

# SHOT HOLE DISEASE CONTROL

## IN ALMONDS—*by injecting fungicides into overhead sprinklers*

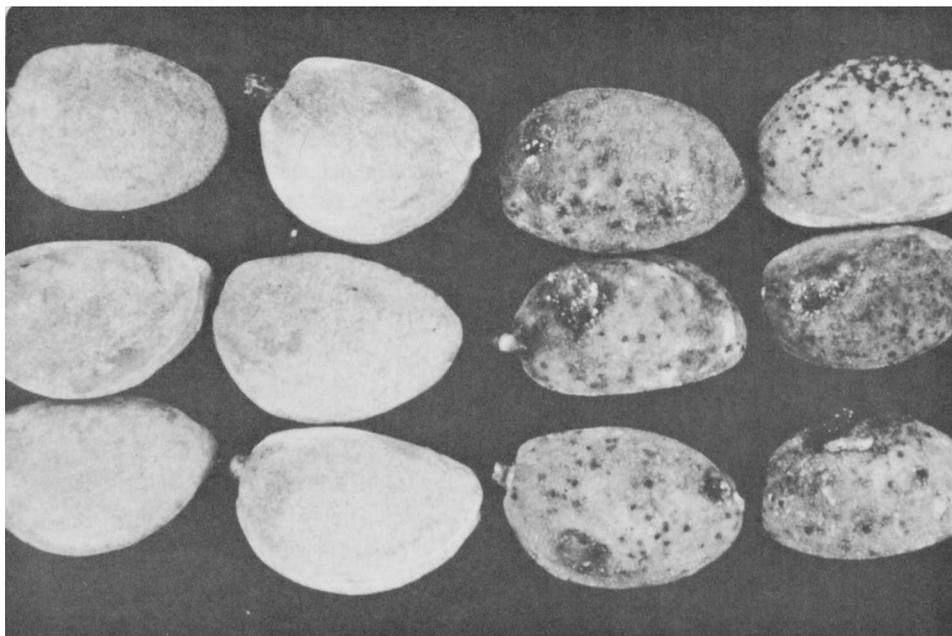
T. ALDRICH · W. J. MOLLER  
H. SCHULBACH

**T**HE SOLID-SET, over-tree multiple-use irrigation system in almonds was evaluated during 1972 and 1973 for its usefulness in the application of chemicals for control of shot hole disease caused by the pathogen *Coryneum beijerinckii*. This fungus attacks leaves, fruit and twigs, resulting in leaf and fruit drop. Under severe circumstances it may cause the hulls to gum internally, affecting kernel quality. Prolonged wet weather in spring enhances disease development and sprinkler-applied water further favors spread. Well-timed chemical sprays will normally give adequate control.

Field trials were conducted in Colusa County to evaluate the effectiveness of applying a fungicide through an over-head sprinkler system. Ziram at eight lbs per acre was applied at 40% bloom and again at post-petal fall.

The plot design was a randomized complete block with four 20-tree replicates per treatment. Each replicate consisted of four varieties and the Nonpareil variety was selected as the one to determine application timing and evaluation of disease control. The first treatment consisted of over-tree applied water containing a Ziram solution; the other treatment was over-tree applied water without Ziram.

Since the normal irrigation application rate was .15 inch an hour (3.60 inches per 24 hrs), any chemical material added in a single application would probably have been too dilute to be effective. To overcome this problem, several applications were made to build up the chemical residue on the trees to the desired quantity. One-half the acreage requirement of chemical material was injected into the irrigation line for 15 minutes, and then the trees were allowed to dry. The balance of the material was injected into the line for an additional 15 minutes, and again the trees were allowed to dry. The irrigation system was then turned on for 10 minutes during which time the remaining material in the irrigation pipes was flushed out and onto the trees. A sticker-spreader was combined with the chemical to minimize leaching of the residue from



Shot hole disease on almond hulls from trees with over tree-applied irrigation (right). Healthy hulls from trees with chemical control material added to over tree irrigation water (left).

the trees during successive wetting periods.

Treatments were applied February 23 and March 24, 1972, and February 22 and March 20, 1973. On June 12, 1972, 200 hulls from each of the plots were evaluated for shot hole infections, and on August 24, 100 kernels from each plot were observed for gumminess. On August 27, 1973, 100 kernels from each plot were evaluated for the gummy condition.

Results of infected hulls in 1972 indicated that the Ziram applications significantly reduced the number of hulls exhibiting more than five infection sites per hull from 187 per 200 hulls to two per 200 hulls. In the assessment of gummy kernels at harvest, four kernels from the Ziram-treated plots exhibited gumminess as compared to 32 from the plots receiving no fungicides. The trial was repeated again in 1973 under nearly identical circumstances. Overhead-applied water containing Ziram reduced kernel gumminess from 21 per 100 nut sample to three per sample.

These data indicate that blossom-timed applications, injecting Ziram into the over-head irrigation system, can significantly reduce the incidence of shot hole disease in almond orchards with over-tree systems.

*Thomas M. Aldrich is Farm Advisor (Colusa County), University of California Cooperative Extension; W. J. Moller is Plant Pathology Specialist, Cooperative Extension, U.C. Davis; and Herbert Schulbach is Area Soils and Water Technologist (Colusa County), U.C. Cooperative Extension.*

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