limitations, thus improving the diet and quality of life in China.

Literature Cited

1. Anonymous. 1974. Comprehensive photographic review of tree fruit varieties in Sichuan Province. College Agr. Sci., Horticulture Expt. Sta., Beibei, Chongqing, Sichuan. (in Chinese)
2. Anonymous. 1982. Statistics of China's agriculture. Ministry of Agriculture, Animal Husbandry and Fishery. Peking.
3. Broadbent, P., G. A. C. Beattie, B. Freeman, and R. J. Van Velsen. 1980. Citrus cultivation in China. Agr. Gazette of New South Wales 91(4):32-39.
4. Burke, J. H. 1967. The commercial citrus regions of the world. In: W. Reuther, H. J. Webber, and L. D. Batchelor (eds.), Univ. Calif. Press. 611 pp. The Citrus Industry, Vol. I. Chap. 2, pp. 40-189.
5. Cooper, C. 1982. In Search of the Golden Apple. Vantage Press, New York. 252 pp.
6. Pieniazek, S. A. 1967. Fruit production in China. Proc. XVII Intern. Hort. Congress. Vol. IV, pp. 427-452.
7. Spurling, M. B. 1969. Citrus in the Pacific Area. Proc. 1st Intern. Citrus Symp. Vol. I, pp. 93-101.
8. Webber, H. J. 1967. History and development of the citrus industry. In: W. Reuther, H. J. Webber, and L. D. Batchelor (eds.), Univ. Calif. Press. 611 pp. The Citrus Industry, Vol. I. Chap. 1, pp. 1-39.

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FUNGICIDES FOR POSTHARVEST DECAY CONTROL IN LOQUATS

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Abstract. **The loquat, (Eriobotrya japonica Lindl.), also known as the Japanese plum and Japanese medlar, is found as a dooryard fruit in much of the Florida peninsula. In many countries such as France, Japan and India it is sold in fresh fruit channels as a commercial product. Harvested fruit were treated with thiabendazole, benomyl, sodium o-phenylphenate, benomyl-botran and imazalil, then held at 60°F for 4 wk. Benomyl gave the best control of postharvest decay.**

The loquat, also known as the Japanese plum or Japanese Medlar, is found as a dooryard fruit in much of the Florida peninsula. The fruit grows 4 to 10 per cluster, 1 to 2 inches long; is yellow to orange when ripe with a firm, juicy white to orange flesh. The flavor runs from tart to sweet (3, 13). The fruit is popular for use in jams, jellies and preserves (12) and is also eaten fresh (6).

Native to China, the fruit is found in most subtropical areas of the world (2, 3, 10, 13). In some countries the fruit is sold through fresh market channels. The fruit is susceptible to rots and one of these has been reported to be due to *Diplodia natalensis* P. Evans (2) in India. In France, efforts to increase storage life with cold storage and polyethylene wraps have not met with success (6).

In Japan the fruit is sold in baskets such as strawberries are marketed here. The fruit are harvested by clipping clusters from the tree. Then the individual fruits are clipped from the cluster leaving 1/4 to 1/8 inch of stem attached. The fruit are graded and packed into baskets. No fungicide is used (T. T. Hatton, personal communication).

To determine if fruit grown in Florida could be used as a fresh market fruit, tests were run to compare the efficacy of several common fungicides. Since no fungicides are presently approved in the U. S. for use on loquats (1, 8), treatments commonly used on citrus and peaches were used (4, 5, 9, 11).

Materials and Methods

In Test 1, fruit of an undetermined variety similar to 'Premier', were harvested February 14, 1983, trimmed to leave a stem of 1/8 to 1/4 inch, then divided into 6 lots of 20 fruit having no visible defects. Fruit with bird, insect and other damage were removed before sorting. The fruit was then held for 20 hr at ambient temperature before giving them the treatments listed in Table 1. Each treatment solution had 0.001% Triton X-100 added to aid with wetting. The check fruit received no treatment.

Table 1. Fungicide treatments used for control of decay of loquats.

Fungicide	Concn	Duration	Rinse
1. Checks	None	n/a	None
2. SOPP[z]	0.5%	2 min	20 sec
3. TBZ[y]	1000 ppm	30 sec	None
4. Benomyl	600 ppm	30 sec	None
5. Benomy/Botran	—[x]	30 sec	None
6. Imazalil	1000 ppm	30 sec	None
7. TBZ/SOPP[w]	—	—	—

[z]SOPP = Sodium o-phenylphenate tetrahydrate; = pH 11.8.
[y]TBZ = thiabendazole.
[x]= Test #1, 300 ppm benomyl + 1000 ppm botran; Test #2, 600 ppm benomyl + 1000 ppm botran.
[w]= Treatment #2 followed by treatment #3.

The fungicides used were sodium o-phenylphenate (SOPP), thiabendazole (TBZ), benomyl, 2,6-dichloro-4-nitroaniline (botran) and imazalil.

Treatments 3, 4 and 6 were typical of those used for treating citrus in Florida (9). Treatment 5 is one that is often used on peaches, plums and nectarines. Treatment 2 is one that is commonly used on citrus in California and was chosen instead of the usual flood treatment used in Florida. Which contains the ingredient hexamine which is only allowed on citrus in the United States (1). All treatments were applied at ambient temperature except for treatment 2 which was applied at 90°F. All treatments were mixed and applied within a 60-min period to avoid chemical breakdown of any of the fungicides used (7).

The fruit was then held at 60°F and 90-95% relative humidity during the holding period. At the end of 1 wk, 2 wk, and at 4 wk, the fruit were examined and decayed fruit were removed. After the fourth week the fruit was tested for flavor.

In Test 2, fruit of the 'Gold Nugget' variety were harvested March 19, 1983 and treated in a manner similar to that of Test 1. The exceptions were that the amount of benomyl in treatment 5 was doubled to 600 ppm and the addition of treatment 7 which was a combination of treatment 2 followed by treatment 3. The fruit were then held under the same conditions and evaluated in the same manner as Test 1.

Results and Discussion

At the end of 1 wk all fruit in both tests were without signs of decay (Table 2). By the end of the second week considerable decay was present and by the fourth week the loss due to decay was near 50% in all treatments except treatment 4 (benomyl). In this treatment decay was less than 1/3 the average of other treatments.

Table 2. Decay in treated loquat fruit.

Treatment	Test	Decay at weeks[z] 1	2	4
1. Check	#1	0	2	10
	#2	0	3	8
2. SOPP	#1	0	4	11
	#2	0	3	13[y]
3. TBZ	#1	0	4	6
	#2	0	8	13
4. Benomyl	#1	0	0	2
	#2	0	0	5
5. Benomyl/Botran	#1	0	1	10
	#2	0	10	13
6. Imazalil	#1	0	3	7
	#2	0	6	9
7. SOPP/TBZ	#2	0	5	9[x]

[z]= Number of fruit decayed on examination.
[y]= Includes 7 injured fruit.
[x]= No injured fruit.

The decayed fruit were examined in an effort to identify the organisms responsible for the fruit rots. Two organisms were found: *Diplodia sp.* and *Pestalotia sp.* The literature reports *D. natalensis* and *Colletotrichum gloeosporioides* (Penz.) Sacc. as diseases of loquats (2) but no references to *Pestalotia* was found. This latter organism was apparent on all decayed fruit from the golden color of the mature mold.

In variable 2 (SOPP) of test #27 of the fruit showed an injury that expressed itself as a leathery, brown depression approximately 0.04 to 0.23 inches. Each fruit had from 3 to 8 of these depressions on them. When these injuries were cultured no decay organisms were found. Since none of the fruit in variable 7 (SOPP followed by TBZ) had these injuries, it might be that the TBZ had the effect of protecting the fruit or it is possible this was simply due to the effect of an additional 30 sec rinse.

At the end of the fourth week of storage the fruit did not appear shriveled or discolored. The flavor of fruit from all treatments was normal in both tests.

Benomyl was the only fungicide tested that gave any useful control of fruit rots. When used in combination with botran, benomyl did not seem to be effective at all. This "canceling" of benomyl was confirmed in Test #2 when the benomyl concentration was raised to 600 ppm so that treatments 4 and 5 had the same benomyl content. The pH of a suspension of botran was found to be 7.3 which should not have any effect on benomyl in the short time before fruit treatment (7).

The loquat as grown in Florida is a well flavored, appealing fruit and with proper handling has commercial potential. Benomyl appears to be the only fungicide with any effect.

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Literature Cited

1. Anonymous. 1980. Subchapter E—Pesticide Programs. Code of Federal Regulations Title 40, Parts 162-180. U. S. Govt. Printing Office.
2. Cook, A. A. 1975. Loquat: *Eriobotryae japonica* Lindl. In: Diseases of Tropical Fruits and Nuts. pp. 219-224. Hapner, New York.
3. Campbell, C. W. and S. E. Malo. The Loquat. Fruit Crops Fact Sheet FC-5. Florida Coop. Ext. Serv. Univ. Florida, Gainesville.
4. Eckert, J. W. and M. J. Kolbezen. 1971. Chemical treatments for the control of postharvest diseases of citrus fruits. Proc. 6th Br. Insecticide and Fungicide Conf. 683-693.
5. Eckert, J. W. 1969. Chemical treatments for control of postharvest diseases. World Rev. Pest Control 8(3):116-137.
6. Guelfat-Reich, S. 1970. Conservation de la nefle du Japon (*Eriobotrya japonica*). Fruits 25(3):169-173.
7. Hall, D. J. 1980. Comparative fungicidal activity of benomyl and Its breakdown product methyl 2-benzimidazolecarbamate (MBC) on citrus. Proc. Fla. State Hort. Soc. 93:341-344.
8. Hall, D. J. 1982. Practical considerations of the Federal Insecticide, Fungicide and Rodenticide Act for fruit and vegetable packers. Proc. Fla. State Hort. Soc. 95:210-213.
9. McCornack, A. A., W. F. Wardowski, and G. E. Brown. 1976. Postharvest decay control recommendations for Florida citrus fruit. Ext. Cir. 359-A. Inst. Food Agr. Sci. Univ. Florida, Gainesville.
10. Schroeder, C. A. 1949. The Loquat. Texas Avocado Soc. Yearbook for 1949. pp. 69-73.
11. U. S. Environmental Protection Agency. 1966. Registered Label—Tuco Botran 75W. EPA Reg. No. 1023-36.
12. Walsh, B. H. Using Florida fruits: Loquats. Florida Coop. Ext. Serv. Inst. Food Agr. Sci., Univ. Florida, Gainesville.
13. Will, A. A., Jr., E. V. Golby, and L. S. Maxwell. 1973. Florida Fruit. Lewis S. Maxwell (publisher). Tampa, Florida.

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CONTROL OF CHAFF SCALE ON 'DANCY' TANGERINE[1]

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Abstract. **Low populations of chaff scale,** Parlatoria pergandii **Comst., can produce unmarketable 'Dancy' tangerine** (Citrus reticulata **Blanco) fruit with green feeding marks. Several insecticides were evaluated as to their performance in preventing these grade lowering feeding spots. Methadathion (Supracide), ethion-oil and 1% oil sprays were effective. Spring plus summer and spring plus fall applications of methadathion were superior to summer plus fall applications.**

Chaff scale is one of the more commonly found scale insects occurring throughout Florida's citrus producing areas. Furthermore, this scale is considered the most important scale pest to Texas citrus (6) but is not found on citrus in California (2). Chaff scale can become so abundant on citrus that the bark appears to be covered with chaff (4,

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