Screening of promising biofortified short duration lentil cultivars for conservation agriculture in North-west Bangladesh

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Introduction

In Bangladesh, lentil (*Lens culinaris* Medikus subsp.culinaris) production was 0.26 million tons from 0.20 million hectares (average yield 1.3 t ha^{-1}) which is 29 % of the total national pulse production (AIS, 2016). Globally, it is cultivated as a rainfed crop on 3.85 million hectares (m ha) with a yield of only 1.1 t ha^{-1} (Erskine *et al.,* 2011). In rice based cropping patterns, after harvesting of *t.aman* rice maximum land remains fallow for about 90 days until establishment of the *boro* rice. Presently, this rice land cannot be used to grow lentil since varieties have 110-115 days duration (AIS, 2017). Promising biofortified short duration (83-90 days) lentil varieties can play an important role to expand its cultivation through establishing lentil by relay sowing into *t.aman* rice and harvesting before *boro* rice. The relay cultivation method involves no tillage and residue retention, and establishes the lentil before *t.aman* rice is harvested. The selection of promising biofortified short duration lentil genotypes under relay cultivation method is therefore important to accommodate in fallow between *t.aman* and boro rice.

Materials and Methods

An experiment was conducted at Pulse Research Centre (PRC), BARI, Ishurdi, Pabna to investigate the selection of promising biofortified short duration lentil genotypes under relay and conventional establishment methods. The experiment included 28 lentil genotypes including BARI Masur 6 as the check variety but only the results for two promising short duration lines are presented. The experiment was laid out in a split-plot design with three replications. Lentil as a relay crop was sown on 25 October 2014 and harvested on 25 January, while lentil sown by the conventional method was sown on 8 November 2014 and harvested on 31 January 2015. The unit plot size was 4 x3 m. No fungicide and insecticide were used in this experiment. One hand weeding was used at 25-30 days after sowing. Statistical analysis was done by using MSTAT-C program.

Results and Discussions

Considering days to maturity, two promising short duration genotypes were compared to the long duration recommended cultivar, BARI Masur 6. Plant population, plant height, pods/plant and seed yield showed significant different due to different lines and establishment method (Table 1). In case of yield, there were significant different between short duration genotypes LRIL 22-15, LRIL 22-70 and BARI Masur 6. The yield of lentil under conventional establishment along with BARI Masur 6 were higher than under relay establishment or by advanced lines. However, conventional establishment and BARI Masur 6 while producing higher yield can't be harvested without delaying the planting of *boro* rice. However, LRIL 22-15 and LRIL 22-70 were promising short duration genotypes which can easily fit within the *t.aman-lentil-boro* rice cropping pattern under relay establishment. In addition to reducing turnaround time, relay method can save the cost of production and improved soil health over conventional method (data not shown). The above promising lines have been sent to

Saskatoon University, Canada to know the percentage of Zn and Fe in lentil seed. The experiment is continuing with 14 additional lines in this year (2016-17) for conformation.

References

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Table 1. Performance of promising short duration lentil lines under relay and conventional sowing methods.

Treatments	Advance line/ cultivar	Days to maturity (day)	Plant population (no.)	Plant height (cm)	Pods/plant (no.)	Seed yield (kg ha^{-1})
Relay method	LRIL 22-15	93	153	31	39	1054
	LRIL 22-70	93	198	39	31	1067
	BARI Masur 6	119	177	44	58	1790
Conventional method	LRIL 22-15	84	269	41	75	1293
	LRIL 22-70	85	271	43	91	1226
	BARI Masur 6	114	215	40	59	1486
LSD (p≤0.05)		1.5 **	52.4**	2.2**	18**	14.9**
CV (%)		0.8	7.4	1.9	17.9	0.4

LSD-Least significant difference, ** significant at 1 % level; CV - coefficient of variation