

Plant Science Says



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Mountain Pine Beetle

By Kevin Wanner

Last summer in a state where wheat and barley insect pests "rule", I was confronted with a tiny forest beetle that was killing our large and valuable pine trees. Pine trees that are turning red and dying can be seen while driving, walking or bicycling throughout the Bozeman area. These are pine trees that were attacked by the mountain pine beetle (MPB, *Dendroctonus ponderosae*), last summer. Although the trees remain green over the winter, their vascular system was already destroyed by the beetle larvae feeding underneath the bark and the growth of blue stain fungi that accompany the beetles. During the spring and summer when temperatures warm up, the infested trees turn red from lack of water and nutrients.

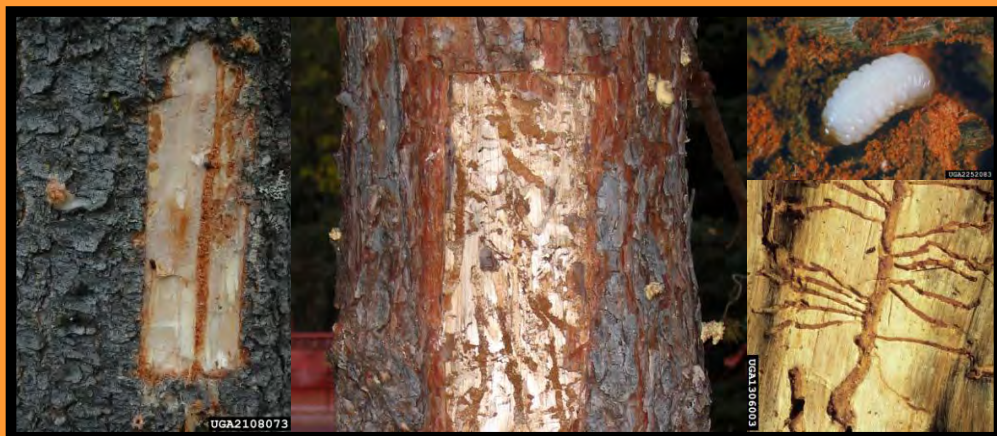
(lower right picture). When a tree is attacked by hundreds of beetles, the inner bark is destroyed by their feeding activity (middle picture).

Mountain pine beetles attacking and killing high value urban trees is not an isolated problem. Pine forests in western North America are currently experiencing an infestation of unprecedented size. **Ninety percent of British Columbia's** lodge pole pine forest will be killed during the next 10 years. In Montana two to three million acres of pine forest were killed last summer. Patches of **red dying trees on Montana's** mountain sides are evidence of the MPB infestation. With such large infestations it is inevitable that this tiny insect that lives in the forest finds its way into our urban environments.

Although Great Falls is located more than 20 miles from a forest, 1000 pine trees were attacked and killed last summer within the city. Likely aided by prevailing winds, the beetle even found its way to isolated farm shelter belts in the central region.

Has our society contributed to the MPB problem? Yes and No. The MPB is native to Western pine forests and large scale outbreaks occur periodically in

older mature forests contributing to their cyclic regeneration. Activities that promote large areas of even aged forest, such as suppressing fires, can contribute to the scale of outbreaks. Warmer average winter temperatures have resulted in an expanded range towards higher elevations and northern latitudes. In turn, MPB infestations may contribute to global warming by converting pine forests from carbon sinks



After boring through the bark, female beetles construct a vertical gallery underneath the bark (left picture). After mating, the female lays eggs along the vertical gallery. The eggs hatch into small grub-like larvae (upper right picture) that feed in a horizontal direction. The smaller larval feeding galleries radiate out from the larger vertical adult galleries producing a characteristic pattern underneath the bark

into carbon sources (Kurz et al., 2008; Nature, 452: 987-90).



Adult mountain pine beetles under the bark of a Scots pine tree. These are tiny beetles not much larger than a grain of rice.

In the forests there is little that we can do to manage these enormous outbreaks, they will simply run their natural course. In our urban environments however, there are steps that can be taken to protect high value pine trees. The concepts of integrated pest management (IPM) can be employed when managing insect pests. However, managing MPB in urban environments provides challenges. In most cases an insect pest and its damage can be monitored and surveyed, and when a damaging threshold has been exceeded, treatment options can be employed. In the case of MPB however, after the beetles mass attack a pine tree, its fate is sealed and there is not opportunity for therapeutic treatments. Additionally, there is no way to predict which urban trees will be attacked when the beetles fly or are blown into town. Therefore treatments for MPB are preventative; they are applied before the beetles begin flying and attacking trees. The decision to apply preventative treatments is a balance between the risk that your trees will be attacked and the cost of the treatments.

Management recommendations specific to urban environments were developed and can be found on my website at http://www.msuextension.org/drwanner/MPB/mpb_page.htm.

For information on managing MPB in forests, small woodlots and acreage the DNRC Forestry Division has a website: <http://dnrc.mt.gov/forestry/Assistance/Pests/mtnpinebeetle.asp>.

Summary of Recommendations

- 1) Learn to recognize the signs and symptoms of MPB attack. Evaluate the degree of risk to pine trees on your property. Is the property close to an infested forest? Are there infested trees on your property or in the general area?
- 2) Practice prevention. Remove and destroy infested trees by June 1 before beetles emerge to attack nearby trees. Do not bring infested firewood onto your property. If the pine trees are at risk of attack, keep them well watered.
- 3) If your pine trees are at risk, consider protecting them. Trees can be protected by spraying the trunks with an insecticide or by applying a repellent pheromone prior to July 1.
- 4) During the fall season evaluate MPB damage to your pine trees and develop a management plan that utilizes prevention and protection if necessary. The current infestation in Montana will likely last for at least another 3 to 5 more years.



The cost of not protecting your trees

Following is a before and after picture of Mountain Pine Beetle damage in Bozeman:



Gallatin Valley Farm Fair By Mary Burrows

What is the most common question 600 fourth graders will ask MSU's ag representatives at Farm Fair? If you guessed 'can we eat it?' you guessed right! Representatives from Plant Sciences including Ron Larson, Heather Rimel, Jim Berg, Larry Holzworth, Nina Zidack, Brandi Morales and Mary Burrows taught kids about crops in Montana including potatoes, wheat, peas, and alfalfa. Phil Bruckner, Stan Bates, and Carli Lofing helped organize the crops booth but could not attend the fair. Nina had additional help in the potato booth from Dan Durham of the



Nina Zidack in the Potato Booth at the Farm Fair

Gallatin Valley Conservation District and Manhattan grower Barb Cole.

I never thought of seed as 'soft' before, and the kids were really impressed that such a tiny alfalfa seed could make a big plant, and they really liked the green and yellow peas. When asked the difference between white and wheat bread, most said the white bread was made of preservatives and the wheat bread was made of wheat. Most expressed a preference for the wheat bread, although there were a few holdouts, including Ron Larson.

Ron explained that white bread was made from the endosperm of the wheat seed whereas the whole wheat bread was made from the whole kernel (bran, germ, and endosperm). In the potato booth, the kids seemed genuinely impressed that potatoes contain twice the amount of potassium as bananas, and that one potato provides half the daily requirement for vitamin C. I doubt these facts will stick in their minds because **the cattle women's association was making ice cream and the potato bread with honey and potato chips at the potato booth were more memorable.** We can always hope we inspired some of our future farmers, or



Ron Larson teaching teaching 4th graders about several crops grown in the Gallatin Valley.

taught a few of the kids that their food **doesn't originate on the grocery store shelf.**

Western Wheat Workers meet in Oregon By Bill Grey

Alan Dyer, Luther Talbert and Bill Grey gathered with breeders, pathologists, and cereal quality scientists of Oregon, Washington and Montana under the abnormally beautiful, clear sky in Corvallis, Oregon. When one considers that the annual rainfall for the Willamette Valley is 40 inches, a dry, hot day to visit field plots in sandals and shorts is far better than raincoats and galoshes. The big news from the local farmers in the Willamette is the shift from **being the world's largest producer** of grass seed to re-tooling for winter wheat production. It turns out, even grass seed is vulnerable to the downturn in the housing market and sales have dropped on turfgrass and lawns. The growers are tearing out grass fields to be replaced with 120 bu/acre winter wheat fields and the acreage is expected to increase from 30K to 200K by 2010. From the job security point of view, pathologists, entomologists and weed scientists will be dealing with fungal diseases, grassy weeds and aphids bearing a viral complex. In this climate of cool winters and constant dew, stripe rust can be devastating as it can be in other regions of the Pacific Northwest and Intermountain Rockies. So you can well imagine, our discussion and focus was on keeping the level of resistance in cultivars to the prevalent virulence of stripe rust isolates. Oh and not forgetting the quality folks, these varieties better bake and taste like bread, cookies, cakes or noodles; otherwise they may as well stay in the research nursery. There was a lot of talk on the use of DArT for genotyping (no, we were not playing darts in the local bar) and validating molecular markers along with phenotype screening to preserve the durable resistance of cultivars. Fortunately, 'HTAP' or high temperature, adult plant resistance has been effective for keeping a cap on stripe rust epidemics for over 60 years **but that doesn't keep this** group from searching for new sources of HTAP and speeding the process of cultivar development with markers or pathogen screens. In the after hours meetings, we did our best to sample and show no favorites

among the local microbrews and fermented Oregon grapes along with gorging on the delicious lunch and dinner catered by the Oregon St. University food service. It was a great meeting thanks to our hosts, Chris Mundt-OSU Pathologist and Jim Peterson-OSU Wheat Breeder.

Dougher Elected Director

Tracy Dougher has been elected as the Western Regional Director-Elect for NACTA. Her term as Director-Elect will begin at the June 2009 Annual Conference at Oklahoma State and continue for two years through June 2012. Her initial official Executive Committee meeting will be on Saturday, June 20, 8:00 a.m.

Congratulations Tracy!

Outstanding Senior Award

This year, the Outstanding Senior Award went to Alanna Schlosser. Alanna will be **be pursuing a master's degree in plant science** with Mike Giroux as her adviser.



John Sherwood awarding Alanna "The Outstanding Senior Award"

Alanna **says,** "While I was an undergraduate, I was involved with many organizations, but joining a Greek house was the best decision that I made. As a member of Pi Beta Phi, I made many lasting friendships, gained leadership experience, and became more involved on campus and in the community."

Congratulations Alanna!

Our Recent Graduates

Following are pictures of our recent graduates:



Paul Trusty and advisor Cathy Cripps



Oliver Neher and Eva Grimme and advisor Barry Jacobsen.



Leila Feiz and advisor Mike Giroux

New Employees

Toby Day (312 LJH)



Toby Day has been hired as the new Horticulture Associate in the Department of Plant Sciences and Plant Pathology. His appointment is 100% Extension.

For the past two years, Toby has been working as the Silver Bow County Extension Agent in Butte, Montana. Toby received his Bachelor's degree in Horticulture-Landscape Design and Master's Degree in Plant Sciences from Montana State University. He is married to Jennifer Dunn, Assistant Director of Programming in the Admissions Office.

Toby has been previously employed at MSU as a student worker with David Baumbauer and as a graduate assistant with Tracy Dougher. In addition, he survived two years working for Bernie Schaff as a Research Associate II at the Post agronomy farm 😊.

Toby's start date is June 8. His office will be located in 312 LJH.

Debdulal Banerjee (232 PBB)



Hello! My name is Debu and I am with the Vidyasagar University in Midnapore, West Bengal, India. When I started my work on microbial endophytes, I studied the papers of Professor Strobel of this department. This increased my interest

in this field and I contacted him. This led to a BOYSCAST Fellowship, given by the Indian Government, to learn techniques in microbial endophyte research at Montana State University working for Dr. Strobel. This is a dream come true for me. I am hopeful that I will utilize this opportunity to the fullest extent. Being in Bozeman and the Gallatin valley encircled by snow covered mountains is an added bonus. My hobbies are traveling and listening to music.

Publications

Clack, T., Shokry, A., Moffet, M., Liu, P., Faul, M., Sharrock, R.A. (2009) Obligate heterodimerization of *Arabidopsis* phytochromes C and E and interaction with the PIF3 basic helix-loop-helix transcription factor. *Plant Cell* 21, 786-799.

Grants

Cathy Cripps, Whitebark Pine Ecosystem Foundation, USDA Forest Service Grant, "Inoculation of Whitebark Pine Seedlings with Native Mycorrhizal Fungi, Phase 2", \$7,800-17,800, 2009-2011.

Cathy Cripps, MSU Equipment Fee Allocation Grant, \$11,824 for new teaching microscopes.

Alice Pilgeram, Montana Department of Environmental Quality, "Camelina Evaluation for Soil Amendment", \$70,000.

Are Wood Ashes Good for the Garden? By Cheryl Moore-Gough

Yes and no, depending upon where you garden. Wood ash contains about 5% potash and 2% phosphoric acid, and has a neutralizing power about one third that of limestone. It also may contain some cadmium, zinc, copper, nickel, and lead. Each of these heavy metals could be toxic to plants consuming the material if enough is taken up. If ash is used in the same spot for many years, or applied at high rates, then the heavy metals could accumulate to undesirable levels. Wood ashes raise the alkalinity, or pH, of the soil in a manner similar to limestone. Since the optimum pH range for most garden soils lies between 6.0 and 7.0, and since most of our soils have a pH far above that to begin with, adding wood ashes would be like adding gasoline to a fire- you will only make a bad thing worse.

On the other hand, if you live in one of the very few areas of the state that has an acid soil (usually at higher elevations where precipitation is more substantial), you can use the ash to adjust soil pH, but apply no more than one 5 gallon bucket (20 pounds) of ash per 1000 square feet per year. This would raise the pH to the same extent as about 6 pounds of limestone and would not cause undue buildup of heavy metals.

Bob's Byte

By Bob Johnston

Remote desktop – an easy way to connect to your office computer if you have a DSL or Cable modem internet connection.



If you have a need to connect to your office machine to access files, email or programs remote desktop is the easy way to do this. Once you connect to your office computer your home computer will display your office desktop and it appears as if you are actually working in your office.

To setup a remote desktop connection on a Windows XP machine – do the following:

On your office machine -
Right click on my computer
Select properties
Click on the remote (settings) tab
Place a checkmark in the box marked allow users to connect remotely (**for Vista users, click on allow connections for any version of Remote Desktop**) – click on apply click on the computer name tab and make note of the full computer name –

It will look like this –
PlantXX.msu.montana.edu
click on ok and close out of all open menus.

To access your computer from home – do the following:

Click on start and select programs
Click on accessories and select communications
Select remote desktop connection
Enter your full machine when asked

Your screen should now go blank with a yellow bar at the top indicating that you have access to your computer. You will get a logon screen asking for a user name and password. Use the name and password you normally use when you logon to your machine.

That's all there is to it. When you are ready to exit back to your home computer, just click on the X in the yellow bar at the top of the screen. If you need to move back and forth between computers, just minimize the

connection to your office machine by clicking on the – on the yellow bar.

Recipe of the Month

Lemon Delight Cake (served at coffee several weeks ago)

Contributed by Sue Brumfield

1 pkg lemon cake mix,
prepared as usual

3 T poppy seeds

2 T lemon zest to batter

1/3 c blueberries to top half

Spread ½ of batter in a greased 13x9 pan



Filling: 1 pkg cream cheese

1 can lemon pie filling (15 ¾ oz)

Optional: ½ c powdered sugar, 1 T lemon juice

Beat cream cheese until smooth. Gradually add pie filling, sugar and/or lemon juice.

Drop by teaspoonfuls over batter spread gently. Top with remaining batter. Sprinkle topping over.

Topping

1/3 c brown sugar

¼ c chopped pecans or walnuts

3 T flour

4 t melted butter

½ t cinnamon

Combine ingredients and sprinkle over batter

Bake 350 for 40-45 minutes. Test with toothpick. Cool. Glaze with 4 t lemon juice combined with ½ powdered sugar. Drizzle over cooled cake. Refrigerate leftovers.

June Birthdays

Li Huang 12

Ron Larson 12

Ron Ramsfield 15

Jackie Kennedy 15

Luther Talbert 18

Eileen Carpenter 22

Bill Hoch 25

Stan Bates 28

