

# The Bee Line

## NEWSLETTER OF WESTERN CASCADE FRUIT SOCIETY A NON-PROFIT EDUCATIONAL ORGANIZATION

SPRING 1997

Apples Pears Figs Grapes Kiwi Cherries Nectarines Peaches Nuts Blackberries Raspberries Strawberry Blueberries Currents Huckleberries Gooseberries Nuts

### THE 1997 ANNUAL SPRING MEETING ROOTSTOCK SCION WOOD AND FRUITING PLANT SALE

**IMPORTANT THINGS FIRST:** Orel Vallen extends his gratitude to all of you who gave so freely of your time. He says, "Thank you to those who helped with the spring meeting and sale at Puyallup February 28 and March 1, 1997. We had approximately 40 willing and able workers. Again, thank you all."

**SPECIAL THANKS TO:** Chuck Holland for so ably filling in for President Joe Zeppa; Orel Vallen for coordinating all the site (church) details and small fruit sales; Bill Davis and Gerry Fardal for handling the scion wood sales; Doris Leavens, Eveline Takahashi, and two unknown gentlemen (we wish we knew your names) in small fruit sales; Steve Jackson for rootstock pre sales and day of sale; Monte Hendrickson grafting demonstrations; Hildegard Hendrickson and Doris Hoggatt for membership table and book sales; Phil Swanberg and John Davey at the education table; Marlene Falkenbury and Marian Jensen at refreshment table; David Snell at registration table; Ed Jones Master Gardner Booth Coordination; Dick and Marilyn Tilbury signs and education displays; Gary Moulton, Orel Vallen, TK Panni and Mary Robson speakers; Vagn Jensen, Doris Leavens, Eveline Takahashi, Paul and Reda Vander Hoek, Dick and Marilyn Tilbury set up and take down.

And I extend special gratitude and thanks to Marilyn and Dick Tilbury, who stepped in and did what needed to be done while I was ill. These two have given so much for so long, I do not know what I would do without them. Not only did they do what they had agreed to do, they did everything that I was to do, and so very well.

Did someone pick up the Fardal's copy of The Fruit, Berry and Nut Inventory by mistake? Her name is on the front and back. Please check it out and give her a call at 206-232-1936. Gerry was in the scion wood area at the time she noticed it missing.

### DATES TO REMEMBER

- April 8 7:00 p.m. Apple Growing in Alaska. Talk by Dwight Bradley at Alaska Cooperative Extension Service, corner of Northern Lights & Lake Otis
- APRIL 10 **GOOD FRUIT GROWER GROUP SUBSCRIPTIONS DUE - NEW OR RENEWAL  
SEE PAGE 8 FOR SUBSCRIPTION INFORMATION**
- June 15 Deadline for articles/chapter information for Summer newsletter
- June 21 10:00 a.m. Board meeting Swasey Library 7001 6th Ave. Tacoma

**1997 ANNUAL SPRING MEETING  
(CONTINUED)**

**Notes on the general meeting:** President, Joe Zeppa was in Hawaii (you were missed, Joe, and we know you were wishing that you were at the meeting instead of in sunny Hawaii), secretary Chuck Holland chaired the meeting. Chuck gave a quick summary of the current status of WCFS: we are in good shape financially. Four directors were elected to the board: Sally Musseter was reelected and new members Harry Kirschner, Lyle McKnight and Ben Van Deren.

Marlene Falkenbury was nominated for life membership by Dick Tilbury, with these remarks: "Marlene is a longtime member of WCFS, having joined in January 1985 when she became a charter member of the Seattle Tree Fruit Society (STFS) chapter. In fact the founding meeting for this chapter, called by Emory Leland who became the first president of STFS, was held at her home. She was elected president of the chapter in September 1989 and has held that office since. She has done an admirable job in this capacity and the membership in STFS has grown from approximately 90 to over 200 during her tenure.

As a WCFS chapter president, she also serves on the WCFS Board of Directors. In that capacity she has been responsible for coordinating WCFS's participation in the annual Northwest Flower and Garden Show and has been the lead person coordinating the raffle (cider press) at the Fall Fruit Show, and for food service at the Fall Fruit Show and Annual Spring Meeting. Her participation at WCFS board meetings has greatly contributed to the successful business operation of WCFS.

Marlene is truly deserving of the honor of Life Membership considering her dedication to WCFS and the STFS chapter and her outstanding services in promoting the goals of the Society."

Marlene was unanimously approved for the Life Membership, with much appreciation for all she has done.

**Scion wood:** Bill Davis, chair of scion wood sales reports that the number of scion wood available was about half of last year. There were about 100 to 125 varieties of apple, pear, plum, peach and filbert scions. Some scion wood contributors took a lot of pains preparing the wood by dipping the ends and labeling each one.

**Rootstock:** Presales were good-have no information regarding any rootstock that may not have been sold.

**Membership:** Seven new members-WELCOME to all of you.

**Education:** Educational material-bulletins- were good. There is one Fruit, Berry and Nut Inventory and six Book of Apples left. If you are interested, contact the Treasurer.

**Lectures:** Many thanks to WCFS members Orel Vallen and T.K. Panni for sharing their expertise. And to Mary Robson and Gary Moulton for taking time from their busy schedules to speak at our meeting.

**Preliminary Financial Report**

These figures include sales at Mt. Vernon on March 8 and plant material North Olympic Fruit Club sold at their meeting. Book sales are not included as they are group purchases and are at our cost.

Income	
Door Contributions	\$ 91.62
Coffee Contributions (net)	66.24
Bulletins	75.42
Scion wood	329.25
Rootstock/plants	<u>3777.67</u>
	4340.20

Expenses	
Bulletins (printing)	58.92
Rootstock/plants	2709.41
Building rent	385.00
Advertising (flyer printing)	27.23
Honoraria	50.00
Misc. expenses	<u>92.73</u>
	3223.29

Profit \$1016.91

There will be some additional sales and expenses to report in the final analysis.

**Notes on the Board Meeting:** The president's report was discussion on the day's event; there was more socializing, less frenzied sales due to less planting material being brought to sell. The trees were supplied by WCFS members, who gave 10% of their sales to WCFS and took care of those sales. This was good for sales and is something that chapters may wish to participate in. Bill Havens, a Tahoma member, suggested that part of the funds could go to the chapter and the rest to WCFS.

Suggestions for future: list in The Bee Line what scion wood is of interest, perhaps a survey of membership to determine this; more flyers to county extensions and and master gardeners, and sent out earlier, also include garden clubs.

General consensus was that the poor weather may have been a factor in the poor attendance.

Orel Vallen presented the Tukwila Community Center as a site for the 1998 Fall Fruit Show. It is estimated that the cost will be from \$1400 to \$1500 with a damage deposit in addition. However, Orel believes the actual cost will be somewhere in the neighborhood of \$1200 which was approved by those in attendance.

David Snell and his task force prepared a WCFS expenditure proposal. This was not discussed, but will be at the next Board meeting.

Brochures used at trade shows, fairs, etc. should be more user-friendly in appearance-better paper that is less likely to be thrown away. Hats and tee shirts with WCFS logo be available for sale and prizes. Donations to WSU specified for honey bee parasite research,

apple maggot and codling moth eradication. More member and commercial orchard tours. More WCFS events such as social meetings (picnics), meetings with refreshments. Better funding of chapters. Enhanced displays of brochures (stands). All of these will be discussed at the next board meeting.

## MISCELLANEOUS NEWS

Jack Weyh of Lyndon sent the only correct answers to the quiz on apples in the January Bee Line. In fact, he sent the only response received in time. So Jack's dues will be paid for the next year, congratulations!! There was one other response, received late. Here are the answers:

### Chance seedlings

Braeburn	Cameo
Gala Supreme	Ginger Gold
Golden Decilious	Granny Smith
Red Delicious.	

### Which leaves as varieties from breeding programs

Arlet, bred in Switzerland-Golden Delicious x Idared;  
Elstar, bred in Holland-Golden Delicious x Ingrid Marie (a seedling of Cox's Orange Pippin);  
Empire, bred in New York-McIntosh x Delicious;  
Fuji, bred in Japan-Red Delicious x Ralls Janet;  
Gala, bred in New Zealand-Kidd's Orange Pippin x Golden Delicious;  
Honeycrisp, bred in Minnesota-Macoun x Honeygold; Jonagold, bred in New York-Jonathan x Golden Delicious;  
Pink Lady, bred in Australia-Golden Delicious x Lady Williams;  
Sansa, bred in Japan-Gala x Akane;  
Senshu, bred in Japan-Toko x Fuji;  
Southern Snap, bred in New Zealand-Gala x Splendour;  
Sundowner, bred in Australia-Golden Delicious x Lady Williams;  
Sunrise, bred in British Columbia-McIntosh x Golden Delicious.

Your response to the survey has been great. Of the 41 renewals made directly to the Treasurer, not through a chapter, 22 answered one or more of the questions. Fifteen of you like the 2 column format, 1 didn't notice, 4 say it doesn't matter and 2 didn't have an opinion, so we will continue with it. You have given the editor ideas for articles, the board ideas for speakers. Ten of you sent words of encouragement and praise--thank you, thank you. One of you would like the newsletter bigger and more often; your editor has a life other than WCFS!

The survey will continue as it is for the rest of the year so everyone renewing will have a chance to "speak their piece", then it will be revised. Let us know if there are any subjects you would like to have a survey address. Those of you who renew through your chapter could fill in the survey and ask your treasurer to send it on.

## FOLLOW UP TRIP TO KAZAKHSTAN

Plant explorers who collected more than 60,000 apple seeds from rare, wild trees in Central Asia last summer say the material contains a potential genetic bonanza for breeders looking for better flavor, disease resistance, and other traits. "This was the most successful collecting trip we've made to the Kazakhstan region, based on our field observations of the apples growing in their natural habitat," said ARS scientist Philip Forsline.

The trip by Forsline and two colleagues from the University of Minnesota and University of Calgary was the third in a series to Central Asia, (see article in Winter, 1995 Bee Line) where the modern domestic apple is thought to have originated. The scientists collected seed and cuttings from the wild species *Malus sieversii*. It's a forerunner of the domestic apple, *M. x domestica*, which includes Red and Golden Delicious, McIntosh, Granny Smith, and other popular varieties. One of the richest collecting sites was in Tarbagatai, not previously visited by the team. Tarbagatai, where winter temperatures dip to minus 40°F, is the northernmost limit of *M. sieversii*. So the new germplasm could someday extend apple growing farther north on this continent.

In Tarbagatai, the researcher found the biggest apples—up to 3 inches in diameter. Other preliminary signs show commercial potential of the Tarbagatai germplasm: 96 percent of the apples were red to partially red, 67 percent were firm, 84 percent had a pleasant, aromatic flavor, and 70 percent were free of scab, a fungal disease.

The above article was written by Philip L. Forsline, USDA-ARS Plant Genetic Resources Unit, Geneva, New York, and published in the February 1966 Agricultural Research.

## LITTLE KNOWN FACTS ABOUT WCFS

Did you know that WCFS was chartered in 1980? Did you know that there are 584 family members? Did you know that there are twenty two life members? Did you know that there are eight charter members still listed, all of them are life members, one who is still very active (none other than Walt Lyon, of course)? Did you know that so far this year there are 30 new members? In 1996 there were 87 new members, 16 by March 30, and that six have renewed thus far; in 1995 there were 138 new members of whom 114 have renewed, and in 1994 there were 88 new members and 46 have renewed their memberships.



# MANY CAUSES, BUT FEW CURES, FOR COLD DAMAGE

By Geraldine Warner Good Fruit Grower February 1, 1997

**A**pple trees in Washington State have now met their chilling requirement and have broken their rest. From early January until bud break in March or April, the trees are gradually losing their cold tolerance, and the warmer it is, the faster they will come out of dormancy. No matter how cold it gets now, they will not go deeper into dormancy.

This is a phenomenon noted by Dr Del Ketchis, horticulturist with Washington State University (WSU), who has described the four physiological periods that trees go through. And it's one reason why many trees were damaged a year ago when temperatures dipped as low as -20°F at the end of January, Dr Guy Witney, WSU Cooperative Extension agent in Wenatchee, explained at the Washington State Horticultural Association's annual convention.

The extent of freeze damage depends on the physiological state of the trees, as well as how low the temperatures go and for how long, Whitney said. It also depends to some extent on the rootstock and variety involved, and on the grower's cultural practices. And the temperatures before freezing play a role.

In January 1996, before the freeze, temperatures had been mild, and the trees had started to lose their cold tolerance. On January 29, cold air moved in, and temperatures plunged below zero in many orchards and remained around that level for five days.

Then, in March, when the trees were almost at bud break, a frost with temperatures around 20°F was recorded in some orchards. While flowers and spurs were damaged in many areas, trees in some of the coldest areas had split bark on the trunks and major limbs where the underlying tissues were killed.

Tree damage during this period occurred during two other notable winters this century. In 1948-49, there was almost continuous cold from the end of December through the month of February, which led to major tree losses. Lows reached -29°F. In 1978-79, there were 40 cold days from late December, and temperatures dropped to the -20 to -25°F range.

## April

In April, trees enter a new physiological stage during which they rapidly lose tolerance to cold as temperatures rise in the spring. By early June, leaves will be damaged at 36°F and the rest of the tree tissue at 26°F.

## July

The next phase starts about July when terminal bud formation begins, and it continues until the tree reaches vegetative maturity when the buds stop growing, usually in mid-September. Temperature has no effect on the development of cold resistance during this period, but shortening day length does. At the beginning of this period, apple leaves are damaged at 22°F, while the rest of the tree tissues are damaged at 18°F. Toward the end of this period, tissue cold resistance drops to about

5°F. Witney said use of defoliant to induce dormancy may not be a good idea, because it appears to be the leaves that help induce cold resistance by sensing shortening days.

## September

The next physiological period begins at vegetative maturity in September and continues until rest is broken in early January. Cold resistance during this period depends on temperature. Tree tissues gain cold tolerance when exposed to temperatures between 16°F and 40°F, Whitney said, but 28°F is the optimum. Cold resistance is based on the temperatures the tree experienced 7 to 14 days before, and is not a response to the current temperature. Up until the end of November, trees will not lose cold tolerance when temperatures are above 40°F, but, from December, rest begins to decline and the trees will deacclimate above 40°F and continue to acclimate between 16°F and 40°F.

Although this is the period during which trees have the greatest cold resistance, it is also the period during which there have been some of the most damaging freezes.

The freeze of 1955-56 came in mid-November, before trees had reached dormancy. Temperatures reached -15°F during a cold spell lasting nine days. It was estimated that half a million young apple trees were lost in central Washington.

Perhaps the most damaging freeze this century was in 1968-69, when late December temperatures dropped to -20 to -45°F, with temperatures in the 28 to 45°F range for the ten days preceding the freeze.

## Causes and cures

Witney said there are many myths about the causes and cures for cold damage.

**Irrigation:** Overirrigating in August and September can delay the onset of vegetative maturity, which in turn can delay cold acclimation. As a result, maximum cold resistance in late fall and winter may not be reached. It has been shown that withholding water from late August can increase cold tolerance, as long as the trees do not become stressed.

But Witney said there is a fine line between enhancing vegetative maturity and stressing the trees, and some of the worst damage he saw in the Wenatchee area in 1966 was in orchards with signs of water stress the previous season. They were on sandy soils, and the water had been turned off too soon. A moist soil in fall and winter will store more heat than a dry soil and will buffer soil temperature changes in cold conditions.

"The safest thing is moderation in terms of later summer and fall irrigation," he said. "Put the trees into the fall and winter in a healthy, nonstressed condition, and they will probably do well."

**Nutrition:** Witney said the role of nutrition is often overplayed, and he echoed the sentiments of

Wenatchee orchardist Don Heinicke who advised growers during the convention not to try to fix the trees if they aren't broken. Witney told growers to beware of products that claim to promote cold protection. Trees that have adequate nutrients are more cold hardy than those with too few or too many nutrients. Witney recommended routine leaf tissue samples to check the status of tree nutrients.

Nitrogen is known to promote vegetative growth, and excessive vigor may delay the onset of vegetative maturity. Excessive applications of nitrogen while the trees are actively growing in July and early August, coupled with temperatures of 75 to 85°F in late summer, may be hazardous, he warned.

Witney said there is no nutritional alchemy involved in cold tolerance, although there is evidence that zinc can give a little cold protection. Correcting zinc deficiencies will help put the trees into the winter in a healthier condition. The other effect of zinc is to kill the ice-nucleating bacteria, which cover leaves and flowers in the spring. This can give one or two degrees of frost protection.

**Pruning:** Pruning stimulates the tree's metabolism, even during dormancy, and there is some evidence that trees are more sensitive to cold for several days after pruning. Witney said it is best to prune in late February or March, but he acknowledged that may not always be possible because of labor or other management constraints. If severe weather is forecast, growers should not prune right up to tat time.

**Pest management:** Trees that are under stress will be more susceptible to cold. Diseases, insects, mites, and nematodes can all impair tree health and cause stress.

**Orchard floor:** Sod cover on the orchard floor leads to better cold acclimation than a clean cultivated floor, Witney said. Although a moderate weed cover combined with snow in the tree row may be a better insulator of tree roots than snow alone, the weeds may induce some tree stress in the fall, which could retard cold hardiness. In the spring, when the threat of severe freezes has passed, the herbicide strip should be kept clean, so that sunlight can heat the bare soil in the daytime, and the heat can be radiated back into the air at night. This increases nighttime orchard temperatures in spring and reduces the potential for frost damage.

**Snow:** A snow cover can insulate the tree roots during severe cold, but piling snow around the trunks is

not a good idea, Witney said. The snow will slow the tree's acclimation to cold, and then if the snow melts, the damage could be worse.

**Paint:** Tree trunks can be damaged by sunscald. On sunny winter afternoons in the period from January to spring, the tree bark can heat to much higher temperatures than the air, and, when it does so, it loses its cold tolerance very rapidly. At night, when temperatures plunge, the bark temperature drops to air temperature, and this can lead to bark splitting.

White latex paint can reduce damage at this time of year by moderating the trunk temperatures.

### Treatments

Judging by past experience, once the bark splits off a damaged tree, most treatments are a waste of time, Witney said.

Beneath the bark is a layer of cells called the cork cambium. Below that is the phloem, which transports reserves and essential products up and down the trunk and limbs. Next is the cambium layer, and then the xylem tissue (wood), which is made up of mostly nonliving hollow cells that transport water and nutrients from the roots to the rest of the tree. Severe cold kills the cork cambium, the phloem, and the cambium cells. Once killed, these tissues do not regenerate.

Tacking the bark down with nails does not help and may do more damage because the nail will go into the healthy tissue.

Paints are futile and seal in wood-rotting organisms. Winter trunk and limb wounds need to dry out in the spring to delay the onset of wood rot.

If trees have severe bark damage, growers are probably better off removing them rather than trying to treat them, Witney said.

Bridge grafts are a waste of time, he said, because they rarely bring the trees back into production. After the major freeze of 1968-69, some growers bridge grafted trees. While the graft was successful, tree growth was not uniform, and the orchards proved difficult to manage. Some years later, the grafted blocks were replanted. Growers would have been better off replacing the trees immediately, he said. In high density orchards, bridge grafting may not be economically feasible.

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## APPLE MAGGOT TRAPS

Orel Vallen now has available the bait and lemon yellow fluorescent paint for making apple maggot traps. You may call him at 206-772-2119 to order and make arrangements for receiving the material.

## CANADIAN TAKES OVER VIRUS WORK

from an article by Geraldine Warner  
Good Fruit Grower February 1, 1997

Dr Kenneth Eastwell, a biotechnologist in British Columbia, is the new tree fruit virus expert at the Irrigated Agriculture Research and Extension Center at Prosser. He replaces Dr Gaylord Mink who retired last fall.

About 20% of his time will be devoted to directing the National Research Support Project 5 (NRSP-5), which tests foreign tree fruit plant materials and provides virus-free propagating material to the industry. Other research projects will include finding new ways to produce virus-free propagating material and developing faster methods of detecting viruses.

The usual method of detecting viruses is by budding material onto woody indicator plants. In addition to looking at methods involving biotechnology, Dr Eastwell will be identifying indicator plants that will have a faster response.

After receiving his doctorate in biochemistry at the University of Alberta in 1981, Dr Eastwell was a postdoctoral fellow at the University of California, Davis studying metabolism in plants and viruses in legumes. He continued to work on legume viruses at Simon Fraser University in B.C. He has also worked on detection and control of crown gall in grapes and tree fruit viruses, developing molecular probes or diagnosing little cherry virus. He has also been involved in a control program.

The main strategy of the control program is planting only virus-free trees and also involves removing infected trees.

An annual survey of cherry growing areas in the Kootenay Valley was coordinated by Dr Eastwell. About two weeks before harvest, crews visit orchards looking for trees that show symptoms of the disease: small cherries that ripen late. Sometimes, a diagnosis can be made in the orchard. If not, samples of budwood are grown on an indicator plant in a research plot for two years.

Little cherry virus was first discovered in B.C. in 1933 in the Kootenay Valley, which at the time was Canada's premier cherry growing region. Within 15 years, 60,000 trees were infected, and the industry declined.

The virus is spread by the apple mealybug, which appeared in the area about 1927. In the mid-1940s, Agriculture Canada introduced a biocontrol agent which helped to keep the mealybug population in check. The virus continues to spread very slowly, and every year about 100 trees are removed.

From the west side of Kootenay Lake the mealybug spread clockwise and down to the south end of the Kootenay Valley. The cherry industry north of the lake was wiped out, as most orchards were abandoned. The control program started at the south end of the lake and is pushing north as infected trees are removed.

Dr Eastwell is trying to create a buffer zone between the newer cherry industry to the south and the old abandoned orchards further north.

## HOW VIRUS-FREE MATERIAL IS PRODUCED

Good Fruit Grower February 1, 1997

How do Washington State University (WSU) scientists produce virus-free propagating material for the world's deciduous tree fruit industry?

When someone asks the National Research Support Project (NRSP-5) to produce virus-free materials, they are asked to send eight to ten sticks of bud wood. International shipments are accompanied by an importation tag and permit from the U.S. Department of Agriculture's Animal Plant Health Inspection Service (APHIS). These are sent to the Port of Seattle, where APHIS inspects, repackages, and forwards the material to the NRSP-5 lab at WSU's Irrigated Agriculture Research and Extension Center near Prosser.

Upon receipt, the package is opened, and three procedures begin. Scientists propagate a reference tree by grafting buds onto rootstock. The resulting tree, which will be grown for two years, is used as a check to ensure that other processes are properly done. Scientists then graft portions of the same sticks onto a series of virus indicator plants to determine which viruses are present.

The third procedure removes viruses from some buds by prolonged growth in heat chambers maintained at a constant 100°F with 16 hours of artificial light each day. They are forced to grow so rapidly that viruses cannot translocate fast enough to infect new tissue. When the resulting buds are about the size of a match head, technicians remove the virus-free tissue and graft it onto virus-free rootstocks.

These tiny tips begin growing in about seven days in moist chamber conditions at 75 to 80°F. As the new plants grow, they are subjected to a series of screenings for all known viruses. If any are found to be infected, they are destroyed.

Virus-free material is permitted to go through a dormant period, then checked again. If no viruses are found, it is ready to be released.

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### Pesticide registration and development costs \$36 million

On average, it takes ten years and \$36 million between the initial discovery of a pesticide and its registration.

Those are the figures compiled by eight agricultural chemical manufacturers based on registration data for 13 compounds between 1989 and 1993. According to a report in WSU's Agrichemical and Environmental News, it took, on average, 34 months between an application being submitted to the U.S. Environmental Protection Agency and its approval.

Dr. Alan Schreiber, WSU's pesticide coordinator, noted that manufacturers incur additional costs beyond the cost of development and registration of a product. These include the cost of manufacturing, marketing, sales, and other costs of doing business.

from Good Fruit Grower April 1, 1996

## PLANTING DEPTH FOR DWARF APPLES

by Ron Perry

Follow these guidelines to plant your dwarf apple trees at the proper depth

Every year we must remind those planting dwarf apple trees to pay close attention the importance of proper planting depth

All too often, I visit grower orchards and find trees on dwarfing rootstocks that were scion-rooted. At the time of planting, the orchardist may have thought that the trees were planted correctly, only to find out five to seven years later that the unions are too deep. As a consequence, adventitious roots arising from the scion become dominant, and the trees become vigorous, like seedling trees.

Unfortunately, at that point, nothing can be done to correct the problem. Digging down to expose the unions and cutting roots cause a depression in the soil which collects water, leading to phytophthora crown rot or, later in the year, ice formation and subsequent injury to the crown. The depression refills with eroded soil later in the year, requiring follow-up attention.

### Depth Recommendations

My standard recommendation has been to plant apples on clonal rootstocks so that the union is a minimum of 4 inches above the soil line when using a mechanical planter and a minimum of 6 inches above the soil when planting by shovel or augered holes. Because of the problem with infestation by dogwood borer on exposed rootstock shanks in North America,

unions at planting time should not exceed 10 to 12 inches above the soil line.

If graft unions are too high, growers are advised to cover a large part of the exposed shank with a berm or mound of soil. This remedy works well to correct a shallow planted tree and may need follow-up attention annually or biannually. Certainly, a shallow-planted tree can be easily corrected later in tree life, compared to the insurmountable problem of trying to correct a deep-planted tree.

### Correct Depth Problems Early

When using a mechanical planter, growers should be advised that someone should follow up and check each newly planted tree to ensure proper planting depth. While the soil is still loose, pull trees up that are too deep and push those down that are too shallow. When setting planting depth for mechanical planters, stay on the shallow side. If you err, do it on the side of shallow planting.

The last thing you need five years down the road is to have trees planted 5 feet apart in a high-density planting that should have had a spacing of 15 by 20 feet.

This article originally appeared in the Michigan State University Extension Crop Advisory Team Alert Fruit Edition (Vol. 11, No 3, April 30, 1996.) Perry is Professor, Dept of Horticulture, Michigan State University, East Lansing

## "PRUNE LESS, TRAIN MORE" IS HOT TIP FOR ORCHARDISTS

Good Fruit Grower January 15, 1997

Growers could spend less time out in the freezing cold with their loppers and more time out in the summer with a ball of twine, if they follow the advice of WSU horticulturist Dr. Bruce Barritt.

By doing less pruning and more training, growers could not only stay warmer, but may end up with higher fruit yields into the bargain.

"We're doing less pruning, because pruning delays and reduces fruiting," Barritt explained. "We're also doing less because tree size is controlled by the rootstocks we're using. Because they're precocious, cropping is controlling tree size. We don't need to prune them. We're using feathered trees and don't need to stimulate branching."

Barritt said studies have shown that yields and fruit quality were better on a 10-foot tall tree than a 6.5-foot tree. The reason is the shorter trees were pruned too heavily.

On the other hand, growers should avoid allowing the tree to grow too tall. Tall trees tend to shade the next row and lead to shading problems.

Bending the central leader over sideways, however, stimulates too much upright growth from the flat leader. The solution is to bend the leader over at a 45° angle in

the summer, and the next year bend it in the other direction at 45°. The next year, switch directions again. This reduces vigor in the top so that the tree will be cone-shaped, allowing good light distribution throughout the canopy.

"If you change from vertical to some other angle, it reduces vigor without pruning, and improves light distribution without pruning," Barritt explained.

Most of the important decisions affecting the economic viability of the orchard, such as the variety, tree quality, rootstock, and density, are made before the orchard is planted, Barritt pointed out.

"They cannot be changed afterwards, so you must make the right decision before you plant," he said. "I think it's possible to be successful with a number of different orchard systems, but data we've collected over the years suggests we should not go higher than 10 feet."

Barritt suggests using M.9 or M.26 rootstocks, a density of 700 and 1,000 trees per acre and to aim for 12 to 15 inches of growth per season. Acknowledging that it's difficult to know in advance what the growth will be, he encourages looking at what neighbors are doing, or better yet, plant a test block.

## SPRAY ADJUVANTS: BUYERS BEWARE

by Melissa Hansen

Good Fruit Grower February 1, 1997

"ADJUVANT" helping, assisting  
Websters Twentieth Century Dictionary, Unabridged

Horticultural spray programs are becoming more exact and selective through the use of new materials and technology. As orchardists are able to reduce their pesticide use, the importance of spray adjuvants increases, says an Oregon State University professor.

"As you fine-tune your spray program, you had better know about adjuvants," said Dr John Rinehold, assistant agricultural chemist at Oregon State University, Corvallis. "Adjuvants are not regulated, so you must beware," he warned.

An adjuvant is used in a crop chemical formulation to aid the operation or improve the effectiveness of the pesticide. The term includes such materials as wetting agents, spreaders, emulsifiers, dispersing agents, foaming activators, form suppressants, penetrates, or correctives. By using the proper adjuvant, it becomes possible to use certain chemical pesticide combinations in a tank mixture that otherwise would present compatibility problems.

It is important to know what you are buying, because adjuvants are not regulated as vigorously as pesticides, said Rinegold. There are many that can be dangerous, such as phosphoric acid buffers that can burn if spilled on exposed skin. He explained that two identical products may have different safety labels—one stating danger and the other stating caution—depending upon when they were registered with state agencies.

The increased importance of handler safety has encouraged many companies to introduce into the marketplace dry formulations of buffers and adjuvants. Package design also has improved, said Rinehold, although there are still many poorly-designed containers being sold that can leak product. "A poor package is a good indicator that it is a poor product," he said.

It is the interaction or matching of the proper spray adjuvant to the active ingredient and site that results in improved pesticide application.

The mode of action is different in various adjuvants, he said, so it is important to know what you are dealing with and what the needs are for a successful match. Does the active ingredient work by contact, or is it systemic? For example, many salty acids, such as the herbicide glyphosate (Round-up) and gibberellins require penetration through leaf cuticles for plant uptake. Active ingredients that work by contact may need an adjuvant that improves leaf retention, minimizing the amount that bounces off the leaf surface.

In the area of fungicides, few adjuvants have been properly tested to measure their effectiveness with the various types of fungicides available, he said. It is important to know if the adjuvant is phytotoxic, cautioned Rinehold. Some spreader will put holes through the leaf membrane or stomata, and actually increase disease severity, he said.

Growers are encouraged to ask spray adjuvant dealers and representatives questions regarding product chemistry, as well as research that has been conducted on the product. When the product changes ownership, the active ingredient or formulation of the spray adjuvant does not always stay the same, Rinehold said, although the original name may remain.

Rinehold is author of the book *The Farmer's Reference Guide to Spray Adjuvants*, which was written to provide growers with information about reputable adjuvant materials.

As growers look for ways to reduce their use of pesticides, adjuvants will become more important, he said. "Less than one percent of the active ingredient that comes out of a spray rig is even effective," according to Rinegold. Of the material that hits the target and lands on the leaves, very little is absorbed, he added. There is potential to improve the uptake by the plant, resulting in a reduction of the amount of active ingredient that is applied.

## GOOD FRUIT GROWER RENEWALS DUE

NOW is time to renew your subscription to Good Fruit Grower, if you haven't done so already. And the time to add new names to our group subscription. WCFS group subscription is \$17.00 (up \$2.00 from last year, I'm sorry to say). This rate is based on one check paying for the subscription and all coming due at one time. Sorry I didn't get this to you in the January newsletter. I **MUST** have your check by April 15. I'm trying to get this newsletter in the mail before the end of the month to give you time. If you can't get your check to me by then, call to tell me it is coming and I will include you in the order.

Make your check payable to Western Cascade Fruit Society, noting on the check that it is for Good Fruit Grower and mail to: WCFS Treasurer, Evelyn Troughton 2625 13th Ave W Unit 306, Seattle, WA 98119-2054. Phone 206-282-6191.



# MULBERRIES: ARE THEY STRICTLY FOR THE BIRDS?

by Don Gholston

When we speak of mulberries, we are really talking about three different species. The white mulberry (*Morus alba*) is native to eastern and central China, while the black mulberry (*M. nigra*) hails from western Asia. Both species have been grown in Europe for centuries. The red or American mulberry (*M. rubra*) is native to the eastern United States from Massachusetts to Kansas and down to the Gulf Coast. There are other mulberries such as the Korean mulberry (*M. australis*) and the Himalayan mulberry (*M. laevigata*), but none of them produce fruits of any great interest. The black mulberry probably arrived in California with the Spanish missionaries or shortly after. (Lee Reich's useful book, *Uncommon Fruits Worthy of Attention*, is a valuable source of information on the mulberry's history.) In this discussion the term mulberry will be used to refer generally to fruits of the three major species, and individual species will be mentioned only when that is pertinent.

The history of the white mulberry - as the primary food for the silkworm - is intertwined with that of the silk industry. The fact that the main trade route from the Far East was called the Silk Road is a good indication of the value of the commodity to Europe and elsewhere. In fact, it was so desirable that supply was never able to meet demand. When Europe finally learned the techniques of its production, a great silk craze swept the area. With visions of a local silk industry, (white) mulberry trees and silkworm eggs were hastily imported. It soon became apparent, however, that only southern Europe, primarily Italy, was suitable for sericulture.

Before silk fever abated, it spread to the American colonies. Chinese mulberry trees were introduced to supplement the native species, and silkworm eggs were shipped to Virginia in 1621. There were visions of farmsteads from New England to the Gulf Coast producing their own silk. Virginia silk actually made the coronation robes of Charles II. Enthusiasm for silkworm culture reached a peak in the 1830s, fueled in part by the introduction of a variety of white mulberry, *M. alba* var. *multicaulis*, that was supposed to be especially good food for the silkworm.

The American silkworm bubble burst in 1839, the result of disease, winter cold and cheap foreign labor. The legacy of all this was more mulberry trees to mingle with, and some cases replace, the native species. It could also be said that the mulberry was ultimately responsible for the introduction of the gypsy moth, which was imported for silkworm breeding only to escape out a window in Medford, Massachusetts in 1869.

## Culture and Growth Habits

The white mulberry, and to a lesser extent, the red mulberry, are quite tolerant of drought, pollution, and poor soil. The white mulberry is also the most cold-hardy of the three species, although this varies from one clone to another. Some are damaged at 25F, while others are unfazed at -25F. Red mulberries are hardy to sub-zero temperatures. In cold regions, siting to avoid spring frosts is not as critical as it is for most other fruit

plants since mulberries usually start growth relatively late in spring, often later than the walnut. The black mulberry is the least cold-tolerant of the three, although again cold-hardiness seems to depend on the clone. In general it is limited to USDA Hardiness Zone 7 (0 to 10F average minimum) or warmer. Black mulberries also do poorly in areas with humid summers and so do not perform well in the South.

All three mulberry species are deciduous trees of varying sizes. The "mulberry bush" of Mother Goose exists, but most mulberries become stately trees. Both white and red mulberries can grow to 60 feet or more, while the black mulberry seldom exceeds 30 feet in height. The species also vary greatly in longevity. Red mulberries rarely live more than 75 years, but black mulberries have been known to bear fruit for hundreds of years. The light-colored buds of the white mulberry account for its name rather than the color of its fruit, which can be almost any color including white, lavender, red and black. The thin, glossy, light-green leaves are variously lobed on the same plant. The leaves of the red mulberry are large, blunt-toothed and often lobed, with a rough upper surface and a pubescent underside. The smaller black mulberry leaves are similar but with sturdier twigs and fatter buds. White and red mulberries leaf out and bloom in early spring about two months before black mulberries.

The trees are either dioecious or monoecious. The development of non-fruiting male clones greatly increased the popularity of the mulberry as a shade tree. The flowers are held on short, green pendulous, nondescript catkins that appear in the axils of the current year's growth and on spurs on older wood. They are wind pollinated and some cultivars, including 'Illinois Everbearing', will set fruit without any pollination. Cross-pollination is not necessary. In California mulberries set fruit without pollination. White and red mulberries hybridize readily since they have the same chromosome count - yet another example of the affinity between the flora of North America and East Asia. The black mulberry has a different chromosome number.

## What Are the Fruit Like?

The mulberry family, the Moraceae, has many unusually constructed fruits, including the inside-side-out fruit (synconium) of the fig and the compound fruit (syncarp) of breadfruit and jakfruit (the largest of tree-borne fruits). The mulberry fruit is no exception. Although it somewhat resembles a swollen loganberry, botanically the fruit is not a berry but a collective fruit. When the flowers are pollinated, they and their fleshy bases begin to swell. Ultimately they become completely altered in texture and color, becoming succulent, fat and full of juice. In appearance each tiny swollen flower roughly resembles the individual drupe of a blackberry.

There is no denying that mulberry fruits suffer an image problem. Many remember them from their childhood as sweet but insipid, pale fruits growing on weedy trees in the back yard or in a vacant lot. In the land of

their origin, however, some mulberries were held in much higher esteem. Persian poets and others wrote lovingly of the fruit, praising it along with other fruits of earthly paradise such as the fig, pomegranate and grape. Of course they were referring to the black mulberry, in many ways the best-flavored species of mulberry. Black mulberry fruits are large and juicy, with a good sweet-tart balance. The ripe fruits contain about 9% sugar with malic and citric acids. White mulberries are generally sweet but often lacking in needed tartness, although breeding and selection have produced varieties such as 'Illinois Everbearing' that approach the black mulberry in quality.

All mulberries ripen over an extended period of time, unlike many other fruits which seem to come all at once. White and red mulberries are ready to pick in late spring, while black mulberries ripen in summer to late summer. To harvest large quantities of white mulberry fruit, spread a sheet on the ground and shake the tree. A surprising amount can be gathered from a comparatively small and young tree. Black mulberry fruits present more of a problem. When squeezed to pull them loose, the berries tend to collapse, producing a staining blood-red juice. Unwashed berries will keep for several days in a covered container in the refrigerator.

Mulberries can be eaten out of hand or used in any way that other berries are used, such as pies, tarts, puddings, sweetened and pureed as a sauce or dried into a tasty raisin. Slightly unripe fruits are best for making pies and tarts. The fruit also makes excellent sorbet, ice cream and frozen meringue. In medieval England mulberries were made into murrey, a blue-black puree added to spiced meats or used as a pudding. Mulberries blend well with other fruits, especially pears and apples.

Mulberries can be grown from seed, although the plants can take 10 years or more to bear. Spring budding is the most common method for grafting mulberries. When the bark slips in the spring, a T-cut is made in the rootstock. On the lower end of a scion two or three buds long a smooth, sloping cut is made and the scion inserted into the T, wrapped and sealed. Other types of grafts are also usually successful, although there can be incompatibility between white and black mulberry. Hardwood, softwood and root cuttings are also suitable methods for propagating mulberries. Softwood cuttings taken in midsummer root readily when treated with a rooting hormone. Black mulberry cuttings can be difficult since they tend to bleed more profusely.

#### Special Pruning Not Needed

Once a mulberry tree's branches have been trained to a sturdy framework, no special pruning techniques are required. If desired, however, a mulberry can be kept to a tidy form by developing a set of main branches, and then pruning laterals to six leaves in July in order to develop spurs near the main branches. It is not advisable to prune the trees heavily since the plant is inclined to bleed at the cuts. Cuts of two inches or more in diameter generally do not heal and should be

avoided at all cost. Bleeding can be kept to a minimum if pruning is carried out while the tree is dormant.

Mulberries are generally free of pests and diseases, although cankers and dieback can occur. In some areas "popcorn disease" is an occasional problem. Infected fruits swell to resemble popped corn. The disease carries on from one season to the next, so collecting and burning infected fruits is one means of control.

The ripe fruit is very attractive to birds, but there is usually enough fruit left over for harvesting. Some growers plant mulberry trees to lure feathered bandits away from more valuable crops.

A number of mulberry cultivars were named during the nineteenth and twentieth centuries. Some of these exist today, but a large share of them have disappeared from cultivation. Many clones of white mulberry were selected for their fruit and were grown primarily in the northeastern part of the U.S. The most widely planted and probably the best cultivar was 'New American', found in Connecticut about 1854. The tree produced large, tasty, glossy black fruits all summer long. A related but slightly less cold-hardy cultivar, 'Wellington', is a common variety today. A few multicaulis plants were selected for their fruits, the best of which was 'Downing', originating in New York about 1846. 'New American' was often sold under the name 'Downing'. The largest-fruited white mulberry cultivar is 'Pakistan', bearing berries over three inches long. The fruits are ruby-red, firm and sweet with a fine balance of flavor. 'Tehema' is another superior cultivar with very large plump fruit that is sweet, succulent and melting. It is best adapted to mild winter areas.

Red mulberries were cultivated primarily in the American South. 'Johnson', the first mulberry selected for its fruit in America, was a red mulberry. The fruits were large, black and described as having a rich vinous flavor. Other good-tasting red mulberries include 'Wiseman' and 'Cooke'. Some natural hybrids of red and white mulberries also produce notable fruit. One such is the widely planted cultivar, 'Illinois Everbearing', which was found in 1958 and is noted for bearing large, flavorful, nearly seedless fruits throughout the summer. Another tasty hybrid cultivar is 'Collier' with medium sized, purplish-black fruit.

#### Black Mulberries Are Best

The black mulberry has been grown for its fruits in Europe for centuries. There is little, if any, difference among most black mulberry cultivars—they are all good. Fruits of 'Black Persian', 'Kaester', and 'Noir de Spain' are all large, black, juicy fruits over an inch long, with a rich, sweet/tart flavor. Black mulberries are best adapted to the Pacific Coast. If one were asked to recommend a single mulberry to plant, a black mulberry cultivar would be at the top of the list.

Perhaps it is time to rethink our notions about mulberries. The best cultivars, particularly black mulberry varieties, have fruit that many find as good as any blackberry. If there is room, it might make sense to include a mulberry tree in the home orchard. All those Persian poets must have been onto something.

Two caveats are offered concerning growing mulberries, however. Never plant the trees near a sidewalk. The fallen fruits will not only stain the walkway, but are likely to be tracked indoors as well. Also, the dark-colored fruits really will stain fingers, clothing, counter tops, etc., so handle with care.

**Don Gholston**, former California Rare Fruit Grower president, was a director of technical information services for a chemical research company before retiring. He grows a variety of fruits, rare and otherwise, in Santa Cruz County, California.

The above article and the one following appeared in the March/April 1997 issue of *Fruit Gardener*, a publication of the California Rare Fruit Growers, Inc.

Fruit, Berry and Nut Inventory describes the following:

**Black Persian**-Large, dark red to black fruit. Juicy flesh; sweet flavor. Tree grows 30' tall, fairly drought tolerant one established. Often planted to attract birds away from cherries.

**Collier**-Reddish black fruit. good flavor.

**Downing**-Heavy bearer of large, sweet, pink berries with no tartness. Makes excellent pies and jams. Medium size, graceful, wide spreading tree; grows 15' tall in sun or shade. Hardy and productive; long lived and trouble free. Requires very little maintenance.

**Illinois Everbearing**-Large, 1-2½", glossy, virtually seedless fruit; black when ripe. Pleasant mixture of acid and sweet, similar to blackberry but without the large seeds; considered by many to be the best flavored mulberry. Used for dessert, jam, winemaking, fresh eating or in cereals. Handsome tree is slender and fast growing; smaller than the other mulberries. Self-fertile. Bears over about an 8 week period from early spring into mid-July. Fruits hold well on tree. Hardy to -25°. Grows well in Zones 5-8

**Tehama**-Large pure white fruit up to 3½" long with very sweet flavor. Hardy in Zones 7-9.

**Wellington**-Medium to large, long slender, cylindrical, black fruit. Soft flesh; poor to average flavor. Tree is a heavy cropper; ripens over a period of several weeks. Hardy in Zone 5. New states in their catalog, "May be the old variety, New American, which was also sold many years ago as Downing."

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## DIRECTIONS FOR WINTERING FIGS AND OTHER SUBTROPICALS IN THE NORTH

by Robert Stelhorn

After trying the traditional ways to protect figs the following shallow plunge pot system has proven the most successful. It combines the advantages of container and in-ground cultures.

Use a 5-gallon black poly nursery pot (approx. 14" across by 12" deep). Smaller does not work and larger is cumbersome. The pot should have 4-6 thumb size drain holes around lower sides; any bottom center hole must be closed.

Do not use gravel for drainage. Do not use garden soil - it is heavy and will harden and cake. Use potting soil containing perlite, vermiculite, sand, etc. for drainage and soil conditioning. Spread bare roots, fill thoroughly with potting soil and finish off by shaping the soil like a dish—concave. This will cause water to penetrate the center of the soil-root mass. After spring frosts, plunge pot 6" deep into the ground. Mulch around pot to keep sun off exposed sides and keep soil moist and weed free. A curb of tree rings, bricks, landscape logs, etc. helps contain mulch. The pot-bound roots will grow out through the drain holes into the ground to get nutrients and moisture, greatly reducing the need to water and fertilize. Also, the pot will not blow over. In late fall after plant is dormant, pull away the mulch, thrust a shovel along outside of the pot to sever the external roots. Lift out the pot, clean-prune the cut roots back to the pot, hose down, and bring inside for winter storage. A garden shed, unheated garage, cool basement, etc. will do. Occasionally water the pots through the winter so root mass will not dry out.

Top growth can be pruned to maintain balance with root system, keep to 6' height. Encourage bush rather than tree form. After last frost, re-plunge as before. Naturally shallow rooted, figs adapt readily to this culture.

A handful of 10-6-4 fertilizer scattered in the hole outside the pot will encourage external rooting. Several times during the growing season fish emulsion in water can be applied directly into the pot to provide nutrients, especially trace elements.

In Delaware (lower counties) we seldom get temperatures below 10F—perhaps three or four cold nights per winter. For those I set a kerosene lantern in the garden shed where the fig pots are stored over winter. That is sufficient to prevent winter kill. The pots freeze but suffer no harm. My large in-ground 'San Piero' (also called California Brown Turkey) kills back to the ground most winters but comes back with vigorous sucker growth bearing a heavy crop which ripens late (October to mid-November) when we get our first frost.

I have read that California growers of this variety regularly prune back to the ground to force heavy new-growth second crop. Nature is doing the same for mine.

Much of the protection my container figs get inside the shed is being out of the wind which dries the branches. A number of times the weatherman was off and overnight dropped into single digits without my kerosene lantern but no harm was done in the still inside air.

I preserve figs by drying them in a wooden box lined with a stainless steel sheet. It is vented for convection. Heat source is two showcase 25 watt incandescent bulbs (about 1¼" diameter x 5½" long) individually switched. I fill two mesh shelves with fresh whole figs—both bulbs on for about 12 hours then cut down to one bulb for the next 12 hours as fruit is drier. This maintains approx. 130F, which works well. At lower temperatures the figs can become sour; higher temps cook the fruit—a No-No.

After the dryer, I pack the fruit in tins and put them in the refrigerator with the top off. The dry air of the refrigerator tempers the figs to about the right dryness. Since I do not use any preservatives the closed tins are

## BITS AND PIECES

### FROM THE NORTH

#### Ideas from members on preventing moose from browsing on apple trees

Burt and Cindy Durham have been using human hair to discourage browsing moose since 1993, but never got a chance to see how it worked until this winter. They harvest hair from the hairbrush, spin it into a very loose yarn and tie it around the upper twigs of each tree. This year, for the first time, a moose wandered through their young orchard in Talkeetna, and browsed all 22 of their apple trees. The hair worked. The moose ate each twig down to the hair. When the moose got some hair in its mouth, it spat out both the hair and the twig, and moved on to a new tree.

Jay Dearborn of Palmer wraps the upper twigs with a piece of aluminum foil. It seems to work—probably bothers their fillings.

From the Alaska Pioneer Fruit Growers Newsletter, Spring 1997

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### ON DULL LOPPERS

by Karen Maib

At a pruning demonstration last year I offered my loppers to attendees, encouraging them to demonstrate. More than once, they refused. I thought they were just timid.

It turns out, however, that they didn't want to use my loppers, even though they are top-of-the-line. The problem was the blades. Since I use my loppers on trellised trees, there were some nicks. They were serrated, but in a random pattern and had no edge at all.

We have all seen blades that look like they were used for fence cutting, and we all know the effort required when cutting wood with dull blades. With that picture in mind I want to tell you how, in a matter of minutes, my blades were transformed into the tool they should have been and how my loppers became popular once again.

Doug and Will, two members of the audience, approached me with what looked like a pen and offered to bring my blades back to life. With a quick twist and a jerk of the wrist, a sharpening tool protracted from the plastic pen-shaped object.

The tool was a diamond fish-hook sharpener. These come in many shapes and sizes, but essentially consist of a stainless alloy rod bonded with millions of diamond crystals. I didn't know you were supposed to sharpen fish hooks, but I knew I was supposed to sharpen lopper blades, and this hook sharpener worked great. They gave me the sharpener on the spot, and I have used it since, on all kinds of blades.

What makes this tool worth writing about is that it is light and compact, retractable, inexpensive, and diamond coated. Rods range from 2¼" to 3½" with overall "pen" length ranging from 5¼" to 8½". Prices vary, but you should be able to find the one you want for

\$5 to \$9 at stores that carry fishing supplies and/or sporting knives.

Because these tools are round, when you sharpen, leave the rod in contact with the blade and sharpen in a circular motion (instead of a sweeping motion). This will help keep a back edge from forming. To clean and maintain, rub the rod on glass to lift the metal fillings, and wipe with a wet cloth.

#### A story I heard, modified, and a lesson I learned:

A woman came up to a man pruning an orchard. "You look exhausted," she said. "How long have you been on this row?" "A long time," said the man. "This is hard work."

"Well, why don't you take a break for a few minutes and sharpen those loppers?" the woman asked. "I'm sure it would go a lot faster." "I don't have time to sharpen my loppers," the man replied emphatically, "I'm too busy pruning."

Karen Maib is a Washington State University Extension educator specializing in tree fruit production, based in Othello. This article was published in Good Fruit Grower, December 1995.

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### IT HAPPENS EVERY WHERE

#### Tree Fruit Research Cut at East Malling, England

British fruit growers will feel the impact of a finding cut of £1.25 million (about U.S. \$1.88 million) within the next six months, as the research program at Horticulture Research International (HRI), East Malling, England is adjusted in response to reduced financing.

The British government has targeted the horticultural industry's research work, and focused cuts in the budget of the Ministry of Agriculture, Fisheries and Food (MAFF).

Dr Alwyn Thompson, director of HRI, East Malling, says, "As part of HRI's overall cut back program, we will see 15 posts disappear in work associated with fruit culture at Malling by April, 1977." The director is determined to protect key areas for which his center is internationally recognized, but realizes changes will be inevitable.

"Our overall capabilities will be reduced, and in some cases, it will be a 'no going back' scenario once research posts are lost," he explained. "At the moment, we can identify posts that are not sustainable, but we are committed to our existing and ongoing contracts."

Thompson is already encouraging early retirements, and is prioritizing posts for the future. "The longer we delay, the more costly and painful it will be," he said. "Work directly associated with fruit culture will continue, and although it will have breadth across a range of key areas, the depth of our work will be significantly reduced."

Excerpts from an article by Malcom Withnall, Good Fruit Grower, December 1996

# BEES FOR FRUIT CROP POLLINATION IN SOUTHEAST ALASKA

by Joe Orsi

Have you ever wondered why in some years your fruit production didn't materialize? In many cases poor pollination was probably to blame. Adequate pollination of fruits requires: favorable weather conditions at bloom time, different varieties for sufficient cross pollination (when necessary), and of course, the insects to facilitate pollination.

It has been my experience that our native bumblebees, if present, can do a fair job of pollinating. However, they tend to emerge at times that coincide with other nectar sources (i.e. Blueberries, Dandelion, Fireweed, and Clover) and are often not around when you need them for Apples and Cherries which bloom around late-May to mid-June. therefore, over the past three years, I have used two types of bees to pollinate my fruit trees in Auke Bay near Juneau.

The bees I have used are the Orchard Mason Bee (*Osmia cornifrons*) and the Honeybee (*Apis mellifera*). Both bee types have enhanced the pollination success in my micro-orchard here. However, I have learned a few lessons that I would like to share with other growers who may consider using bees for pollination.

## Orchard Mason Bee

The primary lesson I learned with the Orchard Mason Bee was -timing is everything. I began with a small wood nesting block of bees I ordered one fall from the Pacific Northwest. Over the winter I kept the block in my refrigerator and in April I eagerly set the block outside. Unfortunately, in the course of a few days during a short spell of warm weather, all the bees emerged from the block and disappeared. By the time mid-May rolled around and the fruit trees were in bloom, all there was to greet them was an empty block of wood and no bees!

The Orchard Mason Bee is about half the size of a honeybee and resembles a fuzzy little teddy bear with wings. They are a non-colonel bee and noted for their gentleness. They seldom sting, and when they do, I am told it is equivalent to a mosquito bite. Orchard Mason Bees are most commonly sold by the "straw", and placed in the orchard site inside 3" diameter PVC pipe sections.

Once the PVC pipes are filled with bee tubes, the pipes can be strategically placed throughout your orchard. Inside each end of the pipe you can stuff seven folded tubes. I orient my "loaded" pipes in different directions and sites so they receive variable amounts of sun exposure; this staggers the emergence times of the bees. I also partially fill my pipes with empty straws so I can load another foray of filled tubes from the refrigerator a week or so later. Orchard Mason Bees can only survive to about 0°F, so if the thermometer starts dropping they need to be moved to a refrigerator.

I have located an excellent source for Orchard Mason Bees. The person who sells them charges \$1.60 per tube (~16 bees/tube) without shipping charge (see attached table). I recently saw Orchard Mason Bees advertised in a nursery catalog for \$16.50 per tube.

## Honeybees

My first lesson in keeping Honeybees was -it ain't cheap. Even though I was given a great deal of bee-keeping equipment, in my first year I easily spent over \$200.00 (I hope my wife doesn't read this). Honeybees also need to be shipped via ALASKA AIRLINES as live animals, which involves an exorbitant minimum shipping charge. So it behooves you to consolidate shipments with other local beekeepers. My average cost last year for each of my three bee packages was about \$60. Each package contained 4 lbs of workers and one queen. Smaller packages of bees are available (i.e. 2 lb & 3 lb), but I found that you are better off with the largest initial amount you can obtain.

My second lesson in keeping Honeybees was -it don't come easy. It takes a lot of time to construct hive components and ready all your beekeeping equipment before the bees even arrive. Especially if you need to put an electric fence around your hive to keep the bears away as I did my first year. I now put my bees on a rooftop platform. Once your hive locality is secured, you then need to feed your bees sugar water for several weeks during spring. In addition, you should "work" (check out) the bee hive at least every couple of weeks for the entire season. After you get into the routine of smoking your hive and working the bees, it becomes a pleasurable task that you look forward to.

My third lesson in keeping Honeybees was -not all bees are created equal. To get honey you need the proper variety of honeybee. I have worked with both the Carniolan and Italian varieties of honeybees. Last year I had a hive of each variety on my rooftop platform for a side by side comparison. The year before I only had one hive of Italians. In our perpetual spring environment here in Southeast Alaska, I found the Carniolan variety superior. This variety is also a gentler bee and originated from the Caucasian Mountains where seasons are relatively short. The Italian variety, on the other hand, originated from a Mediterranean climate where seasons are relatively long. The Carniolans went right into honey production in summer, and at the same time, the Italians concentrated on maximizing brood production. Of the three hives I kept in 1996, I took about 35 pounds of honey from each of my Carniolan hives and practically nothing from my Italian hive. I had the same general experience with the one Italian hive I kept in 1995.

In summary, for the amount of time and effort invested, the Orchard Mason Bee gives you a better return on pollination, especially if you cannot afford the initial setup cost and seasonal maintenance time required of Honeybees. However, Honeybees are fun to work with once you get over the shock of handling thousands of potentially stinging insects! One major advantage of keeping Honeybees is the "golden harvest" if all goes well. Nothing makes a better Christmas gift than a jar of Alaskan honey!

**Bee Comparison Table**

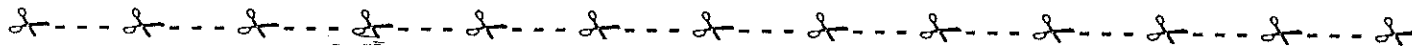
	<u>Orchard Mason Bee</u>	<u>Honeybee</u>
Species	<i>Osmia cornifrons</i>	<i>Apis mellifera</i>
Bee Cost	\$5.00-\$50.00	\$60.00
Equipment Cost	\$10.00	\$150.00+
Honey	none	>35 lbs
Numbers	Tens to Hundreds	Thousands (up too 40K/hive)
Preparation Time	Minimal	Substantial
Maintenance	Low	High
Problems	Timing	Bears, Unenlightened Neighbors
Fascination Level	Low-Medium	High
Pollination Level/bee	Excellent	Moderate
Bee Sources	Ronald A. Smith 9935 NW Cornell Rd Portland, OR 97229 (503) 292-3764	Tabers Honeybee Genetics P.O. Box 1672 Vacaville, CA 95696 (707) 449-0440
Beekeeping equipment	Knox Cellars Bellingham, WA 98225 (206) 733-3283	Brushy Mountain Bee Farm 610 Bethany Church Rd Moravian Falls, NC 28654 1-800-233-7929
Reference Material	The Orchard Mason Bee 1993 by Brian L. Griffin Knox Cellars Publishing 1607 Knox Ave Bellingham, WA 98225 (360) 733 3283	The New Guide to Beekeeping 1994 by Roger A. Morse The Countryman Press P.O. Box 175, Dept BK Woodstock, VT 05091-0175 1-800-245-4151

Our thanks to Joe, a new member of WCFS, for sharing his experience and information with us. He is also a member of the Alaskan Pioneer Fruit Growers Association. You may write to Joe at P.O. Box 210135, Auke Bay, AK 99821.

Editor's note: Those of you who went to the Annual Spring Meeting and Rootstock, Scion Wood and Fruiting Plant Sale may have not ced the book Joe mentioned--"The Orchard Mason Bee" by Brian L. Griffin. Subtitled "The Life History-Biology-Propagation and Use of a Truly Benevolent and Beneficial Insect"

Chapter 1, The Friendly Pollinator, begins: "Washington State University gave our little friend its name: ORCHARD MASON BEE. The true scientific name is OSMIA LIGNARIA PROPINQUA CRESSON. Some knowledgeable entomologists call it the Blue Orchard bee. We will call it the Orchard Mason Bee in our book out of respect for that extension service which first brought it to our consciousness, and because Orchard Mason nicely describes both its lifestyle and its beneficial nature." Chapter 4 names and describes similar species, including the specie mentioned by Joe. I'm sure you will enjoy reading this well written book.

Copies are still available, price is \$10.00, includes mailing. Send in the order blank below to receive yours.

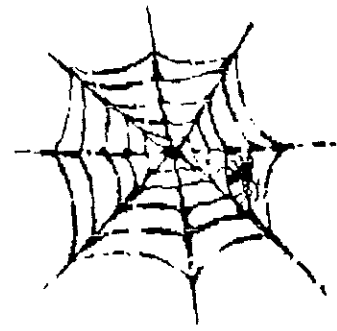


Please send \_\_\_ copies of The Orchard Mason Bee @ \$10.00 each. Enclosed is my check for \$\_\_\_\_\_.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_



## Maggot in the Web

W.W.W. pages are up and running at <http://www.seanet.com/~tberry/grower.html>

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Several pages of information are ready to start compiling reader input at the above URL (Universal Resource Locator) on the World Wide Web portion of the Internet. Access is through a local Seattle server which will give us quick maneuvering through the various "links" that give access to the pages via your computer or "Web T.V.". Although there isn't a lot of information on the pages yet, this will soon change as the growing season progresses and individuals are able to add their own data, experiences, triumphs and, of course failures.

Time will tell just how much success can be gleaned through this kind of data sharing and interaction. Please join the effort as much as you can and as often as

possible. All contributions are valuable in combatting Mother Nature's relentless onslaught of challenges.

There's room in this format for discussion of all kinds of issues besides the Apple Maggot including The Codling Moth, fungus control, canker diseases, pollination and anything else that comes to mind. I'm hopeful that readers and contributors will add suggestions for topics as well.

It is our purpose here to make the results of the information gathered available to as many people as possible. I'm hoping that the page updates can be added to the regular newsletters so that everyone can have benefit of the data.

Regards,.....Tom Berry

### ARE YOU ON LINE?

At a recent meeting of Seattle Tree Fruit Society Tom Berry spoke on the above subject. Several members were enthused about being on line. One member suggested that The Bee Line be sent e-mail to those who have computers and are on line, citing savings in printing and mailing costs. At this time, your editor is NOT on line. So there would be cost involved in acquiring a modem and going on line—the monthly fee. And I would have to learn how to do it. (I am really a low tech person in a high tech world.)

The question is, how many of you would be interested? We need to know how many of you are on line and if there is enough interest in receiving the newsletter via e-mail to make it worthwhile.

Paul Gotz, the STFS member who proposed the newsletter go on line (we could call it *The Bee Line On Line*—just kidding!), is willing to be the collector—is that the right terminology?—receive the message sent from those of you who are interested. His e-mail address (right terminology?) is: **FARMERGOTZ @ AOL.COM**. Please contact him as soon as possible, I guess we should have a deadline, we don't want this to drag out too long. How about April 30, 1997. That will give Paul a chance to get the information to me and I can report to the WCFS board at their next meeting on June 21.

### ARE YOU INTERESTED IN ALASKA WEATHER AND CLIMATE DATA?

If you have ever wondered about the temperatures in Alaska, you need wonder no longer. The Alaska Climate Research Center at University of Alaska, Fairbanks, has a website with lots of useful data on recent weather and long-term climate trends for selected Alaskan locations.

The address is: <http://climate.gi.alaska.edu>. As I understand, there are about 20 locations around the state included in the data; Fairbanks (University), Big

Delta, Matanuska, Anchorage, Homer, Haines, Juneau and Sitka are a few.

Some of the information that can be found on the website are graphs with temperature information, tables showing normal monthly precipitation, average number of days with measurable precipitation, cloudiness (average number of days clear, partly cloudy, and cloudy), average relative humidity, and average wind speed.

## WCFS AT THE MOUNT VERNON OPEN HOUSE

by Dick Tilbury

A well attended Fruit Open House and Field Day was held at the WSU Mt Vernon Research Unit on Saturday March 8, 1997. The event was sponsored by the Western Washington Tree Fruit Research Foundation (WWTFRF) and WCFS was there.

We had two display tables, one for WCFS educational material and one for plant sales. WCFS secretary, Chuck Holland, transported all the blueberry and raspberry plants left over from the WCFS Annual Meeting and Plant Sale in Puyallup held the Saturday before to Mt Vernon and devoted the whole day to selling them. He managed to sell all of our remaining stock and grossed over \$700.00. Good job, Chuck.

Our educational displays were quite popular and there was a brisk sale of educational bulletins, particularly Dr. Eugene Kupferman's report on storing fruit which sold out. (see the Fall 1996 Bee Line, page 20).

WCFS member, Ciscoe Morris, borrowed our insect trap display to supplement his talk on "Integrated Pest Management for the Home Orchard." Ciscoe had a standing room only crowd and someone in the audience made his day by presenting him with a brussels sprout salad (brussels sprouts are his favorite veggie).

Brooke Peterson's lectures and hands on pruning demonstrations were very well attended. His big message was most back yard fruit growers are too timid

with their fruit tree pruning. They just nibble around the edges with a lot of small cuts. For the older neglected tree first stand back, size up the tree and determine what cuts need to be made to re-establish good tree structure. Watching him tackle some of the older neglected trees was a real revelation to me. There was a lot of big wood on the ground when he finished.

It was nice to see some of friends from the BC Fruit Testers Association down for the open house. Jim Walton even helped Babette Gunderson demonstrate grafting.

Sadly, Don Shakow, president of WWTFRF, died of cancer shortly before this meeting. WCFS member, T.K. Panni, volunteered to serve as president this year and was so elected.

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Don Shakow, president of WWTFRF died of cancer February 13, 1997. He was 56. Don was a member of WCFS. He was an advocate of organic farming and home grown food. In the past he operated the worker-owned Little Bread Co. on Lake City Way, founded the worker-cooperative Ploughshare Corp. which ran Soup and Salad in the Pike Place Market and more recently operated fruit tree acreage in Indianola. Our sincere condolences to his widow, Carol, and children.

## WWTFRF DEMONSTRATION FRUIT GARDEN PROPOSAL

At a WWTFRF Board meeting Dr. Wilbur (Andy) Anderson, manager of the WSU Mt. Vernon Research Station, made an appeal to WWTFRF for development of a demonstration fruit garden at Mt. Vernon. (The Skagit County Master Gardeners have a demonstration garden there and asked WCFS to do the demonstration fruit garden, but no one wanted to oversee it. We tried to form a chapter in the area to enlist the aid of members in its planning and implementing, but to no avail.)

The proposed demonstration fruit garden is 375' x 580'—five acres—located at the research Station. The purpose/theme will be research and public education in fruit gardening. This may include public classes and /or workshops for pruning, thinning, propagation, etc. Classes can take the form of garden tours. The same garden can be used to teach many themes including history, cooking, geography, ethnic cultures, etc. It is proposed that if follow the theme of the classic Royal Horticultural Society Book "The Fruit Garden Displayed" by Harry Baker. The book is a living catalog of ideas and educational opportunities for the home fruit gardener, hobby orchardist and landscaper.

There are five design considerations: site maintenance, the use of IPM, early soil tests, maximum use of mulches and ground cover, and the planting of trees of a size that will produce fruit early.

The 18 major areas included in the scope of the project include: garden entrance area, model fruit garden area, grape/kiwi vineyard area, antique apple area, organic orchard, best varieties as listed in EB-0937 orchard, cider apple orchard, nut tree orchard, unusual fruit variety area, small fruit area, rootstock trial area, training trial area, rent a tree area, greenhouse, garden structure, educational signage, plants for small places, microclimates.

Overall management will initially be under the direction of Dr. Anderson. This could later revert to a board of directors comprised of representatives from each demonstration garden group and chaired by the Skagit Co Master Gardeners.

At the March 8 board meeting, WWTFRF voted to go ahead with the development of the demonstration fruit garden. A committee was formed which includes two landscape architects interested in overseeing it. The committee will be meeting in April to start planning. Anyone from WCFS is welcome to work with this group. You may call WWTFRF president T.K. Panni 206-747-4541 for more information on being a committee member, a helper at the garden, or more details on the scope of the project.



# ANOTHER (CENSORED) APPLE MAGGOT REPORT

by Dick Tilbury

The Apple Maggot Fly (*Rhagoletis pomonella*) is a native North American pest whose original host was hawthorn. It was first reported as a pest of apple in the 1860s and has been a key pest of commercial apples throughout eastern Canada and the northeastern United States. The first confirmed apple maggot infestations in the Northwest were in Oregon in 1979. It probably had been in the West for many years before being detected. A review of old California Highway agriculture inspection station records indicates this to be true. (John LaBoyteaux, footnote 2)

Apple Maggot (AM) is very adaptable and can infest many different plants including apple, hawthorn, plum, apricot, pear, sweet cherry, sour cherry, wild rose, cotoneaster and pyracantha. However, in Washington it has been found only on apple, crab apple and hawthorn. It most often attacks early maturing sweet apples. A few incidences of Asian pear attack were reported at the WCFS 1996 Fall Fruit Show.

**AM Identification:** This fly is about the size of a common housefly (my experience is they are about half the size). Its body is black, its eyes are dark red, and the thorax and abdomen have distinctive white or cream bands. The male has a blunt abdomen with three white lines, while the female's more pointed abdomen has four white stripes. A distinct banding pattern on its wings shaped like the letter "F" distinguishes it from most other *Rhagoletis* species except the snowberry maggot. (footnote 1)

Therein lies a major complication: the snowberry maggot fly, which does not attack apple or other edible fruit, looks exactly like the AM fly. Only a trained observer with a microscope can tell them apart. Dr. Elizabeth Beers, an entomologist at the WSU Wenatchee Tree Fruit Research Station, reports that in some areas of the state up to 97% of the flies caught on AM traps may be the snowberry maggot. (footnote 3)

The snowberry maggot fly is not attracted to the red ball traps and for that reason the sticky ball trap should be the trap of choice in areas where this insect is numerous (footnotes 1,2). The problem is, how do you determine whether you are in a high snowberry maggot population area without submitting all your trap catches to the WA State Dept. of Agriculture for identification?

**Injury:** AM injury varies in appearance and severity among apple cultivars. Oviposition punctures may cause the fruit to become dimpled or distorted, and in softer cultivars the tissue around these wounds may darken and decay. Oviposition punctures or stings appear as pin pricks on the fruit surface. Young larvae tunnel throughout the apple leaving small brownish, irregular, thread-like trails. As the larvae grow, the tunnels become more conspicuous and are further enlarged by bacterial decay. Eventually, the apple becomes soft and rotten. This internal breakdown proceeds more rapidly and is more severe in the softer-fleshed earlier maturing cultivars. (footnote 4)

**Control:** Management of this pest can be approached by one or a combination of the following control methods: 1) host eradication, 2) sanitation, 3) chemical, and 4) trapping. I will discuss each method in turn.

1) Host Eradication. This method involves the eradication of all hosts within  $\frac{1}{4}$  to  $\frac{1}{2}$  mile (1 kilometer per Prokopy and Mason) (footnote 5) of the orchard to reduce potential sources of infestation. (footnote 1) This involves the removal of all hawthorns (including ornamental), wild (feral) or unsprayed apple trees and crab apples in the control area.

In my estimation this is a method for large land owners only. It is politically unworkable in an urban environment of many small land owners although I understand it was tried in Hood River, Oregon. For the large land owner (orchardist) it is an option, e.g., John LaBoyteau (footnote 2) reported good control in his organic orchard with just host eradication and orchard sanitation. Early control in his orchard also included mass trapping with red sticky balls.

2) Sanitation. This method involves the quick and efficient harvest of your apples, picking up all apples (drops) under trees and disposing of them. What you are striving to accomplish is to interrupt the life cycle of the AM by preventing any maggots in infested apples from exiting the apple, burrowing into the ground under your apple trees, overwintering in the ground, pupating and emerging as flies the next season. All drops should be gathered up twice a week and disposed of by cooking (over 160°F), freezing, or any method that will insure the death of any larvae in the fruit. All fruit picked from the tree should be quickly and efficiently harvested and put in cold storage or processed into juice, sauce, pies, etc.

3) Chemical. If your choice is chemical (insecticide) control, I must stress that you first deploy monitoring traps in your trees by June 1. The traps can be either the red sticky ball or the sticky yellow panels baited with ammonium carbonate or ammonium acetate. Apply control treatments (spraying with Imidan) within 7 days of trapping an AM fly. If flies continue to be caught, repeat treatment in 14 to 21 days.

If no more flies are caught within 14 to 21 days of the first capture, do not spray again until another fly is detected. Do not spray indiscriminately. Use those monitoring traps to first determine if you have AM flies.

4) Trapping. Three different designs and two different lures (baits) are available. The three trap types are the red sticky ball, yellow sticky panel and the Ladd trap (a combination panel/ball trap). All use an adhesive coating to capture the flies. A number of trap coating adhesives are available on the market but thanks to WCFS member Orel Vallen's research I prefer the Tanglefoot brand brush-on formula insect trap coating. It is easier to apply than the higher viscosity standard Tanglefoot insect trap coating. The brush-on formula was developed for use on traps in a greenhouse and for limited outdoor trap use. I find it holds up fine for the

two week duration between coatings. Because these traps, particularly the yellow panel type, attract many kinds of insects, they need to be inspected and cleaned regularly. I clean and re-coat the traps every two weeks.

As to the lures, two different techniques are used. The AM fly eats mainly insect honeydew (insect poop). As the proteins in this material decay, ammonia is released, thus the use of ammonia compounds such as ammonium carbonate or ammonium acetate mixed or sprinkled on the Tangletrap coating to lure the fly to the trap. The other technique is the use of a lure giving off a concentrate apple odor used in conjunction with the red sticky ball trap. The mated female fly looking for apples to insert her eggs into is attracted to the red sticky ball trap by a plastic vial filled with butyl hexanoate (apple volatile) hung within 10" of the red ball. See Dr. Ron Prokopy's latest report on this printed in this Bee Line.

Let's face it; the use of these traps is a messy, distasteful job. I find the Gempler brand red sticky ball much easier to maintain than any other trap. Its main virtue is the heavy metal hanger that provides a handle to hold onto while you clean and recoat the trap. It takes me about 5 minutes to remove the ball trap from the tree, chuck it up in a vise, scrape off the old sticky coating with a putty knife, apply a new sticky coating and re-hang the ball. It takes me about 11 minutes to service the yellow sticky panel. I find the Ladd trap is pure hell to service. The flimsy plastic panel provides nothing to hang onto.

As I remember Dr. Prokopy reported at the 1994 NAFEX meeting (Umass, Amherst) that his workers could service 20 to 30 red ball traps per hour. This was done in the orchard by grabbing the ball hanger with vice grip pliers, scraping off the old sticky and applying a new coating. John LaBoyteax (footnote 2) reported that they serviced the red sticky ball traps in his organic orchard by just dipping the balls into a heated vat of Tangletrap. By the way, Gemplers sells a citrus oil-based solvent for Tangletrap cleanup of hands, tools and traps.

Deploy traps by June 1. for the red balls select a sturdy branch at head height, 1½ to 3 feet inside the outermost foliage with plenty of fruit nearby. Clear a 10 to 12" zone around the trap to increase visibility and hang the butyl hexanoate lure within 10 to 12" of the trap. Deploy the panel traps within the outer third of the fruiting canopy of the tree, with the trap positioned so that the broad surface is exposed to the foliage. Remove foliage from around the traps for 12 to 18" to make it more visible to the flies.

As for trapping efficiency I offer our 1996 results. Three Gempler brand red sticky ball traps with butyl hexanoate lures and three ammonium acetate baited yellow sticky panel traps were deployed in some of our apple trees on June 1. One Ladd trap was deployed on August 8. All traps remained deployed until harvest and we captured a total of 1204 flies. No attempt was made to identify how many were apple maggot flies and how many were snowberry maggot flies. A total of 704 flies were captured on the red sticky balls, 374 on the yellow panel traps and 126 on the Ladd trap. Some apple

maggot damage was noted in fruit from a Jonagold, Melrose and Holstein tree. The Jonagold and Melrose are large trees and I did not have enough traps deployed. Dr. Prokopy recommends at least one trap per tree and one trap for every 100 apples in a tree. I had no traps in the Holstein tree.

Conclusions and Recommendations: If you choose to deploy but one kind of trap I would have to recommend the red sticky ball trap and butyl hexanoate scent lure. They seem to be more effective than the other traps, are easier to maintain, and attract the apple maggot fly only, not the snowberry maggot fly. This season I am going to continue with a combination of red sticky ball traps and yellow sticky panels traps and also deploy the number of traps recommended by Dr. Prokopy; the red sticky ball trap and butyl hexanoate lure to catch the older, reproductively mature female flies seeking fruit in which to insert eggs and ammonium carbonate baited yellow sticky panel traps to catch the younger flies seeking protein sources (food). I firmly believe that a combination of good sanitation practices and use of traps will minimize apple maggot fruit damage to acceptable levels. Maybe not quite as good as an Imidan spray program but much more environmentally friendly.

As you can tell, much of my material has come from the book Orchard Pest Management, my bible for insect problems. there is a wealth of reference material available on apple maggot. One report given to us at the Hood River meeting lists no less than 66 references with 13 of them tied to Ron Prokopy (footnote 6). A very interesting report, by the way.

I also recommend calling 1-800-874-4755 and ordering the Gempler IPM (Integrated Pest Management) catalog. I have no stock or interest in the company but do appreciate what they are doing in the way of IPM supplies. It is fascinating to go through their catalog and see all the books and supplies for farmers' use in IPM programs. You can sign up for their free newsletter, contact them on the World Wide Web; <http://www.gemplers.com> to join an IPM discussion group and you can even subscribe to a customized degree day report for this area that is faxed or e-mailed to your home each day. Just the thing for those who don't want to mess with a max-min thermometer and all the record keeping to time spraying for codling moth-- only \$50.00/month.

Just a bit of background information; Ronald Prokopy, Ph.D., is an entomologist with the University of Massachusetts, Amherst, and I believe one of the foremost researchers of apple maggot in the U.S. I have seen references to his work dating back to 1968. I was told that Tom Green, Ph.D., the IPM product manager for Gemplers, did some of his graduate work under Dr. Prokopy. Dr. Green started an IPM supply business in Amherst, MA called Pest Management Supply, Inc and then sold this business to Gemplers, becoming their IPM product manager.

I have one further recommendation. In this day of ever increasing budget cuts for higher education, particularly agricultural research, maybe it's time we take action. How about some grant money from WCFS,

WWTFRF and Master Gardener foundations to WSU for further apple maggot research and publication of a good up-to-date Extension bulletin on Apple Maggot control for Western Washington commercial and backyard orchardists. Maybe the WSU personnel could even consult with Dr. Prokopy on this. The apple maggot problem is not going to go away, and the pest will gradually expand its territory northward into Skagit and Whatcom counties and British Columbia.

#### References cited

- 1) Orchard Pest Management by Beers, Brunner, Willett and Warner
- 2) Meeting on Alternatives in Apple Maggot Management at the Hood River, OR County Extension Office Nov 14, 1996 Keynote address: Apple Maggot Management by John

LaBoyteaux, Camp Grant Ranch, Garberville, CA. This meeting was sponsored by the Northwest Coalition for Alternatives to Pesticides (NCAP)

- 3) Letter from Elizabeth Beers to Marilyn Tilbury dated September 19, 1996
- 4) Tree Fruit IPM Insect Identification Sheet #8 for Apple Maggot from the Cornell-Geneva Research Station, NY
- 5) Behavioral Control of Apple Maggot Flies article by Ronald J. Prokopy and Jennifer Mason, Dept of Entomology, Umass, Amherst 1995
- 6) An Analysis of Non-chemical Tactics to Eradicate the Apple Maggot by Brook Murphy, Exotic Pest Analysis Staff, California Dept. of Food and Agriculture, February 1986

## DECLINE MAY BE RELATED TO ROOT PROBLEMS

from an article by Melissa Hansen  
Good Fruit Grower January 15, 1997

Examining feeder roots of fruit trees will provide telling clues for replant and tree decline problems Bill McPhee stated at the Washington State Horticultural Association annual convention held in Yakima last December.

Many of the decline problems in the top of the tree are symptoms of problems in the root system, he went on to say. Evaluating the root system is relatively easy, needing only a shovel and some digging.

Initially, when McKee began work years ago in Canada's tree fruit industry, he thought the majority of decline problems were attributed to crown rot. He believed that if he could identify early stages of crown rot he could solve some of the tree decline problems.

Mushrooms growing around and on the base of trees and rot on the outside layer of bark were thought to be indicators that crown rot was moving in. In a young orchard suspected to have crown rot he found rot on the top of the bark, but upon examination of the root system, he discovered the roots had never developed.

McPhee then began looking at the root system of larger trees that were experiencing decline problems. Typically, he would detect disorders at the lower level of roots. "It's those little, white, fine, feeder roots on the tips that tell the story," McPhee said. Healthy feeder roots, found at the very end or tip of a tree's root system, should be white and showing flush root development. This is usually easy to spot in the spring and late summer growth periods.

Feeder roots that are black, crumbly, or missing are indicators of fungus or nematode problems. Sandy soils, common to British Columbia, are also conducive to nematodes. If the feeder roots can be rejuvenated, and begin to show a white flush, the tree will demonstrate a quick response on top of the soil, reversing the decline.

Root examination can help growers determine the extent of winter injury in young trees and can help in developing nutritional and pruning strategies to save the tree. Additionally, if herbicide damage is suspected from decline in the top of the tree, visual inspection of the roots will help provide clues for diagnosis. Although roots are not damaged from herbicide applications, he said the chemicals will girdle the tree.

In healthy root systems, crown or root galls that are found on the trunk do not create problems. However, if the root system is already weak, then the galls will contribute to decline of the tree, McPhee stated.

Although root systems are complex, the simple task of root digging can provide early warning to orchardists. Reductions in yield and quality from tree decline may be avoided if the problem is identified early enough.

Bill McPhee is horticulturist for Okanagan-Similkameen Growers Cooperative in Oliver, British Columbia.

No great thing is created suddenly, any more than a bunch of grapes or a fig. If you tell me that you desire a fig, I answer you that there must be time. Let it first blossom, then bear fruit, then ripen.

# EVALUATION OF ODOR LURES FOR USE WITH RED STICKY SPHERES TO TRAP APPLE MAGGOT FLIES

by Alan H. Reynolds and Ronald J. Prokopy  
Department of Entomology, University of Massachusetts

Red sticky spheres have shown promise as an alternative to insecticide for control of apple maggot flies in orchards. Such spheres resemble ripe apples in size, shape, and color and are visually attractive to maggot flies at distances of up to about one yard. To increase the effectiveness of these spheres, odor lures also can be used, which serve to draw flies from greater distances. In a study in 1995, we tested two odor lures known to be attractive to apple maggot flies in combination with red sphere traps in commercial orchards. The odors were butyl hexanoate (an odor emitted by ripening apples) and ammonium carbonate (an odor emitted from fly food sources such as bird droppings). Butyl hexanoate is thought to be more attractive to older, reproductively mature flies (with a large egg load) seeking fruit in which to lay eggs. Ammonium carbonate may be more attractive to younger flies (with a small or no egg load) seeking protein sources necessary to achieve sexual maturity. We hoped to discover which odor (or odors) would optimally increase fly captures on spheres.

## Material & Methods

Each butyl hexanoate lure consisted of a capped 15 ml polyethylene vial filled with liquid hexanoate, which diffused through the walls of the vial. Butyl hexanoate currently is available from commercial sources as formulated product in ready-to-use dispensers. Each ammonium carbonate lure was a commercial type (produced by Heath, Gainesville, FL), consisting of a sealed plastic container with 1.7 grams of ammonium carbonate dispensed from a small hole (a plastic flap covered the hole to protect against rainfall). Although these ammonium carbonate lures are not available for widespread commercial use, they represent prototype lures that could be obtained easily by growers.

For our tests, four growers in central and western Massachusetts generously agreed to allow us to use trees in their orchards. In each orchard, we selected plots of about 50 trees (based on similarities in tree size and spacing) which were located at the corners of larger orchard blocks. Red spheres and lures were hung on the perimeter trees of each plot at a spacing of about 5 yards between traps (about 14 traps per plot). Traps were hung about 5 feet above ground (depending on tree size) so that there was no fruit or foliage within 8 inches of a trap (but as much as possible outside of 8").

We tested four combinations of odor lures: 1) butyl hexanoate only, 2) ammonium carbonate only, 3) both butyl hexanoate and ammonium carbonate, and 4) no odor. Each orchard plot was assigned one of these odor treatments. Odor lures were placed within 8 inches of the spheres (usually on the same branch).

Traps were deployed initially during the first week in July and were maintained through mid September. Once every 2 weeks, the traps were checked and

cleaned of captured apple maggot flies and other insects. Odor baits were replaced if necessary.

## Results & Conclusions

The data from this experiment are presented in Table 1. Red spheres baited with butyl hexanoate consistently captured more flies than spheres baited with ammonium carbonate or no odor. This trend was observed throughout each of the five 2-week trapping periods. Ammonium carbonate was not effective, capturing only about as many flies as the no-odor treatment. In addition, spheres with both ammonium carbonate and butyl hexanoate were more effective than spheres with butyl hexanoate alone. A subsequent analysis of captured females showed that there was no difference in reproductive maturity of females among odor treatments. For the most part, females captured on all of the odor treatments throughout the season were sexually mature (>90%) and of high egg load (>20 eggs/female).

Table 1. Average number of apple maggot flies captured on odor-baited or unbaited red spheres in commercial orchards. For trapping periods, "early" refers to the first two weeks of the month, "late" refers to the last 2 weeks of the month

Trapping Period	No odor	Butyl hexanoate	Ammonium carbonate	Both odors
early July	2.2	13.1	1.7	10.7
late July	6.7	38.5	5.7	38.8
early Aug	10.2	40.6	6.5	36.5
late Aug	5.3	25.1	---	---
early Sep	3.5	14.6	---	---

In a previous study in an artificial orchard of potted apple trees, we observed that ammonium carbonate increased maggot-fly captures on red spheres when used alone or with butyl hexanoate. However, this was not the case in commercial orchards. There are several possible explanations for the ineffectiveness of ammonium carbonate in commercial orchards. Part of the problem may stem from the design of the dispenser. Typically, under the hot summer orchard conditions of 1995, all of the ammonium carbonate would dissipate within a week of deployment, leaving an empty container for the duration of the 2 week period. In addition, we observed that the vast majority of captured females were sexually mature. Once mature, maggot flies do not require as much protein as immature flies, and therefore may not respond to a protein food odor such as ammonium carbonate. Such mature flies (with a developed egg load) are more interested in finding egg-laying sites, which may also explain the greater number of captures on spheres baited with butyl hexanoate.

First, ammonium carbonate should probably no longer be considered as a viable odor attractant for use with red sticky spheres in commercial orchards. Second, butyl hexanoate was shown to be very effective,

These findings are important for several reasons. Capturing four to six times more flies than unbaited spheres throughout the growing season. There was some concern that later in the season, ripening apples might emit enough natural butyl hexanoate to mask the butyl hexanoate in the lures. This, however, was not observed in our study. Based on the results of this

work, we conclude that in commercial orchards, butyl hexanoate is an excellent lure for use with red sticky spheres to capture maggot flies, whereas ammonium carbonate is not.

The above article appeared in the Fall 1996 issue of Fruit Notes, volume 61 (Number 4). Dick Tilbury forwarded it with his Apple Maggot report. Dick adds: The butyl hexanoate lures (\$1.95 ea) are available from Gemplers, P.O. Box 270, Mt Horeb, WI 53572.

## CHESTNUT GROWERS FORM ASSOCIATION

With the goal of sharing information about cultural practices and marketing, 30 western chestnut growers have formed an association based in Oregon and headed by Randy Coleman. Coleman says that a lack of current information about cultural practices such as disease and insect control led the growers to form the group, which is called the Western Chestnut Growers Association.

"You can go to the university and get pamphlets about how to grow tomatoes, but there isn't information about growing chestnuts," explains Coleman, who's been in the business nine years.

"That was part of the reason for forming the group—to share the information everybody has gathered along the way."

Because most members have young orchards, the group will not focus on marketing until their plantings mature.

At this point, Coleman says members will not pay an assessment to fund promotion but instead will concentrate on educating consumers about their product.

"A lot of people have no idea what a chestnut is or what to do with it," Coleman says. "We plan to use our marketing to educate the customer in order to create some of that market." Market development is extremely important because, as Coleman points out, "There's not a processor you can sell truck loads of chestnuts to."

Membership dues are \$40.00 initially and \$20.00 annually. For more information, contact Coleman at P.O. Box 641, Amity, OR 97101

## BUNCH ROT CONTROL IN GRAPES

Leaf removal is still the most important and effective step that can be taken by grape growers to control bunch rot, according to Pacific Northwest University Extension specialists. When performed at berry set or at shatter, after anthers have fallen off the flowers (well past bloom), leaf removal alone will control bunch rot (*botrytis cinerea*) if nature provides a dry growing season and harvest. Care must be taken to prevent the bunches from sunburn, leaving protection on the west side of the vine. If leaves are removed at the proper time, the berries produce a thicker cuticle, preventing sunburn problems.

Trials have shown vineyards with leaf removal to have 5% incidence of bunch rot compared with 28% rot in untreated vines. A lot is known about the epidemiology of this disease, but not how to get rid of it.

Researchers know that there must be free moisture for disease conditions and that it overwinters in canes, cluster stems, and mummified grapes and bunches left in the vineyard. Upon receiving moisture, the fungus erupts to spread spores. Rain early in the season will infect berries; rain late in the season also brings disease.

It is known that pulling basal leaves always results in better berry quality than if they were not pulled. While some grape varieties are more susceptible to rot than others, growers can learn to evaluate certain bunch

characteristics that favor rot incidence. These include cluster architecture—cluster tightness and formation—and the amount of the protective epidermal layer produced by the berries. Cabernet Sauvignon is one of the least susceptible wine grape varieties, while Gewurtztraminer, Chardonnay, Pinot noir and Riesling are more susceptible.

Recommendations for controlling bunch rot in Oregon vineyards start with leaf removal. Fungicides, such as iprodione (Rovral), applied at bunch close or berry touch will provide good control as long as they are not overused. To prevent the development of resistance, the systemic fungicide can be used a minimum of twice during the season, but not more than four times, or resistance can be a problem.

Growers are advised to apply Rovral again at veraison and then to wait to see if rain is expected at harvest. If so, one more fungicide application should be made before the rain. The application must be made before rain releases the spores into the vineyard atmosphere.

The above article by Melissa Hansen in Good Fruit Grower June 1996 quotes Jay Pscheidt, OSU Extension specialist, and Dr. Doug Gubler, plant pathologist at UofC, Davis

## MAKING AN OREGON TO EUROPE CONNECTION

by Thomas Weller from The Capital Press, September 20, 1996

Molalla, Oregon - Jim Gilbert will tell you horticulturists in Eastern Europe have developed useful plants that are little known in the West.

He'd like to introduce nurserymen and growers in this country to some of them.

Since 1990 he's journeyed at least 10 times to Eastern Europe and Russia in search of plant material he thinks might have a future in the United States.

"There's a horticulture curtain, just like (there was) an iron curtain. It's like discovering an entirely new world," said Gilbert during a tour of his Northwoods Wholesale Nursery near here.

A late summer visitor to Gilbert's nursery might notice the unusual plants growing there - goumi, a native bush of the Russian Far East known for its tasty fruit and medicinal qualities; and sea buckthorn (also called sea berry), with its narrow greyish-green leaves and bright orange-yellow berries. There's also the red-purple berries of the edible mountain ash and the red fruit of the cornelian cherry, actually a type of edible dogwood.

These and other "unique fruits from the former Soviet Union and Eastern Europe" are detailed in Gilbert's One Green World catalog.

In August, he spent two weeks in Eastern Germany, Poland, Ukraine and Belarus, collecting cuttings of gooseberries and black currants. Of course, plant material Gilbert brings back must be OK'd for entry into the United States by the U.S. Department of Agriculture inspectors.

All my life I've done what I like doing," said Gilbert, who lives on his 20-acre nursery with his daughter, Emmy. He leases another 20 adjoining acres. "A lot of the work I do isn't financially rewarding. It's kind of like work a university would do. Production agriculture isn't so interesting to me."

Gilbert's interest in offbeat horticulture has also led him to offer lesser-known plants in his wholesale nursery catalog, such as the hardy kiwi, a smooth-skinned cousin of the popular fuzzy kiwi, and paw paw, a native tree to the southeastern United States that produces a fruit with a smooth, custard-like texture and banana-like flavor.

Add to that his fascination with the Russian language—a language he continues to study in and out of school—and you begin to see what prompted him to explore countries in the former Soviet bloc and to seek out the people, especially horticulturists, who live there.

On a personal level, he found them to be open and friendly, despite worsening poverty in countries such as Ukraine, where the average worker earns the equivalent of about \$25 a month—if the worker gets paid at all.

"There's no bitterness toward the West. In fact, there's a great curiosity about the United States." On a professional level, he found fellow horticulturists doing valuable breeding work on plants such as sea berry that play a crucial role in regional diets. For example, sea berry is high in vitamin C. "Eastern Europeans didn't have foreign exchange to buy oranges."

In Eastern Germany, people can buy a Tang-like juice made from tart sea berries that's sweetened and diluted. Other preserve-like products made from sea berry is a source of vitamin C during winter months

Gilbert looks at his horticultural exchange work as part of a long-term effort to build understanding between people. So like any thoughtful guest, he takes gifts to his hosts. One trip he took certain plant hormones and vitamins. Another time his offering was 4,000 plastic nursery labels. "In Ukraine and Belarus, you can't go down to the store and buy plastic labels."

He thinks the plants from Eastern Europe have a future here. They're hardy—sea berry, for instance, can withstand -40° temperatures—don't require many chemicals inputs and can be grown on small acreages and around houses as landscaping.

"We need to get some planting out and observe how they do here. My feeling is that these crops have potential for growers."

Gilbert hopes these plants can attract enough attention that eventually money from the Oregon Lottery might be allocated for research into growing the crops here and for a processing plant study.

He'd also like to see growers give more attention to what he considers undervalued plants, such as chokeberry (aronia), paw paw, edible mountain ash, Japanese flowering quince and hardy kiwis.

### THIS SPACE AVAILABLE

ONE OF THE SUGGESTIONS IN THE SURVEY IS FOR A CLASSIFIED SECTION

MEMBERS COULD PLACE ITEMS THEY HAVE FOR SALE OR TRADE

LET'S HEAR FROM YOU

THERE IS ROOM, AS YOU CAN SEE.

# SAVE THE DATE

## WESTERN CASCADE FRUIT SOCIETY FALL FRUIT SHOW

**SATURDAY OCTOBER 25**

**9:30 a.m. to 5:00 p.m.**

**AND**

**SUNDAY OCTOBER 26**

**10:00 a.m. to 4:00 p.m.**

at

Edmonds Community College  
200th SW and 68th Ave W  
Lynnwood, Washington

**LOTS OF FREE PARKING**

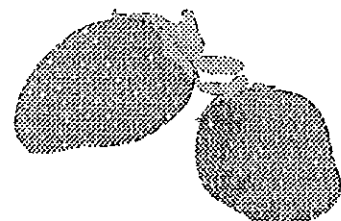
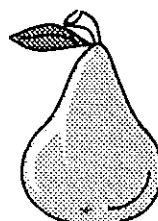
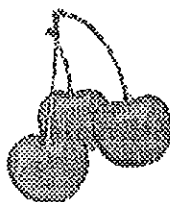
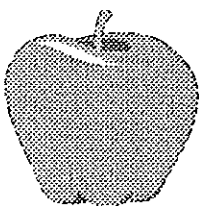
**ADULTS \$3.00**

**CHILDREN UNDER 16 FREE**

The date, the time, the place have been saved--all that needs to be done at this time is for you to save the date so you will be there to make it a success. Whether you volunteer, bring fruit that you have grown to display or attend the lectures, taste the fruit, visit the commercial exhibits you are important to the success of this event. Plan on being there this year. Remember, if you volunteer, you get in FREE.

The Fall Fruit Show is your opportunity to share with other members the fruits of your labor, so to speak, and for you to enjoy the fruits of their labors.

Your board is planning additional features to the event. If you have any suggestions, there is surely a board member who lives within your calling range (so you wont have a toll call) to tell it to. Contact one before June 21 so it can be presented at the next board meeting. Of course, you are welcome to attend and present the idea in person.



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Evelyn Troughton	206-282-6191	2625 13th Ave W #306	Seattle	98119
FAX	206-283-1944			

The Bee Line is the newsletter of the Western Cascade Fruit Society.  
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**NEXT NEWSLETTER JULY 1997**



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## WE WANT TO HEAR FROM YOU

Your Board of Directors needs guidance, as does your newsletter editor. So we are trying to make it easier for you. As you renew your membership, or if you choose not to renew, would you let us know what you think. You may respond even though your membership is not due for renewal

Do you like the 2 column format? Yes \_\_\_\_\_ No \_\_\_\_\_ Didn't notice \_\_\_\_\_ Doesn't matter \_\_\_\_\_

What would you like to read about? \_\_\_\_\_

Please be specific

What changes would you make in The Bee Line? \_\_\_\_\_

What changes would you like to see at the Fall Fruit Show? \_\_\_\_\_

What changes would you suggest for the Spring Sale/Meeting? \_\_\_\_\_

What topics for speakers? \_\_\_\_\_

Is there a particular speaker you would like to have? No \_\_\_ Yes \_\_\_ Name \_\_\_\_\_

How else can we help the home orchardist? \_\_\_\_\_

Why have you decided not to renew? \_\_\_\_\_

Any other comments? \_\_\_\_\_

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### WESTERN CASCADE FRUIT SOCIETY MEMBERSHIP INFORMATION

Please indicate standard WCFS membership or affiliation with a chapter. Dues are as noted.

( ) New

( ) Renewal

Name(s) \_\_\_\_\_

Street Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Phone \_\_\_\_\_ PLEASE SPECIFY ONE CATEGORY BELOW

Standard \$10.00 ( ) North Olympic \$10.00 ( ) Peninsula-Kitsap \$10.00 ( )

Piper Orchard \$10.00 ( ) Seattle Tree Fruit \$18.00 ( ) Tahoma \$10.00 ( ) South Puget Sound \$10.00 ( )

( ) ENCLOSED FIND \$5.00 EXTRA FOR WESTERN WASHINGTON FRUIT RESEARCH

#### HOW CAN YOU HELP THIS YEAR? PLEASE CIRCLE AS MANY AS POSSIBLE

BOARD MEMBER    FALL FRUIT SHOW    PUBLICITY    FIELD TRIPS    SPRING MEETING    SPEAKER  
COMMITTEE CHAIR    ARRANGING FOR SPEAKERS    OTHER \_\_\_\_\_

#### TELL US YOUR FRUIT INTEREST, SO WE CAN PUBLISH ARTICLES OF INTEREST FOR ALL

Apples    Pears    Peaches    Plums    Cherries    Kiwis    Nuts    Berries    Other: \_\_\_\_\_

Make checks payable to WESTERN CASCADE FRUIT SOCIETY and mail to:  
WCFS Treasurer, 2625 13th Ave W - Unit 306, Seattle, WA 98119-2054

SPRING 1997  
YOU'LL FIND IT HERE!

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Page 1	1997 17TH ANNUAL SPRING MEETING
Page 2	MORE ABOUT THE SPRING MEETING
Page 3	MISCELLANEOUS NEWS
Page 3	FOLLOW UP TRIP TO KAZAKHSTAN
Page 4	MANY CAUSES, FEW CURES, FOR COLD DAMAGE
Page 6	VIRUS CONTROL
Page 7	PLANTING DEPTH FOR DWARF APPLES
Page 7	PRUNE LESS TRAIN MORE
Page 8	SPRAY ADJUVANTS
Page 8	GOOD FRUIT GROWER SUBSCRIPTION INFO
Page 9	MULBERRIES: ARE THEY STRICTLY FOR THE BIRDS?
Page 11	OVERWINTERING FIG AND OTHER SUBTROPICALS IN THE NORTH
Page 12	BITS AND PIECES
Page 13	BEEES AND ALASKA
Page 15	BACK YARD ORCHARDISTS ON LINE
Page 16	WCFS AT MT VERNON OPEN HOUSE
Page 16	WWTFRF DEMONSTRATION FRUIT GARDEN PROPOSAL
Page 17	ANOTHER (CENSORED) APPLE MAGGOT REPORT
Page 19	TREE DECLINE MAY BE RELATED TO ROOT PROBLEMS
Page 20	EVALUATION OF ODOR LURES FOR APPLE MAGGOT
Page 21	CHESTNUT GROWERS FORM ASSOCIATION
Page 21	BUNCH ROT CONTROL IN GRAPES
Page 22	MAKING AN OREGON TO EUROPE CONNECTION
Page 23	FALL FRUIT SHOW COMING UP
Page 24	MEMBERSHIP RENEWAL/SURVEY
Page 25	YOUR BOARD MEMBERS

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**WESTERN CASCADE FRUIT SOCIETY EDITOR**  
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