# Spray Residues

## on apricots after codling moth sprays, 1950 recommendations

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**The problem of spray residues** on apricots has received considerable attention the past two seasons largely due to the necessity of applying control measures for codling moth. Without this control the grower and processor are confronted with heavy losses due to wormy fruit and if sprays are applied, there will be minimum amounts of the spray chemical in canned or dried fruit.

No official tolerance has yet been set for canned or processed fruit. As most of the apricots being attacked by codling moth in Santa Clara and southern Alameda counties go to canneries or dried fruit associations, the selection of a spray program should be determined by consultation between the grower and buyer. A hearing to set tolerances on fresh fruits and vegetables has recently been held in Washington, D.C., but it is doubtful if these tolerances will be announced in time to direct the grower in giving crop protection to his 1950 crop.

Spray residues found on apricots sprayed with parathion, methoxychlor, DDT and DDD—the materials employed in an experiment at Campbell in 1949—have been analyzed from large samples of the fruit at harvest. Analyses were made as fruit came: *1*, from the orchard; *2*, after canning as unpeeled halves; and *3*, as strained pulp.

**Spray Residues on Dried Apricots, Campbell Plot, Season 1949**

| April 5th | May 4th | June 2d | Ppm fresh fruit | Dried fruit |
|---|---|---|---|---|
| 2 lbs. Parathion | 2 lbs. Parathion | ..... | 0.16 | 0.00 |
| 3 lbs. Parathion | 3 lbs. Parathion | ..... | 0.18 | 0.00 |
| 3 lbs. Methoxychlor | 3 lbs. Methoxychlor | ..... | 09.3* | 1.8 |
| 2 lbs. DDD | 2 lbs. DDD | ..... | 02.6 | 7.1 |
| 1½ lbs. DDT | 3 lbs. Parathion | ..... | 0.09 Parathion | 0.00 Parathion |
| 1½ lbs. DDT | 3 lbs. Methoxychlor | ..... | 4.5 | 2.2 Methoxychlor |
| 1½ lbs. DDT | 2 lbs. DDD | ..... | 02.6 | 5.0 DDT & DDD |
| 1½ lbs. DDT | 3 lbs. Parathion | 3 lbs. Parathion | 0.13 Parathion | 0.01 Parathion |
| 1½ lbs. DDT | ..... | ..... | 0.8 | 2.8 |
| ..... | 1½ lbs. DDT | ..... | 01.9 | 4.6 |
| ..... | ..... | 1½ lbs. DDT | 02.1 | 2.6* |
| 1½ lbs. DDT | 1½ lbs. DDT | 1½ lbs. DDT | 03.6 | 11.8 |

* Results appear out of line.

Experiments in residue removal employing certain detergents were also run in an attempt to remove the spray residue from the fruit before it was canned. This data will be very valuable in arriving at a reasonable use of the spray chemicals used in codling moth control in apricots.

Chemical analyses of the spray residues on commercially dried fruit from the second picking showed no trace of parathion on the dried fruit but residues of DDT, DDD and methoxychlor present in amounts ranging from two to 12 ppm—parts per million—depending upon the material and the time of application.

If the allowable residue on dried fruit were to be based on a reconstituted condition to the equivalent of fresh fruit by allowing a 5.5 to one differential, the residue in most cases would fall within a reasonable tolerance.

The application of a spray in the jacket period on apricots appears to be justified in that it will control fruit tree leaf roller, tussock moth, peach twig borer, orange tortrix, case bearer and codling moth. The addition of a copper compound in the spray is advisable where brown rot is apt to be a problem. Wettable powders of DDT, DDD, parathion or methoxychlor may be used in this application.

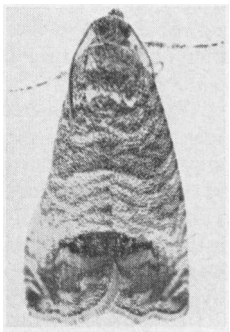
A second application in May to give protection against the codling moth emerging in May and early June is a necessity where codling moth is a problem. This spray should be applied a month or six weeks before the first picking.

Wettable DDT should never be employed in this spray due to its residual properties and toxicity. The use of DDD in this spray may also be restricted due to its residual properties. Although its toxicity as a spray residue is much less than that of DDT its use will depend upon the amounts permitted as spray residue tolerances on fresh and processed fruit.

The low residues of parathion after a 30-day period make it safe to use. The low toxicity of methoxychlor should make it safe from a residue point of view even though it does leave considerable residue after spraying.

These results are apparent from experiments during the fruit season of 1949. An experimental plot in the control of codling moth attacking apricots was conducted in an orchard near Campbell, Santa Clara County. This orchard was reported to have shown a high percentage of wormy fruit in the 1948 harvest.

The orchard was sprayed by the owner on March 14, 1949 in the prebloom stage with a combination spray of a commercial copper compound—for brown rot control—and 50% wettable DDT at a dosage of one pound per 100 gallons of water.



**Adult codling moth greatly magnified. In the larva stage it is destructive to fruit.**

The possibility of this spray affecting the early emerging adult moth was not evident until at harvest. The percentage of wormy fruit on unsprayed trees and throughout the orchard was much less than was to be expected from the previous season's infestation. There may have been enough residue on the bark of the trees from this spray to destroy some of the early moth. This possibility will be investigated next season.

The original control plot consisted of 63 trees. Six different treatments and unsprayed trees were randomized within the plot using nine single tree replicates for each. Additional treatments for the purpose of studying the spray residue on the fruit harvest added 13 trees to the plot.

Six codling moth bait traps were placed at random in an adjoining part of the same orchard which only received lead arsenate spray applications after blossom time. These bait traps were in operation from March 30th to July 2d. The only peak of emergence indicated by the numbers of adult moth taken occurred in the periods from May 1st to 14th and from June 1st to 10th.

The applications were made with a conventional ground portable equipment employing orchard spray guns and 400 pounds pressure at the pump. An average of 10 gallons of spray liquid was applied per tree in each of the two sprays. The application was made when the fruit was mostly out of the jacket period and averaged three eighths of an inch in diameter. The second application was made approximately a month later when the fruit averaged one to 1½ inches in diameter.

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## MARKETING

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seek to prevent: marketing of excess quantities; disorderly marketing; improper preparation or grading; economic waste; and inability by agricultural producers to maintain present or to develop new markets. These are police-power laws intended to protect the purchasing power and the taxpaying ability of growers and to maintain adequate productive capacity. Administration does not greatly differ from the federal procedures. State programs are restricted to intrastate commerce, although especially where processing is involved such control is often adequate to obtain the goals of the state laws.

The California Marketing Act with 19 programs, requires approval of handlers or growers. Only groups directly affected by the regulation are represented on control boards. In addition to the powers authorized in federal orders, this Act provides for stabilization pools; marketing or processing periods or seasons; surplus or by-products pools; advertising—which is specifically prohibited in the federal law; and tree or vine removal which would be unconstitutional under federal statute.

The Agricultural Producers Marketing Act, with three programs, also authorizes most of these additional powers. A state program directly affecting only processors or producers may be effectuated after approval only by the directly affected group. Information on state programs may be obtained from the Bureau of Markets in Sacramento.

### Bases for Market Control

Producers and handlers of farm products are authorized and encouraged to combine in marketing their products because some of the hazards inherent in farming often cannot be overcome by individual action.

Marketing costs are high and rigid relative to other shares of the consumer's dollar. Farm prices, and therefore incomes, may drop sharply if retail prices break either as a result of depressed buying power or of bumper yields or both. Individual producers are not responsible for either of these price depressants nor can they, acting alone, rectify their effects.

Limitation of sales to the amount which would yield desirable returns to the industry is possible only through joint action of the entire industry. There are counterbalancing disadvantages: limitation programs are hard to administer; equitable allotment is difficult; traditional outlets may be impaired; harvesting and packing methods may be affected. However, competition is not seriously affected. Production efficiency need not be lessened.

The only alternative to limitation may often be widespread bankruptcy or governmental relief, which ultimately means government control. Handlers, carriers and marketers move a smaller volume but they need suffer no out-of-pocket losses through limitation and their long-run interest may be served by maintaining productive capacity. Consumers lose by obtaining only the amount they would get were growers able precisely to control yields or precisely to adjust output to fluctuations in demand. This cost may be less than the cost of farm bankruptcy. Consumers may also benefit from the maintenance of long-run productive capacity. There are three real dangers of limitation: it may induce consumers to shift to substitute goods; it may prevent adjustment of acreage in overexpanded industries; it may induce increased production of the regulated product or its competitors. These are the dangers of using limitation as a monopoly device rather than to compensate for the inability of individual farm producers acting alone to adjust aggregate production in the occasional seasons when demand falls or yields are high or both.

Advertising, research, trade promotion, removal of trade barriers and collaboration with other governmental agencies—most of which may be done under state law only—may protect income against long-run increases in output or shifts in consumer habits. Correction of undesirable trade practices may decrease marketing costs. These techniques should not adversely affect other groups.

Regulation of distribution with no restriction upon total volume sold may benefit producers and handlers continuously without harm to other groups. Since individuals will divert to secondary channels only when primary prices fall to by-products levels, the maintenance of desirable differentials in prices among alternative channels is possible only with joint market control. Handlers of many products react simultaneously and alike to present or to expected prices, to expected shipments, and to holding costs. Thus markets may be unintentionally glutted and such gluts may spread to related markets if receivers fear that their margins may be threatened by even further price declines.

Low-grade or irregular packs may bring quick profit to a few handlers but may do serious damage to the entire market. Prevention of these occurrences by *regulating flow and distribution of a crop* may result in larger volumes of sales than would be gotten without regulation. The real dangers, again, are the monopolistic abuses against which the laws authorizing market control, the administrative regulations of the two Departments of Agriculture, the good sense of the control boards and the veto power residing in government officials serve to protect consumer, handler and producer alike.

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## APRICOTS

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The first picking of ripened fruit was made July 7th and the final picking was made July 14th. Randomized counts of fruit were made from each box of harvested fruit at both pickings to determine the percentage of codling moth and orange tortrix infested fruit.

The unsprayed trees within the spray plot averaged only 6% infested fruit and were apparently affected by the prebloom spray and the sprayed trees surrounding them. Unsprayed trees in an adjoining orchard averaged 15% wormy fruit in the first picking.

There are probably no significant differences in the percentages of infested fruit from any of the treatments shown. All treatments were also equally effective in reducing the percentage of injury from orange tortrix.

**Codling Moth Control on Apricots Following Spray Treatments in the 1949 Experimental Plot at Campbell**

| Time of application | | Total fruit count | Percentage infested fruit | |
|---|---|---|---|---|
| April 5th | May 4th | | Orange tortrix | Codling moth |
| 2 lbs. Parathion (1) | 2 lbs. Parathion | 2969 | 0.3 | 2.2 |
| 3 lbs. Parathion | 3 lbs. Parathion | 2594 | 0.3 | 1.9 |
| 3 lbs. Methoxychlor (2) | 3 lbs. Methoxychlor | 3032 | 0.3 | 0.6 |
| 2 lbs. DDD (3) | 2 lbs. DDD | 1492 | 0.6 | 1.9 |
| 1½ lbs. DDT (4) | 3 lbs. Parathion | 734 | 0.5 | 1.9 |
| 1½ lbs. DDT | 3 lbs. Marlate | 3266 | 1.0 | 0.7 |
| 1½ lbs. DDT | 2 lbs. DDD | 3150 | 0.3 | 1.6 |

(1) Parathion—25% wettable powder.
(2) Methoxychlor—50% wettable powder.
(3) DDD—50% wettable powder.
(4) DDT—50% wettable powder.

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