The mycorrhizal-associated nutrient economy hypothesis proposes a strong connection between plant and fungal traits and the dominant form of soil nutrients. If true, then shifting from an organic to an inorganic nutrient economy should benefit arbuscular mycorrhizal (AM) trees because they are more suited to acquiring inorganic forms of nutrients and have limited decomposing capabilities when compared to ectomycorrhizal (ECM) trees.

An inorganic nutrient economy was experimentally promoted by applying inorganic phosphorus (P) fertilizer and/or elevating soil pH with lime in three Allegheny Plateau mixed mesophytic forests. Trees were measured over seven growing seasons to determine how growth responded to the treatments based on mycorrhizal association.

AM-associated trees showed increased growth in response to increased inorganic nutrients, but ECM tree growth was suppressed when compared to the control. We also observed that understory and mid-story trees responded to the treatments, but large overstory trees showed no significant growth response.

Results support the hypothesis that AM trees respond positively to an inorganic nutrient economy. While raising pH in acidic soils can be detrimental to ECM tree growth, the exact mechanism for this response is unclear