

GENETIC USE RESTRICTION TECHNOLOGIES – The Risks & Rewards

*Dale Adolphe
Canadian Seed Growers' Association*

GENETIC USE RESTRICTION TECHNOLOGIES - GURTs

- **Really talking about the expression of specific genes or traits**
- **Could be used as a “technology protection system” (TPS) and an environmental protection system**
- **Can also be used to switch on desirable traits or switch off undesirable traits**

Trait Expression Switching Technology - TEST

- Restricting the use of the gene is one aspect
- Sterility is one aspect
- Switching on traits only when needed is one aspect
- This is a group of technologies – not just one technology – the terminator gene – and not necessarily all related to intellectual property protection

GURTs

- **v-GURT: variety-level system**
 - Applied to restrict variety use
 - Sterility present in generation 2
- **t-GURT: trait-level system**
 - Special trait restriction or expression
 - Gene can be inactive or active
 - Turned on or off for one generation by an inducer (chemical application)

v-GURTs

1. Induced Disruptor Gene

- Embryo development prevented by chemical seed treatment activating sterility in generation 2 (gene inactive without chemical)

2. Chemical Use for normal fertility

- Default position is no chemical and sterility in generation 2 (gene active without chemical)
- Chemical application allows normal fertility and seed multiplication

3. Vegetative Crops

- Growth blocked by genes until chemical activates suppressor and removes block

t-GURTs

Trait switched on, or off, using inducible promoters

Possibilities:

- **Switching off by a trigger**
- **Switching on by silencing**
- **Switching on by gene excision**

STATUS

- **v-GURT concept patented based on work with cotton**
- **No fully functional systems available**
 - **Genes not 100% effective**
 - **Suppressors not 100% effective**
 - **Environment affects the systems**
 - **Timing is critical**
 - **Disruptors found but most do not have restorers**

Impact

- **Added value**
- **2nd generation use restricted**
- **Volunteers reduced**
- **Intellectual property protection**
- **Environmental protection**
 - **Restricts gene flow to adjacent crops**
 - **Restricts gene flow to wild relatives**
- **Seed still needs to be produced**

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CSGA Policy Position:

- **CSGA recognizes that for genetic use restriction technologies (GURTs), as with any new technology, a period of scientific study and evaluation is needed prior to adoption. GURT science is in its infancy and it is not possible to comment on specific applications that are not yet developed. However, the GURT technology does have the potential to create useful tools for agriculture.**
- **CSGA supports the application of Canada's science-based regulatory oversight and risk assessment, as well as information and awareness programs. The CSGA encourages GURT research and debate on implementing any GURT technologies based on the specifics of their application and the context for their use.**