

A NEW PLANT AND TREE GROWTH: ENHANCING INOCULANT



By
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This brief monograph seeks to introduce the reader to Dr. Carol Janerette's invention of a mycorrhizal inoculant which is effective to increase the growth of trees and other plants. Claims to Dr. Janerette's invention are covered by [U. S. Patent No. 5,178,642](#). There is also a published international application on the same subject matter. A review article on Mycorrhizae by Dr. Janerette, ([An Introduction to Mycorrhizae, Am. Biol. Teacher 53: 13-19 \(1991\)](#)).

Certain fungi form symbiotic associations with the roots of plants. The structures which constitute these associations are called "mycorrhizae". In "ectomycorrhizae," a subtype of mycorrhizae which form primarily with the roots of woody plants, the fungal bodies ("hyphae") penetrate the spaces between root cells without entering the interior of the cells. In another subtype, "endomycorrhizae" – which form primarily with the roots of herbaceous plants – the hyphae penetrate the interior of root cells.

Various mycologists have sought a stable inoculant of such fungi which will be effective to produce these symbiotic associations when contacted with plant roots, since, in nature, such associations have been correlated with enhanced growth.

Mycorrhizal associations have been shown to benefit plants and increase their growth by increasing:

1. Nutrient (including minerals such as phosphorus) and water absorption;
2. Root health and longevity;
3. Plant tolerance to drought, temperature, heavy metal toxicity, extremes of pH and transplant shock.

While the level of appropriate fungi in soil can be raised by soil transplant, this is a drastic remedy for poor soil at one location and requires damage (by removal) to soil elsewhere. Accordingly, the value of a stable inoculant product which is effective to introduce such fungi into soil has long been recognized.

Efforts to produce such inoculants have failed commercially because prior inoculants have not had a satisfactory shelf life. Most notably, Abbott Laboratories produced an inoculant under the trade

name “Mycorrhiz”, which was subsequently removed from the market, apparently due to its short shelf life and the consequent complaints of consumers.

Dr. Janerette’s efforts in this area have focused on producing resting structures of the relevant fungi in hopes that inoculants composed of these structures might have longer shelf lives. In her efforts, she has been mindful that obvious resting structures, the sexual spores of these fungi, have not produced consistent results.

Dr. Janerette’s research uncovered a process which reproducibly stresses the fungi and causes them to form structures called “microsclerotia” or initials of microsclerotia”, which structures are believed to be resting forms of the fungi. Dr. Janerette has found that inoculants prepared by this process are stable for at least one year, allowing—for the first time—the production of a practical commercial inoculant. Quite unexpectedly, the inoculant so formed (from fungi traditionally classified as “ectomycorrhizae” and thought to usually associate with woody plants) have been effective with herbaceous plants, forming mycorrhizae having the “endo” morphology usually found for such symbiotic associations with herbaceous plants. Thus, the inoculant can be versatily applied to both woody and herbaceous plants.

It is anticipated that Dr. Janerette’s inoculant will have broad application in gardening, tree farming and agriculture generally. Prior work with shorter-lived inoculants and soil transplants confirms the broad benefits of increasing the level of appropriate fungi, as has Dr. Janerette’s own work with her newly-discovered inoculant.