Soybean Resistant to Cyst Nematodes

The soybean cyst nematode (SCN) is a particularly damaging pest to soybean producing regions around the world. Estimates vary, but SCN infestations cost U.S. farmers approximately between $1.2 and $1.5 billion annually from associated crop loss. It is also estimated that this annual damage is more than the next five most destructive soybean pests combined. Current known resistance sources are proving ineffective at controlling the pest as it continues to adapt and increase in virulence. Additional and improved sources of SCN resistance are needed to mitigate the effects of the pest.

Invention

Most SCN resistance is derived from two quantitative trait loci, the rhg1 locus and the rhg4 locus. Researchers from SIU and the University of Missouri have discovered novel mutations of several genes found in these loci to confer improved SCN resistance. More specifically, mutations in resistant versions of the serine hydroxymethyltransferase (GmSHMT) and the soluble NSF-attachment protein (SNAP) genes have been identified and tested. These mutations can be implemented in various combinations to transform susceptible cultivars so that their native versions of GmSHMT and SNAP are replaced with resistant versions. Potential embodiments include transgenic plants, genetic constructs for plant transformation, and methods of creating resistant plants via breeding crosses and genetic transformation.

Key Advantages

- Mutations in both the rhg1 and rhg4 loci
- Numerous mutations to use alone or in combination for a more robust resistance profile
- Increased resistance compared to current cultivars that are becoming less resistant to the evolving SCN population
- Numerous applications: transgenic crops, transformation methods, genetic constructs for use in plant transformation

Status

U.S. Patent #10,070,614 issued on September 11, 2018 and U.S. Patent #10,294,489 issued on May 21, 2019 for this technology. The technology is available for license.

Applications

- Agricultural pest control
- Genetic-based crop engineering
- Crop yield management and improvement

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Other opportunities related to this technology, included but not limited to sponsored and/or collaborative research, may be available. Please reach out to the designated contact identified at left for more information.