

Fungal genome offers clues on how leaf-cutter ants farm

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Credit: Jarrod Scott

Leaf-cutter ants are well-known examples of insects that use microbes to gain access to nutrients, farming "gardens" in which bacteria and fungi break down plant mass. In an article featured on the cover of the June 2013 issue of *Applied Environmental Microbiology*, a team including DOE Joint Genome Institute researchers and longtime collaborators at the Great Lakes Bioenergy Research Center reported the first draft

genome of a fungus, *Leucoagaricus gongylophorus*, that breaks down plant biomass in the leaf-cutter ants' gardens.

Analysis of the draft genome indicated that the [fungus](#) had nearly 150 biomass-degrading enzymes that can break down proteins, xylan, starch and pectin. The finding lends credence to the team's theory that *L. gongylophorus* plays the primary role in breaking down plant biomass in the fungal gardens. Additionally, a comparison of the soil strata obtained from two different leaf-cutter ant gardens that was done with researchers at the Environmental Molecular Sciences Laboratory revealed that many of the lignocellulases found in the fungal genome were present in the samples, suggesting they played a role in helping to decompose the plant mass collected throughout the 4- to 6-week process.

"The composition of [plant biomass](#) in ant gardens is highly variable due to the diversity of plants foraged by the ants and changes in substrate composition throughout the degradation process," the team reported. "Therefore, the ability of *L. gongylophorus* to quickly alter the production and [secretion](#) of lignocellulases in response to nutrient availabilities is likely critical for efficient biomass processing."

More information: aem.asm.org/content/79/12/3770.abstract

Provided by DOE/Joint Genome Institute

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