ECONOMIC PERFORMANCE OF NON-FUMIGANT STRAWBERRY PRODUCTION SYSTEMS

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Several non-fumigant approaches to strawberry production are being researched as alternatives to methyl bromide. However, these systems will not be widely adopted unless they are profitable and the level of profit is comparable to that achieved with methyl bromide and other fumigants. This means that yield, quality, and costs of production must be competitive with fumigant production economic performance. The profitability of anaerobic soil disinfestation (ASD) will be evaluated.

As discussed in Shennan et al., field experiments were conducted in Watsonville in the 2009 – 2010 season. The experiment compared ASD treatments with different carbon sources including rice bran 4.5 tons/acre (ASD1), rice bran 9 tons/acre (ASD2), and rice bran 8 tons/acre plus mustard seed cake 1 ton/acre (ASD3) with untreated checks (UTC) and MeBr or PicChlor 60 fumigation controls. In addition, each of the treatments was repeated with standard green tarp and clear TIF tarp.

For each treatment the monthly marketable yields were determined from March until August. Monthly prices received by growers for fresh strawberries were based on USDA data. The total income for each treatment was calculated by multiplying the monthly yield by the monthly price to get the monthly income and then adding the monthly incomes. The costs of production were calculated for each treatment only for the costs that varied by treatment. These included the cost of the carbon source, tarp, water, hard weeding, and harvest. In other words, the costs that were identical by treatment such as planting costs and fertility costs were not included in the analysis. The hand harvest rate was assumed to be $11.88 per hour and the harvest costs were approximately $.21 per tray (Bolda et al., 2010). The water cost was ascertained from the grower cooperator as $272 per acre foot. The costs of the carbon sources were collected from the suppliers for the experiment (Table 1). The cost of tarping was estimated by a contract company.

The results show that the highest net income was for methyl bromide with TIF followed closely by MB with standard tarp (Table 2). The costs of all of the carbon sources were substantially lower than the cost of methyl bromide. However, the yields were lower in all of the ASD treatments compared to the MB treatments. The net result was that the income loss outpaced the materials savings. For the ASD treatments, all were higher with standard green tarps than clear TIF. The best performing ASD treatment with green tarp was ASD1 – rice bran at 4.5 tons per acre followed by ASD2, rice bran with 9 tons per acre, and ASD 3 rice bran at 8 tons per acre plus 200 pounds of mustard cake. Interestingly, ASD3 had the highest ASD yields but also the highest cost of carbon and ASD1 had the lowest ASD yields and the lowest cost of carbon. For the clear tarp, all of the ASD treatments with added carbon showed lower net incomes than the checks that were tarped and irrigated but had no additional carbon sources. It should be noted that this site had very low Verticillium pressure (0 microsclerotia/gram soil). Data from other sites with moderate disease pressure are being collected in the 2010-2011season.REFERENCES

Bolda, Mark, Laura Tourte, Karen Klonsky, and Richard DeMoura. 2010. Sample Costs to Produce Strawberries: Central Coast Region. University of California Cooperative Extension.

Shennan, Carol, Joji Muramoto, and Graeme Baird. 2011. Anaerobic Soil Disinfestation: California. 2011 MBAO Conference, San Diego, CA.

Table 1. Cost per Acre of Carbon Sources

Carbon Source	Price $/unit	Quantity	Cost $/acre
Rice bran	175/ton	8,914 lbs./acre	708
Molasses	150/55 ton	8,023 lbs./acre	2,188
Molasses	89.20/ton	8,023 lbs./acre	325
Mustard cake (Ida Gold or Pacific Gold)	1,600/ton	200 lbs./acre	1,600
Ethanol (4.09 acre inch of 0.95% ethanol)	7.54/gallon	1,069 gallons/acre	8,060
Ethanol (0.62 acre inch of 5.7% ethanol)	7.54/gallon	1,010 gallons/acre	7,615
Ethanol (2.05 acre inch of 0.95% ethanol)	7.54/gallon	534 gallons/acre	4,030
Ethanol (0.62 acre inch of 2.4% ethanol)	7.54/gallon	505 gallons/acre	3,808

Table 2. Income, Costs, and Net Returns per Acre for Watsonville Trial 2010

Plot	Tarp	Lbs. /Acre	Gross Income	Fumigant /Carbon	Water	Hand Weed	Tarp	Harvest Cost	Total Cost	Net
UTC	Standard	68,706	$9,085	-	$ 425	$ 932	$363	$34,581	$36,300	$12,785
UTC	TIF	66,873	48,151	-	425	980	545	33,658	35,607	12,544
ASD1	Standard	71,157	50,918	$788	517	180	363	35,815	37,663	13,256
ASD1	TIF	66,557	47,850	788	517	2,702	545	33,499	38,050	9,800
ASD2	Standard	74,673	53,394	1,575	517	500	363	37,586	40,541	12,852
ASD2	TIF	73,171	52,670	1,575	517	1,797	545	36,829	41,263	11,407
ASD3	Standard	77,597	55,585	3,000	517	386	363	39,058	43,324	12,261
ASD3	TIF	75,523	54,269	3,000	517	1,495	545	38,014	43,570	10,699
MB	Standard	90,550	64,699	3,500	425	399	363	45,581	50,269	14,430
MB	TIF	89,818	64,426	3,500	425	229	545	45,213	49,911	14,515