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# Alleviation of dormancy of fluffs in Blou buffel *Cenchrus glaucus* cv. CO1

R. GEETHA

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**SUMMARY**

*Cenchrus* is an apomicitic grass species, established from both seed and rooted slips. The freshly harvested *Cenchrus* fluffs without any seed treatment did not germinate. Acid scarified fluffs recorded 42% germination. Further soaking with ascorbic acid @ 25ppm for 16 h significantly improved germination to an extent of 39 per cent over scarified fluffs followed by $CuSO_4$ at 50ppm and $KNO_3$ at 0.5 per cent concentration. Seedling vigor was the highest with $GA_3$ treated seeds even though the germination (58%) was low compared to other treatments.

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**Key words :** Cenchrus, Dormancy, Pre sowing treatments

Seed dormancy is the natural phenomenon for the survival of grasses in their undisturbed ecosystem. *Cenchrus* is an apomicitic grass species, established from both seed and rooted slips. In *Cenchrus glallclls* also germination itself is a problem and it needs post harvest period of about three months before sowing. *Cenchrus glaucus* (Blou buffel) cv. CO1 is a selection from the local line FS 391 released during 1989 by TNAU, Coimbatore.

*Cenchrus* seeds are chaffy and sold in the form of fluffs. The chaffy seeds contain true seed and the fresh glumes which inhibit the germination of true seeds due to the presence of water soluble inhibitors (Parihar and Patil, 1986; Pandeya and Pathak, 1978). Hence, an attempt was made to improve the germination of seeds by pre sowing seed treatments.

## MATERIALS AND METHODS

The freshly harvested fluffs without any treatment did not germinate in the present study. Hence, the fluffs were acid scarified for 4 min, washed with water, dried to original moisture content and then graded with the specific gravity separator to remove the empty glumes and used as control. The following treatments were imposed with a soaking period of 16 h.

Treatments :

$T_0$ - Scarified fluffs
$T_1$ - Water soaking
$T_2$ - 0.5% $KNO_3$
$T_3$ - 1% $KNO_3$
$T_4$ - 2% $KNO_3$
$T_5$ - 25 ppm $CuSO_4$
$T_6$ -50 ppm $CuSO_4$
$T_7$ - 25 ppm ascorbic acid
$T_8$ - 50 ppm ascorbic acid
$T_9$ - 100 ppm $GA_3$
$T_{10}$ - 200 ppm $GA_3$
$T_{11}$ - 500 ppm $GA_3$

The experiment was conducted with a Completely Randomized Design with four replications. The fluffs were placed for germination in between paper medium. The test conditions were 25/30$^0$C at 90 $\pm$5% RH. Germination period of 14 days was adopted (ISTA, 1990). Fluff was considered as a single seed unit for counting as normal seedling. The fluffs were evaluated for root and shoot length, dry matter production and vigour index values (Abdul-Baki and Anderson, 1973). Data were analysed following Snedecor and Cochran (1967).

## RESULTS AND DISCUSSION

Fluffs exhibited highly significant differences for germination, shoot length and vigour index values except root length due to different dormancy breaking treatments. (Table 1)

The germination level in the acid scarified fluff *i.e.* control was 42 per cent. The improvement caused by acid scarification alone might be due to the removal or disruption of lemma and plea allowing greater gas exchange or water movement into the seed for partial destruction or removal of specific germination inhibitors present in the freshly harvested seeds. Several studies have revealed germination improvement through acid scarification (Smith, 1971 in Panicum; Tischler *et al.,* 1994 in Switch grass).

Germination was further improved by 12.5 per cent when scarified fluffs were soaked in water for 16 h. Water soaking might have leached out some of the inhibitors

**Correspondence to:**
**R. GEETHA,** Seed Science and Technology Unit, Department of Plant Breeding and Genetics, Agricultural College and Research Institute, MADURAI (T.N.) INDIA

**Table 1 : Effect of pre sowing treatments on seed germination and vigour of *C. glaucus* cv. CO 1**

| Treatments | Germination (%) | Root length (cm) | Shoot length (cm) | Vigour index |
|---|---|---|---|---|
| Scarified fluffs | 42 (40.22) | 4.46 | 5.75 | 433 |
| Water soaking | 48 (43.85) | 4.53 | 5.80 | 496 |
| 0.5% $KNO_3$ | 65 (53.78) | 4.38 | 6.25 | 690 |
| 1% $KNO_3$ | 64 (53.22) | 4.61 | 5.78 | 667 |
| 2% $KNO_3$ | 63 (52.24) | 4.62 | 5.45 | 666 |
| 25 ppm $CuSO_4$ | 61 (51.37) | 4.32 | 6.18 | 641 |
| 50 ppm $CuSO_4$ | 68 (55.68) | 4.64 | 6.27 | 742 |
| 25 ppm ascorbic acid | 69 (55.87) | 4.96 | 6.13 | 759 |
| 50 ppm ascorbic acid | 56 (48.46) | 4.56 | 5.22 | 548 |
| 100 ppm $GA_3$ | 58 (49.62) | 4.79 | 8.39 | 766 |
| 200 ppm $GA_3$ | 52 (46.44) | 4.55 | 8.27 | 705 |
| 500 ppm $GA_3$ | 52 (45.87) | 4.57 | 7.90 | 690 |
| M | 58 (49.90) | 4.58 | 6.45 | 650 |
| S.E.± | 2.11 | 0.189 | 0.294 | 50.19 |
| C.D. (P=0.05) | 4.28 | NS | 0.596 | 101.80 |

Figures in parentheses are arc sine values
NS=Non-significant

present in the husk resulting in germination improvement of the fluffs. Similar improvement in germination through acid scarification followed by water soaking was noticed in *B. brizantia* seeds (Montorio *et al.,* 1997). Lahiri and Kharabanda (1963) also opined that inhibitors present in the husk was the primary cause for the lower germination of fresh seeds of *C. ciliaris*, *C. setigerus* and *Lasirus sindicus*.

Further when the scarified fluffs were soaked in different concentration of different chemicals to break the residual dormancy in the fluffs, treating fluffs with ascorbic acid at 25 ppm significantly improved germination to an extent of 39 per cent over control followed by $CuSO_4$ at 50 ppm and $KNO_3$ at 0.5 per cent concentration. Pandeya and Jeyan (1978) also noticed similar improvement in germination of *C. ciliaris* with ascorbic acid, copper sulphate and streptomycin. Umarani *et al.* (1997) also recorded improved germination with ascorbic acid over control in *Casuarina.* Delatorre and Barros (1996) reported that cadmium, copper and zinc at higher concentrations relieved dormancy of partially released scarified seeds of *Stylosanthes humilis* and attributed the reason as ethylene production triggered by the free radical formation due to oxireduction reaction by the copper ions.

$KNO_3$ (0.5 per cent) soaking showed a germination improvement of 35.4 per cent over control. However $KNO_3$ at higher concentration was less effective than lower concentrations. Bhupathi *et al.* (1983) reported the best dormancy breaking treatment for *C. ciliaris* as $KNO_3$ soaking. $KNO_3$ is well documented as a compound, which increases the germination of photo dormant seeds. *C. glaucus* seeds are not light requiring, however, they responded to $KNO_3$ treatment.

Gibberellic acid at 100 ppm level improved the germination of fluffs with lesser magnitude. Seed vigour measured through seedling length (8.39 cm) and vigour index (766) were enhanced by $GA_3$ treatment, possibly due to an increase in enzymatic activity on aleurone layer causing increased starch hydrolysis (Paleg, 1960), increase in amylase activity (Kapur *et al.,* 1990), isocitrate, lyase and peroxidase activity and increase in protein synthesis and cell elongation in embryonic axis (Soliya *et al.,* 1991).

Hence it was concluded that fresh fluffs of *Cenchrus glaucus* (Blou buffel) would be scarified with sulphuric acid for 4min. to reduce the bulkiness and empty seeds and graded with specific gravity separator before pre sowing treatments. Then scarified fluffs would be treated with either $CuSO_4$ @ 50ppm or ascorbic acid @ 25ppm for the duration of 16 h for the improved germination of fluffs.

## REFERENCES

Abdul-Baki, A.A. and Anderson, J.D. (1973). Vigour determination in soybean seed by multiple criteria. *Crop Sci.*, **13**: 630-632.

Bhubathi, P., Jacqueline, Selvaraj, A. and Ramaswamy, K.R. (1983). A note on seed dormancy in *Cenchrus ciliaris*. *Seed Res.,* 11 (2) : 232-234.

Delatorre, C.A. and Barros, R.S. (1996). Germination of dormant seeds of *Stylosanthes humilis* as related to heavy metal ions. *Biol. Plantarum*, **38** (2) : 269-274.

ISTA (1990). Amendments to have International Rules for Seed Testing, 1985, ISTA, Switzerland.

Kapur, A., Kaur, J., Sharma, H.L. and Singh, H. (1990). Preconditioning of peanut (*Arachis hypogea*) seeds to release dormancy. *Ann. Biol.* (Ludhiana), **6** (2) : 141-145.

Lahiri, A.N. and Kharabanda, B.C. (1963). Germination studies on arid zone plants. II Germination inhibitors in the spikelet glumes of *Lasiurus sindicus*, *Cenchrus ciliaris* and *Cenchrus setigerus*. *Ann. Arid Zone,* **1** (2) : 114-126.

Montorio, G.A., Braccini, A.C., Scapim, C.A., Oliveria, U.R. and Braccini, M.C.L. (1997). Evaluation of methods for breaking seed dormancy in *Brachiaria brizantha* cv. Marandu. *Revista Unimar*, **19** (3) : 797-809.

Paleg, L.G. (1960). Physiological effects of gibberellic acid. I. On carbohydrate metabolism and amylase activity of barley endosperm. *Pl. Physiol.,* **35** : 293-299.

Pandeya, S.C. and Jeyan, P.K. (1978). Range management - seed and germinability of eleven ecotypes of *Cenchrus ciliaris* under different agronomic conditions. *Proc. Indian Natn. Sci. Acad.*, **44B**(5): 266-281.

Pandeya, S.C. and Pathak, S.J. (1978). Germination behaviour of some ecotypes of anjan grass under dry storage and physical stress. Proc. 1st Int. Rangeland Congress, USA. pp. 376-383.

Parihar, S.S. and Patil, B.D. (1986). Germination inhibitors in the spikelet glumes of buffel grass and its possible ecological implications. *Forage Res.,* **12** (2) : 115-117.

Smith, C.J. (1971). Seed dormancy in *Sabi panicum*. *Proc. Int. Seed Test. Assoc.,* **36** (10) : 81-97.

Snedecor, G.W. and Cochran, W.G. (1967). *Statistical methods*. A note on the selected bio regulatory treatments on seed viability and associated biochemical changes in summer groundnut. cv. GG2. *J. Oilseeds Res.,* **8** : 280-284.

Tischler, C.R., Young, B.A. and Sanderson, M.A. (1994). Techniques for reducing seed dormancy in switch grass. *Seed Sci. & Technol.,* **22** (1) : 19-26.

Umarani, P.,Bharathi, A. and Karivaratharaji, T.V. (1997). Effect of vitamin nutrients on germination and seedling growth of casuarinas. *Madras agric. J.,* **84** (11-12) : 698-699.

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