The findings in these tests indicated increasing labor requirements as the count per pound increased and as the tree surface per box increased. With an average size of 50 olives to the pound, an average picker would pick 9.0 boxes per 9-hour day when tree surface is 800 square feet per box, but only 7.3 boxes when the tree surface is 1,400 square feet per box. If the payment rate for average picking conditions were $1.00 per 40-pound box, an appropriate rate for the thinner set of fruit would be $1.22 per 40-pound box.

The observed time required to pick a 40-pound box varied from 0.41 to 1.78 man-hours. This range is caused by natural factors—maturity, fruit-set—and the skill and effort of individual pickers. Studies of the actions of 150 different pickers while picking 258 trees indicate that of the time spent actually working, 84% was spent in picking fruit and 16% in climbing ladders, moving ladders, emptying buckets, and in miscellaneous activities.

After olives are picked the fruit growth process is reversed because the normal processes of respiration use up food stored in the fruits and they decrease in size and weight.

These physical losses can be minimized by having the fruit weighed, graded, and placed in brine storage as soon as possible after picking.

Weight loss will normally be greater for fruit held in the orchard after picking than for fruit held inside plants prior to grading. Based on tests conducted during the warm dry harvest season at Corning in 1952, Sevillano olives left in the orchard after picking will lose from 1.0% to 2.6% of their weight within 48 hours. A loss of 2.0% would be equivalent to one 40-pound field box per ton of fruit picked. For the same 48-hour period weight losses for fruit stored in the plant prior to grading would be one-third less than losses in the orchard.

Size and grade loss are more costly than weight loss. As olives stand after picking, shrinkage of individual fruits causes a decrease in the proportion of any lot that will fall in the larger sizes— supercolossal through jumbo — and an increase in the proportion falling into the smaller sizes. In addition, there is an increase in the amount of fruit sorted out as culls. Some fruits which would not be culls at picking time deteriorate because of continued ripening, and some deteriorate because of the breakdown and discoloration of bruises and scratches inflicted in picking. The value of this loss is increased by the fact that these overmature and damaged fruits are mostly in the larger sizes.

Using the schedule of prices ranging downward from $300 per ton paid some growers in 1952 for Sevillano olives, one

Fertilizer Placement

citrus production compared in between-rows, under-tree broadcast

W. W. Jones and C. B. Cree

The application of granular nitrogenous fertilizers to citrus trees resulted in the same production regardless of whether the material was broadcast in the irrigated middles between the rows, or under the trees.

Differential treatments at the Citrus Experiment Station, Riverside, consisted of 1, fertilizer applied in the cultivated zone or row middle, and 2, fertilizer applied under the skirt of the trees. Navel orange, Valencia orange, and grapefruit trees—all on sweet orange root—were used. Nitrogen was applied in the fall of each year at the rate of three pounds per tree—1½ pounds from manure, and ¾ pound each from ammonium sulfate and calcium nitrate.

The trees were 10 years old when the yield records in the experiment were started in 1927. All trees were uniformly treated for eight years. In the fall of 1933, the differential fertilizer placement treatments commenced and were continued through 1952. The 1933 treatment was not considered to have affected the 1934 harvest.

During the eight years—1927–1934— before the treatments were started, the production of the three varieties combined was slightly biased in favor of the plots which later received the under-tree applications. Production for the corresponding row-middle application plots was 97.5% of the under-tree application plots.

The differential treatments were maintained and production records kept for 18 years. During this time the row-middle application was 94.3% of the under-tree production. The bias present in the beginning of the experiment was maintained, on the average, throughout the experimental period. The treatments had no influence on production. This conclusion is confirmed by statistical analysis of variance.

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Relation of Fertilizer Placement to Yield in Citrus
(mean yield in pounds per tree)

Pretreatment period	Years 1927–1934	Fertilizer in cult. zone				Fertilizer under tree			
		Nav.	Val.	Gf.	Ave.	Nav.	Val.	Gf.	Ave.
		112	97	138	116	99	107	151	119
Treatment	1935–1940	129	148	225	167	144	166	210	173
period in	1941–1946	211	185	215	204	208	204	223	212
6-yr. groups	1947–1952	183	145	201	176	196	174	214	195
18-yr. ave.	1935–1952	174	159	214	182	183	181	216	193

ton of olives having the size distribution shown by the original grading in the graph on the adjacent page would have a value of $142. Twenty-two hours later this value would have fallen to $134 and by 66 hours after the original grading, to $126. This loss of $16 due to the combined effects of weight and grade loss is equal to $0.32 per 40-pound field box picked from the tree—an amount equal to approximately one-third of the cost of picking in 1952.

The loss cited in this example would have been even greater if the fruit had been stored in the orchard rather than inside a processing plant. The time lapse of 66 hours is not based on any signifi-

cant practice but came as a result of the timing in this particular test.

The Sevillano olive producer can increase his profits, either by lowering the cost of production and harvesting on all sizes, or by shifting as much of his production as possible to the more profitable sizes. The studies made at Corning in the 1952 season indicate that the latter is more promising.

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