Plant Science Says

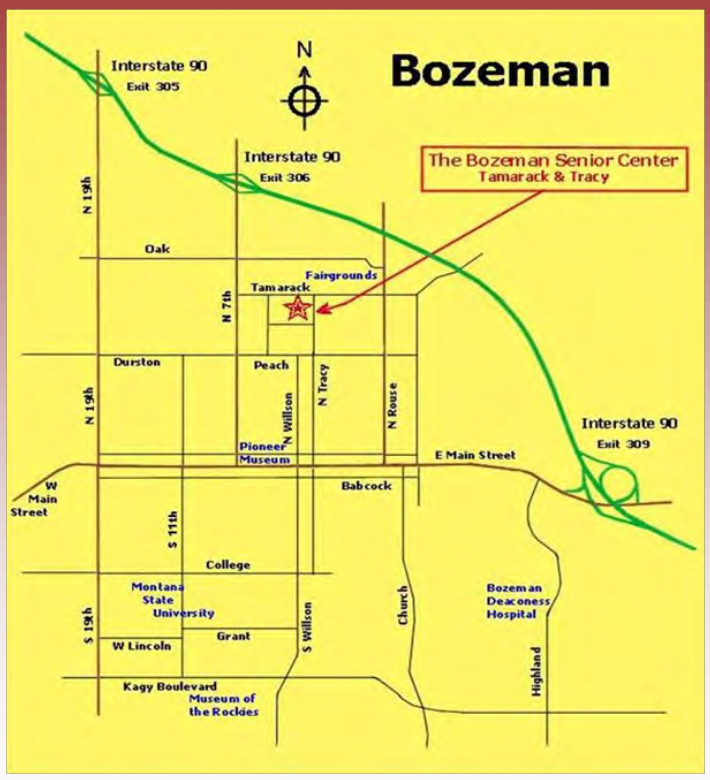
Merry Christmas!

Volume 13, No. 11 December, 2010

Departmental Christmas Party

The Departmental Christmas party will be on Friday, December 10, at 5:30 p.m. at the Bozeman Senior Center. Dinner will be at ~5:45 p.m.; Santa will be showing up around 7:00 p.m., and after that you will have the opportunity to play Bingo.

Please bring one of the following to share: Hors d'oeuvres, a vegetable or potato dish, salad or dessert. The meat, rolls, and drinks will be provided. Please join us! Note: They do not allow alcoholic beverages as it is a city owned facility.



Plant Collecting Trip to Nicaragua
By Gary Strobel

Having collected rainforest plants in almost all areas of South and Central America, a rather large and conspicuous place still remained untouched by our hands- namely Nicaragua. Accompanied by Eric Booth, Natasha Mallette (an engineering student) and a few others including a local naturalist and university professor-- Eric Van der Burghe, we followed a neatly laid out plan to visit at least seven ecosystems in Nicaragua in order to collect plant specimens in these areas. Managua was our first stop and it was obvious that the earthquake of several years ago had left that place in ruins so there is no downtown, no old churches, or old man made landmarks. Nearby are two lakes- Managua and Lake Nicaragua (the largest body of fresh water in Central America) and we would eventually see them up close and personal. The latter is the source of the San Juan River on which we started our jungle journey, from the small town of San Carlos, in a motorized canoe with many indigenous peoples on board.

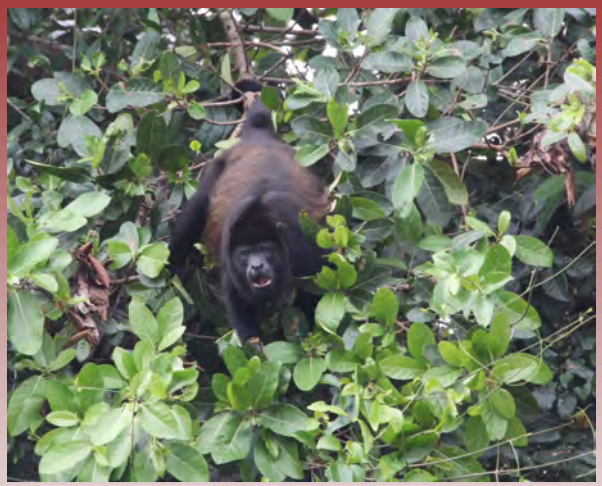
Starting our river journey in a river bus on the San Juan with lots of locals-Eric is on the left and Natasha is on the right.

By early evening the sun had gone down and we were still on this huge, swollen

The canoe transfer at El Castillo on the San Juan River

river. We had to do a canoe transfer which by passed a waterfalls and get into another, but much smaller canoe.

The pouring rain was not as much a problem as were our worries that the river would simply carry us beyond our jungle lodge destination on the far side of the dark river many miles further down its winding path.



Black Howler Monkey whose calls awakened us each day at 4:30 AM precisely.

We did arrive and found ourselves at the Bartola jungle lodge complete with net covered beds and lots of howler monkeys to wake us the next day.

We began our intensive search for novel plant species that we had never sampled before and it seemed as if the forest was filled with them. The collection that we made was the largest ever made in nearly 20 years of doing research on endophytes. This was due to the eager hands of Eric and Natasha whose enthusiasm for the task seemed to be boundless. Bartola had

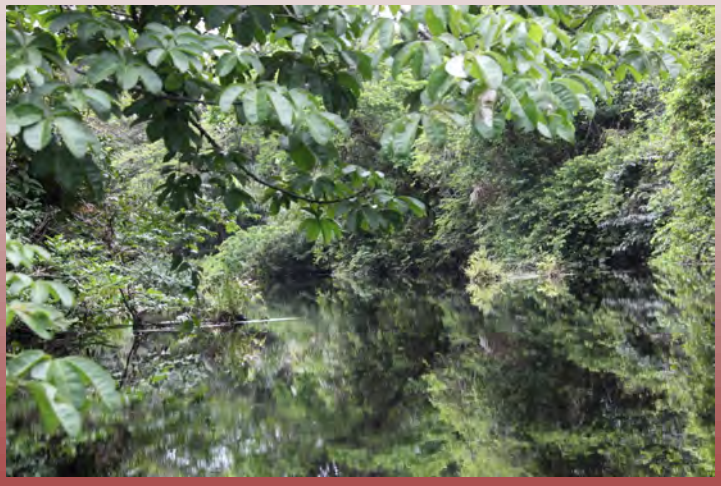
a spider monkey who seemed to like me. When I tried to put her down, she tried to bite me. Apparently she really likes men and would only release me when someone lured her away with a pineapple. After a few days at Bartola we again were heading down the river -this time to San Juan del Norte on the Atlantic Ocean.

Once reaching San Juan we realized the extent of the Indio-Maiz Biological reserve that has been established by the Nicaraguan Govt. It is huge and one of the largest bio preserves in Central America and it is patrolled on a regular basis. One is impressed to see untouched forests on the north side of the river (Nicaragua) and open - over grazed land on the south side of the river which is Costa Rica.

An enormous croc lay in wait as we pulled in to get gas at a small port in Costa Rica. The purchase of fuel was denied us since Costa Rica and Nicaragua are about to go to war over a river border dispute. If we were to

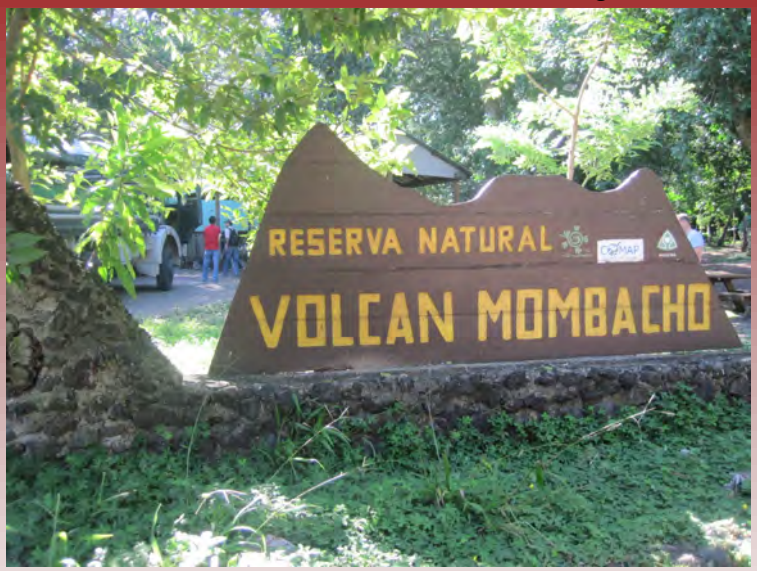
start to make our trip today it would be impossible since the tensions over the border are mounting.

We collected specimens up the Indio River and it was a lovely day as we went in and out of the small tributaries of this beautiful jungle river.



A tributary of the Rio Indo

After collecting in the Rio Indio area we headed 130 miles north in a hand made motorized 18' boat on the open Atlantic Ocean to Blufield, Nicaragua and from there on a very small plane to the greater Corn Island where we did more collecting.



Then we went back to the mainland to see the cloud forest on the Mombacho volcano. Certainly one of the most interesting places was the pacific dry forest at Domitila which is privately owned. Maria was anxious to show us her forest and was also kind enough to sign a release for us to collect at her forest. It was as well taken care of as any national forest and serves as a rare place for scientists who are interested in Pacific dry forests to come, stay and study. We had a grand time collecting at this location and expect that it will give us the greatest diversity of endophytic microbes.

Collecting at Domitila with Suzan Strobel making a photographic record of the tree being studied.

2010 Joint Annual Entomological Meeting
by Anuar Morales Rodriguez

The 2010 Joint Annual Meeting of the Entomological Society of Canada and the Entomological Society of British Columbia was held in Vancouver, BC from October 31 to November 3, 2010. Entomologists from all over Canada arrived to present their research. This year the meeting theme was Communication – in the widest sense: at the level of insect to insect, insect to entomologist, and entomologist to society. About 180 entomologists attended the meeting including undergraduate and graduate students, technicians, professors, researchers and retired researchers.

The meeting opening was on Sunday afternoon with a plenary symposium entitled, "Science Communication: What we can learn from Arthropods". Four very well known entomologists (Gerhard Grie, Jeremy McNeil, Jayne Yack and Mark

Winston) presented their research focus - insect communication, and shared experiences and tricks to communicate results effectively. Following the symposium was a welcome reception to aid in reconnecting with friends and colleagues. It was very fun seeing many people dressed in their finest insect-themed Halloween costume. The program was rich with varied symposia, contributed oral and poster presentations, and outstanding student contributions. Symposiums included Mountain pine beetle system genomics, Invasive insects, Insect community ecology, Invertebrate conservation, Arachnology, Graduate Student Symposium and Biological Survey of Canada.

Our group presented four papers: Joanna Gress talked about the "Molecular Biology of the Wheat Stem Sawfly, *Cephus cinctus*"; Kevin Wanner presented two talks entitled, "Candidate Sex Pheromone Receptor Genes Identified from Yucca Moths" and "Sex Pheromone Receptor Evolution in Moth Genus *Ostrinia*" and I presented part of my research entitled, "Identifying and Sampling the Wireworm (Coleoptera: Elateridae) Species Complex Infesting Wheat and Barley Crops in Montana". I attended several of the many interesting talks including "Wireworm, pheromones and biological control". We met Dr. Robert Vernon and his research group of Agriculture and Agri-Food Canada and explored the possibility of initiating a collaborative research in wireworm control.

The meeting was held in Vancouver, BC in the Coast Plaza Hotel located close to the English Bay. Unfortunately, I did not have time to explore the city; however, I can tell you that the hotel was surrounded by dozens of ethnic restaurants with excellent food options.

Invited Speakers

Dave Sands spoke at the 33rd Annual CSA Conference called Changing the world for Celiacs, in Kansas City, MO October 29-31. Gary Strobel will be speaking at the Thai National Mycological Congress on December 7 in Bangkok, Thailand.

Beggar Receives Award

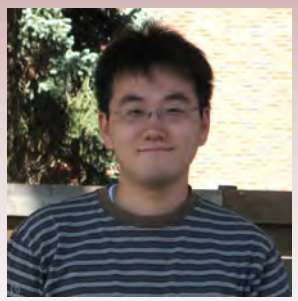
Kyle Begger, a Senior in Horticulture – Landscape Design option was named the D.A. Davidson Scholar Athlete at the Bobcat Grizzly football game on November 20, 2010. One athlete was chosen from the University of Montana and from Montana State University and the one with the highest cumulative GPA was given the award. Congratulations Kyle!

Grad Students Defend

The following graduate students defended their theses in November:

Jean Allen — MS in Plant Science, "Evolution of the Molecular Mechanisms of Sex Pheromone Detection in European and Asian Corn Borers". Jean plans to begin working for the Army Corps of Engineers this month.

Yukiko Naruoka, PhD in Plant Science-Genetics, "Genetic analysis of productive tiller number and green leaf duration under late-seasoned heat and drought stress environment in spring wheat". Yukiko plans to stay here for the next six months working in Luther Talbert's lab.



Dai Ito, MS in Plant Pathology, "Evaluation of susceptibility to *Wheat streak mosaic virus* among small grains and alternative hosts in the Great Plains"

Congratulations Jean, Yukio, and Dai!

Course Focus

BIOO 220 Botany

Botany is again being offered by the Department of Plant Sciences and Plant Pathology! After the retirement of Dr. Rich Stout it took a while to readjust teaching loads, but this course clearly fills a gap between material presented in introductory biology courses or BIOB 160 and upper division courses such as Plant Physiology (BIOO 433), Plant Metabolism (BIOO 460) or Rocky Mountain Vegetation (BIOE 408). At the moment, Botany is offered alternate spring semesters, and will be taught this coming spring in the Plant Growth Center. There is no formal lab with the course, but we do use the collection of live plants in the PGC to examine structures of the different groups of plants we discuss in lecture.

The course deals with all plants organisms that have a genetically integrated plastid organelle) as well as touching briefly on organisms such as the cyanobacteria, fungi, and lichens. The course is NOT a memorization of Latin names, and plant taxonomy is generally limited to questions about large groups, such as "What are liverworts?" or "How do ferns differ from conifers?" We answer these questions by looking at gross anatomy, morphology, and life cycles. We then look at how multicellular plants handle issues such as water (why do mosses grow in wet habitats?) and nutrient transport (how does starch made in leaf tissue end up in potato tubers?), intercellular communication (how does sunlight on leaf blades cause the top of the plant to form flowers?), response to light (why a bean plant near a street light will not flower), and reproduction (what is apomixis anyway?). The final third of the course focuses on the adaptations of plants to their environment (what plants grow in Antarctica and why?) in order to apply what we have learned about the physiology and morphology of plants to practical problems associated with growing in a particular environment.

Hopefully, the course is more fun than work, but it will be anything but boring. Plants are unique and amazing organisms and will surprise you even after years of study.

If you have any questions, please contact me, Norm Weeden, at nweeden@montana.edu or 994-7622.

Grants

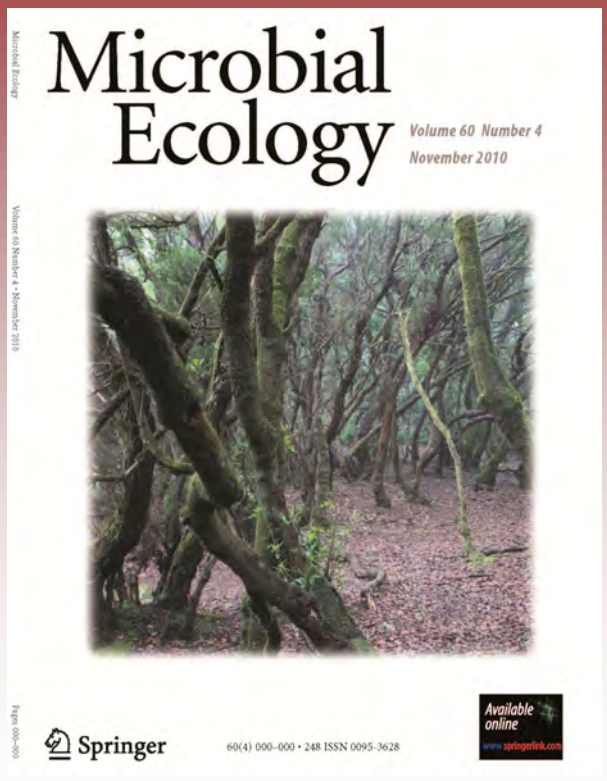
Victoria Blake, "Barley Straw Fructanosic Ethanol", South Dakota State University, $77,868.

Publications

Angela Tomcheck, Gary Strobel, Eric Booth, Brad Geary, Dan Spakowicz, Berk Knighton, Cody Floerchinger, Joe Sears, Orna Liarzi, and David Ezra, "Hypoxylon sp., an endophyte of Persea indica, Producing 1,8-Cineole and Other Bioactive Volatiles with Fuel Potential", Microbial Ecology 60:903-914.

Strobel Photo Makes Cover

A photo taken by Gary Strobel in the Canary Islands last September, 2010, made the cover of the November issue of Microbial Ecology. The article discusses the discovery of an endophytic fungus making a fuel like compound known as cineole.



New Employees
Dara Palmer (Toby Day)

Dara Palmer is the new Assistant Master Gardener Coordinator with MSU Extension. She graduated from MSU in 1998 with a BS in Horticulture and has worked in the green industry in some capacity since then. Dara is a certified Level 1 and Level 2 Master Gardener. She enjoys cross-country skiing, gardening, reading, and loves dogs! Dara lives in Belgrade with her husband Aaron and dog, Enola.

Master Gardeners Honored By Toby Day

Bozeman, MT –November 30, 2010- Eight Montana State University Extension Master Gardeners from across the state were honored at the first annual Montana Master Gardener Conference held October 2, 2010, at the Red Lion Colonial Inn in Helena, MT. The conference was attended by county Master Gardener Coordinators, state Master Gardeners, several guest speakers, and the director of Extension, Dr. Doug Steele. The Master Gardeners were honored for their dedication to education and for volunteering their time and talents through Montana Master Gardener in their community.

Montana Master Gardener of the Year 2010 was presented to **Bob Ford** of Cascade County. Known in Great Falls as "Bob the Gardener", Ford radiates the spirit of Master Gardener with his incomparable community involvement. Bob has taught over 2,000 participants this year alone through his weekly lessons at his place of employment. He continues to assist in bringing Level 1 and 2 Master Gardener courses to the community and has circulated approximately 12,000 Extension MontGuides on gardening and food preservation.

The following Montana Master Gardeners were presented with 2010 Outstanding Master Gardener certificates for their tireless efforts in the community.

Master Gardener **Charlotte Beaudry** attended the Sanders County Master Gardener course in 2009 and has since been a vital asset to the community. John Halpop, the Sander County Extension agent commented "Charlotte has taught clinics, developed a number of well-written news releases and volunteered time at our Farmer's Market." Charlotte also donated her time for nearly two months handling office issues while John was out on sick leave following a motorcycle accident.

Larry Walby, Master Gardener from Yellowstone County oversees a garden for the women's correctional center that encompasses an entire city block. The residents learn about growing flowers and produce from Larry who logged over 340 volunteer hours in 2009 alone. According to Amy Grandpre, Yellowstone County Horticulturist, "his value and accomplishments at the prison are unsurpassed."

Paul and Sandy Joubert, Master Gardeners in Gallatin County, received the 2011 Outstanding Master Gardner Award.

Paul and Sandy Joubert are both very committed Master Gardeners in Gallatin County. They are regular fixtures at the Bozeman Farmers Market as well as being members of the Gallatin Gardener's Club. They have been instrumental in creating many horticultural additions to the area such as a peace meditation garden, community gardens in Belgrade and Manhattan, and assisting with the Belgrade High horticulture and garden club. At their home in Central Park, they grow over fifty varieties of ornamental grasses. "They are an inspiration to all Master Gardeners in the Gallatin Valley," said Toby Day, the Montana Master Gardener Coordinator.

LaDana Hintz, Lake County Master Gardener Volunteer Coordinator, has helped

direct projects such as the demonstration gardens at the Lake County fairgrounds, information displays at the farmers markets and county fairs, judging horticulture related exhibits at the Lake County fair and organizing horticulture education for youth programs. During the 2010 Master Gardener program "LaDana utilized both level 1 and 2 programs to enhance her horticulture education along with helping new program enrollees with knowledge and experience she gained the previous year", praised Jack Stivers, Lake County Extension agent.

Steve Johnson of Flathead County is truly dedicated to serving his community as a Master Gardener and Glacier National Park Volunteer. Pat McGlynn, Flathead County Extension agent said the numbers tell it all; "Steve put in 322 hours, hiked 173 miles and put on 1,983 miles on his personal vehicle-donating his time to Glacier National Park." After receiving 9 days of training in noxious weeds Steve worked for three months pulling and identifying weeds in the park.

Jeanne McCormick, Master Gardener in Park County is described as being "an awesome Master Gardener". Tracy Mosley, Park County Extension agent said "Jeanne McCormick has gone above and beyond, and then some, with the Master Gardener Program in Park County." Jeanne volunteered on countless projects in 2010; some include the Lincoln School Pantry, the Livingston Food Pantry Community Garden, and the Livingston Memorial Hospital flowerbed renovation, helping with the Extension booth at the Farmer's Market, and assisting with Native Plant research.

If you would like to learn more about the Montana Master Gardener Program please visit: www.msuextension.org and follow the Yard & Garden link on the left menu to Master Gardener Program. If you have any questions about the Master Gardener Program contact the Master Gardener Coordinator, Toby Day, MSU Extension Horticulture Specialist at toby.day@montana.edu or call (406) 994-6523.

Purchasing an External Hard Drive

(PC Magazine)
With the needs and wants of data users these days, it makes sense to invest in an external hard drive. We tell you what to consider when choosing the right one for you.

External hard drives promise almost unlimited storage: For under $100, you can add a terabyte of data to your PC or Mac, portable or desktop. That's enough for over 750,000 MP3s or photos, or over 230 DVD-sized movies. Every computer out there, including compact nettops and netbooks, can connect to at least one hard drive. If you're lucky enough to have multiple input/output ports, you can hook up many more. Auxiliary storage allows you to back up your system files, in case your primary system goes kaput.

Hard Drive Types
There are two types of external drives. Desktop-style drives, with 3.5-inch mechanisms inside, require a power adapter. Desktop drives are designed to stay in one place, usually on your work surface at home or at the office. Notebook-class (aka pocket) hard drives, like the Toshiba 650GB External Hard Drive and Western Digital My Passport Elite, are usually 2.5-inch or 1.8-inch mechanisms powered through the connector cable without the need for a power adapter. A 2.5-inch pocket drive can fit in a coat pocket and some pants pockets, while 1.8-inch drives can easily fit in your jeans.
Desktop-style drives currently top out at 2 Terabytes (TB) per mechanism, but some drive makers put two to four mechanisms into a drive chassis for more storage (i.e., two 2TB drives equal 4TB of storage). Notebook-style drives have recently reached 1TB per mechanism, but capacities like 640GB or 500GB are more common.

External solid-state drives (SSDs) have appeared on the scene, mostly in the notebook-style form factor, but these are still rare because they're pricey in terms of cost per gigabyte. They're currently limited to smaller capacities, specifically in the 64GB to 256GB range. We recommend that you buy SSDs for use as internal rather than external drives. Besides, unless you're looking for SSD's shock-resistance attributes, the drive will be wasted if you use the USB 2.0 interface (rather than, say, eSATA) to connect the SSD to your system, since the transfer rate of eSATA is inherently so much faster than USB. An eSATA SSD might eventually be worth it if the prices come down over the next few years.

Input, Need Input

External drives connect to PCs and Macs via their external connectors. USB 2.0 ports are almost always present; others can include FireWire (400 and 800), eSATA, or more esoteric connectors like Wireless USB, USB 3.0, or iSCSI. Note that while iSCSI uses Ethernet cables, it differs from SAN or NAS technologies, since those connect multiple hard drives to multiple computers. Wireless USB and iSCSI are still very rare on drives. Wireless USB just came to market in late 2009, and iSCSI is mainly used on professional-grade drives like the Drobo Pro. USB 3.0, becoming the port of choice, provide faster transfer speeds like in the Buffalo DriveStation, which was able to transfer a 1.4GB file in 28.4 seconds in our labs.

The external drives I look at have at least a USB port, a good thing since even netbooks and ultralight notebooks have at least one USB 2.0 port with its theoretical 480Mbps throughput. Less common, but ostensibly speedier, is the FireWire port, in both 400Mbps and 800Mbps formats. FireWire 400 and 800 are signal-compatible (they can use the same wires), but they have different FW400 or FW800 connectors on the ends of those cables. FireWire can be daisy-chained; i.e., you can connect several drives or devices up to a single FireWire port when you connect them together first. The fastest interface you'll likely see in an external hard drive is the eSATA interface, which is theoretically capable of 3Gbps (3,000Mbps), an order of magnitude faster than USB 2.0. Unfortunately, while eSATA is the fastest, it does not provide power over the connector cable and will require either a USB cable for power or an external AC adapter. It's also currently the most expensive. USB 3.0 is purported to be even faster than eSATA, but so far that interface is barely newborn and won't impact consumers until late 2010 at the earliest. USB 3.0 has the benefit of being backwards-compatible with USB 2.0 (it will connect to USB 2.0 ports, but will transfer bata at the slower USB 2.0 speeds). You can find drives with multiple ports (for example a triple interface drive with USB 2.0, FireWire 800, and eSATA), though you'll still only be able to connect a single drive to a single computer, and each additional interface adds to the drive's complexity and cost.

Is Drive Speed Important?

Some drive manufacturers will crow about the speed of their drive mechanisms. While it is true that a 7,200rpm drive is inherently faster than a 5,400rpm drive, you will only see an improvement in throughput if the drive is connected internally to the PC on the motherboard, or with an eSATA cable. USB 2.0 and FireWire 400/800 interfaces aren't fast enough to handle the raw throughput of a 5,400rpm drive, let alone a SSD, 7,200rpm, or 10,000rpm drive. I'd only worry about the rotational speed of the drive if you're eventually going to remove that drive and pop it in your laptop or desktop (like in a backup/recovery/upgrade kit).

After you've slogged through the above criteria, you may have to look for other differentiators to find the drive you want. Color and design are usually a concern: A drive you're embarrassed to use won't be used at all, defeating its purpose. Included software is a concern if you don't already have a backup plan. Hands-off backup drives like the Rebit, Clickfree, and To-

shiba 650GB are good choices for people who hate installing and configuring utility software. Warranty is also important: Drives can and will fail on you. That cheap drive you found on dealnews.com may only have a one-year warranty. Look for a three- or five-year warranty if you're hard on your drives.

Recipe of the Month

Sweet Potato Casserole

Melissa Graves brought this to the recent shower/ potluck on Nov. 23.

3 large sweet potatoes, cup up and cooked
24 packets of Splenda or 1 c sugar
1 t apple pie spice
2 eggs
1/2 c milk
1/2 t vanilla
1/2 stick butter
Mix all of the above ingredients.

Topping

1/2 c brown sugar—Splenda blend or 1 c sugar
1 c pecans, chopped
1/2 stick butter
1/2 c flour
Sprinkle on top and bake for 35 minutes.

December Birthdays

Ted Clack	3
Bill Grey	4
Nancy Blake	6
Jackie Campbell	11
Sue Brumfield	26
Lucy Cooke	30

Once again, it has been great working for all of you this year. We wish each of you a very Merry Christmas and a Happy New Year!
Tamara, Joanna, Courtney and Irene