

Nitrogen assimilatory enzyme activities of honey locust (*Gleditsia triacanthos*) roots. Evidence for symbiosis?

Ethan Cossio, Mark Schoenbeck

In the family Fabaceae (legumes), there are plants that have swellings of the roots called nodules, where nitrogen gas in the air is fixed by soil bacteria (rhizobia) and turned into ammonium, a form of nitrogen that is assimilated by the plant. *Gleditsia triacanthos* (the honey locust) is special case as it is a legume that lacks root nodules. It remains an open question as to whether or not the honey locust tree is able to have functional symbiosis within the roots. Root tissue proteins were extracted from samples of the studied plant in order to search for evidence of increased nitrogen assimilatory enzyme activities that are usually seen in root nodules of legumes that form symbioses. Treatments of the roots of *G. triacanthos* seedlings included the presence and absence of soil inoculation and of nitrogen amendment. The enzymatic activities of aspartate aminotransferase (AAT), phosphoenolpyruvate carboxylase (PEPC), malate dehydrogenase (MDH), and NADH glutamate synthase (NADH-GOGAT) were detected within the plant-extracts, however the activities for NADH-GOGAT within roots treated with nitrate were lower. Using the DNA of inoculated roots as a template, the amplified DNA of genes encoding enzymes for nitrogen metabolism for symbiosis and for the nitrogenase enzyme has resulted in different amplification products which may be used for future sequence and study analyses.