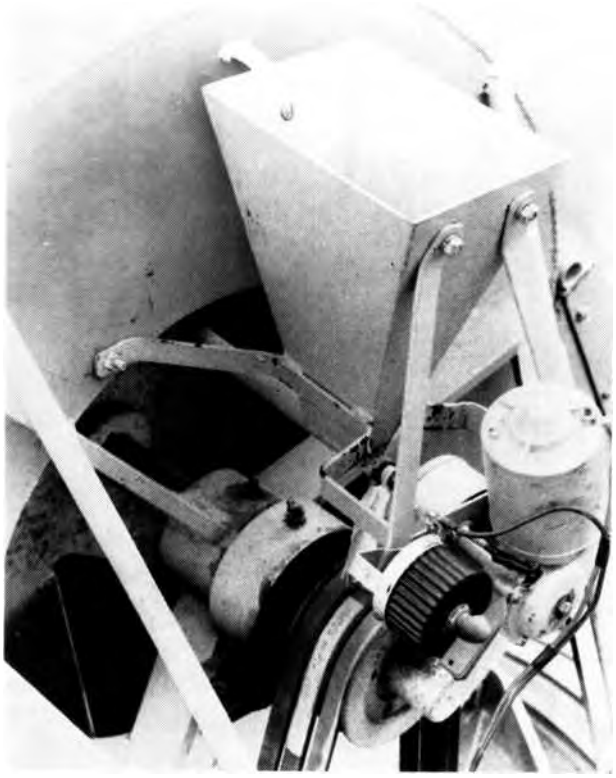


Device for metering pollen into air stream of blower.

Effects of

on

of Nonpareil

Nonpareil almond trees receiving metered rates of supplemental compatible pollen from a ground blower produced no increase in yield over control trees in tests reported here.

ATTEMPTS ARE frequently made to supplement natural cross-pollination of self-unfruitful varieties of fruit trees with artificial methods. This involves the application of pollen collected from compatible varieties occurring outside the orchard to be treated. These methods include hand pollination and the use of pollen dispensers attached to the front of a bee hive. The bees in the latter method, forced to exit through this unit, become dusted with pollen which they presumably carry to the desired crop—a technique that failed to produce any increase in fruit set in almonds in previous tests at Davis. More recently, commercial pollination services have applied metered amounts of supplemental pollen directly to the flowers of fruit trees by means of helicopters or ground blowers. This technique is intended to provide additional pollen for redistribution by pollinating insects (and not to transfer pollen directly to the stigmas of the flowers).

An experiment was set up to test the effect of applying compatible pollen to Nonpareil almonds by ground blower (see photo). Results reported here are from a single test conducted under one set of conditions. However, the consistency of results suggests they are valid for this set of conditions.

The study was conducted in a 27-acre orchard in Colusa County during the spring of 1966. The orchard contained two varieties: two rows of Nonpareils alternating with one row of Texas (Mission). The Texas rows and the border rows of Nonpareil trees were excluded from the experiment. The remaining Nonpareil rows were apportioned into four plots. Each plot consisted of two rows receiving the pollen application and two rows of control trees.

Honey bee colonies were provided at the rate of about two and a half per acre, and were distributed throughout the orchard in eleven sets of six colonies each. The last colonies were placed in the orchard February 25, just prior to onset of bloom.

Ground blower application

Pollen from Peerless almonds was applied by ground blower at the rate of 25 grams per acre. It was diluted in a "carrier" of Lycopodium spores at the rate of 1 gram of pollen to 5 grams of spores, and applied between 11 a.m. and 1 p.m. on March 11—a clear, warm day during which the bee flight activity was good. The Nonpareil trees were nearly in full bloom, and the Texas trees were in about 10 to 20% bloom at this time.

Five limbs each on four trees, selected at random from the treated rows, were caged to exclude pollinating insects during all or any part of the bloom period (graph 1).

Blossom cages

Cages were put on before the blossoms opened, February 25, and removed after most of the petals had fallen, March 21. Any remaining petals were plucked from the flowers when the cages were removed. Counts of the total flowers and buds were made on March 11 and 14. Counts of maturing fruits were made April 19. Cages which were on limbs during the morning of March 11 in treatments 1, 3, and 5 were covered with tarps to prevent direct application of pollen. Cages from treatment 3 were transferred to limbs of treatment 2 during the afternoon of March 11.

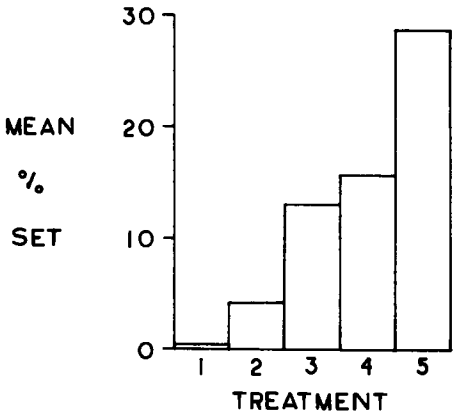
Pollen from Drake almonds was used in the hand-pollination test. This pollen had been collected and treated in the same manner as the Peerless pollen used in the blower application except that it was not diluted with the Lycopodium spores. Both kinds of pollen had been tested for viability prior to application and were considered to be highly viable.

The sample size in the limb cage tests was small and therefore the results within each treatment showed wide variation. However, the mean results (graph 1) confirmed similar trials conducted by previous workers. The mean percentage of

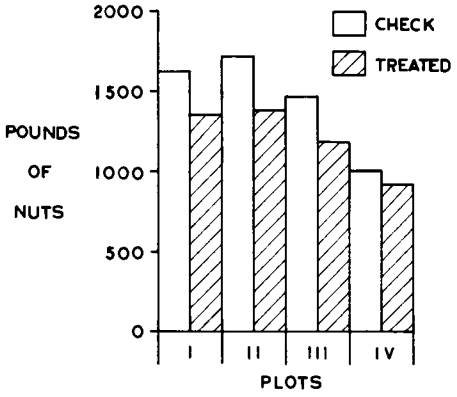
R. W. THORP · W. STANGER · T. ALDRICH

Artificial Pollination Yield Almond Trees

Graph 1. Mean percentage of fruit set of four limbs in each treatment using cages to exclude pollinating insects: 1) no pollination; 2) open pollination through March 11; 3) open pollination after March 11; 4) open pollination throughout bloom period; 5) hand pollination.



Graph 2. Harvest yields from four plots of Nonpareils. Each bar represents the yield from two rows (68 trees).



fruit set from hand-pollinated (caged) limbs was almost twice that of the open-pollinated limbs. At least one of the open-pollinated limbs produced yields as good as any of the hand-pollinated limbs, but the latter were much more uniform in percentage of set. Limbs open-pollinated during the last half of the bloom period had about three times as much fruit set as did limbs open-pollinated during the first half of the bloom period. This would be expected since the Texas trees were just beginning to come into good bloom at the time of treatment.

Yields

The treated and control rows were harvested by the grower. These yields, expressed in pounds of in-shell nuts for each pair of rows (68 trees), are shown in graph 2. The check rows had higher yields than the treated rows in each plot.

The yield for the check rows in all four plots was 5,686 lbs (without compensating for 10 trees lost to oak root fungus)—as compared with 4,859 lbs for the treated rows. The difference between the two represents 8% of the total yield in the four plots, or a 15% lower yield from the treated rows as compared with the checks.

Results of this experiment demonstrated that the application of compatible pollen to Nonpareil almonds by ground blower did not increase the yield of treated trees above the yield of control trees. Whether the consistently lower yields in the treated rows in each plot were due to the blower application of the diluted pollen remains to be determined through further testing.

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Ground blower for applying metered quantities of diluted pollen to fruit blossoms.