

Evaluation of morphological characteristics of local and improved rice (*Oryza sativa* L.) genotypes under two nitrogen levels in hydroponic culture

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Abstract

In order to study the response of rice genotypes to different levels of nitrogen (N), an experiment was conducted to evaluate growth and development of 28 selected rice genotypes (improved and local from north of Iran, and cultivated in Central Iran) under two levels of N including 2.85 mM (N concentration of Yoshida solution) and 1.42 mM (half the N concentration of Yoshida solution) from ammonium nitrate source. The experiment was arranged as factorial, based on a completely randomized blocks design, with three replications. Results showed that the effects of genotype, N level and their interaction were significant on the number of tillers, leaf area, SPAD index, dry weight of roots, shoot and total, shoot and root length and biomass. The extent of reductions in the values of all measured traits, except for root length and dry weight, were higher in north local genotypes as compared to other tested groups. The reductions in total dry weight were 14.82, 5.80 and 2.67 percent for north local, north improved and genotypes from center of Iran, respectively. There was significant variation among genotypes in response to nitrogen deficiency. Nitrogen efficiency was highest in Fajr and Khazar within north improved genotypes, in Hassani and Kazemi within north local genotypes and in Line2 Firozan within genotypes from center of Iran. However, the lowest values for nitrogen efficiency were achieved in Nemat and Shirodi within north improved genotypes, in Tarom-mantaghe and Ahlami Tarom within north local genotypes and in Zayandehrud within genotypes from center of Iran. Results showed that correlation between shoot dry weight (as plant yield) with number of tillers and plant leaf area were higher under N deficiency ($r = 0.74$ and $r = 0.57$) than under nitrogen sufficiency ($r = 0.13$ and $r = 0.41$) conditions.

Keywords: Genetic diversity, SPAD index, Nitrogen efficiency.

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