

Genetic Variability in Root Penetration Ability among Old and New Rice Cultivars Bred in Hokkaido, Japan

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Introduction: Direct-seeded rice is also more susceptible to lodging than transplanted rice. Lodging is a major constraint to rice production, as it leads to grain loss. This study investigated the genetic variability in root penetration ability (RPA) relating to root lodging resistance among old and new rice (*Oryza sativa* L) cultivars bred in Hokkaido.

Materials and Methods: Two experiments were undertaken; testing of RPA in a polyhouse using a paraffin-vaseline (PV) disc in a PVC pot, and evaluation of lodging resistance in a paddy field. The experimental design was Randomized complete block. A total of 22 rice varieties were used in 2 treatments (40% and 50% PV discs) with 8 replications. The soil type at the paddy field was brown lowland soil, 4 varieties were tested in 4 replications arranged by Randomized complete block design. Each plot was 1.2m x 3m and plots were 0.6m apart. There were 4 rows, 0.2m apart within each plot. Sampling was conducted 6 weeks after seeding to check penetrated root number (PRN) in pots and 2 weeks after heading in paddy field to measure lodging resistance.

Results and Discussion: There was a clear difference in PRN between PV 40 and PV 50. Mean PRN in PV 50 (0.46) was very low relative to PV 40(9.6); however, there was no clear trend in PRN between old and newly released rice genotypes in Hokkaido. It was supposed to be due to significant difference in environmental conditions over the two years, especially with respect to solar radiation. Three genetic groups with respect to RPA were identified. These include; varieties which showed a larger PRN in 2009 than in 2008 (Group I); varieties which showed a smaller PRN in 2009 than in 2008 (Group II); and those which largely depicted no change in PRN over the two years (Group III).

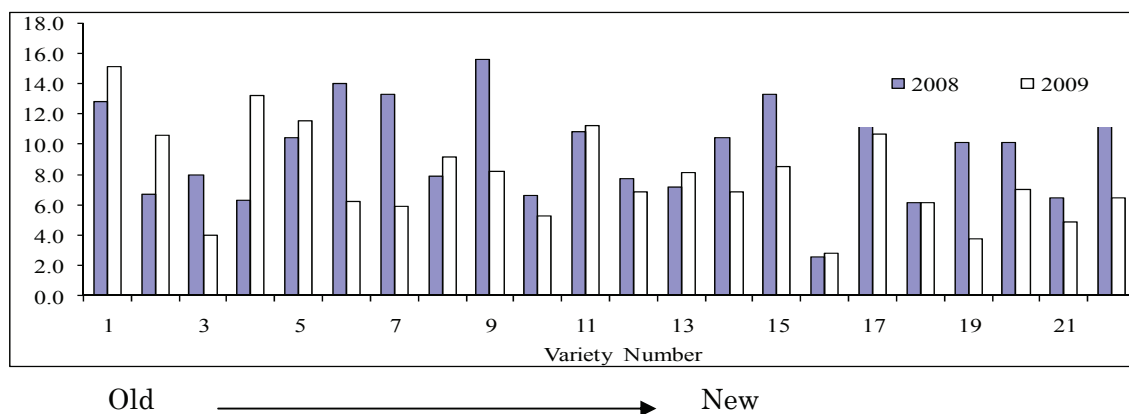


Figure 1. Variation in root penetration ability between old and new rice genotypes.