Dave’s Ramble

Recently, I cleared a little patch of open woods to build a tool shed and blacksmith shop. While grubbing around in the leaf litter I discovered at last the very substance that my country removed, citified grandmother had longed for, “Woods Dirt!”

The aroma of something wonderful, earthy and woody, dark and rich in color, teeming with little creatures; I took deep breathes and fought the urge to just plunge in.

In spirit, I immediately hitched the plow and turned the earth. A truly wonderful journey, tilling until that organic rich soil settles like snow and rolls off the brim of your hat like rich cream. The taste and smell of earth, I’m now convinced, is the real power of agriculture; grasping a young farm hand, creating a farmer, not to be let loose until old and gray. My wife often comments that I conjure projects that require digging a hole in the earth. Consumed by soil; it is a curse! I often remind her that the best thing that you can do for this old farmer is to plant him some day.

I’ll admit that I was not an immediate no-tillage convert. It’s often stated that a beaver is maddened by the sound of trickling water, moved to chew down a tree and obstruct its flow. Similarly, the farmer is prone to hate abandoned unproductive fields, moved to cultivate and plant. I often lash out at the laziness and affluence of our generation as we pass an unproductive field, and again my wife insists that it is someone’s field and they have the right to let it sit idled and abandoned. I am forced to conclude a riparian buffer is a sort of farmer therapy; prescribed in order to reveal the natural world as valuable.

Agriculture demands a balance of work and reward, tillage and soil mending, planting and harvest, adding to such: steel, chemistry, biology, water, sunlight and prayer. Admirably, agricultural science continues to evolve with nobler goals of energy harmony, food availability, and environmental reckoning. Farmers of the future will have ever increasing demands for sustainable approaches. If all goes well “Woods Dirt” will abound!

Calendar of Events
Mark Your Calendars --- Plan To Participate

♦ April 23 – Local Food Purchasing Program - MDA
♦ May 21 – Strawberry Spring Crops Twilight - Wye REC
♦ May 15, 22, 29 & June 5 – Alternative Ag Seminar Series
♦ August 7– Crops Twilight & Barbecue - CMREC

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□ Strategies for Managing Grape Disease
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□ Micronutrients for Great Tomatoes
□ Vegetable Drip Irrigation Basics
□ Mid-Atlantic Thrips Survey
□ Thrips Overwinter in Maryland
□ Good Agricultural Practices Program
□ Turf On-Line
□ IPM Tip: Vegetable Transplants
□ Gypsy Moth Spray Program
□ Wild & Wooly Website
□ New Newsletter: Equine Studies Update
□ Animals that Graze Close
□ Wheat Nutrition: Adding the Extra Touch
□ No-Till Corn Planting into Rye Cover & Residue
□ Is the Price Right?
□ Grain Marketing Highlights
□ USGA Reports Many Factors Challenge Bay Recovery
□ New I-9 Forms Employment Verification
□ MDA News: Positive Legislative Session; Visit Wineries
□ Farm Bureau Says: “Young Farmer Optimistic”
□ Irrigation Salinity Concerns in Tidal Influenced Rivers
□ Nutrient Management Update

It is the policy of the University of Maryland, Agricultural Experiment Station and Maryland Cooperative Extension, that no person shall be subjected to discrimination on the grounds of race, color, gender, religion, national origin, sexual orientation, age, marital or parental status, or disability.
How to Set Up and Manage a Local Food Purchasing Program
April 23, 2008

To Directors of Food & Dining Services, Purchasing Managers, Restaurant & Hotel Chefs, and Farmers, You are invited to attend this free national Web Conference on How to Set Up and Manage a Local Food Purchasing Program on Wednesday, April 23rd from 1:00 – 2:30 pm at the Maryland Department of Agriculture in Annapolis, MD. Join well-known chef and sustainable foods expert, John Turenne, for this informative web seminar designed to educate institutions and restaurants on the “How To’s” of purchasing, preparing and promoting local foods from local farmers.

For the agenda and more information, visit: http://www.sustainablefoodsystems.com/pdffiles/0408-local-food.pdf

This web conference is FREE, but pre-registration is requested by April 18th. Please RSVP to Karen Fedor at: FedorKM@mda.state.md.us or call at 410-841-5773.

Hosted by: The Maryland Department of Agriculture
Sponsored by:
♦ Maryland Hospitals for a Healthy Environment
♦ Buy Fresh Buy Local Chesapeake Sustainable Business Alliance

We look forward to seeing you there!
Karen Fedor
Maryland Department of Agriculture
410-841-5773 Fax: 410-841-5987

Wye Strawberry & Spring Crops Twilight Meeting
May 21, 2008

Make plans to attend the annual Wye Strawberry Crops Twilight Meeting on Wednesday, May 21, 2008 at the Wye Research and Education Center from 6:00 to 8:00 p.m. For more information contact Debby Dant at 410 827-8056 x115.

Light refreshments served after the meeting. No pre-registration necessary.

2008 Alternative Agriculture Seminar Series

Are you thinking of starting or switching to a new crop or enterprise? If so, you will want to attend one or more of the upcoming alternative agriculture series evening sessions offered through Maryland Cooperative Extension. The series covers 3 key enterprise areas in Southern Maryland—Greenhouse/Nursery Enterprises, Vegetable/Small Fruit/Tree Fruit Enterprises and Livestock Enterprises. The last seminar brings it all together with an emphasis on starting the new business. The evening sessions will run on Thursdays from 6 pm to 9 pm. Each session will provide an overview of current industry and market trends, an overview of production methods, market and management considerations and finally avoiding common pitfalls and tips for getting started successfully. The seminar series is free. Please register by calling the St. Mary’s Extension office at 301-475-4484 or the Charles County Extension Office at 301-934-5403.

May 15: Greenhouse / Nursery Enterprises
Charlotte Hall Library, Charlotte Hall, MD

May 22: Vegetable/ Small Fruit/ Tree Fruit
Charles County Extension Office, La Plata, MD

May 29: Livestock Enterprise: Beef/ Sheep/ Poultry
Charles County Extension Office, La Plata, MD

June 5: Putting It All Together
Charlotte Hall Library, Charlotte Hall, MD

Annual Field Crops Research Twilight Barbecue & Ice Cream Social
CMREC, Upper Marlboro Farm
August 7, 2008

You are invited to attend a twilight wagon tour of the University of Maryland Upper Marlboro Research Farm, on Thursday, August 7, 2008 from 4:30 p.m. to 8:30 p.m. Maryland Cooperative Extension will host this Annual Field Crops Research Twilight Barbecue & Ice Cream Social.

Served after the barbecue, “Old-fashioned” homemade ice cream! It’s “old fashioned” ice cream because we will be using a 1929 Fair-Banks Morse antique gas engine to do the cranking.

This event will highlight all field crops, agronomic and horticultural research projects currently conducted at the CMREC Upper Marlboro Farm, possibly including but not limited to the following:

♦ Vegetable IPM
♦ Weed Control
♦ Vineyard Projects - Table and Wine Grapes
♦ Corn Stalk Nitrate Test Study
♦ P Phyto-Remediation Grain vs. Forage Systems
♦ Apple, Peach & Beach Plum Research
♦ Blueberry Project
♦ High Tunnel Specialty Vegetable Production
♦ Strip-Till/No-Till Vegetable Production Techniques
MMS has just received our shipment of the 2008 edition of The Mid-Atlantic Berry Guide for Commercial Growers. Since publication of the first edition in 2005, the "Berry Guide" has become the authoritative source for growers in the Mid-Atlantic region on small fruit production, including strawberries, blueberries, and bramble crops. Topics covered include the economics of small fruit production, marketing, site selection, preplant preparation, variety selection, soil management, nutrition, and pest management.

- New chapter on managing vertebrate pests - How to tell what offenders are feeding on your fruit crops—even if you don’t see them
- Expanded section on weed management, including a new chapter on herbicides and “problem” weeds.
- Updated nursery lists and recipes for the mid-Atlantic grower.

Produced by Penn State in cooperation with the Universities of Maryland and Delaware, Rutgers University, Virginia Tech, and West Virginia University, this comprehensive 240-page guide, available for convenient use, is a “must” for novice and experienced commercial growers alike.

ORDER FORM FOR THE 2008 MID-ATLANTIC BERRY GUIDE FOR COMMERCIAL GROWERS

Name: ____________________________________________
Mailing Address: ____________________________________________
Phone: ________________________________________ (in the event of questions about your order)

Please send me __________________ copies of the new Berry Guide at $18.00 plus $7.00 S&H per copy. Make your check or money order out to “University of Maryland” and mail or fax your order to:

Anne DeMarsay, Ph.D.
Regional Extension Specialist, Fruit Pathology
University of Maryland
2005 Largo Road
Upper Marlboro, MD 20774-8508
Phone: (301) 627-8440
Fax: (301) 627-3273
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Strategies for Managing Grape Diseases
Anne DeMarsay, Fruit Pathology
Extension Specialist, University of Maryland

Wine and table grapes grown in Maryland are susceptible to diseases caused by several types of microorganisms. Diseases caused by bacteria, viruses, and phytoplasmas (bacteria-like organisms) cannot be controlled by chemical means. Examples are crown gall (bacterial), leafroll (viral) and grapevine yellows (phytoplasma). These diseases can shorten the lives of vines or even kill them outright, and can reduce the yield and quality of fruit. For bacterial, viral, and phytoplasma diseases, management = prevention plus prompt removal and destruction of any diseased vines. To avoid bringing these diseases into your vineyard—

- Buy clean, disease-free vines from reputable nurseries.
- Examine vines carefully before planting for injury or disease and discard any that do not look healthy.
- Train at least two trunks for each vine in case one becomes diseased.
- Avoid mechanical injury to trunks and cordons during pruning and other canopy management tasks.
- Control insects that may vector (carry) pathogens. Fungal diseases affect fruit as well as vines. Fungal infection of leaves and canes can reduce the vigor of a vine and even kill young vines by causing premature defoliation. However, fungal fruit rots are responsible for most direct yield losses. The presence of some disease-causing fungi in wine grape clusters can also impair quality by adding an off-taste to wine. In the humid climate of the eastern U.S. there are five major fungal diseases that grape growers must manage in most seasons: powdery mildew, black rot, Phomopsis cane and leaf spot (also a fruit rot), downy mildew, and Botrytis bunch rot. Failure to control any one of these diseases can result in a complete crop loss for the season.

The symptoms of powdery mildew (pathogen: Erysiphe necator) are whitish-gray, powdery fungal spores on leaves (usually on the upper side), green shoots, rachises, and fruit. Warm weather (68–80°F), overcast skies, and high humidity favor disease development. The powdery mildew fungus overwinters in bark and dormant buds and releases airborne spores in the spring that infect emerging shoots, leaves, and rachises. Unless these primary infections are controlled, they will produce spores that will create secondary infections on foliage, shoots, and fruit. Cycles of secondary infections may continue throughout the season in favorable weather, causing severe defoliation and fruit loss. Fruit are susceptible to infection from fruit set to shortly before full ripeness (Brix 8° or higher) and need season-long protection. Infected berries give “off” tastes to wine. They may crack and allow rot fungi to enter. In early, severe infections, fruit set may be poor, and fruit stop developing early. Foliar and shoot infections may impair growth and vigor, especially in young vines.

Black rot (pathogen: Guignardia bidwellii) first appears on leaves as tan to reddish-brown, circular spots with black,
pimple-like fruiting bodies within a dark brown border. The presence of fruiting bodies distinguishes black rot lesions from gramoxone injury. On developing fruit, reddish-brown spots appear, coalesce, and darken to black. Fruit dry and shrivel into hard, blue-black, fungus-filled “mummies.”

Warm (80°F), rainy weather favors infection and disease development. Overwintering fruit mummies release airborne spores in spring rains that infect leaves and shoots. These infections produce waterborne spores that infect other green tissue and fruit. Fruit clusters are susceptible to infection from two weeks before bloom until three to four weeks after bloom, when fruit become immune. Mummified fruit are unusable and must be removed from the vineyard.

Symptoms of *Phomopsis cane and leaf spot* (pathogen: *Phomopsis viticola*) may first appear on leaves or new shoots. On leaves, small yellowish spots with dark centers appear and become larger with age. On shoots and rachises, the disease appears as dark brown streaks and blotches that may coalesce and crack, particular toward the base of the shoot. Rainy, cool weather in the spring, especially during bloom and fruit set, promotes rachis infection and fruit rot. The fungus overwinters in infected wood and bark, releasing waterborne spores in spring rains that infect leaves, shoots, and rachises. Fruit cluster infection occurs early—from before bloom to several weeks after bloom—but rot symptoms appear late, just before harvest. Fruit may be infected through their stems or directly through their skins. Infected fruit turn brown and rubbery, and black pimple-like fruiting bodies appear on skins. Fruit shrivel and may drop. Rotted fruit are unusable, and *Phomopsis* infections in the fruit cluster may degrade wine quality.

*Downy mildew* (pathogen: *Plasmopara viticola*, a fungal-like organism) can be an explosive and damaging disease. Warm (75–80°F), rainy weather favors rapid disease development. Growers should learn to recognize symptoms of disease on various plant parts: light-green to yellow spots on upper sides of leaf that coalesce with age to yellow blotches with dark centers, flower clusters that dry up, and fruit that becomes dull and mottled, or reddish-purple, and may drop. All infected plant parts may be covered with cottony white spores during damp weather.

On leaves, sporulation is usually seen on the underside. The fungus overwinters in dead leaves, producing spores in the spring that are splashed to new leaves and to flower and fruit clusters, which in turn produce new infections. Fruit cluster infection occurs early, from bloom to about three weeks after bloom, when fruit become immune. Foliar infections may occur all season. Fruit and flower infections cause direct yield losses. Premature defoliation may predispose vines to winter injury and can threaten the survival of young vines.

*Botrytis bunch rot* (pathogen: *Botrytis cinerea*) appears on leaves as V-shaped brown patches at the margins. Flower clusters may wither and turn brown. Infected white grapes turn brown or purple; purple grapes become reddish. Fruit may drop if the rachis rots. In damp weather, infected plant parts are covered with brown or gray dusty spores. Mild temperatures (59–68°F) with rain or high humidity favor infection. The fungus overwinters in mummified fruit and dead wood, producing waterborne spores that infect new leaves and blossoms. Fruit are infected through floral ovaries at fruit set, through wounds, or directly through the skin after veraison (beginning of ripening). Fruit and flower infections cause direct yield losses. Infected fruit impart an “off” taste to wine.

Fortunately, the “Big Five” can be managed by integrating sound cultural practices with effective use of fungicides. Crucial cultural practices include—

- **Choosing American or hybrid grape varieties where possible.** American wine and table grapes are generally more resistant to all of these fungal diseases except black rot. Wine grape growers may be able to minimize disease problems by planting American varieties such as Norton, or European-American hybrids such as Chambourcin and Vidal.
- **Planting disease-free vines with no injuries to crown or roots.**
- **Managing the canopy throughout the season.** Thin, train, and hedge shoots to permit air, sunlight, and fungicides to penetrate. Thin clusters for a balanced fruit load to avoid vine stress.
- **Avoiding injury to any part of the vine, especially the crown and fruit, during vineyard operations.**
- **Practicing good sanitation during vine dormancy.** Remove dead or diseased wood, old rachises, dead leaves, and mummified fruit from the vineyard. Bury or burn the debris.

To plan an effective fungicide program, you must know the susceptibilities of your grape varieties, the history of disease in your vineyard, and the critical periods for controlling the fungal diseases of concern to you. Protecting grapes from powdery mildew infection is a season-long job. Black rot and *Phomopsis cane and leaf spot* are threats from budbreak to three or four weeks after bloom. Downy mildew infections may appear as early as May in warmer areas, and vines should be protected for the rest of the season. The critical periods for protecting fruit from *Botrytis* infection are from bloom to post-bloom and at bunch closing, veraison, and pre-harvest. To minimize the number of sprays, choose fungicides or compatible tank mixes of fungicides that will manage all diseases of concern at the time of each spray. Other keys to effective fungicide use are—

- **Using the right spray interval.** From budbreak through post-bloom, use a 7–10 day interval, depending on the weather, to make sure new growth is protected. Later in the season, a 10–14 day interval will be adequate.
- **Adjusting spray volume as the canopy fills out to achieve thorough coverage.**
- **Avoiding interactions between fungicides that may injure vines.** Do not mix sulfur or captan with oil-based pesticides or spray them within 14 days of each other.
- **Avoiding the use of certain fungicides on sensitive varieties.** Norton, Concord, and some red-fruited French-American hybrid grape varieties can be injured.
by sulfur. Flint, a strobilurin fungicide, should not be used on Concord grapes.

- Rotating among classes of fungicides to prevent resistance development. Strobilurins and sterol-inhibiting fungicides are at high risk of resistance development, and resistant strains of powdery and downy mildew are already present in Maryland. For more information, see PestNet Report #1 at: http://www.mdipm.umd.edu/.

For more information on planning a fungicide program for wine grapes, see Extension Fact Sheet 848, Guidelines for Developing an Effective Fungicide Spray Program for Wine Grapes in Maryland, 2008.

Cornell Reports on the Finger Lakes Grape Cold Hardiness
by Joe Fiola, Professor and Extension Specialist, Viticulture and Small Fruit

Please see the info from Cornell and Finger Lakes, NY below. We always discuss relative hardiness of vinifera versus hybrids, vinifera vs. vinifera, and hybrids vs. hybrids, and the following data give you a very nice real time “numerical” comparison. The LT50°F is the temperature at which we would expect to see 50% of the buds killed on that variety at this time. So the lower the LT50°F temperature, the more “cold hardy”, and the lower temperature the buds and vine can withstand with out damage. This is similar information that I sent to you from Tony Wolf a short while back.

In response to the current weather we are having, after a few day of warm weather the vines would start to “deharden” somewhat. The numbers for some of these varieties would become more positive (therefore less hardy). The complication is that each variety dehardens at different rates so the relative order may change. The good news is, at this point, if the weather transitions gradually to normal cold, they should also “reharden.” If it gets very cold very quickly, that is when we are more inclined to suffer bud damage. Our forecast is for a reasonably gradual return to cold and no sever cold, so we should be OK.

Finger Lakes Vineyard Update - February 5, 2008
Bud Hardiness Values
Steve Luce sent this information to some of us extension-types last week. I second his statements regarding differences that might be found on similar varieties in other locations depending on conditions, and that the values just give us a sense the relative hardiness these buds have. Overall, my impression is that things look pretty good.

Each year we test the mid-winter bud hardiness of a large number of our breeding selections as part of our selection procedures. Included with that are also a number of standard cultivars. I'm passing along some information from these recent January 2008 (Jan. 15-29) bud freezing runs. The LT50°F is the temperature at which we would expect to see 50% bud death. These are all from our vineyards here in Geneva. Growers in other locations may see different bud hardness values depending on growing conditions, cropping levels, drought stress, etc. Some cultivars vary in the relative order of hardiness a little from year to year depending on cropping levels and growing conditions. (e.g. Aurore seems especially hardy this winter, but it had a smaller than usual crop in 2007). In spite of that, this gives a rough idea of relative bud hardness of a wide range of hybrids (including some of the MN cultivars), as well as a few vinifera and natives.

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Fact Sheet 848: Guidelines for Developing an Effective Fungicide Spray Program for Wine Grapes in Maryland, 2008
by Anne DeMarsay, Fruit Pathology Extension Specialist, University of Maryland

Extension Fact Sheet 848: Guidelines for Developing an Effective Fungicide Spray Program for Wine Grapes in Maryland, 2008 is now available. I developed this research-based guide for commercial growers last year, and the 2008 edition has been updated, expanded, and converted into an official fact sheet. The 12-page guide offers options and recommendations for
managing major fungal diseases of wine grapes in bearing and non-bearing vineyards, ratings of the effectiveness of various fungicides, and practical advice on managing the threat of fungicide resistance.


You may also link to it from a Web page. A limited number of printed copies will be available from MMS by the end of this week. Contact Brian Pugh at bpugh@umd.edu to request a printed copy.

I hope you will find this new fact sheet of use in your work and would appreciate hearing your comments and suggestions for future editions. If you have any immediate questions, please call or email me.

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Micronutrients and Growing

Great Tomatoes

Steve Bogash, Regional Horticulture Educator
Penn State University

One of the great misconceptions among growers is in the understanding of the importance of micronutrients in creating a great tomato harvest. While the required amounts of these nutrients are very low in comparison to the levels of macronutrients, their importance is still very high. Typically major nutrients or macronutrients are expressed as a percentage of dry matter in plant tissue while the much smaller micronutrient levels are expressed as ppm (parts per million). These smaller amounts lead many to believe that they are less important. However, plant health and fruit quality suffers greatly when there are insufficient amounts of these micronutrients as they are important in cell division, development of flavor compounds, cell wall formation, fruit set and other plant biochemical processes.

Major nutrients include Carbon (C), Hydrogen (H), Oxygen (O), Nitrogen (N), Phosphorus (P), and Potassium (K). Of these, C, H, and O are classed as structural elements, are extracted by plants from the air and water and make up 90-95% of plant tissue. N, P, and K are commonly considered as the macronutrients, make up much of the remaining plant tissue and are the 3 numbers expressed as percentages on fertilizer bags. Required in lesser amounts as critical micronutrients by plants are Calcium (Ca) and Magnesium (Mg) followed by Sulfur (S), Boron (B), Chlorine (Cl), Copper (Cu), Iron (Fe), Manganese (Mn), Molybdenum (Mo), and Zinc (Zn). Of great interest in our industry at this time as well as receiving a lot of research are the elements Silicon (Si), Sodium (Na), Vanadium (V) and Nickel (Ni). So far these last four elements are not considered critical nutrients, but research indicates that they may be beneficial in the right circumstances.

We will consider the list of currently considered “critical” micronutrients for our region. Mo, Mn, and Cl have been left out of this section as they are seldom a problem. All of the tissue levels are based on samples of whole leaves collected as “Most Recently Mature”. On a typical tomato plant, this is the fourth or fifth whole leaf down from the growing point. This leaf will be fully expanded and no longer yellow in appearance.

**Calcium (Ca):** Calcium is critical in cell wall formation. Plant Ca deficiencies include Blossom End Rot (BER) along with many variations of skin cracking. Calcium deficiencies are typically part of a series of problems including uneven watering, low pH, moisture stresses, and imbalances with the nutrients K, Mg and N. Ca tomato tissue levels at fruiting should be near 3%. Calcium Nitrate and Calcium chelates are typically applied through irrigation or foliarly to increase available calcium. Irrigation must be managed properly to solve a Ca deficiency.

**Magnesium (Mg):** The comments for Mg are very similar to Ca as these elements must be in balance with each other. Like Ca, severe Mg deficiency can cause BER. Mg tomato tissue levels at fruiting should be near 0.9%. Field observations indicate that a ratio of ¾ parts Ca to 1 part Mg, assuming that both are near the peak of sufficiency, produces excellent fruit with strong skins and minimal cracking. Magnesium sulfate, Sul-Po-Mag and Magnesium Oxides are common sources of additional Mg.

**Sulfur (S):** Sulfur is especially important in the creation of the complex of organic compounds that make up the odor and flavor profiles of vegetable fruit. Tissue sulfur levels at fruiting should be between 0.8 and 1.2%. Potassium sulfate, Sul-Po-Mag, Magnesium sulfate and Ammonium sulfate are all common sources of sulfur. Since these are common materials used in blending fertilizers, S is seldom a limiting nutrient.

**Boron (B):** Boron is extremely important to growers in our region as this element is often deficient in our soils. B deficiency is often expressed as poor development or death of the growing point since it is very important in many cellular division processes. Borax and Solubor are often applied foliarly at ½ -1 pounds/acre annually. B tissue levels should be between 50 and 75 ppm. Bringing B tissue levels to 75 ppm can increase fruit quality by reducing cracking and uneven ripening.

**Copper (Cu):** Although copper deficiency is seldom seen in the field, observations indicate that keeping Cu levels near 20 ppm will enhance plant growth and aid in the plant’s ability to resist diseases. Most copper bactericides/fungicides supply sufficient amounts of Cu when used in rotation as part of an overall disease management program.

**Iron (Fe):** Iron is very important in the plant’s ability to utilize N and S. Many plant biochemical processes require small amounts of Fe. Recommended tissue levels are 100-300 ppm. Iron deficient plants have interveinal chlorosis and yellowing of younger leaves. High pH soils or irrigation
water can cause Fe deficiency. Iron chelate and Ferrous sulfate are good sources of additional Fe. Tomatoes benefit greatly from the management of irrigation water to a pH of 6.2-6.5. This increases Fe and K availability.

**Zinc (Zn):** Zn deficiency can appear as poor growth and/or poor fruit set and often appear very similar to Fe deficiency. The only way to identify this problem is by tissue testing. Zn levels should be between 20 and 50 ppm. Zinc chelates, sulfate and oxides are common sources of additional Zn.

The best method to avoid micronutrient deficiencies as well as produce the largest crop with the greatest packout is to regularly soil and tissue test plants at critical points. Always test a tomato field prior to planting and apply nutrients as recommended. Then submit plant tissue for analysis at first blossom, 6-8 mm green fruit, first fruit color (pink) and again at first harvest if you are planning on keeping the plants fruiting. If you need information on collecting proper plant tissue for analysis, please contact the author.

**Thinking of Using Drip Irrigation this Season?**

Bill Lamont, Horticulture Extension Specialist
Penn State University

I have long believed that water would be a commodity traded in the future just like oil is now! All we have to do is look around the country and we can see the beginnings of water rights being bought and sold, water being diverted to populated areas, and the lack of water for crop production in areas hit by the recent droughts. We have to remember that in the production of vegetables all we are doing is packaging water in another form and selling it to the consuming public. We are indeed fortunate that vegetables are a major component of a healthy diet and if we look carefully we can see a shift toward preventative medicine based largely on the premise if we eat the right food, exercise, and drink good quality water we can prevent a lot of the current medical problems that we see around us.

Drip irrigation can help us supply high quality vegetables to the marketplace while conserving our precious water resources. Drip irrigation is a method of applying small amounts of water, often on a daily basis, to the plant’s root zone.

No matter the size of the system, a drip irrigation system has four major components and two options.

**Major Components**
- Delivery system: emitters or line source drip tubing
- Filters: sand, disk, or screen
- Pressure regulators: spring or valve
- Valves: hand-operated, hydraulic, or electrical
- Controller: simple electric clock or computer
- Fertigation system: electric pumps, hydraulic pumps, venturi systems, etc.

How you put these components together, and which options you choose, will depend on the size of the system, the water source, the crop, and the degree of sophistication you desire.

**Advantages and Disadvantages**

Although many advantages favor installation of a drip system, there are some limitations as well.

**Advantages**
- Smaller water sources can be used, as drip irrigation may require less than half of the water needed for sprinkler irrigation.
- Lower pressures mean reduced energy for pumping.
- High levels of water management are achieved because plants can be supplied with precise amounts of water.
- Diseases may be lessened because foliage remains dry.
- Labor and operating costs are generally less, and extensive automation is possible.
- Water applications are precisely targeted. No applications are made between rows or other non-productive areas.
- Field operations can continue during irrigation because the areas between rows remain dry, resulting in better weed control and lower production costs.
- Fertilizers can be applied efficiently to roots through the drip system.
- Watering can is accomplished on varied terrains and in varied soil conditions.
- Soil erosion and nutrient leaching can be reduced.

**Disadvantages or problems**
- Initial investment costs may be more on a per acre basis than other irrigation options.
- Management requirements are high. A critical delay in operation decisions may cause irreversible damage to crops.
- Frost protection that can be achieved by sprinkler systems is not possible with drip systems.
- Rodent, insect, or human damage to drip tubes may cause leaks.
- Filtration of water for drip irrigation is necessary to prevent clogging of the small openings in the drip line.
- Water distribution in the soil is restricted.

**Specific Adaptations to Vegetables**

Because vegetables are usually planted in rows, drip tape/tubing with prepunched emitter holes, called a line source emitter, is used to wet a continuous strip along the row. Also since most vegetables are considered annuals, a thin-walled disposable tubing (4 or 8 mil thick) generally is used for only one season. Less emphasis is usually placed on buried mainlines and sub-mainlines to allow the system to be dismantled and moved from season to season. Costs may be high, so a goal should be to develop an inexpensive yet functional system that allows maximum production with minimal costs. You may purchase an entire system from an irrigation dealer or adapt your own components. Assistance in design from an irrigation dealer or professional can be very helpful in avoiding problems later on.

**Water Sources**

The water supply may come from wells, ponds, lakes, municipal lines, or pits. Well water sources generally are fairly clean and require only a screen filter to remove
particles. However, precipitates or other contaminants in the water should be determined by a water quality test prior to considering a drip system. Municipal sources generally provide documentation of water quality tests, making it easier to spot potential problems. Surface water such as streams, ponds, pits or rivers will contain bacteria, algae or other aquatic life, and sand filters are an absolute necessity. Sand filters are generally more expensive.

**Major Components of a Drip System Delivery system**

- Mainline distribution to field
- Sub-mainline (header line)
- Connectors/Feeder tubes
- Drip tape/tube
- Filters
- Pressure regulators
- Valves or gauges

**Delivery System**

- **Mainline distribution to field**: Buried underground polyethylene plastic pipe or PVC pipe or above-ground aluminum pipe can be used to deliver water from its source (pump, filtering system, etc.) to sub-mainline (header line).

- **Sub-mainline (header)**: It is common to use vinyl “lay flat” hose or polyethylene pipe as the sub-mainline (header line). The vinyl “lay flat” hose is durable, long-lasting, and lays flat when not in use so equipment can be driven over it. The lay flat hose and connectors/feeder tubes are retrieved after each growing season and stored until the following year.

- **Connectors/ Feeder tubes**: Water flows to the drip tubing through small plastic tubes attached to plastic connectors that connect the sub-mainline (header line) and each drip tube. This allows some flexibility season to season when the sub-mainline is laid out and the drip tubes are not in exactly the same place.

- **Drip tube**: The design of most drip tubing consists of an inner and outer chamber that allows for even water distribution over a wide range of conditions. Most tubing is polyethylene black plastic, 4 to 8 mil thick, with holes at intervals of 8 to 24 inches. In general, the sandier the soil, the closer the spacing needed. 12-inch spacing is common. The tubing is shipped flattened on a roll and is often called drip tape. Most drip tapes emit water at about 25 gallons per 100 feet per hour when operated at 10 psi pressure. Standard rolls of tape (7,200 feet) contain enough tubing tape for 1 acre of crop on 6-foot row centers.

**Filters**

Filters are essential to the operation of a drip system and may be viewed as the most important component of a drip system. For wells or municipal water a screen filter or disc filter can be used. Screen filters (150-200 mesh screen) are available in sizes from ¼ inch (used only for ½ acre) to 6-inch (used with several acres). Some filters have a valve to open and flush the filter. Disc filters operate with a series of discs stacked vertically to separate out small particles. Although more expensive to purchase, they are reliable and easy to clean.

For any open or surface water sources, sand filters are an absolute necessity. They are installed as pairs of sand-filled canisters and can be back-flushed to accomplish cleaning. Canisters from 14 inches (enough for 2 acres) to 48 inches in diameter are used, depending on the size of the system. I have used a lot of stainless steel canisters over the years to clean the water from ponds.

The need to clean or flush filters can be determined by the loss of pressure through the filter. You can install pressure gauges on either side of the filter to indicate the need to flush when pressure loss exceeds 5 to 7 psi. With only one pressure gauge behind the filter, watch for reduced operating pressure in normal operation. When stream or river water is used, a sand separator is usually needed to remove suspended sand from the water before it enters the sand filter.

**Pressure Regulators**

Most drip tubing is designed to operate at 8 to 15 psi pressure, with 10 psi being standard operating pressure. A spring-type (used on smaller systems) or diaphragm-type pressure regulator can be purchased to hold pressure steady. These are inexpensive and reliable. Both adjustable and pre-set types are available.

**Valves or Gauges**

Watering several fields or sections of fields from one water source can be accomplished by a zone system using valves to open and close various lines. A backflow/anti-siphon valve is a necessity on a well or municipal source where fertilizers or chemicals are to be injected into the line. Hand-operated gate or ball valves or electric solenoid valves can be used to automate the system using a time clock, water need sensor (discussed later), or automatic controller box (“computer” controller).

**Optional Additions**

**Fertigation or Chemigation**: Soluble fertilizers can be added to the drip irrigation water to provide uniform crop fertilization. A simple “hozon” venturi injector siphons soluble fertilizer from a bucket or jug into the line at a preset ratio (usually 1:16 or 1 gallon for every 16 gallons of water flowing through the line). The hozon injection system, however, is only suitable for ¼ acre plantings or less. Other venturi units are available in sizes up to 2 inches in diameter. More expensive injectors with greater capacity and accuracy, use electric or hydraulic “pumps” to inject fertilizer solutions from a stock tank into the line. A hydraulic device, called a Dosatron, can be set at various dilution rates and operates with water flowing directly through the device, which is placed in the mainline. Use only high quality, soluble fertilizers that completely dissolve. All fertilizer injections should be made as close to the field as possible and ahead of a secondary screen filter in the line so that any contaminants are filtered out.

Fertigation is most commonly used to supply nitrogen since it is highly soluble and moves easily through soils to roots. Phosphate and potash are best applied prior to planting and not injected through the irrigation system. Other chemigation applications may include pest control measures, but check label restrictions on use in chemigation applications. If any fertilizer or chemicals are
applied through the system a check valve to ensure no contamination of the water source is a necessity. For regulations on water use, well and valve requirements, and water permits contact the Pennsylvania Department of Agriculture.

Drip systems operate most effectively when used in conjunction with plastic mulches. Mulches reduce evaporation of water from soils and improve economy of drip water application. Vegetable operators typically use 4-foot-wide rolls of black or white-on-black polyethylene plastic mulch on 5-foot row centers with drip tape buried 1 to 3 inches deep below the plastic and either 3 to 5 inches to the side of the row or in the center, depending upon whether a single- or double-row crop is being grown. Use care in laying tubing straight so it will not be damaged when transplanting. Plastic laying machines can lay drip tape and plastic mulch in one operation.

**Maintenance**

The drip system filter should be checked daily and cleaned if necessary. A clogged screen filter can be cleaned with a stiff bristle brush or by soaking in water. Sand filters need to be back-flushed. Check lines for excessive leaking. A large wet area in the field indicates a leaking drip tube. You can install a connector to the leaking tube or bypass the leak with a short piece of feeder tube.

Excessive mineral precipitates on drip lines can be dissolved with acids, usually phosphoric acid. Tapes buried under plastic mulches are much less apt to become clogged from precipitates.

Bacteria, algae and “slime” in lines can be removed by injections of chlorine or commercial bacterial control agents applied through the fertigation system. Use a 2 ppm chlorine daily “rinse” at the end of the irrigation cycle or a 30 ppm “shock treatment” if slime becomes a problem in the system. Consult with a drip system representative for dilution rates for commercial cleaning products.

Periodic flushing of the mainline, sub-mainline and drip tape is an excellent maintenance practice. Adapters are available for the ends of each drip tape to automatically flush lines at the end of each irrigation cycle, or they can be manually opened to allow a few gallons of water to flush from the end. This will prevent any bacteria or algae growth.

**Understanding a Major Pest Problem in the Mid-Atlantic: A Survey for Thrips**

Gerald Brust, IPM Vegetable Specialist
University of Maryland

**Introduction:** Thrips are a major problem for vegetable and flower growers throughout the United States. In the past 10 years, some species (in particular, western flower thrips (WFT)) have caused increasing problems. Symptoms of thrips damage include scarring and/or deformation of the leaves and fruit. Additionally, certain thrips species can damage vegetables by vectoring viruses such as Tomato Spotted Wilt Virus. However, some symptoms that appear to be thrips-induced can be caused by environmental or varietal factors and this can lead to increased applications of pesticides when they were not necessary.

Little is known as to the behavior of thrips in Maryland, and such questions as: what crops they prefer, when and where in the state are they most abundant, what type of damage is associated with their presence in different vegetable crops and many others are still unanswered. One of the most elemental questions—what species do we have in the state—is still not known. It is very difficult to distinguish between thrips species. Color and size are not reliable indicators for identification. Information on thrips species in the state is key to understanding what problems these pests hold for the vegetable industry.

**Methods:** A survey of weeds and vegetable crops for thrips was undertaken in 2006 and more extensively in 2007 throughout Maryland and in the border areas of neighboring states of PA, DE and VA. Vegetable leaves, stems and flowers (when available) were sampled by placing plant parts in a one-gallon plastic Ziploc bag with 20 ml of 90% alcohol. Plant parts were shaken within the bag and then discarded. The washings from the bag were examined in the lab for numbers and species of thrips found. Grateful acknowledgement is made of financial support of the Northeast IPM Center towards the expenses incurred in this survey.

**Preseason survey:** Winter annuals and other weed species (i.e., henbit, chickweed, marestail, wild mustards and radishes) located in and around vegetable fields were sampled in 12 locations in Maryland, Delaware, Virginia and Pennsylvania, in December through April.

**Results and Discussion: Preseason Survey results:** No thrips were found at seven of the twelve sites. At five of the sites, thrips were found in December and January on winter annuals. At two sites thrips were found in March as well. The site with the highest populations had 15% of the winter annual weeds with at least one female thrips. Over 73% of the thrips found were female adults, 21% were males and 6% were immatures or pupae. Chickweed was found to harbor 70% of all thrips species that were detected. Sampling-sites near high tunnels or woods had a greater probability of containing thrips than sites in fields. *Frankliniella tritici* (Eastern flower thrips) made up almost 35% of the population of thrips found. And while *Frankliniella occidentalis* (western flower thrips, WFT) made up only a little over 5% of the population, these results show that this species overwinters in MD, VA and DE., but WFT was not found in PA in two years of preseason sampling.

**Early season survey results:** Early season (pre-bloom) vegetable sampling showed that thrips were found not only on leaves that showed feeding damage, but also on leaves that showed no injury at all. At times, 8-15 thrips would be found on the underside of a tomato or cucurbit leaf with no feeding apparent on that leaf. The question arises as to what are the thrips doing there and what are they feeding on? They were found to be feeding on pollen, not vegetable pollen, but pine pollen. Pine trees shed a lot of pollen during the early spring and when there is little rain the
pollen, which is large and sticky, tends to stay on leaf surfaces and the thrips then follow the pollen. What this early season thrips presence means for later on in the season is not clear at this time. It is conceivable that a large build up of thrips on pine-pollen loaded vegetable leaves may facilitate outbreaks later in the season.

**Seasonal Survey results:** Thrips were found on every vegetable crop grown in Maryland throughout the summer. Some vegetable species had only a few thrips in flowers and others had many thrips. Okra, pumpkins and peppers were three of the most heavily infested vegetables followed by peas, tomatoes, cantaloupe and watermelon. High tunnels and greenhouses had greater thrips infestations on farms where thrips were found overwintering than where thrips were not found overwintering.

Thrips numbers were greatest in July and August throughout Maryland, with a slow decrease through September and October. Immature thrips were most abundant from late July through August with more than 80% of the population consisting of immatures in late July.

*F. tritici* (Eastern flower thrips, EFT) was the most common species in Maryland for most of the sampling dates and locations. *F. fusca* (tobacco thrips) and *Thrips tabaci* (onion thrips) were commonly found on farms throughout the state, and not just on farms growing tobacco or onions. In some areas of MD, PA, DE and especially VA there was a “switching” in thrips species (from *F. tritici* to *F. occidentalis*) starting in late July. There may have been an influx of western flower thrips (WFT) from the south that added to the eastern flower thrips, but if this was the case one would have expected just a large increase in total thrips numbers and not a replacement of EFT with WFT in such a short time, i.e., 2 weeks. In addition, the switch did not occur only in the southern most part of the state, but all over the state in selected fields or, in some cases, entire farms. What triggers this species switch and what it means is still not clear. It is possible that this phenomenon may have been an unusual event, and surveys in additional years are needed to determine how often this occurs. However, in southern Maryland in August over the last 5-7 years there has been a large increase in the number of reports of TSWV infections in tomatoes and WFT is a good vector of this virus.

**Survey Summary:** A great deal of information was found in this survey that will help manage thrips pests over the next few years. Western flower thrips do overwinter in Maryland, Delaware and Virginia; with PA still not clear yet. Many other thrips species besides WFT are active throughout the winter on weeds present in and around growers’ fields. This “starter” population may serve as a reservoir for mid-summer infestations. Numbers of immature thrips greatly increase in late July through August and are difficult to see on leaves, flowers or fruit of vegetables because of their small size and often translucent bodies. Therefore growers may be missing this potential build-up of pests. This may be the surge and switching of the population of thrips in late July and August originates. It could be possible that more WFT eggs are oviposited at this time of the season compared with EFT, or that WFT are better able to compete with EFT and other species for the flower niche and so they dominate the population for several weeks. To know for sure further study is needed, but this survey gives vegetable workers and growers a good start. This report with pictures and figures can be found at: www.mdvegetables.umd.edu/entomology/index.cfm

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**Welcome Cerutti RR Hooks Our New Entomology Extension IPM Specialist to Maryland**

The purpose of this email is to briefly introduce Cerutti RR Hooks as a new faculty member in the Department of Entomology. Cerutti very recently joined the Department of Entomology in College Park after spending years fighting agricultural pests in Hawaii. He claims that he has completed all of the paper work required of a new employee and most of the requirements associated with finding residence in a new state. As such, he is now looking forward to meeting and working with agricultural community in Maryland and surrounding areas.

Cerutti’s research interests include taking a multi-disciplinary approach to pest management. As you are aware, most cropping systems are attacked by a variety of pest organisms. In addition to insect pests, weeds, plant-parasitic nematodes, and other plant pathogens pose great challenges to the development of sustainable farming systems. However, these different pest complexes are typically researched separately. The creation of a comprehensive pest management program may require that these complexes be addressed in tandem. For example, a management practice that successfully suppresses a fungal pathogen may be harmful to beneficial organisms and thus cause additional pest problems. As such, he plans to take an interdisciplinary research approach to develop pest management strategies that suppresses several pest complexes concurrently. He strongly believe this approach enhances the opportunity to improve the overall economic and ecological sustainability of farming communities.
Among Cerutti’s specific research interests are ecological pest management, sustainable agriculture, biological control, and organic farming.

He readily admits, agricultural systems and pest complexes in Maryland differ from those he has grown accustomed to in Hawaii and thus he is eager to learn. Consequently, areas of research priorities will also vary. Accordingly, as an initial step in his familiarization with important pest complexes and research needs of Maryland stakeholders, Cerutti intends to develop a survey to readily assess needs. Please feel free to contact me if you have any questions or suggestions, or comments regarding the Maryland Research Priority List or other related subjects. Cerutti looks forward to meeting, working, and collaborating with all of you in the near future.

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Thrips Overwinter on Winter Annuals in Maryland
By Gerald Brust, IPM Vegetable Specialist
Maryland Cooperative Extension

Vegetable and bramble growers in Maryland have called me often over the last two years about fruit problems in their fields possibly caused by thrips. As an overall study of the possible impact thrips may be having on vegetable and fruit quality I have been conducting a two-year survey for their numbers and species. Over the last two winters I have taken weed samples from vegetable fields looking to see if any thrips were overwintering and if so what species they were. A sample site consisted of 5-12 fields from 2-5 farms that were in close proximity to one another. Pre-season weed samples consisted of 15 x 15 cm quadrats taken from a weedy area, 5 samples per field. Weed samples were placed in a 4-L Ziploc® bag with 20 ml of 70% isopropyl alcohol shaken in the bag ten times and the plants discarded. The bag was marked and placed in a cooler until transported back to lab where it was stored in a refrigerator until examined for content. Below is a 9-point summary of the overwintering sample program.

1. For most samples no thrips were found.
2. In 5 of the 12 sample sites thrips were found in December through January on winter annuals.
3. At four sample sites thrips were found in March.
4. The worse sample site had 25% of the sampled winter annual weeds with at least one thrips.
5. 81% of the thrips found were female adults, 11% were males and 8% were immatures or pupae.
6. Western flower thrips were found to overwinter in Maryland, Delaware and Virginia, although only in low numbers.
7. Chickweed was found to harbor 70% of all thrips with wild mustards and henbit being the next best winter hosts.
8. Sampling-sites near high tunnels or woods had a greater probability of containing thrips than sites out in a field.
9. Farms where thrips were found to overwinter had greater probabilities of infestations during the season.

The results from this year of sampling show that thrips are overwintering to a greater extent than last year’s sampling program detected. Even though several thrips species, including Western flower thrips, were found to overwinter in the mid-Atlantic area it does not mean we have a thrips problem. They may have been there all along and we are just now discovering them. However, growers do need to watch for any early infestations in their brambles and vegetables and not overreact by spraying an insecticide unless really needed. Most brambles can have at least 5 thrips or more per fruit/flower before there is any possibility of damage. The species of thrips you have should be determined only if you think thrips are causing fruit quality problems at low densities. I would be glad to look at your thrips if you send them to me: 2005 Largo Rd, Upper Marlboro, MD 20774 or you can call 301-627-8440 or email me: jbrust@umd.edu

Greenhouse TPM/IPM Weekly Report
University of Maryland Cooperative Extension
Central Maryland Research and Education Center

From: Stanton Gill, Regional Specialist and Karen Rane, Plant Pathologist
Ginry Rosenkrantz, Chuck Schuster and Brian Clark, Extension Educators
Suzanne Klick and Shannon Waskins, Technicians, Maryland Cooperative Extension
John Speaker, Independent IPM Scout

April 4, 2008

Vegetable Transplants
Usually when the economy goes into a recession, people suddenly get interested in vegetable gardens. Several garden centers are telling us that people appear to be more interested in planting vegetables and the demand for transplants is good this year. They are relatively easy to grow and you can get quick results on the bench.

One question that always seems to come up is how do you keep vegetable transplants such as tomatoes and peppers short and compact? Tomatoes grow most quickly when they are warm, wet, and well fed. To restrict till fertility, grow the plants cool, dry, and hungry- or combine cool days with warm nights. Peppers can also be grown hungry, but keep them 2 – 3 degrees warmer than the tomatoes.

When you fertilize try to use a 15-0-15 cal-amg type of fertilizer at 75-100 ppm million. You can alternate with a 20-10-20 at 75-100 ppm to fill the plant in and push growth. A soft pinch on tomatoes or peppers will help to keep the height under control, but adds about 2 weeks to the production time. Another method that has been used to help suppress height is to drape a rough cloth over the foliage of tomatoes or peppers to slightly wound the plant cells.
Good Agricultural Practices (GAPS) for the Production and Handling of Fresh Produce

Background...
Over the past few years we have heard through media announcements about major outbreaks of illnesses that have been attributed to contaminated fresh produce. Whether domestically produced or imported, four key events have brought focus and concern for the microbial food safety of fresh fruits, vegetables, nuts and other edible horticultural foods:

1. Recent reoccurring outbreaks linked to consumption of domestic and imported products.
2. Positive detection of human pathogens from random survey sampling of both imported and domestically produced produce.
3. Recent reports from several researchers documenting the difficulty of cleaning and disinfecting produce surfaces.
4. Recent reports from several researchers documenting the potential for internalization of pathogens during postharvest handling

About the Program...
The goal of every produce farmer is to grow and sell wholesome products. And because of occasional disease outbreaks, agricultural producers of all sizes will soon be increasingly challenged with establishing and documenting methods of microbial risk reduction and prevention. Buyers for retail chains increasingly are requiring producers to establish and document a GAP program and often require third party auditing to verify compliance.

The GAP program outlines of the fundamental components of microbial food safety that should be part of any comprehensive management plan for growers, specialty crop producers, harvest operators, distribution and wholesale handlers, direct marketers, and fresh cut processors. The following website links fully explain the GAP GHP Program:

http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5050875

Turf Questions? Visit the University of Maryland Turf On-Line at:
http://iaa.umd.edu/umturf/umturf.html
MDA Announces: Gypsy Moth Spray Activities to Begin

Maryland is experiencing the worst gypsy moth outbreak in a dozen years. The gypsy moth is by far the most destructive pest of forest and shade trees in Maryland. MDA is planning to spray 100,000 acres in 13 counties and Baltimore City. Governor Martin O’Malley provided $3.5 million and the U.S. Forest Service provided a grant for more than $630,000. Counties provide 30 percent cost share for the gypsy moth suppression program.

The majority of the acreage to be treated is in Western Maryland. Spraying will begin by the first week of May and go through the end of May. Written notifications went to property owners in and near spray blocks. Detailed spray block locations will be posted on or about April 21.

The toll free numbers will be updated as new information becomes available: Baltimore County and east, 800-492-2105; Carroll Co. and west, 800-492-2106. More information on MDA’s gypsy moth program. Click here for a UMD Home and Garden Information Center fact sheet.

Wild & Woolly

The Spring 2008 issue of Wild & Woolly, the quarterly Maryland Sheep & Goat Producer newsletter has been published to the web at: http://www.sheepandgoat.com/news/index.html.

The newsletter may be viewed online or downloaded and printed in its original graphics format.

In between issues of the newsletter, be sure to visit the Shepherd's Notebook blog at: http://mdsheepgoat.blogspot.com.

Susan Schoenian, Sheep & Goat Specialist
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New Newsletter; Equine Studies Update

The Equine Studies Team is pleased to introduce Volume 1, Issue 1 of the Equine Studies Update newsletter. This quarterly newsletter will cover a wide range of topics, events, and current issues relevant to the Maryland equine community as well as showcase the achievements of the University of Maryland’s equine experts. Equine Studies Update will also advertise equine events throughout the state, so feel free to send any items you would like to add to our calendar to kbrannan@umd.edu. We hope you enjoy the first issue of the Equine Studies Update newsletter and look for the next issue coming out in May!


Kelly Brannan
Equine Team, University of Maryland
Extension Activities Coordinator

Why Shouldn’t I let the Animals Graze that Close

Dr. Richard W. Taylor, Extension Agronomist
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Early in the spring before cool-season forages really take off, it is often tempting to place animals on pastures and let them graze as close as they want and in doing so you can reduce your need for hay/grain and allow the animals out of confinement. This practice is especially prevalent among those who are not set up for rotational grazing or don’t have the time to spend moving animals from pasture to pasture. The potential for damage to your pasture with this practice depends on your stocking density (animal units per acre), pasture species, animal species, weather, fertility, and a number of other factors. I often see this practice used by the small grazer who has limited land with which to work (Photo 1). Let’s discuss a few of these factors with emphasis of their impact on pasture health.

Photo 1. An overstocked (2 horses per acre), continuously grazed pasture showing the impact of early grazing on stand density (Photo courtesy R. Taylor). In the upper left corner, note the winter hay fed site.

Stocking density or the number of grazing animal units per acre often is determined by outside circumstances such as acres of pasture available and number of animals on the farm instead of by forage availability and forage (pasture) growth rate. Early in the spring as grasses and legumes are coming out of the winter and using up the last of their stored energy (starch-sugar-carbohydrate) reserves to produce new leaves, the amount of leaf area available to intercept sunlight and fix carbon dioxide as sugars is very limited. Pasture plants left ungrazed quickly produce enough leaf area to become self-sustaining and capable of sustaining the rapid growth rate we traditionally think of for cool-season forages in late spring. If animals are allowed to graze this new growth before the pasture plants reach the self-sustaining point, the plants are forced to use any remaining stored food reserves to generate new leaves. When the food reserves eventually are completely used up, the plant, where possible, will cannibalize existing tissue (roots and other tissues) to support new growth. If close...
grazing persists, plants run out of energy or tissues to sacrifice and die or are weakened to the point that even if grazing is halted the plants are not able to compete with germinating weeds or other plants not favored by the grazing animal.

Pasture species is another key factor in how well the pasture can adapt to early close grazing. Pasture species that have many basal (low growing) leaves are generally less susceptible to close grazing. Kentucky bluegrass, the ryegrasses, the festuloliums, and to some degree tall fescue have basal leaves that allow them to tolerate some close grazing. Kentucky bluegrass and the ryegrasses will tolerate early close grazing the best.

Horses are one of the closest grazing animals and can often keep pastures grazed right down to the soil level (Photo 2). Horses also graze almost continuously due to the small size of their stomach and the fact that fiber digestion takes place in the enlarged cecum that comes after the small intestines. In addition, we often overstock horses on pastures and this places additional stress on pastures. Whenever you graze early in the season, be sure to understand the grazing habits of your animals and avoid adding additional stress to pastures as they begin spring growth.

Another option available is to ensure the animals are well fed before they are let out onto the pasture. This works for ruminants but will not work as well if grazing horses. Horses with their small stomach tend to graze a large percentage of the time they are on pasture. To use this option with horses, you will need to limit the time they spend on the pasture to a few hours per day, lengthening the time as the grass approaches the suggested height for grazing. A second caution—if you have less than 2 to 3 acres available per horse, you are close to the point of overstocking the pasture and will need to be very careful not to over graze.

A third option partially discussed above is to limit the amount of time the animals are allowed to graze on a pasture in early spring. Depending on the growth rate of the pasture it can range from one or two hours per day to many hours per day. This is appropriate where a lack of interior fencing does not allow rotational grazing but the manager has time available to move animals between the barn or exercise/sacrifice lot and the pasture.

**Wheat Nutrition**

**Adding an Extra Touch**

Dr. Richard W. Taylor, Extension Agronomist  
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With the current wheat price, many producers may be thinking of adding extra nitrogen (N) to push yield potential to the maximum. The high cost of N actually could limit any gain from this approach since we know that in most cases what limits yield is the environmental (water—primarily—and temperature) conditions during grain fill and not N availability. Wheat yield, like corn, responds to additional N in a way that for each additional pound of N applied the incremental increase in yield becomes smaller and smaller until the point of maximum economic yield (MEY). After the MEY point, although more N may increase yields slightly, the extra N actually reduces net profit per acre.

So, what extra touch can be used to increase yield. In a four year study, Bob Uniatowski and the author found that a split application of N could on average add an extra five or more bushels to yield even at the highest N rate applied in the study (160 lb N/acre). Although the actual proportion of N applied at each split wasn’t as important as using a split application, the rate of N for the first split (mid-February to green-up in March) should be larger than the second split (growth stage Feekes 5, first node evident above the soil surface) if the plants are not yet at full tiller, were planted late, or did not have enough available N last fall to fully establish. If the first application is at a higher rate, the extra N helps the crop complete the tillering
process; encourages top growth and root formation resulting in a reduced impact from late-season stresses; and, most importantly, helps insure against the possibility that weather conditions will prevent the application of the second split.

The longer the time from N application to stem elongation the greater the risk of N loss from volatilization, leaching, or denitrification. Thus, very early applications of N (mid- to mid-February) potentially can reduce yield if only a single application is made. Where adequate fall N is available from the soil or applied at planting, late winter/early spring crop N needs will be low so a later first application is preferred. Many growers apply N early in the spring to stimulate tiller production. The majority of yield comes from the primary tillers laid down last fall and an early spring N application or split N application will not alter this. However, the small but significant (especially at today's wheat price) increase we observed can be partially explained by an increase in the number of secondary, smaller heads. Another likely factor is that some of the yield increase from splitting the N into two applications comes from the conservation of fertilizer N (providing late-season N if significant leaching, volatilization, or denitrification occurs). In our study, we observed a split effect even at very high N rates so both factors likely came into play during the study.

No-till Corn Planting into Rye Cover Crop Residues

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Cover crop usage in Pennsylvania and other mid-Atlantic states has increased dramatically over the past few years, and much of the cover crop is cereal rye. Benefits to farmers include soil erosion reduction, nutrient loss prevention, and improved soil quality. Farmers are also increasingly interested in planting no till, and have serious concerns about their ability to successfully plant corn into rye cover crop residues. Rye is typically planted in the fall after corn or soybean harvest, and then grows rapidly in the spring, producing large amounts of biomass once temperatures start to warm up. Many farmers are afraid that they won't be able to get the rye killed in a timely manner, and the resulting large amount of plant material may interfere with planting operations.

For the past few years we have evaluated the effect of rye residues on a corn crop at Penn State's Southeast Research and Extension Center near Landisville, Lancaster County. Rye was planted into soybean stubble in mid-October of 2005 and 2006 at 0, 1.5 or 3.0 bushels/acre, and corn was planted no till at three dates (approximately April 29, May 8, and May 20 in each year) the following spring. The experimental design was a split plot with 4 replications and corn planting date as main plots and rye seeding rate as subplots. The rye was killed with glyphosate + 2,4-D approximately 10 days before corn planting, and was completely dead at the time of corn planting. Rye was approximately 6 inches, 12 inches, and 36 inches tall at the time of application for the early, mid, and late plantings, respectively. For the third planting only, the rye was rolled with a culti-mulcher (2006, with tines raised) or roller/crimper (2007). The corn was planted in 30-inch rows using a no-till planter set up with residue managers, 13-wave coulters, seed firmers, and one spiked and one solid rubber closing wheel, and calibrated to drop 33,000 seeds/acre. Fertility was 50 lb of N/acre broadcast as 30% UAN within a week prior to each planting, followed by an additional 100 lb N/acre (as 30% UAN) side dressed in row middles at mid season. Starter (7-21-5) was applied with the planter at 2+2. Weed control was with Harness Xtra (2006) or Guardsman Max (2007) applied after each planting. In 2006 armyworms became a problem, and the field was treated with Warrior. No armyworms were observed in 2007. Data included stand counts and yield at the end of the season.

The amount of biomass produced by rye depends on when it is planted in the fall and when it is killed in the spring. In our studies, rye planted in mid October produced about 2000, 4000, and 4200 pounds of above-ground dry biomass per acre if killed around April 20, May 1, and May 10, respectively, regardless of rye seeding rate (2007 data only). Although there were no differences in biomass between the mid and late corn planting time, the rye at the late timing was much taller.

Corn stands were not affected by the rye, with about 31,700 plants per acre, averaged over all of the plots. There was a significant year by planting date interaction for corn yield. In 2006, the planting date by rye seeding rate interaction and the rye seeding rate main effect were not significant, but there were significant differences in corn yield for each planting date, when averaged over rye seeding rate (Table 1). Corn yield decreased as planting date became later. There does appear to be lower yields when corn was planted into rye at the later two planting dates (and higher at the early planting date), but these differences were not statistically significant.

Table 1. Effect of corn planting date and rye cover crop residues on corn yield in 2006.

<table>
<thead>
<tr>
<th>Rye planting rate (bu/a)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.5</td>
</tr>
<tr>
<td>------------------------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>170.7</td>
</tr>
<tr>
<td>4/29</td>
<td>167.4</td>
</tr>
<tr>
<td>5/4</td>
<td>121.7</td>
</tr>
<tr>
<td>5/21</td>
<td>153.3&lt;sup&gt;a†&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

†. Means followed by the same letter are not significantly different using LSD (0.05).
In 2007 there was a significant planting date by rye seeding rate interaction. Yields for the first two planting dates did not differ, regardless of rye planting rate (Table 2). Yields for the last planting date were lower than all of the others, and when rye was present yields were even lower.

Rye biomass was only measured in 2007 (Table 2). There was little difference in total dry matter between the middle and late planting, but rye at the late planting was well into the boot stage when it was killed. Corn yields were much lower when rye residues were present at the late planting, compared to the middle planting, and were reduced by nearly 25 to 30 bu/acre compared to plots with no rye. The larger rye plant size (but not biomass) may have interfered with corn growth (allelopathy?, nitrogen immobilization?), resulting in lower yields. Lower plant populations do not explain the differences, showing that the planter was able to place the seed properly.

These data show that with a planter set up properly for no till, corn can be planted into fairly heavy rye residues little or detrimental effect on yield. However, to maximize yield, corn must be planted early, necessitating early killing of the rye cover crop. Rye will probably have more of an effect on corn when it grows taller.

Growers should ensure that their planters are set up to cut through the rye residues, giving proper corn seed placement with good seed to soil contact, and make sure the rye is completely dead when corn planting occurs. Growers should also watch out for insects, as cover crops (and winter weeds) can attract insects like cutworms, and armyworms are also often seen in rye cover crop fields.

Table 2. Effect of corn planting date and rye cover crop residues on corn yield in 2007.

<table>
<thead>
<tr>
<th>Corn planting date</th>
<th>Rye planting rate (bu/ a)</th>
<th>Dry rye biomass (lb/ a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1.5</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>4/30</td>
<td>188.2&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>188.6</td>
</tr>
<tr>
<td>5/10</td>
<td>201.3&lt;sup&gt;c&lt;/sup&gt;</td>
<td>197.4&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>5/22</td>
<td>177.8&lt;sup&gt;c&lt;/sup&gt;</td>
<td>154.6&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Mean</td>
<td>189.1</td>
<td>180.2</td>
</tr>
</tbody>
</table>

† Means followed by the same letter are not significantly different using LSD (0.05).

Attached is the latest "Mastering Marketing" information sheet. For more information on marketing and business development, please visit: [http://agmarketing.umd.edu](http://agmarketing.umd.edu).


Topics in this issue include:
- Elements of a Good Advertisement
- To Blog or Not to Blog
- Marketing Strategies
- The Inside Quote
- On-Line Marketing Resource
- FYI

If you have questions or comments about this publication or have clients or colleagues that would value receiving it as well, please contact Ginger Myers at gsmyers@umd.edu.

Is the Price Right?

By Ginger Myers, Extension Marketing Specialist
University of Maryland

Whether you’re gearing up to sell at a farmers’ market, through your roadside stand, or by private treaty, you cannot thrive in business today without a pricing strategy. The price you set for your product must fall between two points: what the customer is willing to pay and your breakeven point (the point at which you start losing money).

What should you charge for your product? Charge too much and it won’t sell. Just reduce the price and fix the problem. But, charging too little is far more dangerous. If you choose to compete on price, you may not only forego significant revenues and profits, but also fix the product’s market value position at a low level. Once prices hit the market it is difficult to raise them. Research reported by the *McKinsey Quarterly* shows that 80 to 90 percent of all poorly chosen prices are too low.

The latest studies indicate that price is a major consideration for between 15 and 35 percent of the population - which means between 56 and 85 percent of the people concentrate on factors other than price. Many businesses act as though 100 percent of the population is
price obsessed. This delusion nibbles away at their profits and attracts only the most disloyal of all customers.

Your pricing objective is to let your customers know the amount of money charged for a product or service, right? Actually, there are multiple layers of pricing objectives. When almost identical brand name items, such as peanut butters, are priced differently, it’s because the manufacturers are pursuing different pricing objectives in their marketing strategy.

Here are some steps to follow to help you set the right price and pursue your marketing objective.

1. Develop a pricing strategy - consider:
   a. Utilizing odd-even pricing ($3.99 instead of $4.00), standard mark-up pricing (typically a manufacturer marks his price up 15% over his total cost per unit, a wholesaler 20% over his costs, and a retailer 40% over his costs.), or customary pricing ( when the product “traditionally” sells for a certain price, such as a pack of gum).
   b. Targeting “quality” customers versus “quantity” customers
   c. Offering volume discounts or add-on products
   d. Offering two layer pricing- one price for premium service and a lower price for an economy service
   e. Matching competitor’s pricing
   f. Always using the same price to establish consistency
2. Develop a goal for your pricing strategy. “What’s the goal for your business?” Pricing is part of your marketing strategy and reflects how you position your product. If you want to be the go-to-guy for a certain product or service, then you need to always sell only top quality product and offer great service. You may have to extend operating hours for customer convenience or perhaps offer a money-back, no-questions-asked return policy. If you’re positioning your enterprise as a family activity, then you need to have activities and operational hours geared towards the weekends with family-friendly packaging, activities and prices.
3. Study the competition. The Internet can give you an abundance of information about your customer, the marketplace and the profit potential - all at a very low cost. You can even interview some potential customers. You might tell them you’re thinking about selling a certain product and ask them what they are currently paying for similar products.
4. Calculate your total costs of producing a product or offering a service by adding together your fixed costs + variable costs. Once you have your total costs, you can calculate the break-even price for a product or service. Of course you’re not in business to just break even.
5. Identify your added value. “What’s your unique selling point? Is it quality, different varieties, free delivery, convenient location, or locally grown? What can you offer that customers are willing to pay more to obtain?”

Remember this golden rule when setting prices: perception is everything. How customers view your product or service and what they are willing to pay for it is based upon perceptions. In the end, customers will tell you loud and clear through their purchasing behavior whether or not your prices are too high, too low, or right on the money.

Don’t Forget Soybean Rust Monitoring
This winter soybean rust overwintered well in the South and we should remind ourselves to pay close attention to the soybean rust monitoring reports. Subscribe to the USDA soybean rust web alerts at:
http://www.sbrusa.net/cgi-bin/sbr/public.cgi

Grain Marketing Highlights
Carl German, Extension Crops Marketing Specialist;
clgerman@udel.edu

USDA April Supply/ Demand Estimates
The bottom line in today's supply and demand estimates for the '07/'08 marketing year is bullish for corn, and neutral to bullish for the soybean and wheat markets.

Corn Analysis
USDA lowered the projection for ending stocks of U.S. corn by 200 million bushels from last month's estimate, now projected at 1.283 billion bushels for the '07/'08 marketing year. On the supply side beginning stocks, production, and imports were unchanged from last month projecting a total supply of 14.393 billion bushels. On the demand side, feed & residual use increased 200 million bushels; food, seed, & industrial use declined 95 million bushels; ethanol for fuel declined 100 million bushels for a change in domestic total use of 5 million bushels more than one month ago. U.S. corn exports were increased 50 million bushels. Total use is now projected at 13.110 billion bushels. World corn ending stocks projected at 102.97 million metric tons (mmt), were down from 104.03 mmt in March.
Soybean Analysis

Ending stocks for U.S. soybeans were increased by 20 million bushels, now placed at 160 million bushels for the ‘07/’08 marketing year. On the supply side, the only change from one month ago was an increase in imports of 4 million bushels for a total domestic supply projection of 3.169 billion bushels. On the demand side, USDA increased their estimate for crushings 5 million bushels; increased exports 50 million bushels; increased seed use 6 million bushels; and decreased residual use 77 million bushels from last month’s estimate. However, the residual use number might not be reliable and is to be considered suspect at this point in time. Total domestic use decreased 16 million bushels and is now placed at 3.009 billion bushels.

World soybean ending stocks projected at 49.31 mmt, up from 47.44 mmt in March.

Wheat Analysis

Ending stocks for all U.S. wheat were left unchanged at 242 million bushels. The ‘07/’08 supply for all wheat in the U.S. was left unchanged at 2.613 billion bushels. Demand estimates for all wheat were increased from one month ago in two categories: feed and residual use was decreased 50 million bushels (reducing domestic total use by 50 million bushels); and wheat exports were increased by 50 million bushels. The net effect is to leave total use unchanged from one month ago estimated at 2.371 billion bushels and ending stocks unchanged. Again, the feed and residual number was increased to offset the increase in the export estimate leaving room to question this change.

World wheat ending stocks are now estimated at 112.48 mmt, up from 110.4 mmt in March.

Marketing Strategy

Viewing this report as bullish for corn and neutral to bullish for soybeans and wheat runs contrarian to popular opinion. Calling the report for corn is easy. Calling the report bullish for soybeans and wheat is taking a bit of a ‘leap of faith’. However, both soybeans and wheat have big bullish for soybeans and wheat runs contrarian to popular opinion. Calling the report for corn is easy. Calling the report bullish for soybeans and wheat is taking a bit of a ‘leap of faith’. However, both soybeans and wheat have big bullish for soybeans and wheat runs contrarian to popular opinion. Calling the report for corn is easy. Calling the report bullish for soybeans and wheat is taking a bit of a ‘leap of faith’. However, both soybeans and wheat have big bullish for soybeans and wheat runs contrarian to popular opinion. Calling the report for corn is easy. Calling the report bullish for soybeans and wheat is taking a bit of a ‘leap of faith’. However, both soybeans and wheat have big bullish for soybeans and wheat runs contrarian to popular opinion. Calling the report for corn is easy. Calling the report bullish for soybeans and wheat is taking a bit of a ‘leap of faith’. However, both soybeans and wheat have big

ever seen before.

Nevertheless, the primary trend in soybeans and wheat is currently down. The primary trend for corn is up. Traders will be watching planting progress as the month progresses. The corn/soybean price ratio currently favors corn plantings. We could see a 3 to 4 million acre increase in U.S. corn acres planted over the March 31st Planting Intentions report. If that happens it would be extremely bullish for soybean prices. Currently, Dec ‘08 corn futures are trading at $6.11 per bushel; Nov ‘08 soybeans at $12.15 per bushel; and July ‘08 wheat is $9.28 per bushel. For technical assistance on making grain marketing decisions contact:

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University of Delaware, Newark, DE 19716-2130
Phone: 302-831-1317 Fax: 302-831-6243
List owner<grn-mktgd@udel.edu> “E-Grain Marketing Club”; and <www.agri-culturehealth.com> “Farm Retail/Wholesale Marketing Web Site”.

USDA TARGETS LOANS FOR WOMEN AND MINORITY FARMERS

Frank Spray, April 1, 2008 — Frank Spray, Farm Loan Manager for USDA’s Farm Service Agency announced today that women and minority farmers interested in buying and operating family-sized farms may be eligible for loans from FSA.

“The Farm Service Agency is interested in promoting greater involvement in farming and ranching by women and minorities,” said Spray. “Each year, we reserve a portion of our farm loan funds especially for socially disadvantaged applicants.”

The loans available to women and minorities are the same as those for other borrowers, as are the eligibility requirements.

Applicants must be primarily and directly engaged in farming and ranching on family-size operations.

In addition to being members of a socially disadvantaged group, applicants under this program must meet all requirements for FSA’s regular farm loan program assistance, including:

♦ Have a satisfactory history of meeting credit obligations;
♦ Have sufficient education, experience and/or training that indicates the managerial ability to assure reasonable prospects of success;
♦ Be a citizen of the United States (or a legal resident alien), including Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and certain former Pacific Island Trust Territories;
♦ Be unable to obtain credit elsewhere at reasonable rates and terms to meet actual needs; and
♦ Possess legal capacity to incur loan obligations.

A socially disadvantaged applicant is one of a group whose members have been subjected to racial, ethnic or gender prejudice because of his or her identity as members of the group without regard to his or her individual qualities. For purposes of this program, socially disadvantaged groups are women, African Americans, American Indians, Alaskan Natives, Hispanics, and Asian Americans and Pacific Islanders.

Contact the local Farm Service Agency county office or USDA Service Center for detailed information about the Socially Disadvantaged Applicant loan program.

Frank Spray 410 479 1202, frank.spray@md.usda.gov

Small Grains Crop Insurance Deadline Fast Approaching

Farmers Install Record On-Farm Conservation Practices in 2007:  Maryland farmers installed more than 2,100 conservation projects on farms in 2007. Farmers matched the record $13.1 million provided through the USDA Agricultural Water-Quality Cost-Share (MACS) funding with more than $1.4 million of their own money to install these projects and will cover ongoing maintenance costs for years to come. Installing best management practices prevents soil erosion, manages nutrients and safeguards water quality.

RMA
Many Factors Will Challenge the Recovery of the Chesapeake Bay

The Chesapeake Bay is affected by multiple factors, ranging from population growth to climate variability, which will challenge the recovery of this important ecosystem. These findings released today by the U.S. Geological Survey (USGS) are part of a comprehensive 5-year summary of the major factors affecting the health of the Bay ecosystem and the implications for its management.

Population growth and agricultural lands have contributed to an overabundance of nutrients, sediment, and contaminants entering the Bay, and loss of habitats that can retain these pollutants. Climate change and variability have caused water temperatures in the Bay to exhibit greater extremes during the 20th century than the previous 2,000 years. Sea-level rise related to climate change is contributing to the loss of vital coastal wetlands. The cumulative impact of pollutants, habitat loss, invasive species, climate change, and disease has affected the health of fish and bird populations in the Bay and its watershed.

“There are multiple factors affecting the Bay ecosystem, which continue to challenge its recovery,” said Scott Phillips, the Coordinator of USGS Chesapeake Bay studies. “These findings provide implications about the types and locations of actions needed for the recovery of the Bay ecosystem.”

“Using the best science available from all of our partners to continually improve our understanding of the Bay ecosystem is a hallmark of the Chesapeake Bay Program. This information and knowledge enables us to make the most informed and cost-effective decisions to restore and protect the Bay and its watershed,” said Jeffrey Lape, Environmental Protection Agency's Director of the Chesapeake Bay Program.

Among the key findings on land use and its relation to water quality and habitats:

- Impervious surfaces increased 41 percent during the 1990s compared to an 8-percent increase in population. The rate of increase of impervious surface implies there will be more rapid delivery of nutrients to streams and an increase in sediment erosion.

- There has been a decrease in nitrogen and phosphorus concentrations at a majority of the sites in the watershed. However, concentrations are not decreasing at a rate that would sufficiently reduce nutrient loads to the Bay to meet water-quality standards by 2010.

- Sediment is having an adverse impact on water clarity and underwater grasses in the Bay and stream quality in the watershed. The results imply that actions to address sediment will have to be focused in the high sediment-generating areas in the Piedmont, promote sediment trapping in wetlands and reservoirs, and address shoreline erosion.

- The traveltime of nutrients and sediment through the watershed ranges from weeks to centuries. This can result in a “lag time” between implementing management actions and improvements in water quality. Knowledge of traveltimes can be used to better focus management actions.

- Synthetic organic pesticides and their degradation products have been widely detected at low levels in the watershed, including emerging contaminants such as pharmaceuticals and hormones. The results imply there are opportunities to better integrate nutrient, sediment, and contaminant reduction measures.

Among the key findings on the fish and bird populations:

- The health of fish populations in the Bay is affected by multiple factors including degraded water quality, pathogens, and disease. The results imply that improving water quality for fisheries may make them less susceptible to disease and pathogens.

- Fish (principally male bass) in the Potomac watershed have testicular oocytes--female eggs growing in their testes--a form of intersex. Reproductive abnormalities in fish have been strongly linked with a variety of contaminants that affect the endocrine systems of fish.

- Concentrations of DDT and other selected pesticides have declined since the 1970s, while PCB concentrations remain mostly unchanged. The populations of many fish-eating birds have rebounded but other species remain at risk due to legacy and emerging contaminants.

- Habitat loss, invasive species, and poor water quality have affected the food sources and habitat for seaduck populations, which have declined over the past several decades.

Among the key findings related to climate change:

- Low dissolved-oxygen conditions have been much more extensive and severe during the past four decades than at any time in the past 2,500 years. These conditions are influenced both by climate change and population growth in the watershed.

- Sea-level rise due to climate change and land subsidence will continue to cause losses and landward migration of tidal wetlands during the coming century. Sea-level rise is also causing sediment erosion in low-lying shoreline areas and has an adverse effect on water clarity in the Bay.

- The findings imply that new strategies to address climate change have to be developed and integrated with on-going actions to restore the Bay ecosystem.
Maryland Department of Agriculture

News

Positive Legislative Session for Ag
Maryland agriculture succeeded on many fronts during the 2008 legislative session, including protecting the Chesapeake Bay, improving the agricultural land preservation program, protecting animal health, assisting dairy farmers and promoting agricultural products and programs in schools.

"Working closely with the General Assembly this session, we passed key legislation to protect our priorities of strengthening our middle class and our small and family owned businesses and farms, providing opportunity for more people, and protecting the health of our citizens and the environment," said Governor O'Malley. "When our farm businesses are sustainable, the next generation will see farming as a viable career opportunity, and Maryland will preserve its open space and locally-grown food industry."

MDA was very active during the session, testifying on numerous occasions, meeting with allied organizations, under the outstanding direction of Joanna Kille, who just completed her first legislative session as MDA's Director of Government Relations. Click here for a list outlining the many successes achieved during the session with a summary of how they will affect the agriculture industry.

Visit Maryland Wineries, Earn a Chance at a Weekend Getaway
Touring a winery or a vineyard in the countryside, tasting some of Maryland's fine wines, and enjoying the company of friends is a wonderful way to spend a springtime day. This month, MDA is encouraging consumers to tour one of the state's seven wine regions and sample the superior vintages offered by our 21 local wineries.

The Maryland Wineries Association is supporting MDA's initiative by donating $300 towards a weekend stay at any Maryland bed & breakfast. To qualify for the getaway, consumers must visit five or more Maryland wineries during the month of April and get a special ticket signed by each winery visited.

Supporting local agricultural products is essential to creating a sustainable Maryland to protect our culture, our economy and our environment. A recent study found that consumers want to buy local and preserve farmland.

To find out more information about the promotion, Maryland wineries, and to download the ticket, click here.

The American Farm Bureau Federation Says: “Young Farmers-Ranchers Optimistic”

The American Farm Bureau Federation says the future of agriculture is in caring and competent hands. To come to that conclusion Farm Bureau conducted an informal survey of participants in AFBF’s Young Farmer and Rancher Program. The survey found that the availability of land and farm facilities and overall profitability remain the top challenges of America’s young farmers and ranchers. However, they also believe they are better off today than five years ago, and they are more optimistic about the future of farming.

Following land and facility availability (36 percent) and overall profitability (20 percent) as the two top concerns, young farmers and ranchers cite increasing urbanization and loss of farmland (14 percent), government regulations (11 percent), and the availability and costs of health care (10 percent) as the next most-pressing challenges. Land and facility availability and overall profitability have ranked high in most previous surveys.

The vast majority of young farmers and ranchers (83 percent) said they are more optimistic about farming than five years ago. In 2007, 79 percent of those surveyed said they were more optimistic. 90 percent indicated they are better off today than five years earlier. Back in 2000, 70 percent said they were better off. In addition, 92 percent of today's young farmers and ranchers see themselves remaining in farming for the rest of their lives. 95 percent would like to see their children follow in their footsteps.

For more studies, and how to obtain the report, can be found at http://chesapeake.usgs.gov/

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New I-9 Forms for Employment Verification Now Required
Federal rules require employers to use new employee I-9 verification forms, and disallow the use of several types of documents to verify worker eligibility.

No longer accepted will be: certificates of U.S. citizenship or naturalization; alien-registration receipt cards; unexpired re-entry permits; and refugee travel documents. Those documents were excluded because federal officials believed they were easier to counterfeit and falsify. However, one new verification document was added as a way to prove eligibility -- the unexpired I-766 employment authorization form.

The new I-9 forms, beginning today, are required for all new hires and those workers who need to be verified again. The new form is available online at www.uscis.gov. There are penalties for failure to use the new form, so make sure you have the info you need before hiring any new workers.

USGS Circular 1316: “Synthesis of USGS Science for the Chesapeake Bay Ecosystem and Implications for Environmental Management,” is a product of the USGS Chesapeake Bay studies, which provide integrated science for improved understanding and management of the Bay ecosystem. More information about USGS Chesapeake Bay studies, and how to obtain the report, can be found at http://chesapeake.usgs.gov/

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Maryland Wineries Association
Irrigation Salinity Concerns in Tidal Influenced Rivers

The following charts describe the summer salinity increase in the upper tidal reaches of the Patuxent River. Direct irrigation from such sources needs to be carefully monitored for salinity to avoid crop injury:

Patuxent River - Nottingham (TF1.5)

Location: Nottingham, Just South of the Merkle Wildlife Management Area on the Upper Patuxent River

Coordinates (NAD83):
Latitude: 38.7101°
Longitude: -76.7014°

Description: This station is a tidal freshwater site in the mid-channel of the Patuxent River approximately 35 feet deep.

| Surface Water Salinity (ppt) Patuxent River / Nottingham (TF1.5) |
|-------------------------|------------------|------------------|------------------|
| Month | Minimum | Mean | Maximum | 2007 | 2008 |
| January | 0.00 | 0.01 | 0.13 | 0.10 | Not Sampled |
| February | 0.00 | 0.02 | 0.29 | Not Sampled | Not Sampled |
| March | 0.00 | 0.00 | 0.01 | 0.15 | Not Sampled |
| April | 0.00 | 0.00 | 0.04 | 0.20 | 0.20 |
| May | 0.00 | 0.04 | 0.43 | 0.10 |
| June | 0.00 | 0.17 | 0.88 | 0.50 |
| July | 0.00 | 0.41 | 1.98 | 1.20 |
| August | 0.00 | 0.66 | 2.65 | 1.35 |
| September | 0.00 | 0.60 | 1.97 | 2.00 |
| October | 0.00 | 0.51 | 2.15 | 1.55 |
| November | 0.00 | 0.33 | 1.52 | 0.50 |
| December | 0.00 | 0.09 | 0.85 | Not Sampled |

Excerpted from MSU at:

Table 1. Relative tolerance of selected crops to salinity of irrigation water.

<table>
<thead>
<tr>
<th>Salt Tolerance</th>
<th>Field Crops</th>
<th>Forage Crops</th>
<th>Vegetable Crops</th>
</tr>
</thead>
<tbody>
<tr>
<td>High (9-12 mins/cm)</td>
<td>Cotton</td>
<td>Bermuda grass</td>
<td>Garden beets, kale, asparagus, and spinach</td>
</tr>
<tr>
<td>Medium (3-4 mins/cm)</td>
<td>Rye, wheat, oats, sorghum, corn, and soybeans</td>
<td>Sweet clover, dallgrass, sudan grass, alfalfa, fescue, wheat and oats for hay, velvet</td>
<td>Tomatoes, broccoli, cabbage, peppers, cauliflower, lettuce, sweet corn, potatoes, carrots, onions, beans, squash, cucumbers</td>
</tr>
<tr>
<td>Low (1-2 mins/cm)</td>
<td>Field beans, peanuts</td>
<td>White clover and landine clover</td>
<td>Radishes, calery, and green beans</td>
</tr>
</tbody>
</table>

Table 2. Guidelines for interpreting irrigation water quality tests.

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Low</th>
<th>Water Quality Hazard Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Conductivity (mhos/cm)</td>
<td>0.00-0.75</td>
<td>0.76-3.00</td>
<td>3.01+</td>
</tr>
<tr>
<td>Sodium Adsorption Ratio (SAR)</td>
<td>0-6</td>
<td>6-12</td>
<td>12+</td>
</tr>
<tr>
<td>Residual Sodium Carbonate (RSC)</td>
<td>0-1.24</td>
<td>1.25-2.50</td>
<td>2.51+</td>
</tr>
<tr>
<td>Chlorides, ppm (root absorption)</td>
<td>0-142</td>
<td>143-285</td>
<td>368+</td>
</tr>
<tr>
<td>Chlorides, ppm (foliar absorption)</td>
<td>0-106</td>
<td>107+</td>
<td></td>
</tr>
<tr>
<td>Iron, ppm (foliar staining potential)</td>
<td>0-3.00</td>
<td>3.01+</td>
<td></td>
</tr>
<tr>
<td>Bicarbonate, ppm (overhead sprinkler systems, foliar staining)</td>
<td>0-90</td>
<td>91-520</td>
<td>521+</td>
</tr>
<tr>
<td>pH (concentrity)</td>
<td>5.5-6.4</td>
<td>6.4-7.0</td>
<td>less than 5.5</td>
</tr>
</tbody>
</table>

* Data applicable to nursery production only.
Table 2. Terms, units, and useful conversions for understanding water quality analysis reports.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Salinity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. EC</td>
<td>electric conductivity</td>
<td>mmhos/cm</td>
</tr>
<tr>
<td>b. TDS</td>
<td>total dissolved solids</td>
<td>mg/L</td>
</tr>
<tr>
<td>Sodium Hazard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. SAR</td>
<td>sodium adsorption ratio</td>
<td>ppm</td>
</tr>
<tr>
<td>b. ESP</td>
<td>exchangeable sodium percentage</td>
<td>ppm</td>
</tr>
</tbody>
</table>

Working with Manure May Drastically Reduce Chances of Developing Lung Cancer

Working with manure may drastically reduce chances of developing lung cancer, according to a report in The Daily Telegraph. Dairy farmers are five times less likely than the general populace to develop the disease, *New Scientist* magazine reports. The study found farmers typically breathed in dust that consisted largely of dried manure and all the bacteria that grew in it. *New Scientist* said adults who had a greater exposure to germs than usual might build up a better resistance to bugs, including cancer. “Some researchers are starting to wonder whether the higher incidence of certain cancers in affluent populations — including breast cancer, lymphoma and melanoma — might also have something to do with sanitized, infection-free living,” the researchers said, noting the unexpected links between exposure to dirt and germs and cancer risk. “If they’re right, the implications are huge. If we can understand exactly what it is about some germs that has a protective effect, we should be able to reduce people’s risk of developing certain tumors later in life by exposing them to harmless microbes.”

http://www.foxnews.com/story/0,2933,326353,00.htm

Nutrient Management Update

Krista Mitchell, Nutrient Management Advisor for Anne Arundel County

The time to finish up those 2008 Nutrient Management Plans is NOW! All of the nutrient management advisors are busy making the final touches to 2008 nutrient management plans. Plans need to be completed and in producer’s hands prior to nutrient applications, so if you have not done so yet, please call your county’s nutrient management advisor to get your 2008 nutrient management plan. Krista’s normal days in the Anne Arundel County office are Mondays, Tuesdays, and every other Wednesdays, with the remainder of her time being spent in Howard County.

You are welcome to stop by our office any time to borrow one of our soil sampling probes. Our office is open Monday through Friday from 8:00 a.m. to 4:30 p.m. Our website contains soil and manure analysis price comparisons for the labs that may be used and the soil sampling procedures that must be followed for nutrient management planning purposes (do not follow the lab’s soil sampling instructions!):

http://extension.umd.edu/local/AnneArundel/AGNR/agbulletins.cfm

Simply scroll down to section G, where you’ll find all nutrient management related information. Contact your nutrient management advisor to find out exactly what analyses are needed to write your NMP and to discuss your soil sampling pattern before taking your samples. Happy sampling and best wishes to all of you for a prosperous growing season!
Check Out Our Updated County Website
Visit us in Cyberspace!!!
Christie Germuth is our website designer. Christie has recently updated our website, and we hope that you find the additions helpful.
Anne Arundel County Extension website:

http://anearundel.umd.edu/

The current and past agricultural newsletter additions are available for viewing or copy at:
http://anearundel.umd.edu/AGNR/agnews.cfm

An agricultural bulletin page is also available for viewing or copy under our hot topics section at:
http://anearundel.umd.edu/AGNR/agnews.cfm

New on the website 2008: Anne Arundel County Agricultural Program Teaching Modules - Streaming Video: http://anearundel.umd.edu/Agriculture.cfm

Also relive the history of Extension and University of Maryland College of Agriculture Land Grant Mission by viewing the 150 Years Anniversary PowerPoint:
http://anearundel.umd.edu/files/University%20of%20Maryland%20150%20Year%20Anniversary.pps

Thanks for Partnering
Thanks for partnering with the Maryland Cooperative Extension, and supporting our programs. I also hope you enjoy this newsletter. If you are no longer interested in receiving this newsletter, please call or write the office for the removal of your name from the mailer.

Happy Planting!

R. David Myers, Extension Educator
Agriculture and Natural Resources
Anne Arundel & Prince George’s Counties

NACAA Communication Award
Individual Newsletter
2002 National Winner

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