

Integrated Pest & Crop Management

IPM Publications, Information You Can Use: IPM1001 Corn Diseases

By Steven Kirk

Corn diseases can cause problems with germination, stand establishment and can affect the quality and size of harvest, making it a costly for Missouri farmers. 'IPM1001: Corn Diseases,' authored by Dr. Laura Sweets and Simeon Wright was written to help farmers and pest managers by outlining diseases that seriously impact corn production in Missouri and aiding in their identification. It also offers management strategies to help treat infected fields and prevent disease outbreaks.

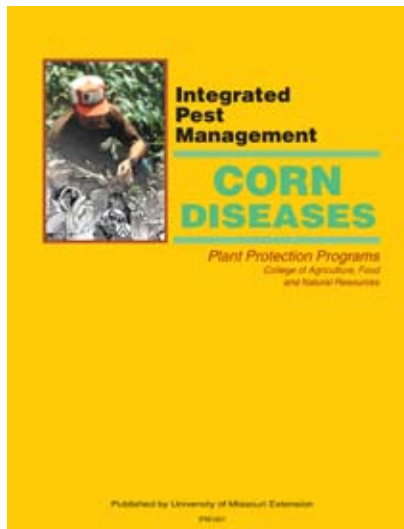


Figure 1. IPM1001: Corn Diseases

IPM1001 also provides valuable tools for making decisions regarding treatment, particularly in relation to the use of resistant hybrids or fungicide seed treatments. The guide also outlines steps to record useful data on incidences of corn diseases, as well as the severity in order to make the best decisions regarding hybrid selection, crop rotation and other cultural practices needed to prevent or reduce the instances of corn diseases in future years.

This manual is a part of the Integrated Pest Management series prepared by the MU Plant Protection Programs. The University of Missouri's Integrated Pest Management program publishes a series of guide sheets that focus on a wide variety of topics important to individuals engaged in making sound pest management decisions. From 'Weed Management Systems for Environmentally Sensitive Areas

IPM1001 offers a valuable resource guide containing more than 50 color photos to aid in correctly identifying diseases present in the field. Areas covered in the pictorial guide are seed rots and seedling diseases, foliage diseases, virus diseases, stalk rots and red root rot, as well as ear and kernel rots.

(IPM1018), to 'Crop Nutrient Deficiencies and Toxicities (IPM1016)', IPM guidesheets offer something for everyone involved in pest management; from crop production, to landscape maintenance, to homeowners to hobby gardeners.

IPM publications are free to view online: (<http://ppp.missouri.edu/ipm/pubs.htm>) and copies can be printed for your convenience. Print copies of most IPM publications can be purchased for a nominal fee. To order copies of our IPM publications online go to: (<http://extension.missouri.edu/publications/order.aspx>). To order print copies by phone with a credit card, call: 573-882-7216 or 800-292-0969.

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Summary of the Corn Stalk Nitrate Test Challenge 2009

By John Lory

In fall of 2009 I announced that my program, with the support of the University of Missouri Soil Testing Lab, would pay for the analysis of up to 10 stalk nitrate samples per farm for Missouri farmers. The stalk nitrate test provides a "post mortem" analysis of nitrogen management for a field when a sample is obtained one to three weeks after black layer has formed on 80% of the kernels of a corn ear.

Caution is needed when interpreting trends in voluntarily submitted data such as this. Still some trends in the data were clear.

We received 73 samples from 14 central and northern Missouri counties under the program. A summary of the Information submitted by the growers showed that:

- + Median planting date was May 19
- + Average yield goal was 175 bu/acre
- + Average nitrogen rate was 175 lbs N/acre
- + 92% of the fields were in corn following soybean.
- + Median stalk nitrate was 587 part per million (ppm) nitrogen.

The stalk nitrate test divides samples into four categories: low rating (0-250

ppm) suggests nitrogen was limiting to yield; marginal (250-700 ppm) suggests that nitrogen availability to the crop bordered on insufficient; optimum (700-2000 ppm) suggest that nitrogen availability was likely within the range to maximize profits; excess (>2000 ppm nitrogen) indicates a high probability that more fertilizer N was applied than needed to maximize profits.

In 2009, a high proportion (53%) of the test results were below optimum likely reflecting the excellent conditions for nitrogen loss in many fields across Missouri this spring. Nitrogen loss inhibitors helped in this group of fields. Forty-five percent of the 53 samples that reported no use of nitrogen loss inhibitors were nitrogen deficient (low) and only 32% were marginal or optimum. In contrast 25% of the 20 samples from fields that used nitrogen loss inhibitors were low and 60% were marginal or optimum.

Other clear trends were difficult to define in this limited data set. There was no clear benefit or cost to fall applied nitrogen. Median stalk nitrate value for the 41 samples from fields where anhydrous ammonia was the primary nitrogen source was 815 ppm compared to 514 ppm for the 20 fields using predominantly urea or UAN solution.

Thanks to the growers who submitted their samples to the stalk nitrate challenge program and filled out the one-page questionnaire on nitrogen management. We hope to have a similar program in fall 2010.

With or without the program the corn stalk nitrate test can provide you good information about nitrogen management on your field. A sample result outside of optimum does not necessarily mean nitrogen management on the field was inappropriate. Results need to be interpreted in the context what else you know about the growing season. For example, this year we had an extremely wet spring. Samples rating marginal likely would be optimal in a more typical year. On the other hand, a farmer should look for opportunities to reduce nitrogen fertilizer on a field rating excessive in a high nitrogen loss year like 2009.

Iowa State University has an excellent publication outlining how to use the corn stalk nitrate test (available on the web at http://nmplanner.missouri.edu/resources/IA_Stalk_NO3_Test_PM1584.pdf). Stalk nitrate samples can be submitted to the University of Missouri Soil Testing Laboratory for analysis.

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Safeguarding Missouri's Citizens and Agriculture through Pesticide Applicator Training

By Steven Kirk

The safe and responsible use of pesticides is of up-most importance to Missouri's agricultural sector and its citizens. All pesticides used in the U.S. must be registered (licensed) by the Environmental Protection Agency (EPA). Registration of pesticides assures they will be properly labeled and if used in accordance with specifications, will not cause unreasonable harm to the environment.

During the decade that made up the nineteen-sixties, there arose a

new awareness of ecology and the environmental resulting in an outcry of public concern over all types of environmental contamination from smoking, belching chimneys and smog; foul water, rivers and streams, as well as pollution from pesticides. Up until that time the old adage of "if a little works, a lot will work better!" was the major premise for applying chemicals to address pest problems on the farm and around the home.

As a result of this public outcry, the EPA and Congress enacted a "new" pesticide law, the *Federal Insecticide, Fungicide, Rodenticide Act* (FIFRA) in the early 1970s that provided the impetus to establish a national program of federal/state certification of pesticide applicators. The primary focus of this new law was to provide federal control of pesticide distribution, sales, and use. Under FIFRA, the EPA was given authority not only to study the consequences of pesticide usage

New Stink Bug Found in Missouri Soybean

By Wayne Bailey

Dr. Kelly Tindall, field crop research entomologist located at Delta Research Center, Portageville, reported Red Banded Stink Bugs (*Piezodorus guildinii*) were found in soybean fields from Dunklin County Missouri. She believes this insect may initially become a significant pest of soybean grown in Southeast Missouri in 2010 and possibly cause problems in soybean statewide in future years. During October, Dr. Tindall surveyed 14 soybean fields in Dunklin and Pemiscot counties and found red banded stink bugs in 3 fields. Although low in number at this time (5.4% of total stink bug species captured), they possess the ability to rapidly increase in number and pose a threat to soybean in future years. The red banded stink bug is a major pest of soybean in most states south of Missouri and in South and Central America.

At present the common stink bug species currently inhabiting Missouri soybean fields include the green stink bug (*Acrosternum hilare*), Southern green stink bug (*Nezara viridula*), and two brown stink bug species, the brown stink bug (*Euschistus servus*) and the one spotted stink bug (*Euschistus variolarius*). In general, the green stink bug feeds mainly on soybean with heavy feeding resulting in "delayed senescence" of the soybean in some fields. In contrast, the two brown stink bug species tend to feed on seedling through silking stage corn plants, although they sometimes can be collected in high numbers from soybean during the fall of the year. The Southern green stink bug, along with an additional species named the red shouldered stink bug (*Thyanta* sp.) are primarily found on soybean in Missouri counties close to Arkansas. All stink bugs use their "piercing/sucking" type of mouthparts to feed on plant juices. Most attack soybean stems, foliage, and more importantly pods when feeding.

The red banded stink bug adult is green in color although it yellows with age. It has a predominant red, and less predominant black, and yellow bands running across the back of the pronotum. A total of five nymphal or immature stages are produced



Figure 1. Redbanded Stink Bug. (courtesy of Russ Ottens, University of Georgia, Bugwood.org)

and appear as small versions of the adult in shape, but vary in color with more red or yellow coloration present. Each adult female will lay approximately 15 black eggs that are positions in two joined lines to produce a sting of eggs. This is in contrast to most other common stink bug species which lay egg in clumps or masses.

The movement of the red banded stink bug into Southeast Missouri soybean fields will most likely alter the existing composition of stink bugs in soybean. In Louisiana where the red banded has been a major problem for the past 5-7 years, it now is the most prevalent (70%) and most important stink bug present. It also is the most difficult to control with insecticides as compared to green stink bug being easiest and brown stink bug species intermediate in ability to control. The red banded stink bug may cause significant economic damage to soybean pods, especially in late planted beans. In several studies conducted at the Louisiana State Agriculture Center, soybeans yields were reduced by an average of 43% when left untreated as compared to treated plots which typically required four insecticide applications to suppress red banded numbers to below economic threshold levels. In studies conducted at

the LSU AgCenter, red banded stink bugs damaged an average of 41% of soybean seeds resulting in about a 30% reduction in seed weight when insects were caged on soybean for a period of 72 hours.

Our concern with this insect comes from the fact that it is a rapid disperser as observed in Arkansas where it moved through the state in about three to four years. It also is more difficult to control with insecticides than most other stink bugs which will allow it to more rapidly become the predominant stink bug pest in Missouri soybean fields. On the other hand, the more northern climate found in Missouri may slow or restrict the movement of this pest into central and northern areas of the state. An extensive monitoring program for this pest in Missouri will be implemented in 2010 in order to track any movement of this pest further into the state.

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Safeguarding Missouri's Citizens and Agriculture through Pesticide Applicator Training

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but also to require users to register when purchasing restricted use pesticides. One of the goals of this program would be to provide the quantity and quality of information needed for various levels of persons using pesticides, ranging from structural pest control specialist to farm laborers.

Because of continuing public concerns over potential effects of pesticides on human health and the environment, new laws and regulations that govern pesticides and their use make an intensive training program essential. For example, there were several changes in the recently implemented Worker Protection Standard. Additional new legislation which provides training opportunities for this program includes the Endangered Species Program and the Federal Recordkeeping Requirement.

The University of Missouri along with the Missouri Department of Agriculture provides certification and recertification for this diverse sector of individuals involved in the pesticide industry. Since the inception of Missouri's pesticide training program, over 6,000 commercial pesticide applicators have received at least initial training. Every three years, these applicators must be recertified by training programs conducted by University Extension as mandated by the Missouri Department of Agriculture's Bureau of Pesticide Control.

The University of Missouri Extension Pesticide Program provides educational outreach for individuals aspiring to become licensed commercial pesticide applicators as well as private applicators. If you engage in the application of a restricted-use pesticide for hire you are considered a commercial applicator. If you engage in pesticide application for the purposes of producing an agricultural commodity

on property you or your employer owns, or rent without compensation other than trading of personal services between producers of agricultural commodities you are considered a private applicator. Private pesticide applicator training is available at the local level through your regional extension offices. It requires no exam to be certified or recertified.

The commercial applicator program involves two areas of instruction: a core training session in which all trainees attend and the specialty category section in which the attendees conduct their business activities. The core training session provides basic pesticide knowledge which impacts all pesticide applicators. The instruction is provided by persons representing several agencies including the Missouri Department of Agriculture, Missouri Department of Natural Resources and University Extension.

Missourians wishing to become licensed commercial applicators must pass a core exam, as well as a category exam tailored to the specific area in which they wish to become certified. There are 11 different specialty categories within the commercial PAT program (category 1 has two sections: 1A: Agricultural Plant, and 1B: Ag. Animal Pest Control and category 7 has three sections: 7A: General Structural Pest; 7B: Termite; and 7C: Fumigation Pest Control). Applicators can be certified in one or more of the following categories depending on which area of expertise you are qualifying for.

Commercial Pesticide
Applicator Categories:
Category 1A: Agricultural
Plant Pest Control
Category 1B: Agricultural
Animal Pest Control

Category 2: Forest Pest Control
Category 3: Ornamental
and Turf Pest Control
Category 4: Seed Treatment
Pest Control
Category 5: Aquatic Pest Control
Category 6: Right-of-
Way Pest Control
Category 7A: General
Structural Pest Control
Category 7B: Termite Pest Control
Category 7C: Fumigation
Pest Control
Category 8: Public Health
Pest Control
Category 9: Regulatory
Pest Control
Category 10: Demonstration
and Research Pest Control
Category 11a: Wood
Products Pest Control
Category 11b: Ground Line
Inspection and Preservative
Retreatment of Standing
Wood Utility Poles

Training programs are conducted every January in Springfield, Kansas City metro area, Cape Girardeau, St. Louis and Columbia. For dates and locations check out the Plant Protection Programs web site at: <http://ppp.missouri.edu/pat/training.htm>.

(Information used in this article came in part from MU Extension publications and Purdue Extension).

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Visit our Web site at ppp.missouri.edu

COMMERCIAL PESTICIDE APPLICATOR TRAINING

COMING JANUARY 2010

Pesticide applicator training helps reduce the harmful effects of improper pesticide use. The University of Missouri Extension Commercial Pesticide Program provides educational outreach for individuals who wish to become licensed commercial pesticide applicators. Licensed applicators must pass an exam and participate in continuing education courses on environmentally sound uses of pesticides.

For more information on training dates and registration, visit us at <http://ppp.missouri.edu/pat>

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Nutrient Management Course Will Focus on the New DNR Nutrient Management Standard

By John Lory

On February 2-3, 2010 there will be a nutrient management course focused on the new Missouri Department of Natural Resources (DNR) Nutrient Management Technical Standard for concentrated animal feeding operations (CAFOs).

The new Nutrient Management Technical Standard defines the protocols that permitted animal feeding operations need to use to determine manure application rates and defines conditions where manure applications are restricted. The standard also defines the record keeping and monitoring requirements for manure storages and land application of manure.

The course will provide detailed presentations and discussion on how

to interpret and use the new Nutrient Management Technical Standard. Topics will include phosphorus loss assessment including the phosphorus index, plant available nitrogen calculations and other protocols outlined in the new standard.

The course instructors will include faculty from University of Missouri and representatives from Missouri DNR. We have applied for 12 continuing education units (CEU's) for CAFO and Wastewater operators and for 2.5 Soil and Water CEU's and 9.5 Nutrient Management CEU's for certified crop advisors.

The course will be held at the University of Missouri Research and Extension Center at Bradford Farm near Columbia MO. Cost of the course

is \$185 and includes two lunches. Call Shane Ferguson at 573-884-6311 to register. Pre-registration is required before Tuesday January 26, 2010,

More information about the course including a tentative agenda is available at the website <http://nmplanner.missouri.edu/training/index.asp#advanced>.

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Weather Data for the Week Ending December 8, 2009

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.	Dec 1- Dec 8	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	32	19	43	12	26	-6	0.00	-0.44	3243	-152
St. Joseph	Buchanan	34	21	42	14	27	-6	0.00	-0.54	3158	-278
Brunswick	Carroll	35	23	42	16	29	-6	0.24	-0.26	3240	-252
Albany	Gentry	34	21	42	14	27	-6	0.00	-0.58	3060	-312
Auxvasse	Audrain	37	25	41	18	30	-5	0.62	-0.16	3237	-300
Vandalia	Audrain	37	25	42	17	30	-6	0.65	-0.08	3212	-306
Columbia-Bradford	Boone	36	24	41	15	30	-7	0.56	-0.08	*	*
Columbia-Jefferson Farm	Boone	37	25	42	17	31	-6	0.52	-0.12	3313	-364
Columbia-South Farms	Boone	37	25	42	17	31	-6	0.54	-0.10	3311	-365
Williamsburg	Callaway	37	24	42	15	31	-5	0.74	+0.06	3234	-251
Novelty	Knox	35	23	41	16	29	-5	0.03	-0.73	2924	-498
Linneus	Linn	35	22	42	15	28	-5	0.15	-0.43	3031	-298
Monroe City	Monroe	35	24	41	18	30	-4	0.49	-0.24	3091	-390
Versailles	Morgan	38	24	43	17	31	-7	0.52	-0.15	3480	-285
Green Ridge	Pettis	37	23	42	15	30	-6	0.31	-0.39	3299	-160
Lamar	Barton	38	24	42	18	31	-8	0.41	-0.32	3505	-448
Cook Station	Crawford	40	22	45	12	31	-8	0.61	-0.26	3242	-538
Round Spring	Shannon	42	21	46	9	31	-8	0.67	-0.08	3287	-310
Mountain Grove	Wright	39	24	44	15	30	-8	0.50	-0.57	3203	-386
Delta	Cape Girardeau	42	28	49	19	35	-5	2.14	+1.33	3765	-405
Cardwell	Dunklin	44	31	54	23	37	-5	2.14	+1.30	4159	-391
Clarkton	Dunklin	43	30	53	21	36	-6	2.76	+1.93	4038	-445
Glennonville	Dunklin	43	31	52	23	37	-5	2.76	+1.99	4086	-366
Charleston	Mississippi	43	30	55	21	36	-2	1.90	+1.13	3985	-177
Portageville-Delta Center	Pemiscot	44	31	55	23	37	-6	2.07	+1.19	4265	-230
Portageville-Lee Farm	Pemiscot	44	31	56	22	37	-6	2.02	+1.14	4277	-1.84
Steele	Pemiscot	44	32	55	24	38	-5	2.09	+1.11	4355	-144

* 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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