ISSN: 2287-688X

Annals of
Plant Sciences

Volume 13, Issue 04 (2024) pp. 6299-6302

Research Article

Smart Agronomy of Ginger Production through *Palash* Leaves Organic Mulching under Changing Climate

R.A. Singh[1], I.P. Singh[1], R.K. Singh[2], P.V. Singh[1], and Dharmendra Yadav[1]

[1]*C.S. Azad University of Agriculture and Technology, Kanpur (UP), India*

[2]*KVK, Hamirpur (U.P.), India*

Abstract

The field experiment was laidout during two consecutive years of 2009-10 and 2010-11 at Badaura village of Babina block, Jhansi district in catchments area of river Betawa. The study was made under "Farmers Participatory Action Research Programme on Water/ Rain Water Harvesting" (Scheme of Ministry of Water Resources, New Delhi) for carrying out the research programme on important technologies of water harvesting. The pilot area located on coarse Rakar soil having low status of plant nutrients. Three treatments i.e. conventional system, *Palash* leaves for green manuring and mulching and mulching with farm yard manure were tested. The highest yield of ginger was found under *Palash* leaves for green manuring and mulching by 288.00 q/ha, which was higher 86.00 q/ha or 42.60% in comparison to conventional system of ginger cultivation. Similarly, mulching with thin layer of FYM gave ginger yield as 261.00 q/ha, which was also higher 59.00 q/ha or 29.20 % than the conventional system. The farmers practice or conventional system produced lowest yield of ginger by 202.00 q/ha in comparison to other two tested treatments. The *Palash* leaves for green manuring and mulching displayed the highest gross return Rs. 720000/ha, and net return Rs. 605085/ha, followed by mulching with thin layer of FYM as gross return Rs. 6,52,500/ha and net return Rs. 5,49,785/ha. *Palash* leaves for green manuring and mulching and mulching with thin layer of FYM increased net income of farmers upto 1.50 fold and 1.36 fold, respectively, in comparison to farmers practice.

Keywords: *Ameliorate, Changing Climate, Conventional system, Ginger, Palash leaves for green manuring.*

Introduction

While rising temperature and change in weather conditions is affecting agriculture and it is matter of serious concern. The farmers affected by climate have shifted to crops and cropping system. Country is facing unpredictable weather for last few years. Analysis of different meteorological variables available from weather stations in the country shows an upward trend in mean monthly temperature and downward trend in relative humidity, annual rainfall, 34 number of rainy day and number of wet day in year.

Trend indicates that agricultural productivity is declined. The small and marginal farmers with small land holdings are more vulnerable to climate change. Fickle monsoon and water security is drastically reduced crop yield in arid and semi-arid tract of Uttar Pradesh. Due to vagaries of weather and debt several farmers suicide as they were unable to repay the loan and fulfill social obligation of feeding their families.

Bundelkhand region of U.P. is he worth suffer to climate change, under this situation poor farm families residing in remote area did not have two square meals. Therefore, there is a urgent need for development and extension of smart agronomy for different crops, which is

***Corresponding Author:**
R.K. Singh;

DOI: http://dx.doi.org/10.21746/aps.2024.13.4.1

capable for ameliorate to changing climate. The introduction of new drought and heat resistant varieties, green manuring with green leaves, use of organic manure, use of bio-fertilizers, suitable cropping system, agro-forestry, mulching with available local material, drip irrigation, sprinkler irrigation, rain water harvesting, integrated plant nutrient management, integrated pest management, use of traditional technology for pest management, timely harvesting etc. are the pin points of smart agronomy for obtaining good crops yield under changing climatic condition.

In Uttar Pradesh, Jhansi, Lalitpur and Mahoba districts are famous for the cultivation of ginger. But due to climate change and other biotic and abiotic factors, the ginger cultivation affected more. In ginger growing tract, farmers having shifted their fields for cultivation of colocasia, resulted in, the area and production of ginger declined. Therefore, for revival of ginger cultivation and smart agronomy under changing climatic condition is the subject matter of this text.

Materials and Methods

The field experiment was laidout during two consecutive years of 2009-10 and 2010-11 at Badaura village of Babina block, Jhansi district in catchments area of river Betawa. The study was made under "Farmers Participatory Action Research Programme on Water/ Rain Water Harvesting" (Scheme of Ministry of Water Resources, New Delhi) for carrying out the research programme on important technologies of water harvesting. The pilot site soil was coarse Rakar, having pH 8.1, organic carbon 0.27%, total nitrogen 0.03%, available P_2O_5 10.21 kg/ha and available K_2O 230 kg/ha. The pH was determined by Electrometric glass electrode method (Piper 1950), while organic carbon was determined by Colorimetric method (Datta, *et al*., 1962). Total nitrogen was analyzed by Kjeldahl's method as discussed by Piper (1950). The available P_2O_5 and K_2O were determined by Olsen's method (Olsen, *et al*., 1954) and Flame photometric method (Singh, 1971), respectively. The experimental site was located 2 Km away from the *Betawa* river. The treatment comprised conventional system, *Palash* leaves for green manuring & mulching and mulching with farm yard manure. FYM @ 250 q/ha was given to ginger, which supplied the NPK @ 112 kg, 56 kg and 112 kg/ha, respectively. As per estimation that 34 kg N, 40 kg P_2O_5 and 84 kg K_2O/ha was available from 112 kg N, 56 kg P_2O_5 and 112 kg K_2O/ha to ginger. Therefore, rest 66 kg nitrogen was given from urea. Out of 66 kg N, 33 kg N top dressed after 35 DAP and remaining 33 kg N top dressed after 75 DAP. The ginger cultivar ***Surbhi*** was planted in the end of June after onset of monsoon on 2009 and 2010 and harvested in the end of January, 2010 and 2011. The *Palash* leaves for green manuring and mulching and mulching with thin layer of FYM were spread just after planting of the ginger. The smart agronomical practices were followed in raising of ginger. The protective irrigation was given to ginger as and when required. The experiment was laid out on farmer's field in the partnership of farmers.

Results and Discussion

The pooled data were recorded and presented in Table -1 and discussed here under appropriate heads.

Yield of Ginger Under Different Treatments: The yield of ginger weighed higher under *Palash* leaves for green manuring and mulching by 288.00 q/ha which was higher 86.00 q/ha or 42.60% over conventional system. Similarly, mulching with thin layer of FYM gave ginger yield as 261.00 q/ha, which was also higher 59.00 q/ha or 29.20% than the conventional system. The conventional system produced lowest yield of ginger by 202.00 q/ha in comparison to *Palash* leaves for green manuring and mulching and mulching with thin layer of FYM (Table-1). The increase in yield of ginger under *Palash* leaves green manuring & mulching was due to the retention of moisture and more availability of plant nutrients to ginger from soil profile, weeds control and good source-sink relationship. These findings are in agreement with those reported by Singh, (2017).

Economic Study: The cost of cultivation of Rs. 99,915/ha, Rs. 1,14,915/ha and Rs. 1,02,715/ha were calculated under conventional system, *Palash* leaves for green manuring and mulching and mulching with thin layer of FYM, respectively. The gross return under conventional system, *Palash* leaves for green manuring and mulching and mulching with thin layer of FYM were computed by Rs. 5,05,000/ha, Rs. 7,20,000/ha and Rs. 6,52,500/ha, respectively. The highest net return Rs. 6,05,085/ha was found in *Palash* leaves for green manuring and mulching, while under conventional system net return was noted lowest to Rs. 4,05,085/ha. Similarly mulching with thin layer of FYM gave net return of Rs. 5,49,785/ha. The BCR was record 1:5.50, 1:6.27 and 1:6.35 in plantation of ginger under conventional system, *Palash* leaves for green manuring and mulching and mulching with thin layer of FYM, respectively. These finding supports to the findings of Singh, (2017).

Application of *Palash* leaves for green manuring and mulching was increased the 1.50 fold net income of farmers while, mulching with thin layer of FYM increased the 1.36 fold net income to the ginger growers in comparison to the cultivation of ginger with conventional system.

Germinated crop of ginger under live mulching of *Palash*

Table-1: Yield of ginger and its economics under different treatments. *(Pooled data of two, Years)*

Sl. No.	Treatment	Yield (q/ha)	Increase in yield (q/ha) over conventional system	%age increase	Economic study (Rs/ha)				Net income increase in fold
					Cost of cultivation	Gross return	Net return	BCR	
1.	Conventional system	202.00	-	-	99915	505000	405085	1:5.05	-
2.	*Palash* leaves for green manuring and mulching	288.0	86.00	42.60	114915	720000	605085	1:6.27	1.50
3.	Mulching with thin layer of FYM	261.00	59.00	29.20	102715	652500	549785	1:6.35	1.36

Note: Sale rate of ginger – Rs. 2500 per quintal.

Conclusion and Recommendation

The application of *Palash* leaves for green manuring and mulching gave higher net return in ginger growing tract farmers of Bundelkhand of Uttar Pradesh, therefore, house hold residing under such situation may be advocated for adoption of *Palash* leave for green manuring and mulching and harvest the fruits of newly generated technology.

References

1. Datta, N.P., Khera, M.S. and Saini T.R. "A rapid colorimetric procedure for the determination of organic carbon in soils." *Journal of Indian society of soils sciences,* 10(1962): 67-74.
2. Olsen, S.R. Cole C.V., Watanable, F.S. and Dean, L.A. "Estimation of available phosphorus in soils by extraction with sodium bicarbonate. "*U.S.D.A*. circ. 939 (Washington) (1954): 19.
3. Piper, C.S. "Soil and Plant Analysis." *Univ. Adelaide, Aust* (1950).
4. Singh, R.A. "*Palash* leaves for organic matter and mulching in ginger production. A smart agronomy under climate change." *Abstract (In), National Conference on Organic Farming for Sustainable Agriculture and Livelihood Security under Changing Climatic Condition, organized by CSAUT, Kanpur* (2017): 09-10.
5. Singh, T.A. "A laboratory manual for soil fertility and fertilizer." *U.P. Agril. Univ. Pantngar (Nainital)* (1971): 71-74.

Source of support: Nil;
Conflict of interest: The authors declare no conflict of interests.

Cite this article as:
Singh, R.A., Singh, I.P., Singh, R.K., Singh, P.V. and Dharmendra, Y. "Smart Agronomy of Ginger Production through *Palash* Leaves Organic Mulching under Changing Climate." *Annals of Plant Sciences*.13.04 (2024): pp. 6299-6302.