Plant Protection Programs University of Missouri

Integrated Pest & Crop Management

Drought Conditions That Persisted in Part of September and October Resulting in Low Soil Potassium Levels in Soils

By Manjula Nathan

There have been quite a few calls from crop consultants, growers and researchers regarding the low soil potassium (K) levels being reported from soil testing labs. This is due to the dry weather conditions that persisted during the months of September and October in Midwest region. Iowa, Missouri, Indiana, southern Illinois and western Kentucky received less than half their normal rainfall in October. Missouri recorded the 4th driest October in 138 years and the driest since 1964. In Missouri during the month of September, the Bootheel area was classified as in severe drought. As a result, harvest progressed rapidly and earlier than normal. The crops matured early and the weather in late September and most of October provided ideal conditions for field work and soil sampling. Thus the MU soil testing labs have been loaded with samples for analysis. Persistent dry weather conditions and associated low soil moisture conditions can affect the soil K levels.

The dry fall conditions resulted in soil K levels lower than expected. The wet and favorable weather conditions that prevailed early in the growing season resulted in good plant stand, plant vigor and root establishment, enhancing the uptake of plant nutrients like nitrogen, phosphorus and potassium, and higher yields. Most of the K taken up by the plants during the growing season remains in the crop residue. As the crop grows and matures, uptake lowers the available soil test K levels in soils. For example 160 lbs of K2O is removed by plants to produce 150 bu/ac of corn. For corn, wheat and sorghum, most of the K is in the vegetation and only about 25 – 30% in the grain. Once the grain was harvested there wasn't sufficient rain to leach the K from the crop residues back into the soil. So the soil test K comes out as lower than expected from these fields. A quick comparison of the soil test results of samples received by the MU soil testing labs from July to Dec 2009 and July to Nov 2010 reveals about a 12% increase in the number of the samples tested as being very low to medium levels from 2009 to 2010 during this period.

Soybean grain contains about 60% of the total K taken up by the crop, so the removal is higher. Therefore, the K content in corn residue is higher than in soybean residue. The drier conditions that existed in October would have resulted soil test K values being lower in corn fields than in soybean fields. Since the K is still remaining in the residue, growers need not panic over the lower soil test K levels in soils as eventually with sufficient rains the K will leach from the residues to the soil.

Reference:

1. Jim Camberato, Purdue University News Service. Nov 1, 2010.
2. Lloyd, Murdock. Managing Seasonal Fluctuations of Soil Tests. University of Kentucky Cooperative Extension Services. AGR-189.

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Fall Nematode Sampling on Corn and Soybean

By Laura Sweets

Corn nematodes have become a "hot"topic and we are getting some questions related to fall sampling for corn nematodes. Dr. Greg Tylka, Iowa State University recently addressed the issue of sampling for corn nematodes in an article in the ISU Integrated Crop Management News newsletter. His article is reprinted as follows.

When to Sample for Nematodes on Corn - It Depends by Greg Tylka

A recurring question often asked concerning plant-parasitic nematodes that feed on corn is, "When should samples be collected to check for these pests?" The answer depends on the details of each specific field situation. In most cases, fall sampling to test for nematodes that feed on corn is not recommended.

Most nematode species present during early to mid season

The reason that fall sampling generally is not recommended is because to determine if nematodes are causing or have caused damage to a corn crop, the species and population densities (numbers) of the nematodes in a sample are compared to damage thresholds. But the numbers of most nematode species that feed on corn tend to decline as the corn crop matures and dies. So low numbers from samples collected in the fall may be because the nematode numbers were not very high (and not damaging) during the growing season or may be the result of numbers declining from some higher, possibly damaging, level earlier in the season. There is no way to tell exactly what occurred during the growing season based on low nematode numbers in samples collected in the fall.

To determine if plant-parasitic nematodes are causing damage to corn, samples should be collected early to mid season, when nematode numbers are generally greater. Iowa State University recommends collecting samples whenever symptoms of damage, such as stunting, yellowing of foliage, mid-day wilting, lack of fine roots, swollen roots, and/or dead areas on roots are observed.

There are a few instances when fall sampling is warranted or even preferred, namely for root-lesion and lance nematodes and for needle and sting nematodes, as described below.

Root-lesion and lance nematodes

These two nematode species are endoparasites that enter corn roots and feed and reproduce almost completely within the roots throughout the growing season (see figure). Early or mid-season soil sampling is acceptable for the root-lesion and lance nematodes. But fall sampling for these nematodes also is acceptable because nematode numbers accumulate in root tissue throughout the season. Root-lesion and lance nematodes need to be extracted from both soil and root fragments in order to accurately determine the population densities of these nematodes.

Sting and needle nematodes

These two nematode species are among the largest plant-parasitic nematodes, and their distribution is limited to soils with 70 percent or greater sand content. These nematodes reportedly migrate deep into the soil profile during the middle of the growing season and thus, they may be missed in soil samples collected mid season, even if soil cores were collected to a depth of 12 inches. The damage threshold for these nematode species is very low (one worm per 100 cm3 or about a half-cup of soil) and their numbers do not get very high. So it is important to collect samples when there is the greatest likelihood of detecting low numbers of these nematodes. If nematode damage to corn is suspected in fields with high sand content (over 70 percent), spring or fall soil sampling for needle and sting nematodes is warranted.

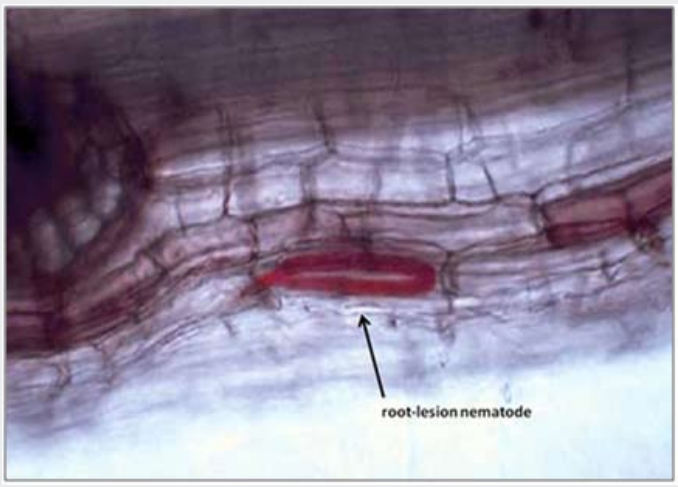

Figure 1. Endoparasitic root-lesion nematode (arrow) inside of corn root tissue. (Image via Greg Tylka)

Soybean cyst nematode continues to be the most serious disease of soybean in Missouri as well as much of the rest of the United States. Although Missouri soybean producers can help protect their crop against SCN by planting soybean varieties that have some resistance to SCN and by rotating soybean with corn, grain sorghum, wheat and other non-host crops, the first step toward protecting against SCN is to test the soil in a field for the presence of SCN.

Although soil samples for SCN may be collected at any time, a convenient time to sample is immediately after soybean harvest. SCN numbers tend to be highest when the plants are almost mature to shortly after harvest. Sampling after harvest is easier to do because the plants have been removed making it easier to move through the field. And sampling in the fall allows sufficient time for the University of Missouri Plant Nematology Laboratory to process samples and provide results so that information can be used in making variety selections for the coming season, planning field rotations or deciding which crop to plant in which field.

The University of Missouri Plant Nematology Laboratory provides nematode identification, population levels and management information on samples submitted. The SCN egg

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count test is the test that most soybean producers need. Because SCN egg counts are only as good as the sample taken, here are some suggestions to improve sampling for SCN:

1. Limit the size of the area being sampled: 10 acres is a good target.
2. With your bucket and probe or shovel, walk the area in a W or Z pattern, sampling between the rows. Take about 20 cores (each core should be about 8 inches deep). When using a shovel take about ¼ cup of soil from near the shovel tip. Mix the cores well into a composite sample, and place about a pint of the soil into a plastic bag for submission.
3. Label the plastic bag, avoid storing the bag in the sun and ship it as soon as possible.
4. Fill out a submission form available from the Web site http://soilplantlab.missouri.edu/nematode/ or your local county extension office.
5. Please be sure to include your name, address, phone number and email address if you have one. Also include county and cropping history.
6. Mail samples early in the week. Always use at least first-class mail.
7. There is a $15.00 fee for the SCN egg count test to determine the SCN population level in a sample.
8. Mail samples to the Extension Nematology Lab, 23 Mumford Hall, University of Missouri, Columbia, MO 65211.

The Extension Nematology Laboratory Web site gives more information of how to sample, the tests available, and how samples are actually run in the lab. A submission for can also be downloaded from the site http://soilplantlab.missouri.edu/nematode/. Questions may also be sent to Bob Heinz at E-mail:heinzr@missouri.edu, phone number 573-884-9118 or fax number 573-884-4288.

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Weather Data for the Week Ending November 15, 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.	Nov. 1-Nov. 15	Departure from long term avg.	Accumulated Since Apr. 1	Departure from long term avg.
Corning	Atchison	57	35	74	28	46	+4	1.77	+0.67	4077	+676
St. Joseph	Buchanan	56	39	73	32	47	+4	1.68	+0.78	3964	+540
Brunswick	Carroll	59	41	74	31	50	+6	1.12	-0.33	4087	+604
Albany	Gentry	55	34	73	28	46	+4	1.52	+0.41	3835	+476
Auxvasse	Audrain	64	41	76	32	51	+6	0.25	-1.49	4037	+505
Vandalia	Audrain	65	38	77	30	50	+5	0.17	-1.41	3990	+492
Columbia-Bradford Research and Extension Center	Boone	64	39	75	28	50	+4	0.41	-1.07	3975	+314
Columbia-Sanborn Field	Boone	64	43	76	32	52	+6	0.37	-1.13	4358	+576
Williamsburg	Callaway	66	39	78	27	52	+7	0.06	-1.68	4062	+586
Novelty	Knox	60	39	73	31	49	+6	0.83	-0.77	3753	+346
Linneus	Linn	60	39	75	30	48	+5	0.84	-0.46	3811	+491
Monroe City	Monroe	63	39	75	31	50	+7	0.50	-1.14	3923	+462
Versailles	Morgan	63	42	76	29	52	+5	0.70	-0.92	4379	+625
Green Ridge	Pettis	60	41	73	30	50	+5	1.44	-0.10	4143	+687
Lamar	Barton	63	43	74	31	52	+4	1.74	-0.05	4404	+461
Cook Station	Crawford	70	36	80	23	53	+5	0.01	-2.09	4017	+251
Round Spring	Shannon	69	33	80	24	49	+2	0.12	-1.80	3954	+359
Mountain Grove	Wright	66	42	76	26	53	+6	0.19	-1.86	4180	+605
Delta	Cape Girardeau	*	*	*	*	*	*	*	*	*	*
Cardwell	Dunklin	68	36	78	30	52	+2	0.20	-1.51	5020	+472
Clarkton	Dunklin	69	37	78	31	53	+3	0.08	-1.80	4969	+495
Glennonville	Dunklin	69	37	79	30	54	+4	0.20	-1.65	4968	+524
Charleston	Mississippi	68	38	78	31	53	+4	0.28	-1.38	4869	+695
Portageville-Delta Center	Pemiscot	69	42	79	32	55	+5	0.30	-1.54	5172	+672
Portageville-Lee Farm	Pemiscot	69	39	79	33	54	+4	0.20	-1.60	5164	+697
Steele	Pemiscot	69	40	80	33	54	+3	0.27	-1.49	5249	+741

* 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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