Why We Behave the Way We Do
by Norm Weeden

Haven't you ever wondered how much of our behavior is determined by genetic factors? This last month, I obtained an update on studies related to this question at a symposium entitled "Genetics and Genomics of Behavior" in Raleigh, NC. You may ask why a plant biologist would worry about behavioral genetics—and, indeed, there were no papers on plants given at the symposium—but more of that later.

The symposium was sponsored in part by the American Genetic Association and the Department of Genetics, North Carolina State University. Both the AGA and NC State have a wide interest in the genetics of behavior, and most of the invited speakers described research in insects or non-primate vertebrates. However, many of these studies had direct implications for human biology. For instance, several speakers talked about their studies of genes effecting alcohol and drug dependence in fruit fly and mouse. One piece of equipment used to measure sensitivity to alcohol in the fruit fly looked like a distillation column. Ethanol vapor at a specific concentration was slowly passed up the column and flies were introduced at the top of the column. The flies gradually became overcome by the alcohol and eventually dropped out the bottom of the column, where they could be sorted and revived. Despite the primitive nature of the apparatus, the length of time a fly could stay in the column before dropping out the bottom was found to be a reasonable and highly reproducible measure of its sensitivity to alcohol. Crosses between tolerant and susceptible fruit fly lines revealed that malic enzyme and pyruvate dehydrogenase kinase, two enzymes that are crucial entrance points to the fatty acid synthesis pathway, were found to be important in the determination of a fly's sensitivity to ethanol.

Adaptation (development of dependence) to alcohol or drugs involves a different pathway, and in mice this pathway was shown to require several genes that produce receptors (or proteins interacting with receptors) in basal ganglia of the brain. Not surprisingly, these same or very similar proteins are found in the human brain, and studies in humans have identified QTL (quantitative trait loci) in the regions containing the genes coding for these proteins. Thus, it appears that drug addiction involves the same pathway in mice and man.

Courtship is always a good subject for behavioral genetics. The genetics of courtship behavior is well known in fruit fly, with olfactory and taste receptors playing major roles. If you can't release the right pheromone, you ain't going to get to first base with your date! Sexual preference in mice also has been partially resolved. Males usually will actively court only females. However, a mutation in a single gene appears to eliminate the discriminatory ability, causing males to become interested in other males as well as females. Other genetic changes will cause females to behave like males and actively court males or other females. Environmental factors can induce similar behavior patterns, although not as reproducibly as the genetic changes.

Human behavior was the primary topic of two presenters. One detailed the results of a study on the genetic basis of schizophrenia, while the other was interested in bipolar disorder. Both studies were very similar in that they used massive data sets (thousands of people from throughout the world) and performed QTL analyses using DNA markers

in affected individuals, their sibs, parents and offspring. As might be predicted, the genetic basis of these disorders was found to be complex, with many regions of the genome weakly associated with the syndromes. Unfortunately, the studies failed to find any region consistently associated with either disorder. People from Iceland showed one set of QTL (genes), while individuals from the U.S. displayed a second set and those from Asia a third. Thus, despite the strong evidence for a genetic basis to these disorders, the identification of the genes involved has proven frustratingly difficult (perhaps some consolation to those of us struggling with quantitative traits in plants).

So why was I interested in the meeting? For one, I am a member of the American Genetic Association, and for graduate students interested in genetics, I strongly encourage you to join because there are *many* benefits (see me for a list!). Secondly, my MS research involved a study of social behavior in rabbits, so I have been interested in such questions for quite a while. However, most importantly, students in BIOL 301 and PSPP 305 are generally much more interested in the genetic basis of human traits than those of yeast, fruit fly or even pea. The use of appropriate human examples in my lectures goes a long way to making these courses relevant if not exciting.

Can Hops be a New Crop for Montana?
Article by Vicki Blake

In the fall of 2007, Todd Scott, the brewmaster at the Bozeman Brewing Company placed a classified ad in the Bozeman Daily Chronicle asking if anyone with hops growing on their property would be willing to donate hop cones. At that time, hop prices were at a premium and there were essentially none to be found in the market. From that ad, Todd received over 1000 pounds of fresh hops donated from Bozeman locals, many of whom had old prolific vines in their backyards. As many of us have observed, hops (*Humulus* sp.) grow abundantly in the Gallatin Valley, but there is no longer a commercial market. Victoria and Tom Blake hope to change that.

With the enthusiastic support of David Baumbauer, the horticulture farm will soon be the home of a demonstration hopyard. Plans for this hopyard include a traditional trellising system that will support over 100 different hop varieties for evaluation in Bozeman and an area to demonstrate trellising systems that would be appropriate for small scale or backyard production. Our plan is to build the infrastructure of the hopyard this summer and begin planting in the spring of 2009. On a recent road trip on the west coast, Tom and Vic visited the USDA-ARS National Clonal Germplasm Repository (NCGR) in Corvallis, Oregon. There they met Bruce Bartlett, the curator of the hop collection. Given the current market for hops, at over $20 a pound if you can find them, "the demand for hop cuttings from the NCGR has tripled in the last year", said Bartlett. Although the Blake lab submitted an order to the NCGR for the Core Collection early in 2008, our cuttings will likely not be ready until mid-July.

A traditional hopyard in Corvallis, Oregon

In April, we received two tissue culture samples of the hop varieties Fuggles and Northern Brewer, and have successfully transferred these to soil where they are currently thriving in the PGC greenhouse. Once the cuttings arrive, they will also be placed in pots to grow in the greenhouse until next spring. Since winter comes so early to Montana, we want to assure that the plants have a well-established root system before placing them in the field. Cuttings of all of

the varieties will also be maintained in the greenhouse.

The National Clonal Germplasm Repository hop collection.

For an excellent discussion of this genus, including species information, history and current production statistics, visit Wikipedia http://en.wikipedia.org/wiki/Hop_(plant).

Field Days for July
July 2 - Southern Ag Research Center, Huntley

July 2-3 - MAES Summer Conference, Huntley

July 16 - Eastern Ag Research Center, Sidney

July 18 - Northwestern Ag Research Center, Creston

Farewell to Lance Stott
After being a Master's student with Tracy Dougher and then working with Li Huang, Lance is leaving us to take a position as a Horticulture Professor at the Nebraska College of Technical Agriculture in Curtis, NE. NCTA is part of the University of Nebraska at Lincoln. He will start preparing curriculum for the fall semester in mid-July and move to Nebraska the first part of August. Lance's last day will be July 18. Best wishes Lance!

Grants
Mary Burrows, "Implementing IPM Certification for Urban Landscape Professionals and Enhancing Awareness of IPM in the High Plains and Intermountain West", National Extension Integrated Pest Management Special Projects Program.

Barry Jacobsen, "Development of management techniques", Montana Dept. of Agriculture.

Norm Weeden, "Development of High-Amylose Dry Peas for the Northern Plains, USA Dry Pea and Lentil Council.

Books
Gough, R.E. 2008. *An Encyclopedia of Small Fruit*. Boca Raton, FL. CRC Press; Taylor & Francis Group, LLC.

Growing Shallots
By Cheryl Moore-Gough

Shallots are a cool-season bulb crop and must be planted early in spring. As with their cousins onion and garlic, the development of bulbs is induced by rising temperatures and long days, while leaf growth is governed by cool temperatures and short days. Since the amount of leaf growth determines the extent of bulb development, it is important to get the shallot bulblet into the ground as soon as you can work the soil in early spring. Under those conditions, the plants will develop a strong root system and make maximum top growth prior to the onset of long days. When the photoperiod (day length) is right, top growth ceases and the bulbs begin to enlarge. The greater the top growth, the larger the bulbs can be so one possibility is that you are planting too late. Another is that you may be setting the bulblets too closely together. Give them at least 4 inches between bulblets to allow enough room for the plants to develop. A third possibility is that you have insufficient fertility and water to allow for best plant development. Since shallots have a rather small root system, be sure there is plenty of fertilizer within a foot or so of the plants.

Bob's Byte
By Bob Johnston (Chris Leonti filling in)
Chris's article is on the following page.

Recipe of the Month
Grilled Honey Mustard Chicken
4 skinless, boneless chicken breast halves
1 cup Salad dressing or mayonnaise
1/4 cup Dijon-style mustard
1/4 cup honey
1/2 teaspoon salt
1/2 teaspoon pepper

In a bowl mix salad dressing, mustard, honey, salt and pepper. In a ziplock bag, place chicken and pour honey mustard over chicken, reserving 1/2 cup. Let marinate at least 2 hours, overnight is even better. Remove chicken and discard the marinade. Grill chicken about 10 minutes each side. The last few minutes brush with reserved honey mustard.

July Birthdays

Name	Day
Jinling Kang	1
Susie Couch	2
Mary Burrows	7
Andy Hogg	8
Jack Rieselman	9
Ernesto Moya	12
John Dudas	14
Susie Siemsen	22
Peter Zuck	30

Check Your Computer For Software Updates

By
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http://ag.montana.edu/infotech

It is an unfortunate reality that using a computer requires us to keep our software up to date to prevent issues. Issues can be as minor as incompatibility with certain types of files or websites through exposing your computer to malicious hackers. Though most of us know this is important it is like changing oil in your car – you know you should do it, but we aren't always as diligent about it as we should be. Microsoft has tried to make it easier to keep their software up to date with Windows/Microsoft Update but this tool doesn't update software from other companies. Most of us use programs like iTunes, Quicktime, Java, Flash Player, Adobe Acrobat and Firefox so keeping everything up to date can be a seemingly insurmountable task.

Use Secunia Software Inspector To Keep Software Updated

Secunia (www.secunia.com) is a well-respected security company that offers a lot of information, advisories and tools for the geek crowd. They also offer a free tool to scan your computer to find common programs that are out of date. Best of all, it's Web-based, so there's no software to install though you do need to install a Java application the first time you visit.

Software Inspector works fine with Windows XP or Windows Vista using Internet Explorer or Firefox. You need to be using Windows though, so Mac and Unix/Linux users will not be able to make use of this great tool. That said, this tool has a comprehensive coverage of common programs and best of all - it's free.

Running A Scan

Running the scan is pretty simple. Just follow these steps:

1. Run *Microsoft/Windows Update* and install all pending updates.
2. Open Internet Explorer or Firefox and go to www.secunia.com/software_inspector
3. Click the START NOW button near the middle of the webpage.

4. If you receive a message similar to the following, you need to click the CANCEL button and then visit www.java.com to install the latest version of Java on your computer before running the scan.
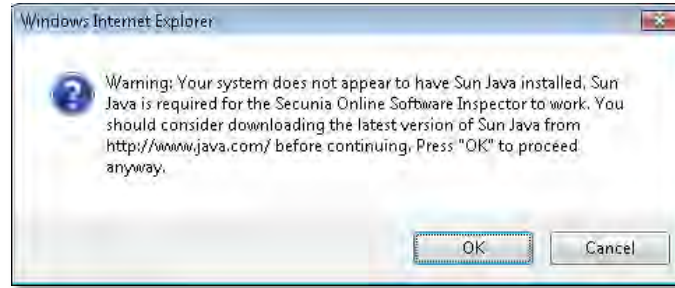
5. If you see a prompt similar to the following, click the RUN button.
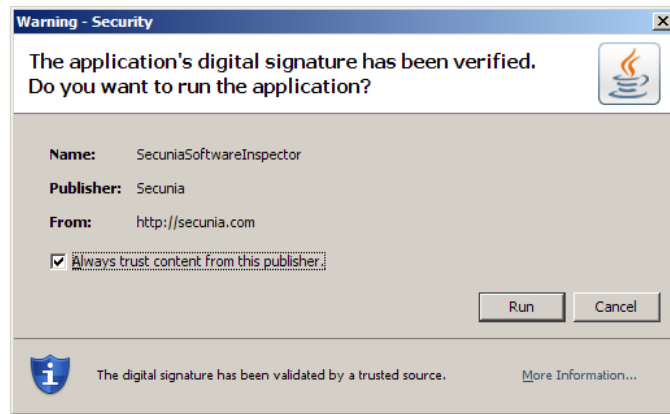
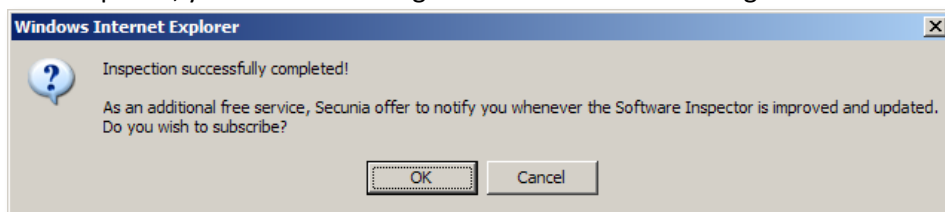6. Wait until you see *Java Applet loaded successfully. Press "Start" to begin* before proceeding.

7. Click the START button to initiate the scan.

The scan will run anywhere from a couple minutes to 10-15 minutes depending on the software you have installed and the speed of your computer.

8. When the scan completes, you will see a dialog box similar to the following:

9. I suggest you click the CANCEL button, but you can click OK if you would like to receive reminders from Secunia.
10. That's it! You have successfully scanned your system!

Ok, I See Programs That Need To Be Updated, So Now What?

After the scan completes, the website lists the programs it detected and whether there is an update available. You will see a listing similar to the following:

Now you have to start updating everything. If this is the first time you have run Software Inspector or it has been a while since you last ran it you may have a lot of updates pending. If you update your system regularly – such as monthly – the process will go fairly quickly since you will have a much smaller number of updates to load.

Secunia is very good about including links to the newest version of programs so for many programs you just have to click the link and download the latest version or update. There are some programs that you will want to handle carefully to ensure they are updated optimally. Most programs not noted below can be updated simply by following the link provided by Secunia and installing the new version or update.

Java

As noted previously, Java won't remove old versions so you will need to take care of this yourself. The easiest way to do this is to open ***Add/Remove Programs*** in the Control Panel (***Programs and Features*** in Vista), then uninstall all versions you see listed. Once that is done, install the latest version from the Java website (www.java.com). **IMPORTANT**: If you see any versions labeled with **SE** or special edition, do not remove them as they are likely needed for programs on your computer like SAS or Banner.

<u>**Flash Player**</u>
Flash is another application that usually leaves old versions installed when you install the latest version, so you will need to uninstall it yourself. The easiest way to do this is to open ***Add/Remove Programs*** in the Control Panel (***Programs and Features*** in Vista), then uninstall all versions you see listed. You can then install the latest version from www.adobe.com/go/getflash. If you have problems uninstalling Flash, you may need to use one of the following methods to remove it:

Uninstaller for version 5+:
http://www.adobe.com/support/flashplayer/downloads.html#uninstaller
Manually remove Flash:
http://kb.adobe.com/selfservice/viewContent.do?externalId=tn_12727&sliceId=2

Do You Get A Java Error When Trying To Run Software Inspector?
If you attempt to run Software Inspector and the process doesn't complete or you receive a Java error it likely means you need a more recent version of Java installed. Yes, you need a working copy of Java to scan your system for flawed versions of Java. You can download and install the latest version of Java from the following site: www.java.com.

Do You See Duplicate Programs Listed?
Does the report show more than one version of programs like Flash, Acrobat or Java? This is likely because you have multiple versions of some programs installed without realizing it. This means you can have one version that is secure and more than one version of the same program that is not. In the case of programs like Java and Acrobat the old version often remains as opposed to upgrading or removing the old version when installing a newer one.

If I Use Software Inspector And Microsoft Update, Does That Mean Everything Is Up To Date?
Using Microsoft Update and Software Inspector will definitely ensure a majority of the programs on your computer are up to date. That said, the combination of these two tools may not catch everything on your system. If you are aware of any programs on your computer not listed in the Software Inspector results you may want to check them individually to be sure. Most programs have an option to check for updates off the HELP menu to make this process a little easier.

That's It
Hopefully this information helps you keep your computer running well for the long haul. If you run into any snags using Software Inspector or have questions about something you see on the results, make sure to touch base with your IT support person.