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Optimizing the date of transplanting to increase seed yield and quality in davana (*Artemisia pallens* Wall.ex.D.C.)

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Abstract

A field experiment was conducted to study the effect of date of transplanting on growth, yield and seed quality attributes of davana. The experiment was laid out with five different dates of transplanting *viz*., October 15th, November 1st, November 15th, December 1st and December 15th with the spacing of 15 cm × 7.5 cm. The results revealed that the seedlings transplanted on 15th November recorded the maximum number of branches plant^{-1} (26), herbage yield plot^{-1} (1064.39 g), seed yield plant^{-1} (9.01 g), seed yield plot^{-1} (112.66 g), resultant seed germination (64%) and vigour index (168) whereas the seedlings transplanted on December 15th recorded the minimum number of branches plant^{-1} (20), herbage yield plot^{-1} (799.62 g), seed yield plant^{-1} (6.33 g), seed yield plot^{-1} (79.08 g) and the seedlings transplanted on October 15th recorded 61% seed germination and vigour index of 145.

Keywords: davana, drymatter, germination, herbage yield, vigour

Davana (*Artemisia pallens*) is an important high value annual aromatic herb of India belonging to the family *Asteraceae* and commercially cultivated in south India (Karnataka and Tamil Nadu) as a short duration crop from November to March. India has a monopoly in production and export trade of davana oil. Davana is traditionally used in religious ceremonies and in making garlands, bouquets, floral decorations and floral chaplets, lends an element of freshness and a rich sumptuousness of fragrance to religious occasions (Narayana *et al*. 1998). *A. pallens* possesses anti-inflammatory, antipyretic and analgesic properties and is used in Indian folk medicine for the treatment of *Diabetes mellitus* (Al-Harbi *et al*. 1994). The productivity of any crop is the ultimate result of its growth and development, which mainly depends on the time of transplanting. Since davana is being propagated through seeds, an attempt was made to study the effect of date of transplanting on seed yield and quality.

Field experiment was conducted during *rabi* season of 2011 at Tamil Nadu Agricultural University, Coimbatore. The experiment was

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laid out in randomized block design with four replications had five dates of transplanting *viz*., October 15th, November 1st, November 15th, December 1st and December 15th. After application of 125:125:75 NPK kg ha^{-1}, transplanting was done at a spacing of 15 cm × 7.5 cm to accommodate 90 plants plot^{-1} with the plot size of 2 m × 1.5 m. Phosphorus and potassium were applied as basal and 50% of N was applied as basal and the balance 50% was applied at 25th and 50th day after transplanting. Growth attributes such as plant height (cm) and fresh weight of the seedlings (g plant^{-1}) were taken at maturity stage (90 days after transplanting), chlorophyll content measured by SPAD meter, days to first flowering, days to 50% flowering, number of branches plant^{-1} and yield attributes *viz*., number of flower heads plant^{-1}, seed yield plant^{-1}, seed yield plot^{-1}, 1000 seed weight, herbage yield plot^{-1} were recorded. Resultant seed quality such as germination (ISTA, 2009), seedling length, dry matter production and vigour index (Abdul-Baki & Anderson 1970) were also recorded. Data were statistically analyzed as per the standard procedures (Panse & Sukhatme 1985).

The seedling transplanted on November 15th recorded significantly higher plant height, fresh weight, yield attributing characters and reduction in days to first flowering and days to 50% flowering (Table 1). The resultant seed from the November 15th transplanting registered significantly higher seed quality. Appropriate time of sowing is one of the basic requirements for obtaining maximum yield and high return of any crop. As emphasized by Snoek (1981), the total yield of the crop is markedly influenced by different sowing and transplanting times. In seed production, Wood *et al.* (1980) opined that the environmental conditions particularly light and temperature (Crocker & Barton 1955) interact with genetic system and elicit developmental changes during ripening, which exert influence on yield and seed quality. Highest seed yield was obtained from a plant height of 58.46 cm. Seedlings planted on November 15th flowered first and were first to reach 50% flowering, registered higher number of branches (26) and number of flower heads

Table 1. Influence of date of transplanting on growth and yield attributes of davana (*A. pallens*)

Treatments	Plant height (cm)	Fresh weight of the seedling (g plant^{-1})	Dry matter production of the seedling (g plant^{-1})	Chlorophyll content (SPAD value)	Days to first flowering	Days to 50% flowering	Number of branches	Number of flower heads plant^{-1}
October 15th	49.55	11.77	8.66	10.8	48	55	21	103
November 1st	54.84	13.95	9.74	12.7	45	52	22	108
November 15th	58.16	16.62	9.80	13.7	44	52	26	110
December 1st	53.73	12.44	8.45	12.7	47	54	22	105
December 15th	47.74	10.48	7.45	11.7	49	57	20	90
Mean	52.80	13.05	8.82	12.3	47	54	22	103
SEd	0.51	0.29	0.12	0.138	0.2371	0.6671	0.3845	2.0387
CD ($P<0.05$)	1.12	0.63	0.26	0.302	0.5167	1.4535	0.8378	4.4421

plant^{-1} (110) and contributed towards increased seed yield. Seedlings planted on November 1st also enhanced 50% flowering. Similarly, maximum 1000 seed weight (162.8 mg), seed yield plant^{-1} (9.01 g), seed yield plot^{-1} (112.66 g) and herbage yield plot^{-1} (1268.11 g) were obtained with the seedlings planted on November 15th and delay in transplanting resulted in corresponding decrease in seed yield (Table 2). Similar results were observed in radish by Gill & Gill (1995) and Warde *et al*. (2004).The seed quality characters were significantly influenced by time of planting. The physiological potential of the seed in terms of germination (64.0%), seedling length (2.62 cm) and vigour index (168) were higher with the seeds produced in 15th November planted crop. It is concluded that 15th November planting recorded the maximum seed yield and quality in davana.

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Table 2. Influence of date of transplanting on seed yield and resultant seed quality characters of davana (*A. pallens*)

Treatments	Seed yield plant^{-1} (g)	Seed yield plot^{-1} (g)	1000 seed weight (mg)	Herbage yield plot^{-1} (g)	Germination (%)	Seedling length (cm)	Dry matter production (mg seedling^{-1})	Vigour index
October 15th	5.57	69.54	151.76	898.05	58(49.60)	2.23	1.20	129
November 1st	7.68	95.93	154.77	1064.39	60(50.76)	2.31	1.22	139
November 15th	9.01	112.66	162.81	1268.11	64(53.13)	2.62	1.23	168
December 1st	7.74	96.77	156.78	949.17	62(51.94)	2.45	1.21	152
December 15th	6.33	79.08	158.79	799.62	61(51.35)	2.38	1.20	145
Mean	7.26	90.79	156.98	995.86	61(51.35)	2.40	1.21	146.54
SEd	0.2093	5.0241	1.2476	53.7202	0.6687	0.0188	0.0047	2.2503
CD (P<0.05)	0.4561	10.9467	2.7184	117.0474	1.4570	0.0410	0.0101	4.9031

Figures in parenthesis indicate arc sine values

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