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Research Article

Effect of supplemental sources and chemical nitrogen on raising *Jatropha* nursery (*Jatropha curcas*)

DHIRAJ MOHAN AND C.S. DHANAI

ABSTRACT : The nursery of *Jatropha* was raised at farmer's field in poly bags using two seeds shown in each poly bag. 200 poly bags were filled with the soil mixture as per the treatments for seedling raising. Significantly maximum number of poly bags *i.e.*138 with germinated seeds were found with the APSA applied with soil at the time of seed sowing followed by vermin compost applied in soil, while, minimum 80 poly bags were found when simple soil was used to germinate seedlings.

KEY WORDS : Supplemental sources, Nitrogen, *Jatropha*

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INTRODUCTION

Jatropha grows readily from seed which germinate in around 10 days, or from stem cuttings. Growth is rapid. The plant may reach one metre and flower within five months under good conditions (Heller, 1996). The growth is sympodial, with terminal flower inflorescences and lateral branching, eventually reaching a height of 3 to 5 metres under good conditions. It generally takes four to five years to reach maturity (Henning, 2008a).

Bio-fertilizers are new generation cost effective and renewable sources of plant nutrients to supplement chemical fertilizers.The role of bio-fertilizers in agricultural production assumes greater importance, particularly in the present context of very high cost of chemical fertilizers. Though bio-fertilizers cannot totally replace the conventional chemical fertilizers, upto 20-25 per cent of nitrogen requirement can be met through bio-fertilizers. This situation coupled with cost advantage provides vast scope for promotion of alternative source of nitrogen particularly bio-fertilizer to different crops.

Pre-cultivation in nurseries, sown in either nursery beds or containers, enables better germination and survival of seedlings through control over moisture, shade, soil, weeds, pests and diseases. Seeds should be sown three months before the start of the rains in polyethylene bags or tubes. The bags should be long enough to avoid unduly restricting taproot growth.

Sowing into nursery beds with suitably prepared free-draining and fertilized soil is a cheaper option that avoids expenditure on bags and reduces transport and labour cost at transplanting. The downside is the greater care needed to avoid damaging the roots and preventing the plants from drying out during the lifting and transplanting operation. Direct seeding in the field should take place at the beginning of the rainy season when the rain is assured. Timing is crucial for success.

MEMBERS OF RESEARCH FORUM

Address of the Correspondence :
DHIRAJ MOHAN, Department of Agroforestry, Institute of Agriculture Science, Bundelkhand University, JHANSI (U.P.) INDIA

Address of the Coopted Authors :
C.S. DHANAI, Department of Agroforestry, Institute of Agriculture Science, Bundelkhand University, JHANSI (U.P.) INDIA

Seed stored and dried for at least one month should be used to overcome seed dormancy. The seeds should be planted 4–6 cm deep, with two per station and later thinned to one. Keeping above facts in mind an investigation was held in 2007-08 at farmers' field in Etmadpur of Agra district in U.P. to analyse the effect of supplemental sources and chemical nitrogen on raising jatropha nursery.

EXPERIMENTAL METHODS

Seedlings were raised in poly bags. The size of each polythene bag was 20 x10 cm and filled with (i) Simple soil + Vermicompost + *jatropha* seeds, (ii) Simple soil + FYM + *jatropha* seeds, (iii) Simple soil + APSA + *jatropha* seeds and (iv) Simple soil + Urea half dose + *jatropha* seeds. Two seeds of *jatropha* were sown in each poly bag in the month of September, 2007

EXPERIMENTAL RESULTS AND ANALYSIS

The results obtained from the present study have been discussed in detail under following heads :

Seed germination:

The data presented in Table 1 clearly indicates that various treatments as applied in this experiment affected the germination of *Jatropha curcas* significantly. Table clearly shows that significantly maximum number of poly bags *i.e.*138 with germinated seeds were found with the APSA applied with soil at the time of seed sowing followed by vermicompost applied in soil, while, minimum 80 poly bags were found when simple soil was used to germinate seedlings.

Applications of urea FD in soil and urea HD in soil were statistically at par with the application of FYM in soil in regard of seed germination. Table also shows that maximum poly

Table 1: Seed germination per poly bag as affected by various treatments

Treatments	Total no. of polythene bags used for germination	No. of polythene bag without germination	Total No. of polythene bags with seedlings	No. of polythene bags with long seedling	No. of polythene bags with short seedlings
Simple soil	200(100.00)	120(60.00)	80(40.00)	68(34.00)	12(6.00)
Soil+vermicompost	200(100.00)	70(35.00)	130(65.00)	125(62.50)	5(2.50)
Soil + FYM	200(100.00)	80(40.00)	124(62.00)	110(55.00)	14(7.00)
Soil + APSA	200(100.00)	62(31.00)	138(69.00)	86(43.00)	52(26.00)
Urea FD+ soil	200(100.00)	79(39.50)	121(60.50)	94(47.00)	27(13.50)
Urea HD + soil	200(100.00)	77(38.50)	123(61.50)	97(48.50)	26(13.00)
S.E. ±		2.314	1.826	1.781	1.413
C.D. at 5%		7.406	5.844	5.700	4.523

Figures in parenthesis indicate percentage, NS=Non- significant

Table 2: Seedling count per poly bag as affected by various treatments **(2 seeds in each poly bag)**

Treatments	No. of polythene bags with seed germination	Total no. of seedlings germinated	No. of polythene bags with double seedlings	No. of polythene bags with single seeding
			Poly bags/seedlings	Poly bags/seedlings
Simple soil	80 (100.00)	95 (100.00)	15/30 (18.75/31.58)	65/65 (81.25/68.42)
Soil+vermicompost	130 (100.00)	170 (100.00)	40/80 (30.77/47.06)	90/90 (69.23/52.94)
Soil + FYM	124 (100.00)	163 (100.00)	39/78 (29.17/47.75)	85/85 (70.83/52.25)
Soil + APSA	138 (100.00)	194 (100.00)	56/112 (40.58/57.73)	82/82 (59.42/42.27)
Urea FD+ soil	121(100.00)	161 (100.00)	40/80 (26.67/49.69)	81/81 (73.33/50.31)
Urea HD + soil	123 (100.00)	177 (100.00)	54/108 (36.00/61.02)	69/69 (64.00/38.98)
S.E. ±	1.826	1.793	1.504	2.274
C.D. at 5%	5.844	5.739	4.814	7.278

Figures in parenthesis indicate percentage

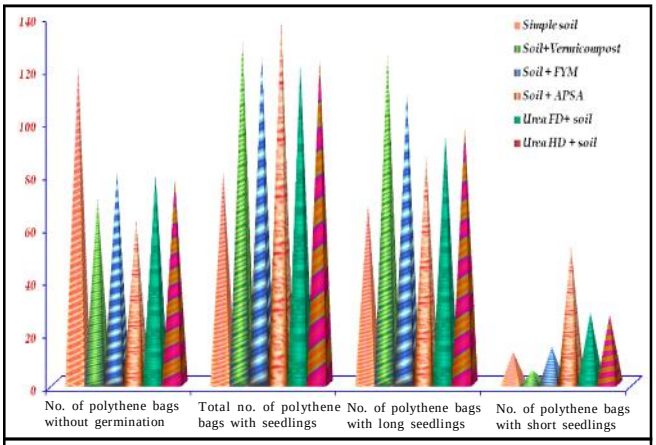

Fig. 1 : Seed germination per poly bag as affected by various treatments

bags *i.e.* 125 with long seedling were found with vermicompost, while minimum number of poly bags in this regard were found with simple soil and maximum number of poly bags with short seedling were found with the application of APSA(52) and minimum (5) were found with vermicompost application in soil.

Seedling count:

Seedlings were counted for all treatments applied in this study. For this purpose poly bags were counted with germinated double seedlings and single seedling.

The data related in the regard of seedling count are presented in Table 2. The data presented in Table 2 show that maximum number of seedlings were counted 194 (48.50 % of the total seeds sown) with the application of APSA in soil followed by urea HD mixed in soil (177 *i.e.* 44.25 % of the total seeds sown). Minimum seeds *i.e.* 95 (23.75 % of total seeds) were germinated in simple soil. The difference in germination count was found to be statistically significant at 5 per cent level of significance.

Table also shows that significantly maximum number (56) of poly bags with two seedlings were noted with the application of APSA in soil followed by the application of urea HD mixed with soil (*i.e.* 54 poly bags). Number of poly bags with two seedlings germinated was statistically at par with application of vermicompost, FYM and urea FD, however, number was significantly higher than simple soil. Significantly higher number of poly bags with single seedling was found with the application of vermicompost in the soil, while minimum number was found with simple soil.

Conclusion:

On the above facts it can be concluded that soil treated with ammonificated supplement APSA followed by vermicompost enriched soil is a best media to raise *Jatropha* nursery.

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