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Sulaksh Bishnoi

Student, Department of
Agronomy, Vivekananda Global
University, Jaipur, Rajasthan,
India

Response of Barley (*Hordeum vulgare* L.) on different dates of sowing on growth parameters

Sulaksh Bishnoi

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Abstract

A field experimentation was conducted at carried out during rabi season of the year 2024 at research farm, Vivekananda Global University, Jaipur. The objectives were to study the response of barley with different date of sowing on growth parameters. The experiment consisted of seven treatments: - date of sowing of 05th October, 15th October, 25th October, 05th November, 15th November, 25th November, 05th December. The experiment was laid out in randomized block design and replicated thrice. The result revealed that different date of sowing significantly influenced highest plant height (cm), dry matter accumulation at different stages, effect tillers plant¹, length of spike with T5 (15th November date of sowing).

Keywords: Growth parameters, Barley (*Hordeum vulgare* L.), Vivekananda Global University

1. Introduction

Barley (*Hordeum vulgare* L.) is a significant grain crop. It is a resilient crop that is cultivated across temperate, tropical, and sub-tropical regions of the world, ranking fourth among cereals in terms of acreage and production behind wheat, rice, and maize. It is an Indian rabi cereal crop that is primarily used for human consumption as well as animal and poultry feed. Its potential as a grain crop in Rajasthan is lower than that of wheat, however depending on the amount of rainfall, it thrives in rainfed environments. Farmers are cultivating barley in December since there aren't many high-yielding types available. They also like to seed barley under late-sown conditions, which means they need to use suitable sowing time. The most crucial element in optimizing barley yield is coordinating phenology with current meteorological conditions. As it establishes the ideal period for crop sowing, the date of sowing is one of the most crucial variables for increased yield production. The effects of different sowing dates on dual purpose barley are rather noteworthy since the plant, which is a dual-purpose barley, offers green fodder during lean periods. Therefore, the best time to sow should be chosen to ensure green fodder availability for a longer length of time. To make the most of the ideal planting season, it is crucial to adhere to the recommended sowing date. Understanding the varied physiological processes that the crop goes through in various growth situations is essential to increasing the yield of barley. For a considerable amount of time now, it has been widely acknowledged that plants rely on their genetic makeup as well as the soil and temperature around them for growth and development. A crop planted too early may be exposed to higher temperatures during the tillering stage. (Arya, K.C. and Singh, S.N. 2000) ^[1].

2. Materials and Methods

The experiment was conducted in the rabi season of 2024 in an experimental area of the research farm of Vivekananda Global University in Jaipur, Rajasthan. India's Jaipur is located at latitude 26.907524 and longitude 75.739639. Jaipur, India is a city in the India country that can be found at 26° 54' 27.0864" N and 75° 44' 22.7004" E on a GPS map. The climate of Jaipur, Rajasthan, is subtropical and semiarid, with hot, dry summers from April to June, hot, humid summers from July to September, and cold winters from December to January. The composite soil samples

Corresponding Author:

Sulaksh Bishnoi

Student, Department of
Agronomy, Vivekananda Global
University, Jaipur, Rajasthan,
India

show that the experimental field's soil has a texture similar to loamy sand, is neutral in reaction (pH 7.6–8.0), and is devoid of salts (EC0.10–0.15dS/m). The experiment was lay out in RBD with 7 treatments and replicated thrice. Treatments are T₁- 05th October T₂- 15th October T₃- 25th October T₄- 05th November T₅- 15th November T₆- 25th November T₇- 05th December. Slits were made with a zero-till cum fertilizer seed drill to plant 100 kg ha⁻¹ of Barley seeds. A row spacing of 22.5 cm was used to seed the crop. The barley crop was treated with a dose of N (120 kg ha⁻¹), P₂O₅ (30 kg ha⁻¹), and 40 kg K₂O kg ha⁻¹.

3. Experimental Results

Growth Parameters exhibit the data collected on growth characteristics, such as plant height, dry matter accumulation plant-1(g), number of tillers plant⁻¹ and spike length at various observational phases as influenced by various planting dates.

3.1 Plant Height (cm)

Plant height is an important useful index of plant development to give an idea of predictable dry matter production and crop yield. A review of the information in the tables reveals that as crop ages grow, plant heights do as well. To evaluate the impact of various treatments, plant height was measured during the experiment. The information on plant height at 30 DAS, 60 DAS, 90 DAS, and maturity stage is shown in Table No. 3.1. Based on data from a critical investigation, the maximum plant height (29.67 cm) was found with treatment T₅, or the date of sowing on November 15. At 30 DAS, treatments T₄, T₇, and T₆ (28.33 cm, 28.00 cm, and 27.33 cm) matched treatment T₅ (29.67 cm) statistically. Likewise, Treatment T₅ outgrew all other treatments by a large margin, reaching its maximum plant height at 60 DAS, 90 DAS, and harvesting stage (49.67 cm, 92.33 cm, and 111.00 cm, respectively). At 30 DAS, 60 DAS, 90 DAS, and at harvesting stage, i.e., 20.00 cm, 36.00 cm, 80.33 cm, and 98.00 cm, respectively, the minimum plant height was recorded with treatment early sowing of crop, i.e., T₁ (05th October date of sowing), followed by treatment T₂, which was significantly different from treatment T₁.

Plant Height (cm)				
Treatments	At 30 DAS	At 60 DAS	At 90 DAS	At Harvesting
T ₁ - 05 th October	20.00	36.00	80.33	98.00
T ₂ - 15 th October	23.67	33.33	79.67	102.00
T ₃ - 25 th October	25.00	34.67	83.33	103.67
T ₄ - 05 th November	28.33	39.33	90.33	107.33
T ₅ - 15 th November	29.67	49.67	92.33	111.00
T ₆ - 25 th November	27.33	44.10	87.00	107.33
T ₇ - 05 th December	28.00	42.00	85.00	106.67
SEm±	0.91	1.20	1.17	1.00
CD (p=0.05)	2.83	3.74	3.65	3.12

3.2 Number of tillers plant⁻¹

Table 3.2 presents data on the number of tillers plant⁻¹ as impacted by various planting dates at various stages. The data showed that, during the investigation, the number of tillers plant⁻¹ was considerably impacted by varied dates of planting. The maximum number of tillers plant⁻¹ (5.68, 8.12, 8.16, and 8.22) was recorded in treatment T₅ (15th November date of sowing) at 30 DAS, 60 DAS, 90 DAS, and at harvesting stage, respectively, according to a review of the data in Table 3.2. This was followed by treatment T₆ (8.12, 8.16, 8.08, and 8.14), which was statistically comparable to superior except at 30 DAS. On October 5, treatment T₁ recorded the minimum number of tillers plant⁻¹ (4.24, 7.08, 7.12, and 7.16 at 30 DAS, 60 DAS, 90 DAS, and at harvesting stage, respectively). Treatment T₂ (4.38, 7.26,

7.32, and 7.36 at 30 DAS, 60 DAS, 90 DAS, and at harvesting stage, respectively) was next, and it was statistically equivalent to treatment T₁.

Number of tillers plant-1				
Treatments	At 30 DAS	At 60 DAS	At 90 DAS	At Harvesting
T ₁ - 05 th October	4.24	7.08	7.12	7.16
T ₂ - 15 th October	4.38	7.26	7.32	7.36
T ₃ - 25 th October	4.68	7.72	7.78	7.82
T ₄ - 05 th November	5.26	7.88	7.82	7.84
T ₅ - 15 th November	5.68	8.12	8.16	8.22
T ₆ - 25 th November	5.02	8.02	8.08	8.14
T ₇ - 05 th December	4.98	7.78	7.85	7.82
SEm±	0.28	0.24	0.26	0.18
CD (p=0.05)	NA	NA	NA	NA

3.3 Dry Matter Accumulation gm plant⁻¹

In the current study, changing the planting date had no discernible impact on the amount of dry matter that accumulated (gm plant⁻¹), which was measured at 30, 60, 90, and maturity and is shown in Tables 3.3. The data clearly shows that while growth continued, dry matter buildup grew, reaching its maximum value at harvest. The data clearly shows that varying the sowing date has an impact on the amount of dry matter accumulation. Treatments T₄ and T₅ (November 5 and 15) had the largest dry matter accumulation, measuring 0.47 gm. T₆, T₇, and T₃ (0.46 gm, 0.45 gm, and 0.45 gm, respectively) followed, all of which were statistically equivalent to treatment T₄ and T₅ (November 5 and 15) at 30 DAS. However, treatment T₅ (15th November) recorded the largest dry matter accumulation at 60 DAS, 90 DAS, and the harvesting stage at 8.32 gm, 21.36 gm, and 21.22 gm, respectively. This was statistically comparable to other treatments at different dates of Sowing.

Dry matter accumulatio plant-1 (gm)				
Treatments	At 30 DAS	At 60 DAS	At 90 DAS	At Harvesting
T ₁ - 05 th October	0.42	7.08	19.24	19.78
T ₂ - 15 th October	0.44	7.58	20.46	20.68
T ₃ - 25 th October	0.45	7.98	20.76	20.82
T ₄ - 05 th November	0.47	8.02	21.06	20.98
T ₅ - 15 th November	0.47	8.32	21.36	21.22
T ₆ - 25 th November	0.46	8.12	21.24	21.18
T ₇ - 05 th December	0.45	8.04	21.08	21.04
SEm±	0.05	0.82	0.32	0.28
CD (p=0.05)	NA	NA	NA	NA

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