GF-SI-54

GRAPEFRUIT ORCHARD MANAGEMENT

Coachella Valley
Riverside County, 1954

COST
INCOME
CULTURAL PRACTICES

based on actual records
of 10 cooperating growers
totalling 227 acres

University of California
Agricultural Extension Service
Riverside County

Ten Coachella Valley grapefruit producers have kindly furnished data as to their yields, returns and costs for the 1954 crop. The data has been summarized in three tables on succeeding pages. For the newcomer to the Valley, here are some of the important points to be considered in growing grapefruit.

ACREAGE: In 1954 there were 1,814 bearing acres of grapefruit in the Valley, 740 acres non-bearing and 190 acres planted in that year for a total of 2,744 acres.

VARIETIES: Most of the older plantings are the white Marsh seedless variety. Since the war, nearly all of the plantings have been to the red fleshed Ruby Blush.

ROOTSTOCKS: Older plantings were mostly on Sour Orange which has been a very satisfactory stock here. However, because of susceptibility of this stock to Quick Decline, few people are now using it. Quick Decline has been produced experimentally on grapefruit, but so far as is known, it has not spread through natural means. The stock is noted for disease resistance, long life and good quality production.

Cleopatra mandarin deserves more commercial trial here because of favorable performance in tests at Brawley and Riverside. It is disease resistant, suited to wide range of soils and produces high quality fruit. University of Florida reports it has more cold resistance than rough lemon, less than sour orange and is a shy bearer with grapefruit, decreasing production by 1 to 1 1/2 boxes or more per tree as compared with rough lemon.

Rough Lemon is now the most commonly used stock being well suited to the sandier soils now being planted where it can produce a more rapid growth and earlier fruiting than any other stock. It is susceptible to gummosis and in tests has shown tenderness to frost and has produced the poorest quality fruit.

Sweet Orange stock is also commonly used. It has performed well in the Brawley and Riverside tests, producing good yields of good quality fruit. Has the disadvantage of susceptibility to disease and iron chlorosis. Probably best suited to the unstratified soils such as Coachella fine sand. Should be avoided on soils with clay layers and poor drainage.

COACHELLA VALLEY GRAPEFRUIT MANAGEMENT STUDY 1954

RIVERSIDE COUNTY

TABLE 1

PER ACRE COST OF CULTURAL OPERATIONS

227 Acres Included in Study

Ser. No.*	Cultivation & Furrow	Hoe & Spraying	Irrigation Labor	Irrigation Water	Pruning	Lbs. Nitrogen Per Ac.	Fert. and Application	Pest Control	Hired Super.	Misc.	Total Cultural
1	12.49	7.84	14.32	14.05	16.76	312	53.51	8.97		14.87	142.81
15	35.29		28.24	47.18	47.18	66	35.53	19.41	47.06	14.11	274.00
7	33.33	8.29	47.73	32.27	191.82	156	51.00	14.02		62.18	440.64
16	35.22	37.30	15.30	14.52	23.91	342	58.09	14.21		28.80	227.35
6	19.17		39.50	10.00	140.00	690	110.16	39.18	25.00	16.83	399.84
5	11.82		10.59	29.47	2.23	223	31.71	10.23			93.82
8	18.36	2.71	8.64	18.55	47.45	131	32.73	15.58	12.73	4.09	160.84
17	38.39	46.95	14.48	32.29	125.37	195	72.72	18.95		43.92	393.07
18	6.63		25.00	50.00		70	14.56	4.70		16.66	117.55
2	62.52		36.46	41.31	94.79	317	67.96	18.74	19.04	51.41	392.23
Total	273.22	103.09	240.26	289.64	687.28	2502	527.97	163.99	103.83	252.87	2642.15
Avg.	27.32	10.31	24.03	28.96	68.73	250**	52.80	16.40	10.38	25.29	264.22

* For explanation of column headings see last page.

** About half from organic and half from inorganic source.

TABLE II

MAIN PROFIT DETERMINING FACTORS - INDIVIDUAL ORCHARDS - PER ACRE
227 Acres Included in Study

Serial Number	*Average Yield Per Pkd. Box	*Average Income Per Pkd. Box	Total Income Per Acre	Cult'l Labor & Field Power	Material Costs	Cash Overhead cost	Total Cash Cost up To Pick	Capital Overhead Costs: Int. on Invest.	Capital Overhead Costs: Depreciation	Total On Tree Cost	Harvest Costs	Total All Costs	Capital & Management Income	Management Income
1	1013	1.70	1721.76	73.49	69.32	69.74	212.55	89.53	7.24	309.32	263.92	573.24	1238.05	1148.52
15	665	1.90	1260.33	185.41	88.59	79.41	353.41	101.51	29.26	484.18	230.92	715.10	646.74	545.23
7	903	1.43	1287.36	343.45	97.19	80.74	521.38	101.42	31.82	654.62	285.09	939.71	449.07	347.65
16	576	1.55	896.06	122.89	104.46	25.72	253.07	93.55	5.01	351.63	220.60	572.23	417.38	323.83
6	578	1.89	1091.22	262.61	137.23	49.83	449.67	78.56	4.23	532.46	275.95	808.41	361.37	282.81
5	759	1.04	786.82	29.80	64.02	32.35	126.17	98.27	16.46	240.90	263.54	504.44	380.65	282.38
8	443	1.40	620.74	105.38	55.46	42.59	203.43	95.00	10.25	308.68	153.81	462.49	253.25	158.25
17	378	1.74	657.33	281.00	112.08	67.43	460.51	96.24	12.58	569.33	145.82	715.15	38.43	-57.81
18	207	1.24	256.00	51.99	65.56	40.88	158.43	104.58	16.50	279.51	71.77	351.28	9.30	- 95.28
2	291	1.69	491.25	269.22	123.01	82.49	474.72	91.17	8.22	574.11	69.16	643.27	-60.85	-152.02
Av. all	492	1.54	755.24	183.81	92.41	61.83	338.05	93.91	11.47	443.43	155.73	599.16	249.99	156.08

*equivalents

TABLE III

YIELD, COSTS AND RETURNS PER PACKED BOX EQUIVALENT (62#)
227 Acres Included in Study

Serial Number	Yield Per Acre: Field Boxes	Yield Per Acre: Packed Boxes*	Income Per Packed Box*	Cult'l Labor & Field Power	Material Costs	Cash Overhead Cost	Total Cash Cost Up To Pick	Capital Overhead: Interest	Capital Overhead: Depreciation	Total On Tree Cost	Harvest Pick And Haul	Total All Costs	Capital & Management Income	Management Income
1	1257	1013	1.70	.07	.07	.07	.21	.09	.01	.31	.26	.57	1.22	1.13
15	825	665	1.90	.28	.13	.12	.53	.15	.05	.73	.35	1.08	.97	.82
7	1018	903	1.43	.38	.11	.09	.58	.11	.03	.72	.32	1.04	.50	.39
16	780	576	1.55	.21	.18	.05	.44	.16	.01	.61	.38	.99	.72	.56
6	827	578	1.89	.45	.24	.09	.78	.13	.01	.92	.48	1.40	.62	.49
5	941	759	1.04	.04	.09	.04	.17	.13	.02	.32	.35	.67	.50	.37
8	549	443	1.40	.24	.12	.10	.46	.21	.02	.69	.35	1.04	.57	.36
17	521	378	1.74	.74	.30	.18	1.22	.25	.03	1.50	.39	1.89	.10	-.15
18	256	207	1.24	.25	.32	.20	.77	.50	.08	1.35	.35	1.70	.04	-.46
2	361	291	1.69	.93	.42	.28	1.63	.31	.03	1.97	.24	2.21	-.21	- 52
Av. all	616	492	1.54	.37	.19	.13	.69	.19	.02	.90	.32	1.22	.51	.32

*equivalents

LOCATION: Relative freedom from frost and freedom from high water-tables are probably the two most important considerations. Some temperature records are obtainable from the "First Annual Report on Fruit Frost Investigations" by Dale R. Harris of the U. S. Weather Bureau. Information on water-tables is obtainable from the Coachella Valley County Water District.

SOILS: Citrus is grown on a great range of soils. A medium soil such as Coachella Very Fine Sand or Indio Very Fine Sandy Loam is preferred, but much citrus is being planted on lighter soils because of better temperature and water-table considerations.

COST OF PLANTING: Sample costs show a total net cost of $976.27 per acre at the end of the 5th year to plant and bring an orchard into production. This is without the cost of land and irrigation system which was estimated at $750.00 per acre. See "What Does It Cost to Develop a Grapefruit Orchard in the Coachella Valley," obtainable from this office.

PLANTING DISTANCE: Most new plantings are being made on a 24x24' spacing. Considerable interplanting has been done on a 12' or 15x24' spacing. On rough lemon stock with good soil and care, grapefruit will probably begin to crowd on a 15' spacing at about ten to twelve years.

IRRIGATION: On lighter soils where citrus is now being planted, frequent irrigation is desirable, especially in the first growing year. In order to save on labor and water, it is important that a good irrigation system and proper levelling of the land be used. See "Developing Efficient Irrigation System in the Coachella Valley," available at this office.

FERTILIZERS: On young trees on light soils, leaching of fertilizers may be a problem. Most growers use some organic fertilizer such as chicken manure during the winter, supplemented with mineral Nitrogen in the summer. For bearing trees, 200-250# of actual Nitrogen per acre per year is common. About half of this is from organic sources. So far as is known, Phosphorous deficiency has not appeared on citrus in the Coachella Valley and in view of possible effect on zinc and manganese deficiency which is difficult to correct, heavy applications of phosphorous and manures to bearing orchards are not recommended.

PRUNING: Little pruning is done except to remove dead wood until trees begin to crowd, then some heading back is done to retain desirable tree size. Recently some experimentation has been done by the University with hedging saws and results are encouraging. Severe pruning should be done before the first growth in March, for best results.

DISEASES: Ferment gum is an infection of the heartwood probably through pruning cuts. It causes gumming and scaling of the bark and tree decline. Treatment may be helpful early, but trees badly infected and unprofitable are replaced. Gummosis is a fungus disease of the bark at ground level which kills trees. Nursery trees should be carefully inspected before planting and trees should be planted high to reduce damage. Soil should not be pulled up around the trunk. Stubborn is a virus disease causing poor tree growth, misshapen fruit with a blue albedo and poor production. Use of virus-free budwood will prevent this disease and Coachella Valley nurserymen are beginning a program of registration of budwood mother trees to avoid this and another virus disease Psorosis or Scalybark, which also causes decline and death. See "Gum Diseases of Citrus."

MEANING OF COLUMN HEADINGS

Serial Number-- Arbitrary number assigned to each grower.

Average yield packed box equivalents-- Total yield all kinds and sizes of fruit per acre in pounds divided by 62 - the usual net weight of a grapefruit packed box.

Average income per pkd. box equivalent-- Total money per acre the grower received for his fruit after deductions for packing and selling divided by yield in packed box equivalents.

Total Income per acre-- Total money grower received divided by number of orchard acres.

Cultural Labor and Field Power-- All money spent for labor and tractor divided by acres.

Material Costs-- Total spent for water, fertilizer, etc. divided by acres.

Cash Overhead Costs-- Taxes, repairs, insurance and general expense per acre.

Interest on Investment-- 5% of the average value of all facilities over their useful life. This includes all money invested in land, pipe, orchard etc.

Depreciation-- Yearly share of original cost of all facilities that wear out. Orchard is not included since, if properly replanted, it should continue indefinitely.

Capital and Management Income-- Management income plus interest on investment-profit if interest is not considered as a cost.

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