Integrated Pest & Crop Management

Soybean Cyst Nematode Management: Take the Test. Beat the Pest.

By Allen Wrather

Here is the situation: Soybean cyst nematode (SCN) is the worst pest of soybeans in the U. S. A. including Missouri.

Fortunately, this pest can be managed, but farmers must take steps before planting to protect their 2011 soybean crop against these nematodes.

The first step is to test the soil for SCN, and this must be done in the next few days. This step must soon be finished so the soil test results will be available by early April and the information can be used to select varieties for planting this year. University of Missouri Extension Regional Agronomists have information about taking and submitting soil samples for SCN analysis, and more information is available at the University of Missouri web site http://soilplantlab.missouri.edu/nematode.

The second step is to make decisions about crops to plant in 2011. Farmers should rotate fields out of soybean and plant corn or another crop resistant to SCN in fields that have a high population of SCN in the soil. Crop rotation is a great SCN control method because SCN numbers decline during years when crops such as corn, grain sorghum, a forage crop, or cotton are planted. The number of years these crops should be planted before planting soybean again will depend on the number of SCN in the soil. Soybean may be planted in fields that have a low population of SCN in the soil, but farmers should only plant varieties with some type of resistance to SCN. Soybean cyst nematode resistant varieties are available and most yield well. Very few varieties are resistant to all types of SCN so selecting the best variety to plant is difficult. Information about soybean variety resistance to SCN is available at University of Missouri Extension Offices, and the University of Missouri Variety Testing web site, http://varietytesting.missouri.edu. Visitors to this site should select "Soybean", then select "Characteristics". This page lists company provided information about varieties they sell and the source of SCN resistance used to develop each variety. Farmers should also ask the representatives for the soybean seed companies they buy from about the best SCN resistant varieties to plant in each field. These are the only useful SCN control methods available.

More information about SCN management is available in the University of Missouri Extension Guide titled, Soybean Cyst Nematode: Diagnosis and Management. This guide is available at http://muextension.missouri.edu/xplor/agguides/crops/g04450.htm.

The Missouri soybean farmer checkoff managed by the Missouri Soybean Merchandising Council funded much of the research by University of Missouri scientists to develop SCN resistant varieties and determine that crop rotation is a great SCN management tool.

Following these suggested procedures will give soybean farmers a better chance of producing a profitable soybean crop in 2011.

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In This Issue

Alfalfa Weevil vs. Clover Leaf Weevil

By Wayne Bailey

Two different species of weevil larvae can be present in Missouri alfalfa fields. Alfalfa weevil (AW) larvae often cause severe damage to first-cutting alfalfa whereas larvae of the clover leaf weevil are generally heavily parasitized and rarely causes economic damage to alfalfa. Occasionally clover leaf weevil larvae are misidentified as alfalfa weevil and needlessly sprayed with an insecticide. How do we tell them apart in the field so we don't apply unneeded insecticide applications?

The following list compares identifying characteristics of larvae of these two weevils found in alfalfa fields early season.

Clover Leaf Weevil (CLW)

- Appear in fields in early season, often March and April
- Larvae look similar to Alfalfa weevil larvae, but are larger in size, have a white stripe running down the back that is often bordered by patches of pink or rosy pink areas or flecks
- Head capsules are brown in color
- Larvae feed at night and generally spend the day on the ground near the plant or in the plant crown
- Larva often roll into tight c-shape when disturbed
- A large majority of CLW larvae are often infected by a fungal pathogen or parasitized by one to several larvae of a parasitic wasp species
- Feeding damage is seen as circular holes cut into the alfalfa leaflets
- Populations of CLW rarely reach economic levels due to fungal pathogen or parasitism, so they rarely require insecticide applications to reduce or prevent damaging populations

Alfalfa Weevil (AW)

- Larvae appear in fields about two weeks later than CLW (late March, April and May depending on location in state)
- Larvae have brown to black head capsules (sometimes difficult to distinguish from CLW larvae)
- AW larvae always feed on the alfalfa plant foliage and are not found on the ground
- Parasitism rates rarely exceed 15% in most areas of the state
- Small larvae (1st and 2nd instars) feed inside growing plant terminals that produces shot-hole damage on plant leaflets as they grow out of the terminal. Older larvae (late 2nd, 3rd, and 4th instars) substantially reduce forage yield and quality of the alfalfa by skeletonizing and defoliating plant leaflets
- Common pest of first cutting alfalfa in Missouri, especially in the southern half of the state.

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Wireworm Baits and Preplant Decisions for Corn

By Wayne Bailey

Wireworm is a group of insects which are often difficult to scout and manage. One method used to determine wireworm numbers prior to planting is the use of a solar baiting system. It can effectively estimate wireworm larval populations present at a site.

The scouting technique consists of placing bait stations or traps at several locations within a crop field. A minimum of two bait stations per acre is recommended, but in reality establishing 5 to 10 bait stations per 30 to 40 acres of crop field should be sufficient if traps are properly located. In order to gain accurate estimates of the wireworm population, traps should be located in high risk areas such as in any grassy areas of the field or in areas where wireworms caused injury in previous seasons. Although trap placement in fields may occur 2-3 weeks prior to planting of the corn crop, traps placed 7-10 days prior to planting provide more accurate estimates of wireworm numbers as wireworms often remain deep in the soil until soil temperatures warm in the spring. With wet conditions and planting dates rapidly approaching in 2011, 7-10 days of monitoring should be sufficient to estimate wireworm populations in field crops.

This wireworm trapping technique consists of digging a 4-inch deep by 6-9 inch wide hole at the soil surface. Place into the hole 1 cup of equal mixture of untreated corn and wheat seed which has been pre-soaked for 24 hours prior to use in order to speed up seed germination. Fill and slightly mound each station with soil. Cover each

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Time to Test for Endophyte in Pastures

By Craig Roberts

If you have a tall fescue pasture, chances are it is common Kentucky 31. Nearly all of Kentucky 31 tall fescue is infected with a microscopic fungus known as the tall fescue endophyte. The tall fescue endophyte gets its name from growing inside (endo) the plant (phyte).

The common endophyte produces toxins that cause fescue toxicosis, the most serious forage-livestock disorder in Missouri. Symptoms of fescue toxicosis are not always noticeable. For example, it is hard to tell when steers are gaining 1.3 lb/day rather than 1.8 lb/day. But when steers go to the sale barn, the cost is very real. According to research in Georgia and Oklahoma, a steer on highly infected Kentucky 31 will go to the feedlot 100 lbs lighter than a steer on non-toxic tall fescue.

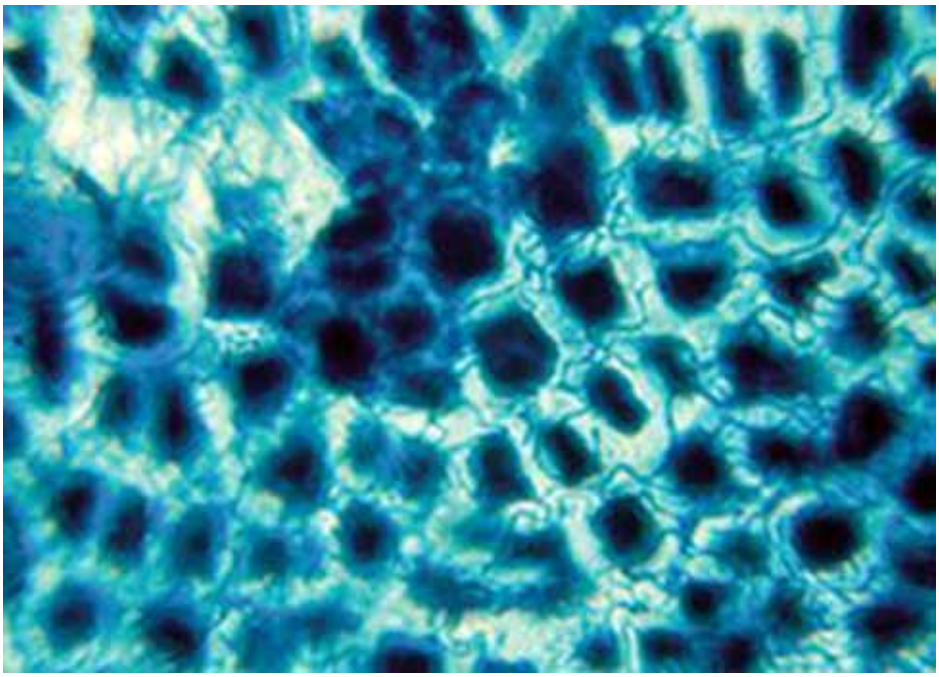

Figure 1. The endophyte is seen here, appearing as strands of yarn growing between cells in the seed of tall fescue.

Some producers are electing to replace their old tall fescue with new cultivars. Others are learning how to manage the Kentucky 31. In either case, producers must first test for endophyte level. If the endophyte level is 20 percent or less, producers should manage what they have. If endophyte level is 55 percent or higher, they should consider replanting or seriously improving the management. It is critical to know the level of endophyte.

How do we test for the endophyte? This time of year, it is best to test the growing tillers. The testing process involves clipping each tiller at the soil surface, where it meets the root, then sending it to a good lab. Details about sampling, shipping and costs willbe provided by a lab you choose.

A good lab is NOT a lab that is certified; this is because certification is based on fiber and protein, not the endophyte. In fact, there is no certification for endophyte testing. Therefore, a good lab is one with a good record of analysis.

Some test with the microscope. As your samples arrive, these labs unpack your sample, stain it, and look for the endphyte growing between the cell walls. These labs are accurate only if the technician is well-trained. If not, the lab will still give you a value. And you cannot be sure it is correct.

Other labs use a chemical procedure. The chemical labs treat your sample with reagents that eventually give off a color; this color indicates the presence or absence of endophyte. The chemical lab most often used by MU researchers and extension specialists is Agrinostics, a private lab located in Georgia. The Agrinostics lab has never given an inaccurate reading to our researchers or extension specialists and is therefore considered reliable. They also offer a quick turnaround time. For more information about testing, check out the Agrinostics website at www.agrinostics.com.

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Wireworm Baits and Preplant Decisions for Corn

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mound with an 18-inch square of black polyethylene plastic (appropriate sized trash bag) followed by a 1-yard square sheet of clear polyethylene or similar clear plastic bag. Cover the edges of the plastic layers with soil to prevent wind damage. The black plastic layer absorbs heat and the clear plastic helps retain heat in the soil producing a "greenhouse effect" which allows for more rapid germination of the bait seed. Carbon dioxide is produced during the germination process and attracts wireworms to the bait. Just prior to planting, remove the plastic layers and soil from the bait and count the number of wireworm larvae in and around the germinating ball of bait seed. **If the average number of wireworm larvae collected in bait stations located in the field average one or more per bait station, the economic threshold has been exceeded and treatment is justified.** If an economic infestation is found, control options implemented before or at the time of planting are recommended. Management options include such strategies as use of liquid or granular insecticides at planting, planting insecticide treated seed (high rate), or application of liquid insecticide with fertilizer application. Rescue treatments for this soil inhabiting insect pest are not available at this time.

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Potential for Alfalfa Weevil Problems in 2011

By Wayne Bailey

The alfalfa weevil is considered an occasional to severe pest in Missouri. In most years problems with this pest are more severe in southern Missouri counties where adult beetles may lay eggs during mild fall, winter, and spring days when temperatures rise above 50°F for several consecutive days during these seasons. Eggs may be laid in dormant stubble or in new spring growth of alfalfa. Although harsh weather conditions may cause egg mortality during periods of freezing weather in fall and winter, snow cover on fields during these periods provide eggs with some protection from the cold. Although high numbers of alfalfa weevil eggs present in the spring do not always result in economic infestations of larvae, the potential for damage is greater in years when this condition exists. Alfalfa weevil eggs develop and eventually hatch after accumulating about 300° degree day heat units based on 48°F. This means that infestations of alfalfa weevil larvae often occur first in more southern counties of Missouri and sooner on south-facing slopes of alfalfa fields due to the faster warming of these slopes in early spring.

Although problems with alfalfa weevil have yet to occur this spring, producers in the southern counties of Missouri should scout fields on a weekly schedule beginning now and continue through first harvest. Producers in central and northern counties should begin scouting for alfalfa weevil within the next two to three weeks. The first damage observed will be small feeding holes in alfalfa leaflets as they grow out of the terminals of plant stems. This minor foliage damage is caused by the 1st and possibly 2nd larval (worm) stages called instars as they feed in the terminal buds of alfalfa plants. As larvae grow larger (3rd and 4th instars) they can readily be found on plant foliage where their feeding causes very visible foliage damage which often result in substantial forage yield and quality losses.

Scouting for alfalfa weevil is accomplished by randomly collecting 50 alfalfa stems (10 stems at 5 different locations) and tapping them into a white bucket. Third and fourth larval instars will generally be dislodged by this action and allow for an average number of larvae per alfalfa stem to be calculated. Caution should be used when collecting stems as larvae can be easily dislodged from the growing tip of the plant stem by rough handling. It is recommended that the top of the alfalfa stem be cupped in one hand while the plant stem is removed near the base of the stem by cutting with a knife. If an average of one or more larvae per stem is found and 30% of plants exhibit larval damage, then the economic threshold has been reached and control is justified.

Management Options

The main management option for early infestations of alfalfa weevil larvae on small alfalfa is an application of a labeled insecticide. Early harvest of the alfalfa by either machine or livestock may be viable options for some producers in Missouri. If early harvest of alfalfa by machine is selected as a control strategy, then the crop is harvested approximately 7-10 days prior to the normal plant growth stage of 1/10nth bloom. Missouri data indicate that alfalfa

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Potential for Alfalfa Weevil Problems in 2011

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weevil larval numbers are reduced by about 95-98% with mechanical harvest and about 90-95% by cattle grazing in a management intensive grazing system. Producers using grazing as a control strategy must be aware of the bloat risk to cattle grazing green alfalfa and risk to the alfalfa stand due to hoof trampling during wet conditions. If an insecticide application is selected, a list of insecticides recommended for alfalfa weevil larval control follows.

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Table 1. Recommended Insecticides for Control of Alfalfa Weevil in Alfalfa - 2011

2010 Policies	Common Crop	Class	Formulated Material per Acre	REI	PHI/PGI
Beta-cyfluthrin	*Baythroid XL	pyrethroid	1.6 to 2.8 fl oz/A	12	7 day / 7 day
Chlorpyrifos	*Lorsban Advanced	organophosphate	1 to 2 pts/A	24	PHI & PGI = 7
					day at 1/2 pt/A;
					14 day at 1 pt/A;
					21 day at >1 pt/A
Chlorpyrifos 4E	*Lorsban 4E *numerous products	organophosphate	1 to 2 pts/A see specific labels	24	same as previous
Chlorpyrifos 4E plus Gamma-cyhalothrin	*Cobalt	organophosphate pyrethroid	19.0 to 38.0 fl oz/A 19.0 to 38.0 fl oz/A	24	PHI & PGI = 7 day at 7-13 fl oz; 14 day at 13-26 fl oz; 21 day >26 fl oz/A
Chlorpyrifos plus zeta-cypermethrin	*Stallion	organophosphate pyrethroid	9.25 to 11.75	24	7 day / 7 day
Cyfluthrin	*Tombstone	pyrethroid	1.6 to 2.8 fl oz/A	12	7 day / 7 day
Gamma-cyhalothrin	*Proaxis	pyrethroid	2.56 to 3.84 fl oz/A	24	7 day / 1 day
Lambda-cyhalothrin	*Warrior *Numerous products	pyrethroid	1.28 to 1.92 fl oz/A 2.56 to 3.84 fl oz/A	24 24	7 day/ 1 day 7 day / 1 day
Lambda-cyhalothrin + chlorantraniliprole	*Voliam Xpress	pyrethroid	6. to 9.0 fl oz/A	24	7 day / 1 day
Methyl Parathion	*Chemnova Methyl 4EC	organophosphate	2.56 to 3.84 fl oz/A	96	15 day / 15 day
Phosmet	Imidan 70-W	organophosphate	2.56 to 3.84 fl oz/A	12	7 days /7 days
Zeta-cypermethrin	*Mustang Max EC	pyrethroid	2.24 to 4.0 fl oz/A	12	3 day / 3 day

Read and follow all label direction, precautions, and restrictions.
**Designated a restricted use product.*
REI =Restricted Entry Interval
PHI = PreHarvest Interval
PGI = PreGrazing Interval

Weed of the Month: Giant Ragweed

By Eric Riley and Kevin Bradley

Giant ragweed (*Ambrosia trifida* L.) is a summer annual native weed in the *Asteraceae* family that now inhabits most of the United States. Giant ragweed used to be found primarily as a weed of stream banks, roadsides, right-of-ways, and other sites with disturbed, moist soils, but in recent decades has become a primary weed of corn and soybean production throughout the Midwest. Giant ragweed is one of the earliest summer annual weeds to emerge in the spring. In central Missouri, we observed some giant ragweed seedlings emerging in corn and soybean fields last week. Giant ragweed will continue to emerge over the next several weeks and months, which is one of the reasons why this weed is a troublesome weed of corn and soybean production systems. Several studies have shown that giant ragweed emergence can be observed as early as March and as late as July. Giant ragweed seedlings can be identified by their large round or spatulate-shaped cotyledons which are 3/4 to 1 ½ inches long and ½ to ¾ of an inch wide (Figure 1). The first pair of true leaves are ovate to lanceolate in shape, unlobed, and contain entire to slightly toothed leaf margins. Young leaves are arranged oppositely and contain rough hairs. After the second pair of true leaves emerge, subsequent leaves take on a 3- to 5-lobed palmate leaf arrangement (Figure 2). Giant ragweed can reach as much as 15 feet in height but the growth that each individual plant reaches is determined by the density of the infestation (Figure 3). Giant ragweed contains small, green, inconspicuous flowers that are typically present from July through September. Male flowers are found in racemes on the ends of upper branches (Figure 4) and female flowers are located in the upper leaf axils.

Figure 1. A giant ragweed seedling.

Figure 2. Soon after emergence, giant ragweed takes on a 3- to 5-lobed palmate leaf arrangement.

Giant ragweed is very competitive with both corn and soybean. In one study conducted in Ohio, the authors found that an infestation level of one giant ragweed plant per 10 m2 resulted in a 1% corn yield loss. Other studies have shown that giant ragweed is even more competitive in soybeans. In another study conducted in Missouri in 1991, season-long interference of giant ragweed at a density of 2 plants per 9 m of row resulted in a 50% soybean yield reduction.

Due to the nature of giant ragweed emergence, this species cannot and should not be managed with any one single herbicide application. In order to effectively manage this weed, you must consider a variety of herbicides with multiple modes of action, applied at different times throughout the growing season. Since approximately half of the total giant ragweed

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Weed of the Month: Giant Ragweed

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Figure 3. A giant ragweed infestation in soybeans.

population that is going to emerge in any given year does so by the typical time of soybean planting in Missouri, the selection of an appropriate burndown herbicide program is critical in the management of giant ragweed. For the selection of an appropriate burndown herbicide in either corn or soybean, visit the 2011 Pest Management Guide at http://weedscience.missouri.edu/publications/m00171.pdf.

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Figure 4. Giant ragweed flowers.

Weather Data for the Week Ending April 2, 2011

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.	Mar. 1-Mar. 30	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	52	30	74	24	42	-6	0.63	-1.59	5	+5
St. Joseph	Buchanan	51	33	71	27	42	-6	1.48	-0.70	5	+4
Brunswick	Carroll	51	33	69	28	42	-7	1.88	-0.51	3	+1
Albany	Gentry	51	30	69	27	41	-7	1.38	-0.96	2	+2
Auxvasse	Audrain	51	33	68	26	41	-8	2.81	+0.09	3	+1
Vandalia	Audrain	51	32	65	26	41	-8	2.68	-0.19	1	+1
Columbia-Bradford Research and Extension Center	Boone	51	32	69	25	41	-9	3.06	+0.08	3	-1
Columbia-Jefferson Farm and Gardens	Boone	*	*	*	*	*	*	*	*	*	*
Columbia-Sanborn Field	Boone	51	34	70	27	43	-8	3.45	+0.52	5	0
Columbia-South Farms	Boone	50	32	69	26	42	-8	3.70	+0.71	4	0
Williamsburg	Callaway	51	32	67	24	41	-8	2.89	-0.15	3	+2
Novelty	Knox	51	31	65	26	41	-8	1.38	-1.18	1	0
Linneus	Linn	51	31	67	26	41	-7	1.80	-0.67	3	+3
Monroe City	Monroe	51	31	65	27	41	-7	1.22	-1.36	1	0
Versailles	Morgan	51	34	73	28	42	-9	2.99	0.00	8	+1
Green Ridge	Pettis	51	32	71	27	42	-8	2.16	-0.59	6	+5
Lamar	Barton	50	34	74	30	42	-10	3.76	+0.25	7	+1
Cook Station	Crawford	52	33	71	29	42	-10	4.77	+0.93	2	-5
Round Spring	Shannon	55	33	74	29	43	-8	4.49	+0.61	1	-3
Mountain Grove	Wright	51	33	72	28	42	-8	3.69	-0.25	7	+5
Delta	Cape Girardeau	55	37	72	31	46	-7	4.34	+0.05	6	-1
Cardwell	Dunklin	54	39	71	35	46	-9	5.84	+1.52	8	-4
Clarkton	Dunklin	54	38	72	34	46	-8	4.39	+0.27	7	-2
Glennonville	Dunklin	55	39	71	33	46	-8	4.56	+0.66	8	-3
Charleston	Mississippi	*	*	*	*	*	*	*	*	*	*
Portageville-Delta Center	Pemiscot	54	39	69	35	47	-8	5.03	+1.02	8	-4
Portageville-Lee Farm	Pemiscot	54	39	70	35	47	-8	5.04	+1.08	8	-3
Steele	Pemiscot	55	40	71	35	47	-8	5.52	+1.27	8	-5

* 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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