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Pest Alert

June 16, 2000

**The Pest Alert is now found on the World Wide Web at
www.colostate.edu/programs/pestalet**

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JUNE 11 VEGNET REPORT

During early June of 2000, rainfall has varied from less than 0.25 inch to zero throughout all of Colorado, western Nebraska, eastern Wyoming and western Kansas. Temperatures have been in the 80s and 90s at most sites. The regional weather forecast predicts average to above average rainfall and average temperatures for the next week.

Most crops have now overcome early-season challenges from soil crusting as a result of wind-driven rain and freeze damage to onion, sugar beet and potato in northeastern Colorado. Warm conditions after planting have minimized soil-borne emergence problems for dry beans; however, avoid heat and water stress post-emergence to promote vigorous healthy root systems.

There are still no reports of foliar disease problems on potato, sugar beet, onion or bean at this stage. Continued warm, dry conditions will reduce the threat from early-season fungal

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

and bacterial pathogens during the vegetative stages of plant development. However, this week may bring lower temperatures and more moisture, so follow an aggressive scouting program to detect early signs of pest problems.

The potato foliar disease model was complicated by the mid-May freeze, which caused partial to complete death of emerged potato foliage. If one uses a May 1 emergence date, the early blight model (threshold of 300) is averaging 250 throughout the Front Range and northeastern Colorado; however, if one uses a May 15 emergence (regrowth) date, then the early blight model is averaging 180. The late blight model (threshold of 18) is below 3 at all reporting sites in Colorado, regardless of the early or mid May emergence date. Since not all potato plants were frozen back in every field, it is probably better to use the earlier emergence date to schedule aggressive scouting calendars to detect the first signs of early blight before initiating your fungicide program as row closure approaches.

Please share sightings of pest problems by calling the CSU VegNet Team at 970-491-6987 (Howard Schwartz), 491-7846 (Mark McMillan), or 491-0256 (Kris Otto). (Schwartz)

VEGNET 6-11 WEATHER CHART

REGIONAL WEATHER SUMMARY & FORECAST

6/05 - 6/11/00	Weekly Values		This Week's NWS Forecast	
	Moisture (inches)	High Temp (F)	Moisture	Temperature
COLORADO				
Ault	0	88.9	Above	Normal
Avondale	0	90.0	Above	Normal
Burlington	0.18	91.1	Above	Below
Delta	0	90.8	Normal	Normal
Dove Creek	0	83.3	Normal	Normal
Fort Morgan	0	92.5	Above	Normal
Grand Junction	0	90.9	Normal	Normal
Kersey	0.03	92.2	Above	Normal
Peckham	0	91.9	Above	Normal
Rocky Ford	0	92.7	Above	Normal
Sterling	0.03	92.2	Above	Below
Wray	0.16	90.2	Above	Below
Yuma	0	90.6	Above	Below
NEBRASKA				
Alliance	0.16	90.8	Above	Below
Champion	0	92.5	Above	Below
Scottsbluff	0	92.0	Above	Below
WYOMING				
Torrington	0	92.4	Above	Below

KANSAS				
Tribune	0.05	90.8	Normal	Below

ASSUMPTION: average moisture = 0.25 inch & average daily high temperature = 86 F/week
 [Based on data from the National Weather Service + Data Transmission Network, COAGMET + Colorado Climate Center of Colorado State University – Fort Collins, and the High Plains Climate Center of the University of Nebraska – Lincoln. Conditions may vary with your own situation, for more detailed information consult the following Web Sites: Colorado data at <http://ccc.atmos.colostate.edu/> and Nebraska data at <http://hpccsun.unl.edu/>]

EARLY SEASON CORN SPIDER MITES

Golden Plains Pest Survey has reported Banks grass mite infestations in both irrigated and dryland corn adjacent to wheat. I have seen infestations at both the Stratton and Sterling Dryland Agroecosystem research sites. Western Kansas and Nebraska also have reported problems. The mild winter and warm, dry spring have encouraged mite buildup in wheat and movement into corn as the wheat crop matures.

Banks grass mite is traditionally a late season pest of corn. Infestations start as wheat and other grasses mature, with mite densities and damage increasing rapidly after tassel emergence. They are controlled most commonly with applications of either Comite II or Capture 2E, which have enough residual effect to get the crop to the hard dough stage and past most mite risk. Details on management of "typical" mite problems can be found in the High Plains Integrated Pest Management Guide for Colorado, Western Nebraska, Montana, and Wyoming and in the Colorado State University SiA Fact Sheet 5.555 (<http://www.colostate.edu/Depts/CoopExt/PUBS/INSECT/pubins.html>).

We have much less experience with early season infestations. There are several differences to consider:

- Mite damage potential is greater because of the additional time available to damage the plant.
- There is more time for natural enemies to become established, so effective biological control is more likely.
- A single treatment of Comite II or Capture 2E will not protect the crop for the remainder of the season.
- Infestations may be limited spatially to field margins.
- Insecticides for treatment of other insect problems should be used with caution. Such treatments have the potential to trigger mite outbreaks ("flare the mites").

There are no good treatment guidelines for early infestations. I would consider treatment if infestations are on the increase, natural enemies are scarce, cool wet weather is not expected, and the lower 2-3 leaves are heavily damaged. At this point dimethoate would be a good treatment choice. Save the expense of a Comite II or Capture 2E treatment for after

tasseling when the greatest damage potential exists. Consider spot treatments of infested areas. If other pests must be treated, try to select products with some miticidal activity. (Peairs)

CORN DISEASE UPDATE

Rootless Corn Syndrome—Is a new one on me. We had been getting some samples in that were stunted and appeared to be unable to establish their brace roots in the soil. No sign of fungi or potential herbicide seemed to be implicated.

Then in a recent Kansas State University newsletter, Doug Jardine (KSU Extension Plant Pathologist) mentioned that they had received their first case of rootless corn syndrome in their clinic that week. He also mentioned that the condition can occur on sorghum as well. He reports that it occurs during periods of hot, dry, windy weather that corresponds with the development of brace roots on the plants (sounds like us for sure). During these periods when the surface of the soil is hot and dry, particularly if high winds are present, the plants are unable to develop the brace roots. This causes them to lay over onto the soil. Sometimes the brace root tips appear scorched (also what we are seeing).

Although the symptoms look similar to 2,4-D or Banvel injury, these herbicides are not involved in the problem and in some instances have not even been used. Doug states that rainfall and cooler temperatures usually help correct the problem. Also, cultivation to break up the soil and placing some soil up around the base of the stem will help stimulate the brace roots. The consultants that I have talked to and I pretty much agree with Doug on this one.

First case of Goss's wilt for the season found in NE Colorado--- We are getting an early start on Goss's wilt this year. I do not know if this is because of the stress conditions for the corn or people are more tuned into it's return. Some of the plants appear to be systemic infections in contrast to the normal "leaf freckles" we have learned to recognize. As in previous years the disease is associated with fields that have a long history of corn without rotation.

Stewart's bacterial wilt showing up in eastern Kansas----Stewart's bacterial wilt is caused by the bacterium *Erwinia stewartii*. Stewart's wilt has not been found in Colorado. It is common in Ohio, Nebraska, Kansas and other areas farther east. The bacteria are spread by flea beetles, which also serve as the main over wintering source. In Kansas and Ohio this year flea beetle populations have been high due to the mild winter weather. In those areas where the pathogen is known, higher flea beetle populations indicate there can be increased risk of the disease.

In Kansas, Doug Jardine reports seeing affected corn fields during a June 6-7 survey in south eastern Kansas, also their clinic has received a couple of samples from north east Kansas. The disease is more severe on sweet corn, while dent (field) types are more tolerant and in many, resistance exists. Doug points out that diagnosis in the field is usually based on:

- presence of yellow streaks that follow leaf veins that later develop reddish brown dead areas in the center of the streak;
- wilting as the infection progresses, with newest leaves wilting first; and

➤ the crown, or growing point, of the infected plant rots and turns soft and brown.

While we have never confirmed the occurrence of Stewart's wilt here, yellow streaking in corn is frequently found associated with Goss's wilt and some non-disease factors (i.e., iron deficiency) in many fields. We are very interested in keeping track of Goss's wilt and any suspected Stewart's wilt occurrences. Please contact your local extension agent or our lab if either disease is suspected. (Brown)

KANSAS DISEASE FACT SHEETS UPDATED AND MOVED

Joy Pierzynski (Extension Associate) at Kansas State University has updated and provided new pictures to the Plant Pathology Extension fact sheets. These can be viewed on a new server at: http://www.oznet.ksu.edu/dp_path-ext/. This is the same site that KSU archives it's Plant Disease Alert newsletters. Many of the problems we come up against in Colorado frequently hit Kansas 2-3 weeks earlier. It is a good site to become familiar with, give it a try. (Brown)

IPM AND CHLORPYRIFOS

The Environmental Protection Agency announced June 8 that chlorpyrifos, commonly known as Dursban, is to be banned from all over-the-counter home, lawn, garden, school and park use. Dursban has been one of the most commonly used insecticides for over three decades as the active ingredient in sprays and powders for everything from ants, cockroaches and grubs to mosquitoes, termites, and wasps. Other formulations of chlorpyrifos are used in many agricultural applications. Many of the agricultural uses will also be significantly curtailed as a result of the EPA's decision.

Integrated Pest Management (IPM) offers the whole spectrum of control options, with an emphasis on reducing risks to humans and the environment. As most of you know IPM approaches pest and disease management with a variety of methods. For years IPM has been an effective, multi-tactic approach that will continue to work even if any one tactic - for instance, an oft-used pesticide like Dursban - is lost. In the home and grounds arena, for instance, a wide variety of control tactics fits the bill. These include: sanitation to remove necessary food, water, breeding sites and "hiding places" ... barriers to entry like screens and caulking foundation cracks ... biological treatments (including parasitic nematodes and "milky spore" disease for lawn grubs) ... baits ... insect traps ("roach motels") ... repellents ... encouraging predators of insects like swallows and bats ... nest removal of stinging bees and wasps (qualified professionals only!) and many cultural practices that are effective for both pests and diseases. While properly applied chemical pesticides are still an important component of IPM, they are not the only way.

While there is considerable concern over the loss of chlorpyrifos, like our loss of the agricultural mercury, it is not the end of the world. It is an incentive to explore the more sustainable IPM approaches to pest and disease management. See Cranshaw article on page 10 for more. (Brown)

GE CROPS AND PEST MANAGEMENT IN THE U.S.

Dennis Lamm (CSU Extension, Fort Collins) passed along the following summary of an April 2000 report (released in May) from the U.S. Dept. of Agriculture's Economic Research Service, which examines ***Genetically Engineered Crops for Pest Management in U.S.***

Agriculture. The report summarizes variations in pesticide use, yields, and net monetary returns occurring in farm-level adoption of genetically engineered (GE) crops.

J. Fernandez-Cornejo and W. McBride (the report's lead authors), found that cotton (*Gossypium hirsutum*) enhanced with Bt (*Bacillus thuringiensis*) to protect against pest insects grown in the southeastern region of the country, was the most beneficial application of crops genetically modified for enhanced pest management. Use of Bt-cotton increased crop yields, increased net returns, and "significantly reduced insecticide use", according to the document (AER 786).

Results associated with other major GE crops listed, i.e., herbicide-tolerant cotton and herbicide-tolerant soybean (*Glycine max*), were positive, but provided lower levels of benefits. Use of the former increased yields and net returns, but did not significantly reduce herbicide usage, whereas the report notes that herbicide-tolerant soybeans led to "small but significant increases in yields, no changes in net returns, and significant decreases in herbicide use".

The report can be found at: www.ars.usda.gov/whatsnew/thisweek/index.htm#third (Brown)

LONG TIME IPM ADVISORY COMMITTEE DR. FRANK CLOUGH, DIES

Frank Clough a long time member of the Colorado IPM advisory Committee died recently. Frank was born in Boise, Idaho in 1924 and grew up in Laramie, Wyoming. He had a BS (cum laude) in Chemistry from the University of Wyoming, a MS and Ph.D. in Physical Chemistry from Princeton University. At different times he worked in industry, was a Professor of Chemistry at Virginia Polytechnic Institute (VPI) and in 1955 Frank moved to New Jersey and taught and conducted research in physical, inorganic, and analytical chemistry at Stevens Institute of Technology.

Frank was involved in environmental assessment, air quality, and ground water pollution studies when he participated in a study of the worldwide circulation of trace elements with the Sea Air Exchange Program (SEAREX). He was also involved in the beginning of the clean up of the Passaic River in the early 1960's. In 1980, he began a new career as a Consulting Chemist in Colorado working on solutions to a variety of problems in environmental and analytical chemistry. From 1991 to the present he was Proprietor and Chief Scientist of Chemical Criteria, an analytical service specializing in ion chromatography and thermal analysis in Arvada, Colorado. Frank was a Certified Professional Chemist (AIC), a Fellow of the American Association for the Advancement of Science, and a Fellow of the American Institute of Chemists.

Frank was an active member of the Audubon Society of Greater Denver where he served on many committees including Co-Chair of the Conservation Committee. He served on the Rocky Mountain Arsenal Restoration Advisory Board, The Rocky Mountain Arsenal Site Specific Advisory Board, and the Cherry Creek Basin Study Group. He was one of the original members of the State IPM Advisory Committee serving for more than ten years with us. He was especially helpful in representing the environmental views in our discussions and helping to keep Colorado IPM on track. His quiet and unassuming manner covered his intense interest and dedication to the environment and the role of IPM in protecting that environment.

His wife Elinor preceded him in death. A brother, sister, and many nieces and nephews survive him. His countless friends and associates in environmental and ecological organizations and those of us that have had the privilege of working with him will miss him.

Donations can be made, in lieu of flowers, in Frank's name to the National Audubon Society of Greater Denver, 9308 S. Platte Canyon Rd., Littleton, CO 80128. (Brown)

NEW APPLE IPM GUIDE

Michigan State University announces the publication of a pocket guide for IPM scouting in apples. David Epstein (MI Apple IPM Project Coordinator) and Larry Gut (MSU Entomology) compiled the guide as part of the Michigan Apple IPM Implementation Project. Designed as a pocket field book for easy use in the orchard, the guide provides information to help identify pests, pest injury, and beneficials. Guidelines for pest monitoring and thresholds in Michigan are also included. The guide is 72-pages, features full-color pictures, and is printed on a paper that will resist some wear and tear in the field. The price for the guide is \$11. A description, sample pages, and order form are available at the MSU IPM web site: www.msue.msu.edu/ipm/ApplePocket.htm

FARM FRESH LOCATOR

Dennis Lamm (CSU-SARE Coordinator) pointed out this interesting web site. I pulled it up and it is fun. It helps to locate local farm fresh producers. Take a look.

<http://www.LocalHarvest.org>

I am attaching the press release that Dennis forwarded-----

"Ocean Group formally launched today a unique way for consumers to find fresh, locally-grown foods in neighborhoods throughout the US. Hungry web-surfers can now log on to find fresh produce sold directly by farmers.

This web-based resource was developed to provide a comprehensive, one-stop real-time directory of the increasing number of farmers selling through Farmers' Markets, Farm Stands, U-Pick Farms and Community Supported Agriculture (CSA) programs. LocalHarvest.org meets increasing consumer demand for fresh food. The average "fresh" produce in a grocery store is 7-14 days old and has traveled approximately 1,400 miles to get there.

Increasing public concern about the environmental impact of long-haul transportation and consumer desire for a healthy lifestyle, point to an increasing dissatisfaction with the current food delivery system. Many have started to change their shopping habits by supporting farmers' markets and CSAs. "Through LocalHarvest.org, consumers find ways to make personal connections with farmers, enjoy 'fresh from the vine' foods, and support the local economy," stated Erin Barnett, Project Coordinator for Local Harvest. In the past decade, America has experienced a rapid growth in the number of farmers markets and CSAs, although there has not been an easy way for interested individuals to find them. According to Secretary of Agriculture Dan Glickman, the USDA tracks over 2,500 farmers' markets across the country. "The growth in the number of farmers' markets illustrates the importance of the bridge between farmers and consumers."

LocalHarvest.org utilizes a sophisticated mapping service - an Open Source Geographic

Information System (GIS) -specially customized to allow customers to "point and click" anywhere in the United States and get an interactive picture of where direct marketing farms are located. Ocean Group is an Internet engineering company committed to making technology available to nonprofit organizations with 20% of staff time devoted to non-commercial projects. In addition to collaborating with nonprofit organizations, Ocean Group owns projects, such as LocalHarvest.org, that reflect the company's values, but are not-for-profit ventures. The company can be found on the web at www.oceangroup.com.

For more information on LocalHarvest.org or Ocean Group contact: Erin Barnett at (831) 466-0700, or erinb@oceangroup.com. (Brown)

THIS COULD BE A GREAT YEAR FOR YELLOWJACKETS

There are several indications that this summer could be a bad yellowjacket year. For one, overwintering survival of queens, at least locally, seems to have been extraordinarily high. Second, during the critical past month when colonies are established, dry favorable conditions persisted. Both of these should contribute to above-average numbers of foraging workers, which peak during late summer. Compounding the problems, should dry weather persist, is that yellowjackets become much more aggressive foragers during late summer when food and water are scarce – much more “in your face”.

The western yellowjacket, a serious late summer pest, is the predominant species that causes nuisance problems and is the cause of probably 95%+ of all "bee stings":

Western Yellowjacket *Vespula pensylvanica*

Habits of the Western Yellowjacket: Yellowjackets are social insects, like ants and honeybees, which make a colony. However, the colonies of yellowjackets are produced annually and die out at the end of the season. Normally only a few fertilized queens survive winters, scattering from the old colony in early fall and secreting under protective cover - although survival seems to have been particularly high this year. In spring, the queens reemerge and search new locations to establish a nest. Abandoned rodent burrows and other underground hollows are a favored nesting site. Yellowjackets may also nest above ground in wall voids.

Two related insects, the baldfaced hornet and the aerial yellowjacket (*Dolichovespula* species), nest in trees, shrubbery or under eaves, producing a large, football-shaped paper nest. These aerial nesters, although larger and more conspicuous, are much less of a nuisance problem and actually provide considerable benefit to gardeners as a predator of caterpillars and other pests.

During spring, nests start out very small, as all the nest chores must be done by the overwintered queen. This includes nest construction, collection of food and rearing of young. The first yellowjackets produced tend to be small, due to a relative lack of food and attention. However, these can then assist in the rearing of later siblings and colonies begin to expand rapidly during early summer, peaking in late August or early September. Throughout the year the great majority of yellowjackets are infertile female "workers". A few queens and some males are produced during the end of the colony cycle.

Yellowjacket nests are made of "paper" chewed wood fibers of various sorts. The nests are similar to, but smaller than, those of the hornets and are not produced in exposed locations.

Some Differences between Yellowjackets and Honeybees:

- In general, appearance of both yellowjackets and honeybees is similar, although honeybees on average are larger. Honeybees are also more orange, whereas yellowjackets are distinctly yellow. Both have some dark banding. Honeybees, as collectors of pollen, are much more hairy-bodied than yellowjackets.
- While foraging, honeybees are pretty mellow. Yellowjackets have a very "nervous" and erratic behavior.
- Honeybees make a perennial nest that is maintained between seasons; yellowjackets (and hornets) abandon the nests at the end of the season, with only the fertilized queens surviving winters.
- Nests of yellowjackets (and hornets) are made of paper; honeybees make nests of wax.
- Yellowjackets are general scavengers, tending towards protein-rich material early in the season and sugary products later. Honeybees develop on pollen and nectar, occasionally also scavenging very sugar-rich products, along with yellowjackets.
- Both honeybees and yellowjackets can sting; only honeybees leave the stinger behind as it is barbed.

Control of the Western Yellowjacket: Colonies are abandoned at the end of the season and are not reoccupied. If nests are in a location where they are not likely to cause problems, the best course is often to leave them alone.

When yellowjacket scavenging activity is very annoying and disruptive it is important to try and eliminate all food sources around the home. Partially covered garbage containers, pet food left outside, and honeydew produced by aphids and soft scales are among the more attractive food areas that may cause yellowjackets to concentrate activity around a home.

Yellowjacket traps exist. These involve a funnel-based trap design and typically use a bait or baits. For the western yellowjacket heptyl butyrate is an attractant. These traps can be supplemented with foods as lures. Fresh protein-rich foods (turkey ham, ham, bratworst, barbecued meats and fish) are most effective early in the season; sweet materials (apple juice, cola beverages, overly ripe fruit, fermenting fruit juices) tend to be better baits later in the season. There seems to be some differences in trap performance but these have not been quantified. In my own limited experience, the Sterling Rescue Yellowjacket Trap seems to perform much better than the Scentry line.

Yellowjackets can be largely trapped out if the right design is used, effective baits are identified, and they are put out in a timely manner. **However**, the best time to bait for yellowjackets is early in the season. Kill the queen and you may prevent a colony from becoming established. Wait until late August or early September and the colony established by a single queen may have several hundred foraging workers. The few dozen a trap may get is a small percentage of the entire colony. Trap early.

However, most yellowjacket control involves treating the colony with an insecticide. "Wasp and Hornet" or "Flying Insect Killer" insecticide formulations abound in garden centers and most supermarkets. These contain a mixture of a fast-acting "knockdown" insecticide

(pyrethrins or a similar acting pyrethroids - aka synthetic pyrethins - such as resmethrin or tetramethrin) along with one that has more residual activity (such as propoxur, carbaryl, or chlorpyrifos) to kill later emerging wasps. A propellant allows one to be several feet away from the nest entrance, to which the spray should be directed. This is best done at night or very early in morning, when then wasps are unlikely to fly. (Cranshaw)

EFFECT OF DURSBAN RULING ON YARD/GARDEN/LANDSCAPE PEST MANAGEMENT

On June 8 the EPA and Dow AgroSciences announced a plan that would phase out essentially all residential uses of chlorpyrifos (Dursban) over the next year and a half. This apparently would include all indoor uses, uses for lawns and other landscape care uses, e.g., shade trees and ornamentals. Registrations for commercial nurseries and most agricultural crops are not affected.

This is no big surprise to many. All organophosphate insecticides have been under intensive scrutiny since the 1996 passage of the Food Quality Protection Act. This included provisions whereby *all* uses of a product are considered in terms of risk evaluation and during the FQPA implementation, especially stringent criteria were applied to organophosphates. Chlorpyrifos had three big strikes against it: 1) it is an organophosphate; 2) it is the biggest selling insecticide in the world and has more types of registered uses than any other; and 3) it is in a subclass of the organophosphates where laboratory studies showed some disturbing evidence of potential neurological problems from exposure in the womb or during early development.

Chlorpyrifos/Dursban has many attributes that have made it an effective pesticide. Primary is its broad spectrum of action, which includes most chewing insects as well as most sucking insects. There is also some miticidal activity. It is fairly persistent and has some limited systemic activity when applied to foliage. However, there are alternatives - in some case superior alternatives - for all current chlorpyrifos uses:

- **Caterpillars, leaf feeding beetles:** There are myriad alternatives. For most species *Bacillus thuringiensis* (Dipel, Thuricide) and spinosad (Conserve) are both effective and much more selective. Pyrethroids (permethrin/Astro et al., bifenthrin/Talstar et al., cyhalothrin (Scimitar), cyfluthrin/Tempo et al., esfenvalerate) are extremely effective and generally low toxicity. Carbaryl/Sevin works well on this group as do various organophosphates (malathion, diazinon, acephate/Orthene).
- **Wood borers, bark beetles:** Permethrin is probably superior for control of borers that are Lepidoptera (e.g., clearwing borers, Zimmerman pine moth) and probably at least equivalent for borers that are beetles (roundhead and flathead borers). It already has become the primary mountain pine beetle treatment and likely is effective for other bark beetles. Carbaryl/Sevin is also a long-term standard for both borers and bark beetles. Homeowners still have access to lindane.
- **Aphids, leafhoppers, plant bugs:** Imidacloprid (Merit/Marathon), acephate (Orthene), and dimethoate (Cygon) not only are equivalent or superior to chlorpyrifos but have much better systemic action, important for leaf-curling species. Other insecticides have activity against this group, including malathion, diazinon, Sevin (except for aphids), and various

pyrethroids such as permethrin and esfenvalerate (except for many aphids). Several new products are to be marketed imminently to the landscape/nursery market.

- **Spider mites:** Chlorpyrifos was always a marginal miticide on shade trees; some other organophosphates such as acephate/Orthene and dimethoate/Cygon are pretty much equivalent. Dicofol/Kelthane and Hexygon are selective miticides. Homeowners have access to Ortho Isotox Insect Killer Formula IV which is a combination of acephate with the selective miticide hexakis (a.k.a. Vendex). Horticultural oils that can be used as summer/foliar sprays are a very underutilized means of controlling spider mites on ornamentals. Diazinon and Kelthane are equivalent for control of clover mites on turfgrass. Some pyrethroids, notably bifenthrin/Talstar, have some miticidal activity.
- **Miscellaneous turfgrass pests:** Chlorpyrifos/Dursban was only effective against surface-active species since it bound tightly to organic matter. Several pyrethroids, diazinon and carbaryl/Sevin all are equivalent or superior for these applications.
- **"Nuisance" pests in yards:** There are at least a dozen different alternative treatments for ants, with effectively foraged baits involving a slow acting toxicant (e.g., insect growth regulators, boric acid) being superior. Sprays and dusts which include various pyrethroids (bifenthrin, permethrin, esfenvalerate, cyfluthrin, tralomethrin, etc.) are very efficacious. Sevin and diazinon also can fill essentially every chlorpyrifos niche.
- **Household pests:** Among over-the-counter products, the pyrethroids (e.g., tralomethrin, permethrin) seem to be already taking over this market. Commercial pest control applicators have been using insect growth regulators, slow acting toxicant baits, avermectin, pyrethroids and a host of other chlorpyrifos alternatives for years.

A publication that would be a useful reference is Extension Bulletin XCM-38, the Landscape and Nursery Insect Management Recommendation Guide. This lists all the insecticides that are recommended for turfgrass, shade trees and shrubs - both in landscape settings and in nurseries - and can be used to identify Dursban alternatives that are recommended. It is available from The Other Bookstore, 115 General Services Bldg., Colorado State University, Ft. Collins, CO 80523. Their phone is (970) 491-6198 (1-877-692-9358 for orders only). (Cranshaw)

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Where trade names are used, no discrimination is intended, and no endorsement by the Cooperative Extension Service is implied.

Sincerely,

William M. Brown, Jr.

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