

Yield maximization of rice under *rabi* season through physiological manipulation

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SUMMARY

The effect of foliar application of plant growth regulators such as brassinolide, mepiquant chloride, salicylic acid, triacontenol, humic acid and seaweed extract of *Sargassum* sp. on rice was observed in *rabi* season. The results revealed that among the treatments sea weed extract and brassinolide brought about significant increases in yield through favourably modifying morpho- physiological characters.

Key words : Rice, *Rabi* season, Plant growth regulators, Yield

Rice is the major cereal crop in South East Asia, which is grown under two seasons, namely, *kharif* and *rabi*. Its productivity level could not be maintained because of significant control exercised by seasons. When compared to rice grown under *kharif* season, the yield of *rabi* season rice is much lower and this could be attributed to lower level of solar radiation and decreased temperature pertaining during *rabi* season. Previous studies have also indicated lower yields in rice under *rabi* season as a consequence of decreased photosynthesis, which led to lower biomass productivity (Tanaka *et al.*, 1964). Under low light conditions, the crop suffered higher sterility, which accounted for low yield levels during *rabi* season. Besides, the plants also exhibited taller stature (Stansel *et al.*, 19565). With a view to increasing the productivity of rice under *rabi* season, an attempt was made using plant growth regulator and other chemicals for enhancing the yield potential. In an experiment conducted during the period 2003-05.

MATERIALS AND METHODS

A study was conducted at the experimental fields of the Agricultural College and Research Institute of Tamil Nadu Agricultural University at Madurai during the period 2003-05. The field trial was laid out in a Randomized Block Design and the treatments consisted of foliar spray of the following chemicals at pre-flowering phase of the crop:

- Brassinolide (0.3 ppm),
- Mepiquant chloride (125 ppm),

- Salicylic acid (125 ppm),
- Triacontrol (100 ppm),
- Humic acid (1 %)
- Seaweed extracts (5.0 %).

The soil of the experimental field was clay loam with available N, P and K being 265.0, 12.2 and 310.0 kg/ha and, respectively. Twenty five days old seedlings of the rice variety, ADT 39, were transplanted at the rate of 2-3 seedlings per hill at a spacing of 20 x 10 cm. The recommended package of cultivation practices was carried out. The physiological and yield parameters were recorded in each of the treatment plots.

RESULTS AND DISCUSSION

The results of the experiment clearly indicated the positive influence of chemicals applied to the plants through foliar spray (Table 1). Among the various treatments imposed, brassinolide (0.3 ppm) followed by sea weed extract (2.5%) brought about significant increase in leaf area index (LAI) and leaf area duration (LAD). The positive impact of these two chemical substances was already confirmed in previous studies. The increased source site as reflected by higher LAI and LAD led to greater DMA under these treatments.

Besides brassinolide, seaweed extract effectively enhanced the total chlorophyll content (3.24 mg/g) and photosynthetic rate (38.5 mg CO₂ dm⁻² h⁻¹). These results are in accordance with the reports of earlier studies (Gandhiyappan and Perumal, 2001). The Plants that received the foliar spray of sea weed extract registered higher grain yield of 3466 kg ha⁻¹. The brassinolide treatment also was equally effective in significantly improving the yield.

The lowest grain yield (2990 kg/ha) was recorded under untreated control plots. The maximum yield achieved under seaweed extract could be explained by the higher level of performance in growth as well as

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