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SEED STORAGE STUDIES IN CLONES OF CENCHRUS CILIARIS LINN

JAEQUELINE A. SELVARAJ and K. R. RAMASWAMY

Seed storage studies conducted ambinent conditions with three exotic clones FS 3108, FS 339 and Anjan and one 'local' revealed significant clonal differences in the period of seed dormancy, germination and seedling vigour. Exotic Clone 'Anjan recorded the highest germination of 89.0% after 12 months of storage, while the local, the lowest of 40.0% after 18 months of storage. A close association was evident between seed germination and seedling vigour.

Cenchrus ciliaris is an important perennial pasture grass in the central districts of Tamil Nadu. Though, this grass flowers through out the year, seed setting is highly influenced by environmental factors. Being a dryland pasture grass, collection and storage of seeds become important, since it is always advantageous to collect the seeds in a good crop year and carry them on to storage for sowings in the subsequent years.

MATERIALS AND METHODS

Being perennial, the bulk crop received a forage cutting during October 1980 and subsequently came to seeding during December 1980 when the earheads were collected and seeds extracted.

Bulk seed from four clones of diverse origin viz., FS 3108, FS 339, Anjan and the 'local' were collected chaffy seeds removed and bulk seeds cleaned were dried to 10% seed moisture content. Sample seeds were drawn packed in moisture resistant container i.e., butter paper bags sealed with gum and kept in storage from 11.80 to 30.9.81 under ambient conditions.

The seed samples were drawn and tested for germination at trimonthly intervals as per ISTA Rules (Anon, 1985). The seedling vigour was arrived at by determining the dry matter production of seedling (Gelmond *et al* 1979) and calculating the vigour indices bymultiplying the germination percentage with the total length of seedling.

RESULTS AND DISCUSSION (Table I)

During the period of storage in the storage room, the mean maximum temperature ranged from 29.4° C to 34.9° C and minimum from 16.0° C to 28.1° C and relative humidity from 77 to 90 percent.

The seeds failed to germinate immediately after harvest in all the

* Department of Seed Technology, Tamil Nadu Agricultural University Coimbatore-641 003.

clones. There was no significent improvement in the next three months of storage; however, the germination improved in the subsequent three month period and was 21 0, 12.0 and 35.0 per cent in FS 3108, FS 339 and Anjan respectively while there was nil germination in the 'local'. By the end of ninethmonth of storage, the percentage of germination increased to 65, 62 and 86 respectively in the former three clones, while it was only 8 in the 'local'. The results have brought out significant differences due to genotypes. The 'local' clone would have become well adopted due to its slow growing and more draught resistance nature to the prevailing conditions where in the soil remains wet with the receipt of monsoon rains during the months of September, October and November when the pasture grasses would be in full bloom. Therefore it is plausible that the seeds produced during this period must posses long period of dormancy to withstand the long spell of dry period that is to follow so that they can germinate during the next monsoon season. In *C. Ciliaris*, Pandey and Pathak (1980) reported low germination of fresh seeds due to the presence of phenolics particularly anthcyanic in fresh glumes and other phenolics in the fresh seeds. A similar trend was observed in *P. maximum* which showed an improvement in germinability after 9 months of ambient storange.

In the exotic clones the highest germination was between 9th and 15th month of storage whereas in the 'local' only 11% was recorded on the 15th month of storage which slowly improved to 40%, the highest for that clone at the end of 18th month of storage. Germination decreased from 18th month onwards, in the exotic clones while 21st month onwards in the 'local'. According to Peel and Prodonoff (1970) seeds of *P. maximum* remained viable for 3 months and there after sealed storage was found saferand beneficial to open storage. Kock (1970) concluded in his seed storage studies with five clover species, lucerne and eight grasses that for long term storage of seeds in jute or paper packets, the relative humidity should be about 50-70% and that at higher relative humidity the seeds should be stored in plastic packets. Yespes and Matias (1975) reported that seeds of *C. seitgerus* recorded reduced viability after six years of storage at 17° C in cloth bag.

Seedling vigour as measured through the yardsticks of vigour index and dry matter production of seedling was maximum in 'Anjan' followed by FS 3108 and FS 339. In the clone 'local', the values were the lowest. This variation again may be due to clonal differences The three exotic clones maintained good vigour upto 15 months of storage. Decrease in seedling vaigour preceded that of germination in all the clones. Similar

Table I. Germination per cent (G), dry matter production (DMP) in mg and vigour index (V) of seed as influenced byperiod of storage in four clones of *C Ciliaris*.

Storage Period [month]	Parameter studied	FC 3108	FS 339	Anjan	Local	Mean
1	2	3	4	5	6	7
nitial	G	0(0.6)	0(0.6)	0(0.6)	0.(0.6)	0.0(0.6)
3	G	1(5.7)	0(0.6)	6(14.2)	0.(0.6)	1.8(5.3)
	DMP	6.3	0	5.1	0	5.7
	V	6.3	0	30.6	0	18.5
6	G	21(27.3)	12.(20.3)	35(36.3)	0.(0.6)	17.0(21.1)
	DMP	6.3	5.8	5.2	0	4.3
	V	193	84	363	0	160.3
9	G	65(53.7)	62(51.9)	86(68.0)	8(16.4)	47.5(55.3)
	DMP	6.8	5.5	5.1	6.4	6.0
	V	598	440	911	82	507.8
12	G	73(58.7)	68(55.6)	89(70.6)	8(16.4)	59.5(53.3)
	DMP	6.4	6.0	5.3	6.3	6.0
	V	657	503	1026	75	565.3
15	G	68(55.6)	62(51.9)	77(61.3)	11(19.4)	47.1
	DMP	6.0	5.6	5.0	6.0	5.7
	V	605	434	800	98	484.3
18	G	61[51.4]	46[42.7]	42[40.4]	40[39.2]	47.3[43.4]
	DMP	4.5	2.6	4.0	3.8	3.7
	V	595	377	365	404	435.3
21	G	50.[45.0]	10[18.4]	18[25.1]	38[38.1]	29.1[31.7]
	DMP	2.3	2.0	2.5	2.5	2.3
	V	435	89	140	338	250.5
ean	G	48.4[44.1]	43.3[41.2]	504[45.2]	15.0[2.2.8]	
	DMP	5.4	4.6	4.5	6.0	
	V	514	321	601		

Comparison between	Germination CD	Dry matter Production CD	Vigour Index CD
[i] Clones	0.62**	0.09**	96
[ii] Period of storage	0.89**	0.13**	67
[iii] Clones x Period of storage	1.76**	0.19**	40

[Figuers in the parenthesis are transformed values]

reports have been published by many early workers (Harrington, 1972 and Rajendran, 1976). Therefore, it becomes imperative to consider both vigour and germination together in deciding the safe storage period for individual clones.

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INFLUENCE OF CERTAIN CHEMICAL FACTORS IN GERMINATION OF SPORE CELLS OF *BACILLUS CEREUS*

MOHAMED, HABIBULLAH KHAN and N. NATARAJAN

Among the various chemicals added glucose, casamino acid, alanine, aspartic acid and glycine showed higher germination of *B. cereus* spores. Among the positive germinants which were tested in milk all of them showed marked improvement in promoting the germination of spore cells of *B. cereus*. The most positive germinant among these was L-alanine which as a result of enhancing the germination of *B. cereus* increases the keeping quality of heat treated milk to 30 hours at room temperature.

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