DEVELOPMENT OF A SYSTEMS APPROACH FOR US CHERRIES EXPORTED TO JAPAN

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Roughly 20% of US cherry production is exported to foreign markets, with a significant proportion going to Japan. Although cherries are a very poor host for codling moth, Japan requires a methyl bromide quarantine treatment for cherries from the US against this pest. Recently, Japan has accepted New Zealand cherries based on a systems approach, which involves the incorporation of production, harvesting, and packaging practices so that quarantine requirements for export are satisfied.. When developing the systems approach for New Zealand cherries, researchers also demonstrated the lack of codling moth in cherries harvested from orchards near more suitable codling moth hosts, such as apple and pear. In order to win approval of a systems approach for US cherries, a similar demonstration in cherry orchards in California and the Pacific Northwest (Washington Oregon) was conducted.

Methods

Three commercial cherry orchards near apple or pear orchards in the Pacific Northwest and four cherry orchards near walnut, apple or pear orchards in California were selected as study sites (Table 1). Each study site contained at least 25 mature trees. No pest management measures that would negatively affect codling moth populations were used in the study sites. Two sticky traps baited with codling moth pheromone lures were placed in each study site at least 5 weeks before harvest and monitored weekly. At least 10,000 cherries, harvested by professional pickers, were collected from each study site and examined for the presence of lepidopterous larvae. If possible, any live larvae found were reared to adult emergence. Dead larvae were kept in alcohol. All specimens were identified by either systematists at the National Museum of Natural History at the Smithsonian Institution or the California Department of Agriculture Diagnostics Laboratory.

Results

Pheromone trap results are given in Table 2. More codling moths were recovered from traps in study sites in the Pacific Northwest than in California. Considerable laboratory and field research has demonstrated that codling moth develops poorly on cherries, and does not prefer cherry for oviposition. Therefore, it is assumed that all codling moth found in cherry orchard traps were from the adjacent apple, pear or walnut orchards. Trap catch data (not shown) from orchards adjacent to the California study sites agree with this; the cherry orchard with the highest trap

catch was adjacent to the walnut orchard with the highest trap catch. Consequently, we assume that trap catches were higher in the Pacific Northwest cherry orchards because codling moth populations were higher in the adjacent orchards.

The results of the fruit examinations are summarized in Table 3. In total, more than 78,000 cherries were examined. The percentage of cull fruit was much higher in the California samples, due to heavy rains that occurred shortly before harvest. The rain increased the number of moldy fruit that was harvested, and mold growth continued on the fruit even while in cold storage.

No codling moth larvae were recovered from any of the samples. A single leafroller larva (three-lined leafroller, *Pandemis limitata*) was found in the Pacific Northwest cherries. Another leafroller larva was found in the California cherries, and identification is pending, although it has been tentatively identified as the obliquebanded leafroller (*Choristoneura rosaceana*).

Discussion

There is a considerable body of evidence from laboratory and field studies showing that cherries are very poor hosts for codling moth. The recent work by researchers in New Zealand, as well as the current study, provides additional support for this position. In addition, over the course of 22 years, inspectors in California and the Pacific Northwest have examined more than 777 million cherries destined for export to Japan and Korea, and only 12 larvae suspected to be codling moth have been found. It seems clear that the risk of introducing codling moth into a new area through untreated US cherries is very low.

The systems approach to codling moth quarantine for US cherries is not strictly an alternative to methyl bromide fumigation, but rather an alternative to any quarantine treatment for this commodity. However, it still requires approval of the Ministry of Agriculture, Forestry & Fisheries in Japan before US growers may adopt the method. Until then, growers will be required to fumigate with methyl bromide any cherries destined for the Japanese market.

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Table 1. Description of cherry study sites

Site	Location	Description	Harvest Date
		Pacific Northwest[1]	
PNW1	8.9 km NE of Wapato	Organic, mostly 'Bing';	6/16/06
PNW2	5.5 km NW of Zillah	Conventional, mostly 'Bing'	6/30/06
PNW3	8.9 km NE of Wapato	Conventional, mostly 'Bing'	6/19/06
		California[2]	
CA1	9.8 km NE of Stockton	Conventional, mostly 'Bing'	6/4/06
CA2	10.9 km NE of Stockton	Conventional, mostly 'Bing'	5/31/06, 6/16/06
CA3	23.5 km ENE of Stockton	Conventional, mostly 'Bing'	6/1/06
CA4	17.6 km ENE of Stockton	Conventional, mostly 'Brooks'	6/6/06

[1] Pacific Northwest study sites all near apple or pear orchards
[2] California study sites all near walnut, apple or pear orchards

Table 2. Pheromone trap results[1]

Pacific Northwest									
Date	**5/16**	**5/23**	**5/30**	**6/6**	**6/16**	**6/19**	**6/28**	**Ave/Wk**	**Max**
PNW1	36.5	28.5	0.5	28.0	8.0	0.0	13.5	16.4	36.5
PNW2	2.0	17.0	0.0	1.0	0.0	0.0	3.5	3.4	17.0
PNW3	12.5	5.5	0.0	4.5	6.5	0.0	25.0	7.7	12.5
California									
Date	**4/27**	**5/4**	**5/9**	**5/17**	**5/24**	**6/2**	**6/16**	**Ave/Wk**	**Max**
CA1	0.5	0.5	1.5	5.5	2.0	0.0	0.5	1.5	5.5
CA2	0.0	0.5	0.5	0.5	0.0	0.0	0.0	0.2	0.5
CA3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CA4	0.0	0.5	0.5	0.5	0.0	0.0	0.0	0.2	0.5

[1] Values are averages of 2 traps at each location

Table 3. Fruit evaluation results

Location	# Fruit Examined	% Culls	Codling moth larvae found
	Pacific Northwest		
PNW1	11,448	6.6	0
PNW2	10,929	15.4	0
PNW3	14,182	17.0	0
	California		
CA1	10,646	11.0	0
CA2	11,021	22.7	0
CA3	10,272	39.6	0
CA4	10,203	49.3	0