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Relationship between different growing environments and rice varieties at Raipur condition

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Abstract
The performance under different growing environments with rice variety was evaluation during kharif season of 2015-16 at research and institutional farm of Indira Gandhi Krishi Vishwavidyalaya, Raipur. The treatment combinations of three sowing dates (01 June, 15 June, and 30 June) and three varieties (Swarna, Mahamaya, MTU-1010) were laid out in a randomized block design with three replication. Were found that the highest grain yield was recorded for crop sown on 30th June (49.33 q/ha), highest straw yield on 15th June (74.77q/ha) and harvest index was highest on 30th June (42.56) and similarly different varieties influenced the grain yield where highest grain yield was recorded with Swarna 60:40:40 (54.04 q/ha), highest straw yield of variety Swarna100:60:40 (73.52q/ha) and highest harvest index was noticed with Swarna 60:40:40 (42.70). The effect of interaction between dates of sowing and varieties was found non-significant at 5% level of significance.

Keywords: Growing environments, Rice, Variety, RBD, Interaction

1. Introduction
Weather and climate greatly influence the agricultural productivity in any region. Agricultural production and productivity of any region is being regulated by the prevailing climate of that area through temperature, rainfall, light intensity, radiation, sunshine duration etc. The importance of temperature and humidity in enhancing plant nutrient availability and absorption and also the role they play in disease and pest infestation is well documented. Relationship between two or more weather parameters with grain yield of crops can be used for yield prediction well before the actual harvesting of the crops. The unusual weather during reproductive period of a crop adversely affects the crop productivity. In recent years untimely rainfall in Chhattisgarh region during maturity period has affected rice and wheat cropping system. Although the climate is the least manageable part of environmental resources, yet a better understanding of the climatic resources and their interactions with agricultural parameter can help to increase the crop productivity (Goswami *et al*., 2006).
The major climatic factors affecting growth and yield include solar radiation, temperature and rainfall. Temperature, solar radiation and rainfall are important weather factors that influence rice yield directly by affecting the physiological processes involved in grain production and indirectly, through their effect on diseases and insects pest. These factors are often difficult to differentiate in the field. In the tropics, it is determined primarily by onset and withdrawal of the monsoon.

2. Materials and Methods
2. 1 Study area
The field experiment was carried out at Research and Instructional farm of Indira Gandhi Krishi Vishwavidyalaya; Raipur situated in Eastern Central part of Chhattisgarh at $21^0$16' N, longitude 81^0 36' E latitude and an altitude of 289.5 m above mean sea level.

2.2 Climate
The general climatic condition of Raipur is classified as sub-humid with mean annual rainfall of about 1188 mm out of which 87 percent (1023.0 mm) rainfall is received during monsoon (June to September). During *Rabi*, (December to February) only 33.8 rainfall is received and hence rice is mostly grown under rainfed conditions. Maximum and minimum temperature ranges between 24.4 ^{0}C to 42.6 ^{0}C and 10.0 ^{0}C to 27.5 ^{0}C (1 SMW and 22 SMW). Atmospheric humidity is normally higher during June to September thereafter, decreases during *rabi* with increased sunshine hours.

2.3 Weather condition during crop period
During the crop growth period the maximum temperature ranged from 30.0 ºC to 42.9 ºC as where minimum temperature ranged from 15.5 ºC to 27.7 ºC. The total rainfall recorded 972.6 mm, the morning relative humidity varied from 57 to 94 per cent whereas; in after noon it varied from 25 to 80 per cent.

2.4 Soil
The soil of the experimental field was sandy loam with moderately coarse texture of inceptisol group locally known as "*Matasi*." The soil was neutral in reaction and had low phosphorous medium nitrogen and potassium content.

2.5 Cropping history of the field
Prior to the present experiment, the field was cropped with rice (*Oryza sativa* L.) during *Kharif* and wheat (*Triticum aestivum* L.) during *Rabi* in the preceeding three years.

3. Results and Discussion
3.1 Grain yield q/ha.
The data on grain yield in rice varieties as affected by different treatments are presented in the table 6.1. The grain yield was significantly influenced by different dates of sowing. The highest grain yield was recorded for crop sown on 30th June (49.33 q/ha) followed by 15th June (48.28 q/ha) data were significantly differed from each other and least grain yield was observed when crop sown on 01st June. Similarly different varieties influenced the grain yield. The highest grain yield was recorded with Swarna 60:40:40 (54.04 q/ha) followed by Swarna 100:60:40 (53.11 q/ha) and lowest yield was recorded under MTU1010 (32.59 q/ha). The effect of fertilizer dose did not become apparent as grain yield under Swarna 60:40:40 and Swarna 100:60:40 (53.11q/ha) were observed was significantly different to each other. The interaction between dates of sowing and varieties was found non-significant at 5% level of significance.
Delay in sowing reduced the number of filled grains, number of panicle/m^2, test weight, panicle length, harvest index and yield and increase the sterility percentage. This might be due to cloudy weather prevailed during rice growing season. Apart from this the effect of low temperature are poor germination, delayed seedling emergence, stunted growth, leaf discoloration, panicle tip degeneration, incomplete panicle exertion, delayed flowering, failure of dehiscence and fertilization, high spikelet sterility and irregular maturity. Similar findings were also obtained by Khushu and Mavi (1991) and Reddy and Reddy (1992).

Table 6.1: Grain yield in rice as affected by different growing environments and varieties

Treatments	Grain yield qha-1
Dates of sowing	
D_1 (01 June)	35.85
D_2 (15 June)	48.28
D_3 (30 June)	49.33
SEm ±	0.75
CD(p=0.05)	1.98
Varieties	
V_1(Swarna 100:60:40)	53.11
V_2(Swarna 60:40:40)	54.04
V_3(Mahamaya)	38.19
V_4(MTU1010)	32.59
SEm ±	1.30
CD(p=0.05)	2.56

3.2 Straw yield q/ha.
The data on straw yield is given in the Table 6.2. The straw yield q/ha under different dates of sowing was found significant and ranges from 65.73 q/ha to 74.77 q/ha where highest straw yield was obtained when crop sown on 15th June (D_2) which is significantly higher than D_3 and D_1 however straw yield for 30th June and 01th June were at par. Similarly the highest straw yield was observed by variety Swarna100:60:40 (73.52q/ha) followed by Swarna 60:40:40. (72.73q/ha) but found at par with each other and significantly differed from rest of the varieties. Effect of fertilizer dose is coming out to be significant as Swarna 100:60:40 having higher straw yield than Swarna 60:40:40. Least straw yield is for variety MTU-1010 which is significantly less than all other varieties. The interaction between varieties and dates of sowing showed the non-significant difference at 5% level of significance.

Table 6.2: Straw yield in rice as affected by different growing environment and varieties

Treatments	Straw yield qha-1
Dates of sowing	
D_1(01 June)	65.73
D_2 (15 June)	74.77
D_3 (30 June)	67.25
SEm ±	2.16
CD(p=0.05)	5.66
Varieties	
V_1 (Swarna 100:60:40)	73.52
V_2 (Swarna 60:40:40)	72.73
V_3 (Mahamaya)	68.70
V_4 (MTU1010)	62.04
SEm ±	3.74
CD(p=0.05)	7.31

3.3 Harvest index (%)
The data on Harvest index (%) in rice genotypes as affected by dates of sowing and varieties is shown in the table 6.3. Harvest index was significantly differing due to growing environment. The harvest index was highest when crop sown on 30th June (42.56) followed by 15th June (38.79) both were at par and lowest harvest index was noticed under 1st June sowing (33.99). Similarly harvest index showed significant difference due to different varieties, highest harvest index was noticed with Swarna 60:40:40 (42.70) followed by Swarna 100:60:40 (42.27) but both data were at par and lowest was found with MTU1010 (33.62). The effect of interaction between dates of sowing and varieties was found non-significant at 5% level of significance. Similar the different growing dates and that interactions with production parameters are findings were also obtained by Godwa, A. (1993) and Chen S. (2014).

Table 6.3: Harvest index (%) in rice as affected by different growing environment and different varieties

Treatments	Harvest index (%)
Dates of sowing	
D_1 (01 June)	33.99
D_2 (15 June)	38.79
D_3 (30 June)	42.46
SEm ±	0.56
CD(p=0.05)	1.47
Varieties	
V_1 (Swarna 100:60:40)	42.27
V_2 (Swarna 60:40:40)	42.70
V_3 (Mahamaya)	35.05
V_4 (MTU1010)	33.62
SEm ±	0.97
CD(p=0.05)	1.91

Reference

1. Goswami B, Mahi GS, Saikia Uday S. Effect of few important climatic factors on phenology, growth and yield of rice and wheat. Punjab Agricultural University, Ludhiana-141 004, India. Journal of Agrometeorology. 2006; 27(3):223-228.
2. Khushu MK, Mavi HS. Performance of rice varieties under different solar radiation regions. Indian. J Agron. 1991; 36:246-247.
3. Reddy KS, Reddy BB. Effect of transplanting time, plant density and seedling age on growth and yield of rice. Indian Journal Agronomy. 1992; 37(1):18-21.
4. Godwa A, Godwa BA, Muniyappa TV. Effect of planting on productivity of rice cultivars. Journal of Agronomy. 1993; 30:289-291.
5. Chen S, Chen X, Xu J. The economic impact of weather variability on Chinas Rice sector. Evironment for Development, 2014, 1-27.