

Plant Science Says



October, 2006

Adventures in Brazil

By Matt Lavin

From 22 August until 8 September, I visited Rio de Janeiro, Brazil, mostly to work and hardly to play. I



was invited by Drs. Vidal Mansano de Freitas and Haroldo Cavalcante de Lima, two long time colleagues from the Rio de Janeiro Botanical Gardens who study the plant diversity and systematics of Brazilian plants and who specialize in the systematics of the legume family. Legumes are one of the most abundant and species-rich plant families in most types of forest that cover Brazil, so this plant family is targeted as a proxy for all of plant diversity in the country.

I was invited to help instruct a graduate course in molecular phylogenetics to 12 graduate students who attend various universities in the states of Rio de Janeiro, Minas Gerais, and São Paulo, but who are affiliated with the Rio Botanical Gardens as part of their graduate studies. The course was taught on the grounds of the Botanical Gardens, so every morning I had the pleasure of being able to walk (under the statue of Christ of Corcovado) from one



Copacabana. Biking and running trails connect the Gardens to the adjacent city, so it was very easy (especially for someone who likes to jog) to visit a lot of the Rio tourist attractions right from the Botanical Gardens.

A couple of trips to wet forest (the Mata Atlantica in the vicinity of the “Finger of God”) and dry forest (Cabo Frio, the view behind the white Toyota





jeep) revealed the huge diversity of plants within Brazilian forests. For example, I would be with several Brazilian botanists who collectively had many decades of experience working in Brazilian forests, and we would more-than-occasionally come across a tree, even a legume tree, whose identity would be uncertain or unknown (in some forests over 200 species of trees coexist per hectare). Of course, trying to identify trees with all of their leaves, flowers, and fruits suspended at least 30 feet above your head is not a simple matter.

The course I helped instruct involved various methods of phylogenetics (parsimony, maximum likelihood and model selection, Bayesian inference, and evolutionary rates) adapted for the PC environment (which dominates over Mac and Unix platforms in Latin America) to run in the command-line batch-file mode. But, we don't need to go there. Needless to say, the hospitality and collegiality of my Brazilian hosts were exceptional, as were the intellectual abilities of the graduate students. I plan to continue doing research with several of these students and faculty. In addition, I will be involved with organizing the next international conference on legume diversity and biology. This event will be held on the grounds of the Rio Botanical Gardens during 2008, will coincide with the 200th anniversary of this incredible Garden that specializes in the cultivation of the many endemic trees of Brazil.

Montana Ag Live! Fall Schedule (2nd half)

Montana Ag Live! is broadcast on KUSM, Channel 9, at 7:00 p.m. on Sundays. Following is a schedule of the guests:

October 8 – Dr. Vince Smith, Ag Economist,

Dept. of Ag Economics/Economics

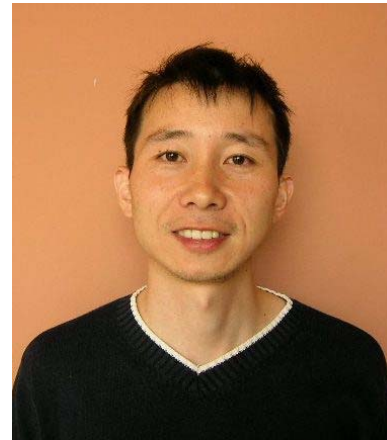
October 15 – Dr. Mike Reilly, Professor of

Marketing, College of Business

October 22 – Governor Brian Schweitzer

New Employees

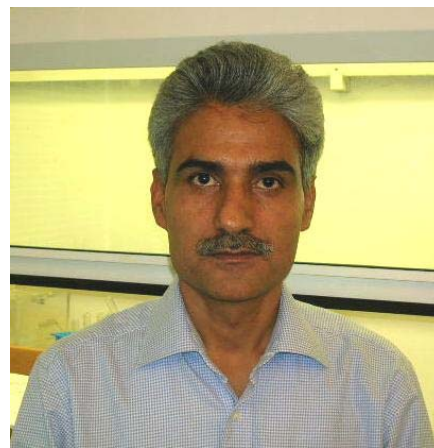
Dr. Yuhao Ren - Visiting Scientist (Strobel)



Dr. Yuhao Ren from China will be working with Gary Strobel for approximately one year. He received his PhD from King's College in London. His work focuses on isolation and characterization of bioactive compounds from

natural sources.

Dr. Sewa Ram– Visiting Scientist (Giroux)



I am working on different aspects of wheat improvement with major emphasis on processing and nutritional quality. The major areas of research are to identify germplasm lines

having desirable quality traits and use them in the breeding program, to conduct studies on Biochemical/Molecular basis of wheat and barley grain quality especially grain hardness and storage proteins and to develop molecular tools useful in screening recombinant lines in breeding program. Work has been initiated on improvement in yield by manipulating starch biosynthesis genes including enhanced sucrose translocation.

Germplasm lines having unique quality traits have been identified and are being used in the breeding program for the enhancement of processing and nutritional quality of wheat. Nap Hal, a unique Indian land variety of wheat, has been characterized

for gluten proteins, puroindolines, rheological traits and baking tests and it has demonstrated that it can be used for the improvement of biscuit making quality. High and low molecular weight glutenins and gliadins have been separated electrophoretically from 285 released varieties of wheat in India using SDS-PAGE and Acid-PAGE techniques. A relationship between specific HMW-GS and gluten strength has been established. The Acid-PAGE technique exhibited large genetic diversity in Indian wheats and some gliadin patterns were observed in specific environments. Grain hardness was studied at the molecular level in greater detail. PCR amplification of puroindoline genes indicated the prevalence of null mutation in pinA in released varieties in India which had harder grains. However, there are a few exceptional cultivars with harder grains but having both puroindolineA and glycine type puroindoline B. Puroindoline genes from these exceptions (two cultivars) were cloned and sequenced and the frame shift mutation identified in pin B in both the varieties. Alkaline water retention capacity (AWRC) and solvent retention capacities (SRC) showed a significant negative correlation with both biscuit diameter and spread factor. SRC profile exhibited strong correlation with Farinograph water absorption (FWA) and explained 88% variability in FWA. This test is useful in predicting FWA and hence chapati and biscuit quality. It was established that SRC of 1 gram whole meal flour can be used in screening the recombinant lines in the breeding programme for biscuit making quality. Rheological studies (alveograph tests) showed that dough extensibility is the main limitation in many of the cultivars for bread and biscuit making quality. Efforts are being made to understand the biochemical/molecular basis of dough extensibility for improving dough properties for these end-use products.

Grants

Victoria Carollo, “Regional Barley Gene Mapping Project,” Oregon State University

David Sands, “Value-added Omega-3 products from Goats and Dairy Cows”, Biobased Institute

Alice Pilgeram, “Cold refined Omega-3 Camelina Oil and Improvement of the Nutritional Value of Bake Products and Spreads (peanut butter)”, Biobased Institute

Chaofu Lu, “Modification of Camelina Oils for Food Purposes”, Biobased Institute

Barry Jacobsen, “Development of bacillus-Based Biological Control Agents for Plants”, Biobased Institute

Mike Giroux, “Identifying Parameters Critical to Ethanol Production from Montana Small Grains”, Biobased Institute

Publications

Ashley D. Lehman, Florence V. Dunkel, Robyn A. Klein, Saidou Ouattara, Drissa Diallo, Kadiatou Toure Gamby, and Moussa N'Diaye. “Insect management products from Malian traditional medicine: Establishing systematic criteria for their identification.”

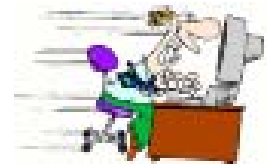
This paper is senior authored by a former Mali extern following on her undergraduate research begun as an extern. She was a Plant Biology major, graduating in 2005. A supplementary list of 294 Malian medicinal plant species was also requested by the editor for web publication at the same time the hard copy of the journal article is published.

Bob's Byte

By Bob Johnston

Hints for traveling with a notebook computer

A laptop is stolen every 53 seconds and according to the FBI, 97% are never recovered. Laptops are taken from coffee shops, hotel rooms and



automobiles every day. Losing your laptop is costly, even devastating when you consider the priceless photos, files and personal information you have stored on your laptop.

What to do??

This is a no-brainer. Important data files should always be backed up whether you travel with a notebook or not. Consider buying an external USB drive to store your data – about \$100.

If you need to check your computer – Don't just put it in your checked bag. It will be much safer in a protective case and incase it does go missing you will have a record that the case was actually checked through security. **Storm Case** from

Hardigg Industries and **Pelican cases** would be good choices for day to day, extensive travel with delicate equipment including your laptop. The cases from both of these companies can be locked using a variety of means, including built-in locks and external padlocks or zip ties. The built-in locks don't yet meet TSA specifications because they cannot be opened using the TSA master key. However, the added locking tabs mean you can use a TSA-approved padlock.

Locking cable - Purchase a 4-5 foot locking cable which will connect to the Kensington lock slot on all notebook computers. Use the cable whenever the computer is unattended.

Consider using an encryption program to encode all the data on your notebook. At least if it does get stolen, it will take someone with a considerable amount of time and expertise to get at it.

For 50 dollars, you can purchase **LoJack for laptops** tracking software which will call a monitoring center every time you connect to the internet. If the laptop is stolen and reported to the monitoring center, an alert is sent to the laptop the first time it reconnects to the internet and the laptop will start calling the monitoring center every 15 minutes to report its' location. The information is sent to law enforcement allowing them to secure a search warrant and recover your laptop.

How can I make my yard look more attractive in winter?

By Bob Gough

There are two kinds of people in Montana; those who love winter and those who don't. Consider the winter landscape. This can offer those who love the winter more to love and those who cringe at the first snow flake something to look forward to. Many woody ornamentals have stunning and practical winter characteristics. Look for plants with unusual bark texture or color such as the exfoliating cinnamon-colored Amur chokecherry (*Prunus maackii*), the shiny cinnamon-colored European mountainash (*Sorbus aucuparia*) or the brilliant red or yellow bark colors of the dogwoods (*Cornus*



spp.). The Russian olive (*Elaeagnus angustifolia*) has unusual fuzzy, light green young twigs with a faint musky scent and deeply ridged and exfoliating older wood with a grey/brown color.

For attracting wildlife and birds, many species have fruit that persist into the winter months. Most viburnums (*Viburnum* spp.) offer persistent berries from bright red to black in color, depending upon the species. The barberries (*Berberis* spp.) do too, if you don't mind the thorns.

A particular form or habit may complement the existing landscape. Consider a fine-textured species such as the weeping cutleaf birch (*Betula pendula* 'Gracilis' or 'Dalecarlica') or a very course-textured and tiered, upright habit like the thornless common honeylocust (*Gleditsia triacanthos* var. *inermis*). A combination of characteristics can be aesthetically pleasing and add nicely to your winter landscape. For example, red or yellow-twig dogwoods in front of an evergreen or an informal hedge containing various species with a wide array of winter characteristics could be more captivating than if any of these species were used alone. Place such species or their combinations directly out a window, in view from the hot tub, or along a walkway so that you can enjoy them at all times.

Recipes of the Month

Apple-Cranberry Crisp

3 cups cubed Granny Smith apple (about 1 pound)

2 cups fresh cranberries

1/2 cup sugar

Cooking spray

1/3 cup whole wheat flour

1 cup regular oats

1/2 cup packed brown sugar

1/4 cup canola oil



Preheat oven to 350°.

Combine the first 3

ingredients in a medium bowl; spoon into an 8 x 8-inch baking dish coated with cooking spray. Lightly spoon the flour into a dry measuring cup, and level with a knife. Combine flour, oats, sugar, and oil, stirring with a fork until crumbly. Sprinkle over the apple mixture. Bake at 350° for 40 minutes or until bubbly.

Hot Orange Spice Cider

6 c apple cider

1 c orange juice
6 apple cinnamon spice tea bags
5 whole cloves
Combine all ingredients. Simmer for 10 minutes.
Strain out whole cloves and tea bags. Enjoy!

October Birthdays

| | |
|-----------------|----|
| Hope Talbert | 5 |
| Florence Dunkel | 10 |
| Bob Sharrock | 11 |
| Jamie Sherman | 20 |
| David Parrott | 27 |
| Ahmed Shokry | 28 |
| Peng Liu | 31 |

