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## Japanese journal of crop science

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#### A Consideration of the Water Transport Status in Napier Grass(*Pennisetum purpureum* Schumach.)Based on the Temporary Rises in Leaf Photosynthesis and Transpiration by Plants Excision

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#### Abstract:

Napier grass(*Pennisetum purpureum* Schumach.)is known as a species with high productivity of biomass and high water use efficiency. In this study, the water transport and leaf photosynthesis of the species, using plants (var.Merkeron)grown in different environments, were discussed on the bases of photosynthetic and transpiratory responses measured directly after excisions of various parts of plants. During the measuring of rates of leaf photosynthesis(Pn) and transpiration(Tr), the excision of a lower part of the leaf blade allowed the rates to rise temporarily, and especially large increases were observed in leaves subjected to drought stresses. The rise of Pn depended on the increases in stomatal and mesophyll conductances. No responses in Pn and Tr were detected by excising any parts of plant below the sheath joint of the measuring leaf, but excision of the leaf sheath caused increases in both rates. Such parts as the leaf sheath joint seem to have a role in controlling or preventing water stream in a plant. Contrary to this, in shade-grown plants the rates increased by rhizome excision. Napier grass is considered to have a high sensitivity to water movement in a plant and a unique morphological mechanism to conserve the use of water.

#### Keywords:

Excision of plant parts, Growth environment, Mesophyll conductance, Napier grass, Photosynthesis, Stomatal conductance, Transpiration, Water transport

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