IDENTIFICATION OF AFLP FRAGMENTS LINKED TO CREEPING-ROOTEDNESS IN LUCERNE

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Creeping rootedness (CR) in lucerne is the ability to form adventitious shoots on horizontal roots. CR is an interesting trait to introgress in lucerne because it may confer high tolerance to grazing and better stand persistence. Selection for CR is difficult because the complex genetic control of the trait, which behaves as a QTL with low penetrance: in some individuals the CR phenotype may appear even after 3-4 year of surveys. For these reasons, breeding for CR could take advantage of a Marker-Assisted Selection (MAS) strategy.

To investigate the presence of markers linked to CR in lucerne, AFLP markers were used to screen a segregating population following a Bulk Segregant Analysis (BSA) strategy. This population was obtained by crossing a CR individual (male) showing high expression of the trait with a non-CR individual (female) genetically related to the CR parent. DNA extraction was carried out on 20 F1 hybrids (10 CR and 10 non-CR) selected as the individuals showing the extreme expressions of the trait (estimated on the number of the satellite plants developed by the mother plant over time). This DNA was pooled out to form two CR and two non-CR bulks (composed by 5 individuals each) on wich the BSA strategy was applied, taking the parental DNA as a reference to avoid artifacts.

Seventy EcoRI-MseI primer combinations were applied on bulk analysis, yielding on average 70 scorable fragments each. Among these, 28% were polymorphic between parents, 45% of which being polymorphic among bulks. In total, 6 amplicons were present in all the CR bulks and absent in non-CR bulks. When the segregation of these amplicons were investigated across the whole mapping population, two of these (M1 and M2) showed non-independent segregation from the CR trait. These two amplicons resulted closely linked each other. The predictivity of the two markers were respectively 80,8% (CR) and 83,3% (non-CR) for M1 and 82,6% (CR) and 80,8% (non-CR) for M2, then showing their potential to be effectively used in MAS for this trait.

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