**Near-isogenic lines for days to heading with an Indica-type variety IR64 genetic background**

IR64, recognized globally as a high quality rice variety, was first released by the International Rice Research Institute (IRRI) in 1985. To increase yield potential and broaden the adaptability of IR64, a set of near-isogenic lines (NILs) of IR64 with various days to heading (DTH) were developed using Japonica-type high-yielding varieties including new plant type varieties as donor parents.

A total of five NILs were developed through marker-assisted selection. Three NILs having quantitative trait loci (QTLs) from IR65600-87-2-2-3 (IR64-NIL7) and Hoshiaoba (IR64-NIL10 and IR64-NIL11) showed earlier heading by 5 days than IR64, while two NILs from IR65598-112-2 (IR64-NIL8) and IR69125-25-3-1-1 (IR64-NIL9) showed later heading by 10 days (Table 1). Three QTLs for short DTH were detected on chromosomes 8, 6 and 11, while two QTLs for long DTH were detected on chromosomes 6 and 11 (Fig. 1 and Table 1).

These lines are the first set of NILs carrying various QTLs for DTH suitable for tropical conditions. These NILs can be used to understand the genetic basis of DTH and the effects of a single QTL/gene by testing it under different environmental conditions. Furthermore, early heading NILs could be useful for avoiding abiotic stresses at the late growth stage, while late heading NILs could be useful as breeding materials to develop high yielding lines.

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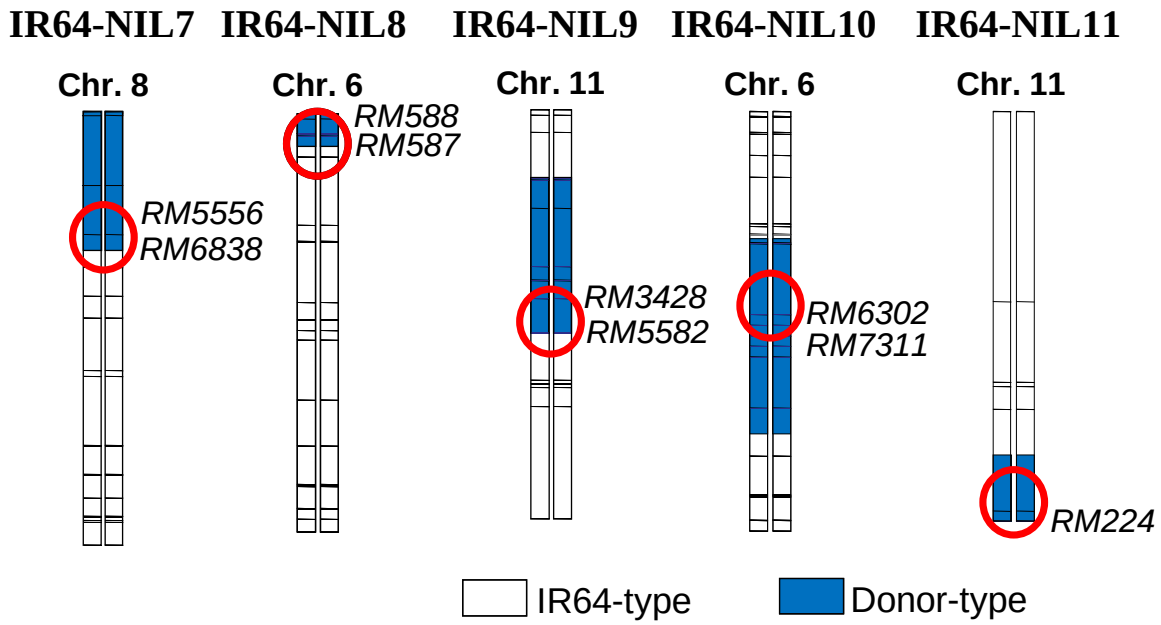


Fig. 1. Graphical genotypes of IR64-NILs' chromosomes which contain QTL regions for DTH (indicated by red circles) derived from donor parents

Table 1. Agronomic characteristics of near-isogenic lines of IR64 for days to heading

| Variety/Line | QTL | Donor parent | Agronomic trait (average ± standard deviation) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Days to heading | Culm length (cm) | Panicle length (cm) | Leaf length (cm) | Leaf width (cm) | Panicle number |
| IR64 | – | – | 85.4±1.2 | 78.6±3.0 | 25.2±1.5 | 38.2±5.3 | 1.29±0.1 | 18.0±5.3 |
| IR64-NIL7 | *qDTH8*[yp1] | IR65600-87-2-2-3 | 80.5±2.2* | 71.8±2.0* | 22.3±1.9* | 36.1±4.6 | 1.22±0.0 | 21.1±5.1 |
| IR64-NIL8 | *qDTH6*[yp3] | IR65598-112-2 | 95.6±2.3* | 85.6±1.8* | 26.6±1.7 | 42.8±4.5 | 1.41±0.1* | 18.5±5.6 |
| IR64-NIL9 | *qDTH11*[yp6] | IR69125-25-3-1-1 | 93.4±2.5* | 83.6±4.1* | 25.7±1.6 | 40.7±3.0 | 1.38±0.1* | 26.6±8.5* |
| IR64-NIL10 | *qDTH6*[yp7] | Hoshiaoba | 80.3±2.5* | 76.4±6.0 | 26.7±2.1 | 43.1±5.1 | 1.30±0.0 | 18.6±3.3 |
| IR64-NIL11 | *qDTH11*[yp7] | Hoshiaoba | 81.9±2.2* | 77.9±2.6 | 26.8±2.1 | 41.9±6.2 | 1.36±0.1 | 18.8±5.3 |

Data was obtained in the IRRI experimental field (Los Banos, Philippines) during 2010 dry season (Jan – May) except for days to heading during 2010 wet season (Jun – Nov). Asterisks indicate significant difference with IR64 at the 5% level according to Dunnett's test.