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Productivity and water use efficiency of aerobic rice under different moisture regimes in Eastern India

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ABSTRACT

A field experiment on aerobic rice culture was initiated at the Deras Farm, Mendhasal in Khurda district, Odisha during summer season (January to April) of 2007 and 2008 with the objective of identifying the suitable variety and irrigation regime for aerobic rice culture. Under aerobic condition, three rice varieties viz., Lalat, Surendra and Kandagiri were directly sown in the main field without puddling. All the varieties were also sown on the same day in nursery and transplanted 25 days after sowing. Irrigation treatment consisted of I₁-keeping soil moisture at 80-90% of available soil moisture (ASM) throughout the crop season, I₂-keeping soil moisture at 60-70% of ASM during vegetative and thereafter 80-90% and I₃-keeping soil moisture at 60-70% of ASM throughout the crop season and I₄- Conventional rice cultivation. Growth and yield characters were significantly influenced by establishment methods, irrigation regime and varieties. Initial plant growth characters like plant height, tiller number were higher under aerobic rice. However, as the season advanced, values of growth characters were higher under transplanted rice. Yield attributes viz., panicle numbers, grains per panicle were also higher under transplanted rice. Among irrigation regimes under aerobic culture, higher values of yield attributes were recorded in the treatment I₁. Under aerobic rice root mass density was maximum under Kandagiri, which was followed by the variety Lalat. The highest yield (4.88 t ha⁻¹) was recorded in the variety Surendra under transplanting method. In aerobic condition, the highest grain yield (3.98 t ha⁻¹) and higher water use efficiency (46 kg ha⁻¹ cm⁻¹) was recorded in the variety Surendra, irrigated at 80-90% soil moisture content (I₁).

Key words:

Aerobic rice,
Eastern India,
Rice growth,
Water management