

Trichomes, commonly known as plant hairs, are cellular outgrowths from cell differentiation of epidermal cells. The benefits of trichomes include improved defense against insects and pathogens, both through the physical protrusion of the trichomes and the effects from certain chemicals often accumulating in glandular trichomes. In our research, the *GL1* gene was researched in *Arabidopsis* in an attempt to further understand the developmental pathway of trichomes; moreover, due to likely similar trichome developmental programs in soybeans, potential benefits of trichomes in this important crop could be explored.

Abstract:

The Correlation Between the *GL1* Gene and the Glabrous Phenotype in Various *Arabidopsis* Ecotypes

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Arabidopsis trichome cell-fate determination is positively regulated by the *GL1* gene. Trichomes are essential for the entomological and pathogenic defense mechanisms of *Arabidopsis*, as well as all other plants. Mutations in *GL1* result in pleiotropic defects, including a complete loss of trichomes (glabrous). The purpose of this study is an investigation of whether the glabrous phenotype found in various glabrous ecotypes/natural accessions of *Arabidopsis* is due to the 6.5 kilobase *gll-1* deletion. First, ecotypes with the glabrous phenotype were identified in a greenhouse screen of over 400 *Arabidopsis* ecotypes (natural accessions) grown by the ABRC. The glabrous ecotypes of *Arabidopsis thaliana* were identified in Mir 0, LP3413.41, Wil-2, Lithuania, Pdl-0, PHW 230,002, Wu-0, and Sarno-1. DNA from the glabrous ecotypes was extracted through a DNA isolation procedure. PCR (polymerase chain reaction) and agarose gel electrophoresis allowed a visual assay of the DNA, including the possible presence of the *gll-1* deletion allele. After performing PCR assays to discover whether the *GL1* gene was absent in any of the glabrous ecotypes, two of the ecotypes showed an absence of a band indicating a deletion of the *GL1* gene, leading to the conclusion that these two ecotypes Wu-0 (Germany) and Pdl-0 (Spain) strongly indicate that their glabrous phenotype is due to the *gll-1* deletion, and that the other ecotypes that contained the glabrous phenotype is due to other genes or different alleles of *GL1* involved in trichome formation.