عنوان مقاله:

Linkage Map of SSR Markers and QTLs Detection for Heading Date of Iranian Rice Cultivars

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خلاصه مقاله:

The construction of molecular maps and identification of genomic regions controlling quantitative traits have great significance for plant breeders. In this study, a genetic analysis of quantitative trait loci (QTLs) affecting the heading date of rice was performed using an F۲ population of a cross between two Iranian landrace cultivars, Domsephid and Gerdeh, comprising ۱۹۲ plants. An approximately normal distribution was observed for the heading date in the F۲ population. A genetic linkage map with ۸۸ informative microsa-tellite markers (SSR) was constructed, which covered ۱۳۶۷.۹ cM of the rice genome with an average distance of ۱۸ cM between markers. Single marker analysis (SMA) and inter-val mapping (IM) procedures were used to detect the QTLs controlling heading date and QTLs identified were further confirmed using composite interval mapping (CIM). Six significant QTLs (LOD≥۳.۰) were identified for the heading date, of which three major QTLs mapped on chromosomes ۶ (hd۶), ۷ (hd۷) and ۸ (hd۸) had particularly high LOD scores and explained ۲۳.۵%, ۱۹.۸% and ۲۰.۵% of the total phenotypic variance, respec-tively. Three other minor QTLs detected for the heading date, located on chromosomes ۱ (hd۱), ۳ (hd۳) and ۱۱ (hd۱۱), accounted for ۶.۶%, ۱۱.۷% and ۶.۶% of the phenotypic variation, respectively. The additive effect of a single QTL ranged from ۱.۶۷ to ۳.۹۱ days. In the QTL hd۶, alleles from Domsephid were responsible for reducing the heading date, while in the other five QTLs, alleles from Gerdeh caused a decrease in the heading date. The QTLs hd۱, hd۳ and hd۸ showed over dominance effects for increasing the heading date, whereas the other three QTLs had partial to incomplete dominance effects for in-creasing (hd۷ and hd۱۱) and reducing (hd۶) the heading date.

کلمات کلیدی:

Rice, Linkage map, Heading date, Microsatellite markers, Quantitative trait loci