Weed Genetics Project Update

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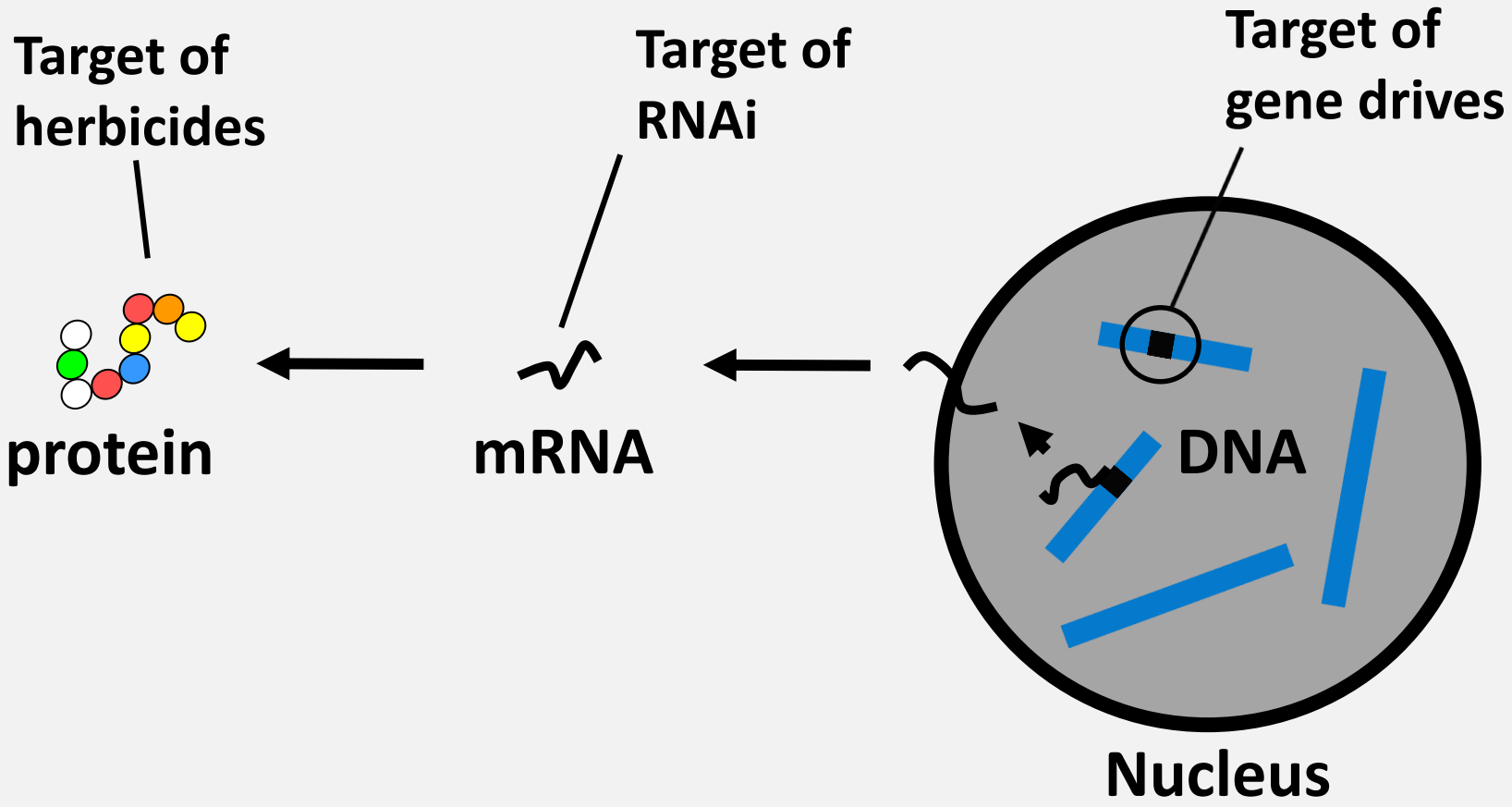
Genetic Biocontrol



Genetic Biocontrol: Gene Drive Update

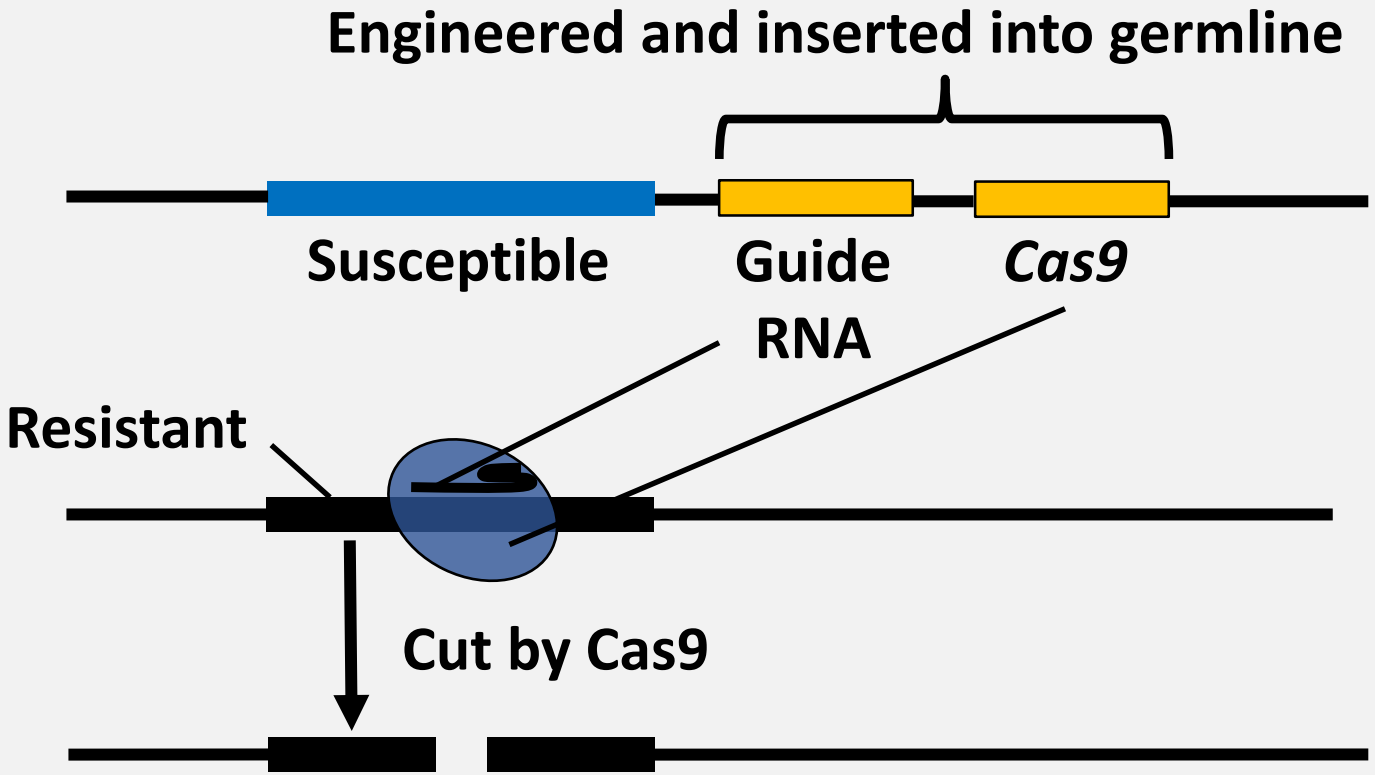

James D. Gathany


Judy Gallagher


NIH


United Soybean Board

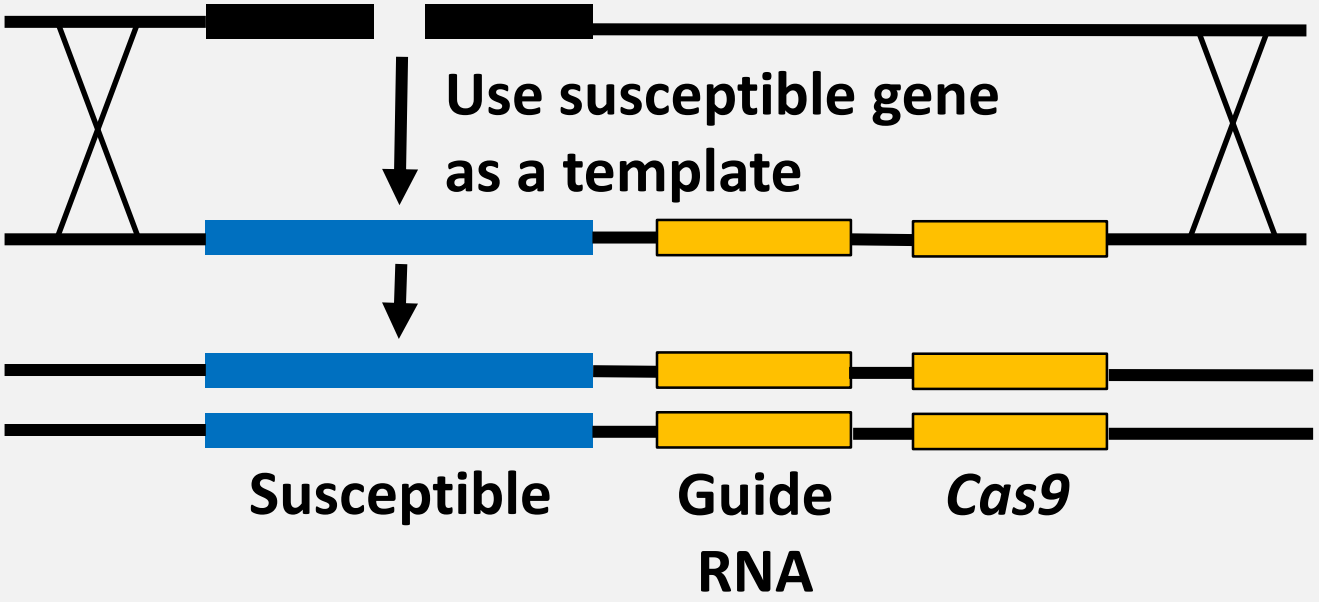
Example: Reversion of Pesticide Resistance



Example: Reversion of Pesticide Resistance

Natural repair of the cut, one of two possibilities:

① Use susceptible gene as a template



Example: Reversion of Pesticide Resistance

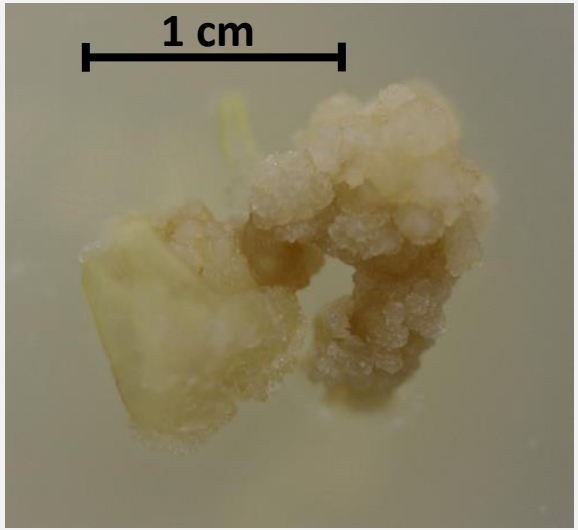
Natural repair of the cut, one of two possibilities:

② Join the broken ends together

Waterhemp Tissue Culture

Germinated seeds

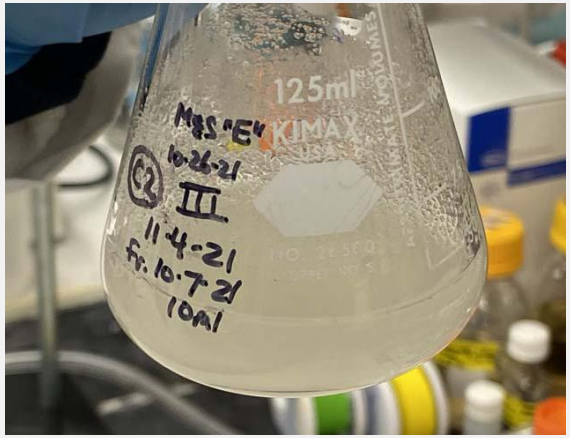
Remove a portion of the stem (hypocotyl)



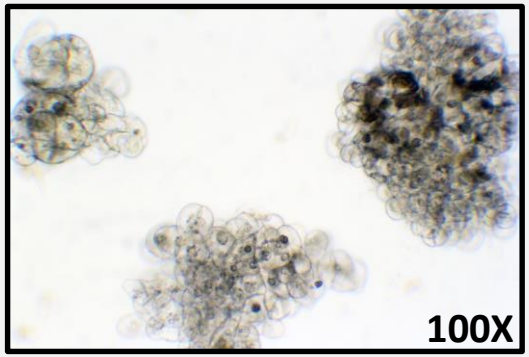
Callus tissue

Waterhemp Cell Suspension Culture

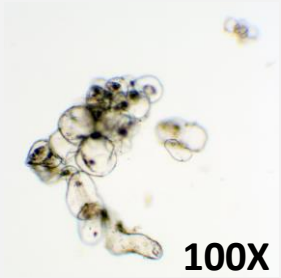
Callus tissue

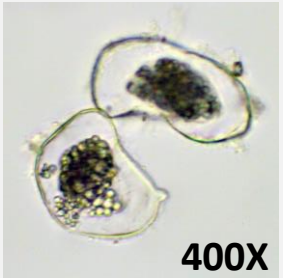


Cell suspension culture

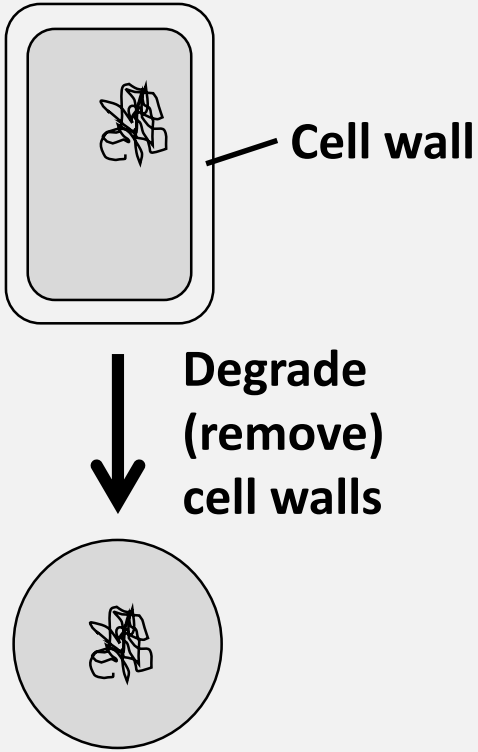


Subculture

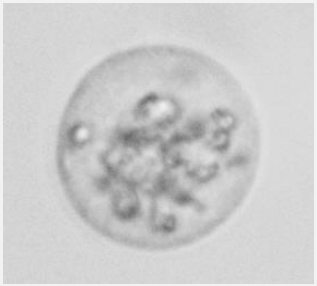




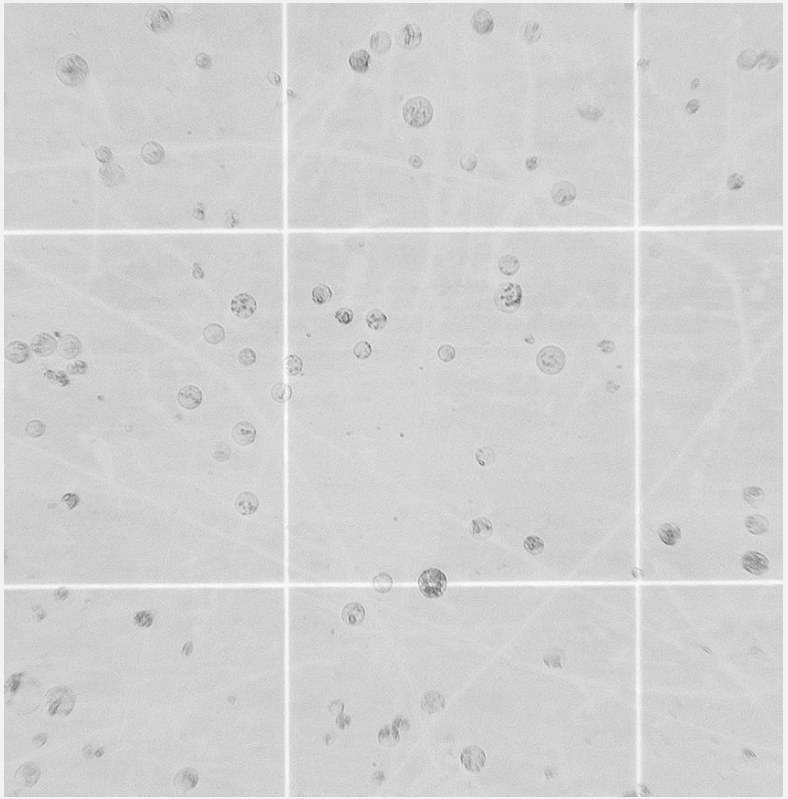
Successful Production of Waterhemp Protoplasts



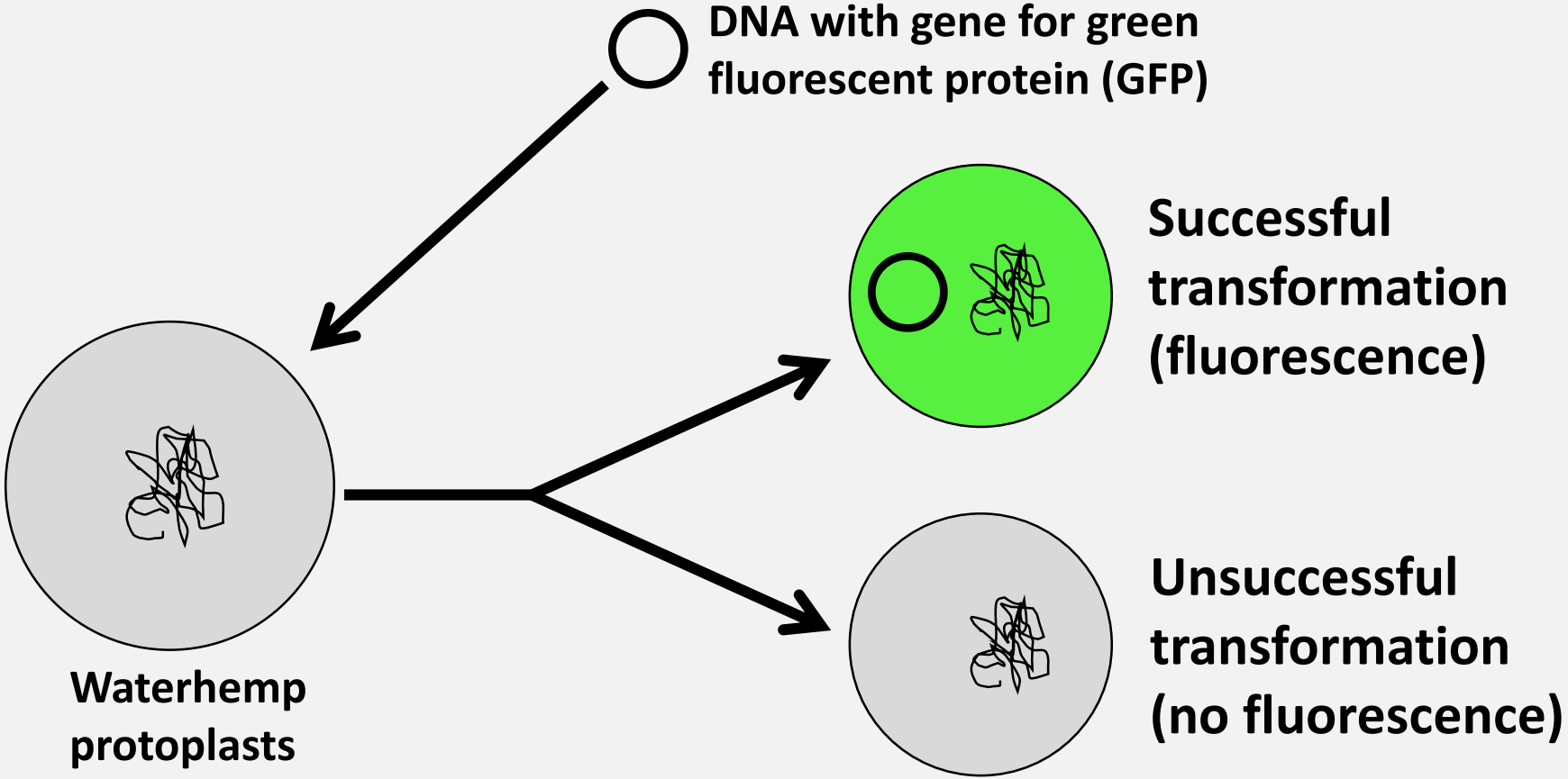
Waterhemp
protoplast



Waterhemp protoplasts

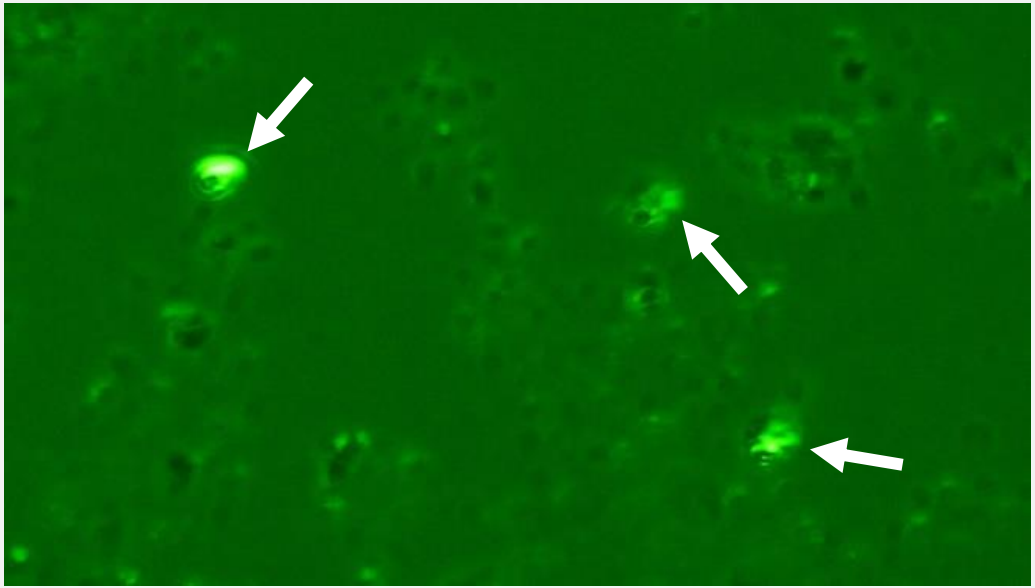


Protoplast Transformation



Transformation of Waterhemp Protoplasts

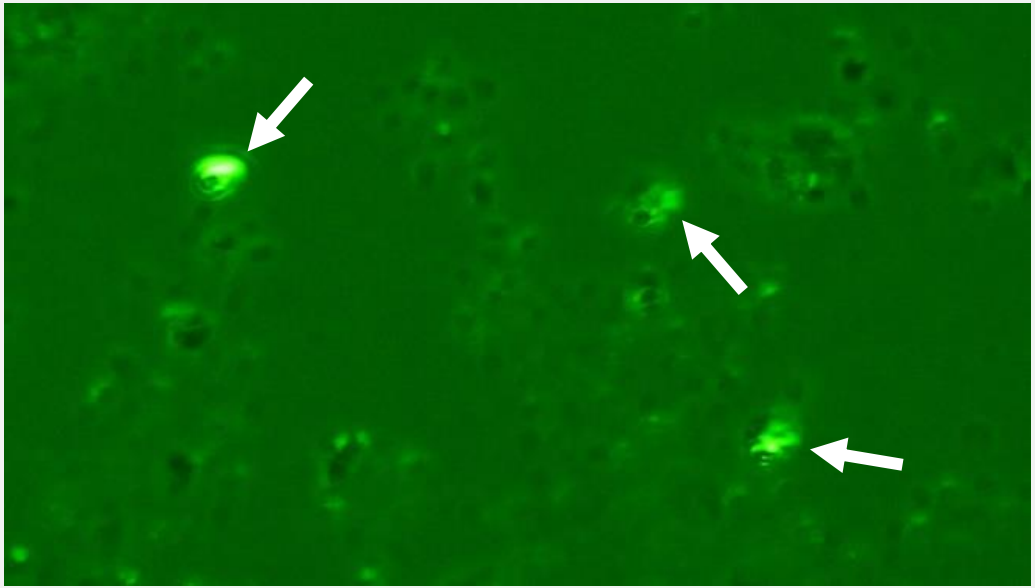
Waterhemp protoplasts after transformation with the gene for GFP



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

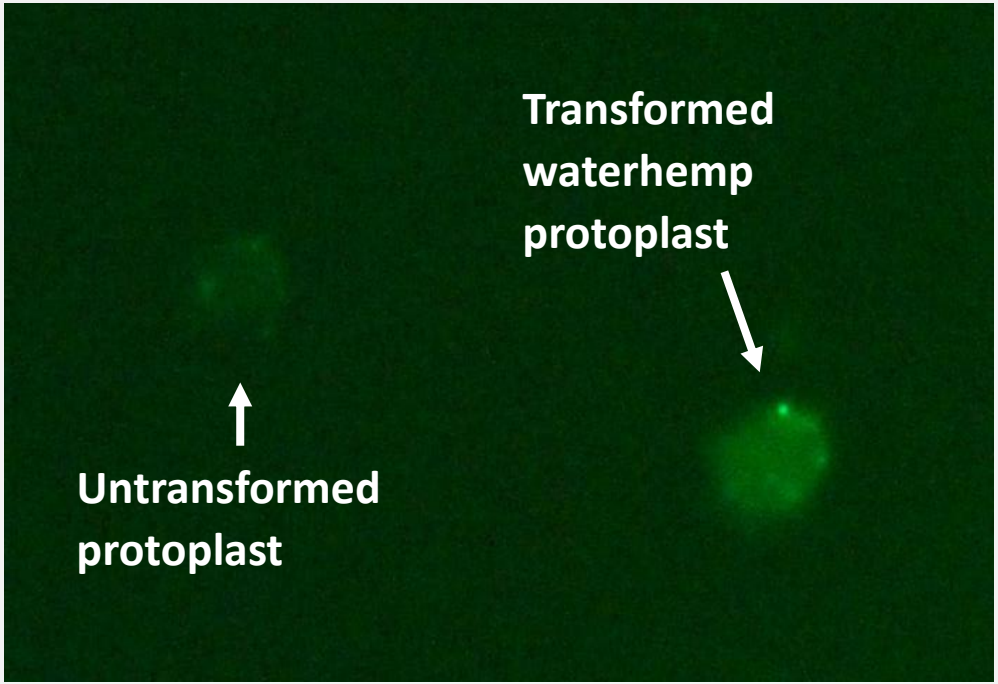
Transformation of Waterhemp Protoplasts

Waterhemp protoplasts after transformation with the gene for GFP



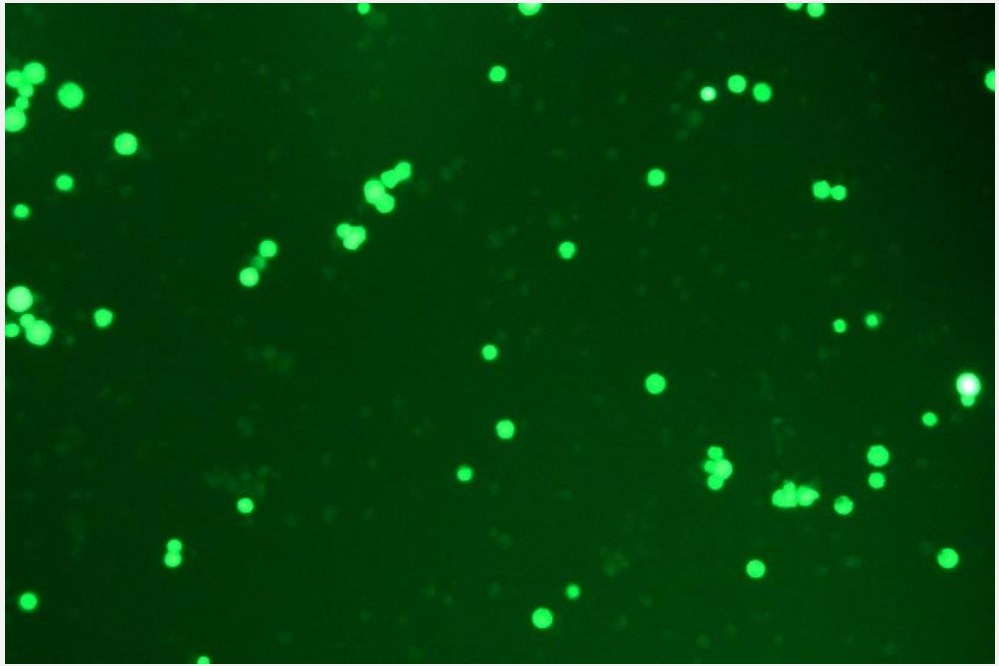
- ~~Arrows indicate likely expression of GFP in waterhemp protoplasts~~
- Additional confirmation and optimization is needed

Protoplast Transformation with Protein



Green fluorescence indicates successful transformation of waterhemp protoplasts with protein (Cas9/GFP fusion protein)

Testing for Oxidative Stress



In this case, green fluorescence is <u>bad</u>

Indicates that waterhemp protoplasts are under oxidative stress

Acknowledgments

- Robert Sabba and Peter Beerbower
- ND Agricultural Experiment Station
- ND Corn Council
- ND Soybean Council
- ND State Board of Agricultural Research and Extension – Soybean
- USDA – National Institute of Food and Agriculture