

Marker-assisted backcrossing: a useful method for rice improvement

ABSTRACT

The world's population is increasing very rapidly, reducing the cultivable land of rice, decreasing table water, emerging new diseases and pests, and the climate changes are major issues that must be addressed to researchers to develop sustainable crop varieties with resistance to biotic and abiotic stresses. However, recent scientific discoveries and advances particularly in genetics, genomics and crop physiology have opened up new opportunities to reduce the impact of these stresses which would have been difficult if not impossible as recently as the turn of the century. Marker assisted backcrossing (MABC) is one of the most promising approaches is the use of molecular markers to identify and select genes controlling resistance to those factors. Regarding this, MABC can contribute to develop resistant or high-yielding or quality rice varieties by incorporating a gene of interest into an elite variety which is already well adapted by the farmers. MABC is newly developed efficient tool by which using large population sizes (400 or more plants) for the backcross F1 generations, it is possible to recover the recurrent parent genotype using only two or three backcrosses. So far, many high yielding, biotic and abiotic stresses tolerance, quality and fragrance rice varieties have been developed in rice growing countries through MABC within the shortest timeframe. Nowadays, MABC is being used widely in plant breeding programmes to develop new variety/lines especially in rice. This paper reviews recent literature on some examples of variety/ line development using MABC strategy