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Productivity of Groundnut (*Arachis hypogaea*) as Influenced by Weed Management Practices

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ABSTRACT

The field experiment was conducted during two consecutive years in *kharif* 2019 and 2020 which falls in agro climatic zone IIIa (Transitional plain zone of inland drainage). Soils of the experimental sites were sandy to sandy loam in texture, slight alkaline (pH 7.6) in reaction, low in nitrogen and phosphorus and medium in potassium status. The study consists two treatments namely T_1- Farmers practice (hand weeding at 30 DAS), T_2-Imazethapyr spray@ 50 g a. i. /ha at 25-30 DAS. Average number of pods per plant was recorded 63 and 61 in treatment T_1 and T_2, respectively. Pod yield of groundnut was recorded 25.55 and 20.05 during 2019 and 2020, respectively in treatment T_1 having the mean value of 22.80 q/ha and 25.0 and 19.80 q/ha were recorded in 2019 and 2020, respectively in treatment T_2 having the mean value 22.4 q/ha.Total weeds count/m^2 at 40 DAS were recorded 3.3 and 3.5 during 2019 and 2020, respectively in treatment T_1 having the mean value 3.40 and 4.3 and 3.80 during 2019 and 2020 respectively in treatment T_2 having the mean value 4.05. Similarly the B: C ratio was recorded 3.91 and 3.27 during 2019 and 2020, respectively in treatment T_1 having the mean value 3.59 and 4.46 and 3.87 during 2019 and 2020, respectively in treatment T_2 having mean value 4.17.

Keywords Groundnut, Weed management, Imazethapyr, Pod yield.

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INTRODUCTION

District Dausa falls in Agro climatic zone IIIa, namely "Semi-Arid Eastern Plains" covering Dausa, Ajmer, Tonk and Jaipur Districts. Headquarter of the zone is situated at Rajasthan Agricultural Research Institute, Durgapura, Jaipur. The technologies generated by scientist of, Rajasthan Agricultural Research Institute, Durgapura were tested and disseminated through front line demonstrations to farmers of Dausa District.With increasing population growth and diminishing water availability Indian agriculture facing severe challenge to produce more crop per drop of water per unit area and per unit time.

The average productivity of India is only about 988 kg/ha as against 2995 kg/ha in USA, 2688 kg/ha in China, 1379 kg/ha in Brazil, 1360 kg/ha in Indonesia and 1145 kg/ha in Nigeria. Among all oilseed crops, groundnut accounts for more than 40-50 % in area and 60 to 70 % in production in the country.

Groundnut or peanut or earthnut or monkey nut is an important edible oil crop in Rajasthan both from the point of view of gross hectare cultivated and pod outturn. The groundnut was cultivated in 5.53 mha area with 9.67 m.t. production having 1750 kg/ha productivity. In Rajasthan the area, production and productivity of groundnut was 0.47 mha, 0.91 m.t. and 1943 kg/ha, respectively (Anonymous 2014). India ranks first, followed by China and Nigeria, the production and productivity are comparatively less. In comparison, China holds the most promising in production (16.63 m.t.) and USA in 43 q/ha of groundnut. Consequently, China had maximum share (Approximate 40%) followed by India (Approximate 17%) in global groundnut production (Anonymous 2015). Dausa District comprises the area, production and productivity 9635 ha, 13576 tonnes and 1409 kg/ha, respectively (Anonymous 2020). After successful story of green revolution the country has made an impressive progress in enhancing productivity of wheat. However, today itself a major portion of foreign money has to invest to import of edible oil by India government. This calls for renewed efforts for analyzing the production constraints and evaluating location specific monetary and non monetary technology for improving the existing productivity level.

The hike in production of groundnut in recent years has been possible due to improvement in productivity and strategies adopted by the government by launching various schemes. Groundnut can be cultivated in dry and hot areas and sandy to sandy loam soils in rainy season. Weed of different kinds in rainy season groundnut limits the crop production. Weed management is an important factor for improving the productivity of groundnut as weeds compete for nutrient, water, light and space resulting in reduces crop yield and quality. Uncontrolled weed reduces the yield of *kharif* groundnut by 54-71% especially during early period of crop growth (Agasimani *et al.* 2010). Groundnut grow slowly in early stage is a poor competitor with weeds. Critical period defines the maximum period weeds can be endured without affecting final crop yields. Critical period for weed management in groundnut is 3-8 weeks after sowing (Weslay *et al*. 2018). Major weeds are *Ageratum congoides, Amaranthus virids, Commelena benghalensis, Digera arvensis, Euphorbia hirta, Lucas aspera, Tridex percumbens, Saccharum spontaneum, Sorghum helpense, Cyperus rotundus* infesting the groundnut. Hand weeding is an excellent way for reasonable weed control. In this area groundnut is grown in rainy season in which there are not many rain free days resulting in delay in weed control. Rising labor wages and non-availability of adequate labor are becoming serious problem now days. Chemical weed control is also one of the options to control the weeds timely and efficiently. Keeping in view the importance of chemical weed management one on farm trial was framed during *kharif* 2019 and 2020 to demonstrate the chemical weed management in groundnut for better production.

MATERIALS AND METHODS

The field experiment was conducted during two consecutive years in *kharif* 2019 and 2020 at farmers' fields in Mohanpura and Badoli villages of Lalsot block of Dausa District of Rajasthan, which falls in agro climatic zone IIIa (Transitional plain zone of inland drainage). Soils of the experimental sites were sandy to sandy loam in texture, slight alkaline (pH 7.6) in reaction, low in nitrogen and phosphorus and medium in potassium status. The study consists two treatments namely $T_{1.}$ Farmers practice (hand weeding at 30 DAS),T_2-Imazethapyr spray@ 50 g a.i. /ha at 25-30 DAS. The above two treatments were replicated 10 times in the year 2019 at farmers' fields of Mohanpura village in Lalsot block of Dausa. The groundnut variety GG-20 was grown in the third to fourth week of June. The crop was irrigated at critical growth stages and as and when needed. The crop was raised with the recommended dose of major nutrients in the zone IIIa i.e. 15 kg N and 60 kg $P_2O_5$and 250 kg gypsum per hectare. The crop was harvested in the second week of October. During the year 2020 these two treatments were replicated 10 times at farmers' field in Badoli village of Lalsot block. The groundnut variety GG-20 was grown in the third week of June. The crop was irrigated at critical growth stages and as and when needed. The crop was raised with the recommended dose of major nutrients in the zone IIIa i.e. 15 kg N and 60 kg P_2O_5 and 250 kg gypsum per hectare. The crop was harvested in the second week of October. The harvesting and threshing was done in separate strips of treatments. The observations of

Table1. Effect weed management practices on yield attributes and yield of groundnut.

Treatments	Number of pods/ plant			Haulm yield (q/ha)			Pod yield (q/ha)			Biological yield (q/ha)			Total weeds count/m^2 at 40 DAS		
Year	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
T_1- Farmers practice (hand weeding at 30 DAS)	65	61	63	16.15	17.45	16.80	25.55	20.05	22.80	41.7	37.5	39.60	3.30	3.50	3.40
T_2- Imazethapyr spray@ 50 g a.i. /ha at 25-30 DAS	64	58	61	14.5	16.2	15.35	25.0	19.80	22.4	39.5	36.0	37.75	4.30	3.80	4.05

yield attributes and yield like number of pods per plant were recorded treatment and replication wise at every location and then statistical analysis for the test of significance were done. Observations of ten competitive plants at maturity stage from each treatment and replication were randomly selected; average of these plants in respect of different plant characters like number of pods per plant was taken.After separate threshing of different treatments the pod, haulm and biological yield was recorded and then converted in to q/ha for further statistical analysis. For the calculation of economics the cost of inputs like Imazethapyr only was included because the spray was done by farmers themselves so the cost of spray was not included in all the treatments under study and pods were sold @ Rs 52.75/kg and the haulm was sold by the respective farmers @ Rs18000/ha.

RESULTS AND DISCUSSION

Data in Table 1 revealed that number of pods per plant were 65 and 61 during 2019 and 2020, respectively in treatment T_1- Farmers practice (hand weeding at 30 DAS) and 64 and 58 in 2020, respectively in treatment T_2-Imazethapyr spray@ 50 g a.i./ha at 25-30 DAS. Thus the average number of pods per plant was recorded 63 and 61 in treatment T_1 and T_2, respectively. Similarly the mean haulm yield was recorded 16.80 and 15.35 intreatment T_1 and T_2, respectively. Pod yield of groundnut was recorded 25.55 and 20.05 during 2019 and 2020, respectively in treatment T_1 having the mean value of 22.80 q/ha and 25.0 and 19.80 q/ha were recorded in 2019 and 2020, respectively in treatment T_2 having the mean value 22.4 q/ha. The biological yield of groundnut was recorded 41.7 and 37.5 in treatment T_1 during 2019 and 2020, respectively having the mean value 39.60 q/ha and 39.5 and 36.0 q/ha in treatment T_2 during 2019 and 2020, respectively having the mean value of 37.75 q/ha. Total weeds count/m^2 at 40 DAS were recorded 3.3 and 3.5 during 2019 and 2020, respectively in treatment T_1 having the mean value 3.40 and 4.3 and 3.80 during 2019 and 2020 respectively in treatment T_2 having the mean value 4.05.

Data presented in Table 2 revealed that cost of cul-

Table 2. Effect of weed management practiceson economics of groundnut.

Treatments	Cost of cultivation (Rs/ha)			Gross returns(Rs/ha)			Net returns (Rs/ha)			B:C ratio		
Year	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
T_1-Farmers practice (hand weeding at 30 DAS)	37324	37874	37599	146050	123764	134907	108726	85890	97308	3.91	3.27	3.59
T_2-Imazethapyr spray@ 50 g a.i. /ha at 25-30 DAS	32104	31654	31879	143250	122445	132848	111146	90791	100969	4.46	3.87	4.17

tivation of treatment T_1 was Rs 37324 and 37874 during 2019 and 2020, respectively having mean value Rs 37599. Similarly treatment T_2 recorded 32104 and 31654 during 2019 and 2020 respectively having mean value Rs 31879. The mean gross return was found higher in treatment T_1 but Net return was recorded higher with treatment T_2 during both the years as well as in mean values also. Similarly the B: C ratio was recorded 3.91 and 3.27 during 2019 and 2020, respectively in treatment T_1 having the mean value 3.59 and 4.46 and 3.87 during 2019 and 2020, respectively in treatment T_2 having mean value 4.17.

Thus in conclusion the treatment T_2 was found almost as effective as treatment T_1, looking the labor crisis and B: C ratio where the availability of agriculture labor is an issue the chemical weed control with Imazethapyr @ 50 g a.i./ha at 25-30 DAS gave an option and gets the at par yield of groundnut in Dausa District of Rajasthan. Further the results were recorded at farmers' fields so the further confirmation of the results will also require.

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