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NOTES

PERFORMANCE OF PELLETISED *ACACIA NILOTICA* SEED UNDER DIFFERENT SOIL CONDITIONS

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Acacia nilotica is an evergreen tree confined to dry tropical thorn forests. The leaves provide excellent fodder and the timber is a source of firewood, gum and for making agricultural implements. The tree grows on varied ecological sites (Mathur *et al.* 1985) with an average rainfall ranging from 200 to 1270 mm and temperature from 0.5 to 47 °C (Dwivedi 1993). For large scale afforestation programmes, aerial seeding is increasingly being adopted in India. For this purpose, the seeds should be pelleted to increase their ballistic property during aerial seeding and to withstand adverse habitat and extreme situations. Protective measures to assist individual seeds after sowing are impracticable and pelleting is the only possible means of achieving some degree of protection (Anonymous 1985). It is therefore important to understand how the pelletised seeds perform under different soil conditions.

Seeds of *Acacia nilotica* were scarified in commercial grade sulphuric acid for 30 min and pelleted with macronutrients, micronutrients, pesticide, fungicide and mycorrhiza at various combinations using gum acacia at the rate of 30 ml kg^{-1} of seed as adhesive and gypsum at the rate of 200 g kg^{-1} of seed as the coating material. The nutrients used, their concentrations and sources are furnished below:

- Macronutrient—30 g of diammonium phosphate kg^{-1} of seed to supply 0.5% of nitrogen and 1.5% of phosphorus pentaoxide. (SPIC, Tuticorin, Tamil Nadu).
- Micronutrient—19.7 g of micronutrient mixture kg^{-1} of seed to supply 0.1% of zinc, manganese and iron and 0.05% of copper, boron and molybdenum. (Central Drug House, Mumbai).
- Mycorrhiza—50 g of *Rhizobium* sp. ALM 2 kg^{-1} of seed (Department of Agricultural Microbiology, Tamil Nadu Agricultural University, Coimbatore).
- Pesticide—2 g of sevin (Carbaryl 50% WDP) kg^{-1} of seed. (Rhone Phloneuc, Mumbai).
- Fungicide—4 g of *Trichoderma viride* kg^{-1} of seed (Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore).

Pelleting was done with hand operated pelletiser and the pelleted seeds of *A. nilotica* were tested for their performance in different soils like sandy loam, acidic, sodic and calcareous soils. The design used was factorial randomised design with four replications. A replication comprised 100 plastic cups with one seed in each. At the final count day (21st day), germination and dry matter of the seedlings were evaluated. Vigour index of the seedling was computed as the integral of germination and dry matter production (Abdul-Baki & Anderson 1973).

Germination was highest under sandy loam soil (66%, arc sine transformed mean) followed by the calcareous soil (59%) and it was lowest under acidic soil (51%). Among the treatments, macro + micronutrients, macro + micronutrients + mycorrhiza, and pesticide + fungicide + macro + micronutrients + mycorrhiza recorded the highest germination (61%) while the least germination (52%) was noticed in unpelleted seeds (Table 1). Similar results were also recorded in dry matter production of seedlings (Table 2). The vigour index was highest in sandy loam soil (3237), followed by calcareous soil (2801), and lowest in acidic soil (2053). Among the treatments, macro + micronutrients exhibited the highest vigour index (2856) and the lowest vigour index was in unpelleted seeds (2253) (Table 2).

Table 1. Germination percentage of pelleted *Acacia nilotica* seed under different soil types

Pelleting treatment	Soil condition			
	Calcareous	Sandy loam	Acidic	Sodic
Unpelleted	68 (55.57)	79 (62.74)	34 (35.66)	65 (53.77)
Pesticide + fungicide	72 (58.08)	81 (64.24)	64 (53.15)	74 (59.36)
Macro + micronutrients	75 (60.05)	85 (67.55)	68 (55.57)	77 (61.40)
Mycorrhiza	74 (59.36)	83 (65.81)	58 (49.62)	72 (58.08)
Macro + micronutrients + mycorrhiza	76 (60.71)	84 (66.77)	66 (54.38)	76 (60.71)
Pesticide + fungicide + macro + micronutrients	75 (60.05)	84 (66.77)	62 (51.98)	75 (60.05)
Pesticide + fungicide + mycorrhiza	73 (58.70)	82 (65.06)	63 (53.07)	72 (58.08)
Pesticide + fungicide + macro + micronutrients + mycorrhiza	76 (60.71)	85 (67.60)	68 (55.57)	76 (60.71)

(Figures in parentheses indicate arc sin transformation). SEd 2.60
CD ns

Thus pelleted seeds registered significantly higher germination and seedling vigour than the unpelleted seeds under all soil types. Maximum germination and seedling vigour was noticed in sandy loam soil but the minimum germination, dry matter production and vigour index were recorded in acidic soil. This is in conformity with the results of Selvaraju (1992) and Ponnuswamy (1993). Under these soil types the pelleting treatments like macro + micronutrients, macro + micronutrients + mycorrhiza, pesticide + fungicide + macro + micronutrients, and pesticide + fungicide + macro + micronutrients + mycorrhiza had a profound influence on seed germination, dry matter production and vigour index. Olsen

and Elkin (1977) reported that acidity inhibited multiplication of rhizobia in the rhizosphere of developing seedlings which might be overcome by lime pelleting of seed. Hence, pelleting with macro, micronutrients, biocides and mycorrhiza can be recommended for augmenting germination and better seedling growth and also to withstand swampy condition and deleterious effect of soils like acidic soil.

Table 2. Dry matter production (DMP) and vigour index (VI) of pelleted *A. nilotica* seed under different soil types

Pelleting treatment	Soil condition							
	Calcareous		Sandy loam		Acidic		Sodic	
	DMP	VI	DMP	VI	DMP	VI	DMP	VI
Unpelleted	37.8	2571	38.0	3003	33.8	1148	35.2	2288
Pesticide + fungicide	38.0	2737	39.2	3176	34.9	2232	36.0	2664
Macro + micronutrient	38.1	2858	39.6	3365	35.2	2394	36.4	2805
Mycorrhiza	37.5	2774	38.6	3204	34.8	2019	36.1	2599
Macro + micronutrient + mycorrhiza	38.2	2902	39.5	3318	35.9	2320	36.5	2775
Pesticide + fungicide + macro + micronutrient	38.4	2880	39.4	3309	36.1	2218	36.4	2730
Pesticide + fungicide + mycorrhiza	38.2	2785	38.6	3175	34.9	1919	36.1	2599
Pesticide + fungicide + macro + micronutrient + mycorrhiza	38.2	2904	39.2	3351	35.8	2175	36.6	2782
SEd	0.45	134.07						
CD	ns	266.13						

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