Cornell University
Cooperative Extension

Capital Area Ag Report
January 3, 2020

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The Ag Report is produced by Aaron Gabriel

Topics in this issue:

Winter Meetings
Soybean Cyst Nematode
Corn Residue Decomposition

Announcements

Farmer Discussion Group Meetings

One Pesticide Applicator Recertification Credit

January 7th @ Proudfit Hall
181 South Main St. Salem, NY (Washington County)

January 8th @ Knox Town Hall
2192 Berne-Altamont Rd., Knox, Albany County

January 9th @ Brunswick Family Community Center
19 Keyes Ln, Troy, NY (Rensselaer County)

January 10th @ CCE – Columbia/Greene Office
479 Rte 66, Hudson, NY (Columbia County)

January 14th @ Agroforestry Resource Center
6055 NY Rte 23, Acra, NY (Greene County)

Noon to 3 pm, lunch provided

Discussion Leaders
Cornell Cooperative Extension Educators Dayton Maxwell and Aaron Gabriel

Farm Business Management
New and Old Pests
Soybean Cyst Nematode, Waterhemp, Palmer Amaranth, Marestail (Horseweed)
Knapweeds, Bedstraws, Western Bean Cutworm
Demonstration of a mobile app prototype to determine machinery and crop production costs.

Please register at least one day before the meeting date. Lunch provided by sponsors.
Contact Aaron Gabriel, 518-380-1496, adg12@cornell.edu or
Dayton Maxwell, 518-380-1498, dtm4@cornell.edu, or
https://tinyurl.com/FarmerDiscussionGroups2020, or
CCE-CAAHP@cornell.edu

Building Strong and Vibrant New York Communities
Cornell Cooperative Extension provides equal program and employment opportunities

February 7, 2020, 9:30 am —3:45 pm —6th Annual Hudson Valley Value-Added Grain School—at the Pegasus Restaurant, 10885 Rte 9W, Coxsackie, NY. Ancient Grains and Heritage Corn. Speakers will cover their importance, production, weed control, marketing, and more. ($40) Register by February 5th. Info and registration at http://ulster.cce.cornell.edu/grainschool2020.

CCE—Central NY Dairy, Livestock, and Field Crop Team meetings:

- **Field Crop Pest Management (2 pesticide applicator recertification credits)**
- **Corn Day (in Cooperstown, Feb 11th) I can drive the CCE van if you want a ride (starting in southern Washington County, going through Albany, down Rte 88. Contact Aaron Gabriel.)**
- **Dairy Day**

Locations and time vary. Information at https://cnydfc.cce.cornell.edu/events.php

Industrial Hemp Meetings:

- **Cornell sponsored meetings,** https://hemp.cals.cornell.edu/2019/11/22/upcoming-events-winter-2020/
- **Univ. of Vermont Industrial Hemp Conference**, https://www.uvm.edu/extension/nwcrops/2020-industrial-hemp-conference
- **King's Agriseeds Hemp meeting, KingsAgriSeeds.com/Hemp**

12th Annual Winter GreenUp Conference—A great line up of speakers on grazing and livestock operations, http://blogs.cornell.edu/capitalareaagandhortprogram/2019/11/07/twelfth-annual-winter-green-up-january-25-2020/

March 10, 2020 - Capital District Pesticide Applicator's Recertification Day, more info to follow.

FYI

Guides Outline Solar Leases for Farmers Two guides to help landowners navigate solar leases are available from the National Agricultural Law Center. *The Farmland Owner's Guide to Solar Leasing* helps landowners understand solar energy development and the solar leasing process. A second publication, *Understanding Solar Energy Agreements*, provides information for landowners considering and negotiating leases. https://attra.ncat.org/guides-outline-solar-leases-for-farmers/?utm_source=WH&utm_medium=PM&utm_campaign=news

Farm Labor Changes— (from Nicole Tommel, Central NY Dairy, Livestock, Field Crop Team)

If you haven't had a chance to check out this website, NYS Workers Compensation Farm Tool Kit , please take a moment as you will find a wealth of information and factsheets to help you navigate the new regulations and insurance requirements.

Also, please do not be afraid to reach out to the DOL ag labor experts. They are there to assist in navigating the new rules. Our specialists in the region are Dania (eastern) and Laura (western/central). Both ladies are knowledgeable and are there to provide education to our farm employers.

Finally, remember to bookmark the Cornell Ag Workforce website, they too have a tremendous amount of information in an organized fashion. Cornell Ag Workforce Development

Agronomy—Aaron's Comments

It is the time of year to *PLAN*. Lots of decisions are made about crops and every aspect of your farm. The hardest decisions are the ones for which you have little or no good information. The easier decisions are those for which you have plenty of good information. It sounds basic, and it is, but sometimes when we wrestle with a decision, we do not realize that what we need is to take time to gather more information.

This past season, **soybean cyst nematode** was found in Columbia County at very low numbers. We will do more sampling this year to see how prevalent it may be. The article below will give you some good information on it. Also, for my first time, I found **tall waterhemp** in Washington and Columbia Counties. This weed is a pigweed, but much more troublesome than our usual redroot or smooth pigweed. It tolerates many herbicides and produces a crazy number of seeds. These pests can be introduced into new fields by machinery and boots. We will discuss these pests and more in our Farmer Discussion Group Meetings.

I sometimes hear comments about corn residue, and how residue of BT type corn does not decompose like conventional corn. The article at the end of this newsletter shows that corn residues all decompose at the same rate whether it is BT or conventional corn, and whether or not nitrogen fertilizer is broadcast on the stubble. Sometimes you need a good study to compare different scenarios, rather than just casual observation.

Will you be trying a new product or seed this year? Set up a couple of strips or spots (3 or 4 is best) to compare results with and without the product. A little extra time can give you valuable information.

Lastly, agriculture continues to go through difficult changes. I do not think that it is fair and some of it is not what I would consider to be good. How do you survive and make a profit? Certainly efficient production is important, but, that is not enough. Having a savvy business plan and marketing plan is absolutely necessary. That means being very honest with ourselves to determine what we are good at, and where we lack talent or expertise. The formulation of a plan begins there, along with what do you need in a career or enterprise to gain satisfaction. There is nothing like a warm wood stove to sit by and think— to do a little self-analysis, business analysis, and introspection.

Soybean Cyst Nematode Now Confirmed in Six Additional Counties in New York

blogs.cornell.edu/whatscroppingup/2019/12/23/soybean-cyst-nematode-now-confirmed-in-six-additional-counties-in-new-york/

Jaime Cummings and Ken Wise, NYS Integrated Pest Management Program; Mike Hunter, Mike Stanyard, Aaron Gabriel and Kevin Ganoe, Cornell Cooperative Extension; Michael Dorgan, NYS Dept. of Agriculture and Markets

The soybean cyst nematode (SCN) is considered the number one pest of economic concern of soybeans nationally and globally, potentially causing 10-30% yield loss in the absence of above ground symptoms. In 2017, national estimates reported over 109 million bushels lost to this pest in the U.S. alone. Considering that this pest is confirmed in surrounding states and provinces, and given its potential to spread, statewide survey efforts have been underway since 2013 to determine the presence or absence of the soybean cyst nematode in NY. From 2013-2016, numerous fields in 17 counties were sampled and tested as part of a statewide soybean disease survey led by Cornell's Field Crops Pathology program, funded by Northern NY Agricultural Development Program and NY Corn and Soybean Growers Association. In 2016, SCN was confirmed in one field in Cayuga County by Cornell's USDA ARS Nematology lab, albeit at

very low levels. Since then, survey efforts have continued, because it is widely assumed that SCN is much more prevalent in NY.

In 2019, the NYS Integrated Pest Management Program was commissioned by NYS Department of Ag and Markets to coordinate a Cooperative Agricultural Pest Survey (CAPS) in soybeans with Cornell Cooperative Extension specialists to maintain vigilance against potentially invasive species. For more information about the CAPS program and this survey effort, please refer to this article. As part of this survey, 25 soil samples were collected from fields in 16 counties across NYS and were submitted for testing at the SCN Diagnostics laboratory. Of those 25 samples, seven of them were positive for SCN in six different counties, confirming our suspicions that this pest is potentially widespread throughout soybean production areas in NY. This brings us to a total of seven counties in NY with at least one field positive for SCN. The counties identified with fields positive in 2019 include Columbia, Dutchess, Jefferson, Monroe, Tompkins and Wayne (Fig. 1).

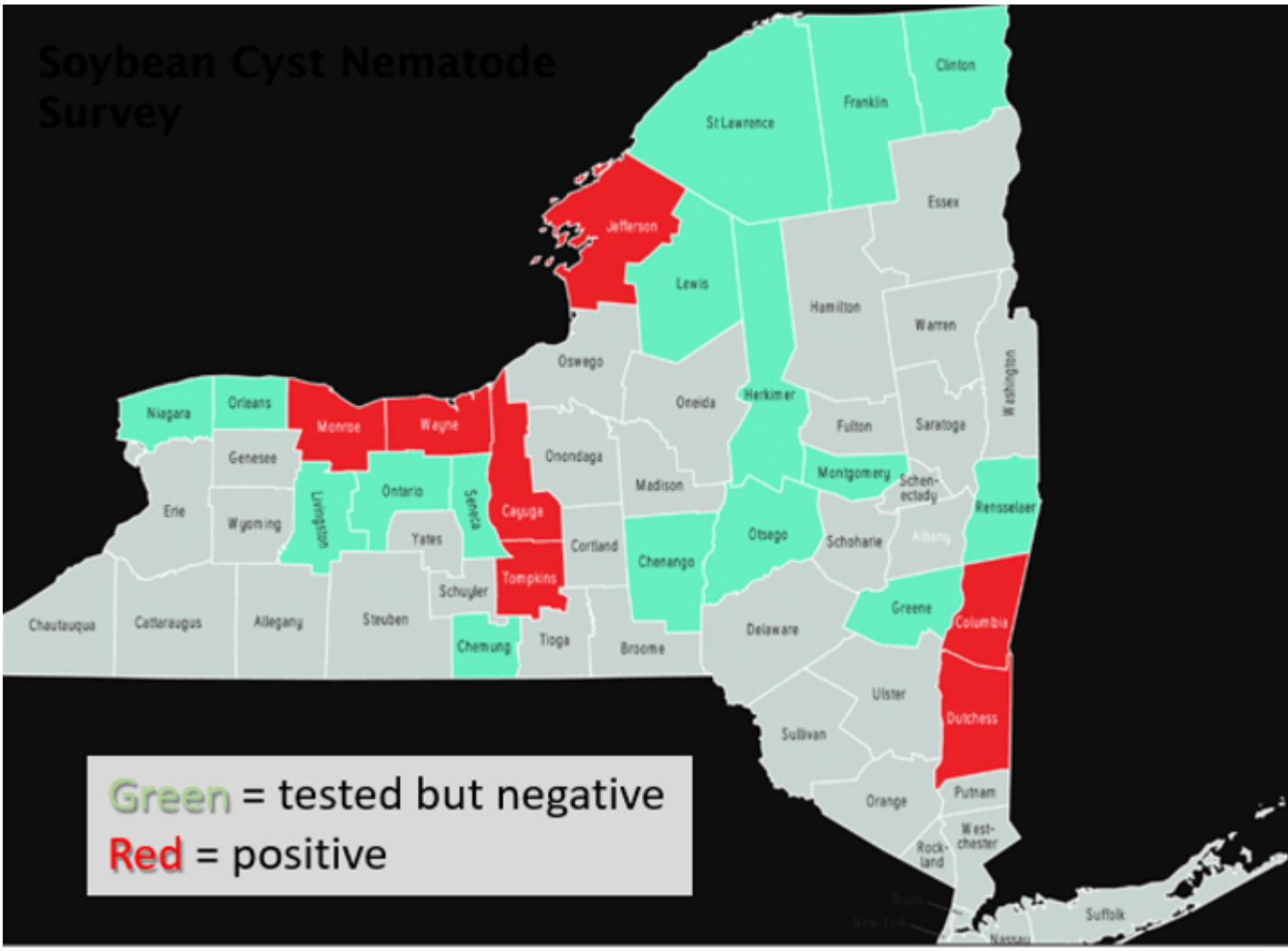

Figure 1. Soybean cyst nematode survey efforts in NY since 2013. Counties colored in green had fields tested with negative results, and counties colored in red had one or more fields that tested positive. The first positive result was in Cayuga County in 216. In 2019, six more counties tested positive as a result of the soybean Cooperative Agricultural Pest Survey.

Thankfully, the egg counts in these positive samples were all below 500 eggs per cup of soil (250 cc of soil). Although that may sound like a lot, these are very low numbers compared to the 10,000-80,000 egg counts that some growers struggle with in other states. This means that we are in a good position to *proactively* manage for this pest *before* it gets out of hand and starts causing economic losses.

An integrated management approach will help NY soybean growers stay ahead of the soybean cyst nematode. This involves continued testing efforts to monitor your fields for SCN. Determining if you have the pest is the first step toward management. For detailed information and recommendations on how to collect samples for SCN testing and where to send those samples to, please refer to this article. If you get a positive result, keep records of your egg counts for each individual field. Implement the following tactics when managing for this pest:

1. SCN can be moved among fields on soil, whether it be via wind, water, equipment, or boots. Consider improving sanitation of equipment coming from fields with known SCN infestation to avoid spreading it to others.
2. Crop rotation is the number one tool for managing SCN. Rotating to a non-host crop, such as corn, small grains, alfalfa, forage grasses and mixes for one year can reduce the nematode population by up to 50%. Continuous soybean production in an infested field can increase nematode populations exponentially, since this pest can have up to three life cycles per season in NY.
3. Select and plant soybean varieties with resistance to SCN, and rotate those resistant varieties that you plant. The nematode quickly develops resistance to the resistant varieties when exposed to the same varieties over and over, in the same way that weeds develop resistance to over-used herbicides.
4. Consider nematicidal seed treatments if your SCN populations start causing economic damage (Fig. 2). Research has shown that these products are only cost-effective with high SCN population levels causing significant damage.

Keep testing. Continue to test fields that you get negative results from, and especially continue to test fields that you get positive results from. Keep track of your egg counts in each field to know how your populations are changing, as that may affect your management strategy. It is recommended that as long as egg counts remain below 30,000 eggs per cup of soil, crop rotation with SCN-resistant soybean varieties is the best approach.

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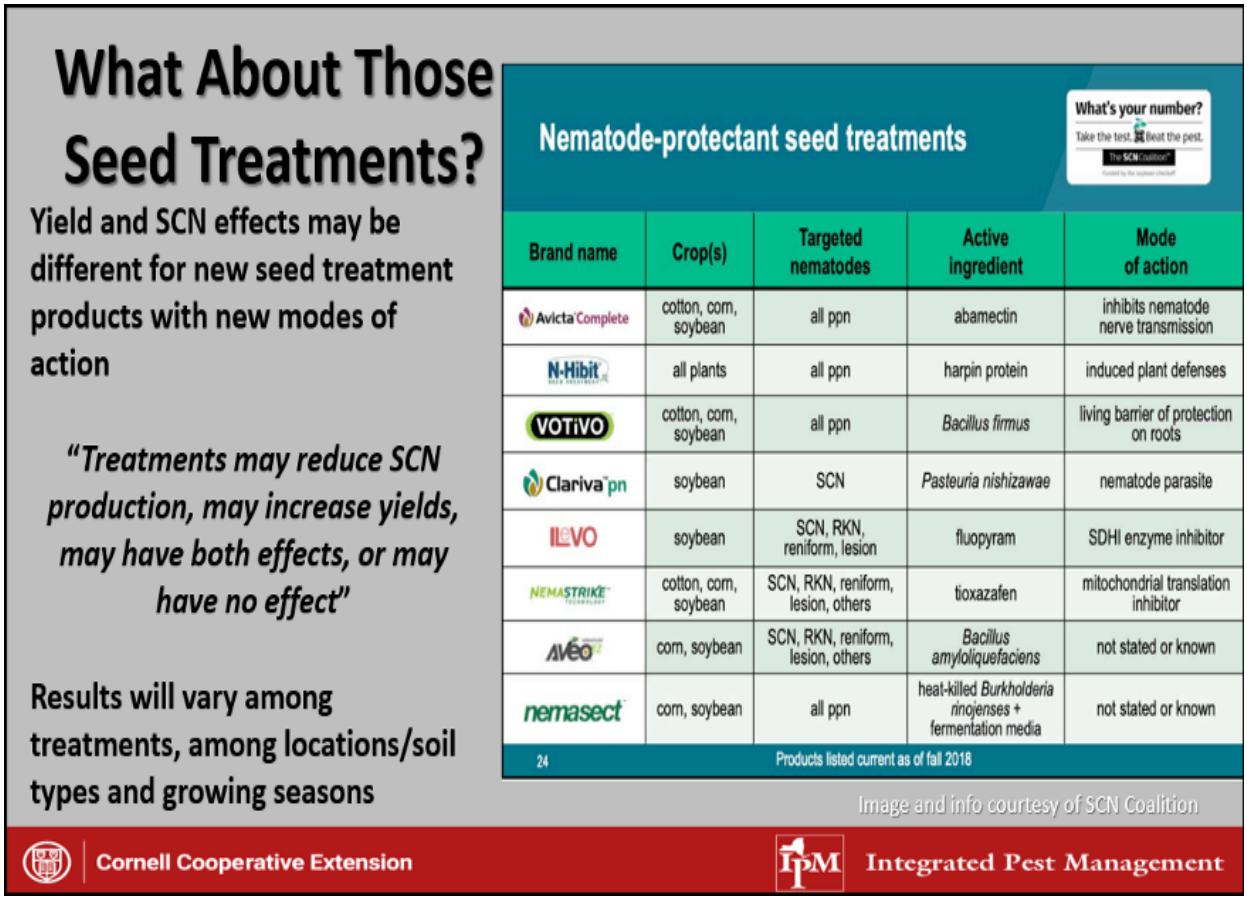

Brand name	Crop(s)	Targeted nematodes	Active ingredient	Mode of action
Avicta Complete	cotton, corn, soybean	all ppn	abamectin	inhibits nematode nerve transmission
N-Hibit	all plants	all ppn	harpin protein	induced plant defenses
VOTiVO	cotton, corn, soybean	all ppn	*Bacillus firmus*	living barrier of protection on roots
Clariva pn	soybean	SCN	*Pasteuria nishizawae*	nematode parasite
ILEVO	soybean	SCN, RKN, reniform, lesion	fluopyram	SDHI enzyme inhibitor
NEMASTRIKE	cotton, corn, soybean	SCN, RKN, reniform, lesion, others	tioxazafen	mitochondrial translation inhibitor
AVEO	corn, soybean	SCN, RKN, reniform, lesion, others	*Bacillus amyloliquefaciens*	not stated or known
nemasect	corn, soybean	all ppn	heat-killed *Burkholderia rinojenses* + fermentation media	not stated or known

Figure 2. Nematicidal seed treatments available for managing soybean cyst nematode.

Crop rotation is the most important tool, and we are lucky to have a number of non-host crops already in our rotations. But, SCN has a fairly wide host range, including a number of our common weeds and cover crops. Some of these weed and cover crop hosts include chickweed, some clovers, common mullein, henbit, pokeweed, vetch and purslane (Table 1). That's just another thing to remember as you plan your crop rotations and weed management strategies.

Table I. Host plants for SCN, including weed hosts, that have had one or more populations of SCN reproduce on them, and nonhost crops. (Courtesy of Univ. of Nebraska, extension publication G1383)

Host Crops	*Weed Hosts*	*Nonhost Crops*
Birdsfoot Trefoil	Common Chickweed	Alfalfa
Edible Beans	Common Mullen	Canola
Clover (Alsike, Crimson, Sweet)	Field Pennycress	Clover (Red, White, Ladino)
Cowpea	Henbit	Corn
Lespedezas	Pokeweed	Forage Grasses
Lupine (White, Yellow)	Purslane	Small Grains (Barley, Oats, Rye, Wheat)
Soybeans	Sericea Lespedeza	Sorghum (Grain, Forage)
Vetch (Common, Crown, Hairy)	Wild Mustard	Sugar Beets

Keep in mind that testing for SCN can be tricky, since it can be difficult to detect at low population densities, and populations can be quite variable within a field (Fig. 3). Focus your testing efforts on fields with unexplained lower yields, or fields with a history of Sudden Death Syndrome (SDS) or Brown Stem Rot. It is well known that there is a strong correlation between the presence of SCN and SDS. If you see patches of SDS in your field, that would be an ideal location to pull soil samples for testing for SCN. For more information on the relationship between SDS and SCN, please refer to this article.

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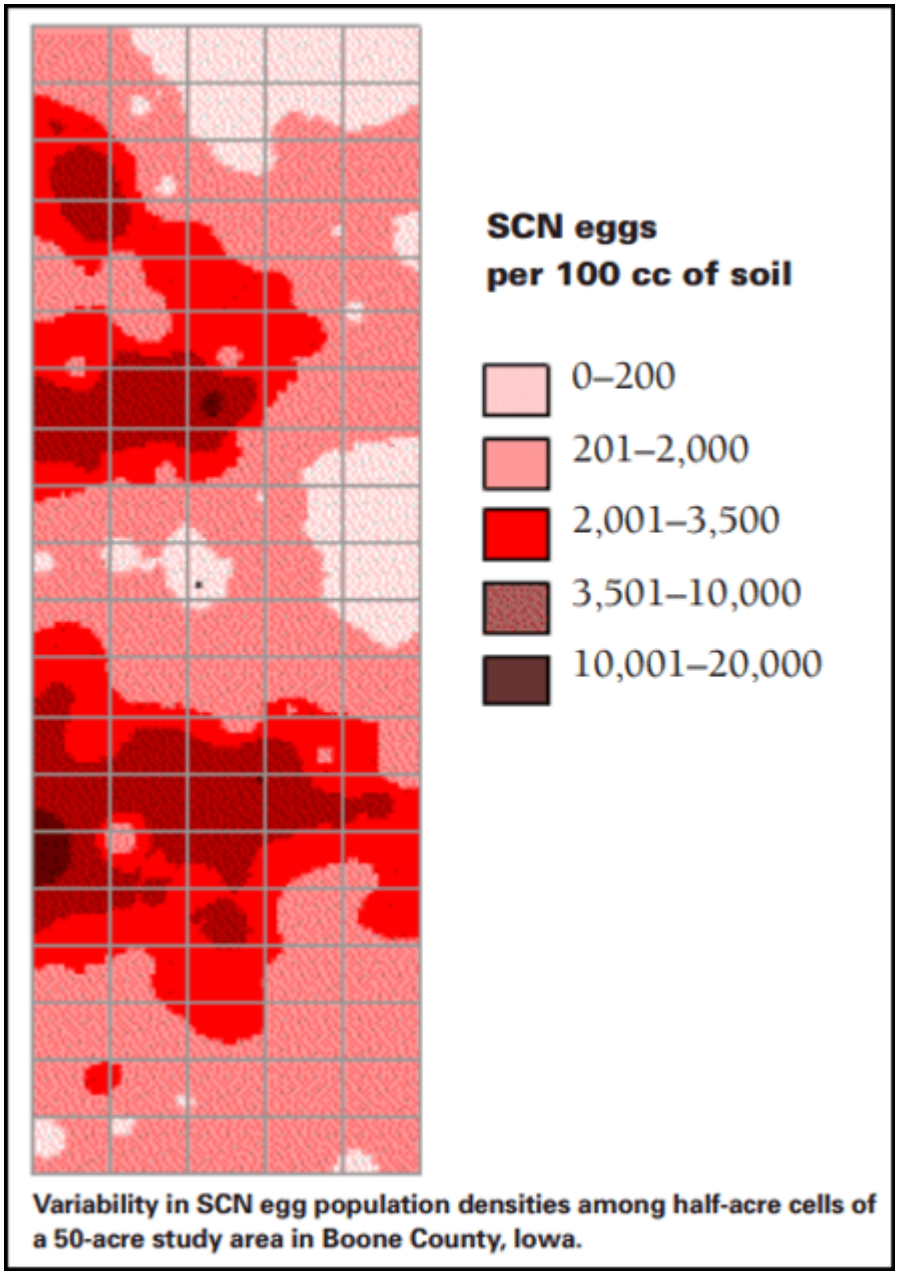

Figure 3. Grid sampling reveals high variability in soybean cyst nematode population densities within a single field. (Image courtesy of Iowa State University)

For more information on this pest and recommendations, please visit the Soybean Cyst Nematode Coalition website. There you will find numerous resources explaining the resistance issues with this pest, how and where to test for it, management recommendations, and success stories. Expanded SCN testing efforts will commence in 2020, supported by the NY Corn and Soybean Growers Association. If you suspect SCN in your fields, contact your area Cornell Cooperative Extension specialist for assistance, they may be able to offer you free testing on suspect fields as part of the expanded testing efforts in 2020.

Corn Residue Breakdown as Affected by Tillage and N Application

Mahdi Al-Kaisi *Professor of Soil Management/ Environment*

Iowa State University, ICM News, November 5, 2019
https://crops.extension.iastate.edu/cropnews/2019/11/corn-residue-breakdown-affected-tillage-and-n-application

Crop residue serves an important role in physically protecting soil from erosion during rain events or high winds, as well as enhancing the soil biological activity by providing sources of organic carbon and nitrogen for its energy needs. In order to understand how residue decomposes, we need to understand how the degradation processes are influenced by environmental and soil conditions; namely, air and soil temperatures, soil moisture availability, soil pH, oxygen, and type of microbial community. The composition of crop residue includes lignin, cellulose, hemicellulose, and macro and micronutrients. Certain biological and enzymatic processes, controlled by a wide range of microorganisms and influenced by other factors, must occur in order to release most of these organic forms.

In agriculture, annual cropping systems and other ecosystems management can influence these factors that are critical to the process of residue breakdown. There is a common belief among many farmers and agronomists that tillage can accelerate residue breakdown by the cutting of crop residue into small pieces or burying residue in the soil profile. Also, there is the belief that the application of nitrogen fertilizer on crop residue (i.e., corn residue) after harvest can speed up the process of residue breakdown. Both assertions are not correct.

Tillage Effects on Residue Breakdown

A study conducted to examine the effect of three different tillage systems that include deep tillage (DT), strip-tillage (ST), and no-till (NT) on residue breakdown of both Bt and non-Bt corn residues. The results of this three-year field and laboratory incubation studies show no significant differences in the breakdown or percent of residue that remained among the three tillage systems with either Bt and non-Bt corn hybrid residues. Also, after 12 months, there was no difference between tillage systems or Bt and non-Bt hybrid residue breakdown in the field, where 34-49% of the corn residue still remained on the soil surface. The results of the residue decomposition study are presented in Figure 1, where the residue decomposition rate is represented by CO_2-C release. The results show no significant difference in the breakdown or decomposition due to tillage or type of residue (Bt or non-Bt).

Nitrogen Fertilizer Application Effects on Residue Breakdown

The results of the study on corn residue decomposition with different N rates in the no-tillage system under field conditions are presented in Figure 2a. Corn residue decomposition was evaluated by applying 32% UAN at three N rates (0, 30 and 60 lb N/acre) to corn residue immediately after harvest, where specific amounts of corn residue were weighed and placed in nylon mesh bags and left in the field immediately after harvest for decomposition evaluation. The rate of residue decomposition was evaluated every three months for the entire year (12 months).

The results showed that corn residue decomposition increased with time with lesser amounts of residue remaining after each evaluation period, but no differences existed in the rate of residue

decomposition as a result of N application of different N rates. These results show that applying N fertilizer to facilitate residue decomposition is not effective. The timing of N application for corn residue decomposition immediately after harvest, as practiced, is not an effective strategy, as the soil and air temperatures decrease over time after fall harvest. Soil moisture and temperature are essential factors for microbial activity for the residue decomposition (moisture at field capacity and warm temperature above 50 ^{o}F). Therefore, fall N application does not achieve the intended result of facilitating residue decomposition.

The same results were observed with laboratory evaluation of corn residue decomposition that was conducted with the same residue treated with different N rates in the field study. Corn residue samples from the field were incubated in the laboratory under constant temperatures of 32° F and 90° F for approximately 30 days each (Fig. 2b and 2c). The rate of corn residue decomposition under laboratory conditions followed a similar trend as that in the field. Again, no differences in residue decomposition/breakdown with different N rates were found. The laboratory study results confirmed the field results and demonstrated the role of temperature in controlling corn residue decomposition rather than N rate, where a slower rate of residue decomposition was observed at the low temperature (32 ^{o}F) and increased at the higher temperature (90 ^{o}F) (Fig. 2b and 2c) without any effect of N application on residue breakdown.

Summary

The use of tillage or N application to increase residue decomposition can be counterproductive from economic and environmental perspectives. From an economic perspective, both options of management add additional costs of materials, time, labor, fuel, and equipment costs. Environmentally, both tillage and this fall N application are not very sustainable practices. Tillage can contribute to soil health and water quality deterioration by increasing soil erosion potential, sediment loss, and water quality degradation, and fall N applications result in water quality risks. Since residue decomposition is controlled by biological processes that are influenced by environmental and soil conditions, our research and many other studies do not support these practices regardless of the justification or claims that propose tillage equipment can manage residue. Disturbing the soil does not constitute an improvement in soil health nor increase in residue decomposition.

(figures on the next two pages)

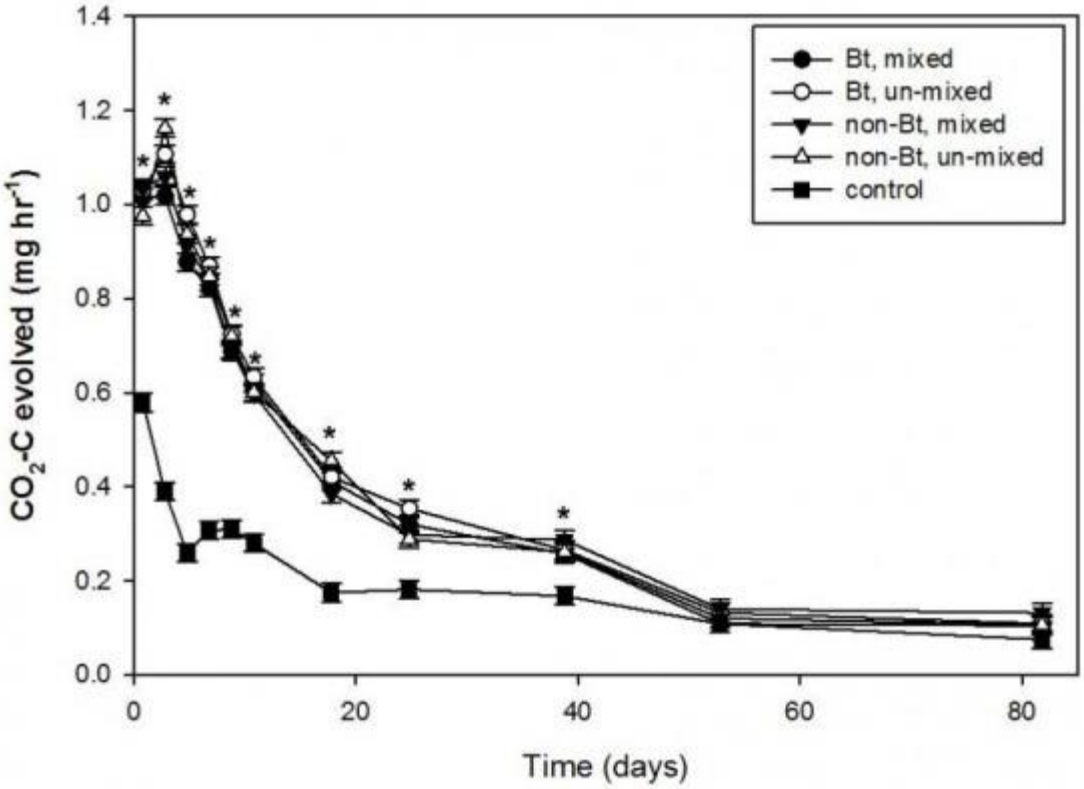

Figure 1. Rate of CO_2-C released as an indicator of residue breakdown/decomposition from control (bare soil) and Bt and non-Bt corn residue mixed into the soil or un-mixed with soil (left on soil surface). Asterisk represents CO_2-C released rates from treatments that were significantly different from control for the corresponding days at the 0.05 probability level using the least significant difference

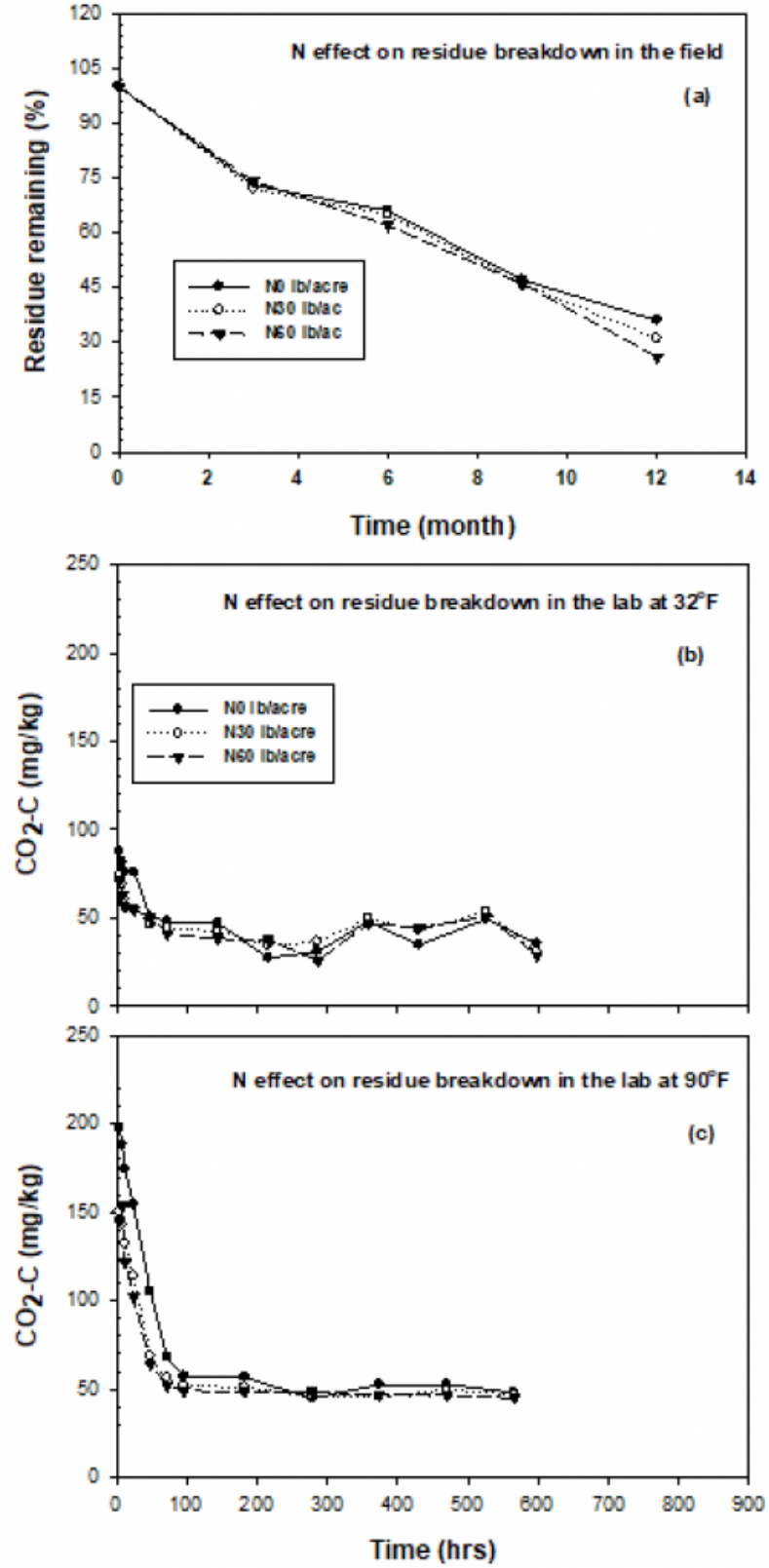

Figure 2. Nitrogen (N) effect on (a) residue breakdown in the field, (b) residue breakdown in the laboratory under 32°F and (c) residue breakdown in the laboratory at 90°F room temperatures.