The Pharma Innovation Journal 2019; 8(6): 86-88

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2019; 8(6): 86-88

www.thepharmajournal.com
Received: 28-04-2019
Accepted: 30-05-2019

Vijendra Kumar
College of Forestry,
Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj,
Uttar Pradesh, India

Biswarup Mehra
College of Forestry,
Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj,
Uttar Pradesh, India

Sameer Daniel
College of Forestry,
Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj,
Uttar Pradesh, India

Nusrat Jan
Department of Biological Sciences, Sam Higginbottom University of Agriculture Technology and Sciences,
Prayagraj, Uttar Pradesh, India

Correspondence
Vijendra Kumar
College of Forestry,
Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj,
Uttar Pradesh, India

Effect of organic manures and irrigation schedule on growth and yield of Sarpagandha under teak based Agroforestry system

Vijendra Kumar, Biswarup Mehra, Sameer Daniel and Nusrat Jan

Abstract
A field experiment entitled "Effect of organic manure and irrigation schedule on growth and yield of Sarpagandha under teak and Poplar based Agroforestry system" under the agro climatic conditions of Northern India was conducted at college of forestry, Sam Higginbottom University Agriculture Technology and Sciences Allahabad. The experiment was laid out in Randomized Block Design, having organic manures and irrigation schedule 15 treatment combinations, each replicated three times. Recorded data were analyzed the method by Panse and Sukhtme (1967). Application of T_{12} 100% FYM+ 20 days Irrigation resulted in higher plant growth *viz.*, plant height (67.58cm), number of leaves per plant (220.25), number of branches per plant (32.25), collar diameter (15.70cm) and root length (55.41cm) and yield parameters *viz.*, root fresh weight (30.52gm), root dry weight (14.52gm), root yield (44.63g) plant^{-1}, root yield (847.97kg) plot^{-1} and root yield (22.04q ha^{-1}).

Keywords: Organic manures, irrigation schedule, growth, yield parameters and Sarpagndha

Introduction
Rauwolfia serpentina L. Benth. Ex Kurz. is commonly known as Sarpagandha (Indian snakeroot). It is an important medicinal plant found in Indian subcontinent and south East Asian countries. Generally, it grows in the region with annual rainfall of 200 to 250cm at 1000 m altitude. The root of the Rauwolfia serpentina Benth (N. O. Apocynaceae) has been in use in India for hundreds of years for a host of unrelated ailments. Since 1949, after the English publication of a clinical report by the author on Rauwolfia serpentina therapy in fifty cases of essential hypertension, the plant has gained universal acclamation as a useful therapeutic weapon in high blood pressure states Vakil, (1955) [7]. Most of these are potent bioactive compounds found in medicinal plant parts that can be used for therapeutic purpose or which are precursors for the synthesis of useful drugs. The active principles differ from plants to plant due to their biodiversity and they produce a definite physiological action on the human body. (Calixto 2000) [5] reported that most of the cultivated medicinal and aromatic plants aexported as crude drugs. Ijeh *et al*. 2004 [6] noted the growing interest on the medicinal properties of a number of common plants. Edeoga *et al.* (2003) [3] and Edeoga *et al.* (2005) [4] have elucidated the importance of medicinal plants and their importance in the pharmaceutical industry. The root of the Rauwolfia serpentina Benth (N. O. Apocynaceae) has been in use in India for hundreds of years for a host of unrelated ailments

Most of the drug is obtained from wild sources in these countries. Dey and De, (2011) [8] and Kavita, (2005). The most important among these are reserpine, serpentine and ajmalicine (Deshmukh *et al.,* 2012). The total alkaloid content varies from 1.7-3% of the dried roots depending upon varieties and cultivation practices. It is a mandate for the medicinal plants to be cultivated by organic means considering their therapeutic values. The qualities of the medicinal plants are highly influenced by the organic management practices. The perusals of literatures revealed that no research work has been undertaken for standardization of organic management practices for R serpentina. There is a growing concern about adverse effect of use of chemical fertilizers and chemical pesticides. Looking at the ill effects of such chemicals, it was considered of interest to use organic manures like farmyard manure and vermicompost. These both manures are very beneficial for proper growth and crop production. Vermicompost (also called worm compost, vermicast, worm castings, worm humus or worm manure) is the end-product of the breakdown of organic matter by some species of earthworm. Vermicompost is a nutrient-rich, natural fertilizer and soil conditioner.

Materials and methods

A field experiment entitled "Effect of organic manure and irrigation schedule on growth and yield of Sarpagandha under teak based Agroforestry system" under the agro climatic conditions of Northern India was conducted at college of forestry, Sam Higginbottom University Agriculture Technology and Sciences Allahabad. There was an assured irrigation facility. College plot was located the right bank of the famous river Yamuna under sub–tropics. It is situated in between 25.8° north latitude and 81.5° east longitude. The elevation of Allahabad above sea level is 78 meter. It receives annual normal rainfall of about 100 mm. with a mean relative humidity of 57 per cent. After the first week of January cool days with cool night occur with occasional frost. The root cuttings of (cimsheel) were brought from CIMAP lucknow for this investigation. Three plants were selected randomly in each plot and tagged, the observation were recorded growth and yield parameters viz., plant height (cm), number of leaves per plant, collar diameter (mm). number of branches per plant, root length, shoot length, root fresh weight (g), root dry weight (g), root yield (g) plant^{-1}, root yield (kg) plot^{-1}(kg) and root yield (t ha^{-1}). Rooted nursery cutting of Rauvolfia serpentine were planted within the plots at doses of organic fertilizer with different days of irrigation as per the treatments. The experiment was laid out in Randomized Block Design, having organic manures and irrigation schedule 15 treatment combinations, each replicated three times. The data were analyzed the method by Panse and Sukhtme (1967).

Results and discussion

Effect of organic manure and irrigation schedule on growth parameters of Sarpagnadha (Table 1). Organic manures and irrigation schedule was significant influenced by growth parameter like plant height (cm), number of leaves per plant, number of branches per plant, collar diameter (cm) and root length (cm). Though the application of T_{12} 100% FYM+ 20 days Irrigation produced significantly highest plant height (67.58cm), number of leaves per plant (220.25), number of branches per plant (32.25) collar diameter (15.70cm) and root length (55.41cm) followed by treatments T_7 100% FYM+ 15 days Irrigation, T_2 100% FYM+ 10 days Irrigation, T_{10} 100% Leaf compost+15 days Irrigation, T_8 100%Vermicompost+15 days Irrigation and T_5 100% Leaf compost+10 days Irrigation. Where as the minimum plant height (56.25cm), number of leaves per plant (159.27), number of branches per plant (16.22), collar diameter (cm) (7.66), root length (24.63cm), root fresh weight (19.52gm), root dry weight (7.66gm), root yield (30.43g) plant^{-1}, root yield (578.17kg) plot^{-1} and root yield (15.03q ha^{-1}) as found in treatment T_1 (Control) + 10 days Irrigation. All the yield attributes in terms of root fresh weight (gm), root dry weight (gm), root yield (g) plant$^{-1,}$ root yield (kg) plot^{-1} and root yield (q ha^{-1}) was significantly influenced by organic manures and irrigation scheduled depicted in table 1. Data showed that the maximum root fresh weight (30.52gm), root dry weight (14.52gm), root yield (44.63g) plant^{-1}, root yield (847.97kg) plot^{-1} and root yield (22.04q ha^{-1}) was obtained in treatment T_{12} 100% FYM+ 20 days Irrigation followed by T_{15} 100% Leaf compost+20 days Irrigation, T_{13} 100%Vermicompost+20 days Irrigation, T_7 100% FYM+ 15 days Irrigation, T_2 100% FYM+ 10 days Irrigation, T_8 100%Vermicompost+15 days Irrigation and T_9 100% Neem cake+15 days Irrigation and the minimum root fresh weight (19.52gm), root dry weight (7.66gm), root yield (30.43g) plant^{-1}, root yield (578.17kg) plot^{-1} and root yield (15.03q ha^{-1}) was observed in treatment T_1 (Control) + 10 days Irrigation. This increase in growth and yield parameters might be due to fact that FYM in combination with chemical fertilizers had increased the uptake of major nutrients in the presence of humus forming microbes and growth inducing substances. These results are in the line with the findings of Arul (2002) [2] and Patil *et al.* (2014) [1] in ashwagandha.

Table 1: Effect of different levels of organic manure and irrigation schedule on growth and yield of Sarpagandha under teak agro- forestry system.

Treatment No.	Treatment combinations	Growth parameters					Yield attributes				
		Plant height (cm)	number of leaves per plant	number of branches per plant	collar diameter (cm)	root length (cm)	root fresh weight (gm)	root dry weight (gm)	root yield (g) plant^{-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	40.9	27.11	11.29	37.82	718.58	18.68
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

Conclusion

It can be concluded from the investigation that Sarpagandha differed significantly in respect growth and yield attributes under different organic and irrigation schedule. Application of T_{12} 100% FYM+ 20 days Irrigation resulted in higher plant growth and yield parameters.

References

1. Patil SR, Kattimani KN, Polaiah AC. integrated nutrient management in Ashwagandha (*Withania somnifera* Dunal.). Plant Archives. 2014; 14(1):373-377.
2. Arul NVJ. Integrated nutrient management of ashwagandha (*Withania somnifera*) for growth, yield and quality. M.Sc., (Hort.) Thesis. TNAU, Coimbatore, 2002.
3. Edeoga HO, Okwu DE, Mbaebie BO. Minerals and nutritive values of some Nigerian medical plants. J Med. Aromatic Plants Sci. 2003; 25:1010-1015.
4. Edeoga HO, Okwu DE, Mbaebre BO. Phytochemical constituent of some Nigerian Medicinal Plants. Afr. J Biotechnol. 2005; 4(7):685-688.
5. Calixto JB. Efficacy, safety, quality control, marketing and regulatory guidelines for herbal medicine (Phytotherapeutic agents) Braz. J Med Biol. Res. 2000; 33:197-189.
6. Ijeh II, Njoku OU, Ekenze EC. Medicinal evaluation of extracts of *Xylopia aethiopica* and *Ocimum gratissimum*. J Med. Aromatic Plant Sci. 2004; 26:44-47.
7. Vakil RJ. Rauwolfia Serpentina in the treatment of high blood pressure. American Heart association, Inc, 1955. Available at circ.ahajournals.org /content /12/2/220.abstract.
8. Dey A, De J. Ethnobotanical aspects of *Rauvolfia serpentina* (L). Benth. ex Kurz. in India, Nepal and Bangladesh. J Med Plants Res. 2011; 5:144-50.