ISSN: 2287-688X

Annals of
Plant Sciences

Volume 11, Issue 07 (2022) pp. 5208-5210

Research Article

Intercropping of Ginger and colocasia under Natural Farming on Coarse raker Soil of Bundelkhand

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Abstract

An experiment was undertaken during rainy season of 2000-01 and 2001-02 at Bedaura village of Jhansi district in catchments area of river *Pahuj*. The study was made under "Development of Technology for Efficient Rain Water Management In Rainfed Area's" (Scheme funded by World Bank through UPCAR, Lucknow). The main objective was to harvest higher yields of ginger and colocasia in intercropping and obtain the better net return from Raker soil. The yield of alone ginger was harvested by 298.00 q/ha. Similarly, pure colocasia gave yield by 253.00 q/ha. The intercropped ginger and colocasia produced 280.00 q/ha and 53.00 q/ha, respectively. The maximum net return of Rs. 707275/ha was found in intercropping of ginger and colocasia. The order of net income performance was ginger + colocasia (Rs. 707275/ha) < ginger alone (Rs. 645085/ha) and <colocasia alone (R. 413088/ha). The BCR recorded by 1:8.16 under intercropping of ginger and colocasia, which was higher over ginger alone (1:7.46) and colocasia alone (1:5.45).

Keywords: *Colocasia, Ginger, Intercropping, Root secretion, Synergistic.*

Introduction

The effective utilization of farm yard manure, compost, vermi-culture, cakes, gypsum for supply of sulphur and biological fertilizers in vegetables and spices are not only provide economic benefits to the farmers but also improves and maintains the soil fertility and sustainability in natural soil ecosystem. It is very encouraging in terms of income generation and also the produces are of better quality in terms of nutrient content, flavor and taste. It is maximizing the farmers return and satisfaction for their work. Organic or Natural farming sustaining the land in a healthy condition for future generations. It encourage closed cycle farming systems that use local resources and recycled nutrients. Natural farming producing viable quantities of high quality, nutrientious food and feed. Replenishing and maintaining long term fertility by providing optional conditions for biological activities.

The Jhansi district of Bundelkhand, having four type soils i.e., *Mar*, *Kawar*, *Padwa* and *Raker*. The *raker* soil is available in the catchment area of rivers, which has low plant nutrients status and poor productivity. Previously the *raker* soil was famous for ginger cultivation, but reduction in the production and area noted due to incidence of diseases. The area of ginger cultivation transferred for growing of colocasia. For sustaining area and production of ginger, the parallel cropping of colocasia with ginger was planned. The flexible plan of colocasis parallel cropping with ginger was made for catchments area of river *Pahuj* at Jhansi. Therefore, the parallel cropping of colocasia with ginger is the subject matter of this manuscript.

Materials and Methods

The introductive field experiment was laidout during rainy season of 2000-01 to 2001-02 at *Bedaura* village of Jhansi district in catchments area of river *Pahuj*. The study was made under "**Development of Technology for Efficient Rain Water Management In**

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DOI: http://dx.doi.org/10.21746/aps.2022.11.7.1

Rainfed Area's" (Scheme funded by World Bank through UPCAR, Lucknow). The pilot site soil was coarse *Raker*, having pH 8.1, organic carbon 0.26%, total nitrogen 0.02%, available P_2O_5 10.38 kg/ha and available K_2O 227 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 Kjendahl's method (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 1 km away from the *Pahuj* river. The main objective was to provide the non polluted drinking water to population of Jhansi city, because almost all the demography of Jhansi city drinks the water from the supply of *Pahuj* river water. The three cropping system i.e. ginger alone, colocasia alone and ginger + colocasia were tested. The parallel crops of ginger and colocasia was planted at row ratio of 8:1. The eight rows of ginger were planted at the distance of 15 cm. The rhizome to rhizome distance was maintained 10 cm. After eight rows of ginger one row of colocasia were planted at the distance of 25 cm. Plant to plant distance of colocasia was maintained 20 cm. Therefore, 83% plant stand of ginger and 17% plant stand of colocasia were adjusted. The planting of both crops was done in second fortnight of June after good rainfall appearance during two experimental years. The 120 kg N + 60 kg P_2O_5 + 80 kg K_2O/ha was the requirement of ginger, and colocasia required 120 kg N + 60 kg P_2O_5 + 80 kg K_2O/ha. The 300 q/ha FYM and 10 q/ha mustard cake were applied to fulfill the requirement of NPK. No chemical fertilizer was applied. For maintaining good soil moisture and increasing the frequency of irrigational days, the gypsum was applied @ 200 kg/ha. The cv. *Baruasagar* of ginger and cv. *Baruasagar* of colocasia were planted. The smart agronomical practices were followed in raising of both crops. Two protective irrigations were given to both crops. The harvesting of both crops was done at maturity stage.

Table 1: Yield of main and intercrop and their economic study
(Pooled data of two years)

S.N.	Cropping system	Yield (q/ha)		L.E.R.	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BCR
		Main crop	Inter crop					
1.	Ginger alone	298.00	-	1.00	99915	745000	645085	7.46
2.	Colocasia alone	253.00	-	1.00	92912	506000	413088	5.45
3.	Ginger + colocasia	280.00	53.00	1.15	98725	806000	707275	8.16

Results and Discussion

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

Yield of Main and Intercrop

The yield of ginger alone was weighed by 298.00 q/ha. In intercropping system ginger yield noted by 280.00 q/ha, which was 93.95% in comparison to pure crop of ginger. Pure crop of colocasia gave yield by 253.00 q/ha, while in intercropping colocasia gave yield by 53.00 q/ha. Pure colocasia gave 200.00 q/ha more yield over intercropped colocasia. In intercropping system, the root secretion of both intercrops added the synergistic effect on each other, resulted in, the rhizome yield of both crop increased considerably. These results are in agreement with those reported by Singh, (2006) and Singh, (2008).

Economic Study of Systems

The cost of cultivation of Rs. 99915/ha, Rs. 92912/ha and Rs. 98725/ha were calculated under sole crop ginger, sole colocasia and intercropping system, respectively. The gross

return of pure giner, pure colocasia and ginger + colocasia were computed by Rs. 745000/ha, Rs. 506000/ha and Rs. 806000/ha in planting of pure ginger, pure colocasia and giner + colocasia, respectively. The highest net return of Rs. 707275/ha was found in intercropping of ginger + colocasia, while pure cropping of ginger gave net return Rs. 645085/ha. Similarly, pure colocasia gave net return of Rs. 413088/ha. The BCR was recorded 1:7.46, 1:5.45 and 1:8.16 in alone ginger, alone colocasia and ginger + colocasia, respectively. These findings support to the findings of Singh, (2006) and Singh, (2008).

LER: The higher LER was found in intercropping of ginger +colocasia by 1.15 in comparison to pure cropping of ginger and colocasia. Therefore, 15% yield advantage was recorded under intercropping system of ginger + colocasia.

Conclusion

In intercropping system of ginger + colocasia, higher net return was found over the pure cropping of ginger and colocasia in ginger growing tract of Bundelkhand of Uttar Pradesh, therefore, the house hold residing under such situation may be advocated for adoption of ginger +colocasia intercropping and harvest the fruits of newly generated technology.

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

Cite this article as:
Singh, R.A., M.K. Singh, I.P. Singh, Dharmendra, Y. and N. Lari. "Intercropping of Ginger and colocasia under Natural Farming on Coarse raker Soil of Bundelkhand."*Annals of Plant Sciences*.11.07 (2022): pp. 5208-5210.

DOI: http://dx.doi.org/10.21746/aps.2022.11.7.1