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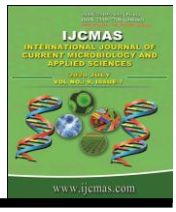

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Performance of Early Maturing Lentil Cultivars in New Alluvial Zone of West Bengal

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A B S T R A C T

A field experiment was conducted to assess sixteen lentil cultivars in terms of phenology, yield attributing characters and yield in randomized block design at district seed farm, AB block, BCKV, West Bengal, during *rabi* seasons of 2015-16 and 2016-17. The results of two the years experiment revealed that phenological characteristics, yield attributing characters and yield varied significantly during both the years of experimentation. Phenological development (flower initiation, 50% flowering, 100% flowering and maturity) was fastest with cultivar ILL 8006. Other cultivars like ILL 10805, ILL 10971, ILL 10921 ILL 10803, ILL 10961 and ILL 10951 were also early maturing type. Maximum seed yield was noted with ILL 10803 (1729 kg ha^{-1}) followed by ILL 10805 (1665 kg ha^{-1}) and ILL 10951 (1623 kg ha^{-1}) by attributing higher number of pods per plant and test weight, whereas, lowest was recorded with ILL 8006 (1114 kg ha^{-1}). Cultivar ILL 10803, ILL 10805 and ILL 10951 has a promising potential in New Alluvial Zone of West Bengal not only due to their higher yield potential but also their early maturing habit.

Introduction

Today's agriculture, specifically the rainfed agriculture is facing an immense challenge due to delayed monsoon, uneven distribution of rainfall and ultimately water crisis in critical growth period of crop. These monsoon vagaries delayed the sowing of *kharif* rice, the mostly grown Indian crop. Coupled with delayed sowing, long duration rice varieties obstruct *rabi* sowing and promotes rice fallow area due to various biotic and abiotic stresses (Ali and Kumar, 2009 and Ghosh *et al*., 2019). In addition to this, cereal based cropping system deteriorates soil health by heavy withdrawal of nutrients. Incorporation of a *rabi* pulse crop in rice-based cropping system would be conveniento serve the

demand of increasing the cropping intensity and restoration of soil fertility (Ali, 2014). In conjunction with a lot of advantages in human and soil health, lentil can thrive well in marginal environment with residual soil moisture of harvested paddy field (Nalia *et al.*, 2019). But sowing of existing long duration lentil varieties can expose the crop in severe terminal heat and drought stress during its maturity leading to poor seed yield and quality. Identification and adaptation of short duration varieties with the ability to escape the terminal stresses is a key to intensify the rice fallow area effectively. Considering all these facts, an attempt has been made to evaluate the suitable genotype of lentil among the sixteen in terms of phenological development and yield in New Alluvial Zone of West Bengal.

Materials and Methods

The experiment was carried out in two consecutive *rabi* seasons of 2015-16 and 2016-17 at the District Seed Farm, AB block, Kalyani, Bidhan Chandra Krishi Viswavidyalaya, Nadia, West Bengal, India. The experimental soil was sandy loam in texture with pH 7.3, EC 0.18 dS m^{-1}, organic carbon 0.56%, available N 231.28 kg ha^{-1},P_2O_5 34.51 kg ha^{-1}, and available K_2O 188.83 kg ha^{-1}. The experiment was laid out in a factorial randomized block design replicated thrice comprising sixteen lentil genotypes (ILL 8006, ILL10951, ILL 10971, ILL 10803, ILL 10971, ILL 10802, ILL 10893, ILL 10921, ILL 10805, ILL 10803, ILL 10961, ILL 10922, ILL 10897, ILL 10893, ILL 10921 and ILL 10951). The genotypes were supplied by ICARDA, Rabat, Morocco under BCKV-ICARDA lentil work place to test under rice fallows of West Bengal. Seeds were sown maintaining a row distance of 25 cm in line after harvesting of monsoon rice.

The recommended dose of fertilizers i.e. $N:P_2O_5:K_2O$:: 20:40:40 kg ha^{-1} were applied at the time of land preparation. The data of phenology, yield attribute and yield were recorded from randomly selected five plants of each plot.

Results and Discussion

Lentil cultivars differ significantly in terms of phenological development like flower initiation, 50% flowering, 100% flowering and days to maturity (Table 1). The cultivars came at their reproductive stages in between 42 to 68 DAS in 2015-16 and 47 to 70 DAS in 2016-17.

According to the pooled result first flower was appeared in cultivar ILL 8006 (44 DAS). Not only flower initiation but also 50% flowering (56 DAS), 100% flowering (64 DAS) and maturity (91 DAS) was earliest with ILL 8006.All other cultivars except ILL 10951 (65 DAS), ILL 10897 (66 DAS) and ILL 10921(69 DAS) succeeded to their reproductive stage within 60 DAS and consequently matures in 114 DAS. ILL 10951, ILL 10897 and ILL 10921 took 121, 124 and 128 DAS respectively to mature.

Due to variation in genotypic character and to a lesser extent differential nutrient and water mining from soil leads to alteration in yield and yield attributing characters. Number of primary branches ranged between 2.4 to 3.8 and 2.1 to 4.4 in 2015-16 and 2016-17 respectively (Table 2). Pooled data over two years recorded highest number of branches per plant with ILL 10803 (3.7). Pods per plant varied significantly among the cultivars with maximum in ILL 10951 for both the years of experiment (112.2 and 101.9 in 2015-16 and 2016-17 respectively).

Table.1 Phonological characteristics of lentil genotypes

Genotypes	Days to first flower initiation			Days to 50% flowering			Days to 100% flowering			Days to maturity		
	2015-16	2016-17	Pooled	2015-16	2016-17	Pooled	2015-16	2016-17	Pooled	2015-16	2016-17	Pooled
ILL 8006	42	47	44	54	59	56	62	66	64	90	93	91
ILL10951	49	47	48	58	55	56	68	62	65	108	101	104
ILL 10971	52	51	51	61	60	60	70	71	71	100	101	100
ILL 10803	59	50	54	66	64	65	75	72	73	104	100	102
ILL 10971	56	59	57	64	69	66	74	78	76	106	107	106
ILL 10802	50	56	53	59	65	62	70	79	75	110	105	107
ILL 10893	64	62	63	75	73	74	85	84	84	113	112	112
ILL 10921	55	52	53	65	64	64	75	71	73	103	99	101
ILL 10805	62	68	65	73	78	75	83	87	85	112	116	114
ILL 10803	61	64	63	70	73	71	81	80	80	110	119	114
ILL 10961	52	55	53	61	66	63	71	75	73	102	104	103
ILL 10922	50	55	53	58	68	63	67	77	72	116	105	110
ILL 10897	66	67	66	74	80	77	85	91	88	128	119	124
ILL 10893	63	58	60	73	69	71	84	79	81	113	107	110
ILL 10921	67	70	69	78	82	80	90	95	92	129	128	128
ILL 10951	68	62	65	79	71	75	91	82	86	126	117	121
S. Em (±)	2.12	2.37	1.31	2.69	3.04	1.64	3.11	3.44	2.14	4.84	3.18	3.29
CD (p=0.05)	6.36	7.09	3.94	8.06	9.13	4.92	9.33	10.31	6.41	14.52	9.53	9.76

Table.2 Yield and yield attributing characters of lentil genotypes

Genotypes	Number of primary branches per plant			Number of pods per plant			1000 seeds weight (g)			Yield (kg/ha)		
	2015-16	2016-17	Pooled	2015-16	2016-17	Pooled	2015-16	2016-17	Pooled	2015-16	2016-17	Pooled
ILL 8006	2.8	2.3	3.0	61.4	51.3	56.3	19.40	21.30	20.35	1099	1130	1114
ILL10951	2.8	2.6	3.2	53.7	69.1	61.4	19.55	26.50	23.02	1178	1261	1220
ILL 10971	2.4	3	2.8	63	70.0	66.5	25.80	30.30	28.05	1405	1466	1436
ILL 10803	3.4	3.4	3.7	92.3	74.9	83.6	23.25	19.60	21.42	1433	1451	1442
ILL 10971	2.9	4.3	3.3	97	77.0	87.0	22.40	23.30	22.85	1522	1563	1542
ILL 10802	3.0	2.5	2.9	65.8	84.8	75.3	22.65	35.40	29.02	1524	1609	1566
ILL 10893	2.9	3.2	2.9	71	45.4	58.2	29.10	29.40	29.25	1542	1481	1511
ILL 10921	3.0	4.4	3.4	101.4	89.6	95.5	29.00	30.70	29.85	1490	1431	1461
ILL 10805	2.7	3.2	2.8	80.9	82.6	81.7	27.25	32.20	29.72	1626	1704	1665
ILL 10803	3.2	2.9	3.1	88.25	85.1	86.7	30.70	31.40	31.05	1683	1776	1729
ILL 10961	3.2	3.6	3.1	85.7	87.1	86.4	27.85	29.00	28.42	1365	1327	1346
ILL 10922	3.6	3.7	3.4	69.6	64.3	66.9	20.25	24.40	22.32	1146	1214	1180
ILL 10897	3.8	2.5	3.2	64.8	61.5	63.2	27.85	30.50	29.17	1524	1595	1559
ILL 10893	2.9	2.7	3.0	64.1	58.7	61.4	22.45	23.60	23.02	1355	1222	1288
ILL 10921	3.5	3.1	3.2	96.1	88.6	92.3	27.70	28.40	28.05	1357	1286	1321
ILL 10951	2.6	4.3	3.3	112.2	101.9	107.0	28.20	31.10	29.65	1563	1684	1623
S. Em (±)	0.46	0.51	0.36	6.28	7.89	5.64	2.40	1.90	2.7	109.55	83.80	88.50
CD (p=0.05)	NS	NS	NS	18.82	23.67	16.90	NS	NS	NS	328.44	251.23	265.34

As per pooled analysis, ILL 10921 (95.5), ILL 10921 (92.3), ILL 10971 (87.0), ILL 10803 (86.7), ILL 10803 (83.6) and ILL 10805 (81.7) also registered significantly good number of pods per plant. Maximum test weight was found with ILL 10803 (31.05g) followed by ILL 10921 (29.85g) due to their bold seeded character (macrosperma type seed), whereas lowest test weight was observed in ILL 8006 (20.35g). Productivity of these sixteen cultivars differed to the tune of 1146 to 1683 kg ha^{-1} during 2015-16 and 1130 to 1776 kg ha^{-1} during 2016-17. Based on pooled analysis, maximum seed yield was recorded with ILL 10803 (1729 kg ha^{-1}) followed by ILL 10805 (1665 kg ha^{-1}), ILL 10951 (1623 kg ha^{-1}) and lowest was recorded with ILL 8006 (1114 kg ha^{-1}).

From the result we noticed that the lentil cultivars differed significantly in terms of flower initiation, 50% flowering, 100% flowering and days to maturity because, being a non-synchronous crop it doesn't possess any marked boundary between vegetative and reproductive stage (Reja*et al.*, 2017). The result of the investigation are also in conformity with Roy *et al.*, 2009, who recorded a variation in test weight among four lentil cultivars grown under West Bengal condition. Superiority of ILL 10803, ILL 10805 and ILL 10951 in terms of seed yield can be attributed to their good number of pods per plant and test weight which substantiated to the findings of Maurya and Rathi (2000), Layek *et al.*, (2012) and Layek *et al.*, (2014). Considering the most important factor of yield and the phenology of these sixteen cultivars it can be concluded that ILL 10803, ILL 10805 and ILL 10951 showed promising potential in the rice fallow areas of New Alluvial Zone of West Bengal.

References

Ali, M., Kumar, S.2009.Major technological advances in pulses- Indian scenario. In: Milestones in Food Legumes Research, (Eds. Masood Ali and Shiv Kumar). Indian Institute of Pulses Research, Kanpur, India, 20.

Ali, M.2014.Improving productivity of pulses in rice fallows. Indian Farming. 63(12):17-19.

Reja, M.H., Mandi, S.K., Kundu, M.K., Nath, R., Goswami, S.B. 2017. Performance of different lentil varieties in new alluvial zone of West Bengal. The Bioscan. 12(3):1673- 1676.

Maurya, B.M. and Rathi, K.S. 2000. Growth and development of soybean as influenced by intercropping with pigeonpea and phosphorus level. Gujarat Agricultural University Research Journal. 26(1): 1-5.

Layek, J., Shivakumar, B.G., Rana, D.S., Munda, S. and Lakshman, K. 2012. Growth pattern, physiological indices and productivity of different soybean (Glycine max) based intercrops as influenced by nitrogen nutrition. Indian Journal of Agronomy. 57(4): 349-356.

Layek, J.A., Chowdhury, S.A., Ramkrushna, G.I., Das, A. 2014.Evaluation of different lentil cultivars in lowland rice fallow under no-till system for enhancing cropping intensity and productivity. Indian Journal of Hill Farming.27(2): 4-9.

Ghosh, A., Reja, M.H., Nalia, A., Mukherjee, B., Nath, R. and Sarker, A. 2019. Evaluation of extra early lentil varieties in rice-fallow areas of West Bengal. The Pharma Innovation Journal. 8(4): 312-314.

Nalia, A., Reja, M.H., Ghosh, A., Mukherjee, B., Nath, R., Dixit, H.K. and Sarkar, A. 2019.Performance of short duration lentil genotypes in the rice fallows of new alluvial zone of West Bengal. Journal of Food legumes. 32(2): 75-7.

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