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Genomic approach to investigate growth and development of root buds in leafy spurge

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Abstract:

Leafy spurge is a deep-rooted, perennial weed that propagates vegetatively from an abundance of underground adventitious buds located on the roots and crown and is the primary characteristic leading to its invasive nature. Each of these buds has the capacity to regenerate a new plant when the aerial portion of the plant is either removed or dies. Since arrested development (dormancy) of the buds allows leafy spurge to escape most control measures, knowledge of genetic pathways that regulate bud growth and development will provide novel ways to control this and other perennial weeds. We are using a genomic approach, based on DNA microarrays, to investigate the biology of bud growth and development because this technology has the capability to simultaneously detect large differences in gene expression related to genetic pathways that govern bud growth and development. Clones identified using this method will be further characterized using a functional genomic-based approach. This method uses modified viral vectors to suppress target gene expression based on virus-induced gene silencing. Genes that are proven to have essential roles in controlling the growth and development of buds in leafy spurge will be used to develop 'bio-herbicides' as a new control measure. The details of research scheme and current progress will be discussed.