

【Workshop 2】 Crop Production under Heat Stress
Rice Anther Tolerant to High Temperatures at Flowering Period

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To improve the tolerance of rice to the high temperatures, it is important to identify the traits that control or represent the tolerance of pollination to the high temperatures at flowering. We found that the length of dehiscence formed at the basal part of anther was strongly correlated with the percentage of sufficiently pollinated florets under hot and humid conditions at flowering in growth chamber. The length explained 95 % of variance in the percentage of sufficiently pollinated florets, which ranged from 5 to 85 % among 18 cultivars. This fact suggests that long basal dehiscence raises the reliability of pollination under high temperature conditions probably through the easy pollen transport from the dehiscent anther to the stigma. Moreover, both the length of basal dehiscence and percentage of sufficiently pollinated florets in non-*japonica* type were smaller than in many of *japonica* type cultivars. This result indicates that pollination of non-*japonica* type cultivars was susceptible to high temperature and the susceptibility was caused by the small dehiscence at the base of the anther. Some *japonica* rice cultivars with long basal dehiscence may be useful genetic resources for the improvement of heat tolerance in rice. We also found that the length of basal dehiscence under the normal condition was closely correlated with that under the high temperature condition. We, therefore, can estimate the tolerance of pollination by measuring the length under a normal condition.

To confirm the practicability of the simple marker, anthers with long basal dehiscence, in the field condition, we examined the relationship between the length of basal dehiscence and the fertility under hot and humid field condition in Jingzhou (Yangtze University) where the high temperature induced floret sterility sometimes occurs. The length was significantly correlated with sufficiently pollinated florets and seed set rate among seven hybrid rice cultivars with variation in the size of basal dehiscence. The results demonstrated that the anthers with long basal dehiscence are useful marker for the tolerance of pollination and seed set in the field.