

Biochemical and molecular characterisation of a *Phaseolus vulgaris* mutant lacking major lectin related seed proteins

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Lectin related proteins (hereon referred to as lectins) normally represent the second most abundant salt soluble proteinaceous component of mature bean seeds, second only to the storage protein phaseolin.

To the lectin family belong both abundant and minor components. The abundant ones are the true lectin phytohemagglutinin (PHA), arcelin and α -amylase inhibitor (α AI). A minor component has been described in the cv. Carioca as well as in the PHA null mutant cv. Pinto UI 111 (1).

Often, these three protein classes are not present together. In fact, while PHA and α AI are found in most of the cultivated and wild accessions, arcelin has been identified only in wild material, where it may represent by large the most abundant protein in the seed.

A screening was carried out to evaluate variation in lectin components among both cultivated and wild accessions. Beside the expected great variability, a wild genotype, G06388 (CIAT), lacking all three major components was identified. In this genotype a minor polypeptide was detectable by Western blot, using both anti-PHA and anti- α AI antibodies. Its molecular weight was in the same range of that of PHA and its abundance was comparable to that of the minor lectin present in the PHA null cv. Pinto UI 111, i. e. about hundred folds less the normal amount of PHA (2).

Genomic organisation was investigated by Southern blot analysis, using probes for the three major proteins. All probes gave the same simple hybridisation pattern, represented by few faint bands detectable when filters were washed at low stringency. Only the PHA probe strongly hybridised to one of these bands and the signal was retained also when filters were washed at high stringency. The strongly hybridising fragment most likely carries the gene coding for the minor lectin, while the other fragments might represent distantly related genes.

Since lectin genes are linked on the genome (3) these results suggest that a great deletion might be responsible for the absence of the major lectins in this genotype.

In the light of the suggested importance of lectins in seed protection against insects, availability of this mutant represents the possibility to express single lectin components in a homologous null background, in order to assess their toxicity.

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- 2) Vitale, A., Ceriotti, A., Bollini, R. 1985. Molecular analysis of a phytohemagglutinin-defective cultivar of *Phaseolus vulgaris* L. *Planta* 166, 201.
- 3) Nodari, R.O., Tsai, S.M., Gilbertson, R.L., Gepts, P. 1993. Towards an integrated linkage map of common bean. 2. Development of an RFLP-based linkage map. *Theor. Appl. Genet.* 85, 513.