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Soybean Yield Enhancement via MicroRNA for Improved Nodulation, Nitrogen Fixation, and Protein Content

A mobile microRNA boosts soybean nodulation, nitrogen fixation, and seed protein, lifting yields ~10–40% while cutting fertilizer needs.

Researchers at Purdue have identified a mobile micro-RNA in soybean (Glycine max) that is involved in regulating the plant nodulation, nitrogen fixation, productivity, and seed protein content. Over-production of this microRNA in tested soybean cultivars enhance productivity/yields and is more effective than stacking yield-related quantitative trait loci and/or using additional nitrogen fertilizers. This technology created soybean plants with higher nodule numbers, optimized distribution of nodes on roots, greener leaves, and more branches, nodes, pods, and seeds per plant. This technology is potentially a game changer on the soybean traits development increasing yield and reducing the need for fertilizers, directly benefiting soybean producers and consumers while reducing the environmental impact imposed by overfertilization practices.

Technology Validation: Transgenic lines confirmed the applicability of the microRNA for enhancement of multiple soybean yield component traits. Preliminary field data showed an increase of approximately10-40% in grain yield.

Advantages:

- Increasing root nodulation

- Reduction on fertilizer usage

- Higher soybean yield

- Better understanding of gene regulatory mechanisms

Applications:

- Soybean traits development

Technology ID
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Category
Agriculture, Nutrition, & AgTech/Precision Agriculture & Smart Farming
Agriculture, Nutrition, & AgTech/Crop Genetics & Breeding
Agriculture, Nutrition, & AgTech/Regenerative Ag & Soil Health

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View online

- Soybean lines more productive

- Food security

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Intellectual Property:

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PCT-Patent, 2024-06-07, WO

Keywords: soybean yield enhancement,microRNA trait development,nitrogen fixation boost,root nodulation increase,protein-rich soybeans,low fertilizer input,transgenic soybean lines,agronomic trait stacking,green leaf phenotype,high pod count,seed productivity improvement,sustainable soybean farming