Plant Science Says

June, 2005

Pond Accepts Position as Assistant Professor of Landscape Design

Dr. Bill Pond has accepted the position of Assistant Professor of Landscape Design. He comes to us from the UniCeub School of Architecture and Urban Planning-FAET in Brasilia, Brazil where he taught Residential Design Studio I, Plaza Design Studio II, Advanced Level Design Studio III and Landscape Grading and Drainage. He will begin his appointment August 16.

Bill's wife, Izulme Rita Imaculda Santos, has a Ph.D. in Plant Stress Physiology/cryopreservation. She states, "In short, I am a biologist, with a master's degree in the plant physiology area (obtained here in Brazil) and a PhD from Colorado State University where I worked with cryopreservation. I have always had more affinity for plant physiology and that is reflected in my training. If possible, I would like to continue working in the plant physiology/plant stress physiology area. I have a particular interest in desiccation tolerance - a topic closely related to cryopreservation and also a very relevant topic in the agricultural research scenario."

Visiting Lecturer at University of Westminster
By Robyn Klein

It was fabulous to be a Visiting Lecturer for three months (Feb-Apr 2005) in the Herbal Medicine Program at the School of Integrated Health, University of Westminster, London. This program is unique in that it integrates complementary therapies such as herbal medicine, homeopathy, nutritional therapy, bodywork, and traditional Chinese medicine. Students get hands-on experience treating patients in the Polyclinic while studying their particular field of expertise. The School also offers research programs and post-degrees in complementary therapies.

My primary responsibility was to co-teach botany to First Year herbal medicine students. I also gave lectures in phytochemistry, incorporating the bio synthetic pathways of secondary plant compounds, something not taught before. I gave a series of weekly seminars at the request of the Second Year herbal medicine students, on a variety of subjects such as newly discovered medicinal phytochemicals, how to read and critique the scientific literature on herbs and the ethnobotany of Montana.

I joined students on field trips to the Royal Botanical Gardens at Kew and the Chelsea Physic Gardens. These were valuable experiences for me to bring back to MSU. In particular, The Chinese Medicinal Plants Authentication and Conservation Centre at Kew uses both conventional (i.e., chromotography, plant keying) and traditional (i.e., tasting or organoleptic testing) techniques to positively identify medicinal plants and their adulterants for the herb market. Wine tasters train their senses to identify the geographical origin of wine. So too, Chinese herbalists can identify the most efficacious and high quality medicinal herbs. The CMPACC program stumbled upon this unique category of medicinal plants, termed *di dao* herbs. Research

remains to be undertaken to discover the genetic differences and possible environmental conditions necessary to produce these special medicinal plants.

Chelsea Physic Gardens was established in London in 1673 as a training ground for the apothecaries (medieval spice dealers). Today, the Apothecaries' Garden is the one place in Britain where a large number of medicinal species can be seen by the visiting public as well as by medical professionals. The Garden serves to reinforce public understanding of our need of plant products. I visited many other botanical gardens throughout southern England, but one of the most exciting was a little known scientific cache, the National Botanic Gardens of Wales. It was here I learned of *The Physicians of Myddfai* (1861), which is a very important Welsh ethnobotanical medical text associated with a legend of the lady of the lake from the original physicians of the twelfth century. This garden has been recently opened, yet is already treasured by the local community who make up its impressive volunteer work force.

Herbal medicine is a legally recognized healthcare delivery system in the UK. Many models of traditional herbal medicine are recognized, including Kampo, African, Sri Lankan, Romany, Eastern medicine (Tibb), and Tibetan. The education of all medical herbalists in the UK will experience many changes when new regulatory statutes are established for herbal medicine practitioners in 2006/07. After this time, newly qualified practitioners will need to have graduated from an accredited course in order to have their name added to the professional register of medical herbalists, which in turn will enable them to practice. It is yet to be seen how these political actions will affect herbal education or the recognition of medical herbalists in the US.

The United Kingdom appears to be leading the way in university-based training of medical herbalists. Accredited degrees in western herbal medicine are rare in the US. It is becoming apparent that the education of medical herbalists must now include research methods, molecular cell biology, metabolomics, and functional medicine.

I arrived at the School of Integrated Health from a country that dismisses unlicensed medical herbalists, yet is rich in lay herbal medicine educational programs. I brought both my lay and academic experiences to London and came away with rich memories of a deep historical respect and dedication to medicinal plants.

River Avon Bath

Note: Robyn is an adjunct instructor, MS (2004) and a professional member of the American Herbalists Guild. She has been educating student herbalists and the general public since 1991 in both the American and Canadian community; and since 2000, in the Montana University system. As a herbalist and medical botanist, Robyn applies plant science to the study of medicinal plants and their bioactivity.

Wheat is Unique
By Humphrey Wanjugi (PhD graduate Student with Mike Giroux and Jack Martin)

I attended and presented a poster on puroindolines at the International Wheat Quality Conference (IWQC-111) in Manhattan, Kansas from May 22 – 26th. The theme of the meeting was "Standing on the shoulders of giants – What we have learned and where we are going".

Scientists and researchers from 35 countries were in attendance.

The conference provided an excellent overview of the state of the art concerning our knowledge of wheat and its utilization. Wheat is indeed a unique crop and provides a good share of the food for mankind. It's not exactly known when sowing of seeds for wheat cultivation began, but evidence of this activity dates back to the earliest historical records. Actually, the ability to grow and store grains has impacted the survival of whole civilizations. It is said that the foundations of the elaborate edifices of Greek and Roman civilizations sat on the shoulders of humble grain producing farmers. Additionally, the shortage of grains played a major role in the Portuguese colonization of Africa in the 14th century leading to Europe's extraordinary impact on South Africa.

The uniqueness of wheat is not based on its composition but instead on its ability to influence the structure of foods prepared from it. Indeed, products made from wheat are in biblical terms, the "staff of life". Most of the presentations at the conference were based on wheat gluten proteins because of their overwhelming influence on the end-use quality of wheat and flour. In addition, the unique puroindoline proteins play a significant role in determining grain endosperm texture and end-use quality. There was great emphasis on the need for more research on rapid detection of grain quality to directly assess end-use qualities from samples of whole-wheat kernels, especially on an industrial scale. This was also based on the fact that quality requirements are diverse from market to market, and are evolving in response to advances in processing and changing consumer preferences.

Wheat does not only provide the bread and the rolls we enjoy at the dinner table, it has other uses as well. At Kansas State University, wheat straw is being used as an important material for manufacturing particle boards widely used in insulation, soundproofing, packaging, filters and construction. Additionally, acid hydrosis of ground wheat straw is being used to generate xylitol which can be used as a 'low carb' sweetener, especially for diabetics. Wheat also has health benefits. Recent research has shown that additional components beyond fiber present in wheat bran contribute to the suppression of cancer risk. Wide ranges of antioxidant activity, e.g. orthophenolics and lignans, have been observed within a sampling of 90 wheat specific cultivars, meaning that whole wheat products are healthier.

Although the United States is the world's largest exporter of wheat, there was an outcry at the meeting that annual domestic consumption has leveled off, due to in part to the popularity of low-carb diets (Dr. Atkin's diet). U.S. wheat acreage has also declined over the last 20 years and its market share has been eroded by increasingly strong export competition from non-traditional exporters. So the question asked at the meeting was "Are non-traditional exporters a future and steady threat to the U.S. wheat market?" The answer was that if the infrastructure and economies of these countries improved, then they could be a threat.

In looking ahead, the traditionally five major producing regions (USA, Canada, Australia, Argentina and European Union) which account for 80% of the wheat trade should respond by improving market strategies and seeking to supply higher value products with more specific quality traits.

Despite the fact that wheat is one of the most genetically manipulated plants, most researchers, especially from Europe, strongly opposed transgenic wheat. The acceptance of transgenic wheat in Europe was projected to occur in the next 50 yrs. Another battle was, "Is wheat healthy or just a source of empty calories"? Is there such a thing as "good" or "bad" carbs? I would guess the latter is based on presumptions and myths!

There would be no baking industry without wheat and visa versa.

Grants

Matt Lavin, "Does undisturbed native vegetation by itself resist the spread of noxious weeds?" Montana Department of Agriculture

David Sands, "Novel Uses for Amino Acids in Weed Control", Montana Department of Agriculture

Book Chapter

Strobel, G.A. Daisy, B.H., Castillo, U., and Harper, J. 2005. Natural Products from Rainforest Endophytes. Humana Press Book Chapter. p.329-352.

Publications

Hansen, K. A., J.M. Martin, S.P. Lanning, and L.E. Talbert. 2005. Correlation of genotype performance for agronomic and physiological traits in space-planted versus densely-seeded conditions. Crop Sci. 45:1023-1028.

Hogg, A.C., A.D. Bettge, B. Beecher, J.M. Martin, and M.J. Giroux. 2005. Hard red spring wheat milling and bread baking traits affected by the over-expression of puroindolines in the seed endosperm. Crop Sci. 45:871-878.

Schrire, B.D., M. Lavin, and G.P. Lewis. 2005. Global distribution patterns of the Leguminosae: insights from recent phylogenies. In I. Friis & H. Balslev (eds.), Plant diversity and complexity patterns: local, regional and global dimensions. Biologiske Skrifter 55: 375-422.

Mohatt Receives Travel Award

Kate Mohatt received a $700 Travel Award from the Mycological Society of America to present her research at the annual MSA meeting in Hilo, Hawaii in August 2005. Kate will present her research on "The Ectomycorrhizal Fungi of Whitebark Pine and their ecology and distribution in the Greater Yellowstone Ecosystem". She is a graduate student of Cathy Cripps.

New Graduate Student
Lance Stott – Dougher – 330 ABS

I am very excited to be attending graduate school here at MSU. I am glad to be back home in Montana. I was born and raised in Choteau, which is debatably the windiest place in Montana. I grew up on my parents' ranch there. I have a large family (5 brothers and 2 sisters). I enjoy horseback riding, camping and gardening. I spent two years in South Korea as a volunteer service representative for my Church. When I returned, I attended Brigham Young University—Idaho in Rexburg and graduated with a B.S. in Landscape Horticulture with an emphasis in Nursery Production in December of 2004. Irene told me to tell you about some of the skeletons in my closet, but I don't know what she could possibly be referring to… Anyway… I'm here and look forward to working with everyone and getting started on my project.

Montana Ag Live! Schedule
June 5 – Bruce Lobel, Water Court Judge

Bob's Byte

By Bob Johnston (Irene Decker filling in)
Page Numbering in Word

Problems with page numbering in Word has come up many times in the last several months. Hopefully, the following section will be helpful.

To format the page numbering for different sections, follow these steps:

1. Click between two parts of your document that you want to number differently.
2. On the **Insert** menu, click **Break**.
3. Click **Next Page**, **Even Page**, or **Odd Page**, and then click **OK**.

For Help on an option, click the question mark, and then click the option.

4. Click in the first section.
5. On the **View** menu, click **Header and Footer**.
6. Click in the header or footer where you want the page number.
7. On the **Header and Footer** toolbar, click **Insert Page Number**.
8. On the **Header and Footer** toolbar, click **Format Page Number**.
9. In the **Number format** box, click the format that you want for the numbers in this section.
10. Do one of the following:
    If you want the page numbering for the first page in this section to start at a particular number other than the first number in the format series, click **Start at** under **Page numbering**, and then enter the first number that you want to appear on the first page of the section.

If you want the page numbering to continue from the previous section, click **Continue from previous section**.

11. Click **OK**.
12. On the **Header and Footer** toolbar, click **Show Next**.
13. Repeat steps 8 through 11 for the page numbering in this section.
14. On the **Header and Footer** toolbar, click **Close**.

By Bob Gough
Will sprinkling my plants prevent the blossoms from frost damage?

Yes, but it may cause another type of damage. Fully open blossoms of most plants are damaged at temperatures of about 29°F or 30°F, depending upon the species. In many cases, the corolla may appear undamaged after a frost, but the stigma and style may have been damaged, resulting in the plant's inability to set fruit. Plants low to the ground, such as strawberries, are most susceptible to this sort of damage.

One ounce of water liberates 2,240 calories of heat (heat of fusion) when it freezes. This heat, though not a great amount, is usually enough to warm the air surrounding the flowers to just above freezing, enough to keep them om freezing. However, there is no residual heat produced and, to be effective, water must be constantly freezing to keep the temperatures safe.

Here's what to do. When the air temperatures at the level of the plant canopy fall to about 35°F, turn on the overhead sprinklers. As the temperature continues to fall, ice will form on the plants. This is a sign the water is liberating heat to the flowers. Keep the sprinklers going so that new water is constantly freezing and keep them going until the ice melts, a sign the plants are out of danger. Many people will be tempted to turn the sprinklers off as soon as the plants are ice-coated thinking the ice protects them. Ice is a lousy insulator and plant temperatures will fall as soon as you turn off the water, regardless of how much ice coats the plants. This is a neat way to protect your plants during bloom. But beware that the accumulation of ice can cause mechanical breakage to some plant parts.

June Birthdays

Uvi Castillo	10
Ron Larson	12
on Ramsfield	15
Jackie Kennedy	15
Luther Talbert	18
Eileen Carpenter	22

Recipe of the Month

Apple Almond Crunch Salad

This easy-to-assemble salad combines the great crunch of apples and almonds with the sweetness of golden raisins and the unique texture of feta cheese. The tanginess of the raspberry dressing works really well with the crispy ingredients. Prep Time: approx. 10 Minutes. Ready in: approx. 10

1 (10 ounce) package mixed salad greens
1/2 cup slivered almonds
1/2 cup crumbled feta cheese
1 cup tart apple, cored and chopped
1/4 cup sliced red onion
1/4 cup golden raisins
1 cup raspberry vinaigrette salad dressing

n a large salad bowl, combine the salad greens, almonds, feta cheese, apple, red onion and raisins. Toss to blend. Apply salad dressing to individual servings.