

Effect of Irrigation and Nitrogen Levels on Growth and Yield of Chandrasur (*Lepidium Sativum*) Under Chhattisgarh Plain



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Abstract

Poor irrigation and nitrogen levels are one of the severe barrier to enhance productivity of chandrasur. The experiment treatments were divided into main and sub plots in split plot design with three replications. The horizontal plots were divided into three irrigation management practices and vertical plots were divided into four nitrogen levels practices. The treatments comprised treatment one irrigation at 25 days after sowing (DAS), two irrigation at 25 & 50 DAS and three irrigation at 25, 50 & 75 DAS in main plot under treatment irrigation management practices and 20kg N ha⁻¹, 40kg N ha⁻¹, 60kg N ha⁻¹ and 80kg N ha⁻¹, in sub plots under nitrogen levels management practices. The different irrigation level influenced significantly on number of branches and seed yield of chandrasur during both the year. However, it was not influenced significantly on plant height during both the year. The maximum mean seed yield (14.79q ha⁻¹) was found under the application of three irrigation at 25, 50 & 75 days during both the year. The different nitrogen level influenced significantly on number of branches and seed yield of Chandrasur during both the year except plant height. The maximum mean seed yield 15.37q ha⁻¹ was found under the application of 80kg N ha⁻¹.

Keywords: Irrigation, Nitrogen Levels, Growth, Seed Yield and Chandrasur.

Introduction

Chandrasoor is commonly known as Garden cress (*Lepidium sativum*) is belonging to family Brassicaceae. Chandrasoor is an annual plant whose height is 50 cm. In India, the southern area is especially involved in the commercial production of chandrasoor. In India, it is grown mainly in Uttar Pradesh, Madhya Pradesh, Rajasthan, Gujarat and Maharashtra. Apart from India, it is also cultivated in North America and parts of Europe (Gokavi et al., 2004). Seeds, leaves and roots are the economic parts of this crop. However, the crop is mainly cultivated for seeds in India. The seeds are known to contain a light yellow coloured fixed oil and alkaloids such as lepidin, glucotropeolin, besides sinapin and sinapic acid. Being a minor crop, it gets least importance and is sown after main crop in winter (rabi) season. The main character of chandrasoor is that it can grow in any type of climate and soil condition.

Due to its diversified uses, demand and popularity, cultivation of garden cress is increasing on a commercial scale. But the scientific information on nutrient management of this crop is very scanty. Water management is very important aspect in cultivation of garden cress and decides the success of crop. Appropriate management of chemical fertilizers is a necessary tool to achieve the targeted yield levels. Hence, the present investigation was carried out to effect of irrigation and nitrogen levels on growth and yield of Chandrasur (*Lepidium sativum*) under chhattisgarh plains.

Material and Methods

A field experiment was conducted during rabi seasons of 2011-12 and 2012-13 at Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh) under irrigated conditions. The experiment was divided into main and sub plots in split plot design with three replications. The horizontal plots were divided into three irrigation management practices

and vertical plots were divided into four nitrogen levels practices. The treatments comprised treatment one irrigation at 25 DAS, two irrigation at 25 & 50 DAS and three irrigation at 25, 50 & 75 DAS in horizontal plot under irrigation management practices and 20kg N ha⁻¹, 40kg N ha⁻¹, 60 kg N ha⁻¹ and 80 kg N ha⁻¹, in vertical plots under nitrogen levels management practices. The plots were supplied with half the dose of nitrogen (in the form of urea) and full dose of phosphorus (in the form of single super phosphate) and potassium (in the form of muriate of potash) at the time of sowing as per the treatments. The remaining half dose of nitrogen was supplemented 30 days after sowing as top dressing.

Results and Discussion

The different irrigation level influenced significantly on number of branches and seed yield of Chandrasur during both the year. However, it was not influenced significantly on plant height during both the year (Table 1). Maximum seed yield (16.18 q ha⁻¹) was found with three irrigation at 25, 50 & 75 DAS which was at par with two irrigation at 25 & 50 day during the first year of experimentation. However, the second year of experimentation, maximum seed yield (13.40 q ha⁻¹) was found under the treatment of three irrigation at 25, 50 & 75 DAS which was at par with the two irrigation at 25 & 50 DAS. The maximum mean seed yield (14.79q ha⁻¹) was found under the treatment of three irrigation at 25, 50 & 75 DAS. Indira and Patel (2013) reported that higher values of growth characters, yield attributes, seed and straw yield were recorded under treatment 0.8 IW: CPE. Each successive increase in the level of N from 40 to 100 kg ha⁻¹ significantly increased the growth characters, yield attributes, seed and straw yield.

The different nitrogen level influenced significantly on number of branches and seed yield of Chandrasur during both the year except plant height. Maximum number of branches per plant (10.88) and seed yield (17.15 q ha⁻¹) were found under the treatment of 80 kg N ha⁻¹ which was at par with the

treatment of 60kg N ha⁻¹ during the first year of experimentation. However, the second year of experimentation, maximum number of branches per plant (9.19) and seed yield (13.59 q ha⁻¹) were found under the treatment of 80kg N ha⁻¹ over the treatment of 60kg N ha⁻¹. The maximum mean seed yield (15.37q ha⁻¹) was found under the application of 80kg N ha⁻¹.

Bodalkar and Prajapati (2013) reported that the morphological growth characters of the Chandrasur crop such as plant height, number of leaves, collar diameter observe maximum under D. sissoo with 6 t FYM ha⁻¹ + N18 ha⁻¹ + P46 ha⁻¹. Highest seed yield (8.14 q ha⁻¹) was observed in 6 t FYM ha⁻¹ + N18 ha⁻¹ + P46 ha⁻¹, while lowest (5.40 q ha⁻¹) was found in 6 t FYM ha⁻¹. Shoot and Root biomass of the plants was found maximum under D. sissoo with 6 t FYM ha⁻¹ + N18 ha⁻¹ + P46 ha⁻¹ (0.21 and 0.16 g plant⁻¹) and it was minimum under M. indica with 6 t FYM ha⁻¹ (0.05 and 0.04 g plant⁻¹). The nutrient accumulation (N, P and K) were found maximum (0.53% N, 0.17% P and 1.86% K) in shoot of plant intercropped under D. Sissoo with 6 t FYM ha⁻¹ + N18 ha⁻¹ + P46 ha⁻¹ and minimum under M. indica (0.43% N, 0.12% P and 1.56% K) 6 t FYM ha⁻¹. The treatment 6 t FYM ha⁻¹ + N18 ha⁻¹ + P46 ha⁻¹ under D. Sissoo was identified as significantly superior to other treatments for obtaining highest seed production under silvi-agriculture system. Choudhary et al. (2010) reported that sown on 31 October at 40 cm row spacing gave higher seed yield of Garden cress (*Lepidium sativum*) and net returns compared to crop sown at 30 cm rows apart on 15 and 30 November. Application of nitrogen at all levels significantly increased the seed yield, yield attributes and net returns over the control. Crop sown on 31st October and fertilized with 60 kg N ha⁻¹ gave maximum seed yield (2.11 tonnes ha⁻¹) and net returns (Rs 37 879 ha⁻¹). The crop sown on 31st October also recorded higher protein content, protein and oil yield (478.5 kg ha⁻¹).

Table 1: Effect of Irrigation and Nitrogen Levels on Growth and Yield of Chandrasur

Treatments	Plant height (cm)			Branches/ plant (no)			Seed Yield (q /ha)		
	2011-12	2012-13	Mean	2011-12	2012-13	Mean	2011-12	2012-13	Mean
Main plot : Irrigation Level									
I1(One irrigation)	92.76	91.53	92.14	9.23	8.32	8.775	9.28	8.42	8.85
I2(Two irrigation)	93.53	92.80	93.16	9.97	8.95	9.46	14.53	12.85	13.69
I3(Three irrigation)	93.82	93.55	93.68	10.30	9.11	9.70	16.18	13.40	14.79
SEm ±	2.70	3.28	-	0.26	0.16	-	1.73	0.34	-
CD at 5%	NS	NS	-	1.03	0.62	-	6.80	1.33	-
Sub plot : Nitrogen Level									
N1(20 kg N ha ⁻¹)	91.23	91.27	91.25	9.21	8.23	8.72	8.29	9.32	8.805
N2(40 kg N ha ⁻¹)	93.62	91.82	92.72	9.54	8.79	9.16	11.03	11.08	11.055
N3 (60 kg N ha ⁻¹)	93.74	92.58	93.16	9.71	8.95	9.33	16.85	12.21	14.53
N4(80 kg N ha ⁻¹)	94.87	94.82	94.84	10.88	9.19	10.03	17.15	13.59	15.37
SEm ±	2.05	2.41	-	0.38	0.14	-	1.96	0.45	-
CD at 5%	NS	NS	-	1.47	0.43	-	5.82	1.34	-

Asian Resonance

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