Research Paper

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Effect of Row Ratios and Phosphorus Levels on Protein Content and Oil Content in Chickpea (Cicer Arietinum)- Mustard (Brassica Juncea) Inter Cropping.

Agriculture

KEYWORDS : Intercropping, Phosphorus levels, Row ratio, Mustard and Chickpea

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ABSTRACT

An investigation was conducted during the winter season (Rabi) of 2000-2001 and 2001-2002 at Agricultural Research Farm to find out the effect of row ratios (4:2,6:2,8:2) and phosphorus levels (30,60 and 90kg P2O5 ha-1) on chickpea (Cicer arietinum.) + Indian mustard (Brassica juncea L.) intercropping under dry land conditions in semi arid region of central Uttar Pradesh. The highest protein content was found with 90 kg P2 O5 ha-1 in chickpea and highest oil content was found with 60 kg P2O5 ha-1 in Mustard. Row ratio also significantly effect the oil production and highest oil production was fond in 4:2 row- ratio.

INTRODUCATION:

Growing of Indian mustard as an intercrop in chickpea is a common practice in India under rain fed conditions. Scientific approach of intercropping of these two crops boost the quality of produce (Protein and oil content). (Jain et al.1999). Where two crops are grown in intercropping with certain proportion, row ratio between the base crop and intercrop is an important factor. Intercropping is one of the important ways of increasing quality of produce by the harmony between the crops grown in association.

Phosphorus fertilization play a role in protein content of chickpea and oil content of mustard. Although information is available on the phosphorus levels in chickpea and mustard grown as sole crop, but phosphorus in their intercropping system have not been thoroughly investigated. This necessitated the need for under taking the present study.

MATERIALS AND METHODS:

The experiment was conducted during the winter season (Rabi) 2000-2001 and 2001-2002 at the Agricultural Research Farm of R.B.S College, Bichpuri (Agra). The soil was sandy loam having pH 8.1, EC 1.55 dS m^{-1}, organic carbon 0.29% available N, P_2O_5 and K_2O 190.75, 28.25 and 294.50 kg ha^{-1} respectively. The treatment consisted of 3 row ratios (Chickpea +Mustard 4:2, 6:2 and 8:2) and sole crop of Chickpea and Mustard to compare for intercropping and three levels of phosphorus (30, 60 and 90 kg P_2O_5 ha^{-1}). The experiment was conducted in R.B.D. The cultivars used were Awarodhi and Rohini for chickpea and Indian mustard, respectively. Sowing was done at 30 cm row spacing. The crop were sown on 24 and 16 October, where as harvesting was done on 21st and 14th March and 4th and 2nd April of Indian mustard and chickpea during 2000-2001 and 2001-2002, respectively. A basal dose of nitrogen for Chickpea and Indian mustard @ 20kg and 60kg ha^{-1} respectively, phosphorus as per treatment and potash as per recommendation (30kg K_2O ha^{-1}) were applied. Phosphorus was applied through T.S.P, Nitrogen through Urea and recommended dose of potash is applied through Muriate of potash.

RESULTS AND DISCUSSION:

Protein content in grains of chickpea did not differ significantly due to different row–ratios and sole cropping treatments in both the years. However, the maximum protein content in grains was noted with 8:2 row ratio and minimum with sole crop of chickpea during both the seasons.

Protein percentage in grain significantly affected by different levels of phosphorus during both the years, 90 kg P_2O_5 ha^{-1} produced the highest protein percentage and this was found significantly superior to 30 kg P_2O_5 ha^{-1}.during both the years. However, the difference between 30 kg and 60 kg, 60 kg and 90 kg phosphorus could not cross the level of significance in first year. In second year 60 kg P_2O_5 ha^{-1} also gave significantly higher protein percent in grain as compared to 30 kg P_2O^5 and difference between 60 kg and 90 kg P_2O_5 ha^{-1} was not significant. Such beneficial effects were also reported by Singh et al. (1983).

PROTEIN CONTANT IN MUSTARD:

The variations in the protein percent in seed as affected by different treatments were of significant order during both the years. All the row rations of intercropping were found to be statistically at par but significantly superior to sole Mustard in respect of protein content during both the season.

Phosphorus level influenced the protein content in seed significantly. It is clear form table that 60kg P_2O_5 ha^{-1} improved the protein content significantly over 30kg P_2O_5 ha^{-1}.Though the highest protein content was observed with 90kg P_2O_5 ha^{-1} but this was statistically at par with 60kg P_2O_5 ha^{-1} in both the seasons. These findings are in close conformity with the findings of Singh and Singh (1994).

OIL CONTENT IN MUSTARD:

The oil content of mustard did not differ significantly due to different row-ratios and sole crop of mustard in both the experimental years. However, the maximum oil content was noted with 6:2 and minimum with sole crop of mustard in both the seasons.

The higher dose of phosphorus significantly affected the oil content in both the experimental years. 60kg P_2O_5 ha^{-1} gave significantly higher oil content as compared to 30kg P_2O_5 ha^{-1}. However, the maximum oil content was noted with 90kg P_2O_5 ha^{-1}, which was found statistically at par with 60kg P_2O_5 ha^{-1} in both the experimental years. Such beneficial effects were also reported by Arthamwar (1996), Singh and Singh (1994).

Table

Effect of row – ratios and Phosphorus levels on protein content and oil content of Chickpea and Indian mustard intercropping.

Treatments	Protein content % in chickpea 2000	2001	Protein content in mustard 2001	2002	Oil content % in mustard 2001	2002
Sole crop of chickpea	19.50	19.81				
Sole crop of Mustard			14.69	14.84	37.87	38.66
Intercropping (Chickpea + Mustard)						
4:2 row ratio	20.04	20.39	17.10	17.40	39.27	40.07
6:2 row ratio	20.29	20.62	17.29	17.60	39.41	40.21
8:2 row ratio	20.44	20.79	17.38	17.69	39.30	40.11

CD (P=0.05)	NS	NS	0.57	0.65	NS	NS
Phosphorus (kg ha-1)						
30	19.39	19.68	16.10	16.34	37.42	38.19
60	20.28	20.63	16.73	17.01	39.57	40.39
90	20.54	20.89	17.01	17.30	39.90	40.72
CD (P=0.05)	0.95	0.72	0.49	0.56	1.39	1.62

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