Stink Bugs and Corn!

Dr. Cerruti Hooks, Extension Entomologist

Corn gangbangers
The level of violence among corn gangbangers is a not a new phenomenon. In general, stink bug gang members have been known for decades for their potential to engage in criminal activity by severely injuring field and sweet corn plantings. However, the recent arrival of a new gang of stink bugs from the streets of southeast Asia, known as the brown marmorated stink bug (BMSB), have raised our fears and heightened our awareness of the potential of stink bugs to invade corn communities. What is frustrating, is that there is no definitive information on the level of BMSB gang violence (infestation) in corn that would justify chemical intervention. However, investigations have been carried out on other stink bug gangs such as the southern green stink bug (SGSB), brown stink bugs (BSB), green stink bug (GSB), and one of my favorites, the onespotted stinkbug (OSSB), to learn of their potential to damage corn. Unlike typical gangs which wage territorial war, BMSB and other stink bugs seem to live in harmony often found chilling on and attacking the same corn plants. Not only will they hang out with other stink bug gangbangers but one may often see stink bugs hanging with non-stink bug corn criminals (pests) such as the leaf footed bug. Though, it is not safe to accept it as a truism that damage inflicted by one stink bug gang (species) will be identical to others, we may be able to use some of the intelligence gathered on other stink bug gangs to develop a criminal characteristic pattern or modus operandi (MO) for BMSB that would lead to their management in corn.

What kind of damage do they inflict and what corn stages are most susceptible to attack?

Studies have shown that all corn growth stages are subject to stink bug attack. Damage to young corn plants commonly occurs when BSB feed at the base damaging the growing point. Observation of corn plantings as early as the 1950s showed that SGSB cause greatest damage to young corn plants 10 to 20 inches in height and to developing ears of older plants. On young corn seedlings, stink bugs insert their needle-like mouthparts into the base of the plants and inject salivary enzymes into the plant. These enzymes help stink bugs feed on the plant tissue. Stinkbugs may feed on the base of the plant by resting on the soil surface and extending their stylets (mouthparts) into the base

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of the plant or the insect may rest directly on the plant and feed. Depending on the plant growth stage when attacked, injury symptoms include feeding lesions surrounded by chlorotic halos on leaves, tightly rolled, twisted, or severed whorl leaves (similar to 2-4-D injury), wilting, stunting, reduced root systems, and tillering. The reduced corn root system resulting from stink bug feeding could make corn more susceptible to stresses such as low soil moisture, pathogens, or damage by soil pests; all of which could reduce corn yield.

One adult BSB exposed to corn for 96 h has been shown to cause significant damage to corn plants at VE (emerging corn), V2, and V4 (4th fully expanded leaf with leaf collar) stages that include reduced growth rate, termination of growth, and plant death. Though, no V4 plants died after exposure to adult BSB for 96 h, tillering occurred and tillering is not something that one wants with injured corn. However, the production of tillers is one of the most characteristic injuries resulting from early stink bug feeding. Tillered plants exhibit significantly reduced plant heights, delays in days to silking, and reduced grain production resulting in lower yields. Tillers also may compete with the main stalk for water, nutrients and light. If stink bugs that are causing extensive feeding punctures at the corn base are controlled with insecticides, healthy suckers may subsequently develop from the injured plants. However, these suckers may have delayed maturation. The severity of stink bug injury to corn may differ according to which stink bug feeds on the corn plant. For example, some investigators have found seedling damage to corn due to stinkbug feeding to be more severe when attacked by BSB versus GSB gang members. However, this may be attributed to the propensity of BSB to feed more readily on seedling corn than their ability to cause more damage than GSB. At this time, I’m unaware of any reports of BMSB attacking the base of corn plants; and the native GSB and BSB, which have only one generation per season, rarely reach population levels in the spring to cause economic injury to seedling corn in the mid-Atlantic area.

Though older corn plants appear better able to withstand stink bug feeding, they are still susceptible to yield reduction if stink bugs target the ears. Some investigators have reported that the milk and soft dough stages are most susceptible to damage. As such, corn is most susceptible to stink bug injury during early developmental stages but stink bugs that puncture and feed on the ears of older corn will also have a significant impact by causing distorted ears and grain development failure. Studies have shown that infestations at tasselling (stage VT) caused more damage than later infestations at silking (R1) or blister stage (R2). At the tasselling (stage VT) or R1 stage, three or more BSB adults confined on a corn ear for 9 days caused significant reduction in kernel weight, whereas only one or two adults per corn ear resulted in no kernel weight loss. Stink bug feeding injury at stage R2 did not affect kernel damage, ear weight or grain weight during the study. Thus, it appears tasselling is the critical stage at which stink bugs can cause significant damage to field corn but they may cause kernel discoloration at stage R1 and R2. Additionally, because this study was conducted on field corn, similar studies are needed to determine whether tasselling is the most critical stage for sweet corn.

High risk corn communities

Though, BSB can overwinter in soybean stubble and become problematic in a soybean/corn rotation, or in fields following a cover crop such as vetch, researchers have reported significantly more BSB damage in corn fields following wheat. Corn next to alfalfa also may be more vulnerable. Some investigators have noticed more stink bug damage occurring in late planted fields and for no-tillage corn planted into wheat stubble. Observations have also indicated that fields where the seed furrow is not fully closed due to planting during wet field conditions may favor injury by stink bugs by allowing access to the plant’s growing point below ground.

The BMSB prefer overwintering in protected areas such as buildings but likely also overwinter in wooded areas. The GSB seems to prefer overwintering in deciduous tree leaf litter and along with BMSB can develop on woody host plants in early spring before making their way to corn and other crops. All these characteristics indicate that cover crop species, host plant types, farmscape features, tillage practices, and rotation sequence all influence stink bug distribution and associated injury to nearby cornfields. With respect to BSB, high risk areas include newly planted corn fields using reduced-, minimum- or no-tillage practices following a soybean/corn rotation and corn fields neighboring wooded areas. The availability of nearby host plants increases the probability of significant infestations of stink bug especially after those hosts senesce or become less desirable food sources. In particular, it is clearly evident from last year’s observations that BMSB is most likely to invade corn fields around field margins next to woodlots, where the first generation adults are known to feed on fruiting bodies of many tree species.
Once these food sources are depleted or are no longer palatable, both overwintered sting bugs and the next generation summer adults move to the nearest available food source, such as corn and soybean. If damage to the field edges is observed soon enough, it may be possible to only treat those areas.

**Scouting and Stink bug threshold in corn**

Good management options for stink bugs include scouting and/or sampling fields before planting corn to detect existing populations and monitoring corn rows bordering woods, fruit orchards, wheat, other corn fields and host plants. Further, two weeks after corn emergence is a critical period to watch for stink bug damage. Feeding may start 10 to 20 days before clear symptoms of injury (twisting, stunting, wilting or plant death) are present, so early scouting is critical. As mentioned above, there appears to be a very strong edge effect with respect to the BMSB. A pronounced edge effect was also reported for the distribution of BSB in corn. So for these gangbangers, initial infestation may be detected along the margin of corn fields. Keep in mind, stink bugs can mobilize quickly from surrounding habitats so good scouting will include weekly field checks. There is not a lot of information with respect to economic threshold for stink bugs. One source indicated that in corn less than 24 inches tall where injury is not evident, consider treatment if 10% or more corn plants are infested. If injured corn plants are present, a suggested treatment threshold is when 3-5% of the plants have injury and stink bugs are still present. Probably most Maryland corn growers didn’t consider stinkbugs to be a real problem in corn prior to the arrival of BMSB. And, there may not be a problem with BMSB prior to corn reaching the tasseling stage.

The previous economic threshold for stink bugs on corn at stage VT (tasseling) through R2 was set at one per 10 ears. However, a recent study indicated that an infestation of less than or equal to three stink bugs per ear for 9 days caused no significant yield loss. Thus, this recent study suggests a higher economic threshold may be justified at stage VT and R1. However, many of us last year witnessed populations of BMSB greater than 3 per corn plant after the ear had started to form, especially along the field margin. The pitfall of trying to arrest BMSB at this time lies in the fact that the corn canopy may prevent sufficient penetration and coverage of spray residue by air application to provide control of BMSB feeding on the ear. High clearance ground applicators provide better coverage but they are not always available to growers. The other thing to keep in mind is that, like other stink bugs, the BMSB appears to congregate along the crop margin. So, if a farmer has the means to treat late stage corn, it may still prove economically unfeasible to treat the entire field if only the border or turn rows have levels above economic threshold. As such, some scouting should also be conducted in the interior of the fields to determine the overall distribution within the corn field. If invading BMSB are detected at the field margin and repeated field visits over a few days indicate that their numbers are increasing (this is most likely to occur in late July through August), then a perimeter treatment applied by an extended over-the-top boom sprayer or airblast sprayer may be the best strategy to prevent further invasion into the field. Field and laboratory bioassays have shown that several pyrethroid insecticides, Lannate (methomyl), and premixes of pyrethroids with other active ingredients are labeled for corn and are effective on BMSB. The main problem with insecticides is not getting a toxic dose to the bugs to kill them because of application issues previously described. This outcome often results in re-invasions after treatments are applied. This season, the feasibility of perimeter treatments will be tested at several University research farms. Also, graduate students at the Universities of Maryland and Delaware are currently investigating the distribution of BMSB in field and sweet corn fields and their impact on corn grain yield and quality, respectively. Their findings will provide valuable information in developing sampling and treatment protocols and thresholds specifically for BMSB in corn plantings.
Leaf Footed Bug

Stink Bug damage on ear of corn

Stink Bug damage

Green Stink Bug

Stink Bug damage on corn

Green Stink Bug
Fall Fertilizer Nitrogen for Wheat: What Does the Research Indicate?

Dr. Bob Kratochvil, Agronomic Crop Production

Over a period of 5 years, we (Patrick Forrestal, my recently graduated PhD student, and I) obtained data from a total of 21 study sites that indicated the average yield increase for use of 30 lb/acre of fall fertilizer N is 3.5 – 4 bu/acre. The average wheat yield from all those locations was 72 bu/acre. This yield has been described modest by some. I would agree that it certainly is not the 90-100 bu/acre yields that some farmers realize. However, the state average wheat yield during our five year research period was 65 bu/acre.

The objective of our research was to assess the response of wheat to fall fertilizer nitrogen across representative locations and soil types in Maryland using production practices that are commonly used by farmers. To avoid causing any unnecessary variability, we kept management practices similar across all locations. All 21 research sites were dryland. All sites had corn as the previous crop with each corn main plot divided into 4 nitrogen rate sub-plots, 0, 120, 180, and 240 lb/acre. This was done since one of our objectives was to determine the influence that the amount of soil residual nitrate has on wheat performance. We collected soil samples (2 ft. depth in increments of 0-6, 6-12, and 12-24 inches) for soil nitrate analysis from all corn sub-plots after the corn was harvested. Wheat was planted into each of the corn subplots. Wheat planting at all locations occurred within a three-week window following the Hessian fly-free date for the area using a seeding rate of 1.5 million seeds/acre. Each wheat plot was placed on a corn nitrogen treatment and then was divided in half; one half received no fall nitrogen and the other half got 30 lb/acre. We used 50 lb/acre of spring nitrogen per split application with the first application March 1 (or ASAP after that date and per Commodity Cover Crop regulation), and the second application when jointing began.

Our results indicated that the response of wheat to the use of fall N was associated with the amount of residual nitrate present in the soil following corn harvest. As amount of residual soil nitrate increased, the wheat yield response decreased. We determined that the probability of a positive wheat yield response improved considerably when fall soil residual nitrate concentration in the surface 6 inches was 10 ppm (~20 lb/acre) or less.

Of course, getting a positive yield response is not the only goal when using fall fertilizer N. Farmers who use it also will want a positive economic response. So, consideration needs to be given to the cost of the nitrogen, the cost to apply it, and the price you will receive for the wheat. On average, over the five years we did this work, the yield response needed to get a positive economic response was 3.5 – 4 bu/acre, the same as the average agronomic response we saw. We saw the agronomic yield response for use of fall N exceed the level needed to pay for the nitrogen application occur approximately 33% of the time when no consideration was given to the amount of residual soil nitrate present after corn harvest. When we looked at how often we saw a profitable response when the fall residual soil nitrate concentration was 10 ppm or less, it was 50% of the time.

This led to our recommendation that use of fall N is warranted when soil residual nitrate (6-inch depth) is 10 ppm or less. Typically, if farmers used the nutrient management guidelines to fertilize their corn and they have achieved their yield goal, they are likely to find residual soil nitrate concentrations that are 10-15 ppm or less. They can verify how much residual nitrate they have with a soil test. They can do this locally at their Extension Office using the same Nitratecheck kits that are used to conduct the PSNT tests in the spring. If the soil test indicates there is 10 ppm or less soil nitrate present, the probability that a profitable return with the use of fall N improves but it is not a guarantee it will happen every time. And, if the soil nitrate concentration is above 10 ppm, our research indicated a probability of approximately 25% that there will be a profitable response with the use of fall N.

I am a firm believer that the Cover Crop Commodity program is a way for farmers to be profitable while at the same time maximizing their use efficiency with nitrogen. This program is paying farmers $25/acre to not use fall N for wheat that they plan to harvest and sell. Using current wheat and nitrogen fertilizer prices, the $25 covers the average yield loss of 3.5-4 bu/acre with no fall N that we saw in our research. Use of a fall nitrate test can be a new, decision-making tool to identify those fields best suited for this program.
Crop Reports

Western
Garrett County weather has been great for field crops. Daytime temperatures have been in the high 70s and low 80s. We have received intermittent showers that have kept the soil moistures ideal. Early planted corn will be tasselling in the next few weeks. Second cutting hay harvest has begun for early harvested hay. In Washington County, Barley harvest has concluded and reports are that there was light test weights. Wheat harvest is winding down. Corn is silking and we have received some welcome rains. The showers have been highly variable across the area but at least everyone has received some rain. Beans behind corn are in the ground and hoping that the showers continue. Most double crop soybean acres following barley are planted and have emerged. The recent heat has been oppressive and is stealing some soil moisture. At this point the Brown Marmorated Stinkbugs do not seem to be as bad as last year, only time will tell and the nymphs will soon be adults.

Central
Much of the area recently received a few needed rain events, but some corn is still showing signs of drought stress with firing and leaf rolling. Corn has begun to tassel so moisture will remain a critical issue through pollination and grain fill. Soybeans are in a similar situation as corn, with some needing moisture, but other areas in excellent condition. The 2011 brood of Brown Marmorated Stinkbugs are hatching and nymphs are on the move. Scout soybeans now and treat if necessary. Wheat harvest is all but complete with good to excellent yields and test weights being reported.

Northeast
Soil moisture levels are generally dry and since this region has very little irrigation we are at the mercy of the scattered storms that push through. Corn ranges from some only 12 inches in height, to the majority in tassel and pollination nearly complete. Soybeans are responding to the showers that have ranged from about one inch to 3 plus inches total over the last two weeks. Double crop beans are mostly planted since all the barley harvest is complete and only a little bit of wheat remains. Second cutting alfalfa is done and some third cutting has been done with leaf hopper damage being reported on some untreated fields.

Southern
We have had intermittent rain showers over the last week, which has improved crop conditions. Most all corn has tasseled, with grain fill occurring in a majority of fields. Some early maturity corn had already suffered too much for rains to help. Most all wheat is harvested. Double crop beans have emerged and are growing well. Grain growth issues observed include spider mites, K deficiency, and grasshoppers. Alfalfa fields are showing hopper burn injury from leafhopper feeding. BMSB populations remain low.

Upper Eastern Shore
Wheat harvest is complete and double crop beans are planted. Rains provided sufficient soil moisture for beans to germinate and emerge with good stands. With the dry weather, corn diseases are minimal with the exception of irrigated fields. Stink bugs are present and have caused damage in many corn fields already. In some fields, there are more than 1 stink bug per plant. I am expecting to find high numbers in soybeans later on. The recent rains will help some corn, but is too late for other fields. While soil moisture is sufficient for bean germination and emergence, the crop will need much more rain in August and September. The recent rains brought some new growth to hay and pasture.

Lower Eastern Shore
Rainfall, or lack thereof, continues to dominate crop conditions on the Lower Shore. Some areas have received much needed rainfall as scattered showers moved over the area last weekend. Other areas continue to be very dry with some corn at tassel and less than three feet tall. Double crop soybean planting is now complete after a 2-3 week delay waiting for rainfall. Hay production is off in many areas, and farmers are waiting for the second cutting. Corn and soybean crops are highly variable; rated good to poor depending on local rainfall. Disease and insect pressure is light.

Announcements

Plant Management Network Launches Focus on Corn Webcast Resource for Growers, Consultants

The Plant Management Network (PMN), a nonprofit publisher of applied crop science information, announces the launch of Focus on Corn (http://www.plantmanagementnetwork.org/foc), a resource that features webcasts and other science-based information tools that will help corn growers and consultants protect and manage corn crops more effectively.

The central feature of Focus on Corn is its 24/7 on-demand educational webcasts. These are audio-visual presentations authored and presented by university professors and extension specialists recognized for their expertise and research on corn management practices.
“Topics are suggested by both a technical advisory board and grower surveys and selected for their current interest and need for timely information,” said Greg Grahek, Director of Publications at the Plant Management Network. “We try to get the best expert in the field to talk about a technical subject in a format for the busy agricultural practitioner.”

One new webcast will be published in Focus on Corn each month. Each of these new webcasts will be open access for a period of at least 60 days. As long as users visit the site monthly to see each new webcast during the open access period, all webcasts may be viewed free of charge, without a subscription. Current freely available webcasts include the following:

- Plant Parasitic Nematodes of Corn by Tamra Jackson, University of Nebraska, Lincoln.
- Residue Management, Nitrogen, and Tillage in Continuous Corn by Emerson Nafziger, University of Illinois.
- Weed Competition in Corn by Bill Johnson, Purdue University
- Southern Rust of Corn and Differentiating Between Southern and Common Rusts by Jerald ‘Snook’ Pataky, University of Illinois
- Corn Silage Management: Seeding Rate Studies by William J. Cox, Cornell University
- Corn Drying by Ken Hellevang, North Dakota State University

Plant Management Network, (http://www.plantmanagementnetwork.org), is a cooperative not-for-profit resource for the applied agricultural and horticultural sciences. Together with its industry, university, and nonprofit partners, PMN provides fast electronic access to science-based crop management solutions for growers and their advisers. PMN focuses on publishing high-quality, applied, and science-based information. PMN is cooperatively managed by the American Society of Agronomy, American Phytopathological Society, and Crop Science Society of America.

2011 Commodity Classic Marks 13th Year

Orion “The Big O” Samuelson Keynote Speaker

Orion "The Big O" Samuelson, is the featured keynote speaker at the Maryland Commodity Classic on Thursday, July 28, 2011. This legendary agribusiness broadcaster is expected to attract a big crowd to this 13th annual event sponsored by the Maryland Grain Producers Association, Maryland Soybean Board, Maryland Grain Producers Utilization Board, and Mid-Atlantic Soybean Association. Orion Samuelson is the co-host of “The Morning Show” on Saturdays, host of the three-minute daily, "National Farm Report", and the weekly commentary, “Samuelson Sez”.

“We invite farmers to start the day seeing the results of their investment through checkoff dollars at our research sites,” states Dr. Robert Kratochvil, Maryland Commodity Classic chairperson and a researcher at the University of Maryland. “Tours will give farmers the latest information on grain and soybean checkoff funded projects designed to make their operations more productive and profitable. This is especially important this year as farmers can vote on whether or not to continue the Maryland Grain Checkoff program at a referendum to be held the day after the Commodity Classic.”

Wagon tours at the Wye Research and Education Center will run from 9:00 – 10:45 a.m. with the Maryland Commodity Classic following at the Queen Anne’s 4-H Park. Exhibits and informational displays will be set up at 11 a.m. Lunch is available from 12:00-1:00 p.m. The business meeting begins at 1:00 p.m., followed by presentations on the value of Atrazine in today’s corn production by Dr. Ron Ritter, UMD, collaborative efforts to market enhanced soybeans by Victor Bohuslavsky, Qualisoy Chairman, and wheat industry update by Wayne Hurst, National Association of Wheat Growers President. Keynote address speaker Orion Samuelson will close the program.

The Classic concludes with the famed Crab Feast, Pork and Chicken Barbecue. Entry prior to 2:30 p.m. is $10, and after 2:30 p.m. the entry fee is $20, there is no entry after 3:30 p.m. Maryland Grain Producers Association members receive a free ticket; call or email for membership information.

For ticket information regarding the 2011 Commodity Classic, contact Lynne Hoot at 410-956-5771 or email lynnehoot@aol.com.

Upcoming Events

Potato Twilight Meeting on July 26th

University of Maryland Extension will conduct a potato twilight meeting for growers on Tuesday, July 26th from 6.00 pm – 7:00 pm at East New Market Rhodesdale Rd, Hwy 14 near North Dorchester High School in Dorchester County Maryland. This meeting will provide an opportunity to observe potato genotype and variety research plots and potato crop modeling research for managing irrigation and production. Interact with University of Maryland Extension specialists and USDA researchers at the site. Materials and refreshments will be served. Please contact Rhonda Barnhart for registration and more information at 410-228-8800 or rbarnhar@umd.edu.
Grain Marketing for Women on July 28th
Have you wondered where to get information about grain markets and what terms like options, futures and basis mean? This workshop will introduce grain marketing basics with topics such as finding grain marketing information, crop budgeting, and pricing tools. We will then use a hands-on-approach in writing and implementing a grain marketing plan.
Cost: $10 per person and includes breakfast and materials
Date: Thursday, July 28th 8:30 am.– Noon
Chesapeake College, Wye Mills, MD
Economic Development Center - Room 27
To register contact 410-758-0166 or email at jrhodes@umd.edu

Sustainable Farming Twilight Meeting
Come join us to see how USDA-ARS on-farm research is using cover crops, poultry litter, and tillage practices in more economically and environmentally sustainable systems. Learn how you can capitalize on the growing interest in local, sustainable, and organic markets.
Monday, August 1, 2011 – 5:00 – 7:30 pm
Cutmaptico Farm/CutFresh Organics
4713 Cooper Rd., Eden, MD
Please register by Thursday 7/28 by calling the Wicomico Extension office at 410-749-6141. A fee of $10 per participant may be paid at the Extension office or at the field site.

Aronia Twilight Tour on August 23rd
Aronia (Chokeberry) is a new alternative crop which has high concentrations of flavonoids and several nutraceutical qualities. University of Maryland Extension will conduct a Twilight Tour of the Aronia research orchard on August 23rd, 5.30 pm at Wye Research and Education Center, 211 Farm Lane, Queenstown MD, 21658. Participants will learn about highly nutritive Aronia berries; varieties and yield; plant densities and propagation; cultural and production methods; fertility practices; and experience ripe Aronia fruit. The event is free, however, registration is requested. Please contact Debby Dant: 410-827-8056 X 115, ddant@umd.edu, if you need any additional information and/or to register.

Mid-Atlantic Precision Agriculture Equipment Day
Please join us and learn how to make precision agriculture pay in your operation. Among the practical and informative presentations that will be given are sprayer and planter section control, variable rate seeding, the economics and practical implementation of RTK and GPS, soil mapping, using technology for on-farm research, and developing variable rate prescriptions.
Tuesday, August 30, 2011
8:30 a.m. - 4:30 p.m.
Caroline County 4-H Park
8230 Detour Road
Denton, MD 21629
Speakers include:
- Dr. Randy Taylor, Oklahoma State University
- Dr. John Fulton, Auburn University
- Dr. Mike Buschermole, University of Tennessee
- Dr. Matt Darr, Iowa State University
- Dr. Bobby Grisso, Virginia Tech
DE and MD Nutrient Management Credits & CCA credits will be available
For more information please contact: 410-228-8800 or 410-758-0166
www.mdcrops.umd.edu

Farm Estate Planning Workshop on September 7th
This workshop is for farmers and owners of rural land. In addition, individuals involved in farm estate planning, businesses that provide services to farmers, and state and local government employees will all find this workshop helpful.
Cost: $10 per person (includes lunch and materials)
Date: Wednesday, September 7
8:30 am Registration
9 am - 1 pm Workshop
Chesapeake College, Wye Mills, MD
Higher Education Center - Room 110
To register contact 410-758-0166 or email jrhodes@umd.edu

2011 Horse Pasture Walk Series
Visit the Equine Rotational Grazing Demonstration site at Central Maryland Research and Education Center for a tour of the pastures and an explanation of current management practices. Each pasture walk will feature a special presentation on a different pasture management issue of interest. These events are free, but advanced registration is requested. Educational materials will be
A Big Thank You!!

Maryland Grain Producers' Utilization Board and Maryland Soybean Board are both recognized for their financial contributions that support the publication and distribution of this newsletter. This is another example of the “checkoff dollars” at work.

Did You Know

Two out of every three bushels of corn in the world originate in the United States.

SIGN-UP TO RECEIVE “AGRONOMY NEWS”

If you would like to receive this newsletter via email please contact Rhonda Barnhart at rbarnhar@umd.edu. The subject line should be: Subscribe Agronomy News 2011.

If you would like a hard copy please contact your local county extension office to sign-up for the mailing list. The list of local county offices can be found at www.extension.umd.edu.

This edition of Agronomy News is brought to you by:

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To register for horse pasture walks simply RSVP to Jennifer Reynolds at jenreyn@umd.edu.