Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

Plan Now to Attend the MU Pest Management Field Day on July 14th

By Kevin Bradley

The annual Pest Management Field Day will be held this July 14th at the Bradford Research and Extension Center near Columbia, Missouri. As in recent years, we have expanded the focus of this field day to include a variety of pest management topics that are of interest to agricultural industry representatives, agrichemical dealers, Extension specialists, and producers throughout Missouri and surrounding states.

Registration will begin at 8:30 a.m. and will include guided wagon tours with stops that feature presentation of results and talks by university weed scientists, entomologists, plant pathologists, and agronomists. There will be a $10 registration fee collected at the time of check-in. This will cover costs associated with lunch and will provide each attendee with a tour booklet that describes the layout and location of each experiment.

Some of the weed management research topics and trials that will be discussed at this year's field day include: options for volunteer corn control in corn and soybeans, a preview of new herbicides and herbicide programs that will be available in 2011 and beyond, considerations for future herbicide-resistant crop offerings, influence of weed removal on cattle grazing preference in Missouri pastures, control of waterhemp and palmer amaranth in conventional, LibertyLink, or Roundup Ready soybean systems, and finally an update on the status and control recommendations for glyphosate-resistant weeds in Missouri.

Dr. Bruce Hibbard, USDA-ARS entomologist, will be discussing the latest research results and future options pertaining to the control of corn rootworm in Missouri. Dr. Wayne Bailey, state extension entomologist, will also be discussing the changes in insect population dynamics that have occurred in soybeans over the past several seasons and how we should be adapting to these changes.

Dr. Laura Sweets, state extension plant pathologist, will discuss results from a multi-state trial evaluating the effects of different sources of soybean cyst nematode resistance on field population levels of SCN. Additionally, Dr. Sweets will discuss corn and soybean seed treatments and an update on the status of soybean rust in the U.S.

As usual, after lunch attendees will have the opportunity to view plots that showcase a wide variety of herbicide treatments and weed management systems for use in corn, soybean, or grain sorghum on their own. This year we have more than 50 trials and 700 separate weed management treatments on display at the research and extension center.

For certified crop advisors, 2 CEU credits for the field day are pending. **If you plan on attending the field day, you must pre-register before July 10th by calling 573-884-7945 or by sending an e-mail to chismt@missouri.edu.** The Bradford Research and Extension Center is located 7 miles east of Columbia, off of highway WW. For more complete directions call 573-884-7945 or visit http://aes.missouri.edu/bradford/index.stm.

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Double Crop Soybean Needs Tender Loving Care for Best Yields

By Allen Wrather

I was recently listening to some old men talk about stuff that old men talk about. I understand that you may think me mentally off for sitting around listening to old men, but I find it easier to do now that I have become one of these old men. As usual, the first story told by an old man never has a chance because other old men will tell stories to top the first. The best story this particular day was about the freeze on Mother's Day one year that killed all the crops and was so severe the radiators in some tractors froze and broke. There of course were some doubts among the other old men about the validity of this story. Most old men can't agree on much. However, these old men were farmers and they all agreed that soybean will yield best when grown on well drained, fertile soil; when the weather is mild (72° nights and 90° days); when sunshine is abundant; and when it rains 1.5 inches every Friday afternoon. All of these old farmers agreed that these conditions usually only develop in their dreams. The conditions that typically occur are too much or too little rain, poor drainage, too little fertilizer, temperatures too high or low, and too much clay soil. These more typical conditions can make soybean farming difficult but not impossible, and soybean can grow and yield well in these conditions with tender loving care (TLC). Tender loving care will be especially beneficial to double crop soybean. Wheat harvest will begin in south Missouri has started and will begin in north Missouri very soon, and farmers will begin to plant soybean in some of these fields. I have some suggestions for these farmers to help the double crop soybean crop grow and yield as well as possible.

1. For south Missouri, plant a maturity group (MG) 4 or early 5 variety. In our tests, yields of mid-June planted MG 3 varieties were always lower than yield for MG 4 and 5 varieties. The yields for the MG 4 and 5 varieties were about the same. The harvest date for a mid-June planted MG 4 variety will be about mid-October.
2. Plant seed that has been commercially treated with a fungicide in fields where irrigation will be used to help the soybean seed germinate. This treatment will help protect the seeds and seedlings from rot that may develop due to wet soil from irrigation. Fungicide seed treatments available now are more effective that those available a few years ago.
3. Scout the crop frequently during the summer and fall to determine if insecticides are needed, especially for stink bugs and pod feeders; to determine if foliar fertilizer is needed, especially potassium; and to determine if a foliar fungicide is needed. Double crop soybean that may yield 40 bushels per acre or more may benefit from a foliar application of fungicides such as Quadris, Headline, Stratego, or Quilt.
4. Pay attention to news reports, especially beginning in August, about soybean rust development. Rust is probably a greater threat to our double crop than full season soybean.
5. Irrigate properly.

Following these suggested procedures will give farmers a better chance of realizing a profit with double-crop soybean in 2010.

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Early Season Soybean Diseases

By Laura Sweets

This could be another interesting year for early season soybean diseases in Missouri. Because of the erratic weather patterns, soybean planting is behind average in some regions of the state. Since a significant number of acres were just planted during the last week to 10 days, plants in those fields are just emerging. The next several weeks will be the test for how severe early season seed decay, damping off and seedling blight are in soybeans this year. However, the unusual fluctuations in both soil moisture and soil temperatures could increase the potential for Pythium seed decay and seedling blight as well as Phytophthora seedling blight. The early season soybean diseases include those that cause seed decay, seedling blights and root rots of soybean. Most of these early season soybean diseases are caused by fungi in the soil that are found wherever soybeans are grown. *Pythium*, *Phytophthora*, *Rhizoctonia* and *Fusarium* are the most common of these early season pathogens, although *Macrophomina* (charcoal rot fungus) may also cause early season seedling problems.

Soybean seedling blights have the potential to cause losses in Missouri soybean fields every year. The specific seedling blights that occur and their severity vary with the environmental conditions each season. With the changes in weather patterns this spring and soybean planting delayed in much of the state because of wet soil conditions, it is difficult to predict which, if any, seedling blights may occur or may cause significant problems this season.

Pythium and *Phytophthora* are favored by wet conditions and are more likely to be serious problems when wet conditions exist at or just after planting. Rhizoctonia and Fusarium are not as restricted by soil moistures and soil temperatures but still need some moisture to initiate infection. *Macrophomina phaseolina* grows best at temperatures between 82-95°F. Infection of seedlings with *Macrophomina* is most likely to occur if conditions

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of high soil temperatures and low soil moisture exist during the first two to three weeks after planting.

Symptoms of *Pythium damping-off* range from seed rot or preemergence damping-off to early postemergence damping-off. Affected tissue develops a soft, watery brown rot. Pythium damping-off is most likely to occur in cool (50-55^{0}F), wet soils.

Phytophthora can cause seed rot, preemergence damping-off and early postemergence damping-off. Initially affected tissue develops a soft, watery brown rot. Within several days the affected plant parts may dry out and shrivel up becoming dark, dry and brittle. This early stage Phytophthora is difficult to distinguish from Pythium damping-off. Phytophthora can also cause a seedling blight in which established seedlings turn yellow, wilt and die. Generally the entire seedling is affected and roots may be poorly developed and rotted. Phytophthora root rot is more likely to occur in heavy, wet soils, low areas or compacted areas, but it may occur in light soils or better drained areas if heavy rains occur after planting.

Rhizoctonia can cause seedling blight and root rot of soybean. Affected stands may have an uneven appearance and seedlings appear pale green in color and stunted in growth. The identifying feature of this disease is a small, reddish lesion on one side of the stem at or just below the soil line. This lesion develops into a sunken, cankered area at the point of infection. Sometimes the lesion will expand to completely girdle the stem. On severely infected seedlings, the entire hypocotyl may be discolored and shriveled into a dry, stringy or wiry stem.

Fusarium can also cause root rot of soybean. Infection is usually confined to roots and lower stems. The lower part of the taproot and the lateral root system may be discolored, deteriorated or completely destroyed. General roots show a nondescript brown discoloration and a dry, shrunken rot. Above ground portions of plants may appear off-color and stunted. Plants with severe Fusarium root rot may die prematurely.

Charcoal rot, caused by *Macrophomina phaseolina*, may be more commonly recognized as a mid to late season disease on maturing soybean plants, but it can also occur early in the season on seedlings. Infected seedlings tend to show a reddish brown discoloration from the soil line up the stem. The discolored area changes from reddish brown to dark brown to black. Foliage may appear off color or begin to dry out and turn brown. If the growing point is killed, a twin stem plant may develop. Under hot, dry conditions, infected seedlings may die. Under cooler, wetter conditions, infected seedlings may survive but carry a latent infection. Then symptoms may reappear later in the season with hot, dry weather.

Once the crop has been planted, there is little that can be done to reduce incidence or severity of soybean seedling diseases. Additional stress from poor growing conditions, herbicide injury or other factors may compound problems with soybean seedling diseases. Prior to planting it is important to consider variety selection (especially in fields with a history of *Phytophthora*), fungicide seed treatment, crop rotation, seedbed preparation and conditions at planting.

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Japanese Beetles *(Popillia japonica)* Numerous in 2010

By Wayne Bailey

During the past week reports of Japanese beetle adults have been received from across the state of Missouri. Populations of this pest vary by location with heavy numbers occurring in many locations in eastern, central, and southwestern Missouri counties. This is the time of year when most annual grub, including the Japanese beetle, complete their grub stages of growth, pupate, and emerge as adult beetles. Although the peak emergence for Japanese beetles usually occurs in late June into early July, high numbers of beetles are actively feeding on many ornamental plants and trees at this time. This pest will readily feed on most field crops with corn and soybean being favorite hosts for Japanese Beetles. This insect continues to disperse across Missouri with beetles being reported in areas where they have not been found in past years.

Infestations of this pest was first found in the United States near Riverton, New Jersey during 1916, following its accidental introduction in shipments of iris from its native country of Japan. During the mid 1900s infestations of this beetle in were found in the urban areas of St. Louis, Columbia, Kansas City, and Springfield, Missouri where they were probably introduced in the soil of container plants coming from infested areas of the US. About ten years ago these urban populations began to expand and disperse to the more rural areas of Missouri. This colonization of rural areas of Missouri continues today with ornamental plants, shrubs, and trees often the first to be attacked. Once populations are established in an area, damage to field crops is common. Japanese beetles are approximately 1/2–inch in length, metallic green in color with bronze or copper colored wing covers. A diagnostic characteristic is the presence of five white tufts of hair or bristles running down each side of the shell and two tufts of hair located on the tail end of the insect. Without magnification, these structures are seen as white dots. Japanese beetles can be confused with adult green June beetle, but are smaller in size than the June beetle. Adult Japanese beetles emerge from the soil in late May, June, and early July to feed for approximately 60 days. During this time the beetles mate and females deposit eggs in the soil. Each female may lay 40 to 60 eggs with larvae emerging in about 2 weeks. Females typically feed then move to the soil to deposit a few eggs. These actions will be repeated until all eggs are laid. Larvae will typically feed on grass roots and decaying material before overwintering in the soil as 3rd instars. The

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Japanese Beetles (Popillia japonica) Numerous in 2010 *continued from page 85*

following spring larvae quickly finish development, pupate, and emerge as adult beetles beginning in early June in most years.

Japanese beetle adults often congregate in large numbers to feed on foliage and fruit of over 400 different host plants worldwide (approximately 220 in US). Hosts include a wide variety of ornamental, tree, small fruit, and field crop plants. Typical feeding damage by the beetles is often seen as a lace-like pattern on host plant foliage as beetles avoid leaf veins when feeding. Beetles often begin feeding on the top of plants and move downward. They tend to select plants which emit strong odors and often feed in large groups on host plants. Tassels and silks of corn can be severely damaged by adult feeding, whereas foliage feeding is common on soybean. Feeding on corn silks can disrupt pollination and result in substantial yield losses. Foliage feeding on soybean is less damaging, although small double-crop soybean may sustain economic damage. The grub stage of this pest will feed on plant roots of both corn and soybean with most feeding occurring in late June, July and August. Damage to plant root hairs may result in poor uptake of water and nutrients or be more severe and cause reduced stands through plant mortality.

In field corn, an insecticidal treatment is justified if during the silking period there are an average of 3 or more beetles present per ear, silks have been clipped to ½ inch or less in length, and pollination is less than 50% complete. For soybean, treatment is justified if foliage feeding exceeds 30% prior to bloom and 20% from bloom through pod fill. The following insecticides are recommended for control of Japanese Beetle in field corn and soybean in Missouri.

Table 1. Insecticides Recommended for Control of Japanese Beetle Adults in Field Corn

Economic Threshold: *Treat when 3 or more beetles are present on silks before pollination is less than 50% complete and silks are chewed to 1/2 inch or less in length.*		
Insecticide Chemical Name	***Insecticide Trade Name***	***Rate of Formulated Material/Acre***
cyfluthrin	*Baythroid XL	1.6 to 2.8 fl oz
bifenthrin	*Capture 2 EC	2.1 to 6.4 fl oz
chlorpyrifos +	*Cobalt	38 to 42 fl oz
gamma cyfluthrin		
deltamethrin	*Delta Gold	1.5 to 1.9 fl oz
zeta-cypermethrin +	*Hero	4.0 to 10.3 fl oz
bifenthrin		
zeta-cypermethrin	*Mustang Max	2.8 to 4 fl oz
Microencapsulated	*Penncap-M	2 to 4 pts
methyl parathion		
gamma-cyhalothrin	*Proaxis	2.6 to 3.84 fl oz
carbaryl	Sevin XLR Plus	2 to 4 pts
lambda-cyhalothrin	*Warrior	2.56 to 3.84 fl oz

**Designated a restricted use product.*

Note: Capture 2EC being replaced by Brigade insecticide

Table 2. Insecticides Recommended for Control of Japanese Beetle Adults in Soybean

Economic Threshold: *Treat when defoliation reaches 30% before bloom and 20% between bloom to pod fill.*		
Insecticide Chemical Name	***Insecticide Trade Name***	***Rate of Formulated Material/Acre***
permethrin	*Ambush	2.9 to 5.8 fl oz
	*Pounce 3.2EC	2 to 4 fl oz
esfenvalerate	*Asana XL	5.8 to 9.6 fl oz
cyfluthrin	*Baythroid	1.6 to 2.8 fl oz
chlorpyrifos +	*Cobalt	19 to 38 fl oz
gamma cyhalothrin		
zeta-cypermethrin +	*Hero	4.0 to 10.3 fl oz
bifenthrin		
imidacloprid +	*Leverage 2.7	3.8 fl oz
cyfluthrin		
zeta-cypermethrin	*Mustang Max	2.8 to 4.0 fl oz
Microencasulated	*Penncap-M	3 to 4 pts
methyl parathion		
gamma-cyhalothrin	*Proaxis	3.2 to 3.84 fl oz
	****Declare***	***1.3 to 1.5 fl oz***
carbaryl	***Sevin XLR***	***1 to 2 pts***
lambda-cyhalothrin	****Warrior***	***3.2 to 3.84 fl oz***

**Designated a restricted use product.*

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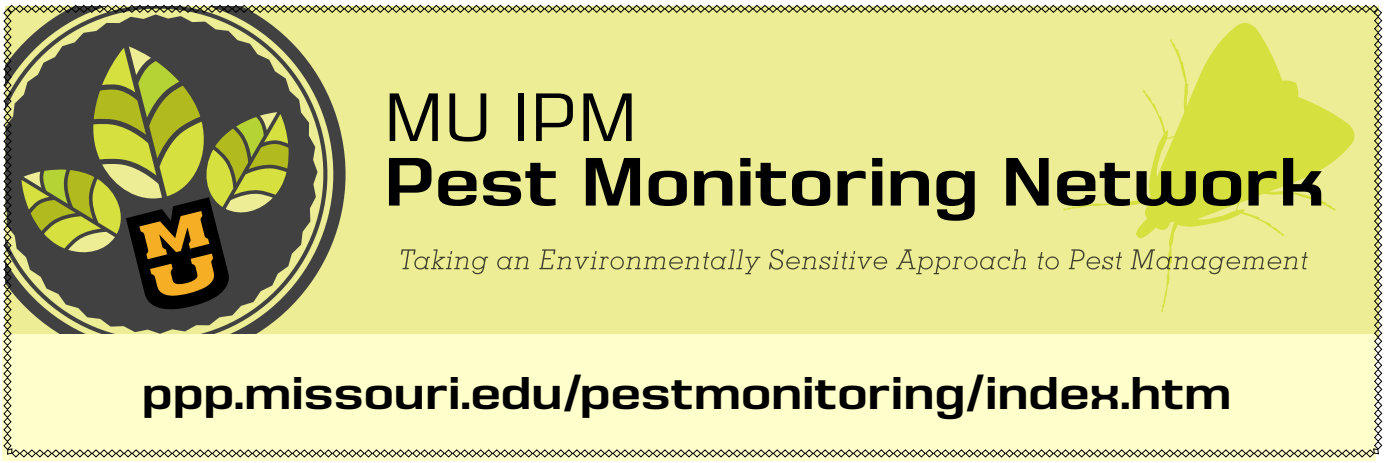
MU IPM
Pest Monitoring Network
Taking an Environmentally Sensitive Approach to Pest Management
ppp.missouri.edu/pestmonitoring/index.htm


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Weather Data for the Week Ending June 13, 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.	June 1-June 13	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	85	67	90	60	76	+5	2.11	0.00	1040	+282
St. Joseph	Buchanan	83	67	88	65	75	+4	6.60	+4.18	995	+224
Brunswick	Carroll	84	68	86	64	75	+4	5.30	+2.93	1059	+258
Albany	Gentry	83	68	88	63	75	+4	3.70	+1.35	967	+223
Auxvasse	Audrain	85	66	90	62	75	+4	2.93	+0.60	1081	+275
Vandalia	Audrain	85	66	91	60	75	+4	3.62	+1.42	1069	+299
Columbia-Bradford Research and Extension Center	Boone	84	65	89	61	74	+2	1.89	-0.31	1048	+199
Columbia-Sanborn Field	Boone	85	67	91	63	75	+2	4.62	+2.30	1172	+288
Williamsburg	Callaway	85	65	90	60	74	+3	2.02	-0.32	1107	+328
Novelty	Knox	83	67	86	62	74	+3	4.19	+2.11	956	+190
Linneus	Linn	84	66	88	63	75	+4	6.22	+3.69	964	+222
Monroe City	Monroe	84	67	87	63	74	+2	4.66	+2.61	1022	+225
Versailles	Morgan	86	68	91	65	76	+4	2.34	+0.18	1159	+262
Green Ridge	Pettis	84	68	89	66	75	+4	1.41	-1.28	1091	+267
Lamar	Barton	85	69	89	63	76	+3	1.43	-1.42	1183	+252
Cook Station	Crawford	86	65	91	59	75	+3	3.40	+1.38	1089	+167
Round Spring	Shannon	87	65	92	58	75	+4	1.50	-0.50	1102	+239
Mountain Grove	Wright	85	67	90	58	75	+4	2.29	+0.43	1090	+269
Delta	Cape Girardeau	91	69	96	62	80	+5	0.21	-1.38	1326	+249
Cardwell	Dunklin	93	72	97	65	82	+5	0.09	-1.56	1520	+293
Clarkton	Dunklin	91	72	98	64	82	+6	0.39	-1.43	1446	+252
Glennonville	Dunklin	91	72	96	64	82	+6	0.00	-1.51	1458	+269
Charleston	Mississippi	90	70	95	61	81	+6	0.46	-1.31	1420	+347
Portageville-Delta Center	Pemiscot	91	73	98	65	82	+5	0.17	-1.74	1532	+328
Portageville-Lee Farm	Pemiscot	91	73	96	64	82	+6	0.22	-1.54	1542	+351
Steele	Pemiscot	91	73	98	68	83	+6	3.24	+1.16	1580	+365

* 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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