

VIABILITY OF PANICUM COLORATUM SEED IN STORAGE

ABSTRACT

Mechanical scarification of two months old seed of Panicum coloratum increased germination substantially but seed so treated failed to survive three years' storage. Unscarified seed stored satisfactorily under laboratory conditions but still maintained a proportion of hard seeds. When stored under laboratory conditions, but in sealed packages, both dormancy and hardseededness were largely overcome during three years' storage. In addition, such storage resulted in a marked increase in germination vigour.

There appears to be little documented information on the viability of individual species in storage in northern Australia. With the steady increase in production of seed of tropical pasture species there is a need to obtain such information.

In the 1963 report of a Technical Committee set up by the Standing Committee on Agriculture to enquire into general problems of seed viability in the tropics and semi-tropics it was pointed out that climatic conditions in Brisbane and further north are unfavourable for warehouse storage of seed.

Strickland has reported (XVth Triennial Congress International Seed Testing Association, N.Z., 1968) that in addition to dormancy delaying germination in a number of tropical grasses, the tight envelopment of the caryopsis by the lemma and palea also has a similar effect. This latter, so-called hardseededness effect, can be largely overcome by a light mechanical scarification. Special, although simple equipment is required for this operation so it would be advantageous to have it done by seed processors before distribution to merchants and farmers. However, the effect of such treatment on the viability of seed in storage needs to be known.

These questions have been investigated in a preliminary study with a Kabulabula type of *Panicum coloratum* CPI 14375, a promising species but one of which seed is not at present available commercially. The study was made at the Cunningham Laboratory of the C.S.I.R.O., Division of Tropical Pastures in Brisbane, Queensland.

Seed was harvested in April, 1966 by shaking mature caryopses from the panicles. In June, 1966 a portion of the sample so collected was mechanically scarified and samples of both scarified and untreated seed were germination tested and sealed in commercial "Dri-seal" packages. These packages, together with unsealed control samples (both scarified and untreated), were stored in a cupboard in the laboratory and subjected to normal temperature and humidity conditions until July, 1969 when all samples were tested for germination. At this date, samples of both sealed and unsealed seed which had not been previously scarified were then scarified and also tested for germination.

The results of these germination tests are shown

The results show:

- (a) a substantial increase in the germination of two months old seed due to mechanical scarification,
- (b) scarified seed did not remain viable after laboratory storage for three years whether sealed in packages or not,
- (c) unscarified seed retained its viability for three years under ordinary laboratory storage but a degree of hardseededness still remained,
- (d) storage of unscarified seed in sealed packages appeared to largely overcome both dormancy and the hard-seed factors, mentioned in (c) above, which were delaying germination, and
- (e) storage in sealed packages resulted in a marked increase in germination vigour as indicated by the greater length of shoots six days after the commencement of germination tests.

TABLE 1

Germination of scarified and unscarified seed of *Panicum coloratum*
C.P.I. 14375 after 3 years' storage in sealed packages and unsealed.

Pairs of figures are germination percentages of duplicate sets of 100 seeds.

1966		1969					
Treatment	Germ. — %	Treatment	Germ. — %	Shoot* length mm.	Treatment	Germ. — %	Shoot* length mm.
Not Scarified	7	Not sealed	42	2.8	Scarified	75	8.2
			45	2.8		81	5.8
	5	Sealed	80	11.1	Scarified	82	18.0
			80	11.2		83	16.0
Scarified	47	Not sealed	0				
	48		Sealed	2			
			0				

* Mean length of shoot at day 6.

The tests reported were made without strict replication although duplicate sets of seed were used for testing germination. After the completion of these tests they were repeated, using seed from other sealed samples, with substantially the same results.

A number of factors is known to affect the viability of seed in storage. Among these is the moisture content of the seed. This was not determined in June, 1966 when storage began, but in July, 1969 the seed in the sealed packages had a moisture content of 4.6%, which would favour satisfactory storage. Again, the seed used in this test was hand harvested and fully mature when collected, a condition which would also favour satisfactory storage. With a mechanically harvested seed crop, subject to different harvest and post-harvest conditions, reactions to storage could be different and require investigation.

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