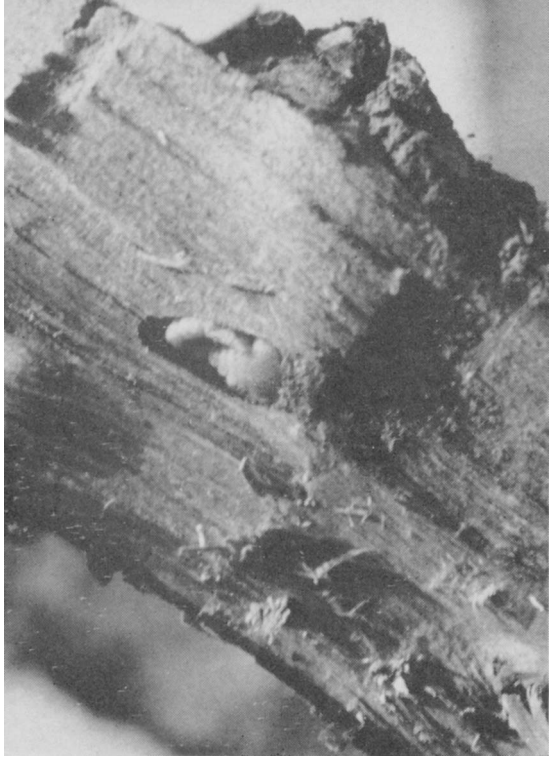


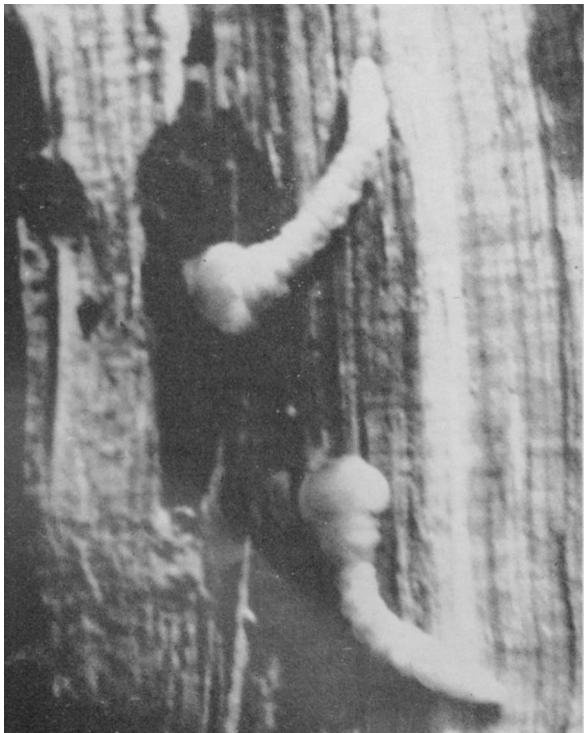
Section of wood cut away to show overwintering flatheaded borer in prepupal cell.

Controlling PACIFIC FLATHEADED BORER

C. S. DAVIS · J. H. BLACK · K. W. HENCH · C. V. CARLSON

Pacific flatheaded borer may be controlled on established deciduous fruit and nut trees with a preventive dieldrin spray when the application is made before eggs are deposited in the spring. However, this treatment is an expensive substitute for good cultural practices to keep the trees in healthy vigor and free from sunburn.

Overwintering flatheaded borer larvae exposed to show shape and length.



THE PACIFIC FLATHEADED BORER, *Chrysobothris mali* Horn, is a major pest of deciduous fruit and nut trees in the central valley of California. The severity of flatheaded borer damage varies greatly from year to year. Severe damage is usually associated with above normal summer temperatures and sunburned trees.

If trees lose vigor, they are likely to be seriously damaged by this borer. Young transplanted trees are particularly subject to attack, since there is a period during their establishment when their condition is somewhat weakened. Also, the severity of attack may be associated with the number of beetles present in the area.

Flatheaded borers may be considered as secondary invaders in established trees. Trees are predisposed to initial infestations by adverse growing conditions which result in weakened trees, the most common of which are: (1) nematode, bacteria, and fungus injury resulting in low tree vigor, (2) poor irrigation, (3) salt injury, (4) summer defoliation by spider mites resulting in severe sunburn, and (5) sunburn due to pruning practices. A common practice by some orchardists is to severely prune out the inside portion of trees which exposes many of the main tree scaffolds to severe sunburn.

The borer has a single generation a year. Transformation into the adult stage occurs from the first of April through July. The adults are sun-loving and quick in flight. The eggs are usually laid singly in cracks and crevices in the bark. The hatching larva bites a hole in the bottom of the eggshell and mines directly into the bark. It works its way into the cambium, bark, or wood, and packs the waste and excrement in the mine behind it.

Almost all the feeding and mining is done in the cambium until the larva is nearly full-grown, when it bores into the outer wood and forms a slightly enlarged oval cell in which to pupate and transform into the adult. The larva then enters the prepupal stage to pass the winter.

In 1962, field evaluations of three insecticides were conducted in the counties of Butte on cherries and prunes, Calaveras on apples, Contra Costa on walnuts, Fresno on peaches, Kern on plums, Merced on nectarines, Santa Clara on prunes, and Sutter on prunes and peaches in the search for an effective chemical control. These treatments were applied by either hand sprayer or paint brush early in the season before egg laying had begun.

Borer populations were low in seven of the eight 1962 plot areas, resulting in insignificant differences between treatments. One test area in Merced County did develop high borer populations. The experiment there was conducted in a nectarine orchard with each treatment having 10 single tree replications and being applied by hand gun. The treatments were: dieldrin 3 lbs 25% WP per 100 gallons; Thiodan (endosulfan), 3 lbs 50% WP per 100 gallons; DDT 3 lbs 50% WP per 100 gallons; and an untreated check. Treatments were applied on April 12 and June 21. Control was evaluated in October by cutting the live borer larvae from the wood of entire trees. The dieldrin treatment gave a striking reduction in the borer population, but the other treatments were only slightly different from the untreated check (table 1).

TABLE 1. COMPARISON OF MATERIALS FOR CONTROL OF PACIFIC FLATHEADED BORER ON NECTARINES IN CRESSY, MERCED COUNTY, 1962

Material	Dosage/100 gals. water*	Number of borers in 10 trees
Dieldrin	3 lbs. 25% WP	18
Thiodan (endosulfan)	3 lbs. 50% WP	147
DDT	3 lbs. 50% WP	192
Check		194

* Plots sprayed on April 12 and June 21.

Since borer infestations are most commonly associated with sunburn on established trees, the 1963 experiments were conducted on mature Santa Rosa plum branches that were artificially defoliated to enhance chances of sunburn and an infestation of borers. This practice proved to be very satisfactory. Sixty exposed, but uninfested, 4-ft scaffold limbs were selected and defoliated on 60 trees in early spring. Ten limbs were chosen at random for each treatment, The first treatment was determined by placing infested wood in screen cages in the orchard and applying the insecticides after the first adult female appeared, on April 30. Control evaluations were made by thoroughly examining the marked and treated branch in September.

The 1963 treatments included dieldrin at 2 lbs 25% WP per 100 gallons of water as single sprays, one applied on May 1 and one on July 10, and as a double spray applied on both May 1 and July 10. Lead arsenate was applied as a dormant spray and as a single spray on May 1. These treatments were compared with an untreated check (table 2).

TABLE 2. COMPARISON AND TIMING OF TWO MATERIALS FOR CONTROL OF PACIFIC FLATHEADED BORER ON PLUMS IN ARVIN, KERN COUNTY, 1963

Materials	Time of application	No. borers per 40 ft limb
Dieldrin 2 lbs 25% WP/100	May 1 and July 10	6[a]*
Dieldrin 2 lbs 25% WP/100	May 1	11[ab]
Dieldrin 2 lbs 25% WP/100	July 10	19[abc]
Check		44[bc]
Lead arsenate 4 lbs/100	Dormant	48[c]
Lead arsenate 4 lbs/100	May 1	52[c]

* Contrast of Means was by Scheffe's Method of Linear Contrast—figures are not significantly different when subscript letters are the same.

At the 90% level of probability, dieldrin applied in May and July was significantly more effective than the check, and lead arsenate applied in either the dormant period or in May; dieldrin applied in May was significantly better than lead arsenate applied either in the dormant period or in May; there were no significant differences between dieldrin applied in July, the check, and lead arsenate applied either in the dormant period or in May.

In 1966 tests were conducted in Kern County in a Beauty plum orchard that had been heavily infested the previous year. Tree selection and procedures were the same as described for the 1963 tests. Timing of spray applications using 2 lbs dieldrin 25% WP per 100 gallons of water per acre was evaluated.

Single treatments were applied on April 27 (30 days before harvest) and June 30 (postharvest), a double treatment was applied on April 27 and June 30; the check was untreated (table 3).

Bark damage from flatheaded borer on sunburned peach limb.

TABLE 3. TIMING OF DIELDRIN SPRAYS FOR CONTROL OF PACIFIC FLATHEADED BORER IN ARVIN, KERN COUNTY, 1966

Timing of treatments*	Number of borers
April 27	1
April 27 and June 30	2
June 30	29
Check	38

* Treatments were 2 lbs dieldrin, 25% WP per 100 gallons of water, applied by hand gun.

Evaluations were made in early December after leaf drop. Dieldrin applied as a single treatment on April 27, or as a double treatment on April 27 and June 30, gave significant reductions in the borer population. This material applied as a single treatment on June 30 did not give adequate control. It would appear from these 1966 data that the April treatment was the effective treatment in the double April and June treatment.

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