

Pest Alert

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SUNFLOWER WHITE RUST UPDATE
ARMY CUTWORM
OZONE TREATMENT OF ONIONS
TURF CARE TIME IS UPON US AGAIN
WHEAT UPDATE
ALFALFA WEEVIL
THE WEEDS ARE COMING, THE WEEDS ARE COMING
WHAT'S NEW IN THE PESTICIDE PROGRAM?
FQPA AS A TRADE BARRIER
RISK LOW FOR CAREFUL USERS OF OPS
FOUR MORE YEARS FOR METHYL BROMIDE
FINALLY THE CONSUMER RIGHT-TO-KNOW BROCHURE
PESTICIDES AND FOOD SAFETY
ON COMPUTER "BUGS"
MILLIPEDES COME MARCHING IN
ZIMMERMAN PINE MOTH
WHITE PINE WEEVIL

SUNFLOWER WHITE RUST UPDATE

A recent article in *Plant Disease* (Vol. 83, Page 77, 1999) by A. Viljoen et al. reported on the seed transmission of white rust (*Albugo tragopogonis*) of sunflower in South Africa. Apparently, the fungus and its disease appeared in fields that were planted out of season and were located more than 300 kilometers (186 miles) away from previously infested fields.

They observed head infection as white rust pustules on head bracts, and/or grayish lesions with dark-colored oospores on stems and petioles. Colonization of seed was confirmed in a few instances. Since the incidence of seed infection is low,

spread of disease to infested fields is expected to be insignificant. Of more concern, however, is the possible long-range dissemination of the fungus by means of infected seed into regions or countries where the disease has not been previously reported.

Colorado State University, the sunflower industry and field personnel have observed white rust of sunflower in northeastern Colorado in recent years. To date the disease has only been a curiosity, but this report highlights the importance of planting high quality seed obtained from seed production areas where the pathogen (and

Colorado State University, U.S. Department of Agriculture and Colorado counties cooperating.
Cooperative Extension programs are available to all without discrimination.

other pests) do not exist or do not cause significant problems. (Schwartz)

ARMY CUTWORM

There have been reports of army cutworm activity in Kansas. Phil Sloderbeck, Kansas State University Cooperative Extension entomologist at Garden City, reports,

“Army cutworms are being found in everything from alfalfa; to wheat, to home lawns; golf course greens; sidewalks; walls of buildings; and native pastures. Calls or reports of worms and or damage have come from throughout southwest Kansas as far north as Hays. Populations in wheat seem to be higher east of Dodge City. In alfalfa, they appear to be higher south of the Arkansas River.”

Such early reports are a warning for alfalfa, sugarbeet and wheat producers to keep an eye on their crops during March and April. Some information about army cutworm biology and management follows.

This article is similar to one sent out last year. We had similar reports of early army cutworm activity that did help predict problems in wheat and alfalfa. Early reports are also an indication for possible problems with miller moths (the adult stage of the army cutworm) in May and June, however, in 1998 there was no big miller moth flight. Additional information on miller moths can be found at <http://www.colostate.edu/Depts/CoopExt/LARIMER/millers.htm>.

The army cutworm has one generation per year. Eggs hatch in the fall following a rainfall and the army cutworm spends the winter as a partially grown caterpillar. It will feed on warmer days throughout the winter. In the spring it feeds more frequently and development proceeds more rapidly.

After development is complete a small pupation chamber is built several inches below the soil surface. Moths emerge in

May and June and migrate to higher elevations in the Rocky Mountains to escape high summertime temperatures. In late summer and early fall the moths return to the plains to lay their eggs in wheat fields and other cultivated areas. With sufficient moisture eggs hatch and larvae of the next generation start feeding as weather conditions permit.

Army cutworms have a very wide host range and will feed on most crops grown in Colorado. They will feed on just about any green tissue presented to them, although they will show preferences when given a choice. For example, army cutworms have been observed to prefer broadleaf weeds in wheat fields over wheat.

Management

Monitor wheat fields periodically during late winter and early spring. Alfalfa, especially fields that were seeded the previous fall, also should be monitored. Army cutworm is a foliage feeder, but usually hides during the day. Larvae can be found under soil clods and surface debris, usually near the base of the plant. Occasionally they may be found feeding on the plants on cloudy days and during the evening. Pyrethroid insecticides, as a group, have been the most effective in Colorado State University tests, particularly under dry conditions. Army cutworm feeding has the most effect on yield when there is relatively little foliage for them to feed on, which increases the likelihood of damage to the crown. Treatment guidelines are based roughly on crop's ability to compensate for foliage loss. Consider treatment as follows:

CONDITION OF CROP	TREAT IF LARVAE EXCEED
Thin or moisture stressed wheat	2 or more per square foot
Healthy wheat	4 or more per square foot
Seedling alfalfa	2 or more per square foot
Established alfalfa	4 or more per square foot

(Peairs)

OZONE TREATMENT OF ONIONS

Onion World (March/April, 1999) presented a progress report on research by university experts in Georgia (Drs. J. Rushing and W. Randle) who studied the effects of ozone treatment on *Vidalia* onion quality and quality losses in storage. Ozone is believed to kill microorganisms such as fungi and bacteria that cause decay of fruits and vegetables, including onions. It is purported to neutralize ethylene gas, which contributes to senescence of horticultural commodities and is believed to help eliminate odors. It can be used in air or it can be dissolved in water, hence, it has many potential applications in postharvest handling operations.

Researchers compared two lots of harvested bulbs, which received minimal rapid curing using forced-air at 95 F for 24 hours. After curing, the onions were graded to remove obvious defective bulbs, and samples were then placed in two separate storerooms at 34 F with 70 % relative humidity. One room was injected with ozone (0.1 ppm ozone residual) and the other served as a control with no ozone. Quality was then monitored over a 6-month period by checking external decay and internal decay; any decay meant an unmarketable bulb.

External decay was reduced by ozone from both fields, and the effect was most obvious at the end of 6 months. Ozone treated bulbs had 30 - 40 % external decay, while non-treated bulbs had 50 - 70 % external decay. Likewise, internal decay was reduced slightly by ozone exposure, but the differences were not as great as those observed for external decay. Sprouting also was inhibited and there was less weight loss of bulbs when exposed to ozone during storage. The researchers concluded that additional research and thorough statistical analysis are required. The influence of ozone on the onion quality parameters was consistent and is worthy of further investigation. (Schwartz)

TURF CARE TIME IS UPON US AGAIN

Now is the time to begin getting your lawn in shape. If there is **snow mold** in the lawn or snow still on the north sides of the house or in other protected areas, loosen it up with a bow rake. Getting turf to dry out as fast as possible is the best approach to snow mold damage. If snow mold is very severe it may be necessary to over seed, but this seldom happens in home turf.

In the early spring as the grass comes out of dormancy do not try to push the turf to green up right away with fertilizer. Split your applications of fertilizer only applying small amounts (1/4 of the recommendation at a time).

Now is also a good time to locate the **fairy rings** which in many cases show as a very dark green ring before the rest of the lawn greens up. There are some new fungicides labeled for fairy ring, but in our trials they have not been effective. These fungicides have been tested elsewhere. There are over 23 different fairy ring fungi and the ones that were controled in the trials to get the labels are not the same as the fairy rings in Colorado.

Fairy rings should be aerated, watered and in some instances small amounts of fertilizer applied. As the rest of the lawn begins to green up, rings will be masked.

Possibly the most important thing you can do for your lawn as the spring develops is to core aerate the area. This can be done using a rental unit or having a commercial turf care professional come. You do not have to buy the whole management practices to get core aeration done, but can hire it separately.

Better yet, do what I do, give your fairy ring a name and make it a pet!

Core aeration is favored over de-thatching because it does less damage to the roots

and crowns of the grass. Caution must be used with both techniques to not let the grass get drought stressed. Both procedures increase evaporative loss of water afterward for a period up to a couple of weeks. Leave the cores on the lawn and just continue to run your mower over them and they will break down. Use a mulching mower or mulching attachment. Do not pick up grass clippings. You are paying good money for that fertilizer, no need to send it to the landfill!

In most instances in Colorado fungicides are not needed or recommended for home turf. If there is a rare case where there may be a need, it is important to make sure that an accurate diagnosis is obtained and the correct fungicide used. **All fungicides do not control all fungi. Follow the label.** (Brown)

WHEAT UPDATE

Wheat looks very good and is off to an early start. It is very dry in much of the high plains and the potential is there for problems. Fortunately we have seen almost no disease.

There have been some reports of yellow wheat in the eastern part of the state in a couple of locations. The problems we have seen are associated with drought and compaction. In most fields the symptoms show regular yellow or pale green wheat throughout the field or over fairly large areas. Use a soil probe or shovel and check for compaction before worrying about virus. We have seen only a couple of instance of wheat streak so far this spring.

Some of the yellowing may be relieved with the recent shot of snow and moisture that we had, if there was enough in the right place. But we will need more before the end of the season.

Leaf rust appears to have over wintered in Kansas. Normally our leaf rust spores have to build up farther south, get established in Oklahoma and Kansas, then spores from

there are blown into Colorado to late to do much damage. When rust gets an early start in Kansas it could cause a problem in Colorado. This is important because none of our varieties have leaf rust resistance. For now begin to scout your fields for early developing leaf rust. (Brown)

ALFALFA WEEVIL

Reports from Kansas indicate that we may be in for an early and heavy alfalfa weevil infestation. We have also seen some early signs of alfalfa weevil activity in Front Range fields. Scouting for alfalfa weevil should start soon, especially in the southeast part of the state.

Alfalfa weevil damage starts as small holes in new leaflets and progresses to heavy skeletonizing of the terminals. Heavily infested fields take on a grayish or frosted appearance and may have a 30-40% yield loss. Losses vary with the intensity of the infestation, growth stage and condition of the crop. Detailed loss studies from Oklahoma State University indicate that an infestation of two larvae per stem can result in a total first and second cutting loss of 1/3 ton per acre.

Alfalfa weevil larvae are green or yellow in color, with a black head and a white stripe down the back. These should not be confused with the cloverleaf weevil, which is similar in appearance but has much less damage potential. Alfalfa weevil larvae are smaller when full grown (1/3 inch vs. 1/2 inch) and have a distinct white stripe along the back, while the clover leaf weevil stripe is yellowish-white and edged in red. Alfalfa weevil management currently relies on either early harvest or on insecticide treatments based on one of several action thresholds. If the crop has reached the bud stage consider cutting early. Large infestations may not be controlled completely unless the crop is green-chopped. Survivors may delay regrowth significantly. If the crop is cut early and fails to "green up" normally, it is likely that it is being held back by weevil feeding. An

insecticide treatment should be considered at this point since delayed regrowth could result in further yield loss and promote weed establishment.

If early cutting is not feasible then treatment should be considered if there are more than 1/3 damaged terminals; or if sweep net counts exceed 20 larvae per 180E sweep; or if larvae average more than 2-3 per stem in a 30-50 stem sample. Details on stem sampling, determining the need to treat based on expected losses per larva per stem, and registered products are found in "High Plains Integrated Pest Management Guide for Colorado-Montana-Nebraska-Wyoming" (Available from CERC, 115 General Services Building, Colorado State University, Fort Collins, CO 80523-4061 970-491-6198, Fax -2961).

A number of effective insecticide products are available for alfalfa weevil control. We have tested some of these for several years as summarized in the following table.

Performance of insecticides against alfalfa weevil larvae in small-plot, replicated trials in northern Colorado, 1984-97

PRODUCT	RATE	% Control at 2 WK*
BAYTHROID 2E	0.025	96 (4)
FURADAN 4F	0.25	91 (8)
FURADAN 4F	0.50	93 (14)
LORSBAN 4E	0.75	94 (11)
LORSBAN 4E	1.00	96 (6)
LORSBAN 4E	0.50	81 (9)
PENNCAP M	0.75	87 (8)
PERMETHRIN**	0.10	64 (6)
PERMETHRIN**	0.20	80 (4)
WARRIOR 1E	0.02	98 (8)

* Number in () indicates number of years included in average. ** Includes both Ambush 2E and Pounce 3.2E. (Peairs)

THE WEEDS ARE COMING, THE WEEDS ARE COMING

The dry, open winter that we have been experiencing has delayed the emergence of many weeds. While winter annual weed populations are not as high as in some years, there always seems to be enough moisture for these troublesome plants to be a problem in alfalfa, small grains, and in non-crop areas. The first flushes of kochia are beginning to show and it will not be long before spring germinating noxious weeds will begin to appear. Leafy spurge often emerges in February or early March along the Front Range, but the dry weather delayed its emergence until very recently. This may give false hope that there will be fewer weeds to manage in 1999. Beware however, weeds, especially noxious weeds, always are troublesome and one should be finished designing weed management plans for 1999 so they can be implemented in a timely fashion. Don't be fooled, every year is a good year for weeds and droughty years may favor deep-rooted perennial noxious weeds even more because they invariably seem to find adequate soil moisture. For more information, contact George Beck (970-491-7568; gbeck@lamar.colostate.edu). (Beck)

WHAT'S NEW IN THE PESTICIDE PROGRAM?!

The Food Quality Protection Act of 1996 (FQPA) continues to dominate the Colorado Environmental and Pesticide Education Program (CEPEP). The Land Grant Universities, including CSU, will play a key role through the USDA in FQPA implementation, especially in risk management and transition strategies. The USDA and CEPEP will provide information on actual pesticide use patterns in various crops – in Colorado this information is being taken from the Pesticide Use Survey CSU conducted in cooperation with the Colorado Department of Agriculture. Individual crop profiles, part of the risk mitigation and transition strategy development are being developed, compiled and refined. The

profiles will provide qualitative use and usage information on a state by state level. The profiles will be continually updated as information is gathered from growers, commodity groups, extension agents, etc.

It is clear that EPA will continue with its mandate under FQPA to reassess 1/3 of the tolerances by August 3, 1999. To meet the requirement they need to reassess 3,210 tolerances. However, EPA officials have recently stated that it will not meet its deadline for completing tolerance reassessments of the organophosphates (OPs) and carbamates by the August 3rd deadline. EPA will not meet the intent of the law as interpreted "worst chemicals first" with the OPs and carbamates considered to pose the greatest potential health risk to children. Organophosphate pesticides were selected as one of the first groups of related pesticides to be examined under the new standard. FQPA requires the EPA to give highest priority to those pesticides that appear to pose the greatest risk. As of February 26th, they had reassessed 2,308 tolerances and were confident they could complete another 1,000 by August 3rd. Of those, 17.8% are organophosphates, 40.4% are carbamates, 19.8% are organochlorines and 35.9% are carcinogens. They had not completed any tolerances for the high hazard inerts but expect to complete 22 of the 24 by the August 3rd deadline.

EPA has also reported on the status of the preliminary risk assessments of the organophosphates as of February 24, 1999. I have listed the Brand name in parenthesis after the active ingredient.

Pre-Phase: The preliminary risk assessment is under development: chlorpyrifos-methyl, chlorpyrifos (Lorsban/Dursban), coumaphos (Co-Ral), diazinon, dicotophos (Bidrin), fenitrothion (Sumithion, Rothion), malathion, mevinphos (import tolerance only), phosalone (import tolerance only) and trichlorfon (Dylox)

Phase 1: Registrant has 30 days to correct typographical or mathematical errors: No Organophosphates currently in this phase

Phase 2: EPA responds to 30 day error corrections: dichlorvos (DDVP, Vapona), phostebupirim

Phase 3: Preliminary Risk Assessment in 60 day public comment period: acephate (Orthene, Payload), azinphos-methyl (Guthion, Sniper)- only ecological risk assessment, chlorethoxyfos (Fortress), disulfoton (Disyston), ethyl parathion, methamidophos (Monitor), methidathion (Supracide), methyl parathion (PennCap M), oxdemeton-methyl (Metasystox-R), phosmet (Imidan), pirimiphos-methyl (Silosan), propetamphos (Safrotin) and tetrachlorvinphos (Rabon, Gardona)

Phase 4: EPA is responding to the comments received during the 60 day comment period (Phase 3) for azinphos-methyl (Guthion, Sniper) - only the human health assessment, bensulide (Prefar, Betasan), cadusafos (import tolerance only), dimethoate (Dimethoate), ethion (Ethion), ethoprop (Mocap), fenamiphos (Nemacur), fenthion (Baytex, Tiguvon), naled (Dibrom, Legion), phorate (Thimet), profenofos (Curacron), sulfotepp (Bladafum), temephos (Abate), terbufos (Counter), and tribufos (DEF)

After completion of Phase 4 EPA will have refined risk assessments that will go to USDA with an overview of what is driving the risk and whether mitigation steps need to take place. USDA will focus their review on the risk assessment's utilization of use and usage information, assumptions used in the assessment, and on possible strategies/options for managing risk. Once USDA returns their comments to EPA, a technical briefing will take place that is open to anyone. EPA and USDA will describe the refined risk assessment (risk drivers, how public comment affected the assessment and use information that was used. USDA will provide ideas on possible risk management strategies. Stakeholders will

have an opportunity to ask questions. The minutes of these meetings will be placed in the public docket. The refined risk assessment will be placed in the public docket and on the website for another 60-day comment period. During this 60-day comment period, EPA and USDA are willing to hold meetings with interested stakeholders to discuss risk management. After the close of this second 60-day comment period EPA will develop Risk Management Strategies.

For further information there are some good web resources for you to peruse regarding food safety and FQPA. The Office of Pesticides Programs' website (<http://www.epa.gov/pesticides/>) contains links to pages for FQPA, the Scientific Advisory Panel, The Tolerance Reassessment Advisory Committee and the Organophosphates Risk Assessment documents. The National Pesticide Telecommunications Network website (<http://ace.orst.edu/info/nptn/>) is jointly sponsored by the Oregon State University and EPA. (McDonald)

FQPA AS A TRADE BARRIER

U.S. and Canadian officials have begun discussing the trade implication of the Food Quality Protection Act (FQPA). The Canadian Horticultural Council charged that FQPA has the potential to become a major non-tariff trade barrier, restricting the fruits and vegetables Canadian farmers can export to the U.S. Eighty percent of Canada's horticultural products are shipped to the U.S.

Canada and some other countries follow a 0.1 parts per million-tolerance level as a default when no other standard exists. However, if a pesticide is not registered in the U.S., and an import tolerance has not been established, those imported food products must be free of pesticide residues. (McDonald)

RISK LOW FOR CAREFUL USERS OF OPS

Dr. Richard Fenske, Director of the Pacific NW Agricultural Safety and Health Center at the University of Washington, conducted a study in New Jersey in an attempt to determine if long-term, low-level exposure to organophosphate (OP) pesticides produced changes in personality or measurable deficiencies in memory, concentration, language skills and coordination. Dr. Fenske studied 57 tree fruit producers that have used OPs for many years, with no history of acute poisoning. He gave the participants a battery of tests to evaluate concentration, visual motor skills, memory, language and mood, as well as complete physical exams focusing on neurological function. He gave the same tests to individuals with no history of OP exposure. The findings were published in the American Journal of Industrial Medicine. No meaningful difference between lifetime applicators of OP pesticides and other farmers or nonfarmers in the region were found. (McDonald)

FOUR MORE YEARS FOR METHYL BROMIDE

The United States has "harmonized" the US Clean Air Act – which mandated a 2001 methyl bromide phase-out date – with the Montreal Protocol. The protocol, an international treaty to preserve the earth's ozone layer, requires developed nations to stop using the fumigant by 2005, while developing nations have until 2015. (McDonald)

FINALLY THE CONSUMER RIGHT-TO-KNOW BROCHURE

After all the mystery, leaks and cloak-and-dagger intrigue, the EPA Consumer Right-to-Know Brochure entitled *Pesticides and Food: What you and your family need to know,* originally scheduled for release in August of 1997 was mailed Friday, February 12, to 30,000 large grocery retailers across the country and 10,000 chain store

executives. Copies of the brochure are available to consumers by calling 1-800-490-9198.

FQPA mandated the preparation and distribution of the Consumer Right-To-Know Brochure. Consumers who read it are to be more informed about the risks and benefits of pesticides on food, new protections provided by FQPA, ways to reduce the amount of pesticides they consume, and how to find more information about pesticides.

Pathogens and pesticides are described as a reason for washing food. The language extolling the virtues of organic produce is considerably muted from previous drafts, leading some environmental groups to call the final version "whitewashed." The brochure acknowledges, without being alarming, that many foods have detectable (yet below established tolerance) pesticide residues.

The brochure is not particularly helpful for those who have not already decided how they feel about pesticides in food. A right-to-know website was on-line when EPA made the formal announcement about the release of the brochure. The website contains a copy of the brochure, in addition, more specific information on how EPA regulates pesticides, organic farming practices, what the pesticide residue limits are on food, and the health problems pesticides may pose. The website contains a tolerance search page which enables consumers to determine what pesticides are approved for which foods, and in the future will link to pesticide residue monitoring data bases. The address of the Right-to-know Website is: <www.epa.gov/pesticides/food. EPA, USDA, FDA and the National Pesticide Telecommunications Network toll-free telephone numbers are also given. (McDonald)

PESTICIDES AND FOOD SAFETY

In February two reports on food safety and pesticides were splashed across the front

pages of newspapers and CNN. The Consumer Union (CU) released "Do you Know What You're Eating." The CU report can be downloaded from www.ecologic-ipm.com/whatsnew.html. The CU report claims to be "one of the most comprehensive studies ever undertaken of pesticide residues on fruits and vegetables." Published with an accompanying article in the March issue of Consumer Reports, it ostensibly aims at educating parents. The week after the CU report was released, the Environmental Working Group (EWG) released a report, "How 'Bout Them Apples" in conjunction with the 10 year anniversary of Alar. They claimed that even though Alar is gone, children are still consuming unsafe levels of pesticides in apples.

Many in the agricultural community feel that these reports were an attempt by environmentalist to push EPA into making a decision on methyl parathion and remove it from the market quickly. EPA has released a statement saying that it does not expect to decide methyl parathion's and other OP's fates until "late this summer." Excerpts from EPA's response to the CU report follow:

"EPA is in the process of implementing the Food Quality Protection Act, the new food safety law. Once in effect, the new law will provide the public with the strongest protections ever against harmful levels of pesticides, and it will be especially protective of the diet and children and infants."

"While this unprecedented scientific review of potential threats from pesticide residues is underway, it is important to note that the US food supply is still the safest in the world, and that the benefits of eating a balanced diet outweigh any risks."

Organophosphate pesticides (OPs) are currently under EPA review. Based on the weight of the evidence from neurotoxicological, developmental, and reproductive tests examining immature rats, EPA decided that for at least eighteen OPs,

an extra 10X factor was unnecessary to ensure safety because the sensitivity of children and adults was similar. An extra 3X safety factor will be needed for another ten OPs because although enhanced sensitivity was not found, testing was not complete. For twelve OPs, an extra 10X factor is still going to be required because either data were too incomplete to make an assessment, or data from the scientific literature suggested enhanced sensitivity. Methyl parathion falls into this latter category.

The scientific community has also expressed concerns. One concern with the CU report is that it has received no scientific peer review. The Council of the Society of Toxicology sent a letter to EPA expressing their concern over the CU report. They stated, "We believe that, in the case of the CU evaluation, information obtained from flawed methodology misinforms the public on the risks of pesticide exposure. The report is based upon CU's term the "toxicity index (TI)," which was calculated for individual fruits and vegetables. We submit that the methodology used to determine the TI is scientifically invalid. Well-known principles of toxicology based on the need to consider dose and duration of chemical exposure are ignored or misrepresented by CU. While CU notes that the analysis is not a true risk assessment, CU implies great risk based upon its TI's!"

The CU toxicity index uses a rating system to score to 27 foods. The number is based on an arbitrarily selected set of criteria. For pesticides listed as suspected "endocrine disrupters" - chemicals that may cause harm by mimicking hormones - the toxicity index "was multiplied by a factor of three." The EWG report used information from the preliminary risk assessment releases (which are still unrefined and in many cases worst case scenarios) and combined it with Pesticide Data Program (PDP) data.

There is no method yet for doing a risk assessment on chemicals that have

possible endocrine active effects. The source CU used for determining what is an endocrine disrupter is not an official database but rather the 1996 book "Our Stolen Future."

Another of CU's discrepancies was to confuse allowable daily doses with chronic ones. The daily or "acute" dose is the most someone can be legally exposed to in a given day; the chronic dose is how much a person can receive daily spread over a lifetime. Obviously, chronic doses are lower because they average some days with higher doses and others with none at all.

CU found that seven fruits and vegetables – apples, grapes, green beans, peaches, pears, spinach and winter squash – have "toxicity scores" higher than most foods analyzed. Peaches are considered the major source of dietary exposure to methyl parathion. Here are the methyl parathion residue findings on peaches reported by the Pesticide Data Program from 1993 - 1996 (tolerance is 1.0 ppm):

1993 - 367 samples, 79 positive (21.5%), maximum level found 0.69 ppm
1994 - 396 samples, 117 positive (29.5%), maximum level 0.29 ppm
1995 - 367 samples, 104 positive (28.3%), maximum level 0.45 ppm
1996 - 324 samples, 82 positive (25.3%), maximum level 0.50 ppm

In 1997, the Pesticide Data Program changed its monitoring focus to sample items more likely consumed by infants and children. Instead of monitoring field peaches, the program monitored canned peaches. Here are the results from 1997 for methyl parathion on canned peaches: 756 samples analyzed, ZERO residues detected!

The reports continually encourage parents to protect their children by buying organic fruits and vegetables. Please remember that organic does not mean pesticide free. Many organic growers use pesticides, mostly those found in the environment such

as sulfur, nicotine and copper. There is no evidence that foods labeled "organically grown" are safer or more nutritious than foods grown using conventional agricultural practices. The relative risks and benefits of applying naturally occurring pesticides versus synthetics have not been determined. But there is no evidence that foods labeled "pesticide-free" are safer than foods conventionally grown. (McDonald)

ON COMPUTER "BUGS"

There has been tremendous hype about the Y2K computer bug - and I have somewhat resented the subtle anti-insect issues that all this has carried with it. Why computer "bug"?

Well there actually is an insect angle to this common term. The origin of the term is widely thought to have involved an incident with the UNIVAC computer, an early 1950s prototype of the modern computer. At one point there was a computer malfunction that when traced proved to be the result of a moth that had been attracted to the warmth of the machine and caused an electrical short. Admiral Grace Hopper, a computer pioneer, made the discovery and subsequently saved the moth among her notes.

In a more recent development of computer "bug" sabotage, there was a note late last year that insects helped crash the Ouray County computer system over the Thanksgiving holiday. In this case the insect involved was the boxelder bug, which fouled the computers and held up the payroll checks for the county employees.

A warning - although I am usually loath to make insect predictions, there are preliminary signs that boxelder bugs could be a candidate for 1999 "Bug of the Year". Mild spring weather, allowing seed set, and a long growing season should provide a great crop of these household pests next fall. Given their already proven track record of screwing up computers they may locally prove more important than any Y2K bug.

MILLIPEDES COME MARCHING IN

A spate of cool, rainy weather often is the catalyst for mass millipede migrations. Hundreds, sometimes thousands of the millipedes may be found crawling up building sides, entering basement windows and collecting under the welcome mat. Most commonly involved is *Allajulus londenensis*, a brown, wire-like species about an inch in length.

The reason for the migrations is not clear. One speculation is that it is an effort to find hibernation sites which the relative warmth and protection of the home provide. Furthermore, the heavy rains may saturate the soil/lawn areas, forcing the millipedes out. Peak migrations usually are short-lived, less than a week in duration. Barrier treatments of insecticides around the building foundation are only marginally effective in stemming migrations in progress and their use is not recommended.

Regardless, the millipedes that do wind up in the home meet an untimely end, usually perishing within a couple of days due to the aridity. They also will not feed on anything in the home and pose no threat to houseplants, although occasionally a couple can establish on organic-matter rich potting soils. However, there still is the problem of having to clean up their crunching little corpses. (Cranshaw)

ZIMMERMAN PINE MOTH

In recent years, the Zimmerman pine moth (*Dioryctria zimmermani*; Lepidoptera: Pyralidae) has been introduced and become established along the Front Range.

Austrian pines have been most commonly infested. Scots and ponderosa pines are also reported as hosts. Branches typically break at the crotch area where they join the trunk. Infestations are commonly marked by dead and dying branches, most often in the upper half of the tree. First external symptoms of injury are the production of popcorn-like pitch masses at the wound site. The pitch mass may reach the size of

a golf ball and ultimately resemble cluster of small pale-colored grapes.

The adults, rarely observed, are mid-sized moths, with gray wings blended with red-brown and marked with zig-zag lines. Adults are difficult to distinguish from other members of this genus. Larvae are generally dirty white caterpillars, occasionally with some pink or green coloration. They are found within characteristic popcorn-like masses of sap on the trunks and branches.

Life History and Habits: The Zimmerman pine moth has a one year life cycle. The insect overwinters as a very young caterpillar, inside a small cocoon (hibernaculum), underneath scales of bark. In mid-late April and May, they again become active and tunnel into the tree. Tunneling may first occur around the branch tips, sometimes causing tip dieback. In late spring, they migrate to the base of branches, tunneling into the whorl area, where and masses of pitch form at the wound site. The larvae continue to feed into July, at which time they become full-grown and pupate within a chamber in the pitch mass.

Adult moths are active primarily in late July and August. After mating, female moths lay eggs, often near wounds or previous masses of pitch. Eggs hatch in about a week and the larvae feed for only a brief time before preparing to overwinter.

Control: Zimmerman pine moth is most vulnerable to control during the periods when larvae are active and exposed on the bark in late summer and spring. Drenching trunk sprays, which penetrate the bark scales, applied in August and/or around mid April should kill active exposed larvae before they have entered into trunks. Dursban and Astro applied during early April and early May have provided a high level of control in Colorado State trials. (Cranshaw)

WHITE PINE WEEVIL

Pissodes strobi (Peck)

Coleoptera: Curculionidae

Hosts: Colorado blue spruce, Engelmann spruce. White pine is the common host in eastern states. Trees in open locations are most susceptible to white pine weevil.

Damage and Diagnosis: White pine weevil is sometimes the most serious insect pest of Colorado blue spruce in landscape plantings, particularly at the higher elevations. In other parts of the U.S. this insect is also an important pest of white pine. Feeding by the developing insects causes the top terminal (leader) to suddenly wilt and die in early summer. Upper branches are affected less frequently. This damage can subsequently result in a bushy, deformed tree that may be considered aesthetically undesirable.

Immature stages (larvae) of the white pine weevil feed underneath the bark of the spruce leader, girdling the plant. When sufficient damage has been done, the top growth will wilt and curl, becoming completely dead in a few weeks. Only the top leader and upper branches are affected by the insect and damaged leaders have an overall characteristic appearance involving a "shepherd's crook" appearance with the needles turning a gray-blue color. Often, at the base of the damaged growth, there are small (1/8-in) round exit holes in the bark made by the emerging insects.

Once the top leader is killed, some side branches will change their growth habit and begin to grow upwards to take the place of the killed leader. If successful, these new leaders will form main trunks and multiple main trunks will occur above the damaged area. This changes the form of the tree from its normal tapering growth to one that is more densely bushy. This can be considered to detract from the appearance of the tree.

The adult stage of the white pine weevil is a small (1/4-in) snout beetle flecked with brown and white patches. A feature it

shares with other weevils is the long, curved snout with elbowed antennae arising from it. Larvae are almost identical to those of bark beetles, looking like a grain of cooked white rice. The larval head is brown. The larvae are found within the terminal growth of spruce.

Life History and Habits: The insect overwinters in the adult stage, under leaf litter and in other protected areas. After snow melts and temperatures begin to warm, (mid-March to early May) the weevils become active and females seek out spruce trees. They feed on the cambium of main branches near the leader and insert eggs into the feeding cavities that are formed. Small points of oozing pitch on the main leader are indicators of this feeding and egg laying activity.

Eggs hatch in one to two weeks and the young grubs (larvae) tunnel downward underneath the bark. Damage increases as the insects grow and wilting starts to become noticeable in June and July.

When full-grown, the white pine weevil larvae tunnel deeper into the stem and form a cocoon made of wood chips in which they pupate. In about two weeks the adult beetles emerge through small holes they chew through the bark. The chip cocoons remain behind and are a useful means of diagnosing old white pine weevil injury.

Adult weevils feed on the needles, buds and twigs of spruce for several weeks before going into a dormant condition for overwintering. Some minor chewing injury to buds may result if infestations are severe.

Related species: A closely related weevil species, *P. terminalis* (Hopping), occurs in the tops of lodgepole pine.

Management: Insecticides applied in spring when adult weevils feed on trees and lay eggs can provide control. Standard bark beetle or wood borer insecticides should provide control if used at rates labeled for the above insects. These include the

insecticides carbaryl (Sevin), chlorpyrifos (Dursban), and permethrin (Astro). Timing of these treatments will vary by location and year but usually should be made in late March or early April. Only the upper areas of the tree need to be treated.

Mechanical removal of infested terminals while the insects are still present can provide some future control if other sources of weevils are not in the area. This is best done in June or July before adult emergence. Infested terminals should be destroyed since weevils can survive in pruned wood. Terminals should only be cut as far down as necessary to remove the weevil larvae, rarely much past the first whorl of branches.

If top growth has been killed, proper training of a single side branch as a replacement leader can help to salvage the future appearance of the tree. Often several side branches will begin to grow upward and the healthiest of these should be favored. Temporarily binding competing shoots or pruning the tips of competing shoots will allow for a single leader to again be established. This new leader should be annually protected with insecticides until the tree is no longer highly susceptible to attack. Such a decision can be based on the incidence of attacks to hosts in the area. (Cranshaw)

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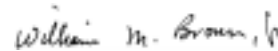
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Sincerely,



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