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THE STRUCTURE AND EXPRESSION OF ORCHID EXTENSIN IN RESPONSE TO WOUNDING

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Two cDNAs coding for extensins have been isolated from *Bromheadia finlaysoniana* in order to study the structure and expression of these proteins in orchids. The alignment of their deduced amino acid sequences showed the consensus Ser-$(Pro)_4$ motif that characterises most extensins in higher plants. This motif was present within tyrosine-rich regions which may be involved in intramolecular and intermolecular cross-links to allow for the formation of a highly ordered impenetrable extensin barrier. A basal level of extensin transcripts in the plant was observed. The effect of wounding on the expression of extensins was then investigated and it was shown that there was an accumulation of extensin transcripts in the wounded leaves. It is also noteworthy that other mRNAs hybridize to these cDNAs and also accumulated in response to wounding. Such complexity is not unexpected as some of the transcripts may represent other highly homologous extensin transcripts produced from closely related members. This hypothesis was substantiated as a Southern analysis carried out demonstrated that extensins belong to a multigene family in the *B. finlaysoniana* genome. In addition to that, a systemic response of an increase in extensin transcripts in young leaves was shown in this plant when one of its leaves was wounded. Overall, it is postulated that these proteins play not only a structural role in orchids but is also involved in plant defense.

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GENETIC MANIPULATION OF PROTEIN QUALITY AND QUANTITY IN MAIZE ENDOSPERM.

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The maize kernel has low quantity and quality of proteins. Approximately 10% of the maize kernel's dry weight consists of diverse types of proteins. In addittion, maize has low content of the essential amino acids lysine and tryptophan, which are not present in the storage protein fraction, zeins, accumulated in the endosperm. Increasing the level of these amino acids has been a long-term goal of many breeding programs. Lysine content in the endosperm is primarily dependent on the amount of non-zeins, which are proteins that perform functions other than storage in the seed. We used the Illinois High Protein (IHP) population and a high-quality protein population (CMS 52 QPM) to study the possibility of obtaining inbred lines with improved quality and higher protein amounts. Many progenies (F2, F3 and BC) derived from crosses of Illinois High Protein x CMS-52 Quality Protein Maize were throughly evaluated at the biochemical level. Our results indicate great variability in protein patterns among segregating materials and the possibility of merging the traits high protein quality and high protein amount to develop materials potentially useful in maize breeding programs.

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TISSUE CULTURE AND TRANSFORMATION OF *PEPEROMIA OBTUSIFOLIA*.

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Many species of *Peperomia* are used as indoor foliage plants. A tissue culture method for plant regeneration of *Peperomia obtusifolia* is described. Organogenesis was induced with leaf segments on Murashige and Skoog (MS) medium supplemented with 0.1 to 5.0 mg/l indole acetic acid (IAA) and 0.1 to 5.0 mg/l 6-benzyladenine (BA). Shoot multiplication and root initiation occured within two months of culture under a 16h light and 8h dark cycle on high BA and IAA media respectively. Shoots were elongated by soaking in 5 mg/l gibberellic acid (GA3) solution and readily formed roots on MS in the absence of growth regulators, forming full plantlets. Callus was produced on modified MS with a combination of 2% glucose, 5 mg/l thiamine, 0.1 mg/l 2,4-dichlorophenoxyacetic acid (2,4-D) and 0.2 mg/l kinetin. A protocol for *Agrobacterium tumefaciens*-mediated transformation was developed for *P. obtusifolia*. Leaf segments were incubated on regeneration medium for 2 days before co-culturing with *A. tumefaciens* LBA4404 carrying the binary vector pBI121. , Transformants were selected on regeneration media supplemented with 30 mg/l kanamycin and 200 mg/l carbenicillin. A total of 8 lines obtained tested positive for both GUS staining and Southern hybridization. Transient expression of GUS was also observed by particle bombardment of pBI121 into leaf segments.