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REVIEW ARTICLE

PERFORMANCE OF NIGER (*GUIZOTIA ABYSSINICA* L. CASS.) AS INFLUENCED BY VARIOUS RESOURCE CONSTRAINTS

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ABSTRACT

Niger (*Guizotia abyssinica* L. Cass.) is an important traditional oilseed crop of India, cultivated mainly in hilly and tribal areas. Inspite of high oil content and a wide range of adaptability, little attention has been paid towards maximization of this oilseed crop. Among the agronomic practices, fertilizer, thinning, weeding and plant protection play important role in maximizing the seed yield. Keeping in view all facts, the study of performance of niger as influenced by resource constraints was formulated in RBD design in three replications with 12 different treatments. The results in the present investigation revealed significant differences in respect of seed yield for all the treatments studied. Among the different treatments, highest seed yield was recorded by the treatment T_1 (484 kg/ha) with B:C ratio 3.61 followed by T_3 (451 kg/ha, BC ratio: 3.64) and T_4 (414 kg/ha, BC ratio: 3.57) and lowest yield recorded by T_{12} (164 kg/ha).

INTRODUCTION

Niger (*Guizotia abyssinica* Cass) is one of the important minor oilseed crops of India. It is known by various names such as Ramtil or Kalatil in India and Noog in Ethiopia. India ranks first in the area, production and productivity of niger in the world. At present it is grown an area of about 1.8 lakh ha. It is cultivated to limited extent in Ethiopia, South Africa, East Africa, West Indies, Zimbabwe and India. In India it is mainly cultivated in tribal pockets of M.P., Orissa, Maharashtra, Bihar, Karnataka and Andhra Pradesh. It is also grown sizeable area in certain region of Arunachal Pradesh, Gujarat, U. P., Tamil Nadu and Rajasthan. Niger although considered as a minor oilseed, is very important in terms of quality and taste of its oil and export potential This crop is also responsible to the adverse climatic and poor soil conditions (Rajpurohit, 2011). Success of any crop production depends on use of quality seed and improved cultural practices. Among the major agronomic practices, recommended dose of fertilizer, thinning, weeding and plant protection practices plays important role in maximizing the seed yield (Kivadasannavar *et al.,* 2007). The resources like agro-biological inputs, intensive cultivation practices and synthetic fertilizers are becoming costlier gradually which are unaffordable by the resource poor tribal farmers are them. Therefore, these resource poor farmers' communities demand a special attention for low-cost input sustainable technology. Popularization and integration of agro-biological inputs and intensive cultivation practices in such a way that a best alternatives will increase the profitability of niger crop in resource poor farmers with low cost (Dwiwedi and Rawat, 2013). Keeping in view the above facts, the present study was undertaken for optimizing the niger production under resource constraints.

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MATERIALS AND METHODS

A field experiments was conducted on Niger (*Guizotia abyssinica* L.f.) cv. Gujarat Niger-1 at Niger Research Station, NAU, Vanarasi (Gujarat), India during *kharif* season of 2013-14. Based on 15 years rainfall data, the district receives 1393 mm average rains annually. Total Twelve treatments comprised as 100%RDF + Thinning + Plant Protections + Weeding (T1), T1 - 100%RDF (T2), T1 - Plant Protections (T3), T1 - Thinning (T4), T1 - Weeding (T5), T1 - 100%RDF + Plant Protections (T6), T1 - 100%RDF + Thinning (T7), T1 - 100%RDF + Weeding (T8), T1 - Plant Protections + Weeding (T9), T1 -100%RDF + Thinning + Plant Protections (T10), T1 -100%RDF + Thinning + Weeding (T11), T1 - 100%RDF + Thinning + Plant Protections + Weeding (T12), were tested in randomized block design with three replications. Niger was sown @ 5 kg seed/ha in rows 30 cm apart and 10cm plant to plant spacing. As per recommended dose (20:20:00 NPK) of the fertilizer, nitrogen was applied as urea and phosphorus as SSP. Only 50% N & 100% P was applied as basal dose. While remaining 50% N was top dressed after one month of sowing. All other treatments were imposed as per the schedule and methodologies given above to specific plots.

RESULTS AND DISCUSSION

The data presented in Table 1 revealed that the seed yield (kg/ha) was highest (484 kg) in the full package treatment (100%RDF + Thinning + Plant Protections + Weeding) as compare to all other treatments.

Benefit cost ratio refers to monetary gain over each rupee of investment under the particular treatment. The treatment T_3 (T_1 - Thinning) was recorded maximum profitability (3.64) followed by T_1 (3.61), T_4 (3.57) and T_5 (3.52) respectively. These results are in conformity with findings of Yadav *et al.* (2008) and Sharma and Kewat (1994). Thus it was revealed from the present investigation that integration of proper

Table 1. Influence of Niger production under resource constraints

S.No	Treatment	Plant height	Capsule /Plant	Seeds/ Capsules	1000 seed wt	Seed yield (Kg/ha)	Cost of cultiva-tions (Rs./ha)	Gross monetary returns (Kg/ha)	Net returns (Kg/ha)	B:C ratio
1	T_1=FT+TH+PP+WD	15.9	22.1	20.9	4.6	484	8050	29028	20978	3.61
2	T_2=T_1-FT	99.5	20.6	20.1	4.7	350	6700	21018	14318	3.14
3	T_3=T_1-PP	112.7	26.9	20.1	4.5	451	7425	27037	19612	3.64
4	T_4=T_1-TH	117.8	26.4	22.3	4.8	414	6970	24861	17891	3.57
5	T_5=T_1-WD	122.9	28.1	19.7	4.9	331	5650	19861	14211	3.52
6	T_6=T_1-FT+PP	103.0	26.9	20.1	4.8	323	6075	19398	13323	3.19
7	T_7=T_1-FT+TH	101.7	24.1	22.5	4.6	295	5800	17685	11885	3.05
8	T_8=T_1-FT+WD	108.2	23.4	19.3	4.5	264	4700	15810	11110	3.36
9	T_9=T_1-PP+WD	114.1	23.7	18.3	4.5	314	5425	18866	13441	3.48
10	T_{10}=T_1-FT+TH+PP	105.2	25.7	17.3	4.6	206	5175	12338	7163	2.38
11	T_{11}=T_1-FT+TH+WD	105.8	19.4	18.4	4.5	193	3800	11551	7751	3.04
12	T_{12}=T_1-FT+TH+PP+WD	101.7	23.0	20.3	4.6	164	3175	9861	6686	3.11
	SE (m)±					17.61				
	CD 5 %					51.65				
	CV %					9.66				

FT: Fertilizer, TH: Thinning, WD: weeding, PP: Plant protection

The treatment T_3 (T_1 - Thinning) was recorded 451 kg seed yield per ha which was at par with the treatment T_1. However, the treatment T_4 (T_1 - Weeding) was at par with treatment T3 but significantly less than that of T_1. The other treatments *viz.,*T_2, T_5, T_6 and T_9 were at par with each other suggesting that these treatments were not make any significant changes in seed yield (kg/ha) in niger. the minimum seed yield (164 kg/ha) was noticed in the treatment T_{12} as the treatment was devoid of any improved cultivation practices and no any improved biological inputs also. Similar results were also observed by Saini and Dhillon (1985) in groundnut.

The tribal farmer's communities are unable to afford costly agro inputs to grow the niger crop. Hence the present investigation was aimed to minimized the expensive cultivation practices and find out the most appropriate treatment combination. The economic status of each treatment was determined by considering the cost of inputs used and gross returns (Table 1). In niger crop, only gain yield have good market value. But large quantity of straw produced by the crop almost negligible value which is used only as fine fuel for cocking of food and or to some extent thatching material. Therefore, enough scope to decompose it as compost manure and prepare the candy cake for use as fuel. The treatment T_1 which includes all the improved cultivation practices recorded highest gross monetary returns (GMR Rs. 29028 ha^{-1}) followed by T_3 (Rs. 27037) and T_4 (Rs. 24861) which suggest increase in GMR due to integration of all resources used during cultivation whereas increase in net monetary return (NMR) is due to increase in GMR (Patil *et al.,* 2003 and Dwiwedi and Rawat, 2013).

treatment combinations will definitely increased the seed yield (kg/ha) and profitability of niger crop with reducing costly cultivation practices.

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