

# Standardization of germination test requirements for *Cenchrus glaucus*

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## SUMMARY

In *Cenchrus glaucus* studies on the effect of temperature and media revealed that seeds germinated better at the alternate temperature regimes than at constant temperature. Seed germination and seedling vigour parameters were maximum at alternate temperature of 25-30°C. Sand and roll towel medium performed well, in producing vigorous seedlings even though radicle emergence was delayed in sand medium.

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**Key words :** *Cenchrus*, Germination test conditions, Media

Seed testing and test conditions play an important role in assessing the quality of seeds. The germination test requirements for *Cenchrus* sp. are top of the paper or sand medium at 20-35° or 20-30°C at 90 ± 5% RH as per 1ST A rules (ISTA, 1999). But *Cenchrus glaucus* seeds behaved differently at high temperature. Emergence was very early and seedlings mortality was observed at the end of germination period of 14 days (ISTA, 1999) and between paper method produced more vigorous /lengthier seedlings than the top of paper method. Difference of opinion was observed by various workers on the temperature requirement for germination of *Cenchrus ciliaris*. Lahiri and Kharabanda (1964) indicated that germination of *C. ciliaris* occurred better at temperature in excess of 30°C than at 25°C. AI-ani and Ouda (1969) reported that increase in temperature had positive influence on germination of *Cenchrus ciliaris* and *C. setigerus* and recommended 25- 30°C. But Low (1981) recommended KNO<sub>3</sub> soaking as a pre treatment and an alternate temperature of 20-35°C for testing buffel grass. Hence, the present study was initiated with different media viz., TP, BP and sand at different constant and alternate temperature regimes to fix suitable medium and temperature for *C. glaucus* seeds.

## MATERIALS AND METHODS

*Cenchrus glaucus* (Blou buffel) cv. CO1 is a selection from the local line FS 391 released by Tamil

Nadu Agricultural University, Coimbatore. Six months old fluffs were imposed with the following test conditions to standardise the optimum temperature and suitable medium for germination of the fluffs. The germination period imposed was 14 days.

### Temperature:

20°C, 25°C and 30°C as constant and 20-25°C, 20-30°C and 25-30°C as alternate temperature (Higher temperature for 8h and lower temperature for 16 h)

### Media :

Sand (S), Roll towel (RT) and Top of paper (TP) designated as M<sub>1</sub>, M<sub>2</sub> and M<sub>3</sub> The experiment was conducted with a CRD design with four replications. The fluffs were evaluated for number of days for germination initiation (radical emergence), rate of germination, germination, root and shoot length, dry matter production and vigour index values (Abdul- Baki and Anderson, 1973).

Fluff was considered as a single seed unit for counting as normal seedling for germination percentage. During the germination test, the emergence of seedling was counted from initiation up to completion and the mean percentage germination was recorded on each counting date; rate of germination was calculated using the following formula (Maguire, 1962).

$$\text{Rate of germination} : \frac{x_1}{y_1} + \frac{x_2 - x_1}{y_2} + \dots + \frac{x_n - x_{(n-1)}}{y_n}$$

(where, x<sub>n</sub> - number of seeds germinated at nth day and y<sub>n</sub> - no of days from sowing to nth day)

Data were analysed following Snedecor and Cochran (1967).

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## RESULTS AND DISCUSSION

In the present study, germination of fluffs was better at alternate temperature regimes than at constant temperatures (Table 1). Constant (20°C) or alternate (20-30°C) temperature increased the days required for initiation of germination (5days). But seeds germinated faster at a constant temperature of 30°C (2days). However, at the end of the test period, most of the seedlings were decayed and dried due to high temperature. Pandeya and Pathak (1978) also observed reduced mean time for germination of *C. ciliaris* seeds when germinated at 30°C. Highest germination of 82% was recorded at 20-25°C followed by 25-30°C (78%).

The seeds kept at 20-30°C alternate temperature regime recorded lower germination (31 %) but when brought again to 25-30°C after 14days recorded higher percentage of germination. Pandey a and Jeyan (1978)

also observed nil germination of *Cenchrus ciliaris* at 15°C for 20 days but recorded 38 per cent germination when the seeds were brought back to laboratory conditions.

The alternate temperature of 25-30°C recorded the minimum of 2.5 days for the radicle emergence. In addition, the speed of germination, seedling length and vigour index were the highest in this temperature range even though the final germination was lower (4.9 per cent) than the seeds germinated at 20-25°C range. The alternate temperature of 20-25°C recorded 2.7days for radical emergence and seedling vigour was low compared to 25-30°C regime.

Grass seeds germinated better at the alternate temperature regimes than at constant temperature. Higher germination was noticed in *Brachiaria brizantha* seeds at 25/30°C (Carneiro, 1994) whereas, in *Paspalum dilatatum* at 20/30°C than at constant 25°C (Schrauf *et al.*,

**Table 1 : Effect of temperature and media on germination and vigour parameters of *C. glaucus* cv. CO 1**

Treatments	Days to first emergence				Speed of germination				Germination (%)			
	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M
20°C	5.25	3.0	8.0	5.42	4.87	13.13	7.39	8.46	29	55	63	49
									(32.53)	(48.06)	(52.63)	(44.4)
25°C	2.5	2.0	4.0	2.83	18.91	29.79	17.31	22.00	58	76	78	71
									(49.65)	(61.11)	(62.32)	(57.7)
30°C	2.0	1.0	3.0	2.0	23.26	39.45	22.58	28.43	22	18	43	28
									(27.95)	(24.36)	(40.97)	(31.1)
20-25°C	2.0	2.0	4.0	2.67	25.48	30.70	14.39	23.52	82	83	80	82
									(64.71)	(65.50)	(63.44)	(64.6)
20-30°C	4.75	4.0	6.0	4.92	0.50	1.00	2.05	1.18	13	20	60	31
									(20.88)	(26.51)	(50.80)	(32.7)
25-30°C	2.0	2.0	3.5	2.5	26.48	37.04	15.96	26.49	78	79	76	78
									(62.15)	(62.94)	(60.77)	(61.9)
M	3.08	2.33	4.75		16.58	25.19	13.28		47	55	67	
									(42.98)	(48.08)	(55.16)	
	T	M	TM		T	M	TM		T	M	TM	
S.E.±	0.18	0.13	0.33		0.96	0.67	1.666		1.63	1.15	2.82	
C.D. (P=0.05)	0.38	0.27	0.65		1.92	1.35	3.32		3.26	2.31	5.65	

Contd.... Table 1

Treatments	Root length (cm)				Shoot length (cm)				Vigour index			
	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M
20°C	2.25	4.31	3.80	3.45	3.77	4.86	4.97	4.53	178	508	557	414
25°C	2.63	5.43	3.81	3.96	4.70	5.20	5.87	5.25	424	811	752	662
30°C	2.95	5.00	5.72	4.56	5.60	7.64	7.95	7.06	196	219	589	335
20-25°C	2.73	4.89	5.67	4.43	4.54	6.75	6.11	5.80	595	959	943	832
20-30°C	1.18	3.77	3.43	2.79	3.35	4.33	4.05	3.91	59	162	447	223
25-30°C	3.05	5.10	5.78	4.64	5.53	7.85	8.21	7.20	672	1029	1061	921
M	2.47	4.75	4.70		4.58	6.11	6.19		354	615	725	
	T	M	TM		T	M	TM		T	M	TM	
S.E.±	1.55	0.110	0.269		0.209	1.48	0.363		30.61	21.65	53.02	
C.D. (P=0.05)	0.311	0.220	0.538		0.420	0.297	0.728		61.37	43.40	106.30	

Figures in parentheses are arcsine values

1995). Butler (1985) recommended constant 25°C or alternate 20/35°C for better performance of *C. ciliaris*.

Physical condition of the germination medium is an important factor as they determine the media, plant-water relationships, aeration and mechanical impedance to root and shoot growth. In the present study, among the media for germination both sand and between paper medium performed well compared to top of the paper medium. The vigour of the seedlings was also better in both sand

and between paper media, even though time taken for emergence was more for the sand medium. Ahuja and Bhimaya (1967) recommended sand medium for germination test in *Panicum antidotale*, *Lasirus indicus*, *Cenchrus ciliaris*, *C. setigerus* and *Dichanthium annulatum*.

Hence, it could be concluded that sand and between roll towel medium and 25-30°C alternate temperature are the best for testing *Cenchrus glaucus* seed germination.

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