

PI: James Thomson

PI's E-mail: James.Thomson@ars.usda.gov

Project ID: FY13-BR-026

ARS Agreement #: New

Research Category: GDER

Duration of Award: 1 Year

Project Title: Down with DON: Stable Expression of Proven Genes in a Marker-free Background.

PROJECT 1 ABSTRACT

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The goal is to reduce DON accumulation in transgenic plants infected with FHB via delivery of *Tri12* and *tlp* via *Ds* transposition, both directly and in conjunction with RCME to effect site-specific recombination; and to produce transgenic barley lines that stably express these genes in Conlon, without extraneous sequences, especially selectable markers. The sub-objectives necessary to this goal that will be completed by the proposed research are:

1. Production of vectors: *Ds-Tri12-Ds*, *Ds-tlp-Ds*, *Ds-TAG-Ds*, and *Tri12* and *tlp* 'EXCH'.
2. Initiation of the generation of transgenic plants: *Ds-Tri12-Ds*, *Ds-tlp-Ds*, and *Ds-TAG-Ds*.

The conceptual work showing the functionality of all proposed work is complete, as is the production of essential vector components, which will allow vector production to be completed in the first several months followed by immediate initiation of transgenic plant production.

The second phase involves hybridization with existing *AcT* lines to induce *Ds*-mediated transposition, which will resolve complex transgenic loci, remove marker genes, and deliver *Ds*-flanked genes (or 'TAG' recombination platforms) to regions that support transgene expression. This process involves standard breeding procedures, published techniques, and is expected to be straightforward. These additional objectives, to be pursued beyond the one-year grant cycle covered by this proposal, are:

- 3 Initiation of transposition of *Ds-Tri12-Ds*, *Ds-tlp-Ds*, and *Ds-TAG-Ds*.
4. Identification of lines with transpositions segregated from *AcT* and the original insertion locus, and which do not interrupt native genes.

This proposal generally addresses the Gene Discovery and Engineering Resistance Research Area, with specific reference to:

- 3) Develop effective FHB resistance and/or reduced DON accumulation through transgenic strategies;
and
- 4) Develop improved methods for the generation of transgenic wheat and/or barley