

SOME MORPHOLOGICAL AND PHYSIOLOGICAL ASPECTS
ASSOCIATED WITH GRAIN YIELD OF RICE

By

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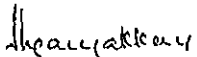
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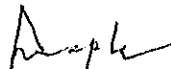
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ABSTRACT

The cultivated Indica varieties of rice (Oryza sativa L.) in Sri Lanka can be divided into three groups namely traditional old improved and new improved. Yield variation among these three varietal groups is high and this may be attributed to the differences in morphological and physiological processes of these different varietal groups. Studies on these aspects may lead to the identification of physiological potentialities of local varieties. Thus the problem of losing the valuable local gene pool may be overcome.

The present research was conducted to study some morphological characteristics and physiological aspects associated with grain yield of rice. Two rice varieties from each of traditional (Pachchaperumal and Kalu Heenati), old improved (62-355 and Bg 301) and new improved (Bg 276-5 and Bg 300) varietal groups were selected for the study.

In the first experiment the selected rice varieties were compared in terms of plant height, tillering habit, dry matter yield, leaf area index, crop growth rate, net assimilation rate and yield components under recommended cultural practices. Traditional and old improved varieties were tall and produced more tillers than new improved varieties. All selected varieties showed maximum tillering at or just after heading and new and old improved varieties had a higher LAI and a higher

total biomass production than those of traditional varieties at harvest. Similarly old and new improved varieties showed a higher crop growth rate than that of traditional varieties from panicle initiation to heading. Net assimilation rate, number of panicles per square meter, filled grain percentage and thousand grain weight varied among varieties regardless of whether the varieties were traditional, old improved or new improved.

The second experiment evaluated the removal of leaves on the productivity of the panicle. Removal of lower leaves had little effect on the weight of filled grains. The presence of top two leaves was adequate to obtain the maximum thousand grain weight in rice. Total grain filling unlike the weight of filled grains is closely related to the presence of leaves after heading. With improvement in genotype, the process of grain filling is greatly dependent on the presence of leaves near the panicle including the flag leaf.

The third experiment investigated the nitrogen response of the selected rice varieties. Biomass production of old improved and new improved varieties were higher than traditional varieties. Straw yield of the tested old improved varieties were higher than other two groups. Furthermore nitrogen increased the panicle number per unit area of all varieties. The results suggests that while nitrogen fertilizer is essential for grain filling, excess quantities have an adverse effect on the percentage of filled grains.