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Authors

Brian Miki, Ashraf Abdeen, Yuzuki Manabe, Souad El Ouakfaoui, Douglas A Johnson, Loreta Gudynaite-Savitch, Ming Hu, Phil MacDonald

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Description

The uptake of transgenic technologies for basic research and commercialization has been rapid and extensive. Yet, only a few studies have been published on the impacts of transgenesis on fundamental genetic processes or the downstream effects of selectable marker genes on the transcriptome, proteome, or metabolome (reviewed by Cellini et al. 2004). Studies with transgenic Arabidopsis generated by Agrobacterium-mediated transformation have shown that the insertion of T-DNA into the plant genome alone does not change the transcriptional programming of plant genes or the ability of the plant to reprogram the transcriptome in response to environmental signals (El Ouakfaoui and Miki 2005). Similarly, studies with transgenic wheat produced through biolistics appear to confirm this observation in crops (Baudo et al. 2006). Any changes resulting from gene insertion appear to be the result of locus-specific changes originating at the insertion site, that is, the “position effects” or related to the activities of the transgenes, that is, the “pleiotropic effects.” The available evidence, therefore, indicates that transgenic plants are basically the same as or “substantially equivalent” to nontransgenic plants. In transgenic research experimental goals vary. In the area of functional genomics transgenic plants are used to assign function to unknown genes emerging from genomics investigations. In crop development plants with novel traits are being engineered using cloned genes to confer specific economically important commercial traits. In both cases, genetic alterations are being generated in transgenic plants that must be assessed and related to the …

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