

# Evaluation of rice genotypes and effect of reclamation practices on growth and yield of lowland rice in coastal saline alluvial soils

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## ABSTRACT

Field experiments were conducted during samba 2004 in farmer's field at Prathaparamapuram, Nagapattinam district, Tamil Nadu to evolve cost effective strategies for enhancing rice productivity through tolerant genotypes and management practices in coastal saline soil conditions. The experiment was conducted with four varieties namely, CR 1009, CO 43, TRY 1 and Dandi with four reclamation practices viz., application of farm yard manure @ 12.5 t ha<sup>-1</sup>, green leaf manure *Calotropis gigantea* 6.25 t/ha<sup>-1</sup>, leaching and without any reclamation practices as control. Farm yard manure had higher impact on yield attributes than green leaf manure and leaching. The application of farm yard manure improved the number of productive tillers m<sup>-2</sup>, panicle length, filled grains panicle<sup>-1</sup> and test weight of grains. CO 43 with farm yard manure application recorded the highest grain yield and was followed by CO 43 with green leaf manure application and TRY 1 with farm yard manure addition.

**Key words :** Reclamation, Farm yard manure, Leaching, Green leaf manure.

## INTRODUCTION

Rice is one of the major staple food crops that have been cultivated for over 10,000 years. Globally, rice ranks second to wheat, but in terms of food crop, rice provides more calories per hectare than any cereal crop. In India, rice is the major food grain crop that ranks first in total production. The average productivity in India is 2.92 t ha<sup>-1</sup>. Tamil Nadu is one of the major rice cultivating state with the major rice growing tracts in the deltaic region of the Cauvery river.

Salinity is one of the obstacles in high production of rice in the deltas and coastal fringes. It is a serious impediment to growth of irrigated rice (Ponnamperuma, 1977). Rice is the major crop that is cultivated in most of the coastal areas during the north east monsoon season (Kothandaraman, 1987). Govindaraju and Balakrishnan (2002) observed that increasing salinity level contributed to significant decline in growth and yield attributes.

In problem soils, amendments were found to increase growth attributes of rice (Kadu *et al.*, 1991). The grain yield of rice was improved due to leaching (Aich *et al.*, 1996). Bandyapoadhyay and Bandyapoadhyay (1984) found that farm yard manure application produced higher yield of rice in coastal saline soils. Green leaf manuring is also a suitable amendment for rice grown in saline soils. The present study was undertaken to study the effect of reclamation on growth and yield in different varieties of rice.

## MATERIALS AND METHODS

Field experiments were conducted in farmers' field, Nagapattinam on a sandy clay loam soil with pH 7.6 and E.C. 4.26 under lowland conditions during rabi 2004. The soil was low in available nitrogen (130.8 kg/ha<sup>-1</sup>), high in available phosphorus (24.34 kg/ha<sup>-1</sup>) and high in available potassium (305.2 kg/ha<sup>-1</sup>). The organic carbon status was

low (0.28%). The rainfall received during the cropping period was 1757mm in 47 rainy days. The experiment was laid out in Factorial Randomised Block Design with three replications with the following treatments

| Varieties              | Treatments  |
|------------------------|---|
| V <sub>1</sub> CR 1009 | T <sub>1</sub> FYM application 12.5 t/ha <sup>-1</sup>                                  |
| V <sub>2</sub> CO 43   | T <sub>2</sub> Green leaf manure ( <i>Calotropis gigantea</i> ) 6.25 t/ha <sup>-1</sup> |
| V <sub>3</sub> TRY 1   | T <sub>3</sub> Leaching   |
| V <sub>4</sub> Dandi   | T <sub>4</sub> Control  |

A common dose of NPK 150: 50: 50 kg/ha<sup>-1</sup> along with 25 kg/ha<sup>-1</sup> ZnSO<sub>4</sub> was applied for varieties Co 43, TRY 1 and CR 1009 and 120: 38: 38 kg ha<sup>-1</sup> NPK for Dandi. The varieties were transplanted with 20 x 15 cm spacing in 5 x 3.9 m plots with a buffer channel of 30 cm around all plots. Irrigation was done to maintain standing water of 5 cm depth. The entire dose of P was applied basally and N and K were applied basally and the remaining was applied in two equal splits at tillering and panicle initiation.

## RESULTS AND DISCUSSION

The results of the study indicate that there was a favourable effect of management practices on growth and yield of lowland rice. Application of farm yard manure had significantly greater influence on growth and yield followed by green leaf manure and leaching over control.

### Growth attributes :

The plant height was influenced by the treatments. Among varieties, TRY 1 had the maximum plant height of 104.4 cm and among the treatments; farm yard application produced the maximum plant height of 93.7 cm. The LAI was improved with the adoption of reclamation practices. The application of farm yard manure 12.5 t/ha<sup>-1</sup> had the highest LAI followed by green leaf manure 6.25 t/ha<sup>-1</sup> and

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