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Evaluation Of The Effects Of Organic Manure And Irrigation Techniques On *Rauwolfia Serpentina* L. Benth. Ex Kurz. In The Tarai Region Of Uttarakhand Under *Tectona Grandis* Based Agroforestry System

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Abstract: In the northern Indian region, where teak is the primary crop, the current field experiment was carried out. With an irrigation schedule, organic manure, and 15 treatment combinations with three replicates for each, it was set up using randomized block design (RBD). According to the studied data, the higher plant growth was 220.25 leaves per plant, 32.25 branches per plant, 15.70 collar diameter, and 55.41 root length when 100% FYM + 20 days watering was applied. The root fresh weight, root dry weight, root yield, and yield parameter are displayed as 30.52 gm, 14.52 gm, 44.63 g ind-1, 847.97 kg plot-1, and 22.04 q ha-1, respectively.

Index Terms- **Sarpagandha, yield parameters, irrigation schedule, organic manure, randomized block design.**

I. INTRODUCTION

The species Rauwolfia serpentina L. Benth. ex Kurz. is known by most as Indian snakeroot, or Sarpagandha. The Indian subcontinent and South East Asian nations are home to this extremely significant medicinal plant. At an elevation of 1000 meters, it often grows in areas with 200–250 cm of yearly rainfall. Since ancient times, India has used the root of the sarpagandha plant (N. O. Apocynaceae) to treat a wide range of unconnected illnesses. A clinical study by the author on Rauwolfia serpentina therapy in fifty instances of essential hypertension was published in English in 1949. Since then, the plant has received widespread praise as a helpful therapeutic tool for conditions involving elevated blood pressure reported by Vakil (1955). The majority of them are strong bioactive substances that can be treated medicinally or act as building blocks for the creation of effective medications. Plants vary in their active principles, which have distinct physiological effects on humans, owing to their biodiversity. Most domesticated aromatic and therapeutic plants are exported as raw pharmaceuticals, according to Calixto (2000). Edeoga et al. (2005) and Ijeh et al. (2003) have clarified the significance of medicinal plants and their role in the pharmaceutical sector.

In many nations, the majority of the medication comes from wild sources. According to Deshmukh et al. (2012), reserpine, serpentine, and ajmalicine are the most significant of these. Depending on the cultivators and cultivars, the total alkaloid content of the dried roots ranges from 1.7 to 3%. Given their therapeutic benefits, it is required that medicinal plants be grown organically. The organic management techniques have a significant impact on the properties of medicinal plants. Reading through the literatures showed that no studies have been conducted to standardize organic management approaches for R. serpentina. The harmful consequences of using chemical pesticides and fertilizers are a source of increasing worry. Using organic manures, such as farmyard manure and vermicompost, was studied in light of the harmful consequences of such chemicals. When it comes to healthy growth and increased crop yield, both manures are really helpful. The final output of some earthworm species' decomposition of organic waste is vermicompost. The natural fertilizer and soil conditioner vermicompost is extremely nutrient-rich.

II. MATERIALS AND METHODS

In Tarai, Uttarakhand, a teak-based agroforestry system was used to study the effects of irrigation schedule and organic manure on sarpagandha growth and yield through a field experiment. There was a guaranteed watering system. Plots were situated in the Uttarakhand district of Udham Singh Nagar's Tarai region. The location of the object is between latitudes 280 55'N and longitudes 790 30'E. With a mean relative humidity of 73%, it receives roughly 1296.85 mm of rainfall annually. December and January have mild days and nights along with typical to heavy frost. For the aim of the inquiry, root cuttings were brought in from CIMAP Pantnagar. In every plot, plants were chosen at random and tagged. The following growth and yield parameters were observed and recorded: plant height (cm), number of leaves per plant, collar diameter (mm), number of branches per plant, root length (cm), shoot length (cm), fresh weight (g) and dry weight (g) of the roots, root yield (g ind-1), root yield (kg plot-1), and root yield (t ha-1). Within the plots, rooted nursery cuttings of Rauwolfia serpentina were inserted at various irrigation days and doses of organic fertilizer in accordance with the treatment combinations, each of which was repeated three times. The Panse and Sukhtme (1967) method was used for analysis.

III. RESULTS AND DISCUSSION

Growth and yield parameters of sarpagandha as affected by irrigation schedule and organic manure (Table 01). The growth parameter such as plant height (cm), number of leaves per plant, collar diameter (mm), number of branches per plant, root length (cm), and shoot length (cm) had a substantial impact on the use of organic manures and irrigation schedule. The results indicate that treatment T12 100% FYM + 20 days irrigation produced the highest plant height (67.58 cm), number of leaves per plant (220.25), number of branches per plant (32.25), collar diameter (15.70 cm), and root length (55.41 cm). Treatments T7 100% FYM + 15 days irrigation, T2 100% FYM + 10 days irrigation, T10 100% leaf compost + 15 days irrigation, and T5 100% leaf compost + 10 days irrigation were the next in order of application. While in the treatment T1 (control) + 10 days irrigation, the minimum plant height (56.25 cm), number of leaves per plant (159.27), number of branches per plant (16.22), collar diameter (7.66 cm), root length (24.63 cm), root fresh weight (19.52 g), root dry weight (7.66 g), root yield (30.43 g ind-1), root yield (578.17 kg plot-1) and root yield (15.03 q ha-1) were observed. Table 01 illustrates how the organic manures and irrigation schedules had a substantial impact on all the yield parameters, including root fresh weight (g), root dry weight (g), root yield (g ind-1), root yield (kg plot-1) and root yield (q ha-1). The results indicate that among the treatments T12 100% Vermicompost + 20 days irrigation, T7 100% FYM + 15 days irrigation, T2 100% FYM + 10 days irrigation, and T8 100% Vermicompost + 15 days irrigation, the maximum root fresh weight (30.52 g), root dry weight (14.52 g), root yield (44.63 g ind-1), root yield (847.97 kg plot-1) and root yield (22.04 q ha-1) were recorded. The lowest root fresh weight (19.52 g), root dry weight (7.66 g), root yield (30.43 g ind-1), root yield (578.17 kg plot-1), and root yield (15.03 q ha-1) were noted in treatment T1 (control) + 10 days irrigation. Possible explanations for the enhanced growth and yield characteristics include the FYM's increased uptake of important nutrients in combination with chemical fertilizers. It is determined from the current study that under varying irrigation schedules and doses of organic manure, sarpagandha underwent substantial differences in terms of growth and yield features. Higher plant growth and yield characteristics are obtained by applying T12 100% + 20 days of watering.

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REFERENCES

(1) Patil, SR, Kattimani, KN, Polaiah, A. C. 2014. Integrated nutrient management in Ashwagandha (*Withania somnifera* Dunal.). Plant Archives, 14(1): 373-377.
(2) Arul, N.V.J. 2002. Integrated nutrient management of Ashwagandha (*Withania somnifera*) for growth, yield and quality. M.Sc., (Hort.) thesis, TNAU, Coimbatore.
(3) Edeoga, H.O, Okwu, D.E, Mbaebie, B.O. 2003. Minerals and nutritive values of some Nigerien medicinal plants. J. of Med. Aromatic Plant Sci., 25: 1010-1015.
(4) Edeoga, H.O, Okwu, D.E, Mbaebie, B.O. 2005. Phytochemical constituent of some Nigerien medicinal plants. Afr.J. Biotechnol, 4(5):685-688.
(5) Calixto, J.B. 2000. Efficacy, safety quality control, marketing and regulatory guidelines for herbal medicine (Phototherapeutic agents).Braz. J. Med Biol. Res., 33: 197-189.
(6) Ijeh, I.I., Njoku, O.U, Ekenze, E.C. 2004. Medicinal evaluation of extracts of *Xylopia aethiopica* and *Ocimum gratissimum*. J. Med. Aromatic Plant Sci., 26: 44-47.
(7) Vakil, R. J. 1955. *Rauwolfia serpentina* in the treatment of high blood pressure. American Heart Association, Inc. Available at circ.ahajournals.org/content/12/2/220.abstract.
(8) Dey, A., De, J. 2011. Ethnobotanical aspects of *Rauwolfia serpentina* (L.) Benth. ex Kurz. In India, Nepal and Bangladesh. J Med Plants Res, 5: 144-150.

Table 01. Effect of different levels of organic manure and irrigation schedules on growth and yield of Sarpagandha under teak agroforestry system.

Treatment No.	Treatment Combinations	Growth Parameters					Yield Attributes				
		Plant Height (cm)	Number of leaves (Ind.$^{-1}$)	Number of Branches (Ind.$^{-1}$)	Collar Diameter (cm)	Root Length (cm)	Root Fresh Weight (g)	Root Dry Weight (g)	Root Yield (g Ind.$^{-1}$)	Root Yield (kg plot^{-1})	Root Yield (q ha^{-1})
T_1	(Control) + 10 days Irrigation	56.25	159.27	16.22	7.66	24.63	19.52	7.66	30.43	578.17	15.03
T_2	100% FYM + 10 days Irrigation	60.21	210.12	28.52	14.45	43.66	28.65	12.66	38.63	733.97	19.08
T_3	100% Vermicompost + 10 days Irrigation	55.66	208.11	25.61	12.52	40.90	27.11	11.29	37.82	718.58	18.08
T_4	100% Neem cake + 10 days Irrigation	57.16	209.31	26.77	13.46	41.65	26.12	10.35	35.26	670.13	17.42
T_5	100% Leaf compost + 10 days Irrigation	58.71	208.21	27.82	10.96	39.93	25.75	11.92	36.21	686.60	17.85
T_6	(Control) + 15 days Irrigation	56.52	160.31	16.52	8.12	29.63	19.52	7.45	30.10	571.90	14.86
T_7	100% FYM + 15 days Irrigation	62.66	215.11	31.25	14.66	51.36	29.63	11.25	39.55	751.45	19.53
T_8	100% Vermicompost + 15 days Irrigation	59.81	214.31	30.22	13.40	48.55	28.41	10.11	38.11	724.09	18.82
T_9	100% Neem cake + 15 days Irrigation	58.96	213.25	29.56	12.52	50.12	28.92	9.82	37.51	712.88	18.53
T_{10}	100% Leaf compost + 15 days Irrigation	59.25	214.12	28.97	13.59	56.52	25.67	10.95	36.20	687.86	17.88
T_{11}	(Control) + 20 days Irrigation	56.49	158.22	18.45	7.05	31.52	19.66	8.55	30.05	570.95	14.84
T_{12}	100% FYM + 20 days Irrigation	67.58	220.25	32.25	15.70	55.41	30.52	14.52	44.63	847.97	22.04
T_{13}	100% Vermicompost + 20 days Irrigation	56.26	219.92	31.52	14.20	54.12	29.91	12.41	42.21	801.99	20.84
T_{14}	100% Neem cake + 20 days Irrigation	58.38	218.11	30.29	13.42	53.93	26.95	13.00	43.12	819.28	21.29
T_{15}	100% Leaf compost + 20 days Irrigation	57.92	219.21	29.65	13.67	54.47	30.05	11.92	41.57	789.77	20.53
F-Test		S	S	S	S	S	S	S	S	S	S
C.D. at 5%		0.75	0.015	0.354	1.95	0.30	0.14	0.36	0.916	0.79	1.51
S.Ed.		0.36	0.007	0.173	0.940	0.146	0.069	0.178	0.447	0.38	0.74