GL-FP1.1.6.1: Evaluation of seed treatment, plant density, planting date and weed management for lentil varieties

Deliverable# 5329: Evaluation of seed treatment, plant density, planting date and weed management for lentil varieties

Experiment 1: Optimization of planting date and plant density in extra-early lentil varieties

Title	:	Optimization of planting date and plant density in extra-early lentil varieties
Objectives	:	Develop and refine crop management practices for extra-early lentil varieties
Outputs	:	Integrated crop management practices for extra-early varieties of lentil developed
Materials and methods	:	The experiment was conducted at ICARDA research station, Terbol, Lebanon. The treatments consisted of two planting dates (1st FN December, 1st FN February) as main plot, seven extra-early genotypes (LIRL22-46, ILL590, ILL6994, ILL10810, ILL10812, ILL6002, and a check, Bakria) as sub-plot and three plant densities (66, 100, 133 plants m^{-2}) as sub-sub plot respectively.
Results	:	Genotypes with different plant morphology would require different optimum plant densities to express their full yield potential. Analysis of variance showed that the effect of planting date was significant on all the agronomic traits (Table 1). Plant height and seed yield in early planting were significantly higher than late planting across all the genotypes, so that mean seed yield decreased by >80% from 1307 to 241 kg ha^{-1} with the delay in planting from 1st FN of December (winter) to 1st FN of February (spring). The effect of planting density was significant on days to maturity, biological yield and seed yield. The increase in plant density increased seed yield, so that seed yield increased by 35% from 601 to 927 kg ha^{-1} as plant density increased from 66 to 133 plants m^{-2} (Fig. 1). Higher the seed yield at high density can be related to greater number of plants per unit area. None of interaction among three factors (planting date x genotype x plant density) shown significant. However, maximum seed yield of 1994 kg ha^{-1} was produced in winter planted ILL590 genotypes at higher density.

Table 1: Analysis of variance for agronomic traits of lentil genotypes as affected by planting date and plant density

Sources of Variation	df	Plant height	Days to 50% flowering	Days to maturity	Biological yield	Seed yield
Replication	2	1.0^{ns}	1.9^{ns}	4.7^{ns}	950309.7^{ns}	229941.0^{ns}
Planting date (A)	1	222.9*	47096.0*	59453.7*	134585929.8*	35725523.7*
Genotypes (B)	6	11.5*	139.4*	30.8*	2486453.1*	549520.6*
Plant density (C)	2	15.3^{ns}	2.8^{ns}	11.5*	7856982.3*	1128701.5*
A x B x C	12	3.6^{ns}	0.4^{ns}	1.0^{ns}	172263.0^{ns}	37983.7^{ns}
Error	56	6.2^{ns}	1.3	1.3	101647.7	21056.5

*shows significantly different at the 5% probability level; ^{ns} is not significantly different.

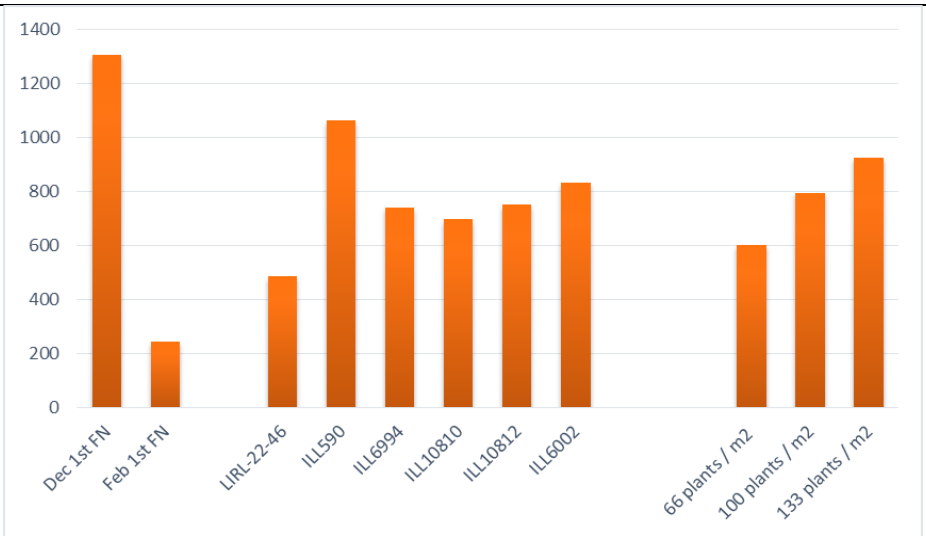

Fig. 1: Effect of planting date, genotypes and plant density on seed yield of lentil

Experiment 2: Efficacy of pre- and post-emergence herbicides for weed control in lentil field

Title	:	Efficacy of pre- and post-emergence herbicides for weed control in lentil field
Objectives	:	Identify the effective herbicides for weed control in lentil fields
Outputs	:	Effective and economic doses of herbicide identified and Integrated weed management modules developed
Observations to be taken	:	The experiment was conducted at ICARDA experimental station, Marchouch, Morocco. Applied all the herbicide according to the treatment (pre- and post-emergence). All other agronomic practices were kept uniform in all the treatments.
Results	:	The study was undertaken to see the efficacy of pre- and post-emergence herbicides and to find out the environment friendly, safe and economical herbicides to control weeds in lentil. Application of double dose of Metribuzin (350 g a.i/ha) observed lower weed density followed by application of Pendimethalin @ 1 kg a.i./ha + Imazethapyr @ 75 g a.i./ha. But these herbicides shown phytotoxic effect on lentil that affected the final yield. With respect to crop yield and weed control efficiency, the higher values were observed with Pendimethalin @ 1 kg a.i./ha + Fluazifop-P-butyl @ 120 g a.i./ha treatment.

Table 1: Weed density as influenced by herbicides application in lentil fields

Treatments	Weed density		
	BLW	GRW	Total
T1 = Pendimethaline @ 1.0 kg a.i./ha (PE)	23	7	30
T2 = Imazethapyr @ 75 g a.i/ha (PoE)	27	5	32
T3 = Imazethapyr @ 150 g a.i/ha (PoE)	12	3	15
T4 = Pendimethaline @ 1.0 kg a.i./ha (PE) + Imazethapyr @ 75 g a.i/ha (PoE)	10	3	14
T5 = Metribuzin 175 g a.i/ha (PoE)	17	2	19
T6 = Metribuzin 350 g a.i/ha (PoE)	3	3	6
T7 = Pendimethali @ 1. 0 kg a.i/ha (PE) + Metribuzin 175 g a.i/ha (PoE)	18	2	20
T8 = Pendimethaline @ 1.0 kg a.i./ha (PE) + Fluazifop-P-butyl @ 120 g a.i./ha (PoE)	19	0	19
T9 = Weed free	16	1	16
T10 = Weedy check	75	18	93

*BLW: broad leaves weeds; GRW: Grassy weeds; PE: Pre-emergence; PoE: Post-emergence