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ANNUAL STRAWBERRY PRODUCTION: A COMPARISON OF TRADITIONAL AND LOW INPUT SYSTEMS

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Background. Annual strawberry production complements other fruit crops by allowing the growth of a crop during the "off season". Strawberries are planted in late summer, when labor demands are lower, and harvested the following spring, before most other fruit production begins. With the traditional annual method, soil is fumigated just prior to planting in mid-September. Plants are grown through the winter, fruit harvested in the spring, and the plants are removed after harvest. This avoids trying to keep the plants alive during the hot, dry summer months.

The goal of low input systems is to reduce the chemical inputs needed to produce a given crop. The use of soil solarization and green manures or animal manures can be incorporated into strawberry production. Soil solarization is used as a replacement for methyl bromide fumigation. Use of animal manure or green manure crops can be an alternative to chemical fertilizer inputs.

Research Findings. 'Chandler' strawberry plants were planted in the fall of 1989. Soil treatments compared fumigation with methyl bromide, solarization with clear plastic for 6 weeks, and untreated control. Nitrogen sources were derived from commercial fertilizers or manure sources. Poultry litter was applied at 2 rates. Green manure crops planted the season before consisted of 1) winter clover/summer cowpea rotation or 2) summer sorghum fertilized with poultry litter. After harvest in 1990, all plots were split; either strawberries were allowed to grow through summer and fruit in the spring or plants were removed and replanted with 'TAM Mild' jalapeno pepper plants. After harvest, the pepper plants were removed and replaced with new strawberry plants. Yields of 1 and 2-year-old strawberry plants were compared in 1991.

In 1990, fumigation with methyl bromide increased strawberry yield over solarization followed by the untreated control (table 1). However, in all cases, yields were high indicating that soil pathogens did not reduce yields in unsterilized soil. High rates of chicken manure or sorghum green manure fertilized with chicken manure produced highest yields. Unfertilized plants produced significantly lower yields as compared to all fertilized treatments.

Pepper production was greatest for clover/cowpea treatments followed by commercial fertilizer treatments. Both treatments received additional nitrogen prior to planting, since the nitrogen should have been rapidly depleted during strawberry production, while manured treatments should have had long term residual nitrogen. Pepper yield was greater for plants grown with high manure compared to low manure rates.

All strawberry yields in 1991 were lower compared to 1990. This is due to the fact that

additional nitrogen was not applied in the fall of 1990. Residual nitrogen supplied by the manures was not enough to maintain high production levels. Second year plants had higher yields than first year plants. The pepper plants may have used most of the residual nitrogen in the summer of 1990, thus the strawberry plants set in the fall of 1990 had very little nitrogen for establishment. Second year plants had stored carbohydrate reserves to draw from as well as residual nitrogen available.

Application. Soil solarization may be an adequate substitute for chemical fumigation. Solarization will not be effective on sites plagued with high populations of nematodes or perennial weeds. The plastic must be applied during the hottest part of the summer with the longest daylength in order to maximize the benefits of solarization. The cost of solarization can be reduced by solarizing individual beds and using those beds for a second crop, such as peppers or melons.

Green manures and/or animal manures can successfully replace chemical nutrient inputs. This practice improves both the physical and chemical properties of the soil. This is beneficial in areas such as East Texas were the soil is inherently low in native organic matter and fertility.

Older plantings have declining vigor and are more susceptible to disease pressures, thus yields are lowered. As a result, the increased maintenance, irrigation, and fertilization needed to carry strawberry plants throughout the summer for second year production cannot be economically justified for a commercial operation.

Table 1. Effect of soil treatment and nitrogen source on strawberry and intercropped pepper yields

	Strawberry Yield (lbs/ac)			
	1990	1991		
Soil Treatment		2nd Year Plants	1st Year Plants	Pepper Yield (lbs/ac)
Fumigation	27702.4	14211.5	4982.4	597.0
Solarization	26206.6	13591.4	4921.4	510.8
Nontreated control	25702.5	13357.6	3918.9	428.6
Commercial fertilizer[z]	27059.8	13313.5	3603.6	654.7
Manure[y] (1x, low)	27800.8	14106.4	4524.4	360.0
Manure (2x, high)	28825.3	14417.3	6427.5	613.4
Clover/cowpea[x]	26592.7	15027.6	5534.7	755.7
Sorghum + manure[w]	28714.5	14186.2	5299.9	599.8
Unfertilized control	21674.7	11305.9	2255.3	89.9

[z]Urea @ 150 lbs N/ac 8/1/89, Nitroform @ 200 lbs/ac 9/15/89, 13-13-13 applied to pepper plots @ 75 lbs/ac 7/11/90.
[y]1x Rate = 10 tons/ac, 2x Rate = 20 tons/ac, 8/1/89.
[x]Chicken litter applied to pepper plots @ 10 tons/ac 7/11/90.
[w]Chicken litter applied @ 10 tons/ac 5/10/89.