitchell grass paddock (photograph courtesy of Dr P. J. Skerman, University of Queensland).



Ungrazed feathertop plants in a heavily grazed Mitchell grass paddock near Blackall.

In the south-west and central west, white spear grass (*Aristida leptopoda*) is also present in the pastures but this species does not occur to any extent in the north-west.

History

Feathertop has been recognized in the Mitchell grass pastures since late last century, but its incidence has fluctuated dramatically over the years.

Perhaps the first documented presence of feathertop was in Lord Casey's father's dairy for June 1890. In his book 'Australian Father and Son' (published by Collins in 1966) Lord Casey cites an extract from the diary: "A great deal of feathery grass (which has a nasty seed) has grown this year on 'Terrick'" (central-western Queensland, near Blackall). Lord Casey adds, "I am told that feathery grass is still liable to occur on Terrick but only during a good season". Although it cannot be confirmed, there is little doubt that the grass referred to was *Aristida latifolia*.

In 1927, N. A. R. Pollock an officer of the Department of Agriculture and Stock, reported "the spread of feathertop on the rolling downs is becoming a matter of some concern". In various reports on the Mitchell grass pastures in the 1930s and early 1940s feathertop was not mentioned, which suggests it was not abundant during that decade. This period was followed by a build-up of the grass during the 1950s and its disappearance during the drought years of the mid to late 1960s.

These fluctuations are supported by observations of a grazier in the Longreach district reported in the *Queensland Country Life* newspaper dated 23 June 1960. From 1920 to 1924 feathertop seed was bad on his property, but it disappeared during the drought years 1926 to 1930, only to return during the good seasons of 1950 to 1956. At Longreach, 1920 and 1921 were medium to good rainfall years which followed the dry year of 1919. Another outbreak occurred in the 1970s when a run of high rainfall years followed the drought of the late 1960s.

A common factor with these outbreaks is that feathertop became abundant only during a run of above average rainfall years. In drought periods and a run of below average rainfall years the problem disappeared due to widespread death of the plants.

Effects of grazing

Early reports indicated that the incidence of feathertop was also influenced by grazing management. Observations in the Blackall district in 1960 by the Government Botanist (Mr S. L. Everist) indicated that the heaviest infestations were on properties that had been lightly stocked for many years. It was not seen in quantity on any of the well-used stock routes, and horse paddocks showed less feathertop than paddocks stocked with sheep.

Results from a Department of Primary Industries' survey in the Blackall district in the 1970s confirmed that feathertop was rare in paddocks with a history of heavy continuous stocking with sheep, compared with paddocks that had been lightly stocked. In these cases, stocking rates had been around one sheep per ha at the heavy rate and one sheep per 1.66 ha at the light rate for the previous 15 to 20 years.

Observations suggest that grazing of mature feathertop by sheep at normal or light stocking rates is insignificant, but the situation could be different at heavy stocking rates and when the plants are young. Sheep normally avoid feathertop-infested areas when the plants are carrying mature seed (March to July) and only move into such areas if forced to by lack of forage elsewhere.

In an experiment on Toorak Field Station, near Julia Creek, heavy grazing of a Mitchell grass pasture with cattle prevented a build-up of feathertop. The pasture was grazed at one beast per ha in the dry season only, between 1971 and 1977. At commencement, the feathertop population was low and after 3 years there were only 4 000 feathertop plants per ha in this paddock compared with 35 000 per ha in the adjacent paddock which had been stocked lightly with sheep only in the dry season.

In the cattle paddock, Mitchell grass plants were grazed to a height of about 5 cm. These plants survived this heavy grazing but tussocks were broken-up into smaller plants and less forage was available from this pasture in the following wet seasons. The pasture also contained more Flinders grass and herbage than the adjacent sheep-grazed paddock. Cattle were losing weight by the end of each grazing period.

Control

From time to time, various attempts to eradicate or at least reduce feathertop have been made. It can be controlled by ploughing or deep ripping but this has virtually no application over the vast areas of Mitchell grass downs. Occasional mowing or burning, or application of nitrogen and phosphorus fertilizers had no deleterious effect on feathertop populations.

The observations and experiments mentioned previously suggest that grazing management can be used to prevent or at least minimize a feathertop problem. Following favourable summer rains, the expected population build-up of feathertop can be prevented or at least significantly reduced by a programme of heavy stocking. Such measures must be adopted before the problem becomes apparent. The question remains of how practical is this approach under the extensive grazing systems of western Queensland.

Some of the problems are:

- Insufficient animals to achieve the high stocking rates required.
- The need for lenient pasture use particularly after droughts to allow recovery of the Mitchell grasses, including establishment of seedlings.
- The risk of causing pasture decline with resulting loss of forage reserves.

It could be feasible to concentrate on one or two paddocks that have past histories of high feathertop populations. At Blackall, low feathertop populations have been maintained by continuous stocking with sheep at around one sheep per ha. A lower rate, around one sheep to 1.25 ha in the central-west might be more practical in the long term.

Feathertop populations would remain low, moderate reserves of forage would be maintained and moderate yields of annual grasses

and herbage would be available following effective rain. At Toorak, the heavy stocking with cattle was followed by complete spelling during the wet and this successfully contained feathertop plant numbers.

The more difficult situation is how to deal with an existing feathertop infestation. Heavy grazing of infested areas with cattle might be effective but this approach has not been examined. In any case, if cattle were used in infested areas during winter they would trample the plants and cause seeds to fall, thus reducing the seed problem for sheep. Grading or slashing tracks into feathertop areas could further encourage cattle to move into these areas.

Time of shearing is another possible management strategy to reduce the shive problem. It appears that wool from sheep shorn in February has less feathertop seed than wool from sheep shorn in August/September. However, in the central west, fleeces rot can become a problem during the wet season with sheep in full-wool, and the usual practice is to shear ewes before lambing in September/October.

Conclusion

Feathertop is a component of the Mitchell grass pastures which increases in good seasons and declines in poor seasons. Our observations and experiments suggest that stocking management can be an effective means to minimize the grass seed problem.

The management strategies outlined involve a degree of very heavy stocking, resulting in short term pasture abuse and possibly slightly reduced animal performance. However, when implemented judiciously, and allowing for pasture recovery in the wet season, feathertop populations have been kept at low levels with a minimum of undesirable effects.

Editor's note

Widespread deaths of feathertop plants have occurred this year in the Cunnamulla area as a result of the current drought which commenced in 1978. In experimental plots feathertop has disappeared after reaching a peak of 10% of the pasture composition in 1976.