



Technology Overview



New Methods for Creating Male and Female Sterile Plants OTT#1459

APPLICATIONS

A unique and efficient strategy to create both male and female sterile Arabidopsis and tobacco plants. The method is extremely unique because, it does not interrupt plant growth and development, and it also allows for plant fertility to be restored. Transgenic trees (e.g. poplar, eucalyptus, and pines) and grasses (e.g. miscanthus and switchgrass) may provide a valuable resource for wood production, biofuels, bioremediation, and many other applications. This research will make commercial uses of those transgenic plants possible.

TECHNOLOGY

The method includes the SDS::SDS-BARNASE system which can specifically ablate pollen and megaspore mother cells. Megaspore and pollen mother cells are two small groups of reproductive cells, which are differentiated after all floral organs are established. Ablating pollen and megaspore mother cells only leads to elimination of male and female gametes, but it does not affect differentiation of any other somatic cells and flower development. The SDS gene encodes a meiosis-specific cyclin. The SDS protein is exclusively present in pollen mother cells in anthers and megaspore mother cells in ovules. Therefore, the SDS-BARNASE fusion protein does not create any toxicity in other cells or tissues. To restore plant fertility, they invented the inducible artificial microRNA system (ER::amirBARNASE), which produces the artificial microRNA to inhibit the BARNASE expression.

KEY BENEFITS

- **Male and Female Plant Sterility** – This system allows for sterility of both sexes.
- **Reversible** – Plant fertility can be restored
- **Uninterrupted Growth** – there is no interruption of plant growth and development when using this method.
- **Non-Toxic** – Specific to pollen mother cells and does not cause toxicity in other tissues.
- **Versatile** – Can be utilized in specific transgenic crops or ornamental plants where fruit production is unwanted.

INTELLECTUAL PROPERTY

A Patent Application was filed in 2016, [US20190112618A1](#)

This technology is part of an active and ongoing research program and is seeking partners for development of the final product. It is available for developmental research support/licensing under either exclusive or non-exclusive terms.

INVENTOR

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