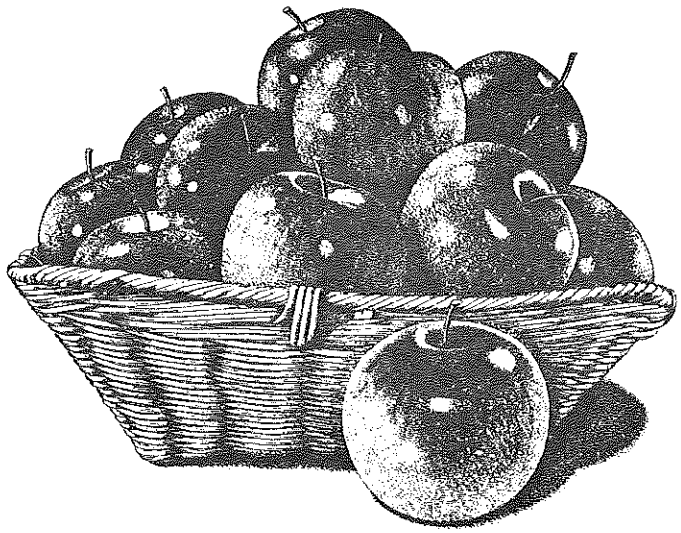
ABSTRACTS OF REPORTS FROM THE 57th ANNUAL WESTERN ORCHARD PEST AND DISEASE MANAGEMENT CONFERENCE

Imperial Hotel, Portland, Oregon
January 13,14,15, 1983



These abstracts of progress reports on research conducted on the principle insect and disease pests of tree fruits and nuts in the states of California, Colorado, Idaho, Montana, Oregon, Utah, and Washington, and the Province of British Columbia, are not intended to be recommendations by the conference. Official recommendations can only be made by public service entomologists and plant pathologists from their respective areas.

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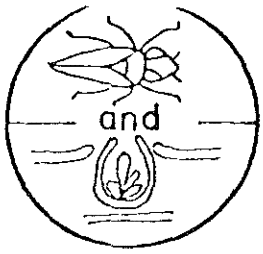
Western Orchard Pest



Disease Management Conference

Will Crites, Chairman
Gary Fields, Sec./Tres.

4600 Westwood Dr.
Hood River, OR 97031
13 October 1982

Ladies and Gentlemen:

The 57th Annual Western Orchard Pest and Disease Management Conference will be held at the Imperial Hotel, Portland, Oregon on January 12, 13, and 14, 1983. We encourage those who can attend to please participate in the meeting by giving reports of your research and/or take part in the discussions. Abstracts of your research work should be prepared and mailed as instructed below.

In the spirit of having the best research orientated meeting we welcome two section discussion leaders from the research divisions of industry this year.

Two (2) copies of your research abstract should be prepared as soon as possible and mailed as follows:

Original to: Joseph Capizzi
Extension Entomologist
Entomology Department
Oregon State University
Corvallis, OR 97331

Copy to appropriate section discussion leader:

Lepidopterous Pests
Irwyn Rammer
FMC Corporation
855 Parr Blvd.
Richmond, CA 94804

Orchard Mites
Brian Croft
Entomology Department
Oregon State University
Corvallis, OR 97331

Other Insect Pests
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Concentrate Spraying, Residues, Phytotoxicity, and Pesticide Development
Sid Sakamoto
Chevron Chemical Corporation
P. O. Box 4278
Modesto, CA 95352

Deciduous Orchard Diseases
Rick Bostock
Department of Plant Pathology
University of California
Davis, CA 95616

Topics Not Covered Under One of the Above
Hal Moffitt
SEA/AR, USDA
3706 West Nob Hill Blvd.
Yakima, WA 98902

It is requested that abstracts be presented under the following subject matter sections:

I. Lepidopterous Insects
II. Orchard Mites

subject matter sections (cont.)

III. Other Insect Pests
IV. Pesticide Spraying, Residues, Phytotoxicity, and Pesticide Development
V. Deciduous Orchard Diseases
VI. Other Topics

Double space the abstracts. List the appropriate sections on the first line, give the name of the insect, mite, or plant disease and its host on the second line, and then list your name, address, and follow with the abstract as follows:

III. Other Insect Pests

Pear Psylla - Pears

Investigator's Name and Address: Abstract . . . .

Allow space for clipping the abstract, please!

The deadline for these abstracts is 15 DECEMBER 1982. Please title your abstracts as sujested above so they can readily be placed in the proper section. To insure clarity of pesticide designations, please submit on a separate sheet the common name and trade name of any pesticides mentioned in your abstract as designated in Entomological Society of America Special Publication 74-1, October, 1974, or in the List of Chemical and Common Names Suggested for Use by AR..., GPA 900-622.

There will be only one Special Interest Groups' meeting time - Wednesday, January 12 at 3 PM.

Committee assignments will be made at the Wednesday morning meeting by Chairman Will Crites.

THIS WILL BE THE ONLY MEETING NOTICE, therefore, PLEASE DO NOT FORGET THE ABSTRACT DEADLINE OF 15 DECEMBER 1982.

Gary J. Fields
Secretary-Treasurer

ABSTRACTS OF REPORTS FROM THE
56TH ANNUAL WESTERN ORCHARD PEST AND DISEASE MANAGEMENT CONFERENCE

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S E C T I O N I

LEPIDOPTEROUS INSECTS

Section Leader -- Irwyn Rammer

Tentiform Leafminer-Apples

Eugene Nelson
Colorado State University, Grand Jct., CO.

During some growing seasons the tentiform leafminer is a serious pest of apples in Western Colorado. Recommended control measures were based on research conducted in the eastern United States and were centered around controlling the overwintering and first summer generations. Mining damage evaluations made the last three years in western Colorado indicate minimal leaf injury results from these two generations with the majority coming from the last summer generation.

Vydate at 1.5 pints/100 gal. was applied when an economic threshold of three mines per leaf had been reached prior to the last summer generation. Timing was based on model predicted egg hatch. The number of mature mines per leaf did not increase in the treated plots while the untreated controls increased to ten mines per leaf.

Codling Moth Model Validation

Eugene E. Nelson
Colorado State University, Grand Jct., CO.

A predictive codling moth model developed by Reidl and Croft (Michigan State University) and adapted by Jorgenson (Brigham Young University) has undergone validation in Western Colorado during the 1980, 81 and 82 growing seasons. Model predictions of adult flight activity, egg laying and egg hatch compare favorably with field observations. Accuracy of forecasted events is increased if a first male biofix is used compared to initiating the model January 1st of each year.

Codling Moth-Walnuts

W.W. Barnett
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1720 S. Maple, Fresno, CA 93702

Fluvalinate at .1, .15, and .2 lb a.i./acre, permethrin at .2 lb. a.i./acre, and phosalone at 3 lb. a.i./acre were applied to 15 year old Ashley Walnuts for control of codling moth. No significant differences in codling moth control were obtained. All the materials provided season long control of walnut aphid. The impact of the synthetic pyrethroids on Pacific and predaceous mites was variable.

Codling Moth-Pome Fruits

R.W. Zwick
Mid-Columbia Experiment Station
Hood River, OR

In single-tree replicated trials SN72129, Mavrik, SAN 406, and phosalone all allowed some codling moth entries over a 4-cover program. BAYSIR 8514, Payoff, cypermethrin, and U-56295 treatments were worm free. BAY SIR 8514 and SAN 406 allowed seasonal Typhlodromus survival but high spider mite populations on almost all plots required a curative spray by mid-August. S-3206 (fenpropathrin) and Payoff in commercial seasonal cover programs on Red Delicious apple showed no worms at harvest.

Peach Twig Borer-Almonds

R.E. Rice and R.A. Jones
Univ. of California, Parlier 93648

Seasonal monitoring of peach twig borer (Anarsia lineatella) was conducted with pheromone traps for additional validation of phenology models.

Concurrent with model validation efforts, chemicals were applied for PTB during the season in order to determine optimum timing for control. The timings were selected on the basis of accumulated day-degrees following first collections of male moths.

Pheromone traps were placed into the field in early April. The first male moth was trapped on April 22, followed by a steady increase in collections to May 7. Following this date, PTB collections declined sharply for one week, apparently due to temperatures being below the threshold (ca. 60^{o}F) for male activity and flight. PTB flight again increased to a second peak on May 28, and then declined naturally to the end of the first flight in early June. The first PTB twig strikes were observed in young almonds on May 17, ca. 300 D^{o} after the first moths were trapped.

Following the first moth collections on April 22, diazinon 50w at 2.0 lbs. a.i. in 400 gal. water per acre was applied to almonds at 300 D^{o} (5/12), 400 D^{o} (5/17), 500 D^{o} (5/23) and 600 D^{o} (5/26), based on the PTB developmental thresholds of 50^{o} and 88^{o}F. Evaluation of timing efficacy was based on twig strikes, counted on June 9. Results of these treatments showed no differences between the 300, 400, and 500 D^{o} applications. The 600 D^{o} treatment was much poorer, and was obviously applied too late in the flight to prevent early hatching larvae from entering twigs. The good control observed at 400 and 500 D^{o} confirmed results from a similar test in 1981, and this timing is believed to be optimum for control of first generation PTB larvae. The relatively high level of control at 300 D^{o} in 1982, compared to poor control at the same timing in 1981, is thought to perhaps be due to longer residual activity of the chemical in 1982.

Seasonal flight activity of PTB in 1982 was similar to that observed in previous years, with four full generations occuring between April 22 and December 3.

Oriental Fruit Moth-Nectarines

R.E. Rice and R.A. Jones
Univ. of California, Parlier 93648

Pheromone traps for OFM were placed into the field on Feb. 1, 1982. First moths from the overwintered larval population were trapped on Feb. 28. Overwintered generation adult flights continued at a low, non-peak level until ca. May 9. The 1982 first generation flight began in early May, and reached its peak on June 4, taking three weeks to peak instead of the usual two.

Chemical treatments for control of OFM were applied at 300 D^0 (5/23), 400 D^0 (5/26), 500 D^0 (5/30), and 600 D^0 (6/4) after Feb. 28, using OFM developmental thresholds of 45° and 90°F. Diazinon 50W was applied to nectarines at 2.0 lbs, a.i. in 400 gal. water per acre. Treatments were replicated ten times using single tree reps; twig strikes were counted on June 24 for treatment evaluation.

Results of these treatment timings showed the best control at 600 D^0 after first moth, followed by 500 D^0, with 300° and 400 D^0 the poorest.

Peach Twig Borer-Peaches

Fred L. Banham, Agriculture Canada,
Research Station, Summerland, B.C. V0H 1Z0

Feeding injury to terminal twigs and fruit of Redhaven and Valiant peaches caused by two summer broods of peach twig borer larvae was effectively controlled by one spray of deltamethrin 2.5 EC at 10 g or CGA 37102 40 EC at 100 g ai/ha timed by sex pheromone traps against first brood moths. These treatments were as effective as a similarly timed spray of azinphos-methyl 50 WP at 1.4 kg ai/ha at the currently recommended rate. CGA 73102 at 50 g ai/ha gave poor control. The treatments were applied 11 days after catches of first brood moths in the pheromone baited traps reached the weekly threshold level of 2 male moths/trap. Traps were deployed at a density of 10/ha. Early summer sprays of the above treatments did not adversely affect phytophagous mite predators of the European red mite and the peach silver mite.

Peachtree borer-Peaches
(A) Pheromone trap monitoring

Fred L. Banham, Agriculture Canada
Research Station, Summerland, B.C. V0H 1Z0

Laboratory formulated peachtree borer sex pheromone attractant caps in IC traps were highly attractive to male peachtree borer moths but locally formulated commercial pheromone caps were ineffective. Misleading results from use of the defective pheromone caps permitted infestations of borers to go undetected in a number of peach blocks. Impurities in the imported synthetic pheromone concentrate used in the commercial caps are suspected to be the cause for lack of attractiveness.

Peachtree Borer-Peaches
(B) Borer reinfestation

Fred L. Banham, Agriculture Canada,
Research Station, Summerland, B.C. V0H 1Z0

Adult peachtree borers rapidly reinfested a 0.8 ha peach block following implementation of a highly effective control program the previous year. Trunk inspections and male moth monitoring with sex pheromone baited IC traps deployed at a density of 2/ha in and adjacent to the the test block showed reinfestation began soon after first moth emergence and continued until termination of emergence. The main source of reinfestation appear to be peach blocks outside the monitored 5 ha perimeter area.

Fruittree Leafroller-Apples

H.F. Madsen, J.M. Vakenti
Agriculture Canada, Research Station,
Summerland, British Columbia

Laboratory tests confirmed fruittree leafroller resistance to azinphos-methyl in the East Kelowna district of B.C. There was a 7-fold tolerance compared to a susceptible strain. In field experiments, azinphos-methyl, methomyl, methidathion, permethrin, and fenvalerate all failed to give adequate leafroller control as petal fall sprays. The only material that provided satisfactory control was a pink spray of Bacillus thuringiensis formulated as a wettable powder (Dipel) or a liquid (Thuricide).

Obliquebanded Leafroller-Apples

H.F. Madsen and J.M. Vakenti
Agriculture Canada, Research Station
Summerland, British Columbia

In the Okanagan area of B.C., obliquebanded leafroller does not respond to commercial formulations of sex pheromone. The pheromone is a 3 component mixture, and a number of different ratios were prepared in the laboratory and evaluated in the field. Most of the prepared lures captured male moths, but no single ratio was more attractive than the other. Female-baited traps captured 10 times as many males as any of the synthetic lures indicating that the correct component mixture has not been determined.

Codling Moth-Apples

J.M. Vakenti and H.F. Madsen
Agriculture Canada, Research Station
Summerland, British Columbia

Codlemone at a release rate of 10 mg/ha/hr was field tested as a control measure by male disruption. Three release rates were used to vary the number of release sites: 320 µg/hr and 160 µg/hr and 80 µg/hr. Male disruption as measured by captures in female-baited and pheromone traps was mearly 100% in the 80 µg area and 80-90% in the 160 and 320 µg areas. Codling moth injury to the apples was evaluated following first generation activity and there were no differences between the treated areas and the untreated control.

Threelined and Obliquebanded Leafrollers-Apples

H.F. Madsen and J.M. Vakenti
Agriculture Canada, Research Station
Summerland, British Columbia

Native hosts of the threelined leafroller and the obliquebanded leafroller were studied in the Okanagan Valley of B.C. Only those plants on which both actively feeding larvae and eggs were found were listed as hosts. Both species were found on a large number of native trees and shrubs including Saskatoon, chokecherry, aspen, cottonwood, wild rose, water birch, dogwood, hawthorne, alder, maple, snowberry, mountain ash and silver birch. This may account for the high numbers of males captured by sex pheromone traps in apple orchards where there is no evidence of leaf or fruit injury.

Navel Orangeworm-Walnuts, Almonds

R.A. Van Steenwyk and W.W. Barnett
Cooperative Extension, Univ. of Calif., Berkeley and
Cooperative Extension, Univ. of Calif., Fresno

The effect of trap color and bait formulation on navel orangeworm oviposition as measured by egg trap catches was studied in walnuts and almonds. In walnuts, lime green, black, yellow, blue and clear plastic standard traps were tested. Lime green increased egg deposition by ca. 20 times over the clear plastic standard while black increased egg deposition by ca. 6 times. Yellow showed little trap improvement and blue showed no trap improvement. In almonds, lime green, dark green, black, yellow, blue, and clear plastic standard traps were tested. Black improved trap catches by ca. 4 times while dark green and blue increased trap catches ca. 3 times over the clear plastic standard. Yellow and lime green showed little trap improvement. In walnuts, bait formulation studies were conducted with almond press cake and refined almond oil, almond press cake alone, refined almond oil alone, bran and empty traps. The

R.A. Van Steenwyk and W.W. Barnett
Navel Orangeworms-Walnuts, Almonds Continued

press cake and oil combination increased egg deposition by ca. 2 times over press cake alone and 6 times over bran. Few eggs were found on the oil alone or on the empty traps. In almonds, almond press cake and crude almond oil, almond press cake and refined almond oil, almond press cake alone, crude almond oil alone, refined almond oil alone, bran and empty traps were tested. The press cake and oil combinations increased egg deposition by ca. 1½-2 times over press cake alone with the combination containing crude oil out-performing that with refined oil. The bran formulation had ca. ½ the number of eggs as the press cake alone. There was little difference in the number of eggs deposited between the refined oil, crude oil and empty trap.

Peach Twig Borer - Peaches

D.O. Hathaway
Agricultural Research Service, USDA
Yakima, WA

A commercially available sex pheromone formulation for the peach twig borer was evaluated in the field to disrupt male mating. The pheromone formulation of the peach twig borer reduced catches of male twig borers in pheromone-baited traps, however, twig strikes in several pheromone treated plots were as numerous as twig strikes in the control plots.

Codling Moth - Apple

Jack Eves
AgReCon, Prosser, WA 99350

Cymbush at .08, .16, and .24; Mavrik at .025, .050, .100, and .200; Lorsban at 1.50 and 2.00; and Guthion at .5 and 1.00 lb. a.i./A was applied to 35 year old semi-abandoned apple trees with a severe moth infestation. Three covers were applied in dilute applications. Chemicals in order of effectiveness were Cybush> Guthion > Mavrik > Lorsban > check.

Cymbush caused an increase of McDaniel mites above economic control thresholds. Mavrik, Lorsban, and Guthion only slightly influenced mite populations compared to the checks.

S E C T I O N II

ORCHARD MITES

Section Leader -- Brian Croft

Pacific Spider Mite and Citrus Red Mite-Almonds

Rod R. Youngman and Martin M. Barnes
University of California, Department of Entomology
Riverside, California 92521

Continued research on water-stressed almond trees was carried out during the 1982 summer months in southern Tulare County.

Among the water-stressed trees a significantly lower leaf water potential occurred after the third week of water withdrawal. Results for 1982 indicated that a significantly higher number of phytophagous mite eggs and motile stages were present on water-stressed trees after four weeks; this is contrary to the results obtained in 1981.

Results with the Riverside dual isotope porometer showed that the most significant decrease in photosynthesis and stomatal conductance to water was due to the interaction of both mite feeding injury and water stress.

European Red Mites-Apples

Russ Gleason
Son Light Consultants; Yakima WA

Plictran was applied commerically at rates from 1#/acre (part of one block) to ¼#/acre. Without exception, when two rates of plictran were applied, the long-term control of red mites was better at the lower rate. This seemed to be directly related to impact on rust mites and predator mites. The ½#/acre of Plictran reduced predator mites by more than one-half as compared with ¼#/acre. Inital kill of red mites was slightly better with the higher rate, but longer-term control was considerably better at the lower rate. All applications were buffered; most summer treatments included calcium nitrate.

European Red Mite-Apples

N.P.D. Angerilli and D.M. Logan
Agriculture Canada, Research Station
Summerland, British Columbia V0H 1Z0

The growth regulator NC 21314 gave excellent control of European red mite when applied at any of the following stages: tight cluster, petal fall, or summer. BAY SLJ 0312 also gave good control when applied as above. Both compounds caused significantly less mortality of predaceous mites than cyhexatin when applied as a summer spray.

Spider Mites - Pome Fruits

R.W. Zwick
Mid-Columbia Experiment Station
Hood River, OR

Avermectin-oil was effective on spider mites and allowed predators and rust mites to resurge after 3 weeks. Oxamyl alone and with oil gave only 2-3 weeks partial reduction of phytophagous species, but complete elimination of Typhlodromus in commercial- and plot-type applications. In multiple seasonal commercial applications, S-3206 gave excellent suppression of spider mites on apple and pear. Payoff in a second and third cover program did not cause a mite flareup on Red Delicious apple.

McDaniel Mite - Pears

Jack Eves
AgReCon, Prosser, WA 99350

Mobay' SLJ 0312 and Plictran applied in early May for McDaniel mites failed to provide economic control. Cool weather prevailed at the time of application.

McDaniel Mite - Apple

Jack Eves
AgReCon, Prosser, WA 99350

FMC 54800 provided good control of a moderate population of McDaniel mites. European red mites increased slightly over the Plictran standard and the check.

Kelthane 4F and 35W provided good control of a moderate population of McDaniel mites. Predator mites were reduced but no flare-up of McDaniel mites occurred.

McDaniel Mite - Apple

Jack Eves
AgReCon, Prosser, WA 99350

Ambush, Ambush + Piperonyl Butoxide, and Ambush + Piperonyl Butoxide + X was applied to a high population of McDaniel mites. Ambush and Ambush + PB had no effect on mite populations but Ambush + PB +X suppressed mites through 20 days when a resurgence occurred.

McDaniel Mite - Apple

Jack Eves
AgReCon, Prosser, WA 99350

Pounce, Ammo, Advantage, and Guthion were applied in 3 covers timed for codling moth control to determine the impact on mite populations. All chemicals including Guthion at .5 and 1.00 lb. a.i./A increased McDaniel mite populations substantially compared to the checks.

S E C T I O N III

OTHER INSECT PESTS

Section Leader -- Mike Willett

Mediterranean Fruit Fly

R.E. Rice and R.T. Cunningham
Univ. of California, Parlier 93648 and
USDA-ARS, Hilo, Hawaii 96720

The attractants trimedlure and Capilure in cotton wick dispensers, and trimedlure in manufactured plastic dispensers, were compared for attraction of Mediterranean fruit flies, Ceratitis capitata (Wiedemann). Dispensers were weathered for varying periods of time from several locations in California, and were then bioassayed under field conditions in Hawaii. Standard 2.0 ml loads of weathered trimedlure in cotton wicks were generally more efficacious than other formulations or dispensers. Trimedlure in cotton wicks lasted up to four weeks under cool springtime weather conditions, but acceptable longevity was only two weeks when weathered during hotter summer conditions. Based on bioassay results, there were no significant differences in weathering rates during 1982 of trimedlure in cotton wicks from the different locations in California.

Several trap designs and colors were compared for efficacy in trapping medflies. Traps evaluated included the McPhail, Nadel, Jackson, Pherocon II, tent, and ball designs. For general detection and survey programs, the cardboard Jackson trap would be the most efficient and cost-effective, with the cardboard tent trap and a suitable alternate design if needed. For sterile medfly release and recapture projects, the Nadel and 9.0 cm ball traps were generally equal in trapping efficiency. The addition of flourescent orange or lemon-yellow colors to the traps did not provide a significant improvement in trapping efficiency, although several tests showed a trend in this direction.

Ants-Almonds

Walter J. Bentley
University of California Cooperative Extension
Kern County

The Southern Fire ant, Solenopis xyloni, McCook, and the Pavement ant, Tetramorium Caespitum, (L.), can damage almond meats. The damage first appears as scraping on the pellicle and eventually the entire meat is consumed leaving only the hollowed pellicle. This feeding occurs only after the nuts are on the ground. Some growers have estimated 10% damage due to ants. Chemical control trials show both Diazinon 14G and Lorsban 15G give good control of ant colonies as well as reducing nut damage when applied at the rate of 20 lbs. per acre. Diazinon 14G is currently registered for ants in California.

Honey bees-Apples, Pears

Danial F. Mayer
WSU, IAREC, Box 30
Prosser, WA 99350-0030

Attractants

Three materials: Gustol[R], fish oil, and fish meal were tested for pollinator attractiveness. Materials were mixed with water and applied by a tractor-drawn airblast sprayer in blooming orchards. All 3 materials were tested on 2-acre plots of pears. Fish oil was tested on a 1-acre plot of apples. Honey bees observed in one minute were counted by slowly moving around individual trees. Each data point presented in the tables is the mean number of 10 counts of honey bees per tree per minute.

Results

There were fewer bees in the fish oil plots than the other plots 1 hour post-treatment, but by 2 hours post-treatment this difference was not apparent. There were no other apparent differences in pollinator activity between pre- and post-treatment or treated and check plots.

Table 1. Results of spraying individual plots of pears at 100% bloom with 2 pounds of Gustol[R], one gallon of fish oil and 4 pounds of fish meal each in 400 gallons of water per acre.

	Mean No. of Honey Bees per Tree per Minute				
	Gustol	Fish Oil	Fish Meal	Check	Temperature
Pre-application	10.2	9.8	11.8	10.6	62°F
Post-application					
1-hour	10.5	5.7	10.1	9.6	62°F
2-hours	18.6	18.0	19.7	19.6	65°F
1 day	14.8	13.5	13.5	15.8	64°F

Table 2. Results of spraying apples at 100% bloom with one gallon of fish oil in 100 gallons of water per acre.

	Mean No. of Honey Bees per Tree per Minute		
	Treatment	Check	Temperature
Pre-application	12.0	12.2	66°F
Post-application			
1 hour	14.1	19.0	70°F
2 hours	22.6	22.2	70°F
1 day	21.6	21.0	75°F

Cherry Fruit Fly-Cherries

Donald W. Davis
Utah State University
Logan, UT

The western cherry fruit fly was first recognized in Utah during 1980. It is now generally distributed from Salt Lake County northward. Utah County, the major cherry producing county, is still apparently free of the insect. Using a 45°F threshold, Oregon's degree day data, and a weather station about 5 miles from the study area, adult catches during both 1981 and 1982 occurred about one week after the predicted date for Providence, Utah. During both years, almost no reports of infested early sweet cherries were received, but backyard sour cherries were heavily infested sometimes exceeding 90%.

Plum Curculio-Mostly Cherries

Donald W. Davis
Utah State University
Logan, UT

The only recorded infestation of the plum curculio west of the Rocky Mountains, occurs at Brigham City, Utah. During 1980 a tentative identification was made from larvae in cherries. During 1981, after considerable effort with beating sheets and sweep nets, we obtained one adult. During 1982, a rather large number of cherries plus a few in other fruit types contained curculio larvae. All were from backyard trees at Brigham City. The lack of a sensitive sampling method has made accurate evaluation and/or eradication impossible.

Pear Psylla-Pears

Peter A. Follett and Dr. Brian A. Croft
Entomology Department
OSU, Corvallis, OR 97331

Preliminary data were collected from 8 Oregon pear orchards to document insecticide resistance in pear psylla. Five insecticides - 3 formerly in use and 2 currently in use - were tested against psylla from orchards in the Hood River Valley, Medford and Corvallis areas. Relative susceptibility levels were determined using an adapted slide-dip method. Selected orchards represented a variety of management practices and surrounding environments.

Pear Psylla-Pears
Peter A. Follett and Dr. Brian A. Croft
Continued

Preliminary data indicated that azinphosmethyl and endosulfan resistance was present in both sprayed and unsprayed sites in each area. Fenvalerate resistance was present at low levels in one intensively treated orchard near Medford. Susceptible psylla to all compounds were only found in a research orchard in Corvallis.

Pear Psylla and Other Pests-Pear

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Tree Fruit Research Center
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A seasonal program using selective pesticides was not as effective as a standard program against pests of pears. Codling moth, leafrollers and twospotted spider mite were controlled by both programs. Pear psylla, San Jose scale and pear rust mite were not controlled by the selective program. Predators (Deraeocoris brevis, Anthocoris nemoralis and Campylomma verbasci survived better in the selective program, but the added biocontrol was not sufficient to prevent fruit damage by psylla, scale and rust mite. Oil and SN72129 were applied prebloom, BAY SIR 8514 and SN72129 were used in summer sprays in the selective program. The standard program consisted of oil plus Pydrin prebloom and Guthion, BAAM and Plictran in summer sprays.

In field tests avermectin B (MK936), SN72129, S3206, FCR1272 and Maverik were effective against pear psylla. MK936 also controlled two-spotted spider mite and pear rust mite.

In laboratory tests BAY SIR 8514 and SN72129 had low toxicity while MK936 was highly toxic to Anthocoris nemoralis.

An insect growth regulator, RD 13-5223, controlled pear psylla and pear rust mite in a seasonal program of one prebloom and two postbloom sprays.

San Jose Scale, Rosy Aphid-Apples

Russ Gleason
Son Light Consultants
Yakima, WA

There was a small survival of San Jose scale and Rosy aphid in some difficult to spray tree areas following pre-bloom Supracide at 1 qt./acre as a concentrate spray. In blocks where coverage was adequate, this was not observed. We will not be recommending less than 1 qt./acre in 1983.

Green Peach Aphid-Peaches

Fred L. Banham
Agriculture Canada, Research Station
Summerland, B.C. V0H 1Z0

Organochlorine-organophosphate resistant strains of green peach aphid on Early Redhaven and Fairhaven peaches were effectively controlled by one post-petal-fall spray of deltamethrin 2.5 EC at 15 g or fenvalerate 30 EC at 125 g ai/ha. Each was as effective as the previously proven but unregistered pirimicarb 50 WP g ai/ha. CGA 73102 40 EC at 50 or 100 g ai/ha gave poorer control. Post-petal-fall applications did not adversely affect phytophagous mite predators of the European red mite or peach silver mite and were not phytotoxic.

Apple Aphid-Apples

N.P.D. Angerilli, D.M. Logan and C. Jong
Agriculture Canada, Research Station
Summerland, British Columbia V0H 1Z0

Dimethoate and pirimicarb gave better control of summer populations of apple aphid than diazinon but also caused greater mortality of predaceous mites than did diazinon.

Pear Psylla-Pears

Eugene E. Nelson
Colorado State University, Grand Jct., Co.

Since the introduction of pear psylla into Western Colorado in 1975 until the present time, researchers have noted the date when they observed the onset of egg laying each year. Accurate weather records were kept during these years. Therefore, degree days were computed using a lower threshold temperature of $43^{o}F$ and summed for the period beginning January 1st until first egg. Accumulated degree days computed from twenty observations spanning six years range from a high of 90 to a low of 57. The majority of the observations fall between 70 to $80^{o}D$. The overall average is $76^{o}D$.

San Jose Scale-Apples

N.P.D. Angerilli, D.M. Logan and C. Jong
Agriculture Canada, Research Station
Summerland, British Columbia, V0H 1Z0

Tanglefoot coated-tapes were more effective for monitoring the spring-flight of San Jose scale males than pheromone baited traps. Methidathion alone and methidathion combined with dormant oil gave significantly better control of San Jose scale than oil alone when all treatments were applied at the 15 mm green stage.

San Jose Scale-Stonefruits

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Univ. of California, Parlier 93648

Collections of San Jose scale crawlers on sticky tapes were continuous at a low level throughout the winter of 1981-82. Pheromone traps were emplaced in mid-February, and first males were trapped on March 9, 1982. Male collections peaked in late March, then declined and ceased in late April. Crawler emergence began to increase rapidly in late April as a result of female mating in March.

First generation crawlers peaked on May 13, then declined rapidly through late May and June. Second generation crawlers began appearing in early July.

Chemical treatments for San Jose scale were at selected day-degrees intervals after first males were collected in traps, using SJS developmental thresholds of 51^{0} and 90^{0}F. Evaluation of treatment efficacies using sticky tape-crawler recapture methods were not satisfactory, so smooth skinned stonefruits were used for treatment evaluations. Diazinon 50W was applied to nectarines and plums at 2.0 lbs. a.i. per acre in 400 gal. water. Treatment evaluations and efficacy were based on percent infested fruit per treatment, using 500 randomly selected mature furit from each treatment.

Results of these tests showed best crawler control at 500^{0}, 600^{0}, or 700 D^{0} after first male scale collections, with the 400 D^{0} timing coming too early in the crawler emergence period to be effective.

Cherry Fruit Fly - Cherries

Jack Eves
AgReCon, Prosser, WA 99350

Pydrin applied at .1, .2, and .4 a.i./A in five applications on replicated plots provided excellent control at all but the lowest rate for cherry fruit fly.

Pydrin applied at similar rates in five applications on .5 A plots by commercial equipment provided 100% control at all rates.

San Jose Scale - Apples

Jack Eves
AgReCon, Prosser, WA pp350

Advantage EC and WP was applied to replicated plots in a dormant and two summer applications. Advantage EC provided 92-93% control, Advantage WP 87-90% control, and Supricide-Parathion 93% control. All chemicals, including the standard, caused an increase in McDaniel mite populations.

Advantage was applied to .25 A plots at 100 and 400 gal/A with commercial equipment to compare concentrate and dilute spray effectiveness. A dormant and two summer sprays were applied. Concentrate Advantage provided 94% control and dilute Supricide-Parathion 96% control. Both Advantage treatments caused an increase in mite populations compared to the standard and check.

Apple Aphid and White Apple Leafhopper - Apples

Advantage WP and EC was applied at .50 and .75 lb a.i./A in late May for leafhopper control. All rates and formulations except Advantage WP at .50 provided good control. Advantage EC provided better control than the WP.

All chemicals and controls provided similar control on apple aphids when applied in early August.

There was a slight increase in McDaniel mite populations in the Advantage WP .75 and Thiodan plots.

Pear Psylla - Pears

Jack Eves
AgReCon, Prosser, WA 99350

Ambush at .2 and .4; Mavrik at .025, .050, .100, and .200; and Noram's SN 72129 at .5 and 1.0 lb a.i./A were applied in two dormant and three summer sprays on replicated plots. All compounds and rates provided good control of psylla adults in the dormant period. SN 72129 provided slightly better control in the summer sprays.

Ammo at .025, .050, and .100 lb a.i./A was applied in three summer sprays on replicated plots. Ammo was equal to or better than the Pydrin standard and lightly less effective than the Bamm standard. Ammo had no adverse effect pm European red mite populations as compared to the check.

Pear psylla - pears

R. W. Zwick - Mid-Columbia Experiment Station, Hood River, OR

In an air carrier application a toxaphene-oil delayed dormant gave psylla control comparable to fenvalerate-oil through mid-June, in two commercial orchards, but was poorer than the latter in single-tree plots. SN 72129-oil in the delayed dormant was the most effective against psylla adults and nymphs for 10 weeks posttreatment. The synergist pipernoyl butoxide improved cover sprays of fenvalerate but had little effect when combined with permethrin. One cover of amitraz gave better psylla control than three covers of S-3206 in commercial applications. Overwintering beneficial species were low and a full rate of fenvalerate in the delayed dormant and two azinphosmethyl covers further reduced their numbers in an orchard which usually exhibits good biological suppression of psylla in mid- to late summer.

San Jose scale - apples

R. W. Zwick - Mid-Columbia Experiment Station, Hood River, OR

In single-tree plots, Dormantol (Canadian refined oil), chlorphyrifos-oil, and Penncap M-oil all gave complete control of overwintering scale in the delayed dormant. Methidathion at a lower rate plus oil or Penetrator oil was more effective than methidathion alone.

S E C T I O N IV

PESTICIDE SPRAYING, RESIDUES, PHYTOTOXICITY, AND PESTICIDE DEVELOPMENT

Section Leader -- Sid Sakamoto

Pesticide Spraying, Residues, Phytotoxicity, and Pesticide Development
Petroleum Oil Toxicity - Pome Fruits

R.W. Zwick

Mid-Columbia Experiment Station
Hood River, OR

Oil following toxaphene by two weeks marked d'Anjou pear fruit as a cover spray. A July cover concentrate spray containing phosalone-hexakis-90 vis. oil at 316-1 lb-0.5 gal/A respectively, seriously marked Newton apple fruit but not Golden Delicious.

Fruit Thinning of Apples

Carl Johansen

Washington State University
Pullman, WA

Sevin XLR is tough on bees when it is either sprayed directly on them or they get into it before it is dry. There was consistently greater kill of bees by Sevin WP than by Sevin XLR used as a fruit thinner. However, spray dilutants were at least 8x too high for best results in safety of bees. Fruit thinning of Red Delicious with Sevin XLR was comparable with Sevin WP.

Phtotoxicity - Apples and Pears

Jack Eves
AgReCon, Prosser, WA 99350

A dilute application (400 gal) of Kelthane 4F at 4.0 and 8.0; Kelthane W at 4.0 and a concentrate application (100 gal) of Kelthane 4F at 4.0 and 8.0; Kelthane 35W at 8.0 lb a.i./A was applied to replicated plots of golden delicious apples and D'Anjou pears. No apparent phytotoxicty occurred at any rate, formulation, or gallonage.

S E C T I O N V

DECIDUOUS ORCHARD DISEASES

Section Leader -- Rick Bostock

Brown Rot Blossom Blight-Cherry (Black Republican)

Iain C. MacSwan
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OSU, Corvallis, OR

Sprays were applied at popcorn, full-bloom and petal fall with the exception of HOE which did not receive the popcorn spray. Treatments (rate per 100 gallons of water): Bravo 500 1.5, 2 and 4 pints, Baycor 50 WP 3 and 4.5 oz. plus Agridex 1 pint, HOE 703 50 WP .75 and 1 lb and Ronilan 50 WP . 375 and .5 lb. Excellent control was provided by both rates of Ronilan 50 WP and of Baycor 50 WP. Good control was provided by Bravo 500 and HOE 703 50 WP.

Brown Rot Blossom Blight-Peach (Improved Early Elberta)

Iain C. MacSwan
Extension Plant Pathology, Cordley 1089
OSU, Corvallis, OR

Sprays were applied at popcorn, full bloom and petal fall. Treatments (rate per 100 gallons of water): Bravo 500 1½ and 3 pints, Baycor 50 WP 3 oz and 4.5 oz plus Agridex 1 pint, Bayleton 50 WP 3.0 oz and 4.5 oz and Ronilan 50 WP .375 lb and .5 lb. Excellent control was provided by both rates of Baycor 50 WP and of Ronilan 50 WP. Good control was provided by both rates of Bayleton 50 WP and all rates of Bravo 500.

Scab-Apple (Red Delicious)

Iain C. MacSwan
Extension Plant Pathology, Cordley 1089
OSU, Corvallis, OR

Vanguard 10 WG when applied at 5 oz alone or at 5 oz and 12 oz in varying spraying sequences with Cyprex 65 WP 12 oz/100 gals. provided control of scab equal to or better than that of Cyprex 65 WP alone.

Powdery Mildew - Apples

Jack Eves
AgReCon, Prosser, WA 99350

Bayleton at .75 oz. a.i./100 applied in green-tip, pink, and petal fall sprays to a six acre block of golden delicious apples provided 7% less russetting and 1.1 tons per acre more fruit than the checks. Considerably less yield increase than past years on the same block.

Bayleton at 1.0 oz. a.i./100 applied in green-tip, pink, and petal fall sprays to a four acre block of Granny Smith apples provided 22% less russetting and 2.1 tons per acre more fruit than the checks.

Scab and Mildew-Apple (Rome)

Iain C. MacSwan
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OSU, Corvallis, OR

All sprays with the exception of Bravo 500 were applied at prepink, pink, calyx, first and second covers. Bravo 500 sprays were applied at ½, 1 and 2 gal./100 gals. followed by Cyprex 65 WP 8 oz. plus Karathane 25 WD 12 oz. at petal fall, calyx, first and second covers with the exception of one Bravo 500 ½ gal. treatment that was followed by Cyprex 65 WP 8 oz. plus Karathane 25 WD 12 oz./100 gals. starting at the pink stage.

All of the treatments except Bravo 500 1 and 2 gal./100 applied at green tip followed by Cyprex 65 WP 8 oz. (plus Karathane 25 WD 12 oz./100) starting at the calyx stage provided scab control equal to the standard-Cyprex 65 WP 12 oz. (plus Karathane 25 WD 12 oz./100) applied at prepink, pink, calyx, first and second covers. Best control was provided by Ro 15-1297 500 EC 40 ml./100.

Treatments providing good control of scab (rates/100 gal.) Ro 15-1297 500 EC at 20 and 40 mls., Bravo 500 ½ gal. applied at green tip followed by Cyprex 65 WP 8 oz. plus Karathane 25 WD 12 oz./100 at pink, calyx, first and second cover, Funginex 18.2 EC 10 oz., Baycor 50 WP 2 oz. plus Bayleton 50 WP .5 oz., Bayleton 50 WP 4 oz. and Bravo 500 ½ gal. applied at green tip followed by Cyprex 65 WP 8 oz. plus Karathane 25 WD applied at calyx, first and second covers.

Mildew: Treatments providing mildew control equal to or better than the standard Karathane 25 WD 12 oz. (plus Cyprex 65 WP 12 oz.) were Ro 15-1297 500 EC 20 ml. and 40 ml., Funginex 18.2 EC 10 Fl. oz., Bayleton 50 WP 2 oz., and Baycor 50 WP 2 oz. plus Bayleton 50 WP .5 oz.

Brown Rot Blossom Blight/Fruit Rot-Cherry (Royal Anne Corum)

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Sprays were applied by Bean airblast sprayer (400 gals./A.) to three-row plots of mixed Royal Anne and Corum sweet cherry at popcorn and full bloom. Each row contained eight mature trees. Disease assessment was made on one row of each block. Treatments (rate per acre) - Baycor 50 WP 8 oz plus superior-type oil 1 pt at popcorn followed at full bloom by Cyprex 65 WP 1 lb plus 1 pint superior-type oil, Baycor 50 WP 12 oz plus superior-type oil 1 pint, Captan 50 WP 4 lb plus superior-type oil 1 pint followed at full bloom by Cyprex 65 WP 1 lb plus superior-type oil 1 pint.

All treatments on both Royal Anne and Corum blocks provided good control of brown rot blossom blight, but best control of blossom blight and fruit rot (Anne's only) was provided by spray of Baycor 50 WP 12 oz plus oil at popcorn followed by Cyprex 65 WP 1 lb plus oil at full bloom.

Scab-Pear (Anjou)

Iain C. MacSwan
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Sprays were applied at prepink, pink, calyx, first and second covers with the exception of the Ro 15-1297 trees which were sprayed at prepink with Cyprex 65 WD 12 oz then four days later received the first spray of Ro 15-1297.

Treatments-Vangard 10 W 2.5 and 3.5 oz, Baycor 50 WP 2 oz and 4 oz, Ro 15-1297 20 and 40 ml and Cyprex 65 WP 12 oz. None of the treatments provided control equal to that of the standard-Cyprex 65 WP 12 oz/100.

Triforine for Postharvest Decay Control of Stone Fruits

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The detection of benomyl-resistant Monilinia fructicola in California in 1977 and the continued widespread occurrence throughout the State have required the use of alternative chemical treatments for both pre- and postharvest. Triforine (Funginex 50W) was incorporated with the current postharvest treatment of benomyl plus DCNA (Botran 75W) in wax treatment on fresh market peaches, plums, and nectarines. This treatment used in commercial applicators, namely Decco-Tiltbelt, Food Machinery and Durand-Wayland, provided excellent control of both benomyl-resistant benomyl-sensitive M. fructicola (Table 1). A bioassay method was used to evaluate decay control. Triforine is effective against M. fructicola but not against Botrytis cinerea. The baseline sensitivity of M. fructicola to triforine was established and spot assessment of field populations has not detected triforine-resistant lines.

Table 1. Efficacy of postharvest fungicide treatment on nectarine fruit on control of benomyl-resistant Monilinia

	Percent decay from brown rot[a]	
Treatment	Inoculated[b]	Noninoculated
DCNA, benomyl and triforine	13	5
DCNA and benomyl	95	4
Nontreated	67	34

[a]Average of fruit samples collected from eight packing sheds.

[b]Inoculated with benomyl-resistant M. fructicola.

Control of Brown Rot in a Peach Orchard with Benomyl-Resistant *Monilinia fructicola*

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An experimental trial was conducted to control benomyl-resistant *Monilinia fructicola* in a Loadel cling peach orchard that experienced crop losses in 1980 and 1981. Each treatment plot was 1 to 2 acres in size except the 3-nonsprayed check plots. Each check plot consisted of 16 to 20 trees and was located within the treatment rows. Two blossom and one preharvest sprays were applied dilute (400 gal/acre) with a Best PTO airblast sprayer. The blossom sprays were applied at pink bud (3/6/82). Four hundred blossoms on each of 14 trees for each treatment were evaluated for brown rot on 4/12/82. A single fruit spray was applied about two weeks before harvest on 7/1/82. Brown-rotted fruit on the ground and in the trees were counted at harvest (7/17/82). Also 50 fruit from each of 4 trees per treatment were picked, incubated at 20 C, RH 85% and evaluated for brown rot development. Disease control data are summarized in Table 1.

Table 1. Evaluation of fungicides for control of brown rot (*Monilinia fructicola*) of Loadel peach - 1982

Treatment[a]	Conc/acre	% Blossom blight[b]	Average number of brown rot fruit on tree and ground[c]	% Fruit brown rot[d]
Vangard 10W	1 lb	0 x[e]	0.4 x	--
Funginex 18% E.C.	36 fl oz	0 x	0.1 x	3.5 x
Ronilan 50W	1 1/2 lb	0.02 x	0.6 x	21.5 y
Funginex 18% E.C.	48 fl oz	0.02 x	--	--
Rovral 50W	1 1/2 lb	0.04 x	0.1 x	--
Benlate 50W + Captan 50W	1 1/2 lb 8 lb	7.2 y	1.8 x	71.5 z
Check	--	6.2 y	7.6 y	83.0 z

[a]Two blossom applications (3/6 and 3/13/82) and one preharvest (7/1/82) with airblast sprayer. Treatment plots were approximately 1 to 2 acres in size except for the check. Exception: Vangard and Rovral were not sprayed preharvest.

[b]Percent blossom blight based on 400 blossoms/tree, 14 trees/treatment.

[c]Average based on 8 trees/treatment. Disease evaluation on day of harvest, 7/17/82.

[d]Percent rot after incubation of fruit for 4 days at 20C, RH 85%. Fifty fruit replicated 4 times.

[e]Numbers in vertical column followed by the same letter are not significantly different, P = 0.05.

Status of Benomyl-Resistant *Monilinia fructicola* on Peach and Nectarine in California

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A baseline sensitivity of 0.1 µg/ml benomyl was established for *Monilinia fructicola* and *M. laxa* in 1967. Since the registration of benomyl in 1972, peach and nectarine orchards in California have been monitored to detect benomyl resistance. With the detection of benomyl-resistant *M. fructicola* in California peach orchards in 1977, a more intensive monitoring program was started. Unlike the high degree of resistance (20-400 µg/ml) reported from other countries and from other areas of the United States, the degree of resistance (0.5 to 2 µg/ml) was low in California. Benomyl resistance is now widespread and some crop loss has occurred. Degree of resistance (5 µg/ml) and populations have increased but widespread crop losses have not been reported in California. Triforine has been used widely, since its registration in 1980, by growers who experienced less than satisfactory control with benomyl in combination with protectant, nonsystemic fungicides such as captan and sulfur.

Suppression of Sporodochia in *Monilinia laxa* Blighted Apricot Twigs with Thiophanate methyl Plus Oil

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Brown rot caused by *Monilinia laxa* is the principal disease of apricot blossom and fruit. The primary source of inoculum for blossom infection is the sporodochia produced in blighted twigs. An eradicant fungicide, sodium pentachlorophenate (SPCP), applied during the dormant period suppresses sporodochial development. SPCP applied after sporodochia emergence kills surface layer conidia and subsequent conidia that emerge are less viable. Because SPCP is no longer available to California growers, an alternative chemical that can effectively prevent sporodochial development is needed. Ramsdell and Manji (1969) found that a benzimidazole fungicide plus oil suppressed sporodochial development in Drake almond twigs. In 1974, a preliminary study showed that thiophanate methyl (Topsin M) plus oil suppressed sporodochia in apricot twigs. Additional trials conducted in 1980 and 1982 confirmed our earlier results. Data from the 1982 trial are summarized in Table 1 and 2.

Table 1. Efficacy of thiophanate methyl in suppressing Monilinia laxa sporodochia in Blenheim apricot twigs - 1982

Treatment[a]	Conc/acre	% Twigs with Sporodochia[b]	Total Number of Sporodochia
thiophanate methyl + Niagara 415 oil	1 1/2 lb. 2 pt.	27 x[c]	72 x
Check	-	82 y	360 y

[a]Fungicide applied at dormant.

[b]Percentage based on 45-9" twigs.

[c]Numbers in vertical column followed by the same letter are not significantly different, P = 0.05.

Table 2. Timing of thiophanate methyl on incidence of blossom brown rot (Monilinia laxa) of Blenheim apricot

Treatment[a]	Application Timing[b]	Average Number Shoot Strikes/Tree
thiophanate methyl	D, RB	16 x
	D, ERB, RB	18 x
	D, FB	21 x
	D, RB, FB	24 x
	D	85 y
Check	---	128 z

[a]Topsin M 70W 1 1/2 lb/acre.

[b]D = dormant; Niagara 415 oil, 2 pt/acre used with Topsin M 70W at dormant.

ERB = Early Red Bud
RB = Red Bud
FB = Full Bloom

Activation of Host Wound Resistance Mechanisms for Control of Ceratocystis Canker of Almond

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Many plants that are susceptible to diseases have very effective resistance mechanisms to these diseases if only given the opportunity to express this resistance. There are numerous reports in the phytopathological literature of induced resistance whereby plants can become systemically protected from disease by prior incoulation with nonpathogenic agents or even the pathogen itself. Some evidence suggests that the physiological basis for the induced resistance is the activation by the inducing agent of normal processes involved in wound healing, such as enhanced deposition of lignin.

Ceratocystis canker of almond, caused by the fungal pathogen Ceratocystis fimbriata, is an important disease for orchardists in California. The fungus is vectored by dried fruit beetles and other insects which are attracted to bark injuries created during harvesting operations. Wounds become resistant to infection 8 to 10 days after injury, although the nature of this resistance is unknown. This disease seems to be one that is amenable to studies on biological control or control based on enhanced wound-healing processes. The cankers only arise from mechanical injuries which are easily identified. A prophylactic control measure would only have to be effective for the 8 to 10 day period of wound susceptibility. Some of these ideas and our related research will be discussed.

Powdery Mildew and Scab - Apple

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Mid-Columbia Experiment Station
Hood River, OR

Treatments were applied to randomized single-tree plots (3 replications) of mature 'Golden Delicious' and 'Rome Beauty' on M7 rootstock. Trees were sprayed to runoff at 300 psi with a handgun. Approximately 3.5 gallons of spray were applied to each tree. Spray dates and growth stages were: April 6 (half-inch green), 22 (prepink); May 19 (petal fall), and June 8 (cover spray). Bravo 500F was applied only on March 22 (green tip). Leaf scab and mildew counts were made on all leaves of 10 shoots per tree and fruit scab counts on 50 fruits per tree on July 1. Nine primary scab infection periods were recorded during March, April, May, and June. Golden Delicious were harvested September 24 and Rome Beuaty on October 18.

Under the moderate scab and mildew pressure in this test, Uniroyal A815 (3.3 oz/100 gal), EL-222 (2.8 oz/100 gal), Vangard (2.5 oz/100 gal), and Bravo 4 qt/100 gal) gave effective control of leaf and fruit scab. However, none were significantly more effective than the Cyprex standard (12 oz/100 gal). Powdery mildew control on Rome with Uniroyal A815, EL-222, and Vangard was significantly better than the Karathane standard (5 oz/100 gal). No phytotoxicity was observed with any fungicides.

Scab Mildew - Apple (Rome)

Iain C. MacSwan
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OSU, Corvallis, OR

Five treatments were applied at prepink, pink, calyx, first and second covers. Scab: treatments that provided scab control equal or better than the standard Cyprex 65 WP 12 oz (plus Karathane 25 WD 12 oz) were: A815 30 2 oz and 6 oz and Benlate 50 WP 4 oz. Bayleton 50 WP 2 oz provided poor control. Mildew: All treatments provided mildew control equal to or better than the standard - Karathane 25 WD 12 oz (plus Cyprex 65 WP 12 oz).

Sprinkler Rot - Pear

R.A. Spotts and J. Laraway
Mid-Columbia Experiment Station
Hood River, OR

A study was done to determine the sensitivity of d'Anjou and Bartlett pear fruit to copper, the effectiveness of fungicides for control of sprinkler rot, and the sensitivity of P. cactorum zoospores to copper. Copper sulfate (0.1 to 100 ppm) was applied to pears in August, 1982, fruits were kept wet for 24 hours, and injury evaluated about 2 weeks later. Copper at 100 ppm caused severe lentical burn and slight injury at 10 ppm. At 1.0 ppm no injury was observed. Kocide (5 ppm copper) controlled sprinkler rot when applied 1 day before inoculation, but not 7 days before or 1 day after inoculation. Ridomil 2 EC (0.5 lb a.i./100 gal) controlled sprinkler rot when applied 7 days before or 1 day after inoculation. Zoospores germinated in 0.1 ppm copper, with a large decrease in 1.0 ppm copper. No significant germination occurred in 10 ppm copper solution.

S E C T I O N VI

Topics Not Covered Under One of the Above

Section Leader -- Hal Moffitt

Residues of Vendex and Two Metabolites on Red Raspberries

Rod Inman
Department of Ag. Chemistry
Oregon State University

Vendex residues on raspberries from plots established at two locations in the Willamette Valley have been determined. Application of Vendex 50WP was made at the equivalent rates of 1 and 2 lbs. a.i./ac with a 100 GPA mist blower. Application was timed so that normal harvest would occur between 14 and 21 days after treatment. Samples were collected at 7, 14 and 21 days after treatment.

Residues range from 1 p.p.m at the 1 x rate and 21 days to 19 p.p.m. at the 2 x rate and 7 days for Vendex and up to 0.3 p.p.m. for the distanoxane hydroxide metabolite and to 0.15 p.p.m. for the stannoic acid metabolite at the 2 x rate and 7 days.

Recoveries from fortified checks were 85%, 98% and 97% for Vendex the distanoxane hydroxide metabolite and the stannoic acid metabolite respectively.

Pesticide Use Estimation Through IPM Monitoring Systems

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Unfortunately, it is most difficult to obtain information about pesticides, their use, effectiveness and integration with other tactics, without conducting expensive special purpose pesticide assessment surveys. As fruit IPM matures, the necessity of understanding pesticide use within a growing region and across years becomes important to develop comparatice economic assessments of IPM versus other tactics, to facilitate EPA's mandated reregistration of pesticides and as a feedback mechanism to optimize IPM strategies and tactics.

This paper presents a new approach to pesticide use estimation and quantification. The methodology uses abiotic (weather) and biotic (pest pressures) as driving variables to simulate and compare pesticide use across Michigan's apple industry under 3 different spray regimes: 1) modified calendar, 2) IPM and 3) a minimum-spray program.

Diapause Development in Rhagoletis pomonella and R. zephyria

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Diapause development in the apple maggot, Rhagoletis pomonella and the Snowberry maggot, R. zephyria is controlled by the chilling temperatures. The diapause development in apple maggot was relatively poor at 27° and 54°F. Moderate diapause development was noticed at 32, 43 and 48°F exposures. The diapause development rate was optimum at 37°F. Diapause development in Snowberry maggot was optimum at 43 and 48°F and moderate at 54, 37 and 32°F, and slightly inferior at 27°C. There appears to be more flexibility in the chilling requirements of the Snowberry maggots than the apple maggots. A substantial number of pupae from both species go through more than one year in the diapausing stage.

A Comparison of Obliquebanded and Orange Tortrix Pheromone Caps for Monitoring OBLR in Filberts

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A field comparison of OBLR and Orange Tortrix sex pheromone caps for monitoring OBLR adults in filbert orchards was made during 1982 season. The OBLR pheromone caps attracted significantly more OBLR adult than the Orange Tortrix pheromone caps, although a substantial degree of cross attraction was noticed.

Predicting the Emergence of Filbertworm Using a Thermal Summation Model

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The emergence of the filbertworm, Melissopus latiferreanus can be predicted by a simple thermal unit (degree days) accumulation model. Starting April 1, approximately 342 thermal units were required for the emergence of 1st adults. A base developmental threshold of 10.6°C was estimated by regression analysis ($\bar{X}$ intercept) method, and was used in TV estimation. Peak emergence was noticed at about 665 TV. This method seems to be much more effective in predicting the emergence of filbertworm than the calendar dates.

Monitoring the Obliquebanded Leafroller-Apples and Filberts

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Oregon State University

The obliquebanded leafroller was monitored in apple and filbert orchards using a commercially available sex pheromone traps. These traps were effective in monitoring this insect for over 6 weeks and no loss of attractiveness was noticed. It seems that Oregon population of OBLR is still attracted by these traps.

Filbert (Hazelnut)
Eastern Filbert Blight; *Anisogramma anomala*

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Attempts to reduce infection have been primarily directed at orchard sanitation and chemical control. Earlier research showed a substantial reduction of new infections resulting from application of Kocide or Bordeaux. Thiodan appeared to have less effect, but the control was in addition to the fungicides. The 1981 and 1982 data substantiates the earlier results, and shows encouraging results from applications of Baycor 50WP (Table 1). Thiodan applications are not giving as good control, but since Thiodan reduces the number of mite infected buds, it is not likely to show a direct control response. The best control is obtained by a combination of canker removal and applications of both fungicides and insecticides.

Table 1. Average Number of New Cankers

	Month of Sprays	1980	1981	1982
Pruned, Thiodan+Bordeaux		4.6a	3.2a	1.1a
Bordeaux 12-12-100	10,2,4	4.9a	5.3a	3.3a
Baycor 50WP (8 oz. actual/100)	10,2,4,5	5.9a	10.0ab	6.4ab
Bayleton 50WP (2 oz. actual/100)	10,2,4,5	10.0a	10.0ab	9.6ab
Thiodan 50WP (1 lb/100)	3,4,5	15.8a	12.7ab	13.0ab
Unsprayed Check		47.1b	19.4*b	13.7ab

*Unsprayed check = number of cankers was reduced because there was not enough healthy wood left to acquire new cankers.

[a] Twenty replicates per treatment

[b] Fourteen replicates per treatment

Filbert IPM

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In 1982 the OSU Extension Service initiated a filbert pest management program, monitoring 261 acres for 14 growers. The filbert aphid, Myzocallis coryli, the filbert leafroller, Archips rosanus, and filbertworm, Melissopus latiferreanus, are the targets of most pesticide applications in filberts. Weekly and bi-weekly sampling involving direct observations and pheromone trapping of these pests allowed most participating growers to reduce insecticide usage compared to 1981 (and their 1982 plans). No reduction in quality resulted from this decreased usage.

Codling Moth Control Using Granuloris Virus

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Corvallis, Oregon

Two rates of codling moth granulosis virus was tested in a Red Delicious apple orchard. Substantial reduction of codling moth infestation was noticed in virus treated plots. The obliquebanded leafroller damage was also significantly lower in virus treated plots than the controls.

Meadow voles-Cherries

Mr. John Thienes and Dr. Kurt Volker
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The Dalles, OR 97058
and ICI Americas, 6506 North Ridge
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Comparative Control of Meadow Voles in a Cherry Orchard Using Volid Broadcast, Volid Hand-Placed and Ramik Brown Broadcast.

In 1981, a cherry orchard in The Dalles, OR, was selected for rodenticide evaluation. The orchard had a sod covercrop, a uniform stand of trees and evidence of a moderate to heavy meadow vole population. Two replicates of four treatments were randomized in plots of 60 trees or approximately one acre. Twenty-four sites on the interior 12 trees of each plot were monitored by census methods before and after treatment. Treatments consisted of an untreated check, RAMIK BROWN 50 ppm nuggets 10 lb/A broadcast, VOLID 3/32-inch pellets 10-lb/A broadcast, and VOLID 3/32 inch pellets hand-placed at 8 lb/A and 9 lb/A.

Meadow voles-Cherries
John Thienes and Kurt Volker
Continued

Based on apple feeding census data before and after treatment, the hand-placed VOLID gave 100% control. Neither broadcast treatment produced satisfactory control. The boradcast VOLID provided ca. 40% reduction in vole activity. RAMIK gave 2-9% reduction in activity.

Following the last posttreatment census, a second broadcast treatment of VOLID and RAMIK, both at 10 lb/A, was applied. VOLID gave approximately 77% control and RAMIK gave 50% control based on reduction in vole feeding activity.

Pollination of Apples

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Most, if not all, previous work on crabapple pollinizers has been conducted by horticulturists. As entomologist, we were able to contribute on of the most important items in our cooperative program last spring. Honey bees flew almost up to certain red- or pink-flowered varities (Pioneer Scarlett, Simpson 11-58, and Adams) and then turned away, usually flying back to the white-flowered apple they had previously visited. This is quite certainly due to an unattractive odor or lack of odor. Bees home in on flowers from a distance by color, but react to odor when they get close. We feel this is an important aspect for next season's research, but will assume all pink or red varities at least "suspect" on this factor until proven otherwise. Actually, investigators in Ohio have already suggested Indian Magic and, in New York, Pioneer Scarlett and Rosedale as potentially good pollinizers. Maybe our continuing work with bees will change their minds.

Twelve crabapples were selected for propagation and further evaluation on basis of growth habit and flowering time. None were rejected on the basis of pollen germination or fruit setting as a result of hand pollinations. The 12 selected will be more critically evaluated for fruit setting ability when diluted pollen is used in hand pollination.

White-blooming varieties in our first season's work which appear to be most promising are Manchurian and Chestnut (early) and Snodrift, Golden Hornet and Donald Wyman (late).

Western Orchard Pest and Disease Management Conference

Chairman - Will Crites
Chairman Elect - Jack Eves
Sec/Treasurer - Gary Fields

MINUTES OF THE 57th ANNUAL MEETING
IMPERIAL HOTEL, PORTLAND, OREGON, JANUARY 12, 13, 1983

The 57th Annual Meeting was called to order at 9:08 a.m., January 12, 1983 by Chairman Will Crites.

Introductions were made around the room with 75 people in attendance at the opening meeting. There were no announcements. The minutes were approved as mailed.

Chairman Will Crites read the lists of committee assignments as follows:

NOMINATIONS:	Hugh Homan	RESOLUTIONS:	Bill Barnett
	Everett Burts		Dan Mayer
	Russ Gleason		Gene Nelson
AUDITING:	Kirk Volker	TURKEY AWARD:	Everett Burts
	Dave Burkhart		Pete Westigard
	Gary Fields		Glenn Fisher

The meeting schedule was announced. The business meeting was adjourned at 9:20 a.m.

The business meeting reconvened at 3:35 p.m., Thursday, January 14, 1983. Joe Capizzi announced that Stauffer Chemical Company offered to host a breakfast for all attendees. The offer was discussed by those in attendance and declined with appreciation to Stauffer.

The Treasurer's report was read showing a beginning balance of $171.24 with $119.21 in expenditures--the biggest item being postage of over $80.00. Receipts from 1983 registration was $108.00, one dollar more than in 1982. The balance stands at $160.03. The report was accepted without change.

Resolutions committee chairman Bill Barnett read the proposed resolutions as follows:

Be It Resolved That:

1. We express our sincere appreciation to the management and staff of the Imperial Hotel for the excellent accommodations and courteous service during the 57th Annual Meeting of the WOPDMC.

2. We express our appreciation to Chairman Will Crites, Secretary/Treasurer Gary Fields, and all the section chairmen for their effective service in organizing and conducting this conference in a successful manner.

3. We extend our thanks to Joe Capizzi and Glenn Fisher for making arrangements for publication of the abstracts.

4. We express our thanks to Glenn Fisher and Jim Calkin for providing and operating the visual aids equipment which is so important to the success of this conference.

5. We extend a special thanks to Jack Dibble for having slides this year that could be read by those in attendance.

With only one cry of dissent on Resolution #5, the resolutions were passed.

Nominations committee chairman, Hugh Homan, read the list of proposed officers as follows:

Chairman - Jack Eves
Chairman Elect - Ron Covey
Secretary/Treasurer - Gary Fields

The nominees were railroaded as usual!

The Turkey Award was not presented by committee chairman Everett Burts, who claimed this was his fifth term as chairman--the last recipient being the next chairman. Everett reported that the committee met and disqualified Glenn Fisher as not eligible to sit on the committee having never received the award. So Everett and Pete reached an unanimous decision not to present the award (although they discussed several deserving candidates). Instead they drove (according to Everett) to Crown Point, east of Portland, and released said turkey into an east wind. Pete was quoted as saying, "I hope he finds a nice turkey home."

Will Crites turned the meeting over to Jack Eves who announced the 1984 meeting dates as January 11, 12, and 13.

The meeting was adjourned at 3:55 p.m.

Respectfully submitted,

Gary J. Fields
Secretary/Treasurer

kj

PLEASE NOTE: If you have not attended the 3 previous meetings or if your mailings are returned as unforwardable, you will be dropped from the current mailing/membership list. Registration at any future meeting will reinstate your name on the list.