

111. Agro-physiological Studies on Low-tillering Rice : an Ideotype for Increasing Grain Yield Potential.

III. Effect of Spacing, Nitrogen and Seedling Number per Hill on the Performance of Low-tillering Rice.

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Objective :

To evaluate the performance of low tillering rice as an ideotype for increasing grain yield potential at different plant spacings, N levels and seedling numbers per hill.

Materials and Methods :

IR25588 and IR58 were used in 1988 dry season, IRRI. The field experiment was conducted using a split-split-plot design with 3 replications. Four N levels were designated as the mainplot ; the combination of two plant spacings and two seedling numbers per hill as the subplot ; and the two rice entries as the sub-subplot.

Results and Discussion :

1) The grain yield of a low tillering, panicle weight type IR25588 was higher than that of a high tillering, panicle number type IR58 under close spacing with high N level in transplanted rice (Fig.1) This result suggests that a low tillering, panicle weight plant type is recommended for increase in grain yield potential in rice.

2) IR25588 had as many panicles per unit area as IR58 under high planting density with high N level. Spikelet number per panicle and 1000-grain weight of IR25588 were higher than those of IR58 under all conditions. Percent filled spikelet decreased with increasing spikelet number per unit area without varietal differences.

The panicle size (spikelet number per panicle) and individual grain weight were the main components responsible for higher grain yields in the low tillering, panicle weight type.

3) The 1000-grain weight of IR25588 was highly correlated with leaf area and culm weight per tiller, but not observed in IR58 (Fig. 3). Spikelet number per panicle in IR25588 and IR58 was positively correlated with total dry weight and leaf area per tiller at heading. However, the correlation was higher in IR25588 than in IR58 (Fig. 4)

Larger culm and leaf area were the main sources of better grain filling and high grain yield in IR25588, low tillering panicle weight type.

This results indicate that, with proper cultural management, the grain yield potential of low tillering rices could be higher than that of high tillering rices.

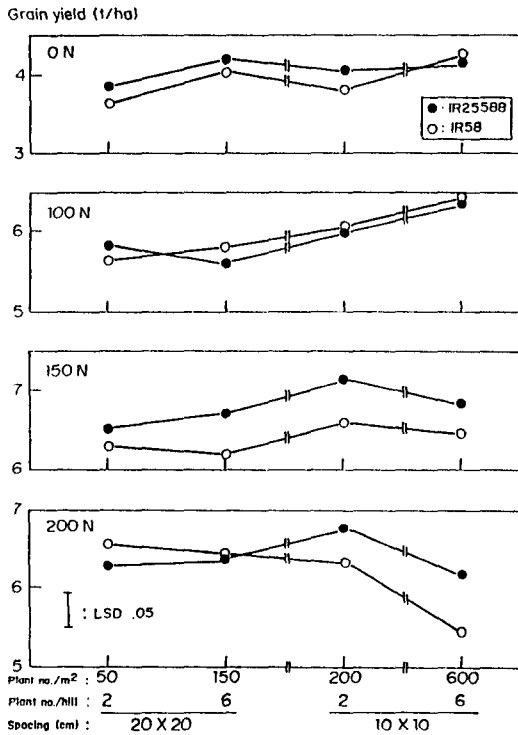


Fig. 1. Grain yield of low tillering IR25588 and high tillering IR58 as affected by nitrogen level, plant spacing and seedling number per hill. IRRI, 1988 DS.

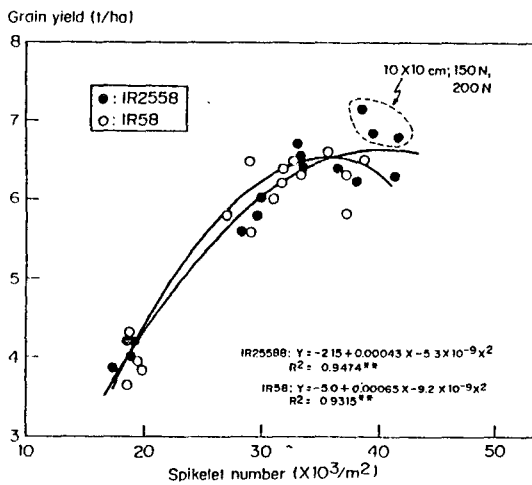


Fig. 2. Relationship between grain yield and spikelet number per unit area in IR25588 and IR58. IRRI, 1988 DS.

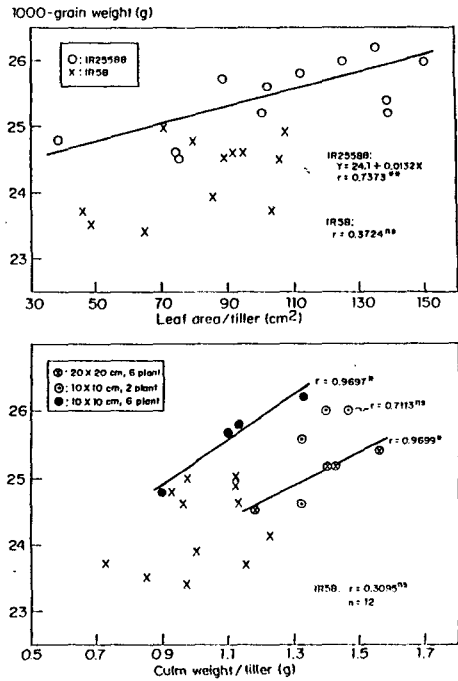


Fig. 3. Relationship between 1000-grain weight and leaf area per tiller at heading and culm weight per tiller at harvest in IR25588 and IR58. IRRI, 1988 DS.

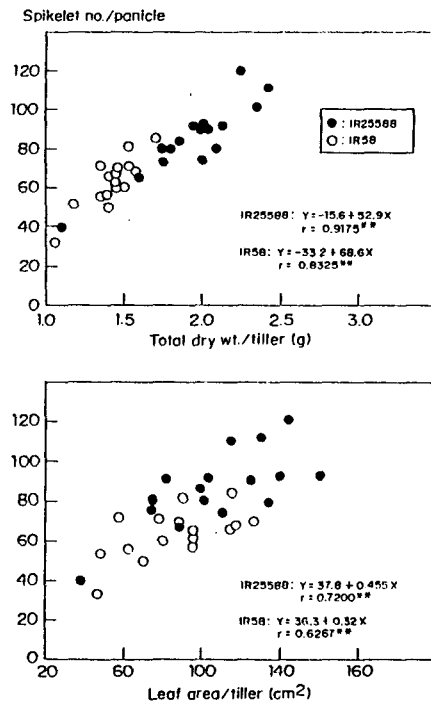


Fig. 4. Relationship between spikelet number per panicle and total dry weight and leaf area per tiller at heading in IR25588 and IR58. IRRI, 1988 DS.