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Molecular approaches to determine genetic diversity of weedy species and their application to biocontrol

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DNA-based molecular markers can provide information about introduced weedy species that could be beneficial to classical biological control efforts. Chloroplast DNA restriction fragment length polymorphisms (cpDNA RFLP) and random amplified polymorphic DNA (RAPD) analysis are two DNA-based marker techniques that can be used to provide estimates of an introduced weed's level of genetic diversity, its possible geographic origins, evidence of multiple introductions and hybrid zones, and potentially identify compatible biocontrol agent/weed relationships. Current criteria for selecting a weedy species as a target for biological control are primarily political and economic. DNA-based markers could be used as the basis for selection criteria by providing an accurate estimate of a plant's level of genetic diversity relative to other potential target species. The success of biological weed control efforts has been limited by the high levels of genetic diversity occurring in target weed species and the lack of biocontrol agent and target weed compatibilities. DNA-based markers can be used to increase our understanding of these factors and contribute to the success of biological weed control.