Microbial-Induced Barriers To Striga Parasitism

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CONTACT
Eugene Sisman
esisman@ucdavis.edu
tel: 530-754-7650.

ABSTRACT

Researchers at the University of California, Davis have discovered an Arthrobacter bacterial strain that promotes suberization of the endodermis in sorghum roots. Suberin, a poly-fatty acid polymer, acts as a physical barrier in sorghum roots, helping to prevent infection by the parasitic plant Striga hermonthica, a significant threat to sorghum production. These microbial-based solutions offer a cost-effective and easily deployable strategy to manage Striga infection in the predominantly smallholder farmer-driven sorghum cultivation of sub-Saharan Africa.

FULL DESCRIPTION

Sorghum, a vital cereal crop in sub-Saharan Africa, frequently faces significant yield losses due to infestations by the parasitic weed Striga hermonthica. Striga attaches to sorghum roots and penetrates their tissues, causing reduced water and nutrient uptake, leading to wilting, stunted growth, and decreased yields. Existing Striga management methods have proven inefficient and challenging to integrate into traditional agricultural practices.

This technology identifies a novel approach to combat Striga infection by harnessing the power of beneficial soil microbes. UC Davis researchers discovered a soil microbiome that suppressed Striga infection in sorghum by increasing suberin content in the plant's root system. Mathematical modeling predicts the specific microbial genera responsible for this suppression. Among the selected candidates, an Arthrobacter strains was highly effective at inducing suberization of endodermis and exodermis, which strengthened the suberin barrier in sorghum roots.

APPLICATIONS

- Sorghum Agriculture: This technology can be applied to sorghum cultivation in sub-Saharan Africa, providing a cost-effective and accessible method for managing *Striga hermonthica* infestations, thus improving crop yields and food security.
- Microbial Inoculants: The *Arthrobacter* strain can be developed into microbial inoculants applied to sorghum seeds, seedlings, or soil to enhance the suberin barrier and protect the crop from *Striga* infestation.
- Plant Biotechnology: Advances the understanding of suberin deposition in plant roots, potentially leading to the development of genetically enhanced sorghum varieties with stronger suberin barriers.

FEATURES/BENEFITS

- Effective Striga Management: The technology offers an effective and sustainable solution for controlling Striga hermonthica infestations in sorghum, reducing crop losses, and improving food production.
- Affordable and User-Friendly: Microbial-based solutions are cost-effective and easy to implement, making them particularly suitable for smallholder farmers in sub-Saharan Africa.

PATENT STATUS

Patent Pending

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Genes Controlling Barrier Formation in Roots
- Gene Editing for Improved Plant Characteristics via Modulation of Suberin Regulators

INVENTORS

- Brady, Siobhan
- Kawa, Dorota

OTHER INFORMATION

KEYWORDS

sorghum, striga, microbial inoculants, soil microbiome, crop protection, plant biotechnology

CATEGORIZED AS

- **Agriculture & Animal Science**
  - Plant Traits
- **Biotechnology**
  - Food
  - Other

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Fax: 530.754.7620