



Products Information

Bison Soil Organic Biochar for Citrus Tree Agriculture



Bison Soil Organic Biochar for Increased Yields and Citrus Greening Disease

Citrus greening is a bacterial disease that attacks the vascular system of plants. Once infected there is no cure for a tree with citrus greening disease. Citrus trees decline and die within a few years and may never produce usable fruit. In Florida, greening disease is widespread. The response of many citrus growers is to stop planting citrus trees.

Biochar has been shown to be effective in treating greening disease as well as increase yields. Pioneering work by IFAS at the University of Florida has shown benefits in citrus yield and soil quality from biochar additions to soils. Schumann and Spann (2012) found that 4-yr old citrus trees had 67% more canopy volume than trees grown in adjacent un-amended soil. Tree canopy volume is a rapid method to estimate tree size, which in citrus, is positively correlated with citrus fruit yield. Thus, the 4-yr old trees grown in biochar should have a greater fruit yield.

They also found that the soil amended with biochar had a cation exchange capacity (CEC) that was 4.5 times greater than the un-amended soils. Copper in the grove soils was found to be high (139 lb/acre) due to its use as a fungicide; however, where biochar was added to the soils the levels in the soil were negligible (0.4 lb/acre) (Schumann and Spann 2012).

More Information on Greening Disease: Citrus greening is considered to be one of the most serious citrus diseases in the world. It is a bacterial disease of citrus that greatly reduces production, destroys the economic value of the fruit and can kill trees. Citrus greening is a disease vectored by two species of citrus psyllid (*Diaphorina citri* Kuwayama and *Trioza erytreae* (del Guercio)). Asian citrus psyllids cause economic damage to citrus in groves and nurseries by direct feeding and, potentially, by transmitting a serious bacterial disease. Both adults and nymphs feed on young foliage, depleting the sap and causing galling or curling of leaves. High populations feeding on a citrus shoot can kill the growing tip. More importantly, this psyllid is able to transmit an endocellular, phloem-restricted bacterium, *Liberobacter asiaticum*, that causes the greening disease. The bacteria are phloem-limited and cause yellow shoots, blotchy mottling and chlorosis, reduced foliage, and tip dieback of citrus plants.

Description of Bison Soil Organic Biochar

Bison Soil Organic Biochar for the citrus industry is sold by Bison Soil and optimized for superior performance to enhance plant growth by retaining nutrients and water; to improve soil physical, chemical and biological properties; to enhance crop growth with less agronomic inputs; and to increase beneficial microbial colonization. This Bison Soil Organic Biochar is manufactured from clean wood biomass to maximize its ability to improve soils and fruit production.

Bison Soil Organic Biochar lasts for hundreds of years, so it stays in the soil providing benefits to the trees for years and years. Bison Soil Organic Biochar is not only good for citrus, but it is also good for the planet because it is a natural, USDA Certified Biobased soil amendment that is derived from plant biomass that would otherwise be a waste product in a landfill.



Application Rates for Bison Soil Organic Biochar

With its ability to improve soil, plant production and fruit yield, Bison Soil Organic Biochar is ideally suited for use in citrus groves. Bison Soil Organic Biochar is particularly effective on sandy soils, much like those that are found throughout Florida. The rates below are based on University research and provide general guidance for the use of Bison Soil Organic Biochar. Studies have determined that 2- 5% (w/w) have been effective in improving crop yields, combating greening disease and improving soil quality.

These are typical application rates, and rates for a given situation depend on the soil type and condition. We thus suggest that trials be conducted with your specific soil and citrus trees to determine the best Bison Soil Organic Biochar concentrations.

Bison Soil Organic Biochar can be applied to each tree, either when it is first planted or it can be worked into the soil around each tree. Adding 3-5% (w/w) requires approximately 8 to 16 cups, respectively, of Bison Soil Organic Biochar per 5 gallon bucket of soil (1.5 to 2.5 lbs of Bison Soil Organic Biochar).