Journal of Tropical Forest Science 11(4):846–848 (1999)

NOTES

EFFECT OF PRESOWING TREATMENTS ON GERMINATION AND SEEDLING GROWTH IN *SYZYGIUM CUMINII*

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Syzygium cuminii (L.) Skeels (Myrtaceae) is an evergreen tree, whose moderately hard wood is used in construction, manufacture of agricultural implements and as an excellent firewood. The fruits are edible. The tree is found throughout India, Myanmar, Andamans, Sri Lanka and Malaysia. The tree is not demanding in soil requirements. Fresh seeds are characterised by low germination rates which decrease with time. Seed germination and seedling growth are known to be regulated by exogenous hormones in many tree species (Verma & Tandon 1988, Singh 1990, Kumaran *et al.* 1994). Similarly, treatments with inorganic ions like KCl (Palani *et al.* 1995) and KNO_3 (Nagao & Furutani 1986, Maideen *et al.* 1990) have also been reported to enhance germination in tree species. But similar studies are wanting in *Syzygium cuminii.* Studies were therefore designed to investigate the effect of some chemicals on seed germination and seedling vigour in *S. cuminii* and to identify a suitable chemical for maximising both these parameters.

Ripe fruits were collected from a 15-y-old woodlot of *S. cuminii* at the Forest College and Research Institute, Mettupalayam (11° 19'N, 76° 56'E; 300 m a.s.l). The fruits were depulped, stored for two months and then treated with IAA 100 ppm, IBA 100 ppm, GA_3 100 ppm, NaH_2PO_4 1%, KCl 1% and water, each for a period of 12 and 24 h. The lower doses were chosen on economic considerations. The experiment was set up in a randomised block design, replicated twice, fifty seeds comprising one replication. The seeds were sown in polybags measuring 15 × 10 cm, one seed per bag at a depth of 1–2 cm. Thirty days after sowing counts were made on normal seedlings and germination expressed in percentage (ISTA 1993). Five seedlings were selected at random in each replication and measured for shoot length, root length and total dry matter production. Seedlings were oven dried at 85 °C to constant weight. Vigour index for each treatment was calculated (Abdul-Baki & Anderson 1973) as the integral of seedling length and germination per cent. The data were subjected to an ANOVA and treatment differences tested at $p \leq .05$ following Panse and Sukhatme (1967).

Compared to water soaking all presowing chemical treatments except those with 1% KCl and 1% KNO_3 recorded enhanced germination but the magnitude of increase was maximum in 12-h soaking in 100 ppm IBA followed by 24-h soaking in 1% NaH_2PO_4 (Table 1). For each chemical, doubling the duration of soaking resulted only in marginal increase in germination barring KCl and KNO_3 which recorded improved germination. However, root growth in several cases was inhibited under prolonged soaking.

The enhanced germination due to IBA may be ascribed either to diffusion of the growth regulator (Mathur *et al.* 1971) or its antagonistic effect on the inhibitor present in dormant seed (Khan 1968). Such augmentative effects of growth regulators have been reported in *Picea smithiana* (Singh 1990) and *Azadirachta indica* (Kumaran *et al.* 1994).

Root length and seedling dry weight were not influenced by the chemical treatments. But shoot growth and vigour index registered an increase following the treatments. Maximum vigour index was evident under the 12-h treatments of 100 ppm IBA and 1% NaH_2PO_4 (Table 1). Increased shoot growth was discernible in the 12-h treatments of IBA and NaH_2PO_4; it was further enhanced in the 24-h treatments of IAA and GA_3.

Table 1. Effect of presowing growth stimulants on germination and seedling growth in *Syzygium cuminii*

Treatment		Germination (%)	Root length (cm)	Shoot length (cm)	Total dry matter (mg/seedling)	Vigour index
Dry seed		46	9.17	9.49	922	857
Water soak	12 h	54	9.99	9.83	934	1070
IAA 100 ppm	12 h	60	11.03	10.74	1073	1306
IBA 100 ppm	12 h	67	11.30	12.43	1120	1595
GA 100 ppm	12 h	59	10.43	10.18	1056	1208
NaH_2PO_4 1%	12 h	65	12.44	12.71	1171	1630
KCl 1%	12 h	45	12.55	10.71	1142	1047
KNO_3 1%	12 h	50	9.99	10.20	926	1010
Water soak	24 h	56	10.01	9.77	911	1108
IAA 100 ppm	24 h	61	10.60	13.43	1297	1466
IBA 100 ppm	24 h	65	10.52	12.25	1299	1475
GA_3 100 ppm	24 h	64	10.92	12.15	1186	1473
NaH_2PO_4 1%	24 h	66	9.17	12.98	1381	1464
KCl 1%	24 h	52	9.58	9.01	1139	967
KNO_3 1%	24 h	65	10.93	10.06	1098	1329
CD ($p \leq 0.05$)		0.63	ns	2.97	ns	89

CD = critical difference,
ns = not significant.

The growth promoting action of gibberellin was suggested to be the outcome of an interplay between supplied exogenous GA and endogenous auxin (Wareing & Phillips 1970). The ameliorative action of chemicals like KCl, KNO_3 has been reported in *Acacia nilotica* (Palani *et al.* 1995). But in the present study these chemicals proved inferior to IBA and NaH_2PO_4. Though IAA in low concentration has been reported to be beneficial in *Cassia obtusifolia* (Singh & Murthy 1982), in the present study, the quantum of its contribution was less than that of either IBA or NaH_2PO_4.

From a holistic consideration, soaking for 12 h in 100 ppm IBA is recommended to realise higher viability and vigour in *S. cuminii*. Compared to the control (dry seed), germination under this treatment increased by 21% and vigour index almost doubled.

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