International Journal of Bio-resource and Stress Management 2016, 7(3):477-479 DOI: HTTPS://DOI.ORG/10.23910/IJBSM/2016.7.3.1512

Short Research Article

Impact of Front Line Demonstration on Production and Productivity of Niger [*Guizotia abyssinica* (L.f.) Cass] in Eastern Ghat High Land zone of Odisha

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Article History

Manuscript No. AR1512
Received in 30th December, 2015
Received in revised form 4th June, 2016
Accepted in final form 7th June, 2016

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Keywords

Niger, front line demonstration, yield, B:C ratio

Abstract

Niger is an edible oilseed crop of tribal farmers of Eastern Ghat High Land zone of Odisha. It supplements to the socio-economic condition and fulfills the requirement of cooking oil of the Indian tribal community. The production and productivity of Niger crop continues to be quite low due to low levels of management in crop production, cultivation in poor marginal lands and repeated use of local cultivars. The yield of Niger can be increased by demonstrating the improved agronomic package of practices *viz.* timely sowing of the crop, proper nutrient management, weed management and need based plant protection measures at the farmer's field under the keen supervision of concern scientists working in the operational area. Keeping in view, the front line demonstration was conducted on Niger crop, under All India Coordinated Research Project on Niger operating at Regional Research and Technology Transfer Station (OUAT), Semiliguda in farmer's field for a consecutive year from 2010–11 to 2012–13. The increase in seed yield of 149%, 124% and 123% with cost benefit ratio of 1.28, 1.61 and 1.38 was obtained from front line demonstration on whole package, improved variety i.e. Utkal Niger-150 and recommended dose of fertilizer 40:40:20 of N:P:K over farmers practices respectively. It can be concluded that FLD programme on niger effectively increase the production and productivity in the specific region of Odisha.

1. Introduction

Niger [*Guizotia abyssinica* (L.f.) Cass] is an important edible oilseed crop of Indian tribal communities, which contains edible oil 38–43%, protein 20% and sugar 12%. As because niger can be grown with minimum agro inputs, it is considered to be a crop for resources poor farmers particularly in developing countries like India. India is the chief producer of niger seeds which ranks second and fourth position in the world for its acreage and annual production respectively (Dalei et al., 2014). It is grown in the states of Madhya Pradesh, Chhattisgarh, Odisha and Maharastra and to a lesser extent in Karnataka, Bihar, Jharkhand, Gujarat and Andhra Pradesh. In Odisha it is grown in an area of 0.86 lakh ha with a production of 0.36 lakh tonnes and productivity of 420 kg ha^{-1} (DOR, 2013). The niger seed has nearly 40% of oil which is used in foods, paints, soft soaps, lighting, lubrication and cosmetics (DOR, 2013). In India about 75% of the harvested seeds are used for oil extraction and the rest is exported for bird food. Roasted or fried seeds are eaten as snacks or used as a condiment. The press cake after oil extraction contains 31–40% protein and is used as cattle feed.

Since, the crop is cultivated by poor tribal farmers in the interiors of villages in scattered fields, the extension agencies could not work efficiently in providing the necessary package of practices to the farmers besides quality seed and required inputs. Thus frontline demonstrations on farmers field are helpful to show the potential of full package of practices and the component technologies has been an efficient method of technology transfer to farmers (DOR, 2013). The major objective of frontline demonstrations (FLDs) is to show the production potential and profitability of improved technologies vis-a-vis farmers practice under real farm situations. The area and production of niger is very low in the state as compare to the national acreage and production. Thus the present frontline demonstrations were undertaken to evaluate the performance of recommended high yielding varieties and package of practices of niger and to compare the yield level of farmers' field and FLD fields.

2. Materials and Methods

Front line demonstration on niger was carried out under All India Coordinated Research Project on Niger operating at Regional Research and Technology Transfer Station (OUAT), Semiliguda, Odisha during *kharif* seasons of 2010–11, 2011–12 and 2012–13 on three components viz. whole package, improved variety and recommended dose of fertilizer in ten villages namely Badagaon, Luluguru, Khotlaput, Malkangiri (2010–11), Masuri, Khamara, Tentuliguda (2011–12), Majhiput, Gelaguda and Kokariguda (2012–13) of Koraput district in Odisha. The demonstration plots are located at 18 °42′ N latitude; 82°30′ E longitude and altitude of 884.0 m above mean sea level with an annual average rainfall of 1567 mm, most of which (90%) was received during monsoon month (June–September). The mean summer and winter temperature varies from 34 °C to 12 °C respectively (Dalei et al., 2014). A total number of sixty five beneficiary farmers were associated under this programme. The demonstration of improved technologies was taken in an area of 0.4 ha of each farmer. In each demonstration one control plot was kept where farmers' practices were carried out. The critical inputs such as seed, fertilizers and pesticides were supplied to the farmers free of cost for demonstration purpose. Adoption of improved technology by the farmers and guidance was ensured through regular visits by the scientists to the demonstration fields. Field days and group meetings were organized at the site of demonstration to provide the opportunities for other farmers to see the benefit of demonstrated technologies. The feedback from the farmers were utilized for further improvement in research and extension programme. Data were collected from the FLDs farmers and analyzed with statistical tools to compare the performance of farmer's field and FLDs field.

3. Results and Discussion

3.1. Whole package

The data in Table 1 revealed that the seed yield was 277.6 kg ha^{-1} in the demonstration plot and 111.3 kg ha^{-1} in farmers practice. The seed yield increase by 149% in the demonstration plot as compared to farmers practice. The increase in seed yield in the demonstration plot is mainly due to adoption of appropriate package of practices. These results are on conformity with the finding of B.M. Kushare and U.G. Sahane (2011). These findings are also in conformity with findings of Patil et al. (2010) in other oil seed crop.

3.2. Improved variety

The data in Table 1 indicated that the seed yield was 253.3 kg ha^{-1} in the demonstration plot and 113.3 kg ha^{-1} in farmers practice. The seed yield increased by 124% in the demonstration plot as compared to farmer practice. The increase in seed yield in demonstration plot might be mostly due to the use of improved variety i.e. Utkal Niger-150 against the local cultivar of niger. These findings corroborate the findings of Meena and Singh (2013) in mustard crop. These findings are also in conformity with Jatav (2010).

3.3. Recommended dose of fertilisers

The data in Table 1 revealed that the seed yield of niger was 256.3 kg ha^{-1} under demonstration plot and 115.0 kg ha^{-1} under farmers practice. The increase in yield of demonstration plot was 123% over farmers practice due to application of recommended dose of fertilizers, with use of HYV of niger (Utkal Niger-150). The results of this study are in conformity with the findings of the study carried out by Meena et al. (2012).

The economic analysis given in Table-2 indicates that in whole package the cost of cultivation is ₹ 6494/- ha^{-1} with net return of ₹ 1742/- and B:C ratio 1.28 under demonstration plot as against cost of cultivation ₹ 2893/- ha^{-1} with net return of ₹ 434/- and B:C Ratio 1.15 under farmers practice. In improved variety the cost of cultivation is ₹ 4687/- ha^{-1} with net return of ₹ 2834/- ha^{-1} and B:C ratio 1.61 under demonstration plot as compared to the cost of cultivation ₹ 2899/- ha^{-1} with net return ₹ 543/- ha^{-1} and B:C ratio 1.20 under farmer practice. In recommended dose of fertilizer the cost of cultivation is ₹ 5643/- ha^{-1} with net return of ₹ 2052/- ha^{-1} and B:C ratio 1.38 whereas the cost of cultivation is ₹ 2893/- ha^{-1} with net return of ₹ 518/- ha^{-1} and B:C ratio 1.21 under farmers practice. These results are in conformity with the findings of Kushore et al. (2011).

Table 1: Performance of improved technology on the productivity potentials of niger under Eastern Ghat High Land zone situations (mean data of 2010–12)

Components of technology	No. of Farmers	Total area (ha)	Yield (kg ha^{-1})		% increase in yield over farmers practice
			FLD	FP	
Whole package	10	4.0	277.6	111.3	149
Improved variety	5	2.0	253.3	113.3	124
Recommended dose of fertilizer	5	2.0	256.3	115.0	123

Table 2: Economics of FLD on niger with respect to whole package, improved technology and recommended dose of fertilizers (mean data of 2010–12)

Technology/ Practice	Cost of cultivation (₹ ha^{-1})	Gross Monetary Return (₹ ha^{-1})	Net Monetary Return (₹ ha^{-1})	B:C Ratio
Whole package				
Improved technology	6494	8235	1742	1.28
Farmers practice	2893	3347	434	1.15
Improved variety				
Improved technology	4687	7521	2834	1.61
Farmers practice	2899	3442	543	1.20
Recommended dose of fertilizer				
Improved technology	5643	6028	2052	1.38
Farmers practice	2893	3461	568	1.21

4. Conclusion

Front line demonstration on improved package of practices of niger crop increase the yield potential up to a great extent and the impact of FLD programme on the same crop effectively increase the production and productivity of niger in the specific region of eastern ghat high land zone of Odisha which provide a better socio-economic security to the niger growing farmers of the region.

5. Acknowledgment

We are greatly acknowledged the Dean of Research, Directorate of Research, OUAT, Bhubaneswar, for providing the infrastructure facilities to carry out the research work. We are also grateful to the Project Coordinator, All India Coordinated Research Project on Sesame and Niger (ICAR), JNKVV Campus, Jabalpur for providing the financial support to carry out the research work.

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