	M	ean Dat	es				
Variety	First bud growth	First bloom	Harvest	Plants living in 1966	Plants vigorous in 1966	Ratio of fruit to vine*	
Tamiami	3/10	4/18	8/1	. 7.	5	2.4	
Lake Emerald	3/6	4/11	7/28	8 .	8	1.3	
Blue Lake .	3/5	4/7	7/18	8	8	1.7	
Buffalo	3/3	4/5	6/24	4	4	3.3	
G. Muscat	3/7	4/8	7/12	7	l	6.4	
Niagara	3/6	4/4	6/30	5	l	4.8	
Concord	3/8	4/7	7/10	7	l	4.6	
Cardinal	3/4	4/12	6/15	2	0	3.5	
Perlette	2/25	4/4	0	l	0	Ö	
Emperor	3/3	0	0	2	0	0	

Table 4. Varietal comparisons for earliness, longevity, and fruitfulness.

* Pounds of fruit per pound of dormant wood prunings removed.

A REVIEW OF THE FLORIDA LYCHEE INDUSTRY

T. W. YOUNG¹

Ten years ago it appeared that the lychee, Litchi chinensis Sonn., would soon become one of the more important minor fruit crops in Florida. Fairly substantial commercial plantings had been made in Dade, Broward, Brevard, Seminole, Lake, Polk, Highlands, Hillsborough, Pinellas, Manatee, Sarasota and Lee Counties. Some citrus growers becoming concerned about the possible over-production of citrus, became interested in lychees as a non-competitive substitute tree crop for citrus. Interest of growers with citrus on deep sandy soils, where spreading decline, caused by the burrowing nematode, Radopholus similis (Cobb) Thorne, had become widespread, was heightened when it was found that the lychee was resistant to the burrowing nematode (2). Lychee trees grew well on burrowing nematode infested soil without benefit of nematocial treatment of the soil, whereas citrus would not.

Prior to World War II, practically all lychee trees, in Florida were dooryard or specimen trees, and mostly in relatively warm locations. During about the first decade following the war, commercial lychee plantings in the state increased rapidly. By 1957 there were approximately 15,000 trees in commercial plantings on about 300 to 350 acres, plus a substantial number of dooryard plantings. This was a period of relatively warm winters. Most of these plantings became well established without serious cold damage. But severe freezes in the winter of 1957-58 damaged lychees in all areas, with extensive damage in the colder locations (6).

Florida Agricultural Experiment Stations Journal Series No. 2522. Horticulturist, University of Florida, Sub-Tropical Experiment Station, Homestead.

Very few lychee groves were equipped for heating of any sort, and fewer still for effective heating during prolonged cold spells. Even banking of young trees was not generally practiced. Table 1 summarizes the more severe low temperatures and resulting damage to lychees that occurred in 1957-58 for groves in eight representative areas.

Tree recovery from this cold, by shoot growth from branches, trunks and even crown roots, was fairly satisfactory in most cases. All the trees were from air layers, so a loss of variety was not involved where shoots originated near the ground, as would be the case for budded or grafted trees. Within two or three years, only lychee trees in the colder locations still showed marked evidence of cold damage. A few groves in such locations were abandoned or removed. Some replanting was done. The net effect of the 1957-58 cold was a slight reduction of lychee acreage in the state.

For the next four years, cold damage to lychees was negligible, except to shoot growth in a few cold spots. Then in December 1962, Florida experienced one of its most severe cold spells of the 20th century. Again there was little or inadequate effort to protect lychee groves from cold. Critically low temperatures and resulting damage to lychee groves in the eight areas covered in Table 1 are summarized for the 1962 freeze in Table 2.

Many lychee trees were killed or so severely damaged by this cold that they did not recover as satisfactorily as they did in most cases following the 1957-58 cold. Repeated damage to the tops had probably resulted in extensive death of roots in some groves. Trees that did come back from large wood were quite subject to wind damage for several years because the new shoots were only weakly attached to the old wood by callus. Cold-killed trees were replaced in only a few groves. Lychee acreage continued to decrease as more cold damaged groves were abandoned.

Urbanization was responsible for some slight additional decline in lychee acreage during the past several years. No new commercial plantings of lychees have been made in the state since 1962. From a total of perhaps 20,00 lychee trees planted initially and as replacements in commercial groves, probably not over 6,000 survive today. This would represent approximately 120 to 140 acres.

But cold and urbanization have not been the only factors involved in the failure of the lychee industry to grow as it once promised. Perhaps the principal retarding factor has been the irregular and generally light crops produced by

Table 1.	Summary	of	low	temperatures	and	resulting	damage	to	lychee
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		In Degrees F				Hrs.		
Location and	Date	Hrs.	at or b	elow:	Min.	at	Extent of damage	
tree age		32	30	28	temp.	Min.		
Geneva	12/12/57	10.6	8.8	6.8	24	1.2	All trees killed to trunks or ground	
11 years	12/13/57	13.2	12.6	9.2	24	3.0	····· ·····	
Merritt Island	12/12/57	9.0	7.0	5.2	25	1.0	25% of foliage and small shoots killed, some	
11 years	12/13/57	2.0	1.1	0.4	28	0.4	damage to bark of larger limbs and trunks	
Largo	12/12/57	.5.5	3.8		29	1.3	90% of foliage and shoots ξ^{11} diam. killed, many	
7 years	12/13/57	13.2	12.6	11.4	24	3.0	limbs killed to trunk, some trees killed to ground	
Osprey	12/12/57	6.0	4.8	3.0	27	2.0	25% of foliage and small shoots killed	
5 years	12/13/57	11.4	10.2	7.2	26	0.2		
Babson Park	12/12/57	9.3	7.7	5.8	26	2.0	65% of foliage and limbs killed, some trunks	
2 years	12/13/57	9.9	4.1	3.0	26	0.7	damaged, 35% of trees killed to ground	
De Soto City	12/12/57	7.2	5.6	4.0	26	1.4	65% of foliage and shoots ½" diam. killed, some	
6 years	12/13/57	11.9	10.8	3.4	24	0.1	large limbs killed to trunk & few trees to ground	
Davie	12/12/57	2.8	0.4		30	0.4	Slight damage to bloom, foliage and small shoots	
8 years	2/5/58	10.0	8.7	4.5	28	4.5	by February cold	
Homestead	12/12/57				33		Slight damage to bloom, foliage, small shoots	
15 years	2/5/58	12.2	11.0	6.0	27	4.0	and wood by February cold	

trees in Florida during severe freezes in 1957-58

Icontion and	Dette					Hrs.	
Location and	Date	Hrs.	at or i	below:	Min.	at	Extent of damage
Liee age		32	30	28	temp.	Min.	
Geneva	12/11/62	11.0	8.2	6.0	25	3.8	All tong billed to two-less to the
16 years	12/13/62	15.4	12.4	9.8	20	1 4	All tops killed to trunks or ground (Tops
	12/14/62	12.4	10.4	9.8	23	2.4	encirely of growth made since 195/ freeze)
Merritt Island	12/11/62	4.0			21	• •	
16 veers	12/13/62	11 0	0 1	7 0	21	3.8	90% of foliage and 80% of branches back to 2"
	12/14/62	7.0	2.1	7.0	24	2.4	diam. killed, some bark damage on scaffold
	12/14/02	/.0	4.0		29	3.0	branches and trunks
Largo	12/11/62				35		All tops killed to trunks or ground
12 years	12/13/62	13.6	10.7	9.3	21	2.0	the cope willed to traiks of ground
	12/14/62	14.5	12.5	7.3	26	0.8	
Osprey	12/11/62				33		95% of folions and 85% of two to the second
10 years	12/13/62	12.0	10.6	8.4	20	07	diam or more killed more hard bitt
-	12/14/62	13.0	11.0	10.0	24	3.0	scaffold branches or trunks.
Babson Park	12/11/62	3.8	0.7		30	0.7	
7 years	12/13/62	13.7	11.5	9.8	21	1.3	All tops killed to truck an and t
	12/14/62	10.9	8.3	3.6	27	1.5	All cops killed to trunks or ground
De Soto City	12/11/62	7.4	6.4	5.9	26	0 /	
1 years	12/13/62	9.9	8.0	6.8	23	1 4	diam willed man branches back to 3" or more
•	12/14/62	11.5	9.6	5.9	22	0.4	branches or trunks
Davie	12/11/62	3.8	2.2		30	, ,	
13 years	12/13/62	0.5			32	0.5	little demonstration in
-	12/15/62	3.0	1.0		30	1.0	bittle damage, excellent bloom, good crop
lomestead	12/11/62	3.1	15		30	15	
0 vears	12/13/62				33	1.5	
	12/15/62	6.0	2.0		30	2.0	Little damage, fair bloom, poor crop

trees in Florida during severe freeze in 1962.

the Brewster variety. This variety makes up at least 95% of all plantings--commercial and dooryard. Trees approaching full bearing size, with a top spread and height of about 20 feet, should easily bear 200 pounds of fruit year after year. Records (7) show that yields have not averaged more than about 20% of this reasonable potential bearing capacity. The approximate yield of lychees in Florida are given for the past 14 years in Table 3 to show something of the light and erratic bearing of the trees. Even in the peak five-year period, from 1958 through 1962, when at least one-half of the trees in the state were near full bearing size, and cold damage was not as widespread as later, average yields were far from satisfactory.

Results of trials to improve yields by fertilizer manipulation, top and root pruning, girdling and spraying with growth regulating chemicals have not been encouraging. Thus far, only girdling has resulted in any measurable increase in yield, and this was neither substantial nor consistent (5, 7). Another serious drawback to lychee growing comes with harvest. The fruits average around 24 to 30 per pound and must be picked by hand. With the labor situation becoming increasingly difficult, the harvesting of lychees become a major problem. This is especially true as the trees, which do not "take" a ladder well, become large and a scatterd light crop must be picked from long ladders.

The fruit matures and must be picked within a period of about four weeks, usually in late June and July. This is a time when there is considerable competition for the consumer dollar from other and better known fresh fruits. Satisfactory marketing of lychee fruit, even in the limited amounts available, has on occasions been a problem.

But the lychee picture is not all dark. With the exception of set-backs from cold, the trees have been fairly easily grown on a wide range of soil types and with any reasonable cultural program. Once established, the trees do not suffer excessively from drought. When in fruit,

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Table 3. Florida lychee production (approximate)

for	1953	through	1966.
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Year	Pounds	Year	Pounds
1953	14,000	1960	55,000
1954	11,600	1961	50,000
1955	40,000	1962	58,000
1956	32,600	1963	45,000
1957	22,200	1964	48,000
1958	61,000	1965	12,500
1959	15,000	1966	40,000

however, they need ample water to prevent fruit shed. Lychee trees withstand flooding without damage somewhat better than citrus. Thus far, the trees and fruit have been relatively insect and disease free. This freedom from insects and disease might not continue if lychee plantings become widespread. Except on the limerock soils of Dade County, where foliar nutritional sprays often are necessary for success, sprays of any sort have not been needed generally on lychees.

Probably varieties could be found which would be commercially acceptable and bear consistently good crops. One variety, Mauritius, which has been a satisfactory bearer in South Africa (3, 4), and is grown extensively there, has produced consistently good crops in limited trials at the Sub-Tropical Experiment Station since reaching bearing size several years ago (1). A qualified search of other lychee growing areas would probably find other fruitful and desirable varieties for Florida.

With scion wood from such newly introduced varieties in short supply, propagation by budding or grafting, rather than by air layering. needs to be adopted by commercial nurseries. With present techniques, the lychee is not as successfully budded or grafted as are citrus, avocados or mangos. With some investigation and effort along this line, satisfactory methods probably will be developed. The use of rootstocks on lychees might pay dividends in addition to the economy of scion wood. It is barely possible that the unsatisfactory bearing habit of some varrities, such as Brewster, might be overcome by the use of rootstocks. Also, rootstocks conceivably could alter the time of fruiting on some varieties so as to extend the fruiting season. This would help overcome some marketing complications.

The present trend of lychee planting in Florida is to dooryard trees, or plantings in commerical groves only by those abel to afford a deficit on the operation year after year. With more productive varieties of commercial quality, perhaps grown on appropriate rootstocks, more extensive trials to make the lychee economically successful will be justified in the warmer sections of the state. Florida needs more diversification of fruit crops, and tropical fruits should be especially desirable because there would be little or no competition from other sections of the continental United States.

SUMMARY

Freezes and urbanization have reduced commercial lychee plantings in Florida from a peak of about 15,000 trees on 300 to 350 acres in 1957 to somewhat less than one-half these figures. Light and irregular bearing of the Brewster variety, which includes 95% of the commercial plantings, has discouraged new plantings. But the lychee tree is a vigorous grower in Florida, and is relatively free of insects and diseases. At least one commercially acceptable variety, Mauritius, has borne satisfactorily in limited trials in Florida. Further commercial trials with this, and other promising varieties, are justified in the warmer sections of the state.

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