

Plant Growth Regulator Product Headstart

We've identified more than 75,000 candidate strains across five genera, with a range of known plant growth-promoting modes of action. Leverage Ginkgo's end-to-end R&D platform to progress one of these strains or produce PGRs in a fermentation-friendly host strain.

WORK PERFORMED TO DATE

Target

Early plant establishment; Abiotic stress tolerance; Improved plant biomass, root system architecture, germination, crop yield

Mode of action

Known phytohormones; Plant-colonizing microbes that secrete phytohormones (e.g., cytokinins, auxins)

Key assets

- Comprehensive *in silico* and *in vitro* mode of action assays
- Validated screening platform for key row crops (corn, soybean and vegetable) including root architecture ("cone-tainer") assays
- 16,000 sq-ft greenhouse with high throughput plant phenotyping using *PlantEye* system

We've performed genomic analysis across our 200,000+ member strain collection

75,000 strains were identified with plant growth promoting activity including:

>66,000
Bacillus strains

>4,000
Paenibacillus strains

81%
impact phytohormone
biosynthesis

71%
affect abiotic
stress tolerance

65%
induced systemic
resistance

57%
affect plant
signaling

HOW GINKGO CAN PARTNER ON PGR PROGRAM

Wild type formulation and fermentation process development

Nominate strains from collection for *in vitro* characterization. Select hits and develop a formulation and fermentation process that matches your desired product strategy *in planta*.

Develop a biochemical production strain

Express and optimize biochemical production pathways in one of our proprietary chassis strains to manufacture phytohormones through commercial scale fermentation.

Optimize performance of a starting strain

Use mutagenesis or rational strain engineering approaches and ultra high throughput screening methods to improve efficacy and / or stability of wild type PGPRs.

HOW WE PARTNER

Our IP Philosophy

Each party retains ownership of the Background IP they bring to a collaboration. Ginkgo seeks ownership of the foreground IP and grants the partner the licenses needed to manufacture and sell the product in a given market.

Commercial Structure

Our payment structure reflects our philosophy: we share risk and share in the success. We get paid through a combination of R&D fees and downstream value-share such as royalties, equity or commercial milestones. Through Joint Steering Committees, we work with partners to govern key decisions in project progress.

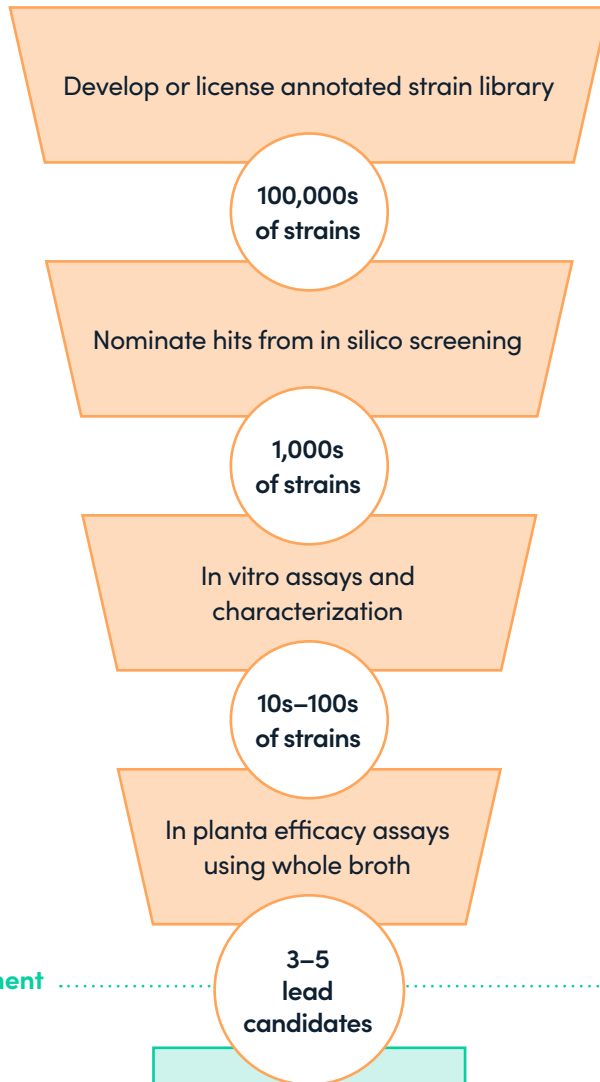
How to start? Speak to our team!
agriculture@ginkgobioworks.com

Get a Headstart on Discovery

Access Ginkgo's diverse strain library to accelerate your next biological product

WILD TYPE MICROBIAL PRODUCT DISCOVERY TO DEVELOPMENT

Early to late discovery

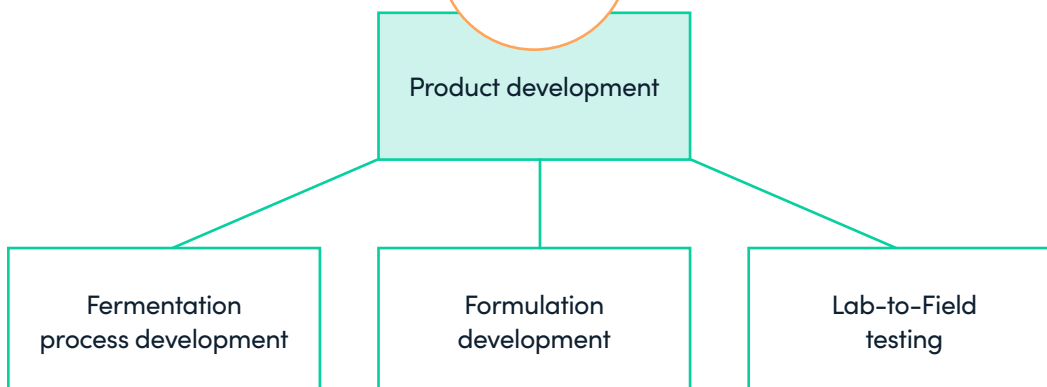


Shave years off of Discovery with our lead candidate strains

Lead candidate strains emerging from *in silico* screening, *in vitro* testing and *in planta* assays address multiple product applications across crop protection and nutrient use efficiency.

Access our world-class 200,000+ member strain library, sourced from diverse soil and plant-associated environments, to nominate additional candidates for *in vitro* and *in planta* characterization.

Product development



PRODUCT DISCOVERY HEADSTARTS

	Application	Lead Candidate Type	Discovery Stage		
			<i>In silico</i> hits	<i>In vitro</i> leads	<i>In planta</i> leads
Crop Protection	Bionematicides	Novel active ingredient	✓	✓	✓
	Biofungicides - Row Crops	Novel strains	✓	✓	✓
	Biofungicides - Specialty Crops	Novel strains	✓	✓	Not tested
	Bioinsecticides	Novel strains	✓	✓	✓
Crop Nutrition	Nitrogen fixation	Novel strains	✓	Not tested	Not tested
	Phosphate solubilization	Novel strains	✓	Not tested	Not tested
	Plant growth regulators	Novel strains	✓	Not tested	Not tested
	Carbon sequestration	Novel strains	✓	Not tested	Not tested

OUR PLATFORM

Leverage our end-to-end platform to progress candidates through product development

Achieve target COGS with our Fermentation Process Development services

- Optimize process requirements for manufacturing with predictive fermentation tools (e.g., Sartorius Ambr250 ml reactors)
- Test at scale with 3000L pilot plant facility

Improve product efficacy and stability with our Formulation Development services

- Industry leading formulation expertise across a range of product concepts - liquid suspensions, dry format formulations, foliar and seed treatment formulations, and adjuvants to enhance bioactives

Go to field trials with confidence with our Lab-to-Field Testing services

- 175k ft² plant science facility with growth chambers, greenhouses, micro plots and rapid phenotyping (multispectral 3D imaging) capabilities
- Robust platform of efficacy and stability assays to validate biological products in formulation

Learn more about accessing our lead candidate strains - Schedule a meeting today!

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