

Nazir, M. S. 1994. Crop Production. (Ed.): Bashir, E. and Bantel, R. National Book Foundation, Islamabad.: 252.

River Floodplain of Bangladesh. Field Crops Research. 169: 77-88.

Sharif, A., Humphreys, E., Muhammad, S. and Chauhan, B.S. 2014. Optimizing sowing management for short duration dry seeded Aman rice on the High Ganges

Mohammed, A. R. and Tarpley, L. 2009. High nighttime temperatures affect rice productivity through altered pollen germination and spikelet fertility. Agricultural and Forest Meteorology. 149: 999-1008.

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Impact of Dates of Planting on Rice Growth and Yield During Karif Season

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Abstract

Rice is one of the most important food crops in the world. Rice is the mainstay of nearly 40% of the world's population. The planting date is critical for ensuring that the crop receives the best weather conditions possible. The duration of phenophases correlated negatively with the maximum temperature. Towards the end of the planting season, the duration is shortening. Plant height was found to have a significant positive correlation with rainfall and a significant negative correlation with temperature. Dry matter accumulation was highest on August 5th, with a positive correlation with relative humidity and a negative correlation with temperature. It was observed that rainfall during heading to 50% flowering had a negative correlation with a number of filled grains. The yield of the crop had a significant negative correlation with rainfall during the flowering to physiological maturity. The planting date is critical to ensuring that the crop receives optimal weather conditions.

Key words : 50% flowering, Phenophase.

Rice is one of the world's most important food crops. Rice is the staple food of nearly 40% of the world's population. Asian countries account for nearly 90 percent of rice production and consumption. Rice has been cultivated for nearly 60% of total cropped area and nearly 77 percent of total food production in the country. As a result, rice production in India should never be overlooked. The planting date of the rice crop is critical for increased productivity. It

ensures that vegetative growth occurs over an optimal temperature and solar radiation range, and that the cold sensitive stage occurs when the minimum night temperatures are at their warmest. Rice yield can be maximized by planting the rice at the optimal time, which varies between varieties (Reddy and Narayana, 1984). Sowing at the right time ensures that grain fills at the right temperature, which improves grain quality (Dixit, *et al.* 2004). Hence the present study aims to study the impact of dates of planting on rice growth and yield.

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Material and method

In order to study the effect of dates of planting on rice growth and yield the experiment was conducted using split plot design with main plot treatments as five dates of plantings i.e. June 5th, June 20th, July 5th, July 20th and August 5th and subplot treatments as two varieties, Jyothi (short duration) and Jaya (medium duration) with four replications. To study the crop-weather relationship, various observations such as weather observations, phenological observations, biometric observations, yield and yield attributes were recorded. SPSS software was used to conduct the crop weather analysis.

Result and discussion

Each date of planting experienced different weather and it had significant relation with various phenological observations, biometric observations, yield and yield attributes. The results of the study had been discussed below.

Phenological observations : Phenophases are visible stages or phases in a plant's life cycle that can be defined by a beginning and an endpoint. Phenophases typically last for few days to a few weeks. For both varieties, including Jaya and Jyothi, the length of each phenophase has been recorded for five planting dates. Being a medium duration crop the maximum days was taken by Jaya than Jyothi. The number of days for active tillering, panicle initiation, booting, heading, 50% flowering, and physiological maturity were all observed. June 5th and June 20th planting took fewer days i.e. 24 and in the case of Jaya, June 5th and July 20th planting took fewer days to reach the active tillering which was 27 days. July 20th planting took a maximum number of days to reach active tillering i.e. 29 and 26 days for Jaya and Jyothi respectively. The number of days for transplanting to active tillering showed a significant negative correlation (Fig. 1).

temperature was found to be inversely proportional to the duration of transplanting to active tillering. The days of tillering were extended due to the drop in temperature. Sridevi and Chellamuthu, 2015 discussed similar results.

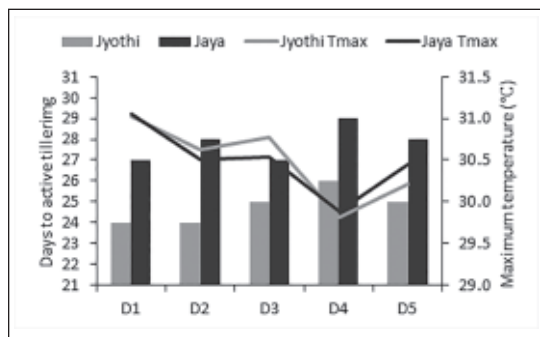


Fig. 1. Impact of maximum temperature on duration of transplanting to active tillering in Jyothi and Jaya

July 20th planting took a minimum number of days (98 days) to achieve physiological maturity. While June 20th planting took 100 days, June 5th and July 5th took the same number of days i.e. 101 days while the last planting took 99 days to attain physiological maturity. In the case of Jaya, June 5th planting took the maximum number of days to attain physiological maturity i.e. 116 days followed by July 5th planting (113 days) and June 5th planting. The last 2 plantings took comparatively fewer days than other plantings i.e. 105 for July 20th planting and 103 days for August 5th planting. Ziska *et al.* (1997) reported that an early maturation of rice crop had been observed with an increase in temperature by 4°C. In dry season the maturity of crop is enhanced by six days and in wet season the crop is expected mature early by five days. And a similar kind of result had been found here (Fig. 2).

Biometric observations : Plant height was recorded at weekly interval, Among the varieties plant height was found to be higher in Jyothi. According to Vysakh *et al.* (2015), an increase in maximum temperature may result in a

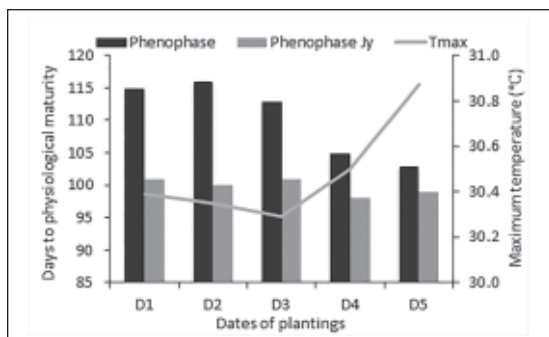


Fig. 2. Impact of maximum temperature on duration of Jaya and Jyothi

decrease in plant height. This was discovered during the course of the research. The effect of maximum temperature on plant height is depicted in Fig. 3. Rainfall was found to have a positive effect on plant height in this study. Fig. 4 depicts how increased rainfall causes an increase in plant height. Precipitation had a

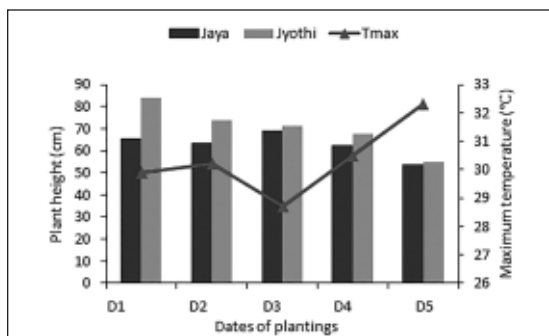


Fig. 3. Impact of maximum temperature on plant height during the vegetative phase

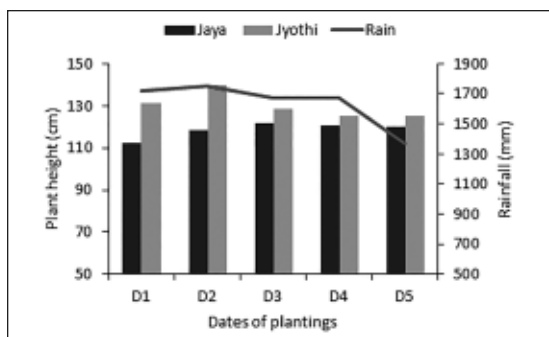


Fig. 4. Impact of rainfall on plant height during the crop period

positive correlation with plant height during the plant growth period, according to Abbas and Mayo, 2019.

Dry matter accumulation was recorded at fortnightly interval. During the August 5th planting, the maximum amount of dry matter accumulated. Singh *et al.*, (2012) found that increasing the maximum temperature resulted in a decrease in dry matter accumulation. Fig. 5 shows that an increase in maximum temperature leads to a decrease in dry matter accumulation. Relative humidity showed positive correlation with the dry matter production i.e. an increased relative humidity enhanced the dry matter production of rice varieties (Fig. 6).

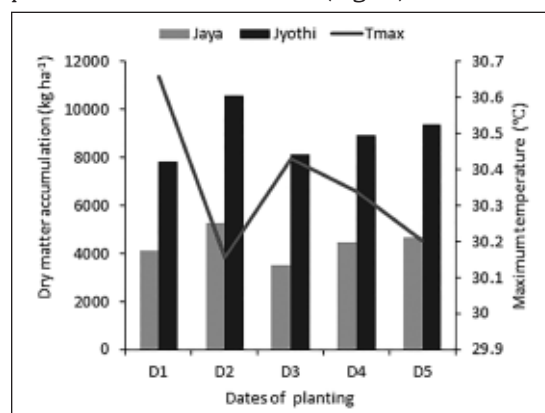


Fig. 5. Impact of temperature on dry matter accumulation

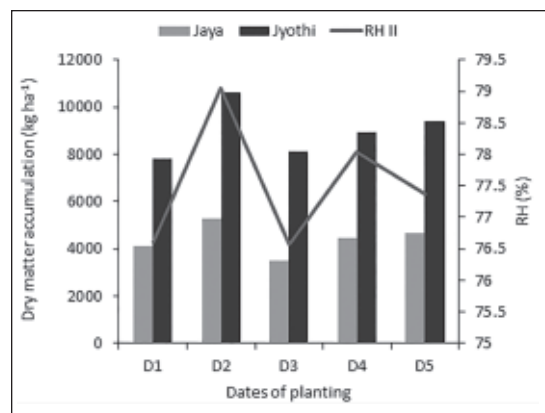


Fig. 6. Impact of relative humidity on dry matter accumulation

Yield and yield attributes : It was observed that rainfall during heading to 50% flowering had a negative correlation with number of filled grains. Fig. 7 depicts the relationship between filled grains and rainfall received during heading to 50% flowering. Sreenivasan, 1985 reported that intense rainfall gave rise to blank florets that may be the reason for the reduced number of filled grains in rice with an increase in rainfall.

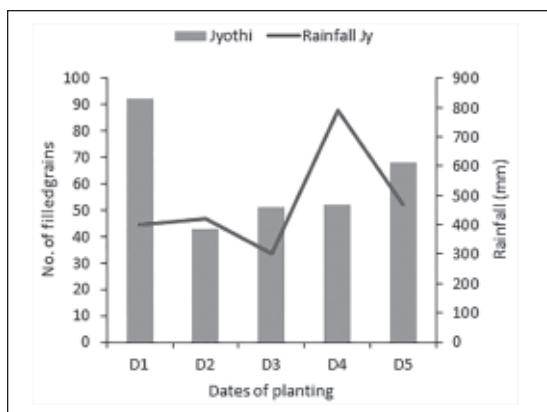


Fig. 7. Impact of rainfall on filled grains

In Jaya, yield obtained during July 20th and August 5th planting were found to be on par. In the case of Jyothi, June 5th planting and August 5th plantings were found to be on par. During the last phenophase of rice, a negative relationship was observed between yield and the number of rainy days. Heavy rains during this time period had a significant negative impact on grain yield (Narayanan, 2004). Rainfall during

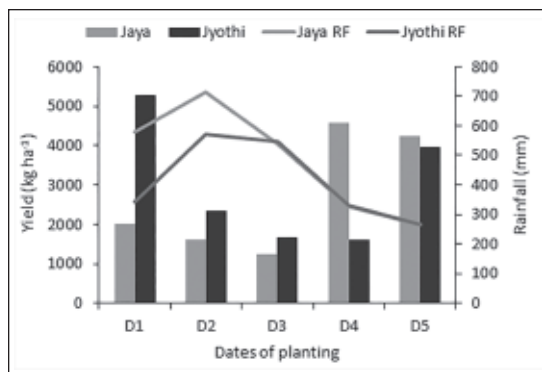


Fig. 8. Impact of relative humidity on dry matter accumulation

the flowering was also found to have a negative correlation with yield in this study (Fig. 8). Pradhan and Dixit (1989) observed a decrease in rice yield as a result of the combined effect of constant rainfall and strong winds. During the July 20th planting of Jyothi, a similar condition was observed. The rainfall and wind speed that prevailed from 50% flowering to physiological maturity are depicted in Fig. 9. That could explain the lower yield of Jyothi during the July 20th planting.

Conclusion

The planting date is critical to ensuring that the crop receives the optimal weather conditions. According to the findings of the study, early planting of the short-duration variety Jyothi may be preferable under changing rainfall patterns. While in the medium term, Jaya late planting may be preferable. These planting dates

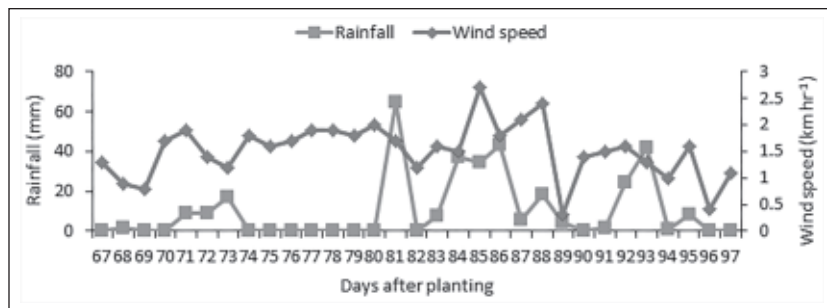


Fig. 9. Impact of rainfall and wind speed in July 20th planting of Jyothi

would prevent extreme rainfall events from occurring during a rainfall sensitive period (flowering).

References

- Abbas, S. and Mayo, Z. A. 2021. Impact of temperature and rainfall on rice production in Punjab, Pakistan. *Environ. Development Sustainability*, 23(2): 1706-1728.
- Dixit, A. J., Thorat, S. T., Gaikwad, V. V. and Jadhav, M. G. 2004. Yield attributes and yield of parental lines of sahyadri hybrid rice as influenced by sowing dates. *J. Agrometeorol.* 6: 95-97.
- Narayanan, A. L. Relative influence of weather parameters on rice hybrid and variety and validation of CERES-Rice model for staggered weeks of transplanting, Ph. D thesis, Tamil Nadu Agricultural University, Coimbatore, 2004.
- Pradhan, L. and Dixit, L. 1989. Source and time of phosphorous application in irrigated rice. *Int. Rice Res. Newsl*, 12(2): 33.
- Reddy, S. N. and Narayana, P. 1984. Pattern of dry matter accumulation and N uptake by rice as influenced by age of seedling and date of planting. *Andhra Agric. J.* 32: 155-56.
- Singh, S., Kaur, P., Kumar, V. and Singh, H. 2012. Incidence of insect pest damage in rice crop in relation to meteorological parameters in Punjab—a plant clinic data based case study. *J. Agrometeorol* 14(1): 50-53.
- Sreenivasan, P. S. Agroclimatology of rice in India. In: *Rice research in India*. ICAR New Delhi .1985. 203-230
- Sridevi, V. and Chellamuthu, V. 2015. Impact of weather on rice - A review. *Int. J. Appl. Res.* 1(9): 825-831.
- Vysakh, A., Ajithkumar, B., and Rao, A. V. M. S. 2015. Evaluation of CERES-Rice model for the selected rice varieties of Kerala. *J. Agrometeorol.* 18(1): 120-123.
- Ziska, E., Fraser, D. and Falcon, P. 1997. Assessing risks of climate variability and climate change for rice. *Science*, 240: 996-1002.

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Assessment of Physical, Chemical and Biological Properties of Soil in Onion Based Cropping Systems Through Organic Nutrient Management

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Abstract

The field studies were conducted for 2 years (2015-16 to 2016-17) on a clay loam soil at the IFSRP, Rahuri, to assess the influence of organic nutrient management systems on soil physical, chemical and biological properties in the onion based cropping systems. In respect of all above assessment, application of 50% N through FYM + 50% N through Vermicompost to kharif crops followed by 100% N through organic (In equal split of N through 50 : 50% FYM : Vermicompost) recorded significant values of physical, chemical and biological properties of soil.

Key words : Onion, cropping system, soil properties, organic nutrient.

Today, the burgeoning population pressure has forced many countries to use chemicals and

fertilizers to increase the farm productivity for meeting their ever-increasing food requirements. An applications of such high input intensive technologies have undoubtedly increased the

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