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## Japanese journal of crop science

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#### Relationship between Root Respiration and Silica : Calcium Ratio and Ammonium Concentration in Bleeding Sap from Stem in Rice Plants during the Ripening Stage

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#### Abstract:

Rice plants were given various treatments, such as organic matter application, a large amount of nitrogen as topdressing and light shading of 75%, and ammonium ( $\text{NH}_3$ ), silica ( $\text{SiO}_2$ ) and calcium (Ca) in bleeding sap were then measured from young panicle formation to ripening stage. The average  $\text{NH}_3$  concentration in bleeding sap of shading plants was remarkably higher (8.3ppm) than those of other treatments and shading plants had shown the lowest content of total sugar in roots during ripening. High  $\text{NH}_3$  concentration in bleeding sap from the stem was accompanied by low total sugar content in the roots. The  $\text{SiO}_2$  concentration in bleeding sap gradually decreased, essentially in parallel with root respiration, according to plant aging. The Ca concentration in bleeding sap was generally constant from young panicle formation to the ripening stage. The  $\text{SiO}_2$  concentration and/or amount per stem in bleeding sap was shown to be highly positively correlated with root respiration. The  $\text{SiO}_2/\text{Ca}$  ratio in bleeding sap was proportional with root respiration;  $\text{SiO}_2/\text{Ca}$  ratio in bleeding sap from the stem had active root in respiration was being higher. Therefore, it supported that the plants which had high root respiration realized to be higher  $\text{SiO}_2$  concentration in their leaves.

#### Keywords:

Ammonium, Bleeding, Calcium, Rice, Root respiration, Silica

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