able characteristics of 'Mauritius' are good fruit size, fair to good color, and good eating quality. Defects include large seed size (a trait shared by 'Brewster') and susceptibility to anthracnose disease (Ledin 1957). This disease, caused by the fungus *Collectotrichum gloeosporioides*, attacks tender young leaves, flowers, and young fruit, and causes severe injury during rainy, humid weather. Florida growers continue to plant both 'Mauritius' and 'Brewster', but would like to have better cultivars to plant.

Future Possibilities

Currently there is keen interest in new lychee cultivars. Some which have already shown promising results are 'Early Large Red', 'Kwai Mei Pink' (also called 'Bosworth 3'), and 'Emperor' (also called 'Chakrapad'). Others being tested are 'Garnet', 'Gee Kee', 'Kaimana', 'Salathiel', 'Souey Tung', and 'Wai Chee'. Researchers and growers are currently seeking new selections from countries like Australia and Israel which have active programs of breeding and selection, and other countries like India, Taiwan, Thailand, and the Peoples' Republic of China, where the lychee is grown extensively and many cultivars exist. The current world-wide interest in lychee cultivation promises to produce interesting changes in the future.

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FALL PRUNING INDUCES BLOOMING IN YOUNG LYCHEE TREES

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Additional index words. Litchi chinensis, bloom induction, flowering.

Abstract. **Five-year-old 'Haak Yip' lychee (*Litchi chinensis* Sonn.) trees were pruned on 3 dates to test the effect on flowering. Twenty uniform trees were randomly chosen and 5 trees each were placed within the following treatments: all new flushes removed after 31 Aug. (AUG); all flushes removed after 30 Sept. (SEP); all flushes removed after 30 Nov. (NOV); and the control (CON). Pruning required an average of 8.6 and 9.0 min per tree for the AUG and SEP treatments, respectively. The NOV treatment required no pruning and was lumped with the CON treatment. Blooming was evaluated in February by counting the number of flower panicles on four uniform branches in the north, south, east, and west quadrants of each tree. There were 54, 43, and 18 inflorescences on the AUG, SEP, and NOV/CON treatments, respectively on 23 Feb. Pruning treatments advanced flower opening (measured in mid-February), with 71%, 76%, and 8% floral opening for the AUG, SEP, and NOV/CON treatments, respectively. There was negligible fruit set in all trees used in the experiment.**

The lychee is a member of the Sapindaceae native to Southern China, where it has been cultivated for centuries. It was first introduced to Florida in the 1880s (Mustard, 1980), with the cultivar 'Brewster' introduced in 1903. Up until the late 1940s and early 1950s, lychee trees were grown predominantly in home gardens. However, due to concern about overproduction of citrus and the presence of burrowing nematode infestations in citrus production areas, there was increasing commercial interest in lychees (Young, 1966). This was a warm period in Florida's history, thus enabling the early establishment of lychee orchards throughout traditional citrus-growing regions of the state. These orchards prospered until the freezes of 1957-1958 and of 1962. These freezes severely damaged or killed lychee trees in all but the most extreme southern locations of the state (Broward, Dade, and Palm Beach Counties). In these locations, and particularly in Dade County, the interest in the commercial production of lychee remained and a small commercial industry persisted. There were about 160 ha of commercial lychee orchards in South Florida in 1992, when Hurricane Andrew devastated fruit tree acreage. Following Hurricane Andrew, interest in planting lychee was invigorated due to the availability of land previously devoted to other tropical fruit, weak markets in traditionally-produced fruit crops such as avocado, lime, and mango, and a strong market for lychee.

One of the most severe problems facing the expansion of this industry in extreme South Florida is inconsistent flowering of the lychee tree. For successful and consistent bloom initiation, lychees require a period of growth cessation brought about by cool temperatures or lack of water. In southern Florida, our often insufficiently-cold winter temperatures and consistent rainfall throughout the autumn combine to promote vegetative growth and inhibit flowering. Pruning has been used previously in lychee to overcome this problem and force bloom (Stern, 1992). However, pruning has never been used for floral induction as a commercial practice with lychee in Florida. Besides consistency of flowering, it would also be advantageous to Florida growers if blooming could be initiated early in the life of the tree. This is important due to the high initial cost of orchard establishment in South Florida, necessitating an early return on the initial investment through crop yield early in the life of an orchard.

The objectives of this study were to test if fall pruning of lychee trees results in flowering and fruiting, and to identify the best timing of this treatment. Finally, we wished to determine if this treatment is economical for commercial growers in Florida.

Materials and Methods

Five-year-old air-layered 'Haak Yip' lychee trees at the Four Fillies experimental farm in Coral Gables, Florida were

used. The experimental orchard consists of about 90% 'Haak Yip' trees, with other cultivars randomly distributed throughout the orchard. The trees have a 5 m in-row and 7 m between-row spacing. The orchard is maintained according to standard commercial cultural practices for lychee production in South Florida.

Twenty uniform trees were chosen for the experiment. The trees ranged from 28.3 to 62.1 cm^2 trunk cross sectional area (TCSA), measured at a height of 10 cm from the soil line. The average TCSA for all the trees used in the experiment was 38.7 cm^2. Trees ranged in height from 1.7 to 2.8 m. Five trees each were randomly placed within the following treatments: all new flushes removed after 31 Aug. (AUG), all flushes removed after 30 Sept. (SEP), all new flushes removed after 30 Nov. (NOV) and the control (CON). When a vegetative flush occurred after the treatment date, it was pruned back to the last mature leaf of the previous growth flush. In trees that subsequently flushed vegetatively following pruning, flushes were removed back to the closest quiescent bud. All pruning was done with hand-held clippers. The time required to prune each tree was recorded.

Blooming was evaluated weekly in January and February by counting the number of inflorescences present on 4 uniform branches per tree on the north, south, east, and west quadrants of the tree. Each branch was selected for uniform size (16 - 20 cm^2 TCSA) to give similar numbers of terminal shoots per treatment. Inflorescences were counted if they were 7 cm or more in length. The percentage of floral opening was determined at the time of bloom evaluation. Floral opening was based on total flowers, with no regard as to type I, type II, or type III flowers (Mustard and Lynch, 1959). Fruit weight was not recorded, as none of the trees in the experimental orchard are variable in vigor (R.J. Campbell, personal observation).

The pruning treatments resulted in the production of inflorescences at multiple nodes per terminal shoot (*Table 1*). Inflorescences arose from up to 5 to 6 nodes back from the pruning cut, and often there were multiple inflorescences per node. There were an average of 54, 43, and 18 total inflorescences on the four test branches of the AUG, SEP, and combined NOV/CON treatment trees by 23 Feb. Taking into account differences in the number of terminal shoots present on the treatment trees, there were 3.1, 3.5, and 1.2 inflorescences per terminal branch for the AUG, SEP, and NOV/CON treatments. The production of multiple inflorescences as a result of pruning has been previously reported (Stern, 1992). On trees that required 3 separate prunings, there were often some large, leafless branches (TCSA = 32 cm^2) present as a result of the pruning. These branches still produced inflorescences. The blooming of large branches on lychee trees has previously been observed on trees which had air-layers removed late in the autumn (D. Chapin, personal communication).

Pruning treatments advanced floral opening when compared to the control. There was 71%, 76% and 8% floral opening in the AUG, SEP, and NOV/CON treatments, respectively by 23 Feb. Lychees have three distinct floral morphologies (Mustard and Lynch, 1959), but no attempt was made to evaluate the influence of pruning on the ratio, timing and/or expression of the different flower types (Type I, II, or III). The production season of lychees is often less than a month in duration. It would be advantageous to Florida producers if pruning treatments could be used to advance flowering and therefore the harvest season. By pruning different

Table 2. Cost of and fruit production required to pay for fall pruning lychees trees.

Treatment	Number of prunings (range)	Avg time per tree	Cost per tree[z]	Harvest per tree required to pay for pruning[y]
AUG	1-3	8.6	$1.22	< 1 lb
OCT	1-2	9.0	$1.26	< 1 lb
NOV/CON	—	—	—	—

[z]Based on a labor cost of $8.50/hr.
[y]Based on an average price of $1.60/lb.

to the pruning treatments. However, if fall pruning initiates blooming in other cultivars, such as 'Mauritius' or 'Brewster', and the trees set fruit, it would warrant adoption of this practice in commercial production. It cost between $1.22 and $1.26 per tree for the pruning treatments, assuming a real cost of $8.50/hr for labor (Table 2). At this cost, less than a pound of fruit per tree would be necessary to pay for the treatments, assuming a price of $1.60/lb for the fruit. The pruning treatments used in our study would obviously be more difficult on larger trees, requiring the use of ladders and incurring considerably more expense. These treatments could possibly be mechanized. However, on young orchards these pruning treatments appear to be an economically viable way to get consistent blooming in lychee.

Experiments conducted in the mid 1950s (Young, 1955; Young, 1956) began to develop a research-based approach to decrease variability in lychee flowering. These techniques included pruning and root pruning, which have gained new interest in temperate fruit for control of fruiting without the use of agriculture chemicals. This work drew considerably on knowledge and techniques used in traditional lychee producing regions such as China and India. This research was terminated largely as a result of reductions in the lychee industry of Florida, but with a resurgence in interest in commercial lychee production these techniques of bloom induction should be re-considered. Also, recent advances in Israel and possibly other locations present new tools to be tested.

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AN EVALUATION OF TWO EXPERIMENTAL POLYSACCHARIDE NATURE SEAL® COATINGS IN DELAYING THE POST-HARVEST BROWNING OF THE LYCHEE PERICARP

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Abstract. **Two experimental polysaccharide coatings were evaluated in order to determine if browning in lychee pericarps is reduced following coating. 'Brewster' lychees were harvested from two farms in Homestead, Florida in June 1994. Treatments were imposed and evaluations made at the EcoScience laboratory in Orlando, FL. Pericarp browning was measured by evaluating change in hue angle (h°) over an 18-day period. Pericarp browning was delayed significantly by both polysaccharide coatings. Treatment effects on pericarp browning were not, however, substantial enough to make these formulations attractive commercially. Further formulation development to increase the control of pericarp browning is needed before polysaccharide coatings can become commercially useful to the Florida lychee industry.**

Additional index words. Litchi chinensis, polysaccharide coatings, pericarp browning.

Lychee fruit (*Litchi chinensis* Sonn.) are increasing in popularity with U.S. consumers. The fruit is attractive for its bright red color and sweet agreeable flavor. The harvest season typically lasts only 6-8 weeks (May-July) in the lychee growing area of south Florida. Lychee fruit are highly perishable. The principle post-harvest problem of lychee is rapid browning of the pericarp. This phenomenon is attributable to the natural process of senescence, although fruit which are stressed by either temperature extremes, water loss, or physical damage exhibit accelerated pericarp browning. Two experimental polysaccharide coatings (from the Nature Seal® 2000 series) were evaluated along with an uncoated control in order to determine if browning is delayed following coating.

Materials and Methods

Lychee fruit (*Litchi chinensis* Sonn. 'Brewster') were harvested and packaged on the morning of 9 June 1994 from two orchards in Homestead, Fla. At each orchard, 10 lb of fruit were sorted and placed in 2 plastic bags containing 6 lb of fruit respectively. The bags were placed in standard commercial fiberboard boxes. The fruit from Orchard 1 was not refrigerated during the time between harvest and the time the fruit was picked up for transport to EcoScience lab in Orlando, Fla. Fruit from Orchard 2 was cooled to 6.6C immediately following harvest until the time of transport. All fruit were placed in styrofoam ice coolers during transport. Ice was placed in the coolers, but direct contact between the fruit and