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Research Article

Companion Cropping of Chickpea with Indian Mustard on Reclaimed Ravinous Land

R. A. Singh[1*], I. P. Singh[2], M. K. Singh[1], P. V. Singh[1], N. Lari[1] and S. B. Pal[1]

[1]C.S. Azad University of Agriculture & Technology Kanpur (U.P.), India

[2]Krishi Vigyan Kendra Auraiya (U.P.), India

*Corresponding Author E-mail: rasinghcsau@gmail.com

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ABSTRACT

An experiment was undertaken during two consecutive years at Model Watershed, Rendhar, Jalaun, Bundelkhand under reclaimed ravinous land. The main objective was to find out the suitable cultivars of chickpea for companion cropping with Indian mustard for better yield and income. The watershed area is situated in the catchments of Pahuj river. The experimental soil was clay loam locally known as Kawar, having low organic carbon, total nitrogen, available P_2O_5 and high available K_2O. Five cultivators of chickpea i.e, Radhey, Awrodhi, K 468, P.G.114 and T 3 were tested in companion cropping of Indian mustard cv. Varuna, Among tested varieties, Radhey gave highest yield of 27.90 q/ha closely followed by cv. Awrodhi (26.85 q/ha) in sole cropping. Cultivar K-468 also gave recognizable kernel yield by 25.00 q/ha in sole cropping under dry land condition. Cultivars P.G.114 and T_3 were not reached to the yield level of Radhey, Awrodhi and K-468. Companion cropping of Radhey and Indian mustard gave better yield advantage, highest system productivity and maximum system net profitability by 12%, 30.37q/ha and Rs 95455/ha, respectively, followed by companion cropping of cv. Awrodhi and Indian mustard. In general companion cropping of Indian mustard with all tested cultivators of chickpea proved superior over their sole cropping.

Keywords: *Companion cropping, Catchment, Pahuj river, Reclaimed ravines, Watershed.*

INTRODUCTION

In chickpea growing tract of Bundelkhand zone of Uttar Pradesh, there was a practice of planting of Indian mustard as a mixed cropping without any consideration of rows ratio and direction of plating. Cultivators processing small holding are particularly interested in such practice to fulfill their domestic needs. They fail to realize that the mixed cropping of chickpea and Indian mustard gives considerably poor yield and the loss accruing there from is not adequately compensated by the additional income, which they learn through the production of Indian mustard.

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It has therefore, been felt necessary to evolve some better way intercropping practice, which might successfully replace the one mentioned above by enhancing the overall income of growers and at the same time giving them a cash return within a short period of time. From some preliminary observations recorded by Singh (1996) from Left Bank Yamuna Ravines Watershed, Kanpur, the plantation of Indian mustard after nine row of wheat in north-south direction gave better yield and net return to farm families residing in this dry farm area. Therefore, with this object in view the present studies on companion cropping of Indian mustard with different cultivars of chickpea planned and undertaken.

MATERIALS AND METHODS

The study was undertaken during winter season of 1990-91 and 1991-92 at Pilot Project of Watershed, Rendhar, Jalaun, Bundelkhand (U.P.) under rain fed situation. The operational area of watershed typically represents soil, climate and socio-economic condition of Bundelkhand Region. The moisture availability period for crop growth is 122 days. The soil of watershed site developed over alluvial and occur ravines affected. The ravines affected area belongs to the class II and III of land capability and were suitable for cultivation of chickpea and Indian mustard. The experimental soil was clay loam locally known as Kawar, having pH 8.0, organic carbon 0.27%, total nitrogen 0.02%, and availableP_2O_5 9.8 kg/ha and available K_2O 252 kg/ha, therefore, the analyzed status of nutrients was indicated poor. The pH was determined by Electrometric glass electrode method (Piper, 1950), while organic carbon was determined by Calorimetric method (Datta et al., 1962). Total nitrogen was analyzed by Kjedahl's method as discussed by Piper (1950). The available phosphorus and potassium were determined by Olsen's method (Olsen et al., 1954) and Flame photometric method (Singh, 1971), respectively. The five cultivators of chickpea i.e. Radhey, Awrodhi, K-468, P.G. 114 and T3 were tested in companion cropping of Indian mustard cv. Varuna. The sowing of both crops was done in second fortnight of November and harvested in second fortnight of March after 125 days of seeding during two experimental years. In companion cropping the rows ratio was maintained 5:1 between chickpea and Indian mustard Five rows of chickpea was sown first followed by one row of Indian mustard. By this sowing method whole field was sown. The protective irrigation was given as and when required. The conservation agronomical practice was followed for rasing of crops in companion cropping. The experiment was laid out on five farmer's fields. The sowing was done in north – south direction.

RESULTS AND DISCUSSION

The experimental findings as influenced by different treatments are discussed below under appropriate heads.

Varietal response under sole and intercropping

The data (Table-1) revealed variation due to different tested cultivators for kernel yield (q/ha). Among the five varieties under sole cropping study variety Radhey registered highest kernel yield of 27.90 q/ha, closely followed by cv. Awrodhi (26.85 q/ha), Cultivar K-468 also gave recognizable grain yield by 25.00 q/ha under rain-fed condition. Cultivators P.G.114 (23.97q/ha) and T-3 (21.95 q/ha) were not reached to the yield level of Radhey, Awrodhi and K-468 in sole cropping.

In companion cropping system, the varietal performance of chickpea was Radhey (24.50 q/ha)> Awrodhi (23.85 q/ha)>K-468 (22.25 q/ha)>P.G.-114 (21.37 q/ha)>T-3 (19.75 q/ha). Intercropped Indian mustard gave seed yield by 5.87 q/ha 5.67q/ha, 4.80q/ha, 5.87q/ha and 4.85 q/ha under Radhey + Indian mustard, Awrodhi + Indian mustard, K-468+Indian mustard, P.G.-114 + Indian mustard and T-3 + Indian mustard, respectively. The similar observations have also been reported by Singh et al. (2019).

These results indicate that the genotypes, Rahey, Awrodhi and K-468 produced highest kernel yield because these

had better sources- sink relationship, that means amount of dry matter or photo synthates produced by sources organs trans located toward sink organ (economic part) and produced higher kernel yield, therefore, these genotypes possessed high sink capacity to utilize the photo assimilates trans located from source. It resulted in higher kernel yield. These results are commensurable to the finding of Panwar et al. (1986), Shrivastava and Bharadwaj (1986) and Pachpor and Shete (2010).

LER and yield advantage-

The LER was calculated 1.12, 1.12 and 1.13 in companion cropping of Radhey + Indian mustard, Awrodhi + Indian mustard and P.G. 114 + Indian mustard, respectively, which was higher over LER calculated under T-3 + Indian mustard (1.10) and K-468 + Indian mustard (1.09). The similar trend was also found in yield advantage as displayed by companion cropping system.

System productivity-

The highest system productivity was found under Radhey + Indian mustard by 30.37 q/ha, closely followed by Awrodhi + Indian mustard (29.57 q/ha), Among the companion cropping system, the lowest system productivity was computed under T-3 + Indian mustard (24.60 q/ha). The other tested treatments gave system productivity under these two limits. It is worthwhile to mention here that the all companion cropping system displayed the higher system productivity over their respective sole cropping (Table-1).

System profitability-

Result given in Table-1 clearly indicated that Radhey + Indian mustard gave maximum net system profitability (Rs. 95455 /ha), followed by Awrodhi + Indian mustard (Rs. 91855 /ha). The minimum system net profitability recorded under T3 + Indian mustard (Rs69490/ha). The companion cropping system P.G. 114 + Indian mustard and K-468 + Indian mustard gave net system profitability by Rs. 81370/ha and Rs. 80515/ha. The entire tested companion cropping system proved superior over their respective sole cropping. In general all the companion cropping systems gave better system net profitability.

Table 1: Yield of chickpea, Indian mustard, system productivity and system net profitability under sole and intercropping (Pooled data of two years)

	Treatment	Yield q/ha.		LER	Yield (advantage) (%)	System Productivity (q/ha)	System net profitability (Rs/ha)
		Main Crop	Intercrop				
1.	Chickpea cv. Radhey	27.90	-	1.00	-	27.90	84340=00
2.	Chickpea cv. Awrodhi	26.85	-	1.00	-	26.85	79615=00
3.	Chickpea cv. K468	25.00	-	1.00	-	25.00	71290=00
4.	Chickpea cv. PG.114	23.97	-	1.00	-	23.97	66655=00
5.	Chickpea cv. T3	21.95	-	1.00	-	21.95	57565=00
6.	Indian mustard cv. Varuna	24=80	-	1.00	-	24.80	70390=00
7.	Radhey+Indian mustard	24=50	5.87	1.12	12.00	30.37	95455=00
8.	Awrodhi+Indian mustard	23.85	5.67	1.12	12.00	29.57	91855=00
9.	K468+Indian mustard	22.25	4.80	1.09	9.00	27.05	80515=00
10.	P.G. 114+ Indian mustard	21.37	5.87	1.13	13.00	27.24	81370=00
11.	T3+Indian mustard	19.75	4.85	1.10	10.00	24.60	69490=00

CONCLUSION AND RECOMMENDATION

The farm families residing in the dry land area may be suggested for the companion cropping system of chickpea + Indian mustard for better productivities and nice profitability because it proved significant over sole crop of chickpea.

REFERENCES

Dutta, N. P., Khera, M. S., & Saini, T. R. (1962). A rapid clorimetric procedure for the determination of organic carbon in soils. *Journal of Indian Society of Soil Sciences*, *10*, 67-74.

Olsen, S. R., Cole, C. V., Watanable, F. S., & Dean, L. A. (1954). Estimation of available phosphorus in soils by extraction with sodium bicarbonate. *U.S.D.A. Circ*. 939 (Washington):19.

Pachpor, N. S., & shete, P. G. (2010). Source-Sink relationship in soybean genotypes in summer season. *International J. Agricul. Scl*. *6*, 67-68.

Panwar, J. D. S., Shukla, D. S., & Sirohi, G. S. (1986). Growth and development aspect in relation to yield of mungbean. *Indian J. Plant physiol*., *4*, 312-315.

Piper, C. S. (1950). Soil and Plant Analysis *Univ. Adelaide* Aust.

Shrivastva, J. P., & Bharadwaj, S. N. (1986). Contribution of different photosynthesizing organ to the pod in relation to source – sink interection in field pea. *Indian J. Plant Physiol*. *4*, 262-265.

Singh, R. A. (1996). Eco-friendly farming system in ravines watershed. *Indian Journal of Soil Conservation*, *24*(2), 156-159.

Singh, R. A., Singh S., Prakash, R., Singh, R. K., Singh, J., & Yadav, A. (2019). Selection of suitable varieties of chickpea in dry farmed area of Bundelkhand for grain and vegetable. *Research in Environment and – Life Sciences, 12*(03), 92-93.

Singh, T. A. (1971). A laboratory manual for soil fertility and fertilizer. *U.P. Agri. Univ. Pantnagar* (*Nainital*): 71-74.