# A genetically modified, drought tolerant plant with higher seed yield ID# 2012-3949



### TECHNOLOGY READINESS LEVEL 4-7

### Seeking

Investment | Licensing | Research

### Keywords

- Drought tolerant and drought resistant
- rice, maize, cotton, soybean, wheat
- G-protein
- plant breeding and higher seed yields
- U.S. Patent No. 9,434,957

#### Researchers

Sally Assmann Waller Professor, Biology Online Bio Website

### **Originating College**

Eberly College of Science

Office of Technology Management Contact Smith, Matthew mds126@psu.edu 814-863-1122



Water stress levels

## Technology Summary

The Penn State inventors have identified a gene and/or protein, which, when rendered inactive, results in rice having higher seed production and yield under drought conditions. The Penn State researchers identified this phenotype in a publicly available rice cultivar, known to harbor a non-functional mutant gene; this gene (RGA1) in wild-type plants encodes the alpha subunit of a heterotrimeric G protein. This is a spontaneous dwarf mutant with reduced height and shorter, erect, thicker, broad, dark green leaves, compact panicles, and short, round grains.

# Application & Market Utility

Experiments performed demonstrated that the plants present higher photosynthetic rates, stomatal conductance, and ?leaf than wild type during both moderate and severe water limitation. The mutants containing the non-functional gene showed increased grain yield under both moderate and severe drought stress relative to wild-type.

The invention has immediate commercial utility as germplasm to improve existing rice cultivars. As noted above, cultivars containing the non-functional gene can be produced via traditional breeding and/or through the use of genetic transformation.

# Next Steps

Seeking licensing opportunities.



Invent Penn State is a Commonwealth-wide initiative to spur economic development, job creation, and student career success. Invent Penn State blends entrepreneurship-focused academic programs, business startup training and incubation, funding for commercialization, and university-community collaborations to facilitate the challenging process of turning research discoveries into valuable products and services that can benefit Pennsylvanians and humankind. Learn more at invent.psu.edu.

Penn State is an equal opportunity, affirmative action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability or protected veteran status.