POST FUMIGATION RECOVERY OF SOIL MICROBIAL COMMUNITY STRUCTURE

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Soil fumigants have been extensively used to control target soil borne pathogens and weeds for the past few decades. It is known that the fumigants with broad biocidal activity can affect both target and non-target soil organisms; but the recovery of soil microbial communities are unknown until recently. The study of microbial community recovery after fumigation is crucial because soil microorganisms play an important role in sustaining health of agricultural soil by contributing to nutrient cycling, soil structure and overall soil quality. The main objective of this study is to determine the recovery of soil microbial community structure after continuous fumigation with different time frames.

Materials and Method

The study was conducted in the Watsonville area, the dominant strawberry growing region of California, USA. Chronosequences were chosen considering Jenny's state factors (1941): organisms, climate, relief, parent material and time; sites were chosen which were as similar as possible. The chronosequence selected for this study contained four sites defined by number of years since fumigation (ysf) with methyl bromide. The sites were a 15 year old site at the time of sampling, a 33 year old site, a 39 year old site, and an organic farm. Soil samples were collected in May 2013 from 0-5, 5-15 and 15-30 cm depths. Three 100 m transects serving as replicates were randomly placed on research sites and soil samples were collected from three equally spaced points along each transects. Phospholipid fatty acid (PLFA) analysis was used to characterize recovery of soil microbial community structure after fumigation. The soil microbial community response to and recovery from continuous fumigation using a chronosequence of three fumigated sites as well as an organic site will be discussed.