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INFLUENCE OF INTEGRATED NUTRIENT MANAGEMENT ON DRY MATTER PRODUCTION AND FLOWERING IN DAVANA (*Artemisia Pallens* Wall.)

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ABSTRACT

An experiment was conducted during the year 2011-12 to study the influence of integrated nutrient management on growth and yield of Davana" at College of Horticulture, Mudigere, Karnatakaka. The dry matter production and days taken for 50 percent inflorescence differend significantly among the treatments. Application of 75%RDF + *Azospirillum* 2 kg ha^{-1} (T_5) recorded significantly maximum fresh weight of leaves (7.02 g), which was on par with T_{12} (6.91 g). Application of 50%RDNPK + Vermicompost 2.5 t ha^{-1} + *Azospirillum* 2 kg ha^{-1} + PSB 2 kg ha^{-1} (T_{12}) recorded maximum dry weight of leaves (3.12 g), fresh weight of shoot(29.56 g), dry weight of shoot (6.40 g), fresh weight of root (4.57 g), weight of root (1.15 g). The plants provided with 75%RDF + *Azospirillum* 2 kg ha^{-1} (T_5) took minimum number of days (58) for 50% inflorescence which was on par with T_{12} (58.67)

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INTRODUCTION

Davana (*Artemisia pallens* Wall.) belongs to family Asteraceae has diploid chromosome number of 2n=16, is a common aromatic plant of south India grown for its leaves and flowers and prized for its fruity fragrance. It forms an important component in garlands and bouquets, where springs of davana lend an element of freshness and a rich sumptuousness of odour (Balakubahan *et al.*, 2011). Its cultivation is mainly concentrated in southern parts of Karnataka and lesser extent in Tamil Nadu, Andhra Pradesh, Kerala and Maharashtra. The sprigs of davana are widely used in floral composition by women folk for decorating their hairs. Among various agronomic practices for higher production nutrients are most important. The use of organic fertilizers and biofertilizers along with balanced use of inorganic fertilizers is of paramount importance in horticulture in general and medicinal and aromatic crops in particular. An integrated nutrient management concept is one of the eco-friendly approaches, which can be incorporated to attain higher crop productivity and sustainability. Commercial cultivation of davana emphasizes the need for having good nutrient management practices to achieve higher yield and returns and in this regard, INM practices may be the best solution. keeping this in view the present study was undertaken to study the influence of integrated nutrient management on davana under hill zone of Karnataka.

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MATERIALS AND METHODS

The field experiment was carried out at the farm field of the division of Plantation, Spices, Medicinal and Aromatic Crops, College of Horticulture, Mudigere, during 2011-12. The experiment was laid out in Randomised Complete Block Design with twelve treatments and three replications in open field condition. The spacing was 15 x 7.5cm and the net plot size 1.125 cm^2. There were 12 treatments combinations consisting of different levels of nutrients.

T_1: Control: RDF (120:40:40 kg NPK ha^{-1} + FYM 6 t ha^{-1})
T_2: RDF + *Azospirillum* 2 kg ha^{-1}
T_3: RDF + *Azotobactor* 2 kg ha^{-1}
T_4: RDF + PSB 2 kg ha^{-1}
T_5: 75%RDF + *Azospirillum* 2 kg ha^{-1}
T_6: 75%RDF + *Azotobactor* 2 kg ha^{-1}
T_7: 75%RDF + PSB 2 kg ha^{-1}
T_8: RDF + *Azospirillum* 2 kg ha^{-1} + PSB 2 kg ha^{-1}
T_9: 75%RDF + *Azospirillum* 2 kg ha^{-1} + PSB 2 kg ha^{-1}

T_{10}: RDNPK + Vermicompost 2.5 t ha^{-1} + *Azospirillum* 2 kg ha^{-1} + PSB 2 $kgha^{-1}$

T_{11}: 75%RDNPK + Vermicompost 2.5 t ha^{-1} + *Azospirillum* 2 kg ha^{-1} + PSB 2 kg ha^{-1}

T_{12}: 50%RDNPK + Vermicompost 2.5 t ha^{-1} + *Azospirillum* 2 kg ha^{-1} + PSB 2 kg ha^{-1}

Nursery and planting

Nursery beds of 1 sq. meter dimension were prepared. Required amount of seeds for the experiment at the rate of 1½ kg ha^{-1} were mixed thoroughly with 8 times of its volume of fine dry sand (1:8 ratio) and sown in the rows all over the bed. A thin layer of sand is then spread uniformly to cover the seeds and the beds were watered twice a day. Forty days old healthy seedlings of uniform height were selected and transplanting in the main field. Recommended dose of fertilizers were applied and necessary care was taken. Harvesting was carried out when the plants were at 50% bloom stage and exhibited a yellowish appearance in the field. The observations were recorded for growth and yield parameters and the data was analysed as per statistical procedure given by Sunderaraj *et al.* (1972).

RESULTS AND DISCUSSION

The dry matter production and days taken for 50 percent inflorescence differd significantly among the treatments. Application of 75%RDF + *Azospirillum* 2 kg ha^{-1} (T_5) and 50%RDNPK + Vermicompost 2.5 t ha^{-1} + *Azospirillum* 2 kg ha^{-1} + PSB 2 kg ha^{-1} (T_{12}) increased fresh and dry weight of shoot and leaves. The increased fresh and dry weight of leaf, stem, aerial part and total plant may be due to superiority of the treatment which resulted in vigorous vegetative growth parameters and yield attributes resulting in higher values. Gandhi Kumar (1996) reported higher dry matter production in davana with the application of *Azospirillum* and nitrogen. Nitrogen and phosphorus had an effect of photosynthetic efficiency of the crop. This increases the production of more number of leaves and stem. The increase in activity of plant growth substances like Gibberelic acid, Indole Acetic Acid and Dehydrozeatin in *Azospirillum* inoculated plants might have been responsible for increased vegetative growth. Similar results were reported by Sukhmal Chand *et al*. (2001) in menthol mint, Majibur Rahman *et al*. (2003) in *Mentha arvensis*.

Table 1. **Influence of integrated nutrient management on fresh and dry weight of leaves, shoot and root in Davana**

	Treatments	Fresh weight of leaves (g)	Dry weight of leaves (g)	Fresh weight of shoot (g)	Dry weight of shoot (g)	Fresh weight of root (g)	Dry weight of root (g)
T_1	Control - RDF	4.46	1.51	20.29	4.12	3.47	0.94
T_2	RDF + *Azospirillum*	5.69	2.17	24.48	5.20	3.84	1.02
T_3	RDF + *Azotobactor*	5.72	2.26	22.71	4.78	3.23	0.93
T_4	RDF + PSB	5.73	2.25	20.69	4.31	3.23	0.87
T_5	75% RDF + *Azospirillum*	7.02	3.07	29.23	6.30	4.24	1.09
T_6	75% RDF + *Azotobactor*	6.42	2.32	25.20	5.39	3.10	0.89
T_7	75% RDF + PSB	5.04	1.91	22.34	4.61	2.74	0.83
T_8	RDF + *Azospirillum*+ PSB	5.88	2.44	25.89	5.46	3.58	0.90
T_9	75% RDF + *Azospirillum* + PSB	5.40	2.22	21.56	4.26	3.43	0.86
T_{10}	RDNPK + VC + *Azospirillum* +PSB	6.20	2.95	26.42	5.37	3.51	0.91
T_{11}	75% RDNPK+ VC + *Azospirillum* +PSB	6.17	2.71	23.15	4.76	3.60	0.92
T_{12}	50% RDNPK+ VC + *Azospirillum* +PSB	6.91	3.12	29.56	6.40	4.57	1.15
	F-test	*	*	*	*	*	*
	S.Em±	0.20	0.14	0.82	0.20	0.23	0.04
	CD at 5%	0.59	0.42	2.39	0.60	0.67	0.12
	CV %	5.89	10.29	5.82	6.94	11.09	7.36

Table 2. Influence of integrated nutrient management on length of inflorescence (cm) and days taken for 50 per cent inflorescence in Davana

	Treatments	Length of Inflorescence		No. of days taken for 50 % inflorescence
		60 DAT	75 DAT	
T_1	Control - RDF	11.04	20.76	80.00
T_2	RDF + *Azospirillum*	13.23	22.33	77.00
T_3	RDF + *Azotobactor*	12.59	21.65	76.33
T_4	RDF + PSB	11.90	21.55	79.33
T_5	75% RDF + *Azospirillum*	17.88	24.98	58.00
T_6	75% RDF + *Azotobactor*	14.14	23.25	64.33
T_7	75% RDF + PSB	11.66	21.65	80.33
T_8	RDF + *Azospirillum*+ PSB	13.94	22.52	77.67
T_9	75% RDF+ *Azospirillum* + PSB	12.19	20.95	69.33
T_{10}	RDNPK + VC + *Azospirillum* +PSB	14.85	22.64	71.00
T_{11}	75% RDNPK+VC+*Azospirillum* +PSB	14.60	22.42	70.67
T_{12}	50% RDNPK+VC+ *Azospirillum* +PSB	17.68	25.34	58.67
	F- test	*	*	*
	S.Em±	0.43	0.53	1.99
	CD at 5%	1.27	1.55	5.82
	CV %	5.43	4.06	4.78

The reasons for the increase in both fresh and dry weight of leaves obtained in T_{12} and T_5 might be due to the fact that organic manures application would have helped in the plant metabolic activity through the supply of required nutrients, which are involved in biochemical synthesis of many phytohormones. Vermicompost is known to stimulate nitrate reductase activity. These enzymes which regulate nitrate availability for the plant is influenced by the nitrate concentration in the soil and growth regulators and improved nitrogen metabolism. Hence, there is relationship between nitrate reductase activity and protein synthesis. Earthworm casts are known to increase protein synthesis in plant and have definite influence on plant growth and yield (Vadiraj *et al.,* 1998). Aruna Kumar *et al.* (2011) recorded higher dry matter production in *Phyllanthus amarus*. The number of days taken for 50 per cent inflorescence differed significantly. The plants provided with 75%RDF + *Azospirillum* 2 kg ha^{-1} (T_5) took minimum number of days (58 days) which was on par with T_{12}- 50%RDNPK + Vermicompost 2.5 t ha^{-1} + *Azospirillum* 2 kg ha^{-1} + PSB 2 kg ha^{-1} (58.67 days) and the earliest to achieve 50 per cent inflorescence. These are significantly superior over the rest of treatments. Application of 50%RDNPK + Vermicompost 2.5 t ha^{-1} + *Azospirillum* 2 kg ha^{-1} + PSB 2 kg ha^{-1} (T_{12}) recorded maximum length of inflorescence (25.34 cm) at 75DAT. This may be attributed to the profuse vegetative growth and prolonged vegetative phase as a result of increased level of nitrogen as well as their split application. Similar results were reported by Kumar *et al*, (2009) in davana.

REFERENCES

Aruna Kumar, R., Raju, B., Umesha, K., Smitha, G.R. and Sreeramu, B.S., 2011, Integrated nutrient management on dry matter distribution, nutrient content, plant and soil nutrient content of Bhumyamalaki var. Niharika (*Phyllanthus amarus*). *Journal of Medicinal and Aromatic Plant Sci*ence, 33(3): 342-348.

Balakumbahan, R., Richard Kennedy, R., Selvakumar, T. and Prem Joshua, J., 2011, Production and Processing of Davana. *Indian Journal of Arecanut, Spices and Medicinal Plants*, 12(2): 28-31.

Gandhi Kumar, P. and Vijay Kumar, M., 1996, Effect of plant density, nitrogen and *Azospirillum* on herbage and essential oil yield of Davana. *South Indian Horticulture*, 45(1&2): 53-56.

Majibur Rahman, A., Islam, A. and Osman, K. T., 2003, Effect of N, P and K fertilizers on growth and herb and oil yield of *Mentha arvensis* in Bangladesh. *Journal of Medicinal and Aromatic Plant Sci*ence, 25: 661-667.

Senthil Kumar, T., Swaminathan, V. and Kuamr, S., 2009, Influence of nitrogen, phosphorus and biofertilizers on growth, yield and essential oil constituents in ratoon crop of Davana (*Artemisia pallens* Wall.). *Electronic Journal of Environmental, Agricultural and food Chemistry*, 8(2): 86-95.

Sukhmal Chand, Anwar, M. and Patra, D. D., 2001. Influence of combined application of Farmyard manure and inorganic fertilizers on herb essential oil yield and nutrients accumulation in Menthol mint (*Mentha arvensis*). *Journal of Medicinal and Aromatic Plant Sci*ence, 23: 29-33.

Sundararaj, N., Nagaraju, S., Venkataramu, M.N. and Jagannath, M.K., 1972, Design and Analysis of field Experiments. University of Agricultural Sciences, Bangalore, Karnataka (India).

Vadiraj, B.A., Siddagangaiah and Narayana, P., (1998). Effect of vermicompost on the growth and yield of Turmeric. *South Indian Horticulture,* 46: 176-179.

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