

# Use of Pest Control Chemicals

public law No. 518 effective July 22, 1955, of concern to all growers, shippers using pesticide chemicals on farm products

G. E. Carman and J. E. Swift

**The Miller Amendment** to the Pure Food Law—the Federal Food, Drug, and Cosmetic Act of 1938—became law on July 22, 1954, with provision that its enforcement with respect to some of the new pesticide materials be delayed one year. More recently, extensions have been granted in specific instances, but the law will become fully effective October 31, 1955, at the end of the 1955 growing season. However, all other requirements of the amended law are now in effect and subject to enforcement.

During the period of transition, an important function of the University—and other research groups—will be to review former recommendations covering the use of pesticide chemicals in light of new requirements and to withdraw those which will predispose an agricultural commodity to illegal residues.

Another activity of research groups will be to obtain, where needed, the additional residue information required to establish specific tolerances. Furthermore, the County Agricultural Commissioner's office and the University of California, through its Agricultural Extension Service, will be able to instruct growers and shippers in safe practices and to warn them against pesticide uses which might involve commodity seizure.

Under the Miller Amendment, actual tolerances or allowable residues—the amounts of the effective chemical ingredient in sprays and dusts which can legally remain in or on a crop—will be a matter of record; the information of most critical value to the agricultural producer will be embodied in the label claims and instructions of the manufac-

turers and more definitively in the regional recommendations released by federal and state research agencies. Failure of an individual to confine his uses of pesticide chemicals to those currently recommended—recommendations issued prior to July 1955 may be invalid—and to employ them in the manner specified may result in the seizure of produce bearing excessive residues in interstate shipment and, possibly, in prohibitive economic losses.

The Miller Amendment does not

pesticide chemicals and still fully protect the public health.

These procedures involved public hearings, and two such hearings were conducted. In 1944, a hearing was held for the purpose of establishing a tolerance for fluorine on apples and pears and, in 1950, a second hearing was held to establish tolerances for all the new pesticide chemicals then in use. Official tolerances based on the 1950 hearings were put into effect June 11, 1955, after being published in March 1955.

In effect, the Miller Amendment corrects the time-lapse defect of the original legislation by requiring that a tolerance be established or an exemption from the requirement of a tolerance be granted for each proposed use of a pesticide chemical resulting in a residue on the consumer product. Otherwise the tolerance is assumed to be zero and none of the pesticide chemical may be present on raw agricultural commodities shipped across state lines.

The amended law defines pesticide chemical and raw agricultural commodity and clarifies the status of processed foods. Herbicides, plant growth

regulators, and similar chemicals are included along with fungicides and insecticides.

Raw agricultural commodities, by definition and interpretation, include fresh fruits, whether or not they have been washed and colored or otherwise treated in their unpeeled natural form; vegetables in their raw or natural state, whether or not they have been stripped of their outer leaves, waxed, prepared into fresh green salads, etc.; grains, nuts, eggs, raw

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## Research by the University of California, Division of Agricultural Sciences, as Affected by the Miller Amendment to the Pure Food Law

Since legislative action by the State of California on March 12, 1889, it has been the responsibility of the University of California, Division of Agricultural Sciences, to issue reports on research on suitable methods and procedures for the production of agricultural crops.

The Miller Amendment to the Federal Food, Drug, and Cosmetic Act of 1938 became law on July 22, 1955, and by its restrictions on the sale and utilization of pesticides imposes an additional responsibility on the Division of Agricultural Sciences to see that any reports and suggestions made—if followed accurately—would comply with the provisions of the law. Requirements of the Miller Amendment may necessitate changes in practices based on information released

prior to July 1955, which should be checked for compliance with the new law.

All future research activities of the University in developing information on the use of a new pesticide will develop—concurrently—residue information on those compounds which may have practical application to agriculture in California.

Reports issued by the Division of Agricultural Sciences as to dosage, timing, rates and methods of application, and minimum interval to harvest on materials and conditions covered by the Miller Amendment are based on data obtained by the California Agricultural Experiment Station. Deviations from the reported research findings may result in residues which are illegal under the Food, Drug, and Cosmetic Act.

**Paul F. Sharp**, Director of California Agricultural Experiment Station.

**Wayne F. Weeks**, Acting Director of California Agricultural Extension Service.

change the fundamental objectives of the Federal Food, Drug, and Cosmetic Act. In passing the original legislation in 1938, Congress recognized the need both for the use of pesticide chemicals in the production of edible agricultural commodities and for the protection of the consumer from excessive residues of restricted materials. Embodied in the Act were provisions for the establishment of tolerance levels expressed as a definite number of parts per million—by weight—which would permit the use of

# Minor Nutrients of Citrus

effects of phosphorus fertilization on the minor element nutrition of citrus studied with three types of soil series

Frank T. Bingham and James P. Martin

**Accumulation** of large phosphorus reserves in avocado and citrus soils will reduce the availability of zinc and copper in many California soils to the point of deficiency.

Many growers include applications of phosphorus in their soil management programs, but California citrus soils—depending upon the original status of the soil and subsequent management—may have deficient, adequate, or excessive available phosphorus.

The possible indiscriminate use of phosphorus prompted a program of studies to investigate the effects of excessive soil phosphorus on the minor element nutrition of citrus—copper, iron, manganese, and zinc—using greenhouse technique.

Soils of the Las Flores, Tierra, and Olivenhain series—all are common in the south coastal area of San Diego County—were selected for testing. To avoid fertilized soils, only uncultivated sites were sampled. The soils were placed in three-gallon crocks and treated with monocalcium phosphate in amounts equivalent to no treatment, as a check—0—76 pounds, 360 pounds, and 900

pounds of phosphorus—P—per acre 6".

In one experiment, Lisbon and Eureka lemons budded on Jochimsen grapefruit and Cleopatra mandarin roots were used to test the Olivenhain soil treated with the four levels of phosphorus. The lemon plants were grown six months, harvested, and analyzed.

In a later experiment, copper was added at the rate of 20 ppm—parts per million—copper to one half of each series of phosphorus treatments for the soils. The copper treatment was superimposed since a preliminary experiment demonstrated that copper was made unavailable by large applications of phosphorus. These three soils were cropped for five to six months with sour orange seedlings. At the conclusion of the experimental period, the seedlings were harvested and analyzed.

## Lemon Scion-Rootstock

Under conditions of low phosphorus fertility, a large response in plant growth to an application of phosphorus—76 pounds P per acre to budded lemons on Olivenhain soil—occurred only with the

Lisbon lemon. The Eureka exhibited a phosphorus response of less than 10% in growth; whereas the Lisbon's growth was increased 50% through fertilization.

Although the rootstock appeared to have no effect on scion growth at low levels of fertilization—under the conditions where large quantities of phosphorus were applied—the rootstock was particularly associated with scion performance. For example, as shown in the lower table on the next page, the Cleopatra mandarin root combination manifested poor growth at lower levels of phosphorus fertilization than the grapefruit root combination. As little as 360 pounds P per acre reduced growth of the Cleopatra mandarin root combinations 50%. Growth reduction of the grapefruit root was only apparent at the highest rate of phosphorus fertilization.

Mineral composition of the lemon tree foliage is especially useful in the interpretation of the growth depression brought about by excess phosphorus. The analysis given in the table, coupled with plant symptoms, shows that large applications of phosphorus have induced a copper deficiency. Each combination

## PESTICIDES

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*milk, meats, and similar agricultural produce. It does not include foods that have been processed, fabricated, or manufactured by cooking, freezing, dehydrating, or milling.*

Such processed foods will be considered acceptable where raw agricultural commodities—which bear residues exempted from the requirement of a tolerance or which are within the permitted tolerance—are used if 1, the pesticide residues have been removed to the extent possible in good manufacturing practice and 2, the concentration of the pesticide in the prepared or processed food sold to the consumer is not greater than the tolerance permitted on the raw agricultural commodity.

Use of pesticide chemicals in storage or transportation is as critical as their use in production of the raw agricultural commodity, and tolerance requirements for a processed food item are the same as for its basic ingredients.

Under the Miller Amendment, tolerances are established or exemptions granted without the necessity of public hearings. The manufacturer or other interested parties may petition for these. Reasonably short time intervals are prescribed for the processing of the petitions by the two governmental agencies involved. On the basis of the information and data accompanying the petition, the Department of Agriculture certifies as to the usefulness of the pesticide chemical for the uses specified and expresses an opinion as to whether the tolerances proposed by the petitioner reasonably reflect the amounts of residue likely to result when the pesticide chemical is used in the manners proposed.

The petition is then reviewed by the Food and Drug Administration of the Department of Health, Education, and Welfare, and its decision with regard to the establishment of a tolerance is announced. Decisions may be appealed to an Advisory Committee, and public hearings or even court reviews may be instituted.

Agriculturists must adhere strictly to the practices recommended for the use of pesticide chemicals. Otherwise, their shipments of produce may be confiscated upon crossing state lines.

The law as amended provides the grower or shipper with the means of controlling pesticide residues on raw agricultural commodities within legal limits without denying him the use of most of the essential pesticide chemicals. At the same time it assures maximum protection for the consuming public.

Several pesticide chemicals have already been exempted from the requirement of a tolerance. Others have built-in safety factors which prevent the retention of any residues, and a great many more—when used as recommended—result in residues below the tolerances now in effect as the result of the 1950 hearings or as the result of petitions submitted under the Miller Amendment.

*G. E. Carman is Entomologist, University of California, Riverdale.*

*J. E. Swift is Extension Entomologist, University of California, Berkeley.*