A SYSTEMS APPROACH TO MEETING QUARANTINE REQUIREMENTS FOR APPLES AND SWEET CHERRIES AS AN ALTERNATIVE TO FUMIGATION WITH METHYL BROMIDE

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Abstract: The codling moth, Cydia pomonella (L.), is the primary insect pest of quarantine concern on apples and sweet cherries from the western United States and has become of increasing concern due to the great expansion of interest in exports to foreign markets. Other pests such as the apple maggot, Rhagoletis pomonella (Walsh); plum curculio, Conotrachelus nenuphar (Herbst); lesser appleworm, Grapholita prunivora (Walsh); and, western cherry fruit fly, Rhagoletis indifferens Curran; have also become of greater quarantine concern. Methyl bromide is the most frequent treatment of choice when quarantine treatments are required by the importing country. With the planned termination of use of methyl bromide in the United States by January 1, 2001, and action pending at the international level, alternative procedures or treatments to provide quarantine security for apples and sweet cherries must be developed.

One alternative is the use of a systems approach. The systems approach has been defined as "the integration of those preharvest and postharvest practices used in production, harvest, packing, and distribution of a commodity which cumulatively meet the requirements for quarantine security" (Jang & Moffitt 1994). For apples and sweet cherries, the systems approach is based on insect pest management practices in the orchard; the incidence of the insect in harvested fruit upon arrival at the packinghouse; postharvest grading, sorting, and packing procedures, with emphasis upon removal of insect-infested or damaged fruit; and, inspection and certification of the packed fruit (Moffitt 1989).

A high degree of quarantine security can be provided for codling moth on apples and for codling moth and western cherry fruit fly on sweet cherries using such a system, without a direct postharvest quarantine treatment. In a two-year study by ARS-Yakima (in cooperation with Washington State University), fruit from 31 commercial apple orchards in Washington were examined for the presence of codling moth. Fruit from each orchard was examined for the presence of codling moth larvae in the packinghouse and in the packed box. Of 171,448 'Red Delicious' and 'Golden Delicious' cull or off-grade apples examined from bins in the packinghouse, only ten were

found infested with codling moth larvae. Of 501,537 apples of both cultivars examined from boxes as packed for export, none were found infested by codling moth larvae (Moffitt 1989). Information developed by the Washington State Department of Agriculture showed that of 41,397,020 apples inspected for export over a five-year period, only 33 were found infested with codling moth larvae (Moffitt 1989). In a later study by the Washington State Department of Agriculture over a two and a half year period, only 10 of 66,345,170 apples inspected were found infested with codling moth larvae. During these studies and inspections, no apple maggot, plum curculio, or lesser appleworm were found. For commercially-produced apples, a very high degree of quarantine security is provided by the systems approach. Thus, the systems approach is a viable alternative to fumigation with methyl bromide as a quarantine treatment for codling moth and other insects of quarantine concern on apples.

Japan and the Republic of Korea both require a quarantine treatment of sweet cherries from the United States to meet their import quarantine requirements for codling moth and western cherry fruit fly. Such a treatment was developed and exports of sweet cherries from the western United States to those countries was begun in 1978. Since that time, more than 11,484,182 cartons of cherries have been treated, inspected, and certified for shipment, according to the California Cherry Advisory Board and the Northwest Fruit Exporters. Of the estimated 629,509,100 cherries inspected over this 17-year period, no live codling moth larvae and only 7 dead larvae have been found. No western cherry fruit fly larvae, alive or dead, have been found during these inspections. The codling moth is not considered a pest in cherry orchards and control measures are not applied against it. In the Pacific Northwest, control measures are routinely applied in the orchard for control of the cherry fruit fly. As was the case with apples, a very high degree of quarantine security is provided by the systems approach (Vail et al. 1993) and the systems approach is a viable alternative to fumigation with methyl bromide as a quarantine treatment for codling moth and western cherry fruit fly on sweet cherries.

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