

Pasture Establishment

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"Pasture" is used here to denote any planned establishment of grasses or legumes and could equally apply to pasture established for grazing, soil stabilisation, weed control, ley pasture establishment in a crop rotation, native pasture revegetation and amenity plantings.

INTRODUCTION

Establishing a new pasture can represent a considerable outlay of time and money, and like all operations to be successful, requires some forward planning. Where seed or planting material for the proposed pasture needs to be sourced ahead of time, a two-year planning cycle may be required.

There are a number of factors which can influence the successful establishment of pastures. The factors we can control are cultivar selection, type of planting material, sowing or planting rate, time of planting both from year to year and within one season, method of sowing or planting, weed management, use of appropriate fertilisers and time of first grazing or cutting. Rainfall cannot be controlled, but correct planning goes a long way towards making the best use of rainfall events to successfully establish a pasture.

Some pastures can be established in new areas with minimal disturbance, but most require some cultivation to ensure adequate establishment because of either soil surface conditions or competition from existing vegetation.



OBJECTIVES OF CULTIVAR SELECTION

The first step in the process is to select a cultivar or mix of cultivars that suit the purpose for which the pasture is required, which are adapted to local rainfall and temperature and the soils on which they are to be grown. For example, some grasses tolerate heavy grazing better than others, some legumes are palatable in the growing season, others are not palatable until late in the season and are more suitable for saved pasture.

Many cultivars used in other parts of Australia are not suitable for the long dry seasons, high temperatures and sometimes humid conditions of the Northern Territory (NT).

There are adapted, productive and persistent pastures available for most areas and situations in the NT. Agnotes on most of these are available from the Technical Publications Section at Berrimah Farm. Local extension officers are also available to discuss specific requirements and experiences. Contact your local departmental office.

PLANTING MATERIAL

The majority of pasture cultivars can be sown by seed. Seed is available from produce merchants who deal in farm supplies, direct from a specialist seed producer, or can be grown on the property as a seed crop or harvested from an area of saved pasture.

Some grasses do not produce viable seed and must be planted by runners or cuttings. They include pangola grass and Aleman grass. Other grasses can be established either by sowing seed or planting cuttings, such as Tully and para grass. However, vegetative plantings are the most reliable method of establishing grasses in seasonally flooded areas. Cuttings for vegetative plantings will generally not be available in large quantities. Initially, only enough planting material will be available to establish a nursery area. The source of these cuttings will mostly be a neighbouring property. The nursery area, if well cared for, will provide the cuttings or runners to sow larger areas of pasture in following years.

SEED QUALITY

From time to time bags of seed you order may also contain sticks, stones, other seeds, dead and damaged seeds, and foreign material. Once you have decided what you want to plant, and before you commit to purchase a bag or a lot of seed, ask whoever is selling it for a seed analysis certificate. If it has not already been done, you can have a sample sent to a seeds laboratory for a germination test and a bulk search to find out if there are any other seeds present. Then, if there is a weed in the seed lot that you do not have and do not want, do not buy the seed.

Seed, particularly grass seed, which has been incorrectly stored or has been in the sun on a truck from interstate could be completely dead. If you buy seed ahead of time, keep it in an air-conditioned room until you are ready to use it.

SEEDING OR PLANTING RATE

Sowing rates are presented in the individual Agnotes for each species or cultivar, but when a single cultivar of a grass or legume is sown, the sowing rate is generally in the range of 2 to 6 kg per hectare, depending on seed size, hardseededness and seed quality. When a mixture of cultivars is sown, the sowing rate of each of the components of the mixture should be reduced. As a general rule, the lower the sowing rate used, the longer the pasture will take to reach its full grazing potential. A high sowing rate should be used to ensure that a pasture establishes quickly, particularly where there is a high weed population which will compete with the establishing pasture.

When planting vegetatively, plant a runner approximately 50 cm long, containing two to three nodes, at a rate of one per square metre (1 m apart in 1 m row spacing).

As most of the currently used cultivars can effectively spread to fill the gaps in the pasture by seed or runners. An alternative to sowing a whole paddock is to sow or plant the desired cultivar in widely spaced strips. In subsequent years, the unsown strips can be fertilised and/or cultivated to encourage and assist spread. As with using a lower sowing rate, the full grazing potential of the paddock will not be realised for a number of years.

TIME OF SOWING

The aim of picking a sowing date is to maximise the likelihood of there being sufficient soil moisture for seed to germinate and the young seedling to survive until the next rainfall event.

The rate of root growth in the young seedling determines this and varies between species but is generally in the range of four to seven days of moist surface soil. Grasses, with their relatively smaller seeds, seedlings which cannot tolerate drying out, and little or no hard seed, are particularly susceptible to establishment failures due to a dry spell after sowing. Commercial legume seed often contains a significant proportion of hard seed, which softens during the wet season and germinates on later rainfall.

The time of sowing depends on the start and duration of the wet season. The earliest reliable sowing dates range from the first week of December in the Darwin-Coastal Plains area, through mid December in the Douglas/Daly area, late December in the Katherine area, to the first week of January in the VRD/Sturt Plateau.

Ideally, have ground prepared and equipment ready to sow when the weather is right. The start of the wet season varies between years, but the long range weather forecasts can give you an estimate of the risk associated with sowing at a particular time in a particular year.

On upland soils, pasture species should not be sown or planted out after early February, as the wet season may not last long enough for the newly established plants to flower and set seed (if annuals), or to develop an adequate root system to survive the dry season (if perennials).

Vegetatively propagated cultivars cannot be planted out until the new season's runners are available. Unless an artificially watered nursery is maintained, new runners are usually not available until January.

On flooded soils, seed or cuttings can be sown or planted in wet soil when there is a good likelihood of follow up rain, or cuttings can be sown into shallow water or mud when the flood waters are receding. On these soils, rapid flooding can drown small seedlings or small establishing plants. Unless there is good control of water depth, planting runners is a more reliable method of establishing grasses on flooded soils, even if seed is available.

CONTROL OF COMPETING VEGETATION

An establishing pasture needs protection from competition from other vegetation until it gets strong enough to out compete it; otherwise it may never establish properly. Consider a few issues at the planning and sowing stage:

1. What and how much vegetation is already there and what impact is it likely to have?
2. What is the best method to deal with this vegetation - cultivation, herbicide before sowing, herbicide after sowing, fertiliser before sowing, fertiliser after sowing, grazing or a combination of these methods? Will herbicide or grazing harm the young pasture if it is used at the wrong time?
3. Make sure you do not accidentally sow a crop of weeds either by using weedy machinery or by sowing weedy seed.
4. Learn the limits of your pasture and plan to keep it in a strong healthy condition so it can resist weed invasion.

GROUND PREPARATION

In the NT environment, pasture seed needs a seedbed where it can get good contact with moist soil. The better the seedbed, the better your chances of a good establishment. For grasses at least, that means a ploughed seedbed. A rough cultivation aids establishment as it reduces runoff and holds moisture longer after rain in small depressions and furrows. Cultivation also reduces competition from existing vegetation, which is required to ensure establishment.

For establishment of legumes, an alternative to full cultivation is the use of a no-till planter following chemical control of existing vegetation.

The minimum requirement is to burn the standing dry material early in the wet season and sow seed into the ash. This method of establishment has only been successful with the stylo legumes and Wynn cassia and is more applicable to the drier, more extensive areas. This method of sowing should be followed up with heavy grazing during the wet season to reduce competition with the establishing seedlings from the grasses present.

SEED TREATMENT

Heat Treatment of Legume Seed

Legume seed can be heat-treated in a hot drum designed for the purpose or hot water treated to soften the hard seed and enhance germination. However, this is generally not recommended for the NT as the hard seed component is regarded as insurance against a false start to the wet season or a poor wet season. Some of the hard seed will break down with exposure to the environment in the field and establish later in the wet season or during the next wet season.

Exceptions to this are the tree-legume leucaena for which hot water treatment should be used to enhance germination, and some legume hay crops where good control over planting conditions is possible and uniform quick establishment is required.

Scarification

Seed of Cavalcade and Bunday can be mechanically scarified using a clover scarifier. This is generally done to have more germinable seed for sowing hay crops. This can double the amount of seed.

Inoculation of Legume Seed

In areas where legumes have not been sown previously, pasture legume seed can be inoculated with compatible rhizobium inoculant to ensure that effective nodulation occurs. However, since all the pasture legumes commonly sown in the NT are not specific in their rhizobial requirements and will freely nodulate with native soil rhizobia, inoculation is not necessary in most cases.

Pelleting

Pelleting of pasture seed has been claimed to enhance establishment but some departmental trials by officers and by producers in the Top End have generally shown a severe negative effect of pelleting on establishment. Pelleted seed generally needs to be sown into moist soil to ensure establishment.

METHOD OF PLANTING

(a) Broadcast

Seed can be broadcast by hand on small areas or by fertiliser spreader or aircraft for large areas. It is often convenient to mix the seed with the fertiliser before spreading over the area. This helps to get a more uniform spread of the seed. If mixing seed with fertiliser, mixing should be done immediately prior to sowing as the viability of the seed is reduced when it is in contact with the fertiliser. Seed which is broadcast onto a trafficable seedbed should be lightly covered by dragging a set of light harrows, a length of pipe, some arc mesh or a small log behind the seeder. The use of a light roller to compress the loose soil surface and give better soil-seed contact often enhances establishment.

(b) Drum Seeders

Usually used for fluffy seed such as buffel and Mitchell grasses.

(c) Conventional Sowing Machinery

Used where a cultivated seedbed is available. Depth of sowing is important for most of the pasture cultivars. Generally, they are small seeded and need to be sown on or near the soil surface. If sown too deep they will not emerge.

(d) Minimum/No-Till Machinery

Suitable for sowing legume seed after herbicide treatment. The use of presswheels often aids establishment.

(e) Runners

On upland areas runners should be spread onto moist soil from the back of a utility or truck and lightly disced to cover part of the runners. On flooded soils the cuttings can be planted by hand or foot into wet soil or mud, or thrown under the wheels or tracks of a light amphibious vehicle, or planted using a disc planter.

The department and some pastoralists have developed their own machines for planting runners on floodplains.

MANAGEMENT OF THE NEW PASTURE

Fertilisers

Fertilisers do not affect the number of seeds which germinate, emerge and establish but they enhance the early growth of the seedlings, ensuring they reach an adequate size before the onset of the dry season and they set more viable seed to allow the pasture to thicken up during the next wet season.

On most Top End soils, with the exception of the flooded coastal clay soils, fertilisers are required to ensure establishment of a productive pasture. In the drier areas soil fertility may be naturally higher, and responses to fertiliser lower.

Agnotes are available from the Technical Publications Section at Berrimah Farm detailing fertiliser regimes for pasture grasses, legumes and a mixture of grasses and legumes.

First Grazing

Apart from the grazing of grass pastures to aid legume establishment described above, as a general rule it is better not to graze a newly established pasture in the wet season of establishment or the first dry season. Plants should be allowed to establish firmly in the ground and to set a seed crop to ensure persistence of the pasture. There have been many instances of newly established pastures being destroyed by heavy grazing during the wet season or the first dry season of establishment.

In some instances, strategic grazing may be used to enhance the establishment of a desired cultivar. In other instances, where a pasture is sown early and receives the benefit of a long wet season and good late rain, grazing during the first dry season may not harm it. These are special circumstances and must be handled on an individual basis.

WHAT TO AVOID

Over the years, there have been large areas of improved pastures sown in the NT, but in many cases there is little to show for it today.

What should be avoided:

- Trying to sow an area which exceeds the capacity of the resources available.
- Trying to establish pastures without some soil disturbance.
- Trying to cut costs by using a low sowing rate.
- Trying to cut costs by not using fertiliser.

In short, do not try to get too big too quickly. Do smaller areas and do them well.

WARNING

Pasture plants have the potential to become weeds in certain situations. To prevent that, ensure that seeds and/or vegetative materials are not inadvertently transferred to adjacent properties or road sides. Contact your departmental extension officer for information on appropriate management.

CHECKLIST FOR PASTURE ESTABLISHMENT

- What species are suitable? Is seed/planting material available for a reasonable price? Where can it be stored? When should it be ordered?
- What ground preparation is needed? When can it be done? Do you have suitable machinery, can you hire it or is a contractor available? If using herbicides, is the spraying equipment in working order and calibrated?
- Will seed treatment or fertiliser be required? When will it be needed? When should it be ordered to ensure it is available when needed?
- What sowing methods are available to you? Will they be available when needed? Is the seeder calibrated?
- Can grazing be controlled? Is there a sufficient firebreak around the pasture?

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