International Journal of Chemical Studies

P-ISSN: 2349-8528
E-ISSN: 2321-4902
Impact Factor (RJIF): 6.85
www.chemijournal.com
IJCS 2025; 13(5): 116-120

Received: 10-07-2025
Accepted: 15-08-2025

Muskan Goswami
M.Sc. Agronomy, BTC CARS Bilaspur, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

Dr. Dinesh Pandey
Scientist, Department of Agronomy, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

Dr. RB Tiwari
Professor, Department of Agronomy, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

Dr. Yishma Sao
Professor, Department of Soil Science, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

Dr. NK Chaure
Principal Scientist, Department of Agricultural Statistics, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

Corresponding Author:
Muskan Goswami
M.Sc. Agronomy, BTC CARS Bilaspur, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India

Response of newly released wheat varieties with varying dates of sowing under irrigated situation

Muskan Goswami, Dinesh Pandey, RB Tiwari, Yishma Sao and NK Chaure

Abstract
The present investigation entitled "Response of newly released wheat varieties with varying dates of sowing under irrigated situation" was carried out during Ravi season 2024 at the Instructional Cum Research Farm, Barrister Thakur Chhedilal College of Agriculture and Research Station, Bilaspur (C.G.). The experiment was laid out in Split plot Design with three replications. The treatment consisting of two Different dates of sowing as main plot *viz.*, D_1 (Timely Sown), D_2 (Late sown) with thirteen genotypes as subplot *viz.*, (V_1) MACS6837, (V_2) GW554, (V_3) HI1683, (V_4) MPO1395(d), (V_5) MP3570, (V_6) HI8713 (d) (c), (V_7) HI8850 (d), (V_8) HI8849 (d), (V_9) MACS6768 (c), (V_{10}) GW322 (c), (V_{11}) GW555, (V_{12}) HI8737 (d)(c), (V_{13}) MACS4135 (d) were laid out in split plot design with three replications. 100 kg of seeds were used hectare^{-1} for the crop, spaced 20 cm apart in rows. The outcome demonstrated that plant population, growth parameters, including plant height, dry matter accumulation plant^{-1}, number of tillers, crop growth rate, relative growth rate and yield attributes, including ear length (cm), number of grain ear head^{-1}, grain yield (qha^{-1}), test weight (g), straw yield (qha^{-1}) and harvest index (%), were recorded maximum under (V_1) MACS6837 which was statistically at par with (V_3) HI1683 and (V_{13}) MACS4135 (d) and significant over all remaining treatments. While the minimum was recorded in (V_9) MACS 6768 (c). Furthermore, an economic study revealed that the crop cultivated on November 10th (D_1) had the highest net return (81662.25 ₹ ha^{-1}), while the plant grown on December 5th (D_2) had the lowest net return (69249.25 ₹ ha^{-1}). The genotype (V_1) MACS6837 had the highest net return (88532.25 ₹ ha^{-1}) among the various genotypes, while (V_9) MACS6768 (c) had the lowest net return (62168.75 ₹ ha^{-1}). The crop cultivated on November 10th (D_1) yielded the highest gross return (114102.25 ₹ ha^{-1}), while the plant cultivated on December 5th (D_2) yielded the lowest gross return (101689.25₹ha^{-1}). The genotype (V_1) MACS6837 had the highest gross return (120972.25 ₹ ha^{-1}) among the several genotypes, whereas (V_9) MACS6768 (c) had the lowest gross return (94608.75 ₹ ha^{-1}). The crop that was cultivated on November 10th (D_1) had the highest B:C ratio (2.51), while the plant that was grown on December 5th (D_2) had the lowest B:C ratio (2.13). The genotype (V_1) MACS6837 had the highest B:C ratio (2.72), while the genotype (V_9) MACS 6768 (c) had the lowest B:C ratio (1.91).

Keywords: Wheat varieties, sowing dates, growth parameters, yield attributes, economic analysis

Introduction
In India, rice is the most important food crop, and wheat (*Triticum aestivum* L.) is the most widely consumed staple. Wheat is produced on 220.7 million hectares worldwide, with a productivity of 3.52 t ha^{-1} and a global production of 792.40 million hectares. In India, wheat is grown about 31.8 million hectares of area with a total production hovering around 113.29 million tonnes and productivity of 3.6 t ha^{-1}. In Chhattisgarh wheat is cultivated in 267.04 thousand hectares and productivity is 16 q ha^{-1}.

The most significant wheat yield component is the number of kernels and spikes per m^{-2}. Reduced kernel counts per spike are a result of both early and late seeding of wheat. Temperature stress following anthesis produce drastic effect on grain yield output through diminishing the kernel weight. The benefits of sowing at the right time include improved seed germination, plant height, spikelet number, grain weight, and 1000-grain weight.

Lack of improved varieties appropriate for late sowing conditions and having a short maturity due to the significantly shorter growing season accessible to crops is another crucial factor. Additionally, in late-sown conditions, cultivars differ in production and nutrient uptake.

Any region can retain increased wheat productivity by choosing optimal cultivars. In general, late sowing of wheat types results in severe temperature stress that has a negative impact on

phenology, growth, and ultimately yield. Under ideal management and input conditions, choosing the right variety is essential to reach maximum yield. In addition to genetic traits, a number of environmental factors that vary depending on the planting date have a significant impact on the growth and development of wheat harvests. Lack of improved varieties appropriate for late sowing conditions and having a short maturity due to the significantly shorter growing season accessible to crops is another crucial factor. Additionally, in late-sown conditions, cultivars differ in production and nutrient uptake Lathwal and Thakral (1999) [1]. Among them Date of Sowing is important factors which affect the wheat crop production. Timely sowing helps in saving seed requirement. It helps in higher yield and reduced pest infestation. Sowing late will drastically reduce the yield and its adaptation to areas where water requirement is very low. So timely sown crop gives best input of resource management in wheat crop production.

Materials and method: A field experiment was conducted during Ravi season 2024 at the Instructional Cum Research Farm, Barrister Thakur Chhedilal College of Agriculture and Research Station [3], Bilaspur (C.G.). Crop was sown at 20 cm using 100 kg seed/ha fertilized with recommended level of nutrients $N:P_2O_5:K_2O$ *i.e.* 120:60:40: kg/ha.The crop was irrigated immediately after sowing to insure uniform germination. After seeding, a pre-emergence herbicide called pendimethalin (3 ml/lit) was used. After 25 DAS, weeds were controlled with post-emergence herbicides such [vesta (Clodinafop propargyl 15% + Metsulfuron methyl 1% W.P)].Cultural practices recommended for Wheat were adopted during the crop growth period. Wherever statistical significance was observed, critical difference (CD) at 5 percent level of probability was worked out for comparison.

Results and Discussion

Effect on crop

Amongst the thirteen genotypes under study, plant height was statistically different. Among these genotypes maximum plant height, Number of tillers m^{-2}, and dry matter accumulation $plant^{-1}$ at 30, 60,90 DAS and at harvest was recorded in (V_1) MACS6837 which was statistically at par with (V_3) HI1683 and (V_{13}) MACS4135 (d) while the minimum was recorded in (V_9) MACS6768 (c). The interaction of sowing dates and varieties did not produce any significant effect on plant height at 30, 60, 90 DAS and at harvest.

Data related to Ear length (cm), Number of grains ear $head^{-1}$, Test weight (g), grain yield, straw yield and harvest index as affected by various Sowing dates and genotypes in wheat are presented in Table 4.3 and 4.4 reveals that According to the results, there were notable differences in ear length, number of grains ear $head^{-1}$, Test weight (g), grain yield, straw yield and harvest index between genotypes. Out of the thirteen genotypes, the highest recorded value among the others was (V_1) MACS6837, which was at par with (V_3) HI1683 and (V_{13}) MACS4135 (d). The genotype with the lowest recorded value was (V_9) MACS6768 (c).

The crop was grown in 10th November (D_1) had the maximum grain yield, while the minimum grain yield was recorded in plant grown on 5th December (D_2). As per data, different genotypes also indicated that genotypes had significant difference in grain yield. Amongst different genotypes, the maximum value of grain yield (46.57 qha^{-1}) was recorded in genotype (V_1) MACS6837 which was at par with (V_3) HI1683 and (V_{13}) MACS4135 (d) while the minimum was recorded in genotype (V9) MACS6768 (c) (36.45 qha^{-1}).

Table 1: Plant height of wheat as influenced by sowing dates and genotypes

Treatments	Plant height (cm)			
	30 DAS	60 DAS	90 DAS	At harvest
	A. Main-plot: Date of sowing (02)			
D_1 - Timely sown (10th Nov)	28.76	68.70	95.92	95.80
D_2 - Late sown (5th Dec)	26.96	66.62	92.61	91.03
SEm (±)	0.28	0.31	0.38	0.80
CD (5%)	1.75	1.92	2.34	4.9
	B. Sub-plot: Newly released wheat varieties (13)			
MACS6837	31.5	71.65	99.52	98.03
GW554	27.4	67.9	94.07	93.11
HI1683	30.8	70.87	99.05	97.22
MPO1395	28.53	69.3	96.4	94.20
MP3570	29.33	69.7	96.46	94.51
HI8713 (d) (c)	27.23	67.2	93.95	93.05
HI8850 (d)	25.4	64.8	91.76	90.16
HI8849 (d)	25.7	65.2	92.53	90.81
MACS6768 (c)	25.0	62.1	90.7	89.05
GW322 (c)	26.5	65.5	93.81	92.11
GW555	27.89	68.2	94.30	93.52
HI8737 (d) (c)	26.8	66.7	93.9	92.40
MACS4135 (d)	30.15	70.52	97.10	96.21
SEm (±)	0.49	0.55	0.91	1.34
CD (5%)	1.39	1.57	2.59	3.82
	Interaction			
SEm (±)	0.7	0.8	1.28	1.27
CD (5%)	NS	NS	NS	NS

Table 2: Number of tillers of wheat as influenced by sowing dates and genotypes.

Treatments	Number of tillers (m^{-2})			
	30 DAS	60 DAS	90 DAS	At harvest
	A. Main-plot: Date of sowing (02)			
D_1 - Timely sown (10th Nov)	184.01	335.17	356.68	353.24
D_2 - Late sown (5th Dec)	178.71	301.82	351.38	347.94
SEm (±)	0.86	8.09	0.83	0.84
CD (5%)	5.24	49.26	5.06	5.16
	B. Sub-plot: Newly released wheat varieties (13)			
MACS6837	203.45	359.92	397.7	395.3
GW554	179.65	320.48	350.68	346.56
HI1683	202.54	353.99	390.88	387.52
MPO1395	185.38	330.75	361.86	359.68
MP3570	s	335.05	365.36	360.14
HI8713 (d) (c)	176.53	311.89	347.09	342.99
HI8850 (d)	164.93	280.18	321.94	318
HI8849 (d)	171.69	294.47	335.13	333.11
MACS6768 (c)	159.47	272.75	311.23	309.4
GW322 (c)	174.37	299.99	340.37	335.32
GW555	184.88	328.20	360.88	357.7
HI8737 (d) (c)	175.92	306.64	343.39	341.31
MACS4135 (d)	192.58	303.96	375.91	370.64
SEm (±)	5.95	8.07	7.96	11.58
CD (5%)	16.94	22.96	22.65	32.93
	Interaction			
SEm (±)	6.60	11.42	11.26	16.37
CD (5%)	NS	NS	NS	NS

Table 3: Length of ear, number of grains ear head-1 and test weight of wheat as influenced by sowing dates and genotypes.

Treatments	Length of ear (cm)	Number of grains ear $head^{-1}$	Test weight (gm)
A. Main–plot : Date of sowing (02)			
D_1 – Timely sown (10th Nov)	9.83	**29.60**	**46.03**
D_2 – Late sown (5th Dec)	8.68	28.34	41.64
SEm (±)	**0.20**	**0.20**	**0.35**
CD (5%)	**1.21**	**1.24**	**2.12**
B. Sub–plot : Newly released wheat varieties (13)			
MACS6837	10.40	32.57	44.21
GW554	9.22	28.73	37.60
HI1683	10.17	32.06	42.15
MPO1395	9.45	29.64	39.36
MP3570	9.66	29.96	40.28
HI8713 (d) (c)	9.08	28.40	35.25
HI8850 (d)	8.38	26.33	32.79
HI8849 (d)	8.73	27.34	33.46
MACS6768 (c)	8.16	25.50	32.62
GW322 (c)	8.86	27.85	35.06
GW555	9.46	29.49	37.52
HI8737 (d) (c)	8.97	28.11	33.87
MACS4135 (d)	9.78	30.69	41.58
SEm (±)	0.23	0.89	0.96
CD (5%)	0.68	2.52	2.75
Interaction			
SEm (±)	0.34	1.27	1.62
CD (5%)	NS	NS	NS

Table 4: Grain yield, straw yield and harvest index of wheat as influenced by sowing dates and genotype

Treatments	Grain yield (q ha^{-1})	Straw yield (q ha^{-1})	Harvest index (%)
A. Main-plot: Date of sowing (02)			
D_1 - Timely sown (10th Nov)	44.11	47.94	47.87
D_2 - Late sown (5th Dec)	38.81	43.18	47.23
SEm (±)	0.43	0.53	0.38
CD (5%)	2.59	3.25	NS
B. Sub-plot: Newly released wheat varieties (13)			
MACS6837	46.57	49.6	48.38
GW554	41.06	45.8	47.24
HI1683	45.78	49.52	47.97
MPO1395	42.38	47.37	47.18
MP3570	42.79	47.85	47.17
HI8713 (d) (c)	40.65	44.21	47.80

HI8850 (d)	37.70	42.5	46.83
HI8849 (d)	39.25	42.64	47.85
MACS6768 (c)	36.45	41.45	46.73
GW322 (c)	39.86	43.27	47.76
GW555	42.26	46.24	47.68
HI8737 (d) (c)	40.21	43.71	47.88
MACS4135 (d)	44.02	48.2	47.72
SEm (±)	1.16	0.53	0.62
CD (5%)	3.30	1.52	NS
Interaction			
SEm (±)	1.82	0.75	0.88
CD (5%)	NS	NS	NS

Table 5: Cost of cultivation (₹ ha-1), Gross return (₹ ha-1), Net return (₹ ha-1) and Benefit cost ratio (B:C) of wheat as influenced by sowing dates and genotypes.

Treatments	Cost of cultivation (₹ ha^{-1})	Gross return (₹ ha^{-1})	Net return (₹ ha^{-1})	B:C ratio
A. Main-plot: Date of sowing (02)				
D_1 - Timely sown (10th Nov)	32440	114102.25	81662.25	2.51
D_2 - Late sown (5th Dec)	32440	101689.25	69249.25	2.13
B. Sub-plot: Newly released wheat varieties (13)				
MACS6837	32440	120972.25	88532.25	2.72
GW554	32440	106464.75	74024.75	2.28
HI1683	32440	118937.75	86497.75	2.66
MPO1395	32440	109877	77437	2.38
MP3570	32440	110943.25	78503.25	2.41
HI8713 (d) (c)	32440	105207.75	72767.75	2.24
HI8850 (d)	32440	97547	65107	2.00
HI8849 (d)	32440	101553	69113	2.13
MACS6768 (c)	32440	94608.75	62168.75	1.91
GW322 (c)	32440	103151	70711	2.17
GW555	32440	109416.5	76976.5	2.37
HI8737 (d) (c)	32440	104065.75	71625.75	2.20
MACS4135 (d)	32440	112697.5	80257.5	2.47

Effect on crop economics: The data on cost of cultivation, gross return, net return and benefit: cost ratio from Wheat as affected by different Sowing dates and genotypes practices are presented in Table 4.5. The crop cultivated on November 10th (D_1) yielded the highest gross return (114102.25 ₹ ha^{-1}), while the plant cultivated on December 5th (D_2) yielded the lowest gross return (101689.25₹ha^{-1}).The crop cultivated on November 10th (D_1) had the highest net return (81662.25 ₹ ha^{-1}), while the plant grown on December 5th (D_2) had the lowest net return (69249.25 ₹ ha^{-1}).The genotype (V_1) MACS6837 had the highest net return (88532.25 ₹ ha^{-1}) among the various genotypes, while (V9) MACS 6768 (C) had the lowest net return (62168.75 ₹ ha^{-1}).The B:C ratio is an economic metric that illustrates how productivity affects economic factors when treatment is used. The crop that was cultivated on November 10th (D_1) had the highest B:C ratio (2.51), while the plant that was grown on December 5th (D2) had the lowest B:C ratio (2.13). The genotype (V_1) MACS6837 had the highest B:C ratio (2.72), while the genotype (V9) MACS6768 (C) had the lowest B:C ratio (1.91).

Conclusion

Plant height (cm), number of tillers (m^{-2}) plant population, growth characteristics, total dry matter production (g plant^{-1}), crop growth rate (g plant^{-1} day^{-1}), and relative growth rate (g g^{-1} day^{-1}) were the highest recorded on November 13 (D_1), while the lowest was recorded on December 3 (D_2) for the majority of the growth parameters. Ear length (cm), number of grain ear head^{-1}, 1000 seed weight and harvest index all of which contribute to yield also peaked on November 13 (D_1) and fell on December 3 (D_2).The wheat crop planted on November 10th (D_1) had the highest grain and straw yield (44.11, 47.94 qha^{-1}), while the plant planted on December 5th (D_2) had the lowest grain and straw yield. On November 10th (D_1), the gross return (114102.25 ₹ ha^{-1}), net return (81662.25 ₹ ha^{-1}), and B:C ratio (2.51) reached their highest, while on December 5th (D_2), the gross return (101689.25 ₹ ha^{-1}), net return (69249.25 ₹ ha^{-1}), and B:C ratio (2.13), reached their minimum. The highest crop growth parameters, including number of tillers (m^{-2}), dry matter accumulation plant^{-1}, crop growth rate (g plant^{-1} day^{-1}), and relative growth rate (g g^{-1} day^{-1}), were recorded by genotype (V_1) MACS6837, which was at par with (V_3) HI1683 and (V_{13}) MACS4135 (d). The lowest crop growth parameters were recorded by (V_9) MACS6768 (c).The genotype (V_1) MACS6837 had the highest grain yield value (46.57 qha^{-1}), which was at par with (V_3) HI1683 and (V_{13}) MACS4135 (d). The genotype (V_9) MACS6768 (c) had the lowest grain yield value. The maximum value of straw yield (49.6 qha^{-1}) was recorded under the genotype (V_1) MACS6837 which was at par with (V_3) HI1683 and (V_{13}) MACS4135 (d) while the minimum was recorded in genotype (V9) MACS6768 (c).The Harvest Index was shown to be non-significant for several genotypes and planting dates. The genotype (V_1) MACS6837 had the highest gross return (120972.25 ₹ ha^{-1}) and net return (88532.25 ₹ ha^{-1}) and B:C ratio (2.72); the genotype (V_9) MACS6768 (c) had the lowest gross return (94608.75 ₹ ha^{-1}), net return (621668.75 ₹ ha^{-1}), and B:C ratio (1.91). The cultivation cost was determined to be the same across all treatments.

References

1. Lathwal OP, Thakral SK. Performance of wheat varieties sown on different dates under rain fed conditions. Crop Res Hisar. 1999;18(3):470-471.
2. *Triticum aestivum* L. [Internet]. Food and Agriculture Organization (FAO). Available from: http://www.fao.org
3. Barrister Thakur Chhedilal College of Agriculture and Research Station, Bilaspur. Instructional cum Research Farm Report. Bilaspur, Chhattisgarh, India; 2024.
4. Anonymous. Recommended package of practices for wheat. Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India; 2024.
5. Panse VG, Sukhatme PV. Statistical methods for agricultural workers. 4th ed. New Delhi: ICAR; 1985.
6. Singh G, Singh Y. Effect of sowing dates and genotypes on growth and yield of wheat. J Res Punjab Agric Univ. 2000;37(1-2):75-81.
7. Gupta PK. Wheat: Production, physiology, and management. New Delhi: Oxford & IBH Publishing; 2012.
8. Anonymous. Fertilizer recommendations for wheat crop in irrigated conditions. ICAR Publication; 2023.
9. Sirgy MJ. Using self-congruity and ideal congruity to predict purchase motivation. J Bus Res. 1985;13(3):195-206.
10. Aaker DA. Building strong brands. New York: Free Press; 1996.