



## Buzz Bombs

Using honey bees to bring bio-control agents to crops

by Matthew Werner

reprinted with permission from the July/August 1996 issue of *Oregon Farmer-Stockman*

Since ancient times, humans have been using bees as a weapon of war. The Romans loaded bee hives on catapults and lobbed them at their enemies. Armies in the Middle Ages dropped bee hives from castle walls to repel invaders. Now bees can also be used in the farmer's age-old battle against crop pests and pathogens. Recent research shows that honey bees can be used as vectors to spread bio-control agents into orchards and other crops.

Honey bees are already the most valuable ally in the insect world. Besides gracing tables with honey and beeswax, bees are the primary pollinators of many economically valuable crops. The new "smart bomb" technique of using bees to deliver bio-control agents has been tested in Oregon, Utah, Georgia and the Canadian province of Ontario.

Alvin Hamson, has been growing apples and pears in North Logan, Utah, for 35 years. He uses finely tuned cultural controls such as water and fertilizer-withholding to prevent fireblight outbreaks in his trees. He also sprays streptomycin, but only when necessary. "Several growers in this area have reported resistance of fireblight to the Ag-Strep, so I avoid using it whenever possible," Hamson explains.

When Sherm Thomson, a researcher at Utah State University, approached Hamson about using his orchard to study bio-control of fireblight, Hamson readily agreed. "I see bio-control as the logical direction we have to move in," he says. What made his project unique was Thomson's use of honey bees to deliver the bio-control agent to apple and pear blossoms.

New flower blossoms are sterile, and fireblight is caused by a bacteria (*Erwinia amylovora*) that colonizes the stigma of newly opened flowers. However, if the stigma is colonized first by non-pathogenic bacteria fireblight can be prevented. Two beneficial bacteria that prevent fireblight are *Pseudomonas fluorescens* (A506 strain) and *Erwinia herbicola* (C91 strain). Both bacterial strains must be applied to the newly opened flower to be effective. When applied using conventional spray equipment, most of the bacteria miss the target and provide no control, and multiple applications are necessary because not all flowers open at the same time.

Honey bees, however, are the ideal vehicle to transport beneficial bacteria into the orchard because they time their foraging to arrive at newly opened flowers. To get the bacteria onto the bees, Thomson used a commercially available hive insert filled with bacteria-laden pollen. The insert forces the bees to pass through the bacteria-pollen mixture on their way out of the hive, coating their bodies in the process. Some growers currently use the hive inserts to increase pollination efficiency in their orchards.

Because pollination was not the goal in the current study, both apple and cattail pollen were evaluated as carriers for the beneficial bacteria.

Thomson's results are promising. Both bacterial strains remained viable on either type of pollen for several weeks, although the cattail pollen was easier to work with. The bees emerged from the hives loaded with the bacteria-pollen mixture, and flowers in the orchard were successfully colonized by the beneficial bacteria. In one trial, *E. herbicola* was present in 92 percent of apple blossoms in a seven-acre orchard, two days after the bacteria-pollen mixture was first introduced into the hives. In another orchard, 72 percent of pear flowers within a 26-foot radius of the hive were colonized with *P. fluorescens* eight days after starting.

Any condition that prevents bee foraging in the intended crop may limit the usefulness of this technique. A study in an apple orchard in Corvallis, Ore., using a freeze-dried preparation of the A506 strain of *P. fluorescens* placed in hive-inserts, found successful colonization of the apple blossoms by A506 in some years. But in years where wet and cold weather prevented bloom-time foraging by bees, A506 was not successfully dispersed into the orchard.

Limitations due to weather may be partly a regional effect. While cold, wet weather in western Oregon limited bee activity in some years, weather was not a limiting factor in the Utah studies. The risk of fireblight is also diminished by the same conditions that limit bee flight, so weather conditions may not be a major limitation to the use of this technique for fireblight control.

Gray mold attack of strawberry fruit follows a pathway similar to the fireblight disease *Cont. on Page 6*

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## Basics in Northwest Beekeeping

by Ron Bennett

September starts our Fall management planning and preparations, and protecting your bees from their neighbor hives and yellowjackets. You need to remember to remove your Apistan® strips after 54 days. It's not only embarrassing to find strips in your hive in Spring, you run the risk of helping to induce fluvalinate (the active ingredient in Apistan) resistance in mites, which will lead to future treatment problems for all beekeepers.

The major nectar flow is over now and the bees are starting to wind their populations down for Winter. But, the populations are still high and there are flowers around (Queen Ann's lace, thistles, mint, and others) for the bees to work, and hives with some storage area will make for a "happier" hive. So, keep supers with a few empty combs on the colonies, especially those that are overly heavy with stores in the brood nest.

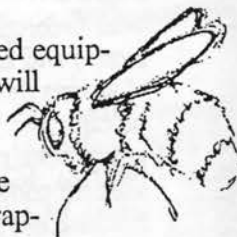
The worst problem beekeepers face in late Summer and Early Fall is robbing. Don't tempt robber bees by exposing honey. Don't work the brood nest unless necessary; stop if robbing starts. One of the best methods to minimize robbing and help your colonies stave off the yellowjacket onslaught is to reduce entrances to a bee space sized slot after hot days are over.

Keep on the lookout for American Foulbrood, chalkbrood and Nosema. You will be treating for these problems later this year, but if you have a problem now, treat it now.

Check your stored comb for possible wax moth infestation. Wax moths (like rust?) never sleep it seems. They can ruin all of your precious combs in little time.

One of the most popular and effective treatments for wax moths are moth balls (don't mix the two different types active ingredient moth balls) or sunlight on the combs. To treat with moth balls, stack your boxes with frames about four to five deep and put a few moth balls (or a handful of crystals) on a paper plate on top of the combs and cover the boxes with large plastic trash bags.

You also need to protect any stored equipment and combs from mice. They will burrow through your stored combs, eat your combs (especially honey supers) and build nests in the boxes. Treat for mice and rats by trapping or use poisons (as you see fit).



# Mason Bee Information

provided by  
OSU EXTENSION SERVICE  
and DOUGLAS COUNTY MASTER GARDENERS

## Subject I: Decline of wild honey bees -

Since 1994 wild honey bee populations have been devastated by two species of parasitic mites. Many domesticated honey bee colonies have also been lost.

This is a nationwide problem. Recent estimates are that 90% of wild honey bee colonies have been lost. In previous years wild honey bees have done most of the pollinating of our fruit trees and gardens. It has also been estimated that 30% of our food supply depends on pollination of a wide variety of plants by bees. Douglas County was considered to be an under pollinated area even before the honey bee mite problem arose.

## Subject II: Mason Bees -

The Orchard Mason Bee, or Blue Orchard Bee (*Osmia Lignaria*), usually referred to as Mason Bees or *Osmia*, is native to Douglas County. It is a very good pollinator as it collects much more pollen than nectar. It is smaller than a honey bee, black in color with a dark blue iridescent sheen on its abdomen (or rear end). A closely related bee (*Osmia Ribifloris*) has an emerald green sheen on its abdomen. Mason bees are very gentle and will sting only if roughly handled.

They are a solitary bee (no hive or queen) and usually nest in holes abandoned by a variety of wood borers. In the deepest part of their hole they form an egg chamber, collect a loaf of pollen and nectar, lay an egg on the pollen and seal up the chamber with mud. They repeat this process until the hole is full of egg chambers. These hard-working little bees only live for up to eight weeks in the spring, usually from the middle of March to the middle of May. This timing is perfect for fruit trees and berries. One of the limiting factors on the Mason bee population is the lack of suitable nest holes. With a minimal amount of effort, we can provide nest blocks that are a proven method of increasing bee populations and assure better pollination of our fruit trees and berries.

## Subject III: Building and placing the blocks -

A Mason bee nest block can be made by drilling a series of  $\frac{1}{32}$  or  $\frac{1}{16}$  holes into almost any piece of sound, dry wood that is free of cracks, providing it is

not treated wood. The holes can be as much as 10 inches deep, but must not go all the way through the wood.

A typical nest block could be made out of a 12-inch long piece of 4x4 inch wood. Since a 4x4 is actually  $3\frac{1}{2}$  by  $3\frac{1}{2}$ , the holes should be 3 inches deep. The holes can be all on one face, spaced  $\frac{3}{4}$  inch apart on center minimum. Our layout would be 4 holes across and 12 holes vertically. This would give a total of 48 holes. An alternate hole arrangement would be to drill row 1 on the left side of the block, row 2 in the front, and row 3 on the right side. And so on down the block. This will spread the bees out a little.

Cleanly drilled holes are desirable. A brad-point bit will give somewhat better results than a steel bit. Try to remove all loose chips from the holes. The blocks will also need a small eye screw or metal strap to hang them up.

A nest block should be preferably hung on the south side of a building (with east and west sides also acceptable), high enough that eaves will protect it from the weather. A block could also be placed on a covered porch. If a dry, protected location isn't available, a small roof could be fastened to the nest block itself. The nest block needs to be fastened in place so it won't be jarred or jolted, or knocked over, as this could dislodge the larval bees from their pollen food supply, thus killing them.

Once you have put up your empty nest block, the Mason bees will find it and begin to make their nests in the holes. A nest block in a well-protected location can be left in place all winter. If it's in a less protected area, it can be moved indoors and stored in an unheated building in the fall (by then the larval bees will be in the cocoon stage and won't be harmed by movement). The nest block would need to be put out the following year about the middle of March.

Because your bee population is expanding, you will need to put out additional blocks next spring. The female bees do all the nest building. They identify their hole by marking it with their scent. When they finish finding a nest hole, unless there is another unmarked empty hole nearby, they will fly away. We can further assist them by planting early blooming plants to assure a continuous pollen and nectar supply, and by providing an artificial mud supply if needed. Another way

Cont. on Page 7

## Hope for Beekeepers

*I received the following copy of the USDA-ARS News from Dr. Burgett of OSU, who received it from Myron Shenk, Extension Pesticide Applicator Training Coordinator, Integrated Plant Protection Center of Oregon State University. BEFORE YOU RUN OUT AND INVEST IN A GRAPEFRUIT GROVE OR THROW OUT YOUR APISTAN STRIPS, REMEMBER THIS IS ONLY PRELIMINARY INFORMATION AND IS NOT APPROVED FOR HONEY-BEES!*

### SMOKING OUT BEE MITES

August 28, 1997  
USDA ARS News

Calming bees with smoke is a long-established beekeeping practice. Now scientists have found that smoke from burning certain plants contains natural chemicals (*unknown chemicals as yet - ed.*) that control honey bee mites. It may have potential as an alternative to using chemicals to control varroa mites, the domestic honey bee's worst threat.

Frank Eischen with USDA's Agricultural Research Service in Weslaco, Texas, has tested smoke from 40 different plants to control varroa mites. The most promising are dried grapefruit leaves and creosote bush, a woody perennial. Creosote bush smoke drove 90 to 100 percent of the mites off bees after a one-minute cage test. Grapefruit leaf smoke drove off 90 to 95 percent of the mites in 30 seconds. The findings are preliminary: more research is needed before scientists could recommend that beekeepers use these plant smokes to control mites (*my emphasis - ed.*)

The ARS scientists, at the agency's Honey Bee Research Laboratory in Weslaco, haven't yet analyzed the active chemicals in the smoke. And they don't know how the smoke controls the mites, but believe it either irritates or confuses them.

Varroa mites began infesting honey bee colonies in the United States in the 1980s. The mites attach to bees and feed on their blood. If the infestation is severe and left untreated, the mites can kill the entire colony.

The standard treatment for the mites is fluvalinate, a synthetic pyrethroid harmless to the bees. Beekeepers put fluvalinate-impregnated strips in their hives to kill mites. But they can only use the strips when bees are not collecting nectar and pollen. Otherwise, the chemical could contaminate the honey. Also, European researchers have reported that mites are developing resistance to fluvalinate.

## Beekeepers Can Help Stop AFB Resistance to Terramycin

Tolerant strains of American foulbrood (AFB) to terramycin are developing, however, it is not a panic situation. Dr. Shimanuki reports that a number of foulbrood samples mainly from the Minnesota/Wisconsin area have been tested. Dr. Shimanuki is almost certain (without scientific research to now support it) that the (improper) use of extender patties has caused the problem.

First of all, beekeepers are mixing their own recipes, which in many cases are under-dosing the colony. I mean that they are not mixing enough terramycin into the patty. As a result, they are killing the foulbrood organisms that are more easily killed, while allowing the more tolerant organisms to survive and reproduce. Secondly, even though a beekeeper may be mixing the correct dose into the patty, small colonies do not consume the mixture fast enough to receive the needed amount of terramycin. The critical issue is that beekeepers can not allow these more tolerant bacteria to continue reproducing.

### Recommendations:

1. Continue to use extender patties only as a preven-



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2. If you find a colony with AFB, use the terramycin dust (3 applications 4-5 days apart) before you place an extender patty in the colony.

3. Be sure that you apply a dose of 200mg of the active ingredient (OTC) to the colony at each treatment. Dr. Shimanuki is confident this this dose still works.

4. Begin routinely inspecting your bees for AFB. When you find heavily infected colonies (with several frames and foulbrood a scale) or colonies that do not respond readily to terramycin, Burn! Burn! Burn! At least burn the infected brood combs and then apply the correct dose of terramycin dust followed by a patty.

One concern that was expressed at the Apiary Inspector's meeting (in January 1997) is that many beekeepers are now expanding their colony count as fast as possible. They are placing bees in old equipment that has been stored for years. They are not being as vigilant about using terramycin as they should be. Consequently, AFB incidence is on a dramatic increase in some states. As a state apiary inspector, I am asking each of us to do our part. I'm asking our inspectors to be on a close lookout for AFB this year. Let's all do what we can to prevent a "resistant strain of AFB" from developing.

Terramycin Dust Formula: One colony - Mix 1 tsp. of TM25 (comes in 6.4 ounce yellow packet containing 10g oxytetracycline) with 5 tsp. powdered sugar.

48 colonies - Mix 1 cup or one 6.4 ounce packet of TM25 with 5 cups (2 lb.) of powdered sugar.

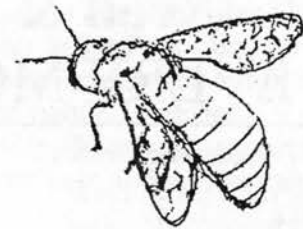
Apply two tablespoons of mixture to the top bars of the hive above the cluster. Apply one or two treatments in the spring and fall to prevent foulbrood disease.

(Reprinted from Wisconsin *Badger Bee*, March 1997. Previously published in *Iowa Beekeepers Newsletter* and the *Mississippi Beekeepers' Assn. Newsletter*. - taken from the July 1997 *Speedy Bee* - author not listed).

## Dr Royce to Discuss Meadowfoam at the OSBA Fall Conference

Dr Lynn Royce of Oregon State University Department of Entomology, will talk about Meadowfoam pollination in the Northwest. This new crop has caused all sorts of excitement in recent years. It requires two hives per acre, and last year, the Meadowfoam Growers Association harvested 8,000 acres. This coming year, they are looking at a significant increase in acreage. This will mean a lot more demand for hives.

Meadow foam is a new Oregon crop that is grown for it oil. It is a rotation crop for grass seed growers that provides an alternative to field burning. Meadowfoam is a plant that benefits from the activity of pollinating insects. Honey bees are suddenly important to grass seed growers. These are farmers that have grown a wind pollinated crop for years and the only good bee was a dead bee. Needing bees is a new concept for these farmers; they do not understand and would rather not have to deal with bees. Your job as beekeepers is not just pollination but education as well. You must be willing to work with and educate the grass seed growers. Meadowfoam will be discussed from a bee's perspective, a beekeepers perspective and a growers perspective.



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Cont. from Page 1 of pears and apples. Gray mold is caused by a fungus (*Botrytis cinerea*) which infects strawberry flowers as a prelude to invading the fruit. Another fungus, *Gliocladium roseum*, controls gray mold at least as effectively as the fungicide Captan when it is applied to strawberry flowers. Researchers in Guelph, Ontario, recently reported on their efforts to use honey bees to deliver the bio-control fungus to strawberries.

A powdered commmeal-fungal spore mixture, loaded into a hive insert, was used to coat the emerging bees. The bees delivered enough fungal spores to the strawberry flowers to suppress gray mold as effectively as when the bio-control fungus was sprayed on the flowers. In fact, the bees delivered more spores per flower than spraying did and they maintained a higher and more stable bio-control population due to frequent visits to the flowers. Occasional cool or rainy periods reduced bee visits, but populations of the bio-control fungus remained high enough to effectively suppress gray mold.

Bees can also be used to send a knock-out punch to crop-munching insects. Heliothis nuclear polyhedrosis virus (HNPV) has been used for years to control the corn earworm (*Heliothis virescens* and *Helicoverpa*).

Researchers in Tifton, Ga., used honey bees to deliver HNPV to fields of clover, a seasonal host of the corn earworm. The bees foraged readily on the clover flowers, liberally dusting the flowers with HNPV in the process.

Mortality of earworm larvae increased by up to 40 percent in clover fields foraged by HNPV-carrying bees.

Getting the bees to forage on the crop and not on weed flowers or neighbors' cherries, is another problem that needs to be worked out.

"It's the nature of the bees," says Thomson. "Bees will forage on the sweetest flowers first, and pears happen to be low on their preference list."

Rachel Elkins, a University of California Cooperative Extension farm advisor in Lakeport Calif., agrees with Thomson's observations. "Bees are not partial to pears," she says. "I have seen pear orchards where dandelion was in bloom, and all the bees were down in the dandelion." Bees were similarly distracted in one of the Oregon trials when nearby peach and sour cherry orchards were in bloom, and in one Ontario trial when rapeseed was flowering close to the study plots.

Increasing the density of bees in the area, by using more hives, may help to insure that bees forage on the intended crop flowers. It may also be possible to apply attractants to the crop flowers, or repellents on nearby competing flowers but these materials have yet to be adequately developed.

Thomson feels that he has done all he can as a researcher to develop this technique, but no one has come forward yet to develop its commercial potential. The pieces are all there. A bio-control agent for firelight hit the market this spring, and more bio-controls are on the way. The hive inserts are already commercially available and perhaps all that needs to be worked out is an improved carrier for loading the bio-control agent onto the bees. "Like all good ideas," remarks Thomson, "who knows how long the research will sit there before someone picks it up and uses it?"

Matthew Werner is a soil ecology specialist at the University of California-Santa Cruz.

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(Cont. from Page 3)

we can benefit all species of bees is to consider bee welfare when spraying pesticides. Try to follow the general guidelines of not spraying plants when they are blooming, don't spray when the wind is blowing, and mow flowering weeds before spraying them. Try to spray in the evening, when the bees have returned to their nests.

Large numbers of Mason bees are being used in commercial agriculture in Douglas County and elsewhere. The need for more efficient methods, and concerns about buildup of molds and disease organisms in wooden nest blocks after several years use have led to the development of more sophisticated materials and products for Mason bee nests. Six inch long reusable cardboard or fiberglass tubes lined with replaceable paper straws are available from commercial suppliers. For those who don't wish to wait for their Mason bee populations to build up gradually, bees can also be purchased.

Most of the material on this information sheet was condensed from Washington State University Extension Bulletin 0922 and from information from Oregon State University, fact sheet #10. These fact sheets can be obtained at your local Extension Service office.

## State Fair a Success!

Once again the OSBA Bee Booth at the Oregon State Fair was a big hit with all who attended. The booth is managed by the Willamette Valley Beekeepers and we all want to give a special thanks to Walt Nichol, Ken Meier, Richard Farrier, Dick and Donna Trent (winners of the "Ironman" honor for the most hours of booth duty), Ron and Judy Bennett, Dave Loescher, Schumacher Video of Sublimity, Susan and Jerry Lalack, Don and June Zink, and all of those troopers who did a round of booth duty this year.

The State Fair bee booth is a unique opportunity for beekeepers to talk directly to the general public about bees and beekeeping. This is the single most important presentation we have during the year and the effort of all who participated by doing booth duty or bringing fair entries deserve all of our thanks.

The number of entries was slightly down this year, but the quality was excellent. The Oregon State Beekeepers Trophy for the most points in the commercial division was presented to Richard Farrier of Jefferson. The Ruhl Trophy for the most points in the hobbyist division was presented to Michael Laux of Beaverton. Michael has won this award for three consecutive years now and will now keep this Trophy. Next year, a new trophy will be started.

We were a little short of observation hives this year with only one entry! We have averaged about five hives but this year, we were short. The observation hives are the most popular part of our exhibit and draw people into conversations on bees and beekeeping. I had planned to bring in my hive (which had won ribbons two weeks prior at the Polk County Fair) on the first Sunday, but they had stressed out from the county fair and absconded (while I watched).

We had almost 100 people request more information or inquire about bees and beekeeping follow-up. Each one of them will be answered and a list will be provided to all local clubs and organizations for their individual follow-up.

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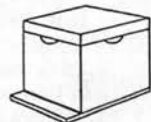
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# Recipes from the National Honey Board

The following group of recipes is from the hand-out provided by the National Honey Board which was distributed at the OSBA Bee Booth at the Oregon State Fair. We have already published the **Linguini with Honey-Sauced Prawns** and **Steak Jamaican** from this promotional sheet in a past issue, and here are the rest of the wonderful recipes on this sheet.

If you have need for a promotional sheet like this, or similar to this sheet, contact the National Honey Board - they have many ways to help you promote honey. Remember, September is National Honey Month!

This promotional sheet starts with the following advice:

## Honey, what's for dinner?

It's a daily challenge. Reach for the honey and you have the answer with these delicious, easy-to-prepare ideas. With its versatility, smooth texture and glorious taste, honey is a natural when comes to dinner. Honey adds the golden touch of a special sweetness only nature creates. Watch how honey's wholesome appeal and rich body adds a glow to every family meal. Honey, may I have seconds?

Because you want your cooking to be quick and easy, here's a kitchen tip: when measuring honey, coat the measuring cup with vegetable cooking spray so the honey will slide right out when poured. It's just a little part of the magic that makes honey the perfect ingredient for dinner.

The recipes are as follows:

### Honey Herb Sauce for Vegetables

Makes about 2/3 cup.

- 1/4 cup honey
- 1/4 cup butter or margarine
- 2 tbsps. onion, minced
- 1/2 tsp. thyme, crushed
- salt and pepper, to taste

Combine all ingredients in a small saucepan and bring to a boil; cook 2 minutes. Toss with vegetables of choice such as: peas, zucchini, spinach, broccoli, green beans, etc. Serve over couscous as a vegetarian entree or alone as a side dish.

### Honey Fried Chicken

Serves 4-6

- 3 pounds meaty chicken pieces
- 3/4 cup honey
- 3/4 cup buttermilk baking mix, or more
- 2 tsp. dry mustard
- 1/2 tsp. paprika
- salt and pepper, to taste
- vegetable oil

Coat chicken with honey; set aside. Combine buttermilk baking mix, mustard, paprika, salt and pepper; dredge chicken in mixture. Heat 1/2-inch oil to 375°F. in a 12-inch skillet over medium heat. Carefully place chicken in hot oil and cook about 5 minutes or until underside of chicken is golden;

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34769 E. Lacombe Drive  
Lebanon, OR 97355



turn chicken pieces and cook about 5 minutes, turning as needed. Reduce heat to low and cook 7 to 10 minutes longer or until juices run clear. Remove chicken; drain on paper towels.

### Asian-Style Vegetable Stir-Fry

Serves 4

¼ cup	honey
¼ cup	prepared stir-fry sauce
¼ tsp.	crushed red pepper flakes, or more
4 tsp.	peanut or vegetable oil
2 cups	small broccoli flowerets
2 cups	small mushrooms
1 small	onion, cut into wedges and separated into 1-inch strips
1 med.	carrot, cut diagonally into ½-inch slices

Combine honey, stir-fry sauce and pepper flakes in a small bowl; set aside. Heat oil in a wok or large skillet over medium-high heat. Add vegetables; cook and stir vegetables 2 to 3 minutes or until tender. Add honey mixture; cook and stir about 1 minute or until vegetables are glazed and sauce is bubbly. Serve vegetables over steamed rice or cooked noodles.

### Finger-Licking Honey Spareribs

Serves 4

1 cup	chili sauce
½ cup	honey, or more
¼ cup	minced onion
2 tbsp.	dry red wine, optional
1 tbsp.	Worcestershire sauce
1 tsp.	Dijon-style mustard
3 pounds	pork spareribs
	salt and pepper, to taste

Combine the first six ingredients in a small

saucepan and bring to a boil over medium heat, stirring constantly. Reduce heat and simmer, uncovered, 5 minutes. Sprinkle spareribs with salt and pepper. Place on a rack over a roasting pan; cover with foil and bake at 375°F., 35 to 45 minutes. Uncover and brush generously with sauce. Bake 45 minutes, brushing with sauce every 15 minutes, until spareribs are fully cooked and tender. Cut spareribs into serving portions and serve with remaining sauce.

### Some Cooking Ideas

from Ron Bennett

Just as a side note for all of you chefs out there, here is a little hint that might help you expand your menus. The sauce called "Worcestershire Sauce" under several different brands is one of the artifacts of the British Empire. The "Worcestershire Sauce" recipes are derived from a basic Indian (as in India) and Southeast Asian ingredient called tamarind. Grown as a seed crop, the tamarind has a slightly sweet and lemon-type taste. The "Worcestershire Sauce" is basically tamarind and soy sauce with cinnamon and cloves thrown in. The easiest way to make your own "Worcestershire Sauce" is to mix tamarind paste (sold in most Asian markets) into soy sauce and add spices (cinnamon, cloves, allspice, lemon grass, ground cardamom, or others to taste). The tamarind paste looks like soft road tar, and a small amount dissolved in a liquid is an excellent way to add a "soft" citrus flavor to any dish.

The Asian-Style Vegetable Stir-Fry calls for peanut or vegetable oil. I highly recommend that you use peanut oil, or better yet add a dash of sesame oil, which will give you a more authentic tasting dish. The peanut oil holds up better to heat and sesame oil adds a wonderful "nutty" flavor to any dish and only requires a very small amount to add flavor.

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## Calendar of Events

Sept.	1	Southern Oregon Beekeepers
	2	Tualatin Beekeepers
	4	Tillamook Beekeepers
	9	Lane County Beekeepers
	11	Portland Beekeepers
	19	Coos County Beekeepers
	22	Willamette Valley Beekeepers
Oct.	6	Southern Oregon Beekeepers
	7	Tualatin Beekeepers
	2	Tillamook Beekeepers
	12	Lane County Beekeepers
	9	Portland Beekeepers
	17	Coos County Beekeepers
	27	Willamette Valley Beekeepers
Oct. 30- Nov. 1		Tri-State/OSBA Fall Conference, Hood River

## A Full Plate for Anyone in Beekeeping - an Event Not to be Missed.

The Best Western Hood River Inn is the site of the "Northwest Corner" Beekeeper's Conference this Fall, presented by the Oregon State Beekeepers Association with the Idaho State Beekeepers Association, Washington State Beekeepers, and the British Columbia Beekeepers Association.

Fill out your pre-registration form and send it to Bart Snyder TODAY. Avoid the line at registration and make your room reservations NOW! The Best Western Hood River Inn has special rates for beekeepers attending the Conference. Call them direct at 800-828-7873.

This "Who's Who" of beekeeping promises to make this conference one of the highlights of the year, nationally!

AGENDA Thur.-Reception & Registration.  
Friday Registration, Welcome from the OSBA - George

Hansen, *Evolution of a "Full Service" Apiary* - Fred Rossman *Bee Economics Software* - Dr. Gloria Di Grandis-Hoffman *"Of Mites and Bees"* - Dr. Mark Winston *"Pollination Requirements and Characteristics for Meadowfoam"* Dr. Lynn Royce, *"Squash and Pumpkin Pollination Requirements"* Ms. Jenny Gavilence, *"Varroa and Secondary Infections"* - Dr. Keith Delaplane, & State/Province Business Meetings and Elections *American Beekeeping Federation and National Honey Board Report, & The BANQUET with "Problems in the industry and How to solve them,"* Dr. Mark Winston, followed by the BENEFIT AUCTION.

Sat. *"Essentials Oils for Varroa Control Experiment,"* Dr. Steve Shephard, *"How Much Mite Infestation Can You Live With?"*, Dr. Keith Delaplane, *"1997 Oregon and Washington Pollination Survey,"* Dr. Michael Burgett, OSU Bee Lab Research Luncheon, with Dr. Burgett, *"Report on the OSBA WWW HomePage and the Pollinator's List,"* Ron Bennett, and the *"Crop Pollination Issues" a Forum.*

### LOOK AT YOUR ADDRESS LABEL

Technology has finally caught up with our mailing list. You will note that there is a code or more likely a date after your last name. This is the date of expiration of your membership. We will be tightening up on past due membership dues starting next month. You will stop receiving the *BeeLine* and your membership will be inactive 60 past the due date.

## Membership and Publications

Membership in the Oregon State Beekeepers Association is open to anyone who has an interest in bees and beekeeping. You do not need to own bees or reside in Oregon to join the OSBA. OSBA Membership is \$15 per person and includes a vote in all OSBA elections, listings on the WWW HomePage, discounts on other bee-related publications, 10 issues of *The Bee Line*, and more. And, if you are already a member of a local group, your group will receive \$1.00 from your OSBA dues. Foreign membership is \$23.

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