CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36228

Project Title

Using a Drone to Measure Cover Crops in Organic Strawberry Furrows

Abstract

Objectives/Goals

The objective of this study was to use aerial photography with a drone to measure cover crop canopy development to determine which planting arrangement (one versus three lines) closed canopy the quickest.

Methods/Materials

This experiment occurred at a USDA-ARS organic research field. On September 28, 2015, a cover crop mixture that by weight included 66% sudangrass and 34% mustard was planted in the furrow bottoms. Two planting arrangements (1 line versus 3 lines) were used to plant the cover crops. In the 3 line arrangement, the middle line was in the center of the furrow, and each of the outside lines was 51 mm away from the center line. This experiment had six replications. Each replication consisted of two furrows randomly assigned to either the 1 or 3 line planting arrangement. The furrow bottoms were drip irrigated as needed to germinate the cover crop. To prepare for winter rainfall, cover crop was planted approximately 1 month before transplanting the strawberries.

Cover crop canopy ground cover was recorded in photographs taken weekly by a drone for a month at approximately mid-day. A consistent height above the plot for each date and replication (ranged from 5-10 m) was maintained by using the altimeter feature of the App. The pilot stood at a fixed point on the north end of the plot, and the assistant stood in front of the furrow being photographed and photos were taken going from left to right.

The photos were cropped and a pixel quantifying program called easyleafarea was used to find the percent ground cover of the cover crops in the furrows. The data was then plotted in excel in a scatter plot.

Results

There was a faster rate of canopy development in the 3 line treatment when compared to 1 line, but overtime the 1 line treatment started catching up.

Conclusions/Discussion

The results agreed with the hypothesis that the 3 line arrangement would develop its canopy faster than the 1 line arrangement.

In conclusion this novel method of cover cropping in the furrows with 3 lines of mustard and sudangrass could make organic strawberry production more sustainable by increasing water infiltration and reducing runoff, soil erosion and nutrient loss during the winter.

Summary Statement

This project tested which arrangement (1 line or 3 lines) of a sudangrass and mustard mixture with the same amount of seed closed its canopy fastest in the furrows of an organic strawberry field in the month prior to strawberry transplantat

Help Received

Used drone at USDA-ARS under the supervision of Dr. Eric Brennan, conducted experiment at the USDA-ARS field at Spence Road under the supervision of Dr. Eric Brennan, Advisor was Dr. Eric Brennan at the USDA-ARS.