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PACKINGHOUSE NEWSLETTER

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COLD TREATMENT OF FLORIDA GRAPEFRUIT

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Cold treatment is one of several quarantine measures approved for use on Florida citrus to guard against the transfer of the Caribbean fruit fly (*Anastreplas suspensa Loew*) from Florida to other citrus producing regions. In-transit cold treatment of Florida grapefruit shipped to Japan has been conducted commercially since 1987. In the 1986-87 season, over 3 million cartons of grapefruit were cold treated. In the succeeding seasons, the volume of cold treated grapefruit has gradually increased, reaching a maximum of nearly 7 million 4/5 bushel cartons in 1988-89 season (Table 1).

Following the 1989 freeze, total shipments of grapefruit to Japan declined to 5.3 million due to freeze damage, with the majority of fruit (92%) shipped from regulated areas, known as Caribbean fruit fly-free zones. In the (1992-93) season, cold treatment of Florida grapefruit to Japan reached a record low of 692,422 4/5 bushel cartons, or 7.5% of total shipments, while shipments of fly-free fruit reached almost 8.5 million cartons.

Shipping grapefruit from fly-free zones usually expires in mid-April due to increased fly population. If application of cold treatment continues to decline, grapefruit shipping to Japan may be shortened by 2-3 months. This could lead to increased domestic grapefruit supply and send more grapefruit to juice processing plants instead of fresh citrus packinghouses.

For the past seven citrus seasons, studies have been conducted on seasonal quality of grapefruit following application of the standard cold treatment. In the 1986-87 season, an in-transit cold treatment test was conducted on two refrigerated containers, each containing over

1100 cartons of Indian River grapefruit. Results of these tests indicated that cold treatment can be carried out successfully with no or a very low level of peel disorder and/or decay.

Tests have also confirmed the effectiveness of grapefruit conditioning by holding fruit for 7 days at 60° F (15.6°C) in insuring good quality of cold treated grapefruit. Early season grapefruit were found most susceptible to chilling injury (peel pitting and scald) which can lead to excessive decay.

To insure successful completion of cold treatment, the following guidelines are suggested:

1. Use good quality grapefruit from healthy, older, well maintained and irrigated groves.
2. Handle grapefruit carefully to minimize mechanical injury during harvesting, hauling and packing. Minor injuries caused by sand particles can develop into pitting and decay.
3. Drench thoroughly with TBZ. TBZ reduces decay and chilling injury to grapefruit.
4. Minimize or avoid degreening of fruit destined for shipment under cold treatment. Degreening weakens fruit and may increase the incidence of stem end rot.
5. Insure proper washing, drying, fungicide application and waxing. Check nozzles for proper flow and avoid fruit pile-ups on the packing line.
6. Insure proper conditioning of grapefruit prior to cold treatment, usually for 7 days after the fruit temperature reaches 60° F. At times, conditioning may seem unnecessary but, it is not possible to predict when it is most needed.
7. Avoid mixing fruit of varying temperatures in the same ship hold to prevent unnecessary prolonged exposure to low temperatures.
8. Use grapefruit qualified for shipment under the short cold treatment schedule to minimize exposure to chilling temperatures. The short schedule can reduce treatment time by as much as 7 days.
9. Upon arrival in Japan, grapefruit should be warmed to 50° F (10° C) by placing pallets 8-12 inches apart in warehouses maintained at 54° F (12° C). This is particularly important if fruit is to be fumigated with hydrogen cyanide.
10. Avoid unnecessary delay in marketing of fruit.

If you need any assistance with implementation of cold treatment or if you have any questions, please feel free to contact the author at (813) 956-1151.

Table 1. Grapefruit Shipments to Japan under Various Quarantine Treatment Protocols.

	Short Schedule CT	Standard CT	Total CT	Fly Control Zone	Total
			4/5 Bushel		
1986-87	1,530,366	1,643,968	3,174,344	926,075	9,158,976*
1987-88	1,142,354	3,905,585	5,047,939	4,821,919	10,967,396**
1988-89	2,291,669	4,571,525	6,863,194	6,185,147	12,103,178
1989-90	103,064	303,486	406,550	4,899,916	5,306,466
1990-91	1,626,865	1,071,805	2,698,670	8,813,266	11,511,927
1991-92	385,835	1,043,456	1,429,291	8,546,914	9,976,205
1992-93	309,856	382,566	692,422	8,489,995	9,182,417

* Includes 4,999,988 4/5 bushel cartons fumigated with EDB.
** Includes 961,484 4/5 bushel cartons fumigated with EDB.

PINK SCAVENGER WORM *Pyroderces rileyi* (Walsingham)

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Insects within the family Cosmopterididae are small moths, with some species rather brightly colored. Most of these moths are leafminers in the larval stage but some are simply scavengers. Two species of scavenger caterpillar, *Pyroderces rileyi* and *Pyroderces badia*, have been identified from citrus and have a geographical distribution that includes Florida. *P. rileyi*, better known as the pink scavenger worm, is most widespread. *P. rileyi* is very similar to *badia* but can be separated by the color pattern on the hind leg. The pink scavenger worm can impact citrus marketing in Japan due to their plant quarantine rules.

Geographical distribution: The pink scavenger worm, has been reported in both Florida and California since 1926. It is also found in regions from Washington D.C. and Arkansas south to Florida, Texas, and southwestern Arizona. It also occurs in the Antilles and South America to Argentina. Several species of *Pyroderces* including *rileyi* and *babia* have been found in Japan, and the Paleartic Region.

Host Plants: *P. rileyi* is a general feeder in vegetable trash having been found in many legumes, aloe, banana, coffee beans, coffee cherries, castor bean, eggplant, milo, and many dried fruits. On citrus, the pink scavenger worm feeds on dry and decayed fruits mainly, but it also feeds occasionally on sound oranges and grapefruit. Generally, it consumes very little peel; but may eat through the rind and leave a hole which may be a source for secondary invasion by other organisms..

In Florida, the pink scavenger worm can be found among piles of purple scales and mealy bugs and is often present where fruit and leaves touch each other. It has been collected among black scales and even found beneath the female black scale cover. It also can be found feeding on the dead floral parts of orange blossoms.

Life cycle: During winter and spring months, the pink scavenger worm remains on the tree under scales or inside mummified fruit on the ground or in the tree. The moth is present in May through July. Eggs are deposited singly on the surface of a substrate. After a few days, the pinkish larvae with a black head hatch and move short distances feeding on any available debris. The full-grown larva pupates in a whitish cocoon among the frass where it has fed. The pupal period is about 2 weeks.

Control: In Florida citrus, control has never been undertaken. Of the materials listed in the 1993 Florida Citrus Spray Guide, compounds such as Lorsban and Sevin might be effective. The bacterium, *Bacillus thuringensis*, should be an effective biological control.

THIRTY-THIRD ANNUAL
CITRUS PACKINGHOUSE DAY
Thursday, August 25, 1994
Registration 8:30 AM
Program 9:15 AM
Commercial Exhibits Afternoon
Citrus Research and Education Center
Lake Alfred