

SCREENING OF NITROGEN USE EFFICIENCY IN PLANTS

Patent Status:

PCT Application filed

License Status:

Collaboration and licenses available

Contact:

Steve De Brabandere
sdebrab@uoguelph.ca

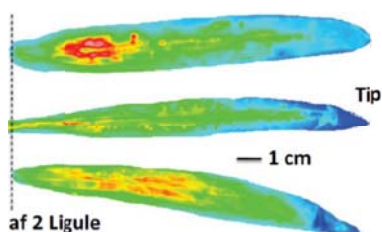


Figure – visualization of glutamine re-mobilization from senescing corn leaf tips through vascular tissue to the base for subsequent export

Description:

Nitrogen is the most important limiting nutrient in plants. Improving nitrogen use efficiency (NUE) can involve improved nitrogen uptake from soil, improved assimilation into amino acids and/or improved remobilization of nitrogen from senescing to growing tissues. There is interest in screening and/or breeding crops with improvements in any of these traits. This potentially requires quantifying nitrogen metabolites in thousands of samples and/or testing for yield at the end of the growing season.

This invention is an inexpensive, high-throughput method of screening for improved NUE including early in the growing season.

The test works by taking leaf punches of plants, including seedlings, and exposing them to a glutamine biosensor, which is the most direct measure of nitrogen uptake and assimilation. In field tests, the sensor was able to detect nitrogen uptake from soil, transport to shoots, assimilation into amino acids and re-mobilization from senescing leaf tips of corn.

This technology should dramatically decrease the costs and labour required for large-scale selection and breeding for improved NUE across a range of crops.

Advantages/Applications:

- Screen plants for improved nitrogen uptake, assimilation and remobilization early in the growing season
- High-throughput, quantitative and cost-effective
- Uses non-destructive tissue sampling
- Can visually quantify free amino acids in intact organs for whole plant physiology