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PRODUCTION OF ANNUAL STRAWBERRIES IN EAST TEXAS

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INTRODUCTION

Fruit growers in Texas have largely overlooked pick-your-own strawberries. There is a large population to draw from, and as of yet, minimum competition for U-pick fruit in April and May. Pick-your-own prices of up to $0.75/lb can be expected even though California strawberries are usually very inexpensive in the market at the time Texas fruit would be ripe.

Annual strawberry production systems compliment other fruit crops by allowing the growth of a crop during a time of the year when other fruit crops need only a minimum of maintenance. The two busy times are at planting in September and at harvest in April and May. Annual strawberries are becoming commonplace in much of the South, from Tennessee to Florida to Texas. Production on plastic has certain advantages over matted row production in that the fruit are earlier, have a longer picking season, are easier to pick and ship, and since they lay on plastic, are cleaner and more disease free. This paper discusses the basics of annual strawberry production for Texas. Much of the production technology for the use of this system in the South was developed by Dr. Barclay Poling from North Carolina.

EQUIPMENT AND MATERIAL REQUIRED

Strawberry plants: The major of annual planting systems in the South use 'Chandler', followed by 'Pajaro', and 'Douglas'. Data from TAES-Overton indicate that the highest yields are with 'Chandler' and lowest with 'Douglas' (Table 1). Fruit size and quality are best with 'Pajaro' and earliest with 'Douglas'. Unlike the other cultivars, 'Douglas' has prominent achenes (seeds) on the fruit surface which makes it a little less attractive than 'Chandler' or 'Pajaro'.

Plants can be obtained from nurseries in either a dormant state from California or freshly dug from North Carolina. We have no data as to what type of plant performs the best under Texas climate. In North Carolina, higher yields are obtained with freshly dug plants than dormant plants. Dormant plants may survive the Texas heat at planting better than freshly dug plants. In all cases, plants should be kept in cold storage until planting. Planting should be done as soon after plant arrival as possible. Our data indicate that planting from mid-September until mid-October is acceptable. However, the later the planting the lower the yield. Planting too early

without evaporative cooling could also decrease yield. Plants should be spaced two rows per bed (12 inches between rows) and 10 to 12 inches between plants in a row (23,000 to 20,000 plants/acre).

Plastic: Several types of plastic are available for planting, however it is recommended that 1.5 mil embossed black plastic be used. Nonembossed plastic will generally not make it through the growing season. Growers can use clear plastic for earlier production or white plastic for later production (Fig. 1 & 2). In general, plants associated with white plastic yielded most, followed by clear and black. Strawberries on clear plastic mature in two weeks earlier than white and one week earlier than black. Strawberries cannot be planted on clear plastic until late in the season or soil temperature will become too high. Clear plastic usually may be put down one month after the plants have been set.

Fumigation: Strawberry production on fumigated soils is usually twice that of non-fumigated soils (Fig. 3). Fumigation is recommended. Bids for custom strip fumigation (350 lbs of methyl bromide/ac) of strawberry beds will usually run between $800 and $1,500/acre. Another option would be to build a single shank fumigator onto a plastic sheet laying device for a minimum of cost. On land that is nematode free and has never had strawberries before, a grower might get adequate production if fumigation is not used. In this case the use of a preemergence herbicide and black plastic is a must for weed control. Dacthal W75 or Enide 90W are two preemergent herbicdes registered on strawberries. They should be sprayed before the plastic is applied. Poast can be used post-emergent to kill grasses.

One alternative to fumigation is solarization. This is the use of clear plastic laid on a moist soil bed in late June. The soil at 6 to 12 inch depth under the plastic heats to 110 to 120°F. Gradually over an eight week period most of the weed seed and nematode population will be suppressed. We have had good success with this system. Yields have averaged 17,000 lb/acre for solarization compared to 13,000 lb/acre for nonfumigated and 19,000 lb/acre for fumigated (Fig. 3). In order for solarization to be effective the beds must be moist, well shaped and have drip irrigation on the center of the bed. A 1.5 mil clear embossed plastic with UV protection is recommended. An eight week or longer time period is required for best results. Relay new plastic over the beds after solarization is complete. Minimum disturbance of the beds after solarization is necessary for the maximum effectiveness.

Row Cover: Plastic tunnels, or floating row covers can be used to increase yield. Our data indicate that the increase in yield is not really worth the added

expense. Some growers may still want to experiment. If so, it is important to take the row cover off during pollination. Row covers will give extra frost control, but not enough in themselves to recommend the elimination of overhead irrigation.

Irrigation and frost control: Strawberries will usually bloom before the first spring frost. The majority of yield and the largest fruit always come off the first set of flowers. No grower should therefore attempt to grow strawberries without overhead frost control. Irrigation from 0.15 to 0.25 inches/hour is required for frost control depending on wind speed and minimum temperature.

Overhead irrigation is also useful for evaporative cooling of plants when they are first set. Poor stand of annual strawberry plants is a major reason for poor yield. Although not essential, evaporative cooling to help stand establishment is important. This involves maintaining small water droplets on the leaves during the heat of the day. An irrigation system which can be set to water 5-10 minutes every hour in the afternoon is better than continuous overhead irrigation during hot temperatures.

Running a trickle irrigation line down the center of the row under the plastic is another irrigation option. Usually a bi-wall line will suffice. This will allow for the application of fertilizer to the plants through the irrigation system when needed.

ECONOMICS

Detailed economics of the annual strawberry systems in North Carolina have been covered in some detail by Poling (1987). Major costs associated with planting annual strawberries in Texas are presented in Table 2. The profit of the system depends both the yield and the inspect costs needed to grow strawberries. If investment in overhead irrigation, bedding and fumigation equipment, and deer fence is unnecessary, the break even point is near $3000/acre. Generally a grower can expect a yield of 1/2 to 1 pound of fruit per plant. Expect to lose about 20% of the crop as culls. Gross profit can therefore range from $0 to > $11,000/acre.

STRAWBERRY PLANTING OPERATION CALENDAR

February: Place order for plants, plastic and irrigation supplies (it is important to order plants early since supplies are usually limited).

March: Soil test and apply lime to raise pH to 6.0

April-May: Plant a cover crop, such as a mix of "Iron and Clay" cowpeas.

Mid-August: Till cover crop, apply 400-600 lbs of 10-10-10/ac, bed rows to 4.5 feet apart, 8-12 inches high and 24-30 inches wide.

Late August - Early September: Band a slow release N (50-100 lbs Sulfur

coated urea or equivalent slow release N source) in the center of the bed 4 inches deep. This step is optional if a grower wishes to apply N through his irrigation system in the spring.

Early September: Irrigate beds to assure a uniformly moist soil prior to fumigation. Reform beds to assure firm bed surface for planting. Fumigated with methyl bromide + chloropicrin and lay plastic (single step).

Mid to Late September: Allow several days for fumigant to work, then slit holes in the plastic for transplants and wait 10 to 14 days for beds to clear of fumigant.

Late September: Plant and water with overhead irrigation immediately after setting plants. If the temperature is hot briefly irrigate plants with the sprinkler every day for evaporative cooling effect.

Additional Reading Materials:

Barclay Poling. 1987. Strawberries on plastic. Fruit South, February/March.

A. Lamont, B. Poling. 1986. Double cropping strawberries and muskmelons. Fruit South, June/July.

Strawberry Production in California. Univ. of California Extension Leaflet 2959.

Table 1. Strawberry cultivar performance at Overton in 1987.

Cultivar	Total Yield (lbs/acre)	Fruit Size (g/fruit)	% Fruit Harvest By May 6
Chandler	8960	12.5	49
Pajaro	4390	14.4	51
Douglas	4010	15.1	54

Table 2. Approximate annual strawberry budget for Texas in 1988.

Annual Variable Cost ($/Ac)		Fixed Expenses for 5 Acres	
Pesticides	50	Pump for drip	1000
Fertilizer	200	Overhead Irrigation	6000
Plants	1000	Bedder	1400
Custom Fumigation		Hole Puncher	350
+ Plastic	800	Plastic Layer	800
Drip Line	250	Fumigation Rig	250
		Deer Fence	6000
Total	$2300	Total Fixed Cost	$15400

Annual Labor Cost ($/Ac)	
Planting	500
Upkeep	150
Total	650

Total Annual Variable Cost	$2,950
Total Annual Cost (Variable + Fixed*)	$3,566

	Annual Net ** income ($/ac) yield (lbs/Ac)				
u-pick price ($/lb)	0	5000	10,000	15,000	20,000
	$/Ac				
0.50	-3566	-1066	1434	3934	6434
0.60	-3566	- 566	2434	5434	8434
0.75	-3566	184	3934	7634	11434

* Annual fixed cost is based on straight line depreciation over 5 years ($15,400/5 yrs/ Ac = $616/Ac)

** Values are not subject to labor and capital costs during U-pick operations. Values will vary dramatically based on the extent of fixed expenses.

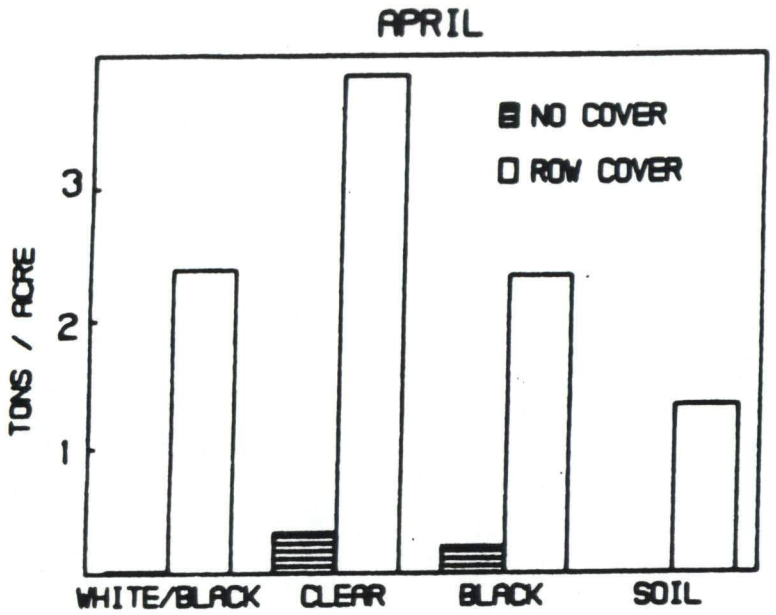

Figure 1. Effect of plastic mulch color and row cover on early strawberry yield.

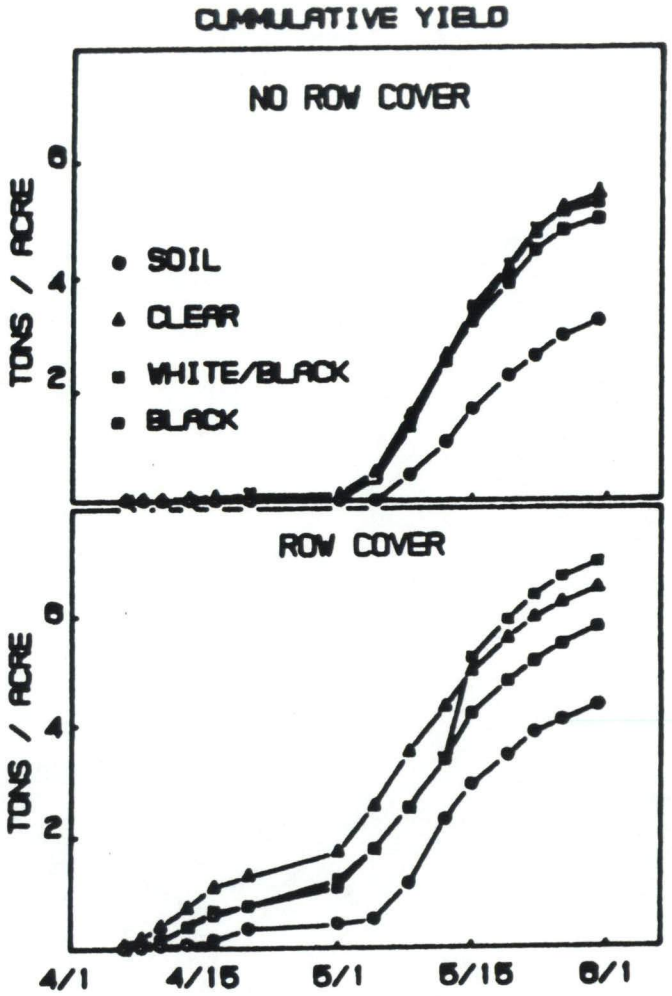

Figure 2. Effect of plastic mulch color and row cover on cumulative strawberry yield.

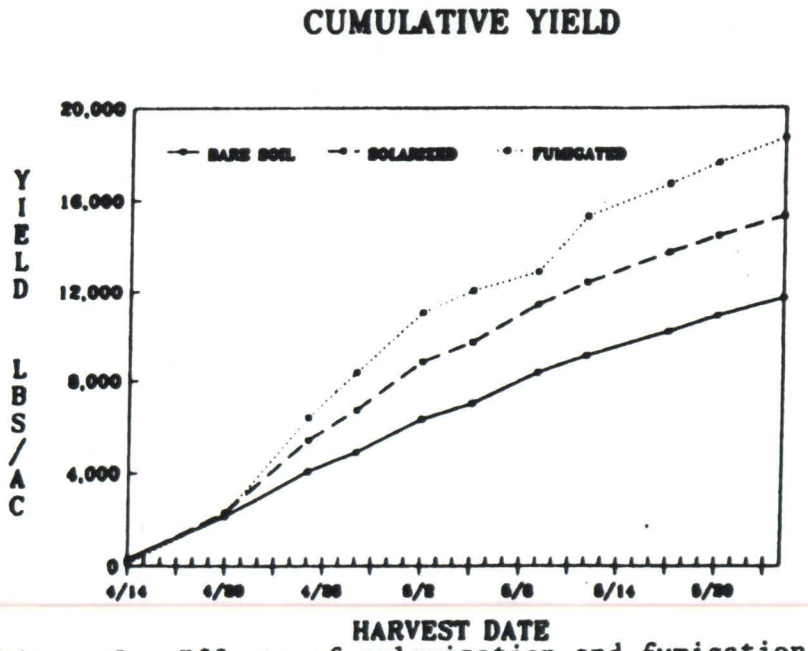

Figure 3. Effects of solarization and fumigation on cumulative strawberry yield.