Plant Canopy Characteristics and Yield Components in the Erect Panicle and Non Erect Panicle Progenies from an Indica × Japonica cross

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The erect panicle (EP) phenotype in rice is expected to provide advantages on light distribution in the canopy and dry matter production. It also may coordinate yield components including panicle number and grain number per panicle. However, only few studies have been conducted on the performance of EP in comparison with the curved panicle (non-erect panicle: NEP) phenotype in relation to agronomical traits such as heading stage, plant height and so on. This study was conducted with a population of filial generation of an Indica × Japonica cross for ensuring materials have as similar traits as possible except panicle type.

[Material and method]
RILs of the F9 generation derived from a cross between ‘Liaojing5’ (a japonica EP variety) and ‘Wanlun422’ (an indica NEP variety) were used in this study.

Twenty seven lines including parents were grown in a rice paddy field (sandy loam soil) at the experimental farm of Kyoto University, Kyoto, Japan (N 35°02 ′, E 135°47 ′). Seeds of the RILs were sown on 8th May, and transplanted on 5th Jun. The lines were arranged in a randomized block design with three replications, each of which included 6 × 13 hills (1 plant per hill with 30cm × 10cm spacing). Chemical fertilizer of N-P2O5-K2O = 20-16.7-18.9 g m−2 was applied as basal fertilizer.

We investigated the vertical distributions of light intensity and leaf area index by LI-2200 and LP-80 in every 10 cm stratified layers at heading stage and 15 days after heading stage. Five medium-growing plants were harvested at the same stage to determine agronomical traits (dry matter and so on). We measured yield components by harvesting 10 plants at maturity. The RILs were classified into EP and NEP groups based on the genotype of the franking marker of ER1 (Tang et al., unpublished).

[Results and Discussion]
The LAI for the whole canopy was slightly smaller in the EP groups than in the NEP groups. On the contrary, the value of diffuse non-interceptance (DIFN) shows the opposite trend. Stratified measurement at 15 days after heading, light transmittance was better in EP than in NEP, while it was not shown at heading stage. The biomass and grain yield did not significantly differ between the EP and NEP groups. Although significant difference was existed between parents in panicle number, grain number per panicle and thousand grain weight (TGW), only TGW was significantly different between the EP and NEP groups. The different canopy traits but similar yield components between EP and NEP may provide the warrants for further analysis of the interaction of EP by environment.