

# Short-term Effects of Cover Crops on Soil Properties and Greenhouse Gas Emissions on Citrus Production in Florida

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**Summary:** Cover crops (CCs) have been reported as a sustainable management strategy to improve soil nutrient availability for citrus production. However, limited information is available on the influence of CCs on soil nutrient cycling and greenhouse gas emissions (GHG). We examined the effect of replacing the traditional row middle of a commercial citrus grove in Florida with five different types of CCs: Cowpeas (CP), Oat (O), Sunn Hemp (SH), Sorghum Sudan grass (SS), and a mixture of Cowpeas/Sorghum Sudan grass (CP+SS). A grower standard was used as a control (C). After one year of CCs, the use of CCs significantly increased soil P, Ca, Mg, Cu, Fe, and organic matter (OM) availability in the row middles compared to C.

For instance, results showed 260%, 100%, 172%, and 216% increase in Ca concentration for SS, SH, O, and CP, respectively. Treatment with CP results also showed increases in the soil Mn, B, and S content by 125%, 114%, and 50%, respectively compared to C. The best CC treatment to improve soil nutrient availability was CP which improved P, Mg, Cu, Fe, and OM by 52%, 199%, 152%, 21%, and 25%, respectively. The results indicated no impact on soil respiration of methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) for the CC treatments in the row middle compared to the C. Overall, our data suggest that CCs can enhance soil nutrient cycling, nutrient availability, and soil respiration in the row middles compared to the C in Florida citrus groves after only one year of CC treatments.

Florida citrus groves after only one year of CC treatments.

## Take Home Message:

- Treatment with cover crop (CC) cow pea (CP) showed increases in the soil Mn, B, and S content by 125%, 114%, and 50%, respectively compared to control.
- The best CC treatment to improve soil nutrient availability was CP which improved P, Mg, Cu, Fe, and OM by 52%, 199%, 152%, 21%, and 25%, respectively.
- Overall, research results suggest that CCs can enhance soil nutrient cycling, nutrient availability, and soil respiration in the row middles compared to the C in Florida citrus groves after only one year of CC treatments.

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