

Parathion, New Insecticide

effective against mites and woolly apple aphid

Arthur D. Borden

A NEW ORGANIC COMPOUND—officially named Parathion by the United States government, and known chemically as O, O-diethyl-O-p-nitrophenyl-thiophosphate and to research field men as 3422—was tested last season on deciduous fruit trees with excellent success.

In the period from July 15th to August 22d, when mite attack was most severe in a randomized plot of Bartlett pears in the Sacramento River area, Parathion held the populations of European red mite and the two-spotted mite—even when the applications were timed thirty days apart.

Seven other miticides tested, failed to hold the European red mite. Only one of the seven held the two-spotted mite.

The dosage employed was one pound of a 15% wettable material to 100 gallons of water.

Woolly Apple Aphid

Field investigations in the control of woolly apple aphid on apples, in Santa Clara County, have shown that Parathion gives excellent control of this aphid at a very low dosage.

A 15% wettable formulation, at a dosage of one-half pound to 100 gallons of water, gave close to 100% control of a very heavy infestation.

In a block of trees sprayed with a three-quarters pound dosage no living aphids were found.

Parathion is undoubtedly the most promising aphicide since the introduction of nicotine.

Bud Moth

In field experimental work for the control of the bud moth on prunes, in Santa Clara County, Parathion has given better control than any other material tested.

At very low dosages it has given perfect control of the larvae on the foliage and on the fruit. Postharvest applications, at a dosage of one pound of 15% wettable powder to 100 gallons of water, have controlled 100% of the larvae within their protective wintering cover.

Parathion is most promising for use in prune orchards, as it should control thrips, aphids, twig borer, and several of the leaf feeding insects, if the applications are properly timed.

Mealybug

Field tests in the control of mealybug on Winter Nellis pears have shown that as good or better control can be obtained with this material, than with lauryl thiocyanate or other recommended materials.

Parathion destroyed the adults as well as the half-grown mealybugs and, if properly timed, should give effective control of mealybug.

Pear Blister Mite

In the control of pear blister mite—bud mite—under the fruit bud scales of Bartlett and Hardy pears, a dosage of three pounds of the 15% wettable powder to 100 gallons of water, gave a 40% kill.

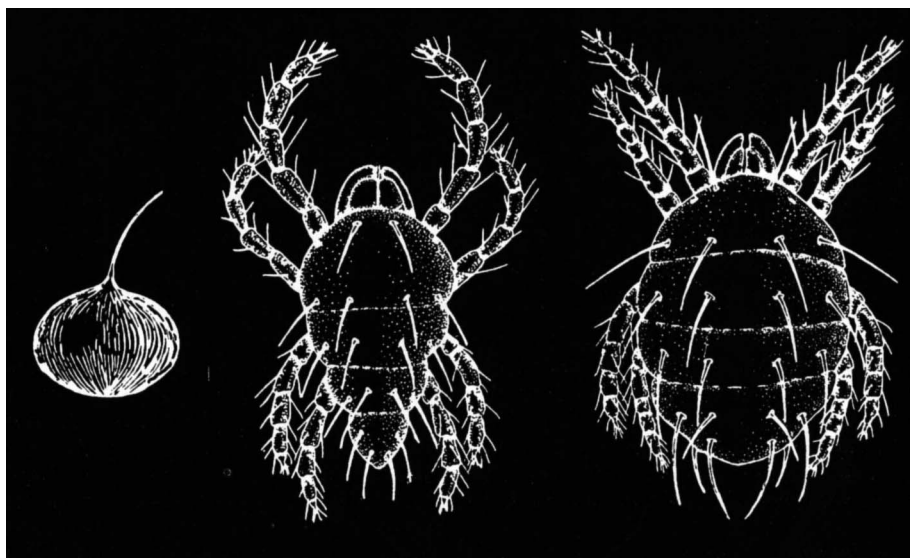
pears—resulting from the use of DDT. It may be used, either in combination with DDT or alone, in the control of these pests.

A suggested program on these fruits, would be the use of 50% wettable DDT for codling moth control when the petals are all off, followed in 17 to 21 days with a combination spray of 50% wettable DDT and Parathion, for the control of codling moth, aphids, leafhopper, Bryobia, and European red mite.

Subsequent applications of Parathion, for the control of late aphid infestations on apple and two-spotted mite on pears and apples, should be timed by the appearance of the pests on the foliage.

On prunes, an application of Parathion at the time of petal fall, or the early jacket period, should be effective in the control of the larvae of bud moth, pear thrips, twig borer, cankerworms, and other leaf feeders. Subsequent infestations of mites and aphids are to be controlled with early cover sprays.

Though no field investigations have as yet been undertaken for the control of cankerworm, green fruit worm, twig borer, mites and aphids on stone fruits such as apricots, peaches, plums, and nec-



European red mite. Left to right: egg; adult male; adult female.

This kill was in comparison to the 93% and the 97% kills obtained with 50% HETP at one pint to 100 gallons, and with lauryl thiocyanate at 1½ pints to 100 gallons.

Other Pests

Parathion was not received early enough last season to be tested for codling moth control on apples and pears, but it will be tested the coming season.

Parathion is the most promising new compound in the control of the two major problems—aphids on apples and mites on

tarines, Parathion will be tested experimentally the coming season.

Caution Urged

Parathion is relatively new and much data on its use are yet to be determined. The results at hand indicate it is most promising, in that it may solve some of the major insect problems on deciduous fruits which were not solved by DDT.

Some of the material will be available commercially the coming season, and its application should receive the same care-

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until its presence cannot be demonstrated by usual methods, although at several points it has persisted in reduced numbers. We can expect very small populations for the next year or so at least.

Leslie M. Smith is Associate Professor of Entomology, and Associate Entomologist in the Experiment Station, Davis.

Francis M. Summers is Principal Laboratory Technician in the Experiment Station, Davis.

FUNGUS FLORA

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some other factor, such as nematodes, pierces or weakens the root, the *Fusarium* is able to enter and cause further damage.

Even if *Fusarium* sp. 1 does not enter the citrus rootlets but grows in close association with them, getting its food material from dead root material, it is in the realm of possibility that it exerts an unfavorable influence on the plant.

When grown on plates it produces a substance which is toxic or antibiotic to other fungi.

If citrus cuttings are placed in a medium in which *Fusarium* sp. 1 has grown, the cuttings die in a short time, whereas cuttings in the same medium, which has not supported fungus growth, remain relatively healthy.

It can be stated that the growth of citrus does influence the nature of the soil fungus population. It is possible that this population directly, or more probably in combination with other factors, may exert a detrimental influence on the growth of the trees. More definite evidence in this connection is currently being sought.

J. P. Martin is Assistant Chemist in the Experiment Station, Division of Soils and Plant Nutrition, Riverside.

Harrietann Joseph is Senior Laboratory Technician, Citrus Experiment Station, Riverside.

Approximate Percentage Concentration of Certain Fungi Consistently Isolated from Old Citrus and Noncitrus Southern California Soils

Fungus species	Approximate percentage concentration	
	Old citrus soil	Noncitrus soil
<i>Fusarium</i> sp. 1	19	2
Fungus D1	18	not found
<i>Pyrenochaeta</i> sp.	12	not found
Penicillia (blue-green)	8	19
<i>Penicillium vinaceum</i>	5	6
<i>Fusarium</i> sp. 2	4	1
<i>Penicillium restrictum</i>	4	10
<i>Aspergillus versicolor</i>	2	3
<i>Aspergillus ochraceus</i>	2	1
<i>Mucor</i> sp.	1	2
<i>Aspergillus niger</i>	1	5
<i>Monotospora brevis</i>	1	<1
<i>Aspergillus sydowi</i>	1	2
Fungus M1	1	<1
<i>Sclerotium</i> sp.	1	<1
<i>Penicillium humicola</i>	<1	8
<i>Trichoderma lignorum</i>	<1	7
<i>Penicillium nigricans</i>	<1	3
<i>Rhizopus nigricans</i>	<1	1
<i>Torula</i> sp. 1	not found	2

PARATHION

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ful consideration as was given DDT in the early applications.

It is suggested for the coming season, in order to reduce possible injury to the fruit and foliage, as well as to the operator, that only the wettable and dust formulations of Parathion be employed.

Due precautions should be taken when handling the undiluted material and from the drift of sprays and dusts.

The wettable material in the drum has a very objectionable musty odor but after dilutions in the water in the spray tank it is not so noticeable. A few days after spraying, the odor can hardly be detected in the orchard.

Excessive Dosages Not Needed

There is apparently no purpose served by employing excessive dosages of Parathion. The limits will probably be found between one fourth and 1½ pounds of a 15% wettable powder or equivalents of a 25% wettable powder.

Limited tests with 0.5% and 1% dusts have shown them to be adequate in most instances.

Compatibility

Parathion is on the acid side and is not compatible with strongly alkaline materials. It is not compatible with lime sulfur solution, bordeaux mixture, or oil emulsions.

It is, apparently, compatible with wettable sulfurs, neutral coppers, DDT, rotenone, pyrethrum, lead arsenate, and dusting sulfurs.

No Injury Noted

At the dosages and formulations thus far used in deciduous fruit orchards, Parathion has shown no injury to fruit or foliage, even under high summer temperatures, but much research is necessary before it can be considered entirely safe.

Its use with kerosene or spray oil has not been explored sufficiently on deciduous fruit. Indications are that these combinations may prove injurious.

Residue

Analytical methods for the study of spray residue deposits are known, but as yet very little technical data are available on spray residues.

Spray deposits apparently persist for a period of two to three weeks. There should be no spray residue problem on applications which are made a month prior to harvest.

No tolerance has yet been set by Federal agencies.

Availability

The availability of Parathion, in the coming season, will depend upon the speed at which the manufacturers of the technical material can get under production.

Apparently, Parathion will be available for future seasons, from most of the spray chemical companies, in formulations of wettable powders and dusts.

Arthur D. Borden, is Lecturer in Entomology, and Associate Entomologist in the Experiment Station, Berkeley.

UREA

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more favorable economically, as well as providing a safe and palatable vehicle for this unpalatable substance and also favor bacterial activity in the rumen.

Use Probably Limited

In general, it would appear that urea will find a place in beef cattle feeding only when natural proteins are unavailable or when the price differential between protein and carbohydrate concentrates is very wide. To meet this possible use in the future, further tests are contemplated using pelleted materials containing urea.

H. R. Guilbert is Professor of Animal Husbandry, and Animal Husbandman in the Experiment Station, Davis.

G. H. Hart is Professor of Animal Husbandry, and Animal Husbandman in the Experiment Station, Davis.

K. A. Wagnon is Assistant in Animal Husbandry, Davis.