

Application of Compost to Alfalfa to Improve Soil Structure and Soil Nutrient Content

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Abstract

Composts consist of decomposed organic matter from plants or animals used to provide slow-release mix of nutrients to soils. While inorganic fertilizers are typically applied to satisfy specific nutrient needs of crop plants, composts contribute carbon and diverse macro- and micro-nutrients that feed into a variety of soil nutrient cycles and more fully support the complete soil ecosystem. From fall 2020 to spring 2023, in collaboration with Michelle Leinfelder-Miles (UCANR) and Rachael Long (UCCE), we assessed the effects of applying green-waste compost on established alfalfa. We evaluated compost effects on soil carbon and nitrogen storage, soil physical characteristics (e.g. water infiltration, reduced compaction), greenhouse gas fluxes, and alfalfa yields. The project included two trials – a high-carbon soil field in the San Joaquin County Delta, and a low-carbon soil field in Yolo County. Over the two and a half years of the project we did not measure significant changes to soil physical characteristics at either site, but we did observe significant changes in pH and some soil nutrient concentrations that correlated with alfalfa yield increases. In addition, changing trends in greenhouse gas fluxes suggested broader changes to the soil microbial communities.