Montana Pesticide Bulletin

MONTANA STATE UNIVERSITY | EXTENSION

December 2009

Healthier Approach to School Pest Control

by Ruth O'Neill, Insect Diagnostician, Montana State University

School districts around the U.S. grapple every year with the best and most cost-effective ways to deal with the encroachment of unwanted rodents and insects on school grounds. How do we know if the pest management practices in our schools are the lowest risk, most effective and cost-efficient available? Are our schools doing everything possible to discourage pest problems?

The expanding use of a strategy known as "integrated pest management" (IPM) is now helping tackle pest problems while reducing pesticide risk and exposure to school children in many areas of the United States. Since children spend so much of their lives in school – more than 1,000 hours a year for most students – the importance of healthy school environments is vital. Montana, too, is due for modernization in pest control approaches, and following a "School IPM" model to make these improvements will be the most safe and sensible approach.

As is true everywhere, Montana's pest control needs must be uniquely tailored to our region. In our colder northern climate we do not, for example, experience significant levels of infestation from certain pests like cockroaches and termites that are common elsewhere. Yet many rodents – particularly voles – and bats, as well as ants, spiders, wasps and numerous other arthropods commonly encroach on school grounds, presenting a variety of potentially serious threats. These issues need to be resolved with sensitivity to environmental and human health using up-to-date, complete information on the life cycles of pests and their interaction with the environment.

School IPM takes advantage of all appropriate pest management options including effective exclusion of unwanted animals from buildings, control of access to enticements like food and water, successful monitoring approaches, and tolerance when appropriate. And, when necessary, the judicious and sparing use of pesticides continue to be an important component of School IPM. Common sense IPM strategies provide a more safe and usually less expensive option for effective pest management in schools.

Courtesy OREGON STATE UNIVERSITY, IPM in Schools Program

Montana State University Extension, in conjunction with the EPA and the Montana Department of Agriculture, is now putting together a pilot program based upon successfully operated School IPM programs elsewhere in the U.S. for use in a Montana school district. What is learned from the pilot program can be expanded to other districts, ensuring healthy, wholesome learning environments for our school students across the state.

INSIDE:

MONTANA Department of AGRICULTURE

Residual Herbicide Can Damage Sensitive Garden Plants

by Melissa Graves, MSU Extension Weed and IPM Specialist, and Cecil Tharp, Pesticide Education Specialist, MSU

This summer an unusually large number of plant samples were sent to the Schutter Diagnostic Lab at Montana State University with symptoms of herbicide damage in home gardens. The Extension offices reporting suspected herbicide damage included: Big Horn, Broadwater, Choteau, Flathead, Gallatin, Garfield, Lake, Lincoln, Madison-Jefferson, Missoula (through the Montana Department of Agriculture), Musselshell, Phillips, Pondera, Ravalli, Stillwater, and Sweet Grass. The majority of reports occurred in Missoula County (38), Ravalli County (10), and Gallatin County (6). Of the specimens sent for diagnosis, tomatoes were most frequently seen, followed by potatoes. The Missoula County samples tested positive for aminopyralid exposure through contamination of composted material.

CLOPYRALID IN COMPOST

All of the samples exhibited symptoms consistent with damage caused by exposure to growth regulator herbicides called Pyridines. Symptoms of growth regulator injury can include leaf cupping or curling, stunted growth, and curling of the growing point, which can give the plant a fern-like appearance. Examples of these herbicides include aminopyralid (Milestone), clopyralid (Stinger), and picloram (Tordon). These herbicides provide excellent control of broadleaf weeds along roadsides and in grass pastures used for grazing livestock or hay production and have low levels of toxicity in livestock forage.

In spite of label instructions restricting their use, manure and hay residues from grazing operations have periodically ended up in composts and natural fertilizers used in home gardens. Plant species known to be sensitive to this type of herbicide damage include beans, peas, tomatoes, potatoes, lettuce, spinach, sugar beets, carrots, dahlias, and some roses. If compost or manure has been applied to the home garden and plants are exhibiting injury symptoms, a simple bioassay test may be used to verify the presence of herbicide (see page 3 for bioassay materials and methods).

Plant Injury Assessments

• Compare plants grown in pots with suspect mixture to plants grown in non-contaminated potting mix or soil.

• Observe plants for symptoms of herbicide injury, such as poor seed germination, yellowing or dead leaves or shoots, or cupped or curled leaves.

• If there is apparent herbicidal activity, do not plant the intended crop (another option is to plant a grass crop in the garden).

• Plants should be examined from emergence until they have three true leaves or more at weekly intervals.

The Breakdown of Pesticides from Composting

Pesticides break down during the composting process; however the rate of decomposition is dependent on many factors including soil type, temperature, aeration of the soil, and compaction. These factors impact microorganisms, extracellular decomposition, intracellular decomposition, adsorption, volatilization, and leaching. The existence of multiple primary and secondary factors makes it difficult to predict the accurate breakdown of certain pesticides in compost. The standard assumption by homeowners is that pesticides will break down to safe levels within 12 months. This is often incorrect.

Picloram. Picloram contaminated compost caused $250,000 damage at a Washington State University Compost Facility in 2000 (Granatstein 2001).

• Tordon 22K (picloram) product label prohibits the use of plants sprayed with Tordon 22K for composting on susceptible broadleaf plants. This includes using manure from animals feeding on treated areas.

Clopyralid. Washington State University found 31 – 75 ppbillion of clopyralid in compost. As little as 10 ppbillion of clopyralid can be toxic to legumes, potatoes, sunflowers, and tomatoes. Routine laboratory tests at commercial composting facilities often can't detect concentrations this low.

• Curtail M (clopyralid) product label prohibits the use of plants treated with this product for composting on susceptible broadleaf plants. This includes using manure from animals feeding on treated areas.

Aminopyralid. The Montana Department of Agriculture received reports of toxicity in gardens which used compost. Low levels of aminopyralid were later detected within the compost used in these gardens.

• Dow Agro does not recommend aminopyralid treated crops to be used for compost on susceptible broadleaf plants; in fact the product label prohibits its use in this manner. This includes using manure from animals feeding on treated areas for use on susceptible broadleaf plants.

Percentages of some active ingredients may actually increase under poor composting conditions (Granatstein 2001). This is due to a total compost mass decrease by half during decomposition.

Granatstein, David. Fall 2001. Beware of Herbicide Contamination. Tilth Producers Quarterly. Journal of Organic and Sustainable Agriculture.

HERBICIDE DAMAGED TOMATO PLANT

Early detection helps prevent establishment of yellow starthistle in Montana

by Jane Mangold, Invasive Weed Specialist, and Melissa Graves, Extension Weed and IPM Specialist

Materials Needed for Bioassay

- 4 or 5 inch flowerpots
- Plastic saucers
- Non-contaminated loam soil or potting mix
- Plastic bags
- Labels for pots
- Disposable gloves
- Garden pea seeds or beans (or intended crop plants)

Bioassay Testing Method

1. Try to remove insect larvae from samples to be tested.
2. Mix each manure or compost sample in a clean plastic bag with soil or potting mix.
3. If testing garden soil, collect soil samples from several spots throughout the garden, then combine and thoroughly mix the samples.
4. Fill 4 pots with soil mixture to be tested, tapping the bottom of pots several times on a solid surface to settle mix.
5. Label pots.
6. Place each pot in a saucer to avoid cross-contamination during watering.
7. Additional pots containing only soil or non-contaminated potting mix should be prepared to serve as control samples.
8. Position pots in random order.
9. Space pots far enough apart to avoid splashing soil from one pot to the next.
10. Water pots and let stand for 24 hours before test crop is planted.
11. Plant 4 seeds in each pot by pushing seeds into the mix so they are just under the surface. Avoid transfer of residues between pots by changing gloves or washing hands thoroughly between plantings.
12. Carefully water each pot to avoid splashing pot contents on work surface.
13. Keep pot contents uniformly moist, minimize water leaching into tray or saucer.
14. Maintain consistent growing conditions with 12 hours of light, supplement with fluorescent grow lights as needed.
15. Night time temperature should not drop below 50 F.

On September 8, 2009, a plant specimen from Beaverhead County was received at the Schutter Diagnostic Laboratory at Montana State University and confirmed to be yellow starthistle (*Centaurea solstitialis*). Until this report, the most recent confirmed reports of yellow starthistle in Montana occurred in 2001 and 2002 in Treasure, Carbon, and Sanders counties. In all cases, a limited number of plants were found and eradication efforts were successfully implemented.

S. DEWEY

The most effective way to manage noxious weeds is to prevent invasion and subsequent spread. A key component of any prevention program is early detection and rapid response (EDRR). By identifying and eradicating a weed early in its invasion process, future ecological and economical impacts can be minimized. Montana has identified six noxious weeds that are known pests in nearby states but have not established in Montana or may be found only in small, scattered, localized infestations (i.e. Category 3 noxious weeds under the current state noxious weed list). Such weeds are ideal candidates for EDRR. One of these weeds is yellow starthistle. In the past and with the specimen found recently, well-informed and vigilant residents responded appropriately and helped to prevent yellow starthistle from becoming established in the state.

Yellow starthistle is a winter annual, overwintering as a rosette and producing flowers and seeds the following season. It is characterized by bright yellow flowers, gray-green foliage, and yellow-ish spines radiating from the base of the flower. Stem leaves grow vertically giving the stem a winged appearance. During the rosette stage, it is best identified by the large triangular lobe at the leaf tip. Seeds are produced in mid- to late summer. Habitat preferences for this species include sunny areas with deep, well-drained soils. While it prefers areas with annual rainfall ranging from 10-60 inches, it has been found in places with significantly lower rainfall. Infestations of yellow starthistle are most severe in California (approximately 12 million acres), but Washington (1 million acres), Oregon (950,000 acres) and Idaho (800,000 acres) report extensive infestations as well.

Because yellow starthistle is not known to be established in Montana, prevention is top priority for managing this species. Early detection and immediate action to control plants is crucial. The following steps provide basic guidance for preventing yellow starthistle from becoming established in Montana:

1. Learn to identify yellow starthistle.

2. Monitor your property and inform a county Extension agent and/or weed coordinator if you find yellow starthistle.

3. Educate your neighbors and friends about yellow starthistle.

4. Clean all vehicles, machinery, and farm equipment accessing your property, especially if coming from a state that has infestations of yellow starthistle.

5. Practice good land management to promote and maintain healthy, vigorous desirable vegetation.

If you believe you have yellow starthistle on your property or have seen it on public land, contact your county Extension agent or county weed coordinator. Plant samples may be sent to either your county Extension office or the Schutter Diagnostic Lab on the campus of Montana State University (121 Plant BioScience; P.O. Box 173150, Bozeman, MT 59717-3150) for identification and verification.

The Changing Perspectives toward Pesticide Safety

by Cecil I. Tharp, Pesticide Education Specialist, MSU Extension

Perspectives have changed regarding many pesticides since the early 1900s. It is said that "Perspective is reality" and I certainly agree. Sometimes "our" perspective, or "society's" perspective, or even "the scientific communities" perspectives are incorrect, and may be evolving as you read this article. Let history be our guide on how perspectives have changed regarding certain pesticides:

1939 – 1972: DDT

A product called DDT (Dichloro-Diphenyl-Trichloroethane) was used for insect control since 1939. This "silver bullet" chemical was widely used throughout the world with very little initial thought regarding environmental impacts. DDT was seen as safe for the environment throughout the 1940s and 1950s.

Two decades would pass before studies would classify DDT as a persistent organic pollutant that degrades very slowly in the environment. This persistent chemical binds to fat tissues while biomagnifying through the food chain, thus causing reproductive effects on many non-target animals. DDT would later be delisted by the EPA in 1972 due to these environmental / non-target impacts.

Late 1940s – 1975: Agent Orange

A product called Agent Orange was widely used during the Vietnam War in defoliation campaigns focused on reducing available sustenance and better seeing enemy combatants. More than 20 million gallons of Agent Orange and other chemical defoliants were released over Vietnam during a nine year period with much more product used by the military in areas not including Vietnam. This herbicide product is a 1:1 mixture of 2,4-D and 2,4,5-T. Agent Orange was initially viewed as safe with little to no chronic toxicity risk associated. Veterans were told that the chemical was harmless and not to worry.

Years would pass before investigations found that dioxins were created in the manufacturing of 2,4,5-T. Dioxins were later associated with a variety of health issues. Decades passed before the government would admit to the health concerns associated with Agent Orange. Congress enacted the "Agent Orange Act" in 1991 to give veterans access to better health benefits and treatment for diseases associated with Agent Orange exposure. Those diseases included: prostate cancer, respiratory cancers, multiple myeloma, type II diabetes, Hodgkin's disease, non-Hodgkin's lymphoma, soft tissue sarcoma, and many other diseases. According to the Vietnamese Ministry of Foreign Affairs, more than 400,000 deaths and/or disabilities, and 500,000 children were born with birth defects due to Agent Orange exposure. Agent Orange has not been used by the military since the 1970s.

1990s – Present Day: Long Term Health Concerns

The lack of personal protective equipment when using products that have low acute (short term) toxicity, or herbicides that are viewed as only having toxic affects towards plants is common. A perspective biased toward the short term toxicity of a pesticide may not consider the chronic (long term) consequences of unsafe practices. This complacent attitude often pervades even when a pesticide product label requires some minimal protective equipment. The Agricultural Health Study, initiated in 1993, assessed over 90,000 private applicators and their wives for health concerns related to pesticide use over a lifetime.

Prostate Cancer. This study found applicators over 50 who used methyl bromide fumigants, aldrin, chlordane, DDT, dieldrin, endrin, hexachlor and toxophene, to be associated with higher rates of prostate cancer. Applicators who had a family history of prostate cancer who used chlorpyrifos (Lorsban®), coumaphos (Co-Ral), fonofos (Dyfonate®), and permethrin (with animal uses) also were associated with higher rates of prostate cancer.

Wheezing. Wheezing was associated with private applicators that used organophosphates including parathion, malathion, and chlorpyrifos. Chlorpyrifos was strongly associated with wheezing in applicators using chlorpyrifos for at least 20 days per year.

Retinal Degeneration. Applicators and applicator's wives who used fungicides including bonomyl, captan, chlorothanonil, copper ammonia carbonate, ferbam, maneb, metaxyl, PCNB, and sulfur were associated with degeneration of the retina. These findings suggest that exposure to many fungicides may increase the risk of retinal degeneration.

Parkinson's Disease. Applicators who used pesticides for more than 400 days in their lifetime had an increased risk of Parkinson's disease. Parkinson's disease was also related to high pesticide exposure events such as spills. Using personal protective equipment was found to reduce the risk of Parkinson's disease.

**** Most applicators with these health concerns did not wear the proper protective equipment as recommended on the product label. Mis-use of many pesticide products may cause damaging long term health problems that may not be initially visible.***

Conclusion. Be aware of chronic toxicity statements within the product label which will state any long term health concerns associated with pesticide exposure. Keep in mind that perspectives often change regarding pesticides. A change from a perspective of low caution to a perspective of moderate to high caution is not uncommon in the world of pesticides. For this reason, it is important to read and follow the product label when handling your pesticide. Wear proper protective equipment even with products having low acute toxicity (signal word: CAUTION). By wearing proper protective equipment you can protect you and your family from any future deleterious health concerns that may not be presently known.

New changes to 2010 Extension Master Gardener Program

The 2010 Montana State University Extension Master Gardener program has gone through some changes to better serve the beginning and experienced gardeners throughout Montana. Prior to this year, the Extension Master Gardener program was a 12-week advanced gardening program in which students had to attend 24 hours of class time, pass a comprehensive test, and perform 20 hours of volunteer commitment in order to be named a Montana Master Gardener.

"As an Extension agent in Silver Bow County for the last two seasons, I taught the previous Master Gardener curriculum and found that many people in the class wanted to learn basic gardening, while others were much more advanced. It made it difficult to keep it interesting for all those who signed up," said Toby Day, the new Montana State University Extension Horticulture Associate, now overseeing the statewide Extension Master Gardener Program.

"While the previous Master Gardener program was successful, we've decided to go forward with a three-level Master Gardener program for Montana to better serve our clientele," Day said.

The three-level Master Gardener Program will start with an eight-week Level 1 (beginning level) course that will cover basic fertility and soils, plant growth and development, growing food and flowers, lawn installation and maintenance, irrigation, yard and garden maintenance, composting, introduction to integrated pest management, and how to select, install and maintain trees, shrubs and vines.

"This class is specifically designed for those who want to learn more about gardening, how to install a garden and how to take proper care of their property," Day said.

"The class will run eight weeks, will have an open book test and will require 20 hours of volunteer commitment."

The volunteer commitment component of the Master Gardener program is an opportunity for the Master Gardeners to give back to the community by answering horticulture questions at their local Extension office, staffing booths at fairs and farmers markets, writing articles and helping design, install and maintain community flower and vegetable gardens.

The proposed date for the program to be available to county Extension agents is January 15.

Following the Level 1 Extension Master Gardener class, the Level 2 Master Gardener program will be available in mid-March. The Level 2 class will be an advanced class for those that have the basic experience and/or knowledge about gardening and want more technical training. It will require a closed-book test and 30 hours of volunteer commitment.

In the summer of 2011, the Level 3 Extension Master Gardener course will be offered as a three day intensive gardening and volunteer training offered on the campus of Montana State University. Details about the training are still being developed.

Every county Extension agent in Montana will have the opportunity to administer the Extension Master Gardener program. However, the individual county Extension agents will determine whether there is a need in their community.

According to Day, "It is really up to the agents if they want to hold a Master Gardener class. The classes can take some time away from other Extension programs, so we have left it up to the agents to decide if, through their needs assessment, the class will benefit their program area."

Times, dates and locations of the Extension Master Gardener series are determined by the county Extension agents that participate in the program in their individual service area. To find out more about the Extension Master Gardener program, contact your local Extension office at http://www.msuextension.org/Directory/field.asp or visit the Extension Master Gardener Web site at http://gardenguide.montana.edu/mgardener/mgardenerindex.asp

TOBY DAY, Montana State University Extension Horticulture Associate, oversees the statewide Extension Master Gardener Program. (Photo by Kelly Gorham/MSU News Service)

Pesticide News and Programs of Montana Interest

• EPA issues two year stay regarding additional aquatic NPDES permits. June 12, 2009.
On April 9, 2009 the Department of Justice filed a 24 month motion of stay to provide EPA enough time to provide structure to support the January 7 NPDES ruling by the 6th Circuit Court. This ruling requires clean water permits (NPDES) for all pesticide or biological applications to control pests directly to water, over water, or near water. See this MSU pesticide news story online at pesticides.montana.edu/News/Miscellaneous/agalertaquaticpesticidepermitsgranted.pdf.

• Tolerance Revocation of Carbofuran effective December 31, 2009. October 28, 2009.
EPA has completed action to revoke existing carbofuran tolerances on December 31, 2009. This is due to EPA's findings of unacceptable dietary risks towards children. Consequently, all uses of carbofuran are revoked on December 31, 2009. This includes any existing supplies of carbofuran. See this MSU pesticide news story online at pesticides.montana.edu/News/Miscellaneous/agalertcarbofurantolerancerevocation.pdf.

• Understanding pesticides when managing Mountain Pine Beetle. October 25, 2009.
Mountain Pine Beetle infestations have caused extreme losses throughout Montana's pine forests. Even homeowners across Montana are experiencing losses to mature pines in their own backyards. Homeowners should have a good understanding of pesticide options prior to rushing to the local distribution outlets to purchase products. This pesticide news story details pesticide products which are currently available to licensed applicators as well as non-licensed homeowners. See this MSU pesticide news story online at pesticides.montana.edu/News/Miscellaneous/agalertMountainPineBeetle.pdf

Hill County. January 7, 2010.
2010 Initial Pesticide Training (6 private applicator credits). This program is an initial training program for private applicators. Current private applicators will attain 6 recertification credits. This program covers pesticide safety, environmental concerns, calibration, the private applicator license, pesticide laws, and pest management. Contact the Hill county Extension office for more details (Joe Broesder; (406) 265-5487) or see online agenda at www.pesticides.montana.edu/PAT/2009/10-36.html.

Hill County. January 8, 2010.
Sustainable Crop Production Update (3 private applicator credits). This program focuses on sustainable crop production and contains presentations on nutrient uptake, IPM, market opportunities, etc. Contact the Hill county Extension office for more details (Joe Broesder; (406) 265-5487) or see online agenda at www.pesticides.montana.edu/PAT/2009/10-35.html

Custer County. January 8, 2010.
Cow Capital Beef Day (2 private applicator recertification credits). This program contains presentations on pesticide laws including a section on USDA restricted use recordkeeping. Contact the Extension office (406) 635-2121 or see online agenda at www.pesticides.montana.edu/PAT/2009/10-30.html.

Cascade, Teton, Pondera, Glacier, Toole, Liberty, Fergus, Chouteau Counties. January 18 – 22, 2010.
Triangle Cropping Seminars (3 – 6 private applicator credits depending on location, see online agendas). These programs focus on a variety of subject areas including insects, weeds, pesticide safety, calibration, crop rotations, variety selections, small grains, fertilizer amendments, and IPM. Contact your local Extension office for more information or see an online agenda at www.pesticides.montana.edu/PAT/2009/Region3.html.

Wibaux, Fallon, Carter, Powder River, Garfield, Rosebud, and Prairie Counties. January 25 – 29, 2010.
Winter Ag. Series (3 private applicator recertification credits). These programs focus on cheatgrass control, calibration, grasshopper management, and chemical / cultural management of weeds. Contact the local Extension office for more information or see an online agenda at www.pesticides.montana.edu/PAT/2009/Region4.html.

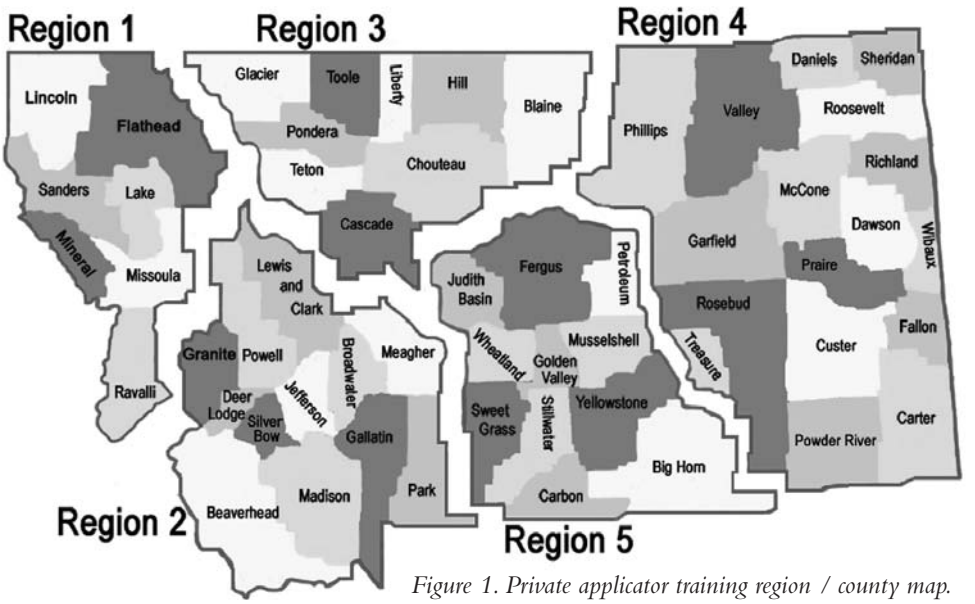

Figure 1. Private applicator training region / county map.

Comments and/or Questions from the Public

Do you have comments or questions regarding pesticides?

If you do, send to:

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Montana Pesticide Bulletin

MSU PESTICIDE SAFETY & EDUCATION PROGRAM

TRAINING & REFERENCE MATERIALS

Personal Information

Name:_____
Address:_____
_____
County of Residence:_____
Phone:_____
Email:_____

INITIAL PRIVATE APPLICATOR CERTIFICATION (STUDY MATERIALS)		
Montana Private Pesticide Certification Handbook EPA How to Comply with the WPS (CD) EPA How to Comply with the WPS (Book) MSU Pesticide Recordkeeping Booklet USDA Recordkeeping Manual for Private App MontGuide: The Montana Private Applicator Program		
Complete PSEP Training Packet	***Total Cost = $11.00***	***Check box if needed***

PESTICIDE SAFETY & EDUCATION REFERENCE MATERIALS			
Reference Materials	***Cost***	***#***	***Total***
Montana Private Pesticide Certification Handbook	***$7.00***		
EPA How to Comply with the WPS (CD)	***$1.00***		
EPA How to Comply with the WPS (Book)	***$3.00***		
MSU Pesticide Recordkeeping Booklet	***$1.50***		
USDA Recordkeeping Manual for Private App	***$1.50***		
Montana Pesticide Bulletin	***$1.00***		
MontGuide: The Montana Private Applicator Program	***$1.00***		
MontGuide: Assessing Pesticide Safety	***$1.00***		
MontGuide: Chemicals and Animal Safety	***$1.00***		
TIPS for Fighting Weeds on Small Acreages in Montana	***$3.00***		
TOTAL COST			

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