1-1-1965

Puccinellia : outstanding saltland grass

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"Puccinellia" is a tussocky perennial grass with an outstanding ability to survive salty and waterlogged conditions. Considerable areas of saltland in Western Australia are suited to its growth. Seed is now available commercially and in this article the conditions to which the grass is suited are described and establishment and management methods are suggested.

IN many years of trials "Puccinellia" has been shown to be a valuable plant on salty soils which are too wet during winter for plants such as bluebush and too dry in summer for plants such as Paspalum vaginatum.

"Puccinellia" was collected in Turkey, introduced into W.A. and tested on a salt area at Kojonup (Rogers and Bailey, 1963). Following thorough testing by the Department of Agriculture throughout the farming areas seed increase plots were established and seed is now available commercially from some of the stock firms.

Description
"Puccinellia" is a winter growing, summer dormant perennial grass. It has long, thin leaves and seeding shoots which in isolated plants radiate in all directions from the base, but in a stand are erect. The small seeds are borne in an open pannicle which is relatively rigid (see illustration). Seed is not shed readily, so that harvesting may be delayed until late summer with little loss of seed.

The growing points are well embedded in the base of the plant, which is compact and resistant to grazing.

Growth in the first year is usually slow, but even in severe salt areas extremely small seedlings survive the summer and in subsequent years develop into large tussocks. Established plants shoot vigorously after the opening rains in autumn and run up to seed in late spring. First year plants usually produce seed, but
natural thickening of stands by seed may be slow, possibly due to competition. Nevertheless, natural spread by seed over bare salty areas does occur even without protection from grazing.

Competition from sea barley grass (*Hordeum marinum*) and other plants interferes with establishment, although once established "Puccinellia" is able to compete.

**Conditions for growth**

Smith (1961) has described the types of salt problem which occur in W.A. (Department of Agriculture Bulletin No. 2928). An extensive network of plots has been established on salt-affected soils throughout the farming areas and the adaptability of "Puccinellia" has been determined.

The conditions under which "Puccinellia" is most likely to succeed are outlined below. It is important to study these carefully before deciding to plant this grass so that failures will be avoided. Results of the recent Saltland Survey (Lightfoot, Smith and Malcolm, 1964) indicated that some farmers had sown saltland plants well outside the recommended environments. Few of these sowings succeeded.

**Seepage Areas**

The first type of salt problem is the salty seepage area. Those parts of seepage areas which remain very wet in summer are best suited to *Paspalum vaginatum*. In any agricultural district "Puccinellia" will grow on the bare dry fringes of these wet seepage areas, on any surrounding land covered with sea barley grass, and in any seepage areas which do not remain wet in summer.

**Salty Watertable**

The second type of salting is caused by the presence of a salty watertable at shallow depth. In the rainfall areas of 15 inches and over any salty watertable areas, either bare or carrying sea barley grass are suitable for growing "Puccinellia." The only exception are those areas which are under several inches of water continuously for a month or more during the winter. Waterlogging in winter, and periods of flooding lasting a week or two do not prevent the growth of "Puccinellia."

In areas of less than 15 inches annual rainfall there are still many watertable areas where "Puccinellia" will grow well. But in some cases the establishment of a good stand may be slower or odd patches may fail due perhaps to dryness or excessive salinity.

**Morrel Soils**

The third type of saltland is that represented by the West Australian morrel soils which are naturally highly saline and are not affected by seepage or a watertable. These soils must be classed as doubtful for "Puccinellia" but are particularly suitable for bluebush. (Smith and Malcolm, 1959, Bulletin No. 2630).

**Establishment**

On bare ground "Puccinellia" may be established by sowing the seed in autumn before the opening rains. The ground should be worked once, superphosphate applied, and the seed spread at one pound per acre. The seed may be mixed with the super provided it is sown almost immediately. Satisfactory establishment has been obtained without covering the seed, or by light harrowing.

Establishment is more difficult where sea barley grass or other natural salt tolerant species are likely to compete. Further experiments are still necessary to determine the best method of sowing
under these conditions. As most suitable salt areas are low lying, weed control by cultivation is difficult and bogging is a hazard. In any case, the aim is to control the weeds and to sow the seed at a shallow depth (less than \( \frac{1}{2} \) inch) in autumn or winter.

The advantages of sowing before the rain are avoidance of bogging and use of a less busy time of year. If a suitable method of controlling sea barley grass can be devised, there is no objection to sowing “Puccinellia” before the rain.

Better first year growth can be obtained by applying at sowing time a dressing of about 50 lb. per acre of urea (or 100 lb. per acre of sulphate of ammonia.)

Management

It is essential that stock be excluded from the time of sowing until the following January. Some cases of failure have resulted from stocking apparently unsuccessful sowings when no plants were seen by spring.

It cannot be overemphasised that the plants in their first year may be very small and extremely hard to find and identify. Grazing protection should be given whether or not plants are recognised.

During the second year a moderate grazing in autumn will not cause damage but stock should be removed during late spring and early summer. Winter grazing is not harmful in the second and subsequent years but stock are not likely to graze salty areas much at this time of year.

From the foregoing it will be evident that a good time to establish “Puccinellia” is when the non-salty parts of a paddock are to go into crop. The normal protection from grazing until after harvest will be sufficient to allow “Puccinellia” to establish.

The importance of time of grazing is not known as yet but it is likely that late spring and early summer would be the most damaging times to allow heavy grazing. Heavy summer and autumn grazing of established plants is not harmful. Field observations indicate that in summer and autumn even under heavy stocking, sheep are not likely to graze the butts of “Puccinellia” to a point where the plants will be killed.

In the wetter districts where little cropping is done it is suggested that “Puccinellia” be sown, and the whole paddock grazed, until the stock begin to move into the salty areas. Immediately this occurs the “Puccinellia” area should be protected from further grazing until late summer.

It may be possible to follow the suggested management practices for “Puccinellia” without recourse to special fencing.
In Brief

“Puccinellia” is a salt-tolerant winter-growing tussock-forming perennial grass suitable for growing on nearly all salty seepage and watertable areas in the farming districts of W.A.

The seed should be sown at one pound per acre in the autumn or winter. Bare areas may be sown before the opening rain but on grassy salt areas competition from weeds must be controlled.

Growth is slow in the first year but rapidly improves in subsequent years. Some special grazing protection is needed in the first two years for establishment, but limited seasonal protection is sufficient to maintain mature stands.

References


Book Review

“BIOLOGICAL CONTROL OF INSECT PESTS AND WEEDS”

Edited by Paul De Bach, assisted by Evert I. Schlinger


This is a most valuable and welcome publication for it comes at a time when toxic pesticides are being widely used and when some pessimists are forecasting the disappearance of many useful parasites and predators. The workers associated with the preparation of this book are pre-eminent in the field of biological control and can point to many successes, even in this age of chemicals.

The book gives a concise but interesting review of early work connected with the use of natural enemies for pest control and explains some of the reasons for past successes and failures. It sets out clearly the various limitations associated with biological control as applied to both insects and weeds, and shows why certain pests are unlikely to yield to this approach.

Special sections of the book deal with the irresponsible use of chemicals and the detrimental effects which can follow, both for crops and human beings.

Of particular interest is the section on the integration of chemical and biological control, setting out as it does, suggestions for the combined use of natural enemies and pesticides so as to obtain the best results from both.

The book is primarily produced for serious students of biology but many sections are of a general nature and contain much to interest the orchardist and grazier, as well as the scientist.

—C. F. H. JENKINS
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