Indian Journal of Agriculture and Allied Sciences
A Refereed Research Journal

ISSN 2395-1109
e-ISSN 2455-9709
Volume: 2, No.: 4, Year: 2016

www.mrfsw.org

Received: 13.10.2016, Accepted: 221216

STUDIES ON CROP ESTABLISHMENT METHODS FOR RAINFED LINSEED (*Linum usitatissimum* L.)

R.R. Nikam, P.R. Manapure, V.K. Biradar, A.A. Choudhary and N.H. Sable

Linseed Agronomist, All India Coordinated Research Project on Oilseeds (Linseed, Sesame & Mustard), College of Agriculture, Nagpur (M.S.) 440001, Phone (O):0712-2541245 Mobile No.: +91-9890451566, E-mail: rrnikam2013@gmail.com, Corresponding Author: R.R. Nikam

Abstract: *A field experiment was conducted to find out suitable method of crop establishment for rainfed linseed in split plot design at Agriculture College Research Farm, Nagpur (Maharashtra, India) during rabi seasons of 2012-13, 2013-14 and 2014-15. There were three crop establishment methods viz., dry seeding with planking followed by irrigation, dry seeding without planking followed by irrigation and seeding after presowing irrigation and four varieties (NL-97, PKV NL-260, Padmini and T-397) studied. Pooled results indicated that dry seeding with planking followed by irrigation recorded highest yield (735 kg ha^{-1}), net monetary returns (26500 Rs. ha^{-1}), B:C ratio(2.82) and soil moisture content (at 0-30 and 30-45 cm depth). Linseed variety PKV NL-260 recorded significantly maximum seed yield (828 kg ha^{-1}), net monetary returns (27831 Rs. ha^{-1}) and B:C ratio 3.13; followed by variety Padmini.*

Key words: *Crop establishment methods, linseed, soil moisture content.*

Introduction: Linseed (*Linum usitatissimum* L) is under cultivation since pre-historic times in the world. Globally Linseed is an important oil seed crop grown for both seed and fibre. Linseed is mainly grown in rabi season. Of late, its value addition has paved the way for its diversified uses in neutraceutical and medicinal purposes. It is highly nutritious laden with complete protein (all 8 essential amino acids) omega-3 fatty acid, complex carbohydrates, vitamins & minerals. Linseed oil is an excellent dyeing oil used in manufacturing paints, varnishes, soaps, printing inks, oil, cloth and linoleum tiles. Linseed is also used in making paper sand plastics. Globally, among the oilseeds linseed or flax is one of the oldest oilseed crops grown widely in Asia, America and Europe for oil, fibre and seed purpose. India has fourth largest vegetable oil economy in the world after USA, China and Brazil. Oilseeds are the second largest agricultural commodity after cereals sharing 14% of gross cropped area, 6% of gross national product and 10% of the agriculture product value in the country. The demand, supply and gap of edible oil in India[1] are 18.94, 10.08 and 8.86 (47%) million tons respectively. Round the globe linseed crop occupies[2] an area of 28.55 lakh ha yielding out 15.46 lakh tones having an average productivity of 541 kg ha^{-1}. In Maharashtra State it is grown on 0.24 lakh ha yielding 0.50 lakh tones with productivity 208 kg ha^{-1}. Rainfed cropping on residual moisture is one the main reason of low productivity. Moisture conservation is the key for successful cultivation of linseed under rainfed condition. Planking is major tillage operation for conserving soil moisture in the soil. Present studies was undertaken to find out suitable method of crop establishment method for linseed under rainfed condition.

Materials and Methods

A field experiment was conducted in split plot design with three replications to study the effect of crop establishment methods on yield of rainfed linseed at Linseed Research Farm, College of Agriculture, Nagpur, Maharashtra (India) during *rabi* seasons of 2012-13, 2013-14 and 2014-15. The experimental field soil was clay loam having P^H of 7.6, organic carbon: 0.65 g kg^{-1}, medium in available nitrogen (247.4 kg ha^{-1}), low in phosphorus (20.52 kg ha^{-1}) and high in available Potassium (480.2 kg ha^{-1}). The

experiment was comprised of twelve treatment (Three main and four sub factors) combinations. Main factor *i.e.* Seed establishment methods (S) are dry seeding with planking followed by irrigation (M_1), dry seeding without planking followed by irrigation (M_2) and seeding after pre sowing irrigation (M_3). And sub factors are varieties i.e. NL-97 (V_1), PKV NL-260 (V_2), Padmini (V_3) and T-397 (V_4). The experiment was sown in last week of October. Dry seeding was done with the help of seed drill followed by irrigation. Seed rate of 25 kg ha^{-1} was used. For protecting the crop from seed and soil borne diseases seed was treated with Thiram @ 3 g kg^{-1} seed. All recommended package of practices were followed. Planking was done with the help of planker after sowing (M_1). In, seeding after pre sowing irrigation (M_3) sowing was done after presowing irrigation. Standard procedures were adopted for recording the data on various growth and yield parameters. Data collected were statistically analyzed[3].

Results and Discussion

Growth parameters: The data on ancillary characters (Table 1) *viz.*, plant height, number of branches plant^{-1}, number of capsules plant^{-1} and test weight, recorded maximum in dry seeding with planking followed by irrigation (M_1) followed by seeding after pre sowing irrigation (M_3) crop establishment methods.

Yield and Economics: The data on the yield of linseed in different crop establishment methods (Table 2) revealed that dry seeding with planking followed by irrigation (M_1) recorded maximum seed yield (753 kg ha^{-1}), net monetary return (Rs 26500 ha^{-1}) and B:C ratio 2.82 followed by seeding after pre sowing irrigation (M_3). Linseed variety PKV NL-260 recorded significantly maximum seed yield (828 kg ha^{-1}), net monetary return (Rs 27831 ha^{-1}) and B:C ratio 3.11. Variety Padmini was at par with PKV NL -260. Significant differences among flax genotypes reported by earlier workers[4,5] are in conformity with the present findings.

Soil Moisture Content: The data on the mean soil moisture content (%) in different crop establishment methods (Table 3) revealed that dry seeding with planking followed by irrigation (M_1) recorded maximum soil moisture content 22.0% and 16.6% at 60 DAS and at harvest at 30-45 cm depth, respectively. Earlier reports were not observed on these aspects.

Table 1. Growth attributes as influenced by various treatments (Mean of thee years)

Tr. No.	Treatments	Plant stand plot^{-1}	Plant height (cm)	No. of branches plant^{-1}	No. of capsules plant^{-1}	Test wt. (g)
A) Main : Seed establishment methods (S)						
S_1	Dry seeding with planking followed by irrigation	986	56.3	4.7	45.3	7.6
S_2	Dry seeding without planking followed by irrigation	975	54.3	4.2	40.6	7.3
S_3	Seeding after pre sowing irrigation	982	54.8	4.5	43.3	7.6
B) Sub : Varieties (V)						
V_1	NL-97	989	60.2	4.0	39.9	7.2
V_2	PKV NL-260	983	56.3	4.5	47.2	8.2
V_3	Padmini	970	49.1	5.1	45.0	7.6
V_4	T-397	988	54.9	4.3	38.8	7.0

Table 2. Seed yield (kg ha^{-1}) and economics (Rs ha^{-1}) as influenced by various treatments (Pooled data)

Tr. No.	Treatments	Seed yield				Gross monitory returns (GMR)				Net monitory returns (NMR)				B:C ratio			
		2012-13	2013-14	2014-15	Pooled Mean	2012-13	2013-14	2014-15	Pooled Mean	2012-13	2013-14	2014-15	Pooled Mean	2012-13	2013-14	2014-15	Pooled Mean
A) Main : Seed establishment methods (S)																	
S_1	Dry seeding with planking followed by irrigation	710	780	770	753	30530	39000	42350	37293	25091	26500	27910	26500	2.42	3.12	2.93	2.82
S_2	Dry seeding without planking followed by irrigation	684	725	743	717	29410	36250	40865	35508	17255	24150	26925	22776	2.41	2.99	2.93	2.77
S_3	Seeding after pre sowing irrigation	671	744	763	726	28855	37200	41965	36006	16270	24700	27525	22831	2.29	2.97	2.90	2.82
	SE (m) ±	20.20	19.8	23.7	18.6	869	989	1320	326.6	869	989	1320	326.6	-	-	-	-
	C.D. at 5%	N.S.	N.S.	N.S	N.S	N.S.	3411	N.S.	N.S.	N.S.	3411	N.S.	N.S.	-	-	-	-
	C.V. %	11.70	10.2	12.7	-	-	-	-	-	-	-	-	-	-	-	-	-
B) Sub : Varieties (V)																	
V_1	NL-97	684	733	718	711	29410	36650	39490	35183	16970	24255	25125	22116	2.36	2.96	2.76	2.69
V_2	PKV NL-260	814	855	815	828	35000	42750	44825	40858	22560	30385	30550	27831	2.81	3.46	3.14	3.13
V_3	Padmini	658	725	807	730	28290	36250	44385	36308	15850	23885	30110	23281	2.27	2.93	3.10	2.76
V_4	T-397	597	683	695	658	25670	34150	38225	32681	13230	21785	23950	19655	2.06	2.76	2.67	2.49

SE (m) ±	6.0	32.0	34.0	12.5	258	1612	1910	590.8	258	1612	1910	590.8	-	-	-	-
C.D. at 5%	17.4	93.0	98.6	36.3	750	4646	5542	1769.1	750	4646	5542	1769.1	-	-	-	-
C.V. %	10.5	14.9	15.5	-	-	-	-	-	-	-	-	-	-	-	-	-
C) Interaction (S x V)																
SE (m) ±	18.0	55.9	58.9	30.8	776.0	2792	3309	654.1	776.0	2792	3309	654.1	-	-	-	-
C.D. at 5%	N.S.	N. S.	N.S.	N.S.	N.S.	N. S.	N.S.	N.S.	N.S.	N. S.	N.S.	N.S.	-	-	-	-

Table 3. Mean moisture content (%) in various crop establishment methods at 60 DAS and at harvest (Pooled data)

Sr. No.	Crop establishment methods	60 DAS		Harvest	
		0–30 cm	30–45 cm	0–30 cm	30–45 cm
1	Dry seeding with planking followed by irrigation (M_1)	20.6	22.0	16.2	16.6
2	Dry seeding without planking followed by irrigation (M_2)	19.4	20.0	15.4	15.6
3	Seeding after pre sowing irrigation (M_3)	20.4	21.4	16.0	16.2

Conclusion: Based on above findings it was concluded that dry seeding with planking followed by irrigation produce higher values of growth (plant height, No. of branches plant^{-1}), yield attributes (1000 seed weight, No. of capsules plant^{-1}) and seed yield of linseed accompanying by highest net profit and B:C ratio among different varieties PKV NL-260 showed good plant stand, yield attributes and maximum seed yield of linseed as well net profit and B:C ratio. Also, recorded maximum soil moisture content at 0-30 and 30-45 cm.

References

1. Anonymous. (2015). Pocket book of agricultural statistics. Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India. p. 39.
2. Anonymous. (2015). Annual Report Linseed, 2015-2016 ICAR-Project Coordinating Unit (Linseed), C.S.A.U.A.& T. Campus, Kanpur (U.P.) p.236.
3. Gomez, K.A. and Gomez, A.A. (1984). Statistical procedures for Agriculture Research. 2nd edition. John Willey and Sons. New York.
4. Mirshekari, M., Amriti, R., Nezhad, H.I., Noori, S.A.S. and Zandvakili, O.R. (2012). Effect of planting date and water deficit on quantitative and qualitative traits of flax seed. *American Eurasian J. Agril. and Environ. Sci.*, 12: 901-913.
5. Abd El-Mohsen, A.A., Abdallah, A.M., Mahmoud, G.O. (2013). Optimizing and describing the influence of planting dates and seeding rates on flax cultivars under middle Egypt region conditions. *World Essays J.*1: 28-39.