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FIXATION OF OPTIMUM TEMPERATURE AND MEDIUM FOR THE GERMINATION OF *Stylosanthes* SEEDS

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ABSTRACT

Experiments were conducted in *Stylosanthes scabra*, an important forage crop to standardise the requirements at different temperature regimes viz constant temperatures of 20°C, 25°C and 30°C and alternate temperatures of 25-30°C, 20-25°C and 10-20°C in 16-8 hours cycle in different germination media viz., roll towel, top of paper, sand and pleated paper. The experimental results showed that the ideal temperature and germination medium for the germination of *Stylosanthes scabra* seeds were 25-30°C and top of paper respectively.

KEY WORDS : *Stylosanthes*, Germination, Optimum Temperature, Medium

Germination plays a major role in uniform emergence, field stand and maturity. Each kind of seeds has its own optimum temperature and

germination media at which it exhibits maximum germination potential. This study on the temperature and media suitability of a seed kind is

Table 1. Effect of temperature and germination media on germination, seedling length and vigour index of *Stylosanthes scabra*

Parameters	Germination (%)					Root Length (cm)				
	M ₁	M ₂	M ₃	M ₄	Mean	M ₁	M ₂	M ₃	M ₄	Mean
CT ₁	81 (64.18)	82 (64.92)	82 (64.92)	79 (62.74)	81 (64.20)	2.2	2.2	2.2	2.1	2.2
CT ₂	71 (54.43)	78 (62.05)	71 (57.43)	85 (67.33)	76 (61.06)	2.2	2.2	2.4	2.1	2.2
CT ₃	70 (56.8)	74 (59.4)	71 (57.43)	73 (58.71)	72 (58.05)	2.3	2.3	2.3	2.1	2.2
AT ₁	86 (68.16)	89 (70.69)	86 (68.16)	82 (65.01)	86 (68.00)	2.3	2.6	2.3	2.1	2.3
AT ₂	81 (64.18)	84 (66.42)	83 (66.66)	82 (64.93)	83 (65.3)	2.4	2.5	2.4	2.2	2.4
AT ₃	78 (62.05)	80 (63.43)	80 (63.49)	77 (61.36)	83 (62.58)	2.3	2.4	2.5	2.2	2.3
Mean	78 (62.13)	81 (64.49)	79 (62.85)	80 (63.35)	-	2.3	2.3	2.3	2.1	-
		T	M	TXM			T	M	TXM	
SE _d		0.68	0.53	1.36			0.03	0.02	0.06	
CD (P=0.05)		1.35	1.10	2.71			0.06	0.05	0.12	

Figures in parenthesis indicate arc sine values.

	Shoot Length (cm)					Vigour Index				
	M ₁	M ₂	M ₃	M ₄	Mean	M ₁	M ₂	M ₃	M ₄	Mean
	3.7	3.8	3.6	3.4	3.6	475	486	482	433	469
	3.8	3.9	3.8	3.4	3.7	424	444	435	385	422
	3.6	3.8	3.8	3.2	3.6	426	444	435	368	418
	3.8	4.1	3.8	3.4	3.8	527	592	527	468	502
	3.7	3.9	3.7	3.7	3.7	492	536	500	482	470
	3.7	3.6	3.8	3.7	3.7	466	478	480	456	470
	3.7	3.8	3.8	3.5	-	468	497	476	432	-
		T	M	TXM			T	M	TXM	
		0.04	0.03	0.07			6.55	5.34	13.09	
		0.07	0.06	0.145			13.05	10.05	26.1	

important for seed testing to determine its planting value. *Stylosanthes scabra* is fast becoming an important forage crop in India and standardisation of the germination requirement is very much important.

Cameron (1967) recommended 25 °C as the suitable constant temperature for the germination of *S. humilis*. But Harty (1967) found out that rapid germination and seedling growth of *S. humilis* occurred at 32 °C after the seeds were ejected out of the pods manually. Butler (1975) found out that an alternate temperature 10-35 °C in short cycles (1.5/4.5 hours) to be suitable for *S. humilis* while

Kowithiyakorn *et al* (1977) observed that an alternate temperatures of 20-35 °C with top of paper and between paper media to be ideal of *S. guianensis*.

The experiment was conducted to fix the optimum temperature and germination medium for *S. scabra* seeds. It was carried out with dehulled and scarified seeds (with commercial H₂SO₄ @ 200 ml/kg for 4 mins.) which were subjected to germination tests in different temperature regimes viz constant and alternate temperatures in different germination media.

MATERIALS AND METHODS

The dehulled and scarified (with commercial H₂SO₄) seeds of *S. scabra* were subjected to germination test in different temperature regimes viz., constant temperatures of 20°C (CT₁), 25°C (CT₂) and 30°C (CT₃) and an alternate temperatures of 25-30°C of 25-30°C (AT₁), 20-25°C (AT₂) and 10-20°C (AT₃) in 16-8 h cycle with different germination media viz., roll towel (M₁), top of paper (M₂), sand (M₃) and pleated paper (M₄). one hundred seeds in four replications of 25 seeds each were used for each test. The temperatures were maintained using a B.O.D. incubator by changing the temperatures alternately at 16-8 h cycle. The seeds were evaluated for germination by taking the first count on seventh day and the second count on the tenth day. The seeds were evaluated for germination, seedling and vigour qualities.

RESULTS AND DISCUSSION

The results of the experiment showed that the seeds of *S. scabra* have their highest germination potential (86%) at the alternate temperature of 25-30°C (AT₁) with top of paper being the suitable media (Table 1). The seeds also performed well in the other two alternate temperatures while the other media did not significantly vary in the germination percentage. In the seedling length also, the alternate temperatures performed better than constant temperatures while among the media, except pleated paper (M₄), the other media measured equal and longer seedling lengths. Consequently, the highest vigour index was obtained in the alternate temperature of 25-30°C (AT₁) with top of paper media (M₂). Seeds of *S. scabra* were found to possess maximum germination potential at an alternate temperature of 25-30°C at 16-8 h cycle. The suitable media was found to be top of paper. This result confirms the earlier findings of Kowithiyakorn *et al.* (1977) who reported an alternate temperature of 20-35°C and top of paper being the ideal temperature and media for

S. guineensis. Daljanis (1980) observed that a temperature of 25-30°C to be ideal for berseem clover and 20-30°C for persian clover. The next best temperatures were alternate temperatures of 20-25°C and 10-20°C, indicating a preference of alternate temperatures by *S. scabra*. Ballard (1975) also reported that alternate temperatures markedly stimulated the germination of *S. humilis*.

Butler (1975) also suggested a short cycle of 10-35°C alternate temperature to be optimum for *S. humilis*. Besides top of paper, pleated paper was found to be suitable for better germination. From this study, it is confirmed that alternate temperature regimes stimulate the germination of *S. scabra* better than constant temperatures which although have high germination percentage. The top of paper media is suitable because the seeds need not exert more force for the protrusion of radicle and plumule when compared to other media. The seedling length also measured more in alternate temperatures and in all media except pleated paper. As a result of the highest germination percentage, the vigour index was the highest in 25-30°C and in top of paper.

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