

Influence of low temperatures stress on growth and yield of rice

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ABSTRACT

A field experiment was conducted during two consecutive seasons of *Kharif* 2003 and 2004 at Regional Agricultural Research Station, Jagtial to study the influence of low temperature stress on phenology and yield of *Kharif* rice. Results indicated that grain yield was significantly higher with early sowing followed by normal sowing. Among varieties JGL 1798, which is a short duration variety, recorded the highest grain yield followed by JGL 384. The long duration variety BPT 5204 produced significantly higher yield under early sown conditions and the grain yield progressively declined as the sowings were delayed. The minimum temperatures at flowering was strongly and positively correlated to yield as compared to minimum temperatures from PI to 50% flowering and 50% flowering to maturity. The regression equation indicated reduction in grain yield by 654 kg/ha due to one-degree reduction in minimum temperature at the time of flowering.

Key words : Dates of sowing, Grain yield, Phenology, Varieties, Rice, Low temperature stress

INTRODUCTION

Rice is the principal crop in the Northern Telangana region of Andhra Pradesh during *Kharif*. Due to erratic monsoon conditions coupled with lack of inflows into reservoirs, delay in transplanting of *Kharif* rice even beyond September is quite a common phenomenon. Drastic reduction in grain yields were observed due to delayed plantings. Further, the late-planted crop here suffers due to higher incidence of pests and diseases resulting in poor yields (Rao, 1991). The major production factor, to boost the yields of high yielding varieties of rice are optimum sowing time and improved package of practices. Temperature is one of the major factor influencing crop growth, which can not be manipulated under field conditions, but seeding time can be adjusted in a particular region to fit the existing temperature regimes best suited for different growth stages (Kumar *et al.*, 1998). Hence, a field experiment was conducted to find out the suitable variety and cut off date of sowing to escape temperatures stress in the Northern Telangana zone of Andhra Pradesh during *Kharif*.

MATERIALS AND METHODS

A field experiment was conducted during two consecutive seasons of *Kharif* 2003 and 2004 at Regional Agricultural Research Station, Jagtial. The soil was shallow medium black with pH 7.9, EC 0.42 m mhos/cm and medium in organic carbon, low in available P and high in available K. The experiment was laid out in split plot design with three varieties of different duration (JGL-1798, JGL- 384 and BPT-5204) as main plots and four dates of sowings (25th May, 15th June 10th July and 2nd August) as subplots with three replications. 30-day-old

seedlings were planted at a spacing of 20 cm x 15 cm. The crop received a uniform dose of 100 kg N, 60 kg P₂O₅ and 40 kg K₂O /ha. Entire P₂O₅ and half the recommended potash was applied as basal and remaining half potash was applied at panicle initiation stage. Nitrogen was applied in three equal splits 1/3 as basal, 1/3 at active tillering and remaining 1/3 at PI stage. The crop was maintained free from major incidence of insect pests and diseases; shallow submergence condition was maintained until 10 days before harvest. Observations on phenological data, yield attributes and yield were recorded and analysed statistically.

RESULTS AND DISCUSSION

The results obtained from the present study as well as relevant discussion have been presented under following heads:

Dates of sowing:

Data on crop phenology (Table 1) reveals that early sowing took significantly more number of days to attain the stage of 50% flowering followed by very late sowing. The days to maturity were more in early sowing.

Observations on yield attributes reveal that the number of panicles/m² and number of filled grains/panicle were higher with early sowing and progressively declined as the date of sowing was delayed. The grain yield was significantly higher with early sowing (5612 and 5461 kg/ha during 2003 and 2004, respectively) as compared to normal, late and very late sowing. Higher grain yield in early date was due to more no of filled grains and higher panicle number.

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