

Chromosomal Location of Molecular Markers Linked to Aluminum Tolerance Genes in Rye

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Abstract: The major limit to plant growth in acid soils is the presence of toxic aluminum (Al) cations, which inhibit root elongation. Aluminum tolerance in rye has been described as controlled by, at least, four independent and dominant loci (*Alt1*, *Alt2*, *Alt3* and *Alt4*) located on *6RS*, *3RS*, *4RL* and *7RS* chromosome arms, respectively. Previous data have shown some discrepancies about the location of *Alt3* locus that should be studied. On the one hand, the rye *Alt3* locus has been assigned to *4RL* because it was linked to an AFLP (AMAL4) reported to be located on that chromosome. On the other hand, this locus co-segregated with an RFLP marker (BCD1230) that was also linked to the wheat *Alt_{BH}* gene, located on *4DL*. In our opinion these data were discrepant and require explanation. Either the map position of BCD1230 should be the first report of homology between *4DL* and *4RL* or there was a mistake in the assignation of *Alt3* locus to *4RL*. Consequently, five molecular markers (B1, B4, B11, B26 and BCD1230) that were previously described as tightly linked to the *Alt3* locus on the *4RL* chromosome arm were studied in wheat-rye addition lines and three F₂ populations that segregate for the *Alt4* locus. Our results show unequivocally that these markers are located on *7RS* and closely linked to the *Alt4* locus. In spite of previous data supporting the existence of an *Alt* locus in *4R* chromosome, our study reveals that the *Alt3* and *Alt4* loci are in fact the same one that is located on *7RS*.