Weed Genetics Project Update

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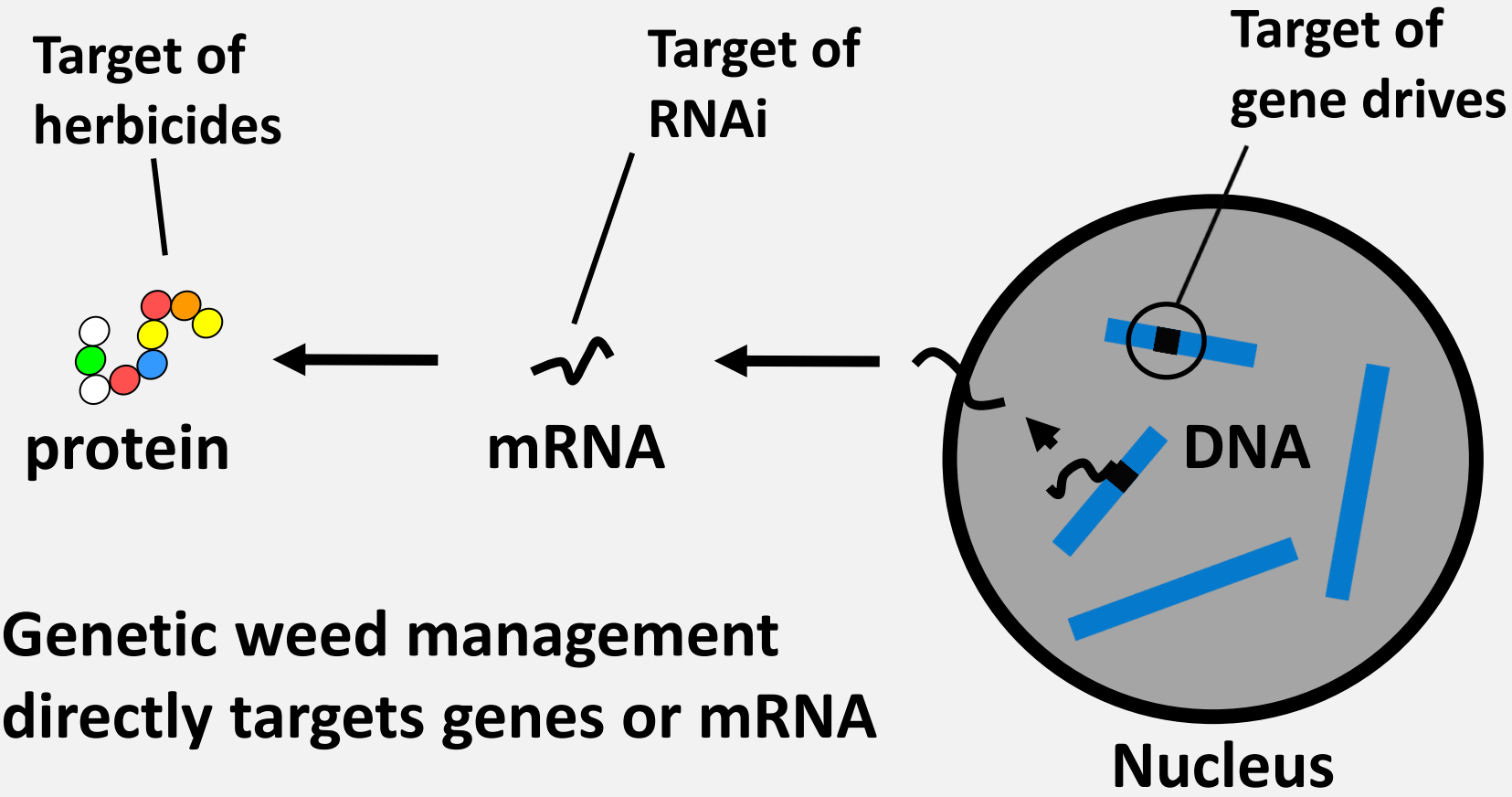
Genetic Weed Management



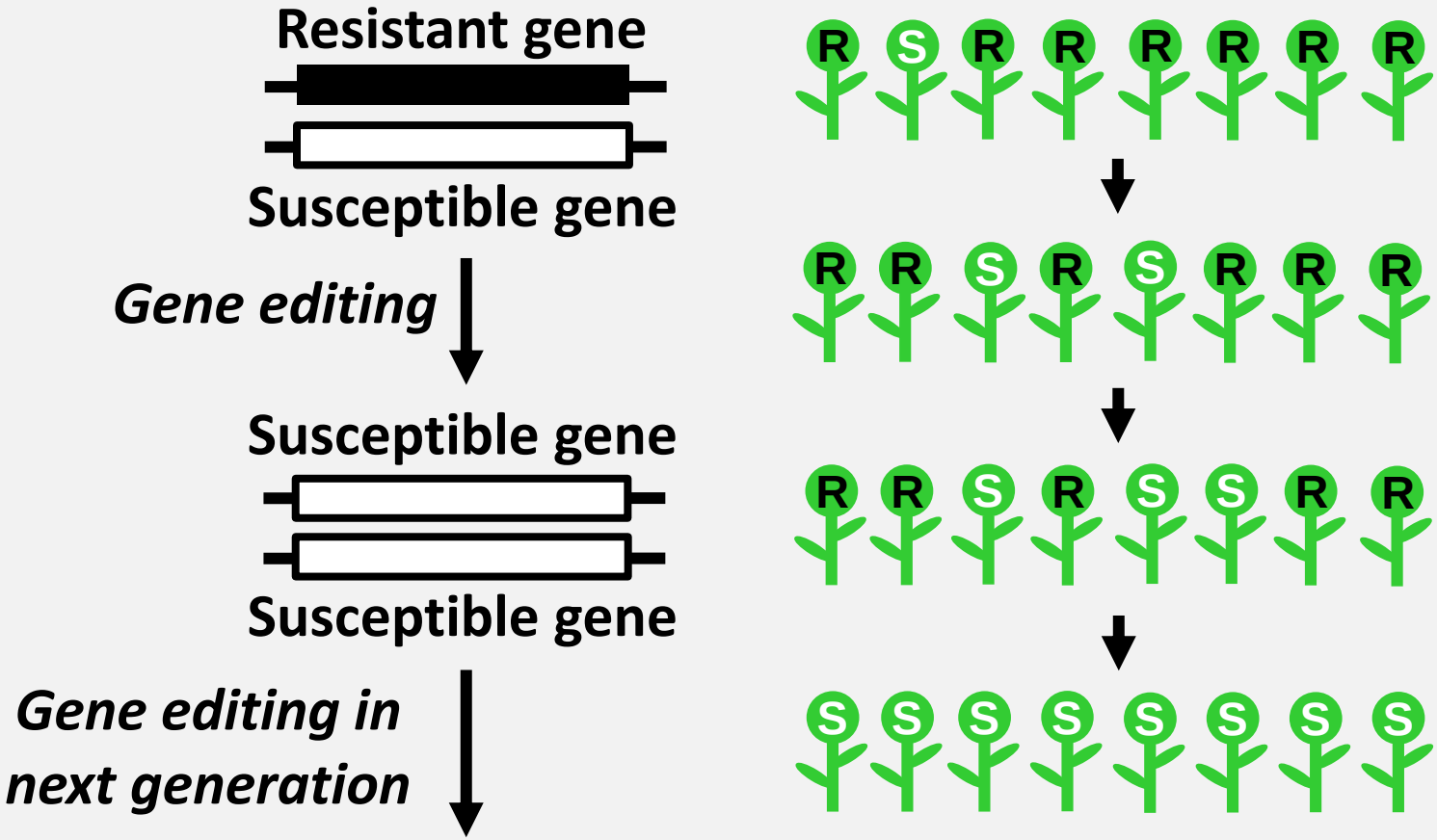
Genetic weed management directly targets genes or mRNA

Gene Drive Research

- Yeast (as a model)
- Insects
  - Mosquitoes, fruit flies
- Rodents
  - Mice and other rodents
- Viruses
  - Herpesviruses
- Weeds
  - Arabidopsis (as a model), waterhemp and Palmer amaranth

James D. Gathany [public domain]

Gene Drives for Weed Management



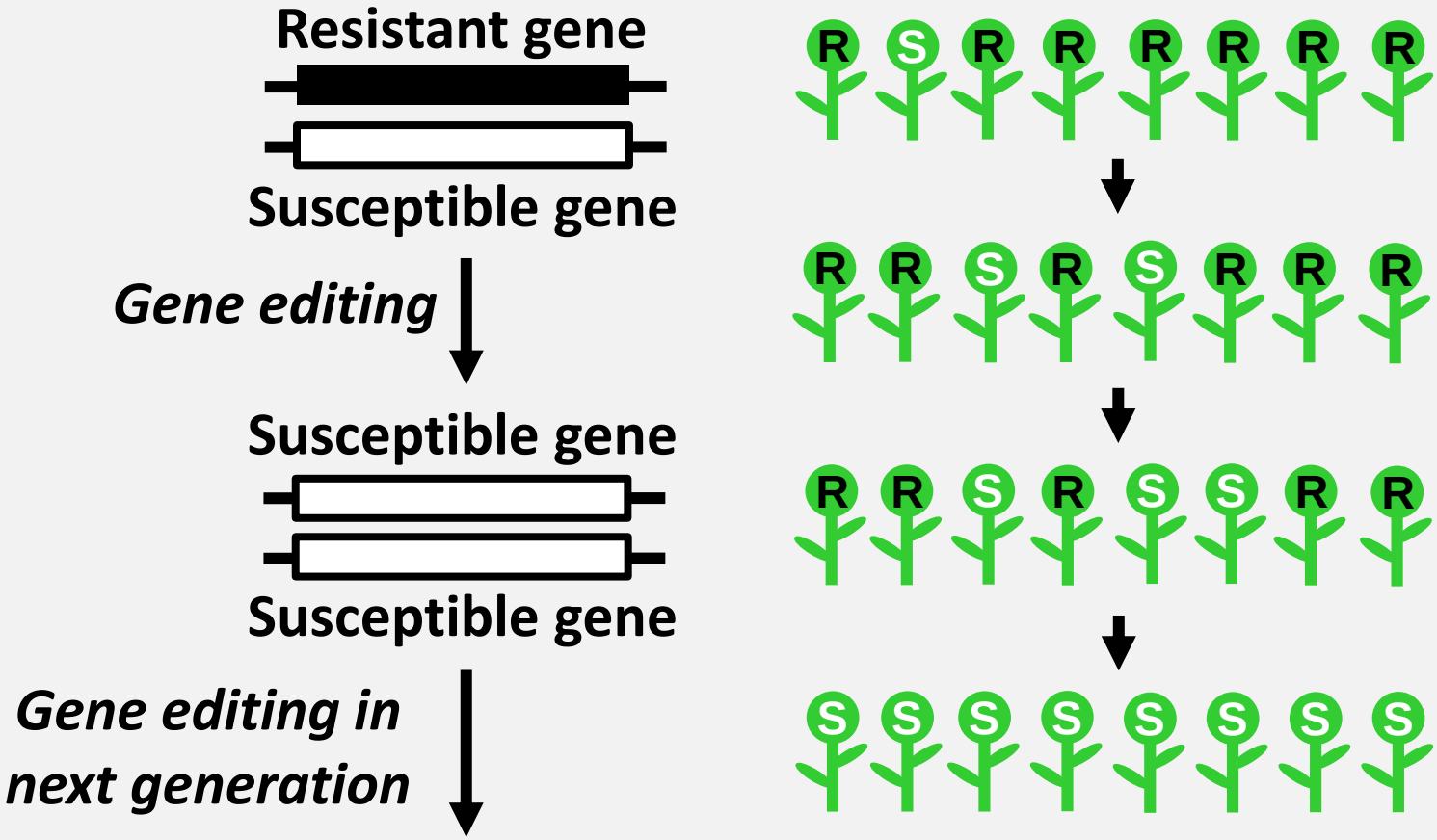
If Genes were Coins

Chance of heads is 50%

↓ **Edit**

Chance of heads is 100%

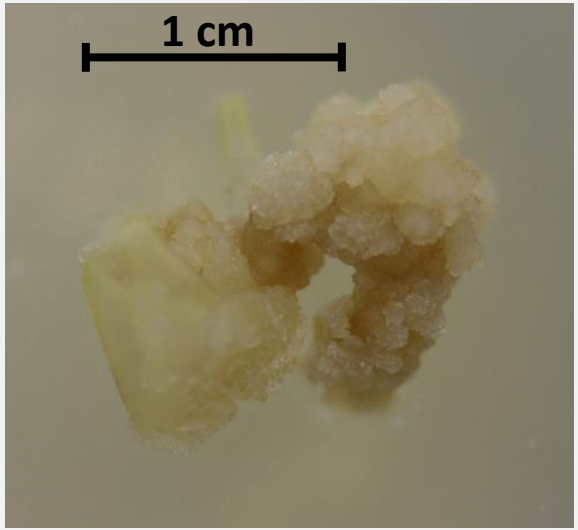
Gene Drives for Weed Management



Waterhemp Tissue Culture

Germinated seeds

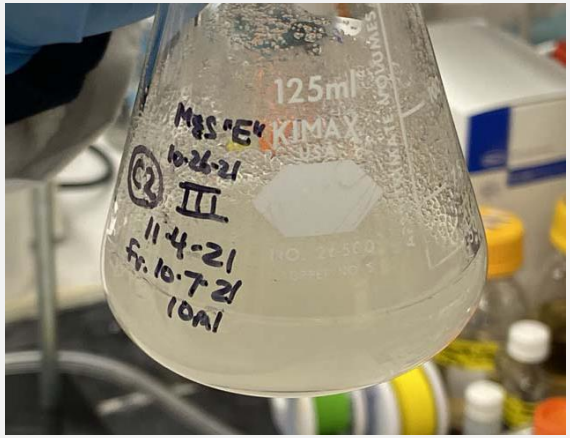
Remove a portion of the stem (hypocotyl)



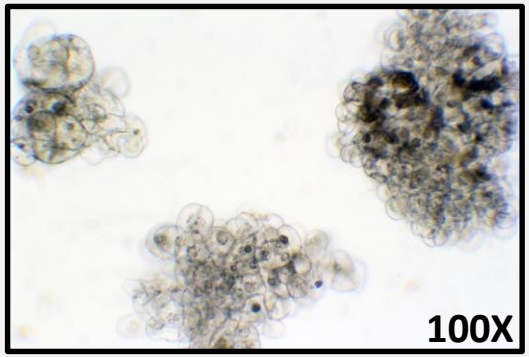
Callus tissue

Waterhemp Cell Suspension Culture

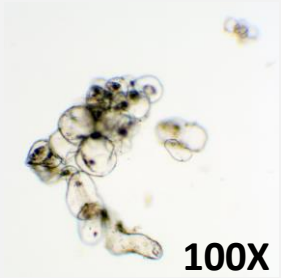
Callus tissue

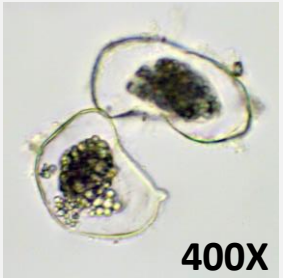


Cell suspension culture

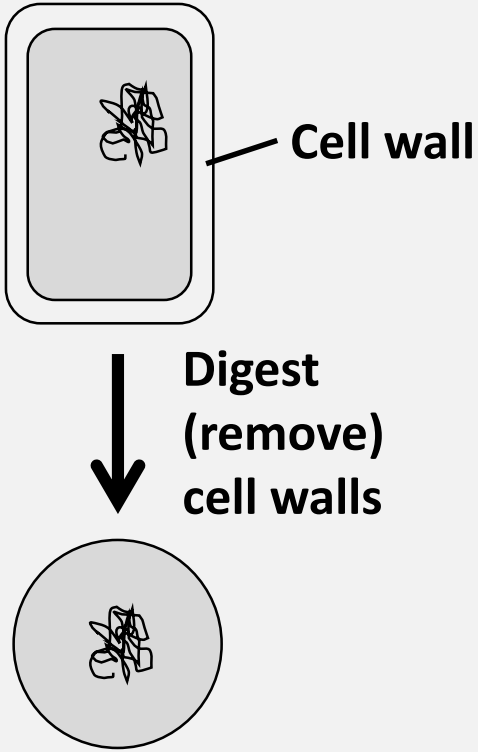


Subculture

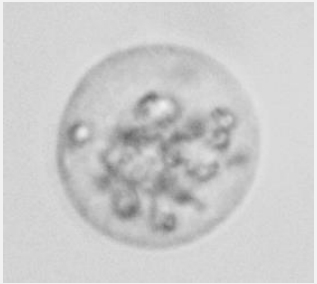




Successful Production of Waterhemp Protoplasts

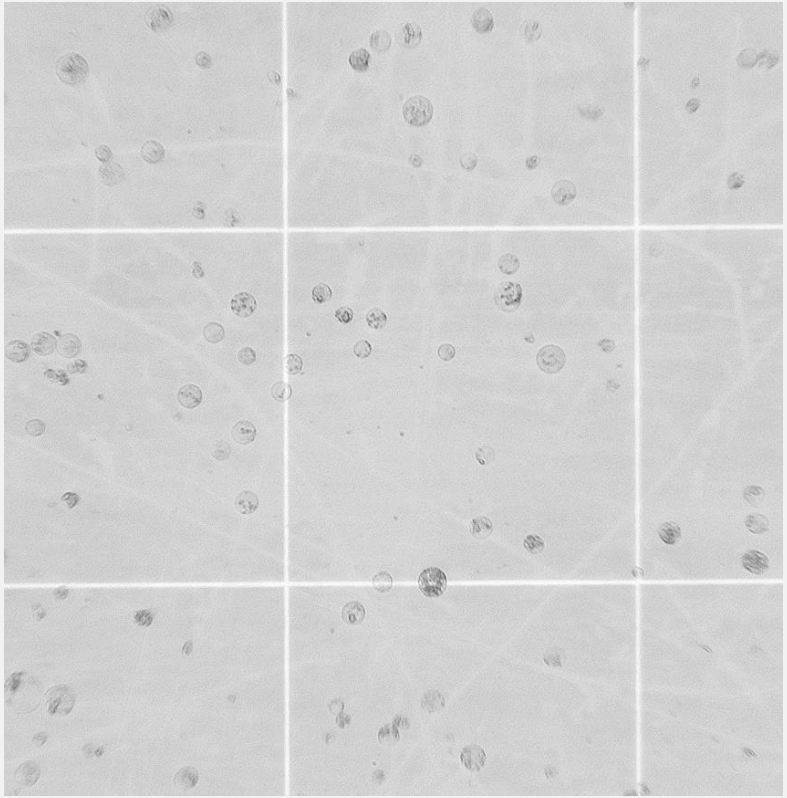


Waterhemp protoplast

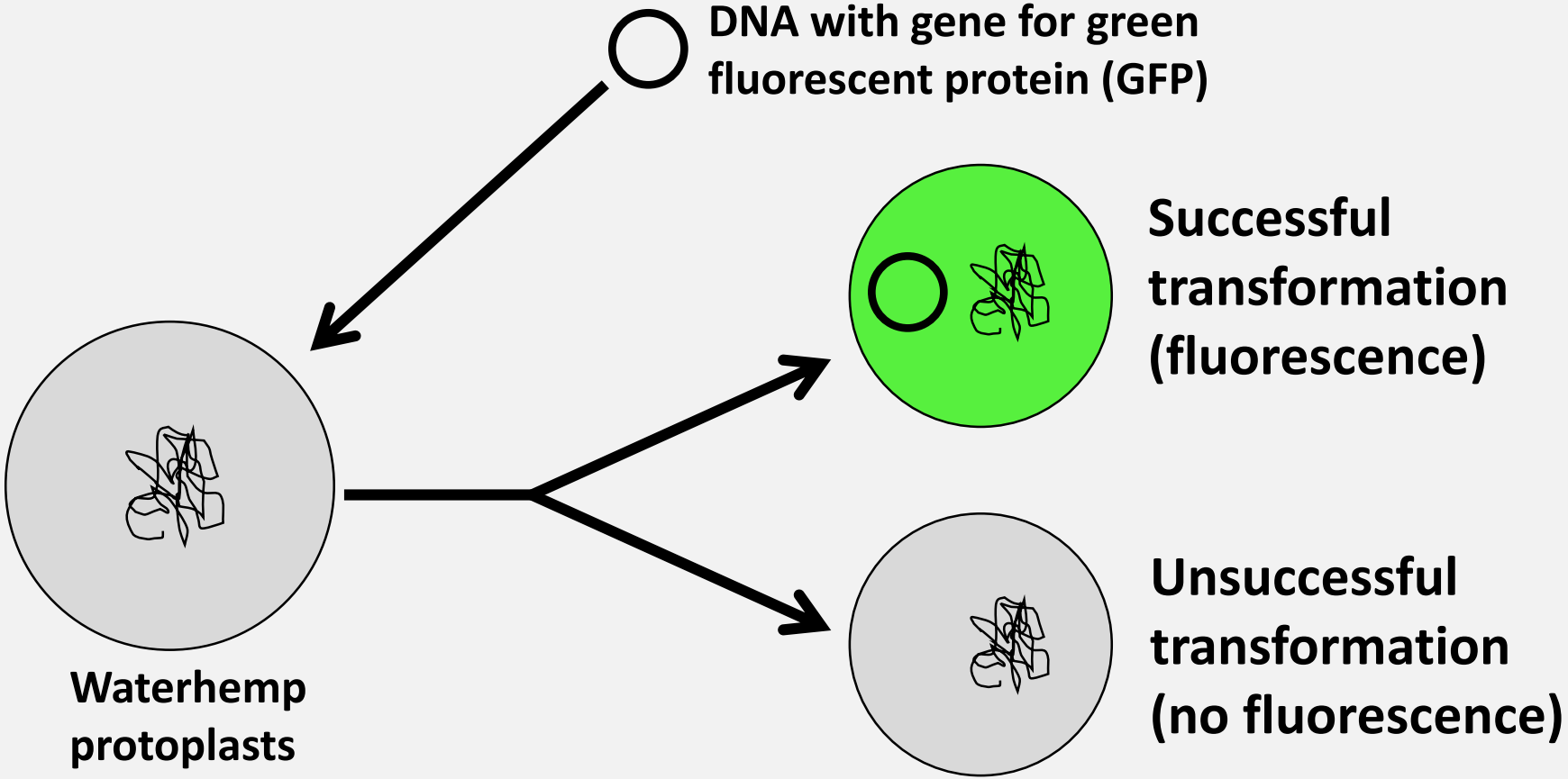


72-78% of protoplasts are alive

Waterhemp protoplasts

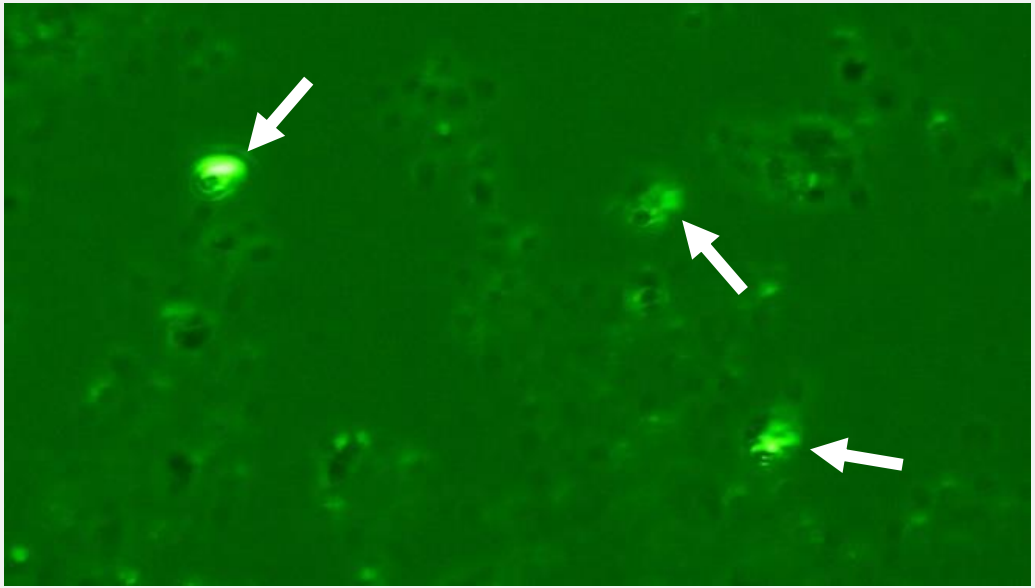


Protoplast Transformation



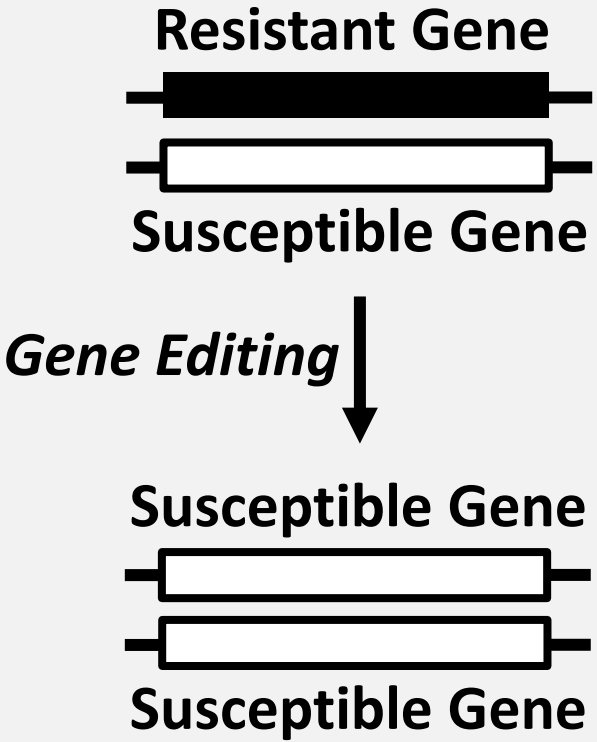
Transformation of Waterhemp Protoplasts

Waterhemp protoplasts after transformation with the gene for GFP



- **Arrows indicate likely expression of GFP in waterhemp protoplasts**
- **Additional confirmation and optimization is needed**

Current Research



- Optimizing waterhemp protoplast transformation
- Recovery and growth of protoplasts
- Gene editing of the acetolactate synthase (ALS) gene (Group 2 herbicides) in waterhemp (and yeast as a model)

Acknowledgments

- Robert Sabba and Peter Beerbower
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