UCDAVIS
UNIVERSITY OF CALIFORNIA

Soil health outcomes of rotation strategies during transition to organic

Oren Hoffman*, Nicole Tautges & Kate Scow *ohhoffman@gmail.com

The transition period is an opportunity to pump organic matter into the soil in preparation to organic production. But how do we maximize SOC gain and minimize financial risk? Annual rotation with tillage to mix in residues and compost? Or perennial crop to reduce soil disturbance and increase deep roots?

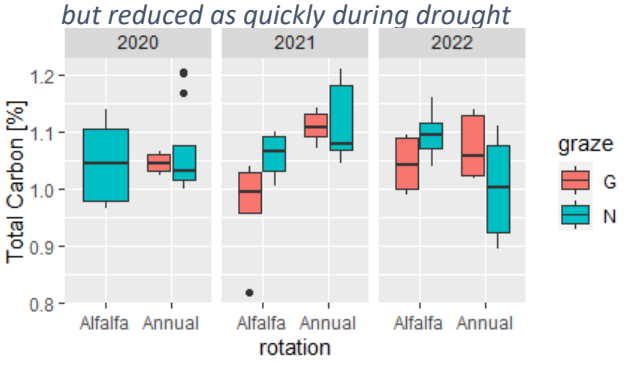
We compared an intensive system of annual forage rotation (10T/He compost x 3 applications) to a lower-input Alfalfa (5T/He compost x2 applications). Soil was compared for SOC, TN, chemical fertility, infiltration and aggregate stability. Silage corn was grown organically after 2 ½ years.

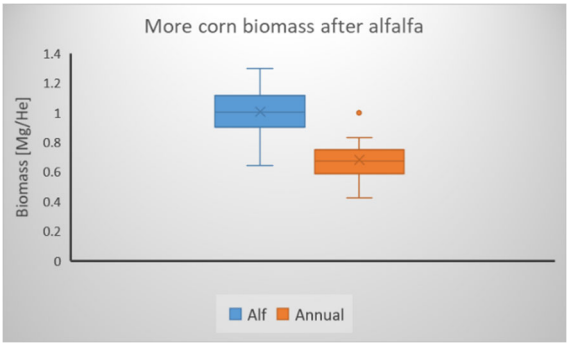
Results:

1. WCC increased soil carbon quickly, but lost it quickly during drought. Alfalfa leads to slow buildup of soil carbon. TN results follow TC exactly; C:N ratio similar.
2. Alfalfa system had more root biomass, especially after >1 year of growth. Alfalfa roots have higher C and N content, and lower C:N ratio.
3. Corn biomass is significantly higher after alfalfa (but also more perennial weeds). We are looking into the main cause.

1. WCC very sensitive to dry winter (middle), but alfalfa (right) can use deeper water to keep growing

2. SOC increased quickly under annual rotation, but reduced as quickly during drought





Conclusion: with drought becoming the norm in California, rotating with alfalfa might be a more appropriate soil health practice.