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## Japanese journal of crop science

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#### Effects of Deep Water Treatment on the Growth of Culms and the Lodging Resistance in Japonica Type Paddy Rice (*Oryza sativa* L.) Cultivars

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#### Abstract:

We carried out this experiment to clarify the growth of culms of Japonica type rice cultivars under deep water conditions with special reference to lodging resistance of culms. We used four Japonica type paddy rice cultivars which are different in plant type. Plant types of Nipponbare and Sasanishiki are high tillering type, and Koganenishiki and Tsukinohikari are ear weight type. Deep water treatment was started from the time of the 8th leaf emergence in main stem and was kept to the ripening stage. The water depth (about 25cm) was deep enough to submerge the sheath of the 7th leaf of the main stem. In the deep water plot at the ripening stage, the diameter of all the cultivars was remarkable large and the breaking strength of the basal elongated internodes tended to increase. However, the breaking strength of the deep water plot was inferior to that of the control plot when the internode was the same diameter as the control plot. In the deep water plot, remarkable development of lysigenous aerenchyma, with a diameter as much as 3.5 times that of the control plot, was observed and the occupation ratio of lysigenous aerenchymas in the cross section of elongated internodes was about 13.7% while in the control it was about 1.5%. The remarkable development of lysigenous aerenchyma may be one of the structural adaptations to aquatic conditions and may play an important role as a passage of air. However, this structural adaptation caused the elongated internode tissue to become insufficient by remarkable development of lysigenous aerenchyma, and this led to a decline in the contribution of the thickening of the basal elongated internode to the breaking strength.

#### Keywords:

Breaking strength, Deep water treatment, Internode, Lodging resistance, Lysigenous aerenchyma, *Oryza sativa* L., Plant type, Rice

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