

## Physiological attributes of rice (*Oryza sativa* L.) as influenced by *Sesbenia aculeata* and other organic sources of nutrients

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### ABSTRACT

An experiment was conducted under long term organic manurial experimental plot at wetlands of Tamil Nadu Agricultural University, Coimbatore, to study the effect of *Sesbenia aculeata* and other organic sources of nutrients on physiological parameters of rice. The experimental study reveals that application of green manure and poultry manure increased the leaf area index (LAI), dry matter production (DMP), chlorophyll content, crop growth rate (CGR) and relative growth rate (RGR). On the other hand Incorporation of *Sesbenia aculeata* (Dhaincha) as green manure + poultry manure application on N equivalent basis improved the crop yield along with the improvement in physiological parameters compared to other treatment combinations.

**Key words :** CGR, RGR, Physiological attributes and organic manures

### INTRODUCTION

Rice (*Oryza sativa* L.) being the principal food crop to the billions of people around the world and India, occupies a pride place among the food crops cultivated in the world. Organic farming is gaining momentum in the recent past due to the farmer's movement, consumer's choice and promotion from the policy planners not only in India but also across the world. Growing awareness on health and environmental issues in agriculture has demanded production of organic foods, which are emerging as an attractive source of rural income generation (Bhattacharyya and Chakraborty, 2005).

Crop dry matter production (DMP) can be analysed in terms of crop growth rate (CGR) and relative growth rate (RGR), which are two important growth indices used in growth analysis (Watson, 1952). Also leaf area index will indirectly influences the plant growth by influencing the DMP. Organics applied to the soil, supply plant nutrients for crop growth and affect the plants physiological processes, which serve as important instrument in yield development. Siddique *et al.* (1989) observed differences in respect to the yield improvements through CGR and RGR. Hence keeping these points in view, the present investigation was carried out to study the effect of *Sesbenia aculeata* as green manure and applied organic sources of nutrients on physiological attributes *viz.*, LAI, DMP, Leaf N content (chlorophyll), CGR and RGR.

### MATERIALS AND METHODS

A field experiment was carried out at wetlands of

Tamil Nadu Agricultural University, Coimbatore, under long term organic manurial trial, during *Rabi* season of the cropping year 2008. The soil of experimental field was clay loam having 21.74% fine sand, 19.92% coarse sand, 18.3% silt and 40.0% clay. Experimental soil contained 225 kg N, 35 kg P and 465 kg K ha<sup>-1</sup>, respectively with the EC (0.44 dSm<sup>-1</sup>), pH (8.68) and OC of 0.5% at the beginning of the experiment. The experiment was laid out in a split plot design with 3 replications. The main plot treatments consisted without and with green manure incorporation *i.e.* G<sub>0</sub> and G<sub>1</sub>. Sub plot treatments includes different organic sources of nutrients *i.e.* FYM (M<sub>2</sub>), poultry manure (M<sub>3</sub>), vermicompost (M<sub>4</sub>) and no manure (M<sub>1</sub>) as a control. The organic manures *viz.*, FYM, poultry manure and vermicompost were analyzed for their N content and applied on N equivalent basis *i.e.* (15 t, 3.5 t and 4.3 t ha<sup>-1</sup>, respectively) prior to transplanting. The green manure crop *Daincha* was raised treatment wise and incorporated after 48 days. Rice seedlings (variety Improved White Ponni) were transplanted (26 days old) from separate organically grown nursery on 12<sup>th</sup> September 2008, with 2 seedlings hill<sup>-1</sup> at a spacing of 20 x 10 cm. Rice was harvested on 10<sup>th</sup> January, 2009.

Dry matter production (DMP) was arrived by discarding the root portion of the plant. The above ground portion of the plant samples were dried under the sun, then in hot air oven at 65°C. Mean dry weight hill<sup>-1</sup> was calculated and it was expressed in kg ha<sup>-1</sup>. Leaf area index (LAI) was worked out using the formula suggested by Palaniswamy and Gomez (1974).

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