

Verdelli summer lemons: a new option for California growers

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The Verdelli summer lemon retains a light green color and is smaller than the normal winter-harvested lemon.

The Verdelli process of growing summer lemons has been used commercially for over 50 years in Sicily, but only in the last two years has it become a commercial practice for some California lemon growers.

The process, as developed in Sicily, is accomplished by withholding summer irrigations to create a plant moisture deficit. The period of stress is from 35 to 60 days, depending on soil and tree conditions. As soon as the stage of optimum wilting is reached, an abundance of water and nitrogen fertilizer is applied. The moisture stress induces a second bloom in August or early September, which sets a crop that can be harvested the following summer when consumer demand for lemons is greatest and supplies are low.

The Verdelli crop is used mainly for the fresh market as light green summer lemons. A similar treatment has also been reported to produce summer limes in Egypt and Santa Barbara, California, and is used to control bloom of orange and mandarin trees near the equator.

California produces approximately twice as many lemons during the winter harvest season as can be profitably marketed and processed. New lemon plantings in Spain now coming into production have increased the competition for foreign markets. This winter glut and summer scarcity have made lemon groves uneconomical for many California growers, who are rapidly top-working their groves over to oranges or bulldozing prime lemon acreage. The Verdelli process presents an alternative for these growers by allowing harvest during the peak price period, May through July, and increases their total annual crop production.

Test plot

In 1983 a 5-acre test plot was established in Kern County to adapt the Verdelli method to California lemons. This test plot yielded 300 field boxes per acre harvested May 15 and June 15, in addition to a normal heavy winter crop.

During 1984 more than 1,000 acres of lemons were subjected to the Verdelli process from Riverside County to Fresno County. Results were encouraging, with over 80 percent of the acreage producing a satisfactory to heavy bloom, good fruit

set, and a potentially marketable crop. Fine-textured soils that allowed gradual drying were more successful than sandy or shallow soils, which produced little or no Verdelli bloom after irrigation was resumed in the summer (see tables).

Advantages and disadvantages

The Verdelli process of producing summer lemons is a new management alternative for California growers, with new production practices, pest problems, and marketing strategies associated with the double or second crop. Advantages of the process are: water savings due to the prolonged summer drought, control of phytophthora root disease by soil drying, reduced pruning cost and, most importantly, marketing of a crop during the period of greatest consumer demand.

Several disadvantages also are evident: increased fertilizer use, greater risk from fruit-scarring fungi and insects, in-

creased susceptibility to frost with small-size fruit, and long-term questions regarding tree vigor. If moisture stress is too severe, internal discoloration of the normal winter fruit (endoxerosis) may occur and reduce fruit quality. Many researchers, at the University of California at Riverside and Cooperative Extension, are studying these problems to develop the horticultural practices necessary to take maximum advantage of the Verdelli process on diverse soil types and locations.

As a result of these 1984 trials, lemon growers in the Central Valley and Riverside area will harvest an estimated 190,000 boxes of summer lemons in the coming season, valued at \$2.8 million.

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TABLE 1. Verdelli summer lemon (plot conditions)

County	Soil type	Irrig. type	Last irrig.	1st irrig.	Bloom*
Kern†	Loam	OH sprinkler	5/25	8/8	8
Kern‡	Loam	OH sprinkler	6/21	8/3	6
Kern	Loam	OH sprinkler	6/20	8/5	4
Kern	Sandy/loam	Mini sprinkler	6/1	7/21	4
Kern	F. sandy loam	Furrow	6/10	7/28	0
Kern	G. sandy loam	Mini sprinkler	6/9	7/7	0
Riverside	Clay loam	Mini sprinkler	7/1	9/6	7
Tulare	Clay	Mini sprinkler	7/15	8/16	3
Fresno	Loam	Hose pull sprkl.	6/17	7/19	0

* Amount bloom rating: scale of 0 to 10 (0 = none 10 = heavy).

† First-year Verdelli process, 1983.

‡ Second-year Verdelli process, 1984.

TABLE 2. Verdelli summer lemon crop, 1985

Acres	Estimated field boxes/A*	Available for harvest†			Total
		May	June	July	
100	180	9,000	9,000	—	18,000
40	90	1,800	1,800	—	3,600
40	225	3,000	3,000	3,000	9,000
78	360	14,040	14,040	—	28,080
77	158	6,083	6,083	—	12,166
78	360	14,040	14,040	—	28,080
38	180	2,280	2,280	2,280	6,840
77	338	9,958	9,958	9,958	29,874
77	339	13,051	13,051	—	26,102
74	203	5,007	5,007	5,007	15,021
40	135	2,700	2,700	—	5,400
40	150	3,000	3,000	—	6,000
45	50	2,250	—	—	2,250
2.5	220	—	550	—	500
806.5	(Ave.) 213	86,209	84,509	20,245	190,963

* 1/15/85 The yields reported in this table are only from those blocks that will produce a harvestable Verdelli crop.

† Projected harvest dates are based on timing the stress period.