

TRANSGENES FOR WEED MANAGEMENT - THE PAST, PRESENT, AND FUTURE

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Theoretically, transgenes can be used in weed management in several ways, but only transgenic herbicide-resistant crops are currently commercialized. As of 2005, only two herbicides, glufosinate and glyphosate, are used with herbicide-resistant crops. Three transgenes are used with various glyphosate-resistant crops and one is used with glufosinate-resistant crops. The prospects are not good for the introduction of crops resistant to herbicides other than these two within the next five years. No transgenes have been introduced that would reduce synthetic herbicide input. Other ways of using transgenes for weed management are: 1) to enhance efficacy of weed biocontrol agents; 2) to make crops resistant to parasitic weeds; and 3) to enhance crop allelopathy. An example of enhancing biocontrol agent efficacy is that of the work of Amsellem et al. (2002) in which the gene for the Nep 1 phytotoxin was inserted into the mycoherbicide fungus *Colletotrichum coccodes*. This enhanced the virulence of the mycoherbicide on weeds, also extended its host range to crops. The work of Westwood (2005) and others in which the gene for sarcotoxin from the flesh fly was put into tobacco is an example of making a crop resistant to a parasitic weed. This gene made tobacco somewhat resistant to *Orobanche aegyptiaca*. The approach of having the crop produce its own natural herbicide (allelochemical) could greatly reduce synthetic herbicide input. Our laboratory is working on enhancing the allelopathic potential of *Sorghum* spp. crops by enhancing production of the allelochemical sorgoleone

Amsellem, Z. et al. (2002) Engineering hypervirulence in a mycoherbicide fungus for efficient weed control. *Nature Biotechnol.* 20, 1035-39.

Westwood, J. (2005) Engineering crop resistance to parasitic weeds. *Amer. Chem. Soc. Symp. Ser.* – In press.