PROJECT NO. 79-I5
(Continuation of Project D3)

COOPERATOR:
USDA-SEA/AR
Stored-Product Insects Research
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Part 1 - Controlled Atmospheres

I. Objective: To determine interactions of low oxygen levels vs temperature vs relative humidity on time required for navel orangeworm mortality.

II. Interpretive Summary: Temperature had the greatest effect on time required for navel orangeworm kill. At higher temperatures, the time for kill was reduced approximately 60% for each 10°F temperature increase. Increased oxygen concentrations from 0.5% to 2% increased kill time by only 6 percent whereas an increase to 5% oxygen produced a 64 percent increase in kill time. A relative humidity decrease from 60 percent to 40 percent at 0.5 percent oxygen decreased the time for insect kill by 65 percent. However, relative humidity in bulk almonds is difficult to control and thus should not be considered an important factor in time required for insect control by this method.

A petition to EPA for exemption of low oxygen atmosphere use in stored agricultural products (including almonds) for insect control was submitted on 12 October 1979.

Part 2 - Varietal Resistance

I. Objectives: To determine navel orangeworm resistance in some almond varieties and to determine chemical resistance factor(s) in almond hulls.

II. Interpretive Summary: Twenty-nine almond cultivars were tested for hull resistance to navel orangeworm. Navel orangeworm delayed development varied from 0.2 to 4.7 days. A general trend of resistance appeared in Mission, Mission crosses and Prunus argentia almonds. Further evaluations on this year's crop is underway. Dr. Ron Buttery has chemically analyzed hulls from Nonpareil and Mission cultivars. A publication showing chemicals and their quantities has been prepared and accepted for publication. Ten of these chemicals were tested against the navel orangeworm and found to produce no significant delay in development.

Neem seed component, Azadirachtin, incorporated in a complete diet at 0.1 ppm prevented navel orangeworm feeding and thus effected a 100 percent mortality.