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EFFECT OF SEED SIZE AND DEPTH OF SOWING ON GERMINATION AND SEEDLING GROWTH OF *CASUARINA EQUISETIFOLIA*

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Casuarina equisetifolia was introduced into India from Australia during the mid-nineteenth century to fuel steam locomotives. Since then it has gained importance as a multipurpose tree. Within a single species there are variations in seed dimensions due to topographic influences and normal genetic variability. The performance of the seed immediately after germination is related to seed size. Seed size also determines seed quality (Turnbull 1975). In order to obtain maximum production of quality seedlings, efforts were made to standardise the optimum seed size and sowing depth of seeds of *C. equisetifolia.*

Table 1. Effect of seed size and depth of sowing on seed germination and seedling vigour of *Casuarina equisetifolia*

Size/ depth	Germi- nation (%)	Root length (cm)	Shoot length (cm)	Dry matter production (mg/10 seedlings)	Vigour index
8R					
0 cm	60	2.00	3.73	19	344
1 cm	58	1.80	3.52	17	310
2 cm	57	1.71	3.60	17	302
10R					
0 cm	50	1.31	2.57	18	194
1 cm	47	1.20	2.42	17	170
2 cm	46	1.10	2.40	17	161
10P					
0 cm	10	1.10	1.52	12	28
1 cm	8	1.00	1.30	11	19
2 cm	8	1.00	1.21	11	18
Size(S)					
SEd	0.907	0.020	0.092	0.610	8.7
CD	1.904	0.042	0.019	1.270	18.2
Depth(D)					
SEd	0.907	0.020	0.092	0.610	8.7
CD	1.904	0.042	0.019	ns	18.2
SxD					
SEd	1.570	1.732	1.732	1.05	15
CD	3.30	ns	0.092	ns	31.5

ns = not significant.

Mature brown cones of *C. equisetifolia* were collected during June 1993 from the Tamil Nadu Agricultural University, Coimbatore, and dried under sunlight for five days. The extracted seeds were graded using sieves of sizes BSS 8 and 10 and separated into three grades, viz. seeds retained by BSS 8 sieve (8R) and 10 sieve (10 R), and seeds that passed through BSS 10 sieve (10 P). The 1000 seed weights in each category were 167, 135 and 105 mg respectively. All the three grades of seeds were sown in trays filled with sand sterilised by autoclaving at 15 lb pressure for 2 h. Seeds were sown at the surface (0 cm), 1 cm depth and 2 cm depth. In each tray of 15 m^2 area, 100 seeds were sown and three replications were maintained. The trays were placed in a growth room maintained at 25 ± 2°C and 90 ± 3% relative humidity. The trays were watered regularly. After fourteen days of sowing (Ng & Mat Asri 1979), counts were made and germination expressed as the percentage of seeds which produced normal seedlings (FAO 1985). The random seedlings were measured for their root and shoot length. The vigour index was derived from the formula :

VI= percentage germination x seedling length (cm)

where seedling length is the sum of shoot and root lengths. Ten seedlings from each category were taken in random and kept in an oven maintained at 80 ± 2 °C to estimate their dry matter production (mg). The results were subjected to analysis of variance and tested (t-test) for significant differences ($p = 0.05$). Percentage values were transformed into arc-sine values prior to statistical analysis.

The results (Table 1) revealed that the large-sized seeds (8R) sown at the surface recorded the highest germination percentage (60%), seedling growth (5.73 cm), dry matter production (19 mg) and vigour index (344). This distinctly superior treatment combination was followed by large seeds sown at 1 cm depth (58% germination). Among the depths of sowing irrespective of the seed size, surface sowing recorded high seed germination and vigour. Seeds that passed through 10 BSS sieve gave very poor germination and low seedling vigour at all the depths of sowing. Proportional effect of seed size or weight on seed germination has also been documented in many tree species like *Leucaena leucocephala* (Natarajan & Vinaya Rai 1984) and *Ceiba pentandra* (Gawande 1985).

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