

PERENNIALS IN THE PASTORAL ZONE

## AERIAL SEEDING - REWARDS AND RISKS AT GOONDIWINDI

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**Abstract.** *Aerial sowing pasture grasses, pre- or post- harvest into cereal crops near Goondiwindi, Qld, protects the land from erosion, minimises establishment costs, and results in faster establishment than conventional cultivation. Requirements for grass establishment include: a 7 bag crop to sow into; pasture seed with a high germination capacity; control of weeds; a competent aerial operator; and treatment of pasture seed to reduce losses due to ants. Legumes can be aerially sown the following autumn after grasses have established.*

### OVERVIEW OF THE REGION AND A BRIEF HISTORY OF AERIAL SEEDING

Goondiwindi is situated on the Qld/NSW border and is a main centre for a diverse, and highly productive rural area. In fact, based on the value of all produce from the region the Waggamba Shire is the second most productive shire in Qld and the Moree Plains Shire is one of the top production shires in NSW.

According to the Bureau of Statistics 1988/89 survey the Waggamba Shire (14,000 km<sup>2</sup>) produced \$138 million. I would suggest this figure could double if we include Moree Plains Shire and within an 80 km radius of Goondiwindi.

The main enterprises in this area are wheat, barley, sorghum, chickpeas, sunflowers, beef cattle (both breeding and fattening), wool and sheep meat production and cotton (irrigated and dryland).

### CLIMATIC CONDITIONS

The area has a 600 mm annual rainfall in the east and 500 mm in the west, slightly summer dominant but generally spread throughout the year. We can expect extreme summer temperatures to reach 40/42°C and winter frosts to go as low as -4/-8°C in isolated areas.

### SOILS

At the bottom of the scale we have bull oak/cypress pine/wattle forest country (brown sandy loam very low in N, P and K). We graduate from this to poplar box/false sandlewood (red-brown clay loam, medium N, very low P and quite high K). A further step up the scale is the flood plains of belah/coolibah (grey clay, low N and P and high K). The best in our region, where most of the farming is undertaken and pastures established, are the Tall Belah Forest (brown clay loam) and the Tall Brigalow Forest (grey clay). There is also the Brigalow melon hole country which, when established provides good grazing land.

### CARRYING CAPACITIES

We would expect cattle rates to be in the vicinity of one breeder unit to 1.5-2 ha on paddocks sown to perennial grasses in comparison to 1:3.2-4.0 ha on native/naturalised pastures.

### INCIDENCE OF DROUGHT

In the last eleven years we have had three severe dry spells which in turn have resulted in large supplementary feeding programs. When rains do come the improved species are first away and will produce bigger yields with superior quality than the native/naturalised pasture.

### MANAGEMENT PRACTICES

I am most adamant that to maintain pasture "stability" there must be adequate management. I am

quite fanatical about rotational grazing; graze and spell.

It is difficult in a drought year but I endeavour never to flog an improved pasture stand unless for a specific reason. It is essential that improved pastures receive adequate spelling through the specific species growing period to maintain that stable pasture *ie.* let your plants stretch their arms a bit and from time to time to form and drop viable seed.

## RESEARCH

To my knowledge there has been no comparative research done between aerial seeding and ground drilling. Probably our Department should do trials in this area so that more concrete evidence is readily available. Later in my paper you will read of the reasons for my preference for aerial seeding.

## AERIAL SEEDING

Up until the late 1970s there had only been small areas of improved pasture established in this region. As more land was cleared for grain production it was natural to follow with improved pastures when the country became "tired" and depleted of nutrients, or badly damaged with soil erosion. The better managers were looking to eliminate this soil damage and simultaneously improve their livestock carrying capacity.

Aerial seeding of pasture species is nothing new to Qld. In fact huge areas of Brigalow land and others have been aerially seeded with different varieties of buffel grass and, to a lesser extent, Rhodes grass. In tropical areas thousands of hectares have been aerially seeded with stylos and other legumes with huge successes. This practice started back in the early sixties.

Aerial seeding of improved pastures into farming land in the Goondiwindi region was pioneered in the late 1970's and early 1980's and to this date substantial areas have been successfully established. At the end of 1989 a survey showed that some 46,000 ha was established. This represents only 4% of the region. Of this 46,000 ha only a small area was established by aerial sowing into crop.

## PRESENT DAY AERIAL SEEDING

### REASONS FOR AERIAL SEEDING AS AN OPTION

**To protect the land from soil loss:** In much of the Goondiwindi region, and more particularly in my area, the country is very susceptible to erosion by water. When farming country needs to go out into pasture for one reason or another, there is a huge risk of soil loss when using the normal DPI recommended method of seed bed preparation.

This preparation can vary greatly depending on the species to be sown and the suitability of the machinery which the grazer has at his disposal. However, it

normally means getting a fairly tilthy seed bed over a period of time with stored subsoil moisture.

With aerial seeding into standing crop or crop residue the risk of soil loss is minimal or nil and therefore very desirable in my mind. In addition it is normal to receive some rain through the crop ripening period and therefore we would have some soil moisture stored very close to the surface. In other words there is no moisture loss from cultivating the soil and little to no soil loss by water or wind erosion.

**To gain a very acceptable and fast establishment:** Once again it is unusual not to receive good rains just before, during or soon after the harvest and therefore the seed has the opportunity to germinate in amongst soil surface cracks and crop residue and is on its way well before Christmas and the hot weather.

Buffel grass grows and performs well in the grey clay loams of the rich Brigalow country but to get it to establish is a constant problem for most graziers. Assuming the correct ingredients, then this method of planting into crop is very successful from an establishment point of view.

Using this approach a grazier can harvest his wheat and be otherwise grazing or harvesting grass seed from his new pasture in five months and this is without cultivating the paddock.

**To lessen establishment costs:** The cost of preparation of a tilthy seed bed would vary from property to property but at the very least would cost \$15 per hectare plus the waiting time. We can aerially-seed a grass pasture for around \$5 per hectare.

## PLANTING METHODS

I believe you should have a reasonable cover of winter crop, *ie.* a seven bag crop or better.

The seed must have a good germination and purity.

Timing is fairly important. If there are a few summer grass weeds as potential competition then you should sow before harvest; in our case this is about the first week in October. If grass weeds are bad, don't plant, or, chemically control the weeds and sow late in February.

It is not advisable to use a chemical with residual effects, such as Glean, in the wheat crop prior to sowing pastures.

The aircraft operator should be competent and cooperative. The sowing method differs depending on the species to be sown.

All seed should be treated for ants. For instance, this year my seed sat on the paddocks for four months before any rain fell. Ants could have had a proper field day if the seed was untreated.

The fluffy types of seed namely the buffel and rhodes grasses, are prone to bridge badly, so normal practice is to shovel three to five 20 kg bags of seed

into the fuselage of a light high winged aircraft such as a Cessna 172. At the rear of the compartment a 15 cm diameter funnel type outlet is installed. You find someone who is not prone to motion sickness and shove them in with the bags armed with a knife. The pilot flies, preferably to markers, at a height of about 30 m. Following instructions from the pilot the "seed pusher" having knifed a bag proceeds to feed seed into the funnel. The forward motion of the aircraft creates a venturi effect and the seed is sucked out. It is a dusty dirty uncomfortable job but it works. The paddock is flown twice, the second time at right angles to the first application.

When seed that will flow easily is sown then we use a large crop duster with a special fertilizer spreader. The aircraft I use is a turbine Airtractor 502 fitted with a Norcal fertilizer spreader. The aircraft has a payload of two tonnes and we will fly the country once to markers at 20 m swath and at 30 m above the ground.

Seeding rates are sometimes governed by economics but it is my opinion that nothing less than 3.3 kg/ha and preferably 5.6 kg/ha should be used to give every chance of a full establishment. Many people can harvest their own seed and this is when they can afford to slap it on at a heavy rate.

I feel it fair that I should point out here that it is not always necessary to use aircraft. For instance if the winter crop paddock is free of weeds or there has been no rain to promote weed germination then the grazier can use his airseeder or combine and drop the seed onto the stubble after harvest. Another plus would be to drag covering harrows as it helps to settle the seed down and allows the operator to see where he has already planted.

#### WHAT SPECIES ARE USED?

**Grasses:** In the region surrounding Goondiwindi we are limited to few grass species. Two have been mentioned, *ie.* buffel and Rhodes. The popular varieties are Biloela buffel (*Cenchrus ciliaris*), and Katambora Rhodes (*Chloris gayana*). Others are purple pigeon (*Setaria incrassata*), Bambatsi panic (*Panicum coloratum*) and green panic (*Panicum maximum*). All manner of cocktails can be used and some graziers include a summer forage in their mix *eg.* silk sorghum (sorghum *cv.* silk) being one that is popular.

**Legumes:** I should point out here that a mixture of legume with grass provides the best productive and 'sustainable' pasture.

A widely used legume on all the better soil types is lucerne (*Medicago sativa*), the most popular variety being Trifecta. There are several snail (*Medicago scutellata*) and barrel medics (*Medicago truncatula*) used; they are Sava, Robinson, Kelsor of the snails and Cyprus, Paraggio, Sephi, Jemalong of the barrels.

The methods of establishment include: sowing under the winter crop aerial sowing the grass later; get the grass established first and then early in late March-

early April over sow, by air or ground, the desired legume.

#### WEED CONTROL

A big burden of summer grass such as urochloa, (*Urochloa mosambicensis*), love grass (*Eragrostis sp.*), barnyard grass (*Echinochloa crus-galli*) or couch grass (*Cynodon dactylon*) on any area can give you hell with establishment.

In some instances a few summer broad leaf weeds can pose a problem. These are "false castor oil" or thornapple (*Datura spp.*), Bathurst burr (*Xanthium spinosum*), mintweed (*Salvia reflexa*) but they can all be controlled with 2,4-D, MCPA, or atrazine, *etc.* There are problems here if lucerne is part of the pasture but with the use of both grazing and chemical this problem can be overcome. In most situations these weeds are a non event because they should have been farmed out years ago.

#### THE RISKS

**S**evere loss of plants due to lack of moisture after the seed strike. The same problem can happen in a conventional seed bed with stinking hot weather following a strike.

A series of light rainfalls that are enough to get grass weeds going but not enough to germinate the good guys. This gives us the competition problem which is most unsavoury.

If you get a bad aircraft operator then there is the risk of uneven distribution. I have two paddocks that are badly striped with grass due to a poor operator.

Probably one of the most painful risks is that if you do have a failure for one of the reasons mentioned then you will have your local extension officer saying 'I told you so, we do not recommend this method of pasture establishment'. That hurts!

#### THE REWARDS

**W**e almost eliminate soil erosion entirely and if we don't think that is important then we should not be given any authority or influence over land use.

The small seedlings and the stored moisture near the surface are protected from the elements by the stubble cover.

There is no emergence problem if a heavy downpour is the initial rain. Often the clay soils, where we have the costly, beautifully prepared cultivated seed bed, get crusted badly by a heavy rain creating an emergence problem.

Everything is done to the book; the tiny seed is sitting snugly covered by 5 to 10 mm of soil and bingo! it all gets sealed in by the rain that you have been

wishing for, or washed off in the case of sheet erosion. The risk of failure is just as high or worse for a cultivated seed bed.

You are going to have a good even pasture weeks or months ahead of converting a wheat crop to a pasture using the conventional cultivated seed bed method.

The costs of establishing your pasture are reduced considerably and then you have the added value of that particular area not being out of production for too long.

## CONCLUSION

It may sound a bit rough and ready but to me establishing pastures by aerial sowing is a very acceptable and I believe, a sound alternative to conventional cultivation for pasture establishment.

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