A QUARANTINE TREATMENT THAT IMPROVES QUALITY?!? DEVELOPMENT OF COMBINATION HEAT & CA TREATMENTS FOR APPLES AND PEARS

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Introduction

Codling moth, *Cydia pomonella* (L.), is the primary pest of quarantine concern for Northwest produced apples and pears. Apples are treated with methyl bromide prior to export to Korea, Taiwan, and Japan. Currently there are no postharvest treatments for the control of codling moth in pears. A model has been developed which describes codling moth mortality in relation to the rate of heating. The effects of heating rate on apple and pear quality was determined in order to identify potential treatments which would preserve fruit quality while controlling codling moth.

Heat treatments have been used to disinfest tropical and sub-tropical fruits. There is also evidence that pre-storage heat treatments of apples may alleviate storage scald. The heat treatments used to control storage scald do not always provide adequate control of quarantine pests. The rate of heating greatly impacts insect mortality as well as fruit quality. In an attempt to determine the effective rate of heating which will provide insect pest control and suitable fruit quality, an extensive study was conducted to describe fruit quality responses to the rate of heating. Linear heating rates of 4, 6, 8, 10, and 12°C/hr to final treatment temperatures of 44 and 46°C were used to treat 8 varieties of apples (Red Delicious, Golden Delicious, Granny Smith, Fuji, Gala, Jonnagold, Braeburn, and Cameo) and two varieties of winter pear (d'Anjou and Bosc). Two time points were taken for each heating rate treatment. The time points coincided with predicted insect mortality goals. Fruit were stored for 90 days in controlled atmosphere, ripened for 7 days, and tested for various quality parameters such as external and internal colors, firmness, soluble solids, titratable acidity, scald, internal break down, and decay. Data were compared over two seasons. Those treatments which provided good quality fruit were selected as the best candidates for potential development as a quarantine treatment. In general, scald was controlled, firmness was higher in heat treated fruit, ripening was delayed but uniform in pears, decay organisms were suppressed, red fruit became redder and green fruit remained green, the flavor index (SS/TA) was either unchanged (Granny Smith) or increased. Physiological disorders such as bitter pit, sunburn, and black heart disorder were acerbated by the heat treatment and culled directly afterwards before the fruit went into storage.