

Influence of irrigation schedule on yield and water use efficiency of rice (*Oryza sativa*) in kharif season

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ABSTRACT

A field experiment was conducted during the rainy (*kharif*) season of 2003 and 2004 at Research Station Kalai, Aligarh of C.S. Azad University of Agriculture and Technology Kanpur, to study the yield and water use of rice (*Oryza sativa*) as affected by irrigation schedule. Irrigation schedule having three days drainage period after disappearance of ponded water yielded rice higher with maximum water use efficiency as compared to continuous submergence or submergence at critical stages like tillering, panicle initiation, flowering and milk followed by saturation or field capacity between intermetant periods. Irrigation schedule having four or five days drainage periods after disappearance of ponded water found to be detrimental.

Key words: Irrigation schedule, Saturation, Field capacity, Drainage, Wateruse.

INTRODUCTION

In the era of global warming and drastic climate change, especially erratic distribution of rainfall during monsoon season, water became most precious natural resource in Agriculture today. Minimizing irrigation requirement of rice crop without reducing yield would be the most appropriate measure to ensure maximum water use efficiency vice-vis savings of water. Keeping this in view, this study was aimed to find out the water use and yield of rice under different irrigation schedule under local conditions.

MATERIALS AND METHODS

A field experiment was conducted during rainy (*kharif*) season of 2003 and 2004 at Kalai (Aligarh) research station of C.S. Azad University of Agriculture and Technology (Kanpur) on sandy loam soil (Typic Ustochrepts) having pH (1:2.5) 7.5, E.C.(1:2.5) 0.59 dsm⁻¹, Organic Carbon 0.45% and available P,K and water soluble-S contents as 13.9, 114.4 and 33.7 kg ha⁻¹ respectively. The treatments comprised of eight levels of irrigation schedule (Table 1). The experiment was laid out in R.B.D. with four replications. Full dose of P₂O₅ (60kg/ha) and K₂O (60kg/ha) and half dose of nitrogen (60kg/ha) were applied as basal. Rest of Nitrogen (60kg/ha) was applied in two equal splits viz. each at maximum tillering and at panicle initiation stages. Rice seedlings variety Pant-12 aged 28 days were transplanted on 16-7-03 and 17-7-04 and harvested on 13-10-03 and 18-10-

04 in 2003 and 2004, respectively. Water level of 7 cm. was maintained after 7 days of transplanting as per the irrigation treatments. Total water expense was calculated as the sum of irrigation water applied and effective rains during the crop seasons of the respective years.

RESULTS AND DISCUSSION

Different irrigation schedules had a significant effect on yield of rice (Table 1). Three days drainage period after disappearance of ponded water significantly yielded higher (5880kg/ha) than that of continuous submergence through out the crop season (5744kg/ha). However, prolong drainage periods (4 and 5 days) as well as submergence at critical stages of crop growth followed by field capacity or saturation through out crop season reduced yield. Application of water at wider intervals of 3to5 days after disappearance of ponded water, depended on location and soil type, yielded higher or at par with continuous submergence through out crop season. Similar results have also been reported by Ganesh (2000) and Ganesh *et al.* (2001). Continuous submergence through out the crop season and one day drainage period after disappearance of ponded water yielded rice at par during summer (Parihar, 2004).

Continuous submergence required maximum water (187.5cm) without any significant increase in grain yield than irrigation applied three days after disappearance of ponded water (Table 2). Therefore, the water use efficiency (WUE) with continuous submergence through

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