Japanese journal of crop science

The Crop Science Society of Japan Info Link

ONLINE ISSN: 1349-0990
PRINT ISSN: 0011-1848

Japanese journal of crop science
Vol.66 , No.3(1997)pp.427-435

[Full-text PDF (1171K)] [References]

Genotypic Variation in the Development of Seminal Root System of Rice under Different Culture Conditions in vitro

Yasuhiro IZUMI, Yasuhiro KONO, Akira YAMAUCHI and Morio IIJIMA
1) School of Agriculture, Nagoya University
2) School of Agriculture, Nagoya University
3) School of Agriculture, Nagoya University
4) School of Agriculture, Nagoya University

[Received: 1996/01/24]
[Published: 1997/09/05]
[Released: 2008/02/14]

Abstract:
To elucidate genotypic variations in the root system architectures of rice, which are determined by the emergence (branching) and elongation of lateral roots, we compared the development of seminal root systems (seminal root axis and lateral roots) among seven cultivars with different ecotypes using an in vitro culture method which can simplify growth conditions. Four different culture treatments were prepared by combining two factors (nitrogen source in medium and presence/absence of shoot) to evaluate genotypic variations as a whole. After three weeks of culture, sampled seminal root systems were developmentally, topologically and geometrically analyzed. First, we researched the responses of root system development to culture conditions. It was especially notable that the responses of L-type and S-type first order lateral roots were completely different, and that root system size was affected by both the composition of medium and the presence/absence of shoot, while branching pattern was mainly controlled by the former. Though it was difficult to find a general trend in cultivar variations throughout the treatments, we characterized and classified the seven cultivars mainly based on the root system size and responses to culture conditions. Instinctive genotypic variations were clearly recognized under culture conditions as compared to soil conditions. Thus, this study showed the possibility that selection of genotypes focused on architecture could be facilitated using an in vitro culture method.

Keywords:
Genotypic variation, in vitro, Lateral root, Link length, Oryza sativa L., Rice, Root system architecture, Topological index

[Full-text PDF (1171K)] [References]