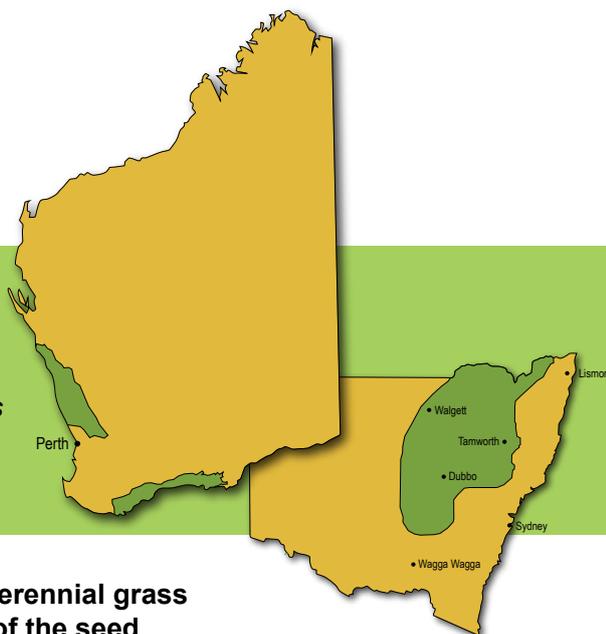




# Tropical perennial grasses

## 3. Seed quality

*This brochure is the third in a series of guides released by the Future Farm Industries CRC (FFI CRC) to promote the use and management of tropical grass based pasture mixes in the summer-rain dominant region of New South Wales (see map). This guide is also relevant to Western Australia, in particular the high-rainfall south coast and the northern agricultural region (see map).*



**Successful establishment of sown tropical perennial grass pastures is highly dependent on the quality of the seed sown. Quality can vary markedly, so you need to know what you are buying – often it is a case of ‘buyer beware’.**

**Always ask for a copy of a current certificate of seed analysis for the seed you are intending to purchase. Check to make sure it has high seed purity and a high germination percentage with low amounts of inert matter and other seeds. Species that have primary dormancy may have low germination but high fresh seed, so alternative seed will need to be sourced or the seed stored until dormancy has broken.**

**If seed quality, purity and germination are well below the average expected for a cultivar, then it can adversely affect establishment, or it will cost extra to increase the sowing rate to compensate. Ask yourself if it is really worth buying poor quality seed.**

The old saying ‘you reap what you sow’ is very true when it comes to buying seed of tropical perennial grasses as quality (germination rate, purity, dormancy, and the presence of weed seeds) can vary widely. If you take the time to buy high quality seed, with high purity and germination, then you have taken the first step necessary for good establishment. Sowing low quality seed is a recipe for poor or failed establishment – even if you do everything else right.

The only way you can be confident that you are buying high quality seed is to ask the seller for a copy of the certificate of seed analysis. Make sure the certificate is from an accredited laboratory and that it is no more than 12 months old. There are two main areas of the certificate to check. The first is the purity test which indicates the percentage of pure seed and conversely the percentage of inert matter (including empty florets) and other seeds. The second is the germination test which shows the percentage of normal seedlings that germinated (usually after at least 14 days) and the percentages of hard, fresh and dead seeds and abnormal seedlings. In grasses, fresh seeds are viable (alive), but do not germinate and include immature, damaged and dormant seeds (see boxed text on next page).



*An example of poor quality seed with a high proportion of darker coloured seeds of other species. Only buy and sow good quality seed with high purity and germination of normal seedlings and low percentages of inert material and other seeds.*

# Tropical perennial grasses - Seed quality

Common name	Cultivar	% Purity	% Germination	Proportion live seeds (PLS)	No. of tests
Bambatsi panic	Bambatsi	95	60	0.57	39
Digit grass	Premier	72	55	0.40	52
Rhodes grass	Katambora	94	55	0.52	18
Bluegrass	Floren	73	30	0.22	27
Creeping bluegrass	Bissett	68	29	0.20	17
Purple pigeon grass	Inverell	94	26	0.24	12

Table 1: Average purity (%) and germination (%) of normal seeds of some tropical perennial grass cultivars commonly recommended for sowing on the North-West Slopes of NSW. The number of tests indicates the number of seed analysis certificates used to calculate the average.

If a current certificate of seed analysis is not available, consider having a seed analysis done. It takes a few weeks and may cost \$150–200 per sample, but compared with the cost of buying seed it is 'cheap insurance'.

Proportion of Live Seed (PLS) is a measure of the seed quality of a sample and is expressed as a number between zero and one. The higher the seed quality the closer that PLS is to one; the lower the seed quality the closer the PLS is to zero. PLS is the purity percentage multiplied by the germination percentage (shown as a value for normal seedlings) and divided by 10,000. Typical values for some of the more commonly sown cultivars in northern NSW were

obtained from analysing the results from 168 seed certificates (Table 1). For these cultivars, the average PLS values for Bambatsi panic, Premier digit grass and Katambora Rhodes grass were between 0.40 and 0.57, while Floren bluegrass, Bissett creeping bluegrass and Inverell purple pigeon had low average PLS between 0.20 and 0.24. If the seed that you are considering buying has a PLS below the values shown in the table then its quality is below average and for good establishment you will have to buy more seed to increase the sowing rate, which increases the overall cost of seed. If it has a PLS above the value shown in the table then it is probably best to maintain the sowing rate with a high potential to establish a high density stand.

## Seed dormancy

Seed dormancy is common in some species and 'primary' dormancy (sometimes called post-harvest dormancy) is usually associated with either the physical structures that surround the seed (lemma, palea and glumes) preventing moisture reaching the seed, or chemical inhibition that declines with time, or mechanisms within the embryo. As a result, seed samples can have a high proportion of viable seeds, but have low germination. Primary dormancy is a natural mechanism that enables seed to survive for extended periods in the soil and germinate at different times.

Katambora Rhodes grass, Bambatsi panic, Swann forest bluegrass, Premier digit grass and kikuyu generally do not display any seed dormancy. Purple pigeon grass, green panic, setaria and signal grass are species that have primary dormancy. For example, one-year-old purple pigeon grass seed may have germination as low as 15%, but two-year-old seed can have a germination of 70%. Similarly, setaria may require 4–5 months storage to reach acceptable levels of germination, while green and Gatton panics can require 8–10 months and signal grass 10–12 months of storage to achieve maximum germination.

'Secondary' dormancy can also occur and may be caused by several uncontrolled factors, such as high

temperatures during seed harvesting or storage. Since the mechanisms that induce this type of dormancy are unknown, so too are the processes required to break secondary dormancy.

Some certificates of analysis may give results for a tetrazolium test. This test determines if a seed has a viable embryo and is an important test for seeds with high levels of dormancy. It also includes seeds that are dormant, immature and damaged and so should not be included in the germination percentage.

If the certificate of seed analysis for species with primary dormancy indicates a high proportion of fresh seed then determine whether the time from harvest to sowing is sufficient for the seed to reach an acceptable level of germination. If there is insufficient time between harvest and sowing, then either source alternative seed with a higher percentage of normal seedlings to sow this season, or consider buying the seed and storing it in dry, well-ventilated conditions until the following season. This is particularly important for producers in Western Australia as some of the most commonly sown grasses (e.g. panic grass) have primary seed dormancy. Since the majority of panic grass seed is harvested in northern Queensland in January–April there is insufficient time for primary dormancy to break down and the germination to reach acceptable levels for sowing in Western Australia in August–September of the same year.

# Tropical perennial grasses - Seed quality

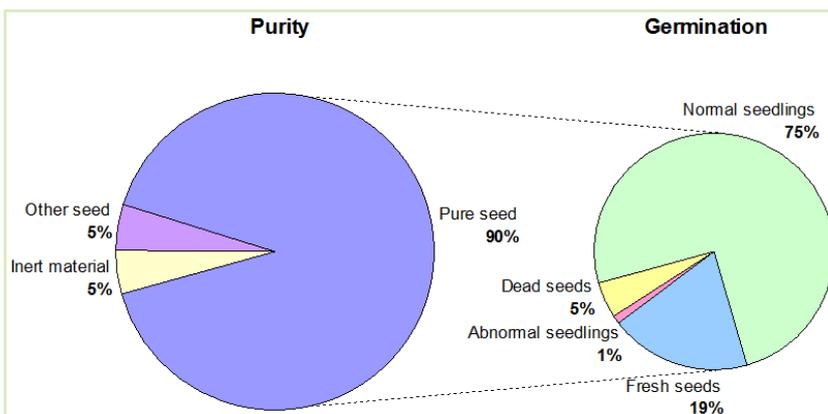
## Examples of two seed lots with markedly different quality

The following examples for Premier digit seed from commercial seed samples demonstrate the effect of seed quality on the potential sowing rate of seeds that may germinate and the resulting seed cost.

### Example 1 – good quality seed

This seed has a high purity of 90% and a high germination (normal seedlings) of 75%. Its PLS would be  $90 \times 75/10,000 = 0.675$ , which is higher than the average PLS (0.40; Table 1) for Premier digit grass and indicates that 67.5% of the sample by weight contains germinable seed.

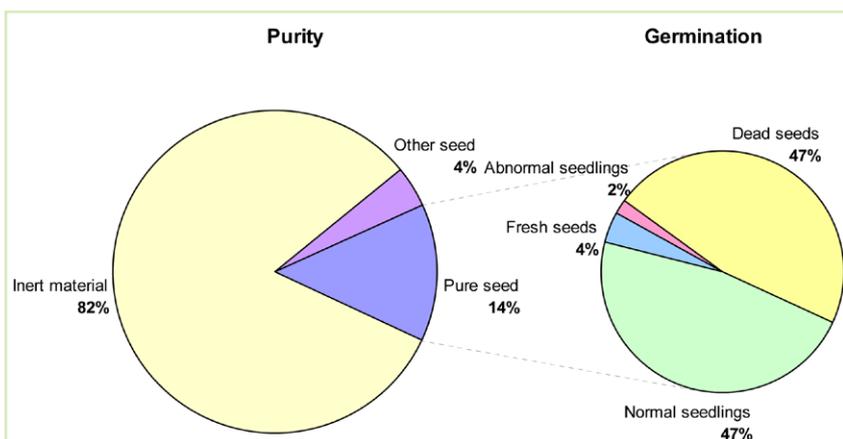
At a sowing rate of 2 kg/ha, this seed would have  $0.675 \times 2 = 1.35$  kg/ha of PLS, which at \$20/kg would cost \$40/ha.



### Example 2 – poor quality seed

This seed has a low purity of 14%, but about average germination (normal seedlings) of 47%. Its PLS would be  $14 \times 47/10,000 = 0.066$ , which is low compared with the average PLS (0.40) for Premier digit grass.

Only 6.6% of the sample by weight contains seeds that may germinate. Seed quality is low because there is a high amount of inert material (82%), which in this case were empty florets that did not contain seed.



To sow the seed in Example 2 at a sowing rate of 2 kg/ha, this seed would have the equivalent of  $0.066 \times 2 = 0.13$  kg/ha of PLS. To sow at the same rate as the average PLS you would need to sow over six times ( $2 \times 0.40/0.13$ ) as much seed, which would cost about \$250/ha. For more information refer to FFI CRC Tropical Perennial Grass Guide Number 4 *Tropical Perennial Grasses – Sowing rates*.

Most tropical perennial grass seed is harvested and sold 'in the floret'. However, tropical grass seedheads tend to ripen unevenly and at harvest some of the florets may be empty or contain immature seed. A high proportion of empty florets can be indicated by a high value on the certificate of seed analysis for 'inert material'. Similarly, a high proportion of seeds other than the cultivar that you are buying (including weed seeds) will be indicated by a high value for 'other seeds'. This also applies to coated seed, as the tested seed sample may include all of the harvested material (florets with seed, empty florets, straw and other seeds can all be part of coated seed).

All seed is sold and sown by total weight. Seed coating improves the flow of light, fluffy seeds when sowing, and is good for checking sowing depth, but does not affect its purity and germination. Sowing rates need to be increased for coated seed. For example, a 2:1 seed coating (2 kg of seed coating for every 1 kg of 'seed' material by weight) triples the cost per hectare of sowing seed.

Always consider buying seed with the highest purity and germination and the lowest cost per unit of seed weight. Ask yourself – is it really worth buying poor quality seed?

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