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.4(1997)pp.640-646

[Full-text PDF (828K)] [References]

Growth Respiration in Rice Organs as Affected by Nitrogen Content

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[Received: 1995/11/16]
[Published: 1997/12/05]
[Released: 2008/02/14]

Abstract:
The relationship between growth respiration and nitrogen content in rice organs was investigated. Top and root CO_2 exchange rates were continuously measured for 5-6 days under different nutrient concentrations by lowering the light intensity with each passing day. There were significant positive correlations between the growth respiration rate in the top (Rgt) and dry matter increase in the top, and between the growth respiration rate in the root (Rgt) and dry matter increase in the root. Though, there were significant positive correlations between Rgt and leaf area expansion, and leaf dry matter increase, no significant relationship was found between Rgt and dry matter in leaf sheath. The growth respiration rate in each plant part was closely related to the dry matter increase and nitrogen increase. The nitrogen content of the leaf blade was higher than that of the leaf sheath. This suggests that growth respiration in the top is utilized more for the growth of leaf blade than that of leaf sheath. Moreover, the ranges of growth coefficient in the whole plant, top and root were from 0.56 to 1.26, 0.44 to 1.11, and 0.60 to 1.11 g g^{-1}, respectively, under different nutrient conditions. The growth coefficient of each part increased as the result of nitrogen content in new biomass. The growth coefficient in the root was higher than that in the top when compared at the same value of the ratio of the increase in nitrogen. The slope of linear regression in the root was higher than that in the top. In this paper, it was determined quantitatively the relationship between nitrogen increase and growth coefficient in rice organs.

Keywords:
Growth coefficient, Growth respiration, Nitrogen content, Rice

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