Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

Missouri Cotton Producers Should Prepare Now for the 2011 Crop

By Allen Wrather

Farmers will finish most of the 2010 Missouri cotton crop harvest by 15 October and should now start preparations for the 2011 cotton crop. The following is a check list of items to consider.

- Identify areas where yields of cotton this year were less than acceptable and then take the time to troubleshoot these areas to determine why yields were less than expected.
- Dig cotton roots after harvest this fall in areas of the field where nematode problems are suspected and examine them for root-knot nematode (RKN) galls. University of Missouri research shows that root gall severity due to RKN is a reliable indicator of the presence of this nematode and the severity of RKN damage to cotton. Producers should complete this soon after harvest because the roots begin to rot by December. Contact me for more information about this method. If RKN is a problem, farmers should make decisions this winter about how to manage it in 2011.
- Select the fields you intend to plant to cotton in 2011 and test a sample of the soil from each field for pH and nutrients if this has not been done since 2007.
- Apply needed lime, phosphorus, and potassium fertilizer this fall or early next spring.
- Break hardpans by subsoiling this fall or next spring.
- Improve drainage of the fields this fall or next spring to reduce wet soil problems for the 2011 crop.
- Select varieties for planting in 2011 based on University of Missouri cotton variety yield trials and the yields of varieties in your own and your neighbor's fields. The University of Missouri cotton variety yield trial results for 2010 will be available by early-November on the web at http://aes.missouri.edu/delta/cotton/index.stm,
- Select treatments to add to seed before planting next year. There are several different treatments available including those to protect the seedling from diseases, insects, and nematodes. Your selections should be based on the problems with pests anticipated next year.
- Hire a cotton scout or consultant to weekly inspect your 2011 crop for pests.

Following these suggested procedures will give Missouri cotton producers a better chance of producing higher yields and greater profits in 2011. For more information contact Allen Wrather at the University of Missouri Delta Center (Phone: 573-379-5431, E-mail: wratherj@missouri.edu) or check the Delta Center Web Page (aes.missouri.edu/delta).

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Will 2010 Problems with Corn Earworm in Soybean Lead to 2011 Problems?

By Wayne Bailey

Over the past 4-5 years numbers of corn earworm (soybean podworm) have gradually increased in many of Missouri's soybean fields. Larvae may feed on numerous crops including the pods, seeds and occasionally flowers of soybean. This insect is a major pest of soybean in many southern and eastern states and traditionally has been an occasional pest of soybean in Missouri's "Boothill" counties and other counties bordering Arkansas. In 2010, infestations of podworm larvae could be found in many late planted fields throughout southern and western Missouri. Most fields with economic podworm infestations were almost exclusively planted after June 1, 2010. These late fields are most attractive to migrating moths as females prefer to lay eggs in fields where soybean plant canopies remain open. Wind direction and the intensity of moth flights during moth migration both help determine the location and intensity of developing podworm larval infestations. Another factor which may allows podworm populations to increase to economic levels is the application of early season foliar insecticides and fungicides. Early spraying for webworms in 2010 may have contributed to the reduction in beneficial insects allowing podworms to flourish during late summer and fall. Additionally, use of fungicides early season often limit the development of beneficial fungal pathogens such as Nomuraea rileyi, a major pathogen responsible for control of late season podworm larvae in most years. In 2010 economic podworm infestations were most severe in soybean fields located in southwest Missouri and in the northern areas of St. Joseph and Chillicothe. Most fields received moderate damage although in the St. Joseph and Chillicothe areas some fields exhibited total yield loss due to all pods being consumed by larvae.

Many producers have asked if the high numbers of larvae found in their fields will overwinter and be a source of future podworm problems in 2011. Although podworms may overwinter in the soil as pupae in southern and central regions of Missouri, a majority of mid-season and late-season podworm larvae come from moths migrating into the state during late summer from more southern locations. In most years the level of the fungal pathogen *Nomuraea rileyi* will substantially reduce numbers of podworm before they are able to pupate in the soil. In surveys conducted during the past two weeks by Ben Puttler (Emeritus extension assistant professor) almost 100% of podworm larvae remaining in soybean fields have been infected by this pathogen and will die within a few days. This pathogen will overwinter in the soil and will again emerge as a strong biological control agent in 2011 if conditions are favorable. In addition, those producers who (1) plant early and use narrow row spacings resulting in quick plant canopy closure (2) do not spray unnecessary insecticide and fungicide foliar applications resulting in reduced numbers of biological control agents, and (3) limit plant stressors such as nutrients, pH, and moisture will experience less problems with this soybean pest. These factors strongly suggest that the podworm larvae present during the past few weeks will have limited effect on the number of podworms found in 2011. The most effective methods of determining whether podworm populations are elevated is through monitoring of soybean podworm (corn earworm) moth flights during June–August and frequent scouting of soybean fields throughout the season, but especially during flowering and pod fill growth stages.

Some identifying characteristics of podworm moths and larvae are as follow. Moths are variable in color but tend to be tan with a yellow to light green tint. Moths are relatively large with approximately 1-1 ½-inch wing spans. They may lay eggs throughout fields at sites where crop canopy has not yet closed. Eggs are laid singularly on several field crops, although silks of late planted field corn and sweet corn are most attractive to ovipositing moths as are soybean fields prior to closure of plant canopies. Traditionally a pest during periods of hot, dry conditions when beneficial insect numbers are reduced, this pest also may flourish whenever field conditions and/or farming practices reduce beneficial insect numbers. There are typically 2-3 generations of this insect produced in Missouri annually with the second and third generations being most damaging to soybean. Each female may lay an average of 1000 (500 to 3000) white to cream colored, somewhat transparent, dome shaped ribbed eggs which are laid singularly. Eggs display brown bands just prior to hatch with larvae emerging in 2-10 days depending on field temperatures. Once corn earworm eggs hatch in soybean, larvae initially feed on foliage, but prefer to feed on pod walls and consume seeds as larvae approach maturity (1 to11/2 -inch in length). Larvae grow through 5 worm stages and change in color with age. Newly hatched larvae are yellowish-white in color with second and third instar larvae changing to yellowish-green. Later instars found feeding on soybean pods can range in color from green to yellow to tan or reddish brown. Regardless of color, they will generally display several dark longitudinal stripes running the length of their bodies and numerous black bumps with protruding hairs will be present on the top and sides of their bodies. In addition, this insect has 4 pairs of abdominal prologs (middle of larva) and 1 pair of anal prologs (back end of larva). When disturbed, larvae often roll into tight balls until the threat passes.

Additional information is available in University of Missouri Extension Guide Sheet G7110 *"Corn Earworm in Missouri."* Excellent images of corn earworm are available in Guide Sheet G7110 or at the Iowa State University entomology photo gallery (www.ent.iastate.edu/imagegal)

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A New Stink Bug Coming to Missouri

By Wayne Bailey

The brown marmorated stink bug (*Halyomorpha halys*) is expected to arrive in Missouri in 2011 although it may already be here in very low numbers. This exotic stink bug was first found in Allentown, Pennsylvania in 1998 and has steadily moved outward from its original location during the past twelve years. As of 2010, this insect is reported from 27 states including Illinois, Kentucky, and Tennessee. This insect is native to mainland China and was probably introduced into the U. S. in the early 90's in cargo from either China or Japan. This insect is in the order Hemiptera (true bugs) and family Pentatomidae (shield shaped insects). Similar to other stink bugs, it inserts a long proboscis or mouthpart into host plants in order to feed on plant juices.

Although the brown marmorated stink bug can be a severe pest of numerous fruit and vegetable crops, it also damages soybean in Japan. It is often a major pest in the field and also can be a major pest inside structures. Similar to the Asian ladybird beetle, it readily invades homes during the fall months to overwinter. Once in the house, this stink bug will quickly release a very repulsive smell if disturbed. Many people who have experienced the foul odor say that it is often necessary to leave the room for several hours to allow the stench to decrease to tolerable levels. Several states report that the best method of eliminating this insect from houses is to suck them up with a vacuum and immediately change the vacuum bag or to let them crawl onto a piece of paper and transport them back outside. The vacuum method may result in some odor remaining in the vacuum after the bag has been removed. Most other methods of control in houses, including use of insecticides, apparently cause the insect to emit their defensive odor when disturbed. Squashing the insect is not a recommended way to eliminate this insect. Thoroughly sealing all cracks and crevices around windows doors, crawl spaces, and other possible entry points prior to fall will help provide barriers to house entry. Another method sometimes used in conjunction with sealing entry points is to have a certified pest control specialist spray the area around and on the structure with a synthetic pyrethroid in order to repel the adults as they search for overwintering sites.

The brown marmorated stink bug can be confused with several other stink bug species already present in Missouri. It is brown to brownish-gray in color on both top and bottom surfaces. It is about ¾-inch in length and about as wide as long. Two identifying characteristics are a white band on the next to last (4th) antennal segment and a row of alternating white and black markings located around the edge of the shell where the front and back wings overlap. Nymphs are red and black when first emerging from eggs, but take on a more gray color as they grow through their immature stages. At present it is thought that only one generation is produced per year in the U.S. although multiple generations have been reported from several Asian countries. The adult overwinters to emerge in late May and June to feed throughout the summer on such plant species as apples, cherries, peaches, pears, blackberries, green beans, lima beans, peppers, sweetcorn, field corn, and soybean. Both adults and nymphs attack host plants. In contrast to most other Missouri stink bugs, brown marmorated stink bug adults may live for several years. No harm to humans by this insect has been reported.

Figure 1. Brown marmorated stink bug

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University of Missouri

Crop Management Conference

Keynote Speaker: Dr. Paul Esker, Department of Plant Pathology, University of Wisconsin

Date	Time	Room	Title
Wednesday, December 1	8:15 a.m. to 9:30 a.m.	Sycamore Room	Understanding risk factors that drive response of foliar fungicide applications in field crops

Wednesday, December 1

Time	Hawthorne	Cypress I	Cypress II
10:00 a.m. to 11:00 a.m.	**Weed, Insect, & Disease Update for 2010:** Dr. Laura Sweets, Dr. Wayne Bailey, and Dr. Kevin Bradley, University of Missouri	**Soil Fertility Update: 2010** Dr. John Lory, University of Missouri	**Glyphosate and Plant Microbe Interactions:** Dr. Robert Kremer, USDA-ARS, University of Missouri
11:15 a.m. to 12:15 p.m.	**Weed, Insect, & Disease Update for 2010:** Dr. Laura Sweets, Dr. Wayne Bailey, and Dr. Mr. Kent Shannon, MU Extension	**Soil Fertility Update: 2010** Dr. John Lory, University of Missouri	**Glyphosate and Plant Microbe Interactions:** Dr. Robert Kremer, USDA-ARS, University of Missouri
1:00 p.m. to 2:00 p.m.	**Evaluating RTK (High Accuracy) GPS Options in Missouri** Mr. Kent Shannon, MU Extension	**Missouri Climate Change and Recent Trends:** Dr. Pat Guinan, University of Missouri	**When Bad Things Happen to Good Seeds:** Dr. Bill Wiebold and Dr. Felix Fritschi, University of Missouri
2:15 p.m. to 3:15 p.m.	**Use of Strip Tillage to Increase Corn Production and Reduce Soil Nitrous Oxide Emissions** Dr. Peter Motavalli, University of Missouri	**Rootworm Management: Current and Future Options in a Fast-changing Regulatory Climate** Dr. Bruce Hibbard, USDA-ARS, University of Missouri	**When Bad Things Happen to Good Seeds:** Dr. Bill Wiebold and Dr. Felix Fritschi, University of Missouri
3:30 p.m. to 4:30 p.m.	**Use of Strip Tillage to Increase Corn Production and Reduce Soil Nitrous Oxide Emissions:** Dr. Peter Motavalli, University of Missouri	**Rootworm Management: Current and Future Options in a Fast-changing Regulatory Climate** Dr. Bruce Hibbard, USDA-ARS, University of Missouri	**Management of Herbicide-resistant Weeds in Missouri. Are we Trying to Push a Rope Uphill?** Dr. Kevin Bradley, University of Missouri

Thursday, December 2

Time	Hawthorne	Cypress I	Cypress II
8:00 a.m. to 9:00 a.m.	**Cover Crops and the Soil System** Dr. Paul Jasa, University of Nebraska	**Water pH and Hardness: A little Factor that Makes a big Difference** Mr. Fred Whitford, Purdue University	**Use of improved Tall Fescue and Endophytes to Reduce Fescue Toxicosis on Pastures** Dr. Chuck West, University of Arkansas
9:15 a.m. to 10:15 a.m.	**Cover Crops and the Soil System** Dr. Paul Jasa, University of Nebraska	**Water pH and Hardness: A little Factor that Makes a big Difference** Mr. Fred Whitford, Purdue University	**Use of improved Tall Fescue and Endophytes to Reduce Fescue Toxicosis on Pastures** CDr. Chuck West, University of Arkansas
10:30 a.m. to 11:30 a.m.	**No-till Planting Equipment, Adjustments, and Operation** Dr. Paul Jasa, University of Nebraska	**Poly Tanks...Preventing Catastrophic Failures** Mr. Fred Whitford, Purdue University	**Strategies for Minimizing Risks from Manure as a Fertilizer** Dr. Ray Massey and Dr. John Lory, University of Missouri
12:30 p.m. to 1:30 p.m.	**No-till Planting Equipment, Adjustments, and Operation** Dr. Paul Jasa, University of Nebraska	**Poly Tanks...Preventing Catastrophic Failures** Mr. Fred Whitford, Purdue University	**Strategies for Minimizing Risks from Manure as a Fertilizer** Dr. Ray Massey and Dr. John Lory, University of Missouri
1:45 p.m. to 2:45 p.m.	**Management of Herbicide-resistant Weeds in Missouri. Are we Trying to Push a Rope Uphill?** Dr. Kevin Bradley, University of Missouri	**Missouri Climate Change and Recent Trends** Dr. Pat Guinan, University of Missouri	**Evaluating RTK (High Accuracy) GPS Options in Missouri** Mr. Kent Shannon, MU Extension

DECEMBER 1 & 2, 2010 - Hilton Garden Inn - Garden Conference Center

Registration Information available online at: http://pltsci-dev.missouri.edu/cmc/

For more information, contact Kevin Bradley at (573) 882-4039 or BradleyKe@missouri.edu

Weather Data for the Week Ending October 19, 2010

By Pat Guinan

Station	County	Weekly Temperature (°F)						Monthly Precipitation (in.)		Growing Degree Days‡	
		Avg. Max.	Avg. Min.	Extreme High	Extreme Low	Mean	Departure from long term avg.	Oct. 1-Oct. 19	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	74	41	80	34	57	+3	0.00	-1.90	4002	+611
St. Joseph	Buchanan	72	45	81	39	58	+3	0.16	-1.78	3887	+478
Brunswick	Carroll	72	42	83	34	57	+2	0.14	-2.11	4002	+540
Albany	Gentry	72	37	79	31	55	+1	0.03	-1.60	3772	+419
Auxvasse	Audrain	72	44	80	37	57	+2	0.10	-1.99	3948	+441
Vandalia	Audrain	72	41	80	34	56	+1	0.00	-1.98	3909	+430
Columbia-Bradford Research and Extension Center	Boone	*	*	*	*	*	*	*	*	*	*
Columbia-Sanborn Field	Boone	73	47	81	42	59	+3	0.12	-2.24	4253	+514
Williamsburg	Callaway	74	43	81	37	57	+2	0.05	-2.37	3972	+523
Novelty	Knox	69	41	80	34	55	0	0.00	-2.23	3685	+296
Linneus	Linn	71	41	81	33	56	+2	0.08	-2.08	3740	+433
Monroe City	Monroe	71	40	80	33	56	+2	0.01	-1.91	3845	+401
Versailles	Morgan	76	46	83	41	60	+3	0.06	-2.65	4272	+565
Green Ridge	Pettis	74	44	82	37	58	+2	0.06	-2.57	4056	+625
Lamar	Barton	75	45	82	38	60	+2	0.43	-2.31	4303	+416
Cook Station	Crawford	76	38	85	33	56	-1	0.02	-2.20	3920	+207
Round Spring	Shannon	74	38	81	31	54	-2	0.01	-2.31	3881	+326
Mountain Grove	Wright	73	44	82	36	59	+3	0.00	-2.36	4081	+544
Delta	Cape Girardeau	76	44	85	37	59	+1	0.00	-2.40	4456	+356
Cardwell	Dunklin	78	46	85	38	61	+1	0.00	-2.86	4892	+429
Clarkton	Dunklin	79	47	87	40	62	+2	0.06	-1.99	4846	+449
Glennonville	Dunklin	77	46	85	38	61	+2	0.32	-1.71	4841	+474
Charleston	Mississippi	76	46	85	39	61	+3	0.02	-2.35	4754	+648
Portageville-Delta Center	Pemiscot	77	50	86	41	63	+3	0.07	-2.62	5035	+623
Portageville-Lee Farm	Pemiscot	77	48	85	40	62	+2	0.02	-2.55	5029	+648
Steele	Pemiscot	79	48	87	40	63	+2	0.01	-2.55	5111	+692

* Complete data not available for report

‡Growing degree days are calculated by subtracting a 50 degree (Fahrenheit) base temperature from the average daily temperature. Thus, if the average temperature for the day is 75 degrees, then 25 growing degree days will have been accumulated.

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