Long before humans started farming, in fact long before humans even existed, the first farmers were ants. Some tropical ants collect leaves which they use to grow fungi in their undergound nests. The ants cannot digest the leaves directly, and so they feed exclusively on the fungi that they farm. The leafcutter ants, or attine ants, include the genus Atta and they eat a significant amount of vegetation - typically 12 - 15% of all of the leaves produced in South American forests. They may have been eating fungi for up to 50 million years, and during that time they have co-evolved with their fungal partners.

The ants and their fungi form a true symbiosis, with both partners benefiting from the relationship. The ants benefit by exploiting leaves : a food they can't digest themselves. The fungi break down the indigestible cellulose of plants, converting it into more edible proteins and sugars which the ants can harvest. The ants, in turn, provide all the food the fungus needs, carefully selecting the leaves that the fungus prefers, and even secreting antibiotics to prevent bacteria from growing on the rotting leaves in competition with the fungus. The ants also carry the fungus around when they move to a new location. The queen ant takes a small amount of fungus in her mouth, and after she mates she digs a hole and spits out the fungus to start a new nest. The image to the right shows a large queen ant surrounded by smaller worker ants.

Fungi are classified as Ascomycetes, Basidiomycetes or Zygomycetes based on the spores that they produce. Until recently it was hard to classify the fungi that are used by leafcutting ants because the fungi rarely produced spores. Now classification can be done by comparing the DNA of a fungus to the DNA of other species.

Recent work studying the DNA of both the ants and the fungi has shown that different colonies of the same ant often grow different species of fungi, despite the fact that each individual colony only farms a single species of fungus. There is also some evidence that ants occasionally "steal" a fungus from a neighboring colony. Although most of the fungi grown by the attine ants are unique to the ant colonies, there are two exceptions: ants which are growing fungi that are found in the wild. This suggests that the fungi were collected by the ants recently. In one case in Florida a species of ant which was introduced in the 1900s now grows a local Florida fungus in its nest. Presumably the original South American fungus that the ant arrived with died out in Florida, so the ant was forced to find a local replacement. In this way the ants can adapt to a change in their environment.