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## Japanese journal of crop science

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#### Relation between Leaf Gas Exchange Rate and Stomata : I. Stomatal frequency and guard cell length in C<sub>3</sub> and C<sub>4</sub> grass species

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#### Abstract:

We measured stomatal frequency and guard cell length in the Gramineae and compared these components among the photosynthetic types and/or the subfamilies. The mean stomatal frequency of the Eragrostoideae was 418.5 no. mm<sup>-2</sup> and that of the Panicoideae was 243.9 no. mm<sup>-2</sup>, which is a half to one third of C<sub>3</sub> summer types. On the other hand, C<sub>3</sub> plants growing in the winter season exhibited low stomatal frequency and large guard cell sizes. Rice plants, C<sub>3</sub> types in the Oryzoideae, had an extremely large number of stomata, but smaller guard cell sizes. In addition, the stomatal frequency in the flag leaves was higher than that of the fully expanded leaves at the maximum tiller number stage. In particular, this tendency was pronounced in the japonica-indica hybrids. The reciprocal relation between stomatal frequency and length of the guard cells was demonstrated, indicating that the distribution of the subfamily in the figure to be coincident with the direction in the evolution of the grass family.

#### Keywords:

C<sub>3</sub> and C<sub>4</sub> Photosynthesis, Gramineae, Guard cell length, Rice plants, Stomatal frequency

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