

Effects of Lateness Gene on Yield and Related Traits in Indica Rice

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Abstract : Various genes which control or affect heading time have been found in rice. Out of them, *Se1* and *E1* loci play important roles in determining heading time by controlling photosensitivity. An isogenic-line pair of late and early lines were developed from progenies of the F₁ from Suweon 258 × 36U. A lateness gene tentatively designated as *Ex* was found to control the difference in heading time between the early and late lines mentioned above. The present study was conducted to examine the effect of *Ex* on yield and related traits. *Indica*-type variety Suweon 258 was crossed with 36U, which is an *Ur1* (Undulate rachis-1) isogenic line of IR36. In the F₂ population, comparatively early-heading, late-heading and intermediate-heading plants were segregated. Segregation similar to that by the three types of heading was observed in the F₃ and later generations. A late-heading plant and an early-heading plant were selected in the F₈ population from an intermediate-heading F₇ plant, for developing L and E of the isogenic-line pair, respectively. Experiments for L and E were conducted by randomized block design with three replications. Transplanting was conducted on May 3 at a planting distance of 30 cm × 15 cm with two seedlings per hill to an experimental field of the Faculty of Agriculture, Kochi University. Chemical fertilizers containing N, P₂O₅ and K₂O were applied at the nitrogen levels of 4 g/m², 9 g/m² and 18 g/m² in total being denoted by 'N4', 'N9' and 'N18', respectively. Yield, yield components and other traits were measured. *Ex* delayed 80%-heading by 17 or 18 days in L as compared with E. In total brown rice yield (g/m²), L was 635, 606 and 590, and E was 577, 548 and 501, respectively, at N18, N9 and N4, indicating that *Ex* increased this trait by 10% to 18%. *Ex* increased yield-1.5 mm sieve (g/m²) by 9% to 15% at the three fertilizer levels. *Ex* increased the spikelet number per panicle by 16% to 22%. As a result, the spikelet number per m² was increased by 11% to 18% at the three fertilizer levels. *Ex* decreased 1000-grain weight (g) by 2 to 4%. L was not significantly different from E in ripened-grain percentage, fertilized-spikelet percentage and percentage of ripened grains to fertilized spikelets. Hence, it is inferred that *Ex* increased yield by increasing spikelet number per panicle. Hence, *Ex* could be utilized to develop high yielding varieties for warmer districts.

Keywords : heading time, lateness gene, photosensitivity, yield, yield components

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