



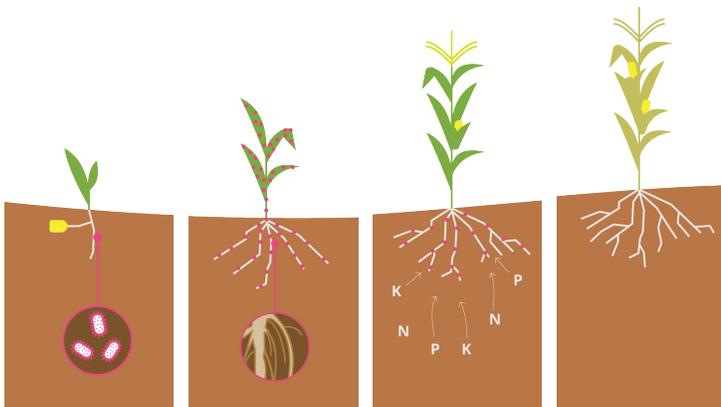
A MICROBIAL INOCULANT PLATFORM DESIGNED TO ENHANCE NUTRIENT UPTAKE FOR INCREASED ROOT DEVELOPMENT, YIELD, AND OPERATIONAL SUSTAINABILITY.

The Terrasym® platform offers growers a better, more cost-effective method to increase nutrient uptake, resulting in robust plant growth, enhanced nutrient acquisition, improved tolerance of abiotic stressors, increased yield potential, and improved crop quality. This easy-to-use platform helps growers optimize in-season performance through convenient application methods, increased efficacy of current inputs, and is complementary to traditional practices.

HOW IT WORKS

Terrasym products contain specially selected beneficial microbes called pink pigmented facultative methylotrophs (PPFMs or 'M-trophs'). PPFMs establish a natural, permanent partnership with plants offering season-long benefits from planting through harvest.

1. As broad plant colonizers, PPFMs spread from the seed surface across a plant's roots and leaves.
2. PPFMs improve nutrient uptake by populating plant roots which promotes higher numbers of root tips and overall root mass in turn enhancing nutrient acquisition.
3. They also secrete beneficial molecules into the root zone that can bind and transport yield-enabling micronutrients.
4. Prolonged PPFM colonization and increased nutrient uptake result in increased chlorophyll content and enhanced photosynthetic efficiency, both of which translate to increases in yield.



PRODUCT BENEFITS



NUTRIENT UPTAKE

Increased uptake of nutrients like iron and manganese in corn, and iron in soybeans.



ROOT DEVELOPMENT

Improved total root area in corn and soybeans by 6% and 12% respectively.



DEVELOPED TO IMPROVE YIELD

Proven to consistently increase yield.

Corn: 80% win rate, +4.5 Bu/A

Soy: 75% win rate, +2.0 Bu/A



FIELD TESTED FOR 5+ YEARS

Over 600 trials have been conducted in 42 unique locations, spanning 19 states with independent researchers, including 7 universities.



BROAD COMPATIBILITY

Convenient planter box applications for both corn and soybean. Compatible with all common seed lubricants and most planter types.*

*Excluding brush meter soybean units

ON-FARM ROOT PHENOTYPING

QUANTIFYING TERRASYM PRODUCT CLAIMS THROUGH IN-DEPTH ROOT SYSTEM CHARACTERIZATION

Recently, NewLeaf Symbiotics® began partnering with independent data companies to bring third-party rigor and commercial-scale data and insights on the agronomic benefits of the Terrasym product line. Data collection and validation began in 2020 with IN10T Farmer Trials and continued in 2021 with Ag Ingenuity Partners (AIP), a business division of Advanced Agrilytics, LLC.

As a component of these trials, NewLeaf scientists are also using DIRT (Digital Imaging of Root Traits) software for root characterization to further quantify Terrasym product claims with a high level of rigor. It's one thing to claim, "enhanced root development." It's another thing to document the claim in greenhouse trials with root characterization. It's something else entirely to be able to track data points on commercial farms that support the claim.

2021 ROOT PHENOTYPING PROCESS

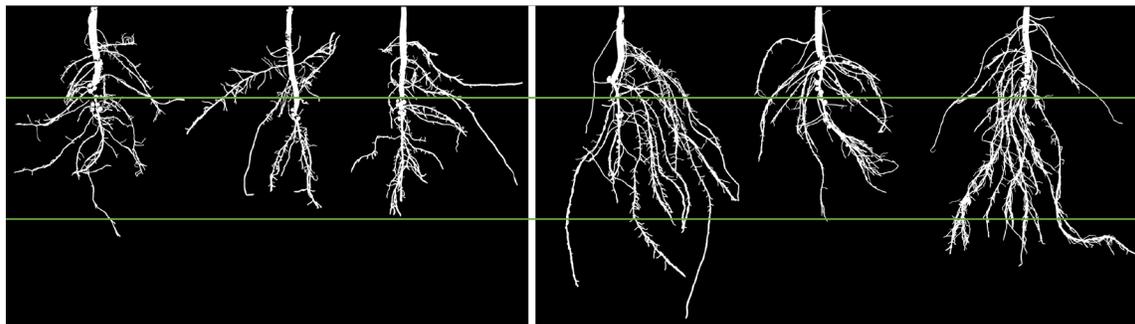
Each AIP trial location is characterized by the topography of the field at planting and divided into three soil wetness index zones: low, medium, and high. AIP agronomists select the two zones that are most characteristic of the field as a whole, geotag the sampling zone prior to the site visit, and then dig plants that will ultimately be processed using DIRT software.

For soybean trials, ten plants are selected per treatment, per zone, totaling 40 soybean plants per trial location. In corn trials, five plants were selected per treatment, per zone, totaling 20 corn plants per trial location. Once the plants have been dug up and rinsed of soil, they are photographed on a black background with a size marker to be processed using DIRT software.

Once the images have been processed, the DIRT software identifies all pixels associated with roots, creating a flat black and white mask to calculate root system architecture traits, as well as a detailed root "map" to identify branching points and root tips. In total, DIRT returns 75 unique root system architecture measurements.

DIRT IMAGE OUTPUT

NewLeaf scientists have analyzed over 2,367 photos since this process began in 2020.



UTC

TERRASYM 401

	Corn	Soy
TOTAL ROOT AREA	+6.7%	+12.4%
ROOTING DEPTH	+7.3%	+10.3%
ROOTING WIDTH	+7.3%	+6.4%
NODAL ROOT LENGTH	+9.6%	Metric not applicable to soy
NUMBER OF ROOT TIPS	Metric only applicable for soy	+7.8%

All untreated checks and PPFM treatments have base fungicide and insecticide application

Corn Source: 2020 IN10T FarmerTrials: Trends reported for Terrasym 450 applied in furrow (V2-V4, 19/24 locations included in the analysis), n = 10 plants per treatment at each location; 2021 AIP Trials: Trends reported for Terrasym 450 as a planter box application (V4-V6, 13/15 locations included in the analysis), n = 10 plants per treatment at each location

Soy Source: 2020 IN10T FarmerTrials: All untreated checks and PPFM treatments have base fungicide and insecticide application; Trends reported for Terrasym 409 applied as seed treatments (V2-V4 15/18 locations included in analyses), n = 10 plants per treatment at each location.

*Nodal roots traced and measured in ImageJ for the 2020 IN10T trials and dissected and measured fresh for the 2021 AIP Trials

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