



Molecular marker-assisted selection of the *ae* alleles in maize

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ABSTRACT. The *ae* (amylose extender) recessive mutant alleles in maize are an important genetic resource for the development of high-amylose cultivars. On the basis of *ae* allele sequences (from the National Center for Biotechnology Information), the *ae* mutant alleles were cloned from high-amylose maize and the allelic *Ae* gene from common maize luyuan92 inbred lines. Five pairs of primers were designed to screen for a molecular marker of *ae* alleles, yielding a dominant molecular marker, *ae474*. We used 53 types of high-amylose maize and common maize inbred lines and their hybrid and backcross offspring for verification and analysis. The *ae* dominant molecular marker was effective in selecting for the *ae* alleles and for biological materials with a high-amylose genotype. Presence and absence of the marker in the offspring conformed to the expected Mendelian ratios. Using this marker, we were able to detect the *ae* alleles in a backcross and its second generation more efficiently (53.3 and 73.3%, respectively) than was possible without marker selection. These data indicate that the marker can be used as a tool to improve selection efficiency and accelerate the cultivation of new varieties of high-amylose maize.

Key words: Maize; Starch branching enzyme; High amylose; Marker-assisted selection