

SPECIAL · REPORT

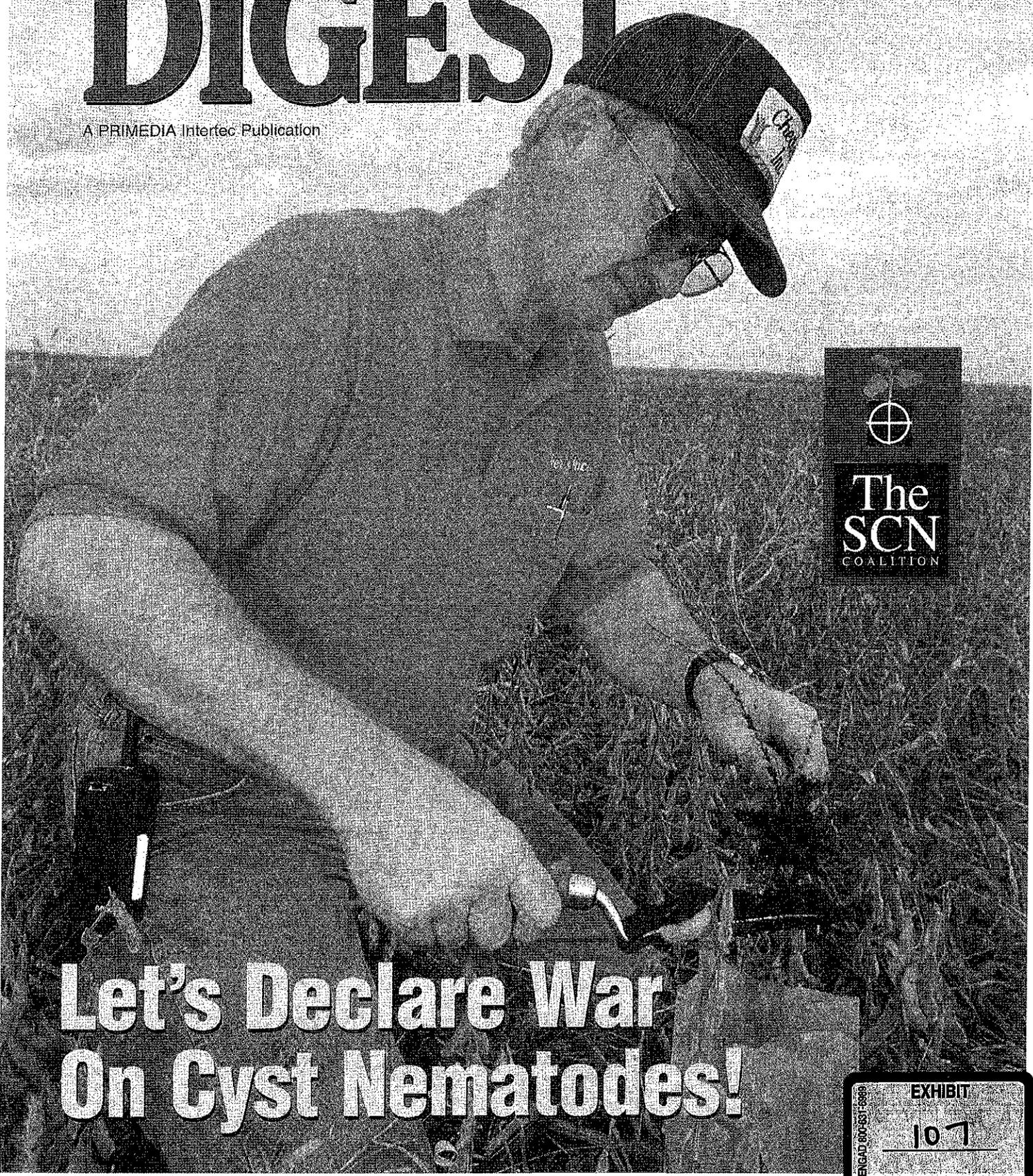
Supplement to Soybean Digest

SOYBEAN

August/September 1998

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Let's Declare War On Cyst Nematodes!

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EXHIBIT

107

Let's Get Tough On SCN Now

It's almost tragic what farmers are letting soybean cyst nematodes do to them. And the pity is, most farmers don't even realize it.

This Special Report is your blueprint toward whipping this profit robber, if you have it, or keeping fields clean or near so if you don't.

We salute companies whose advertising helped bring this important information to you.
— The Editors

Catch more on SCN on our Web site at www.homefarm.com. Find even more on the SCN Coalition site: www.ext.net.iastate.edu/Pages/plantpath/tylka/scncoalition.html

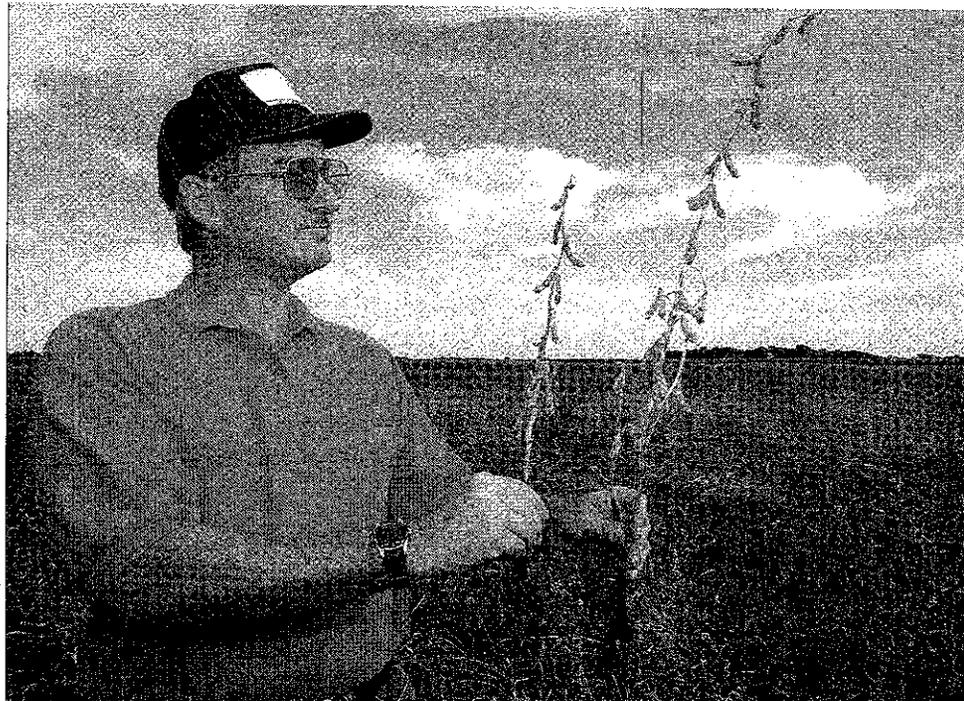
Also: AgDay TV will soon devote part of a 30-minute segment on soybeans to SCN. The broadcast is on Friday, Aug. 14, and re-broadcast on various satellite hookups that weekend. Don't miss it.

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On The Cover: Ron Heck, Perry, IA, grower, shown here taking soil samples for SCN testing, found to his surprise nematodes were causing big losses.

COVER PHOTO: Bob Elbert



Ron Heck, Perry, IA, shows the difference between a non-damaged SCN-resistant variety and a damaged susceptible variety.

\$7 per bu (the price available at that time), that's \$91 per acre. Besides, I spent less on weed control because of the quicker canopy with the resistant beans. "And all I did was change my seed order!"

A dramatic example? Yes. But let's be conservative, say Heck and Greg Tylka, Iowa State University nematologist, who is doing SCN research at Heck's farm.

Let's say the loss was 7½ bu per acre. And let's use \$5.50 per bushel, which most any grower-market ought to be able to beat for his '98 crop. That's \$41.25 per acre. If you raise, say, 300 acres of soybeans, that's \$12,375. Over two years, that's just a tad under \$25,000 — the price of a new, pretty decent pickup truck.

Heck's situation isn't all that unusual, say scientists, and there are plenty of cases that involve worse losses.

There's good news, and there's hope for soybean growers, however. Scientists like Tylka, grower associations and various industries that serve farmers have come to an overdue decision: Enough is enough! They have teamed up to form a 10-state SCN Coalition. Its challenge to soybean growers: "Take the test. Beat the pest."

Its mission: get all soybean growers to take soil samples and have them analyzed for SCN. Then, if they find they have the pests, to take the proper corrective action.

Admittedly, SCN hasn't yet infested every soybean grower's fields. But compared to even 10 years ago, if you're still free of this single-biggest, profit-stealing pest for U.S. soybean growers, it is getting much closer to nailing you.

The thing most growers don't realize — which is probably why they haven't tested for the pest — is that you can have SCN several years before they build high enough numbers to cause noticeable SCN symptoms. The real bad news is this: In most cases, plant damage and yield loss occur years before symptoms are visible.

Consider this: The first reports of SCN in the U.S. came from North Carolina in 1954 — 44 years ago. The destructive buggers now have been identified in virtually all 30 states where soybeans are grown.

For example, 82% of Illinois soybean fields are infested, 74% of Iowa fields, 71% of Missouri fields and 53% of Minnesota fields — and counting in every case.

Sadly, say SCN fighters, two-thirds of soybean growers have done nothing to beat these pests.

Here's what's scary about the nematode spread: Your fields could get infected — even if you do everything known to science to prevent and/or control cyst nematodes.

Migratory geese or ducks could stop to eat in a wet, infested field miles from your farm or even your county and then stop to feed in one of your fields and seed SCN with their muddy feet. Or nematodes can spread via seed harvested from infested fields then planted in your clean fields.

Even if farmers declare all-out war on these destructive pests, they cannot banish them completely. They can't be totally eliminated, caution scientists. But they can be managed well enough to become only small-time thieves, they assure. That's the good news.

In the articles that follow in this Special Report, you will find the details needed to hog-tie these thieves that steal significant profits from so many U.S. soybean growers.

Declare War On SCN

10-state challenge: "Take the test. Beat the pest."

by Syl Marking



Soybean cyst nematodes slap soybean growers collectively with more than a \$1 billion loss each year. Regrettably, most farmers shrug off those national-loss

figures with the feeling, "That's the other guy's problem."

Listen up! Let's put it in terms

then of one farmer — a top grower and one-time president of his state's soybean grower association. Ron Heck, an Iowa State University graduate from Perry, IA, found that SCN had sneaked up on him like a fox looking for dinner. He sought help from his alma mater, then told growers at the Midwest Soybean Conference last August:

"Each year I failed to do something about SCN, I lost about \$20,000."

In 1997 research on his farm, Heck found out exactly how important it was to take some corrective action. Early that spring, after studying 1996 research results, he fired an important management shot by switching varieties and leaving check strips with his old, non-resistant varieties. Let him tell it in his own words.

"I picked up 13 bu per acre when I planted a resistant variety on that infested land. And at

An Open Letter From The Editor

This is "war." And as editor of this magazine, I am declaring it.

It's war on soybean cyst nematodes – microscopic roundworms that could be stealing you blind.

Worse yet, you may not even know it. SCN can be as sneaky as a stealth bomber in military combat. It can be down and dirty.

That's partly why it's gouging so many U.S. soybean growers by an estimated total of \$1 billion-plus per year!

People, listen up. You cannot control weather. You cannot control crop prices.

But, by thunder, you can do something about the \$5,000 to \$20,000 loss many of you are needlessly suffering from SCN.

Admittedly, not every soybean grower has cyst nematodes. Count your blessings if you've tested for them and found you don't.

Study the management pointers in these Special Report articles, so you can do everything possible to avoid getting them – and if you do get them, keep them confined to small areas.

So, my challenge to you is to read – no, study – every article in this report. Then take action now!

Take the test. Beat the pest. Good Luck!

Syl Marking
Editor



A Letter From SCN Regional Coordinator

After weeds, soybean cyst nematodes are the most important soybean pests in the Midwest. Every year, SCN robs yields and profits from soybean producers. In 1997, SCN "stole" 209 million bushels of beans from producers' bins and bottom lines.

Last year, the North Central Soybean Research Program, which uses checkoff dollars to fund research in a 10-state region, decided to do something radically different to get the word out to producers about SCN. Thus, the SCN Coalition was born.

As the SCN regional education coordinator, I am pleased to be working with university, industry and state soybean checkoff board partners in spreading the word about SCN. This coalition is truly a unique venture, combining the efforts of university scientists and state checkoff board staffs in Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, South Dakota and Wisconsin. Also part of the effort are these industry partners: Asgrow, American Soybean Association, Cargill, Cenex/Land O'Lakes, Dekalb, Growmark/Countrymark, Mycogen, Novartis, Pioneer, *Soybean Digest* and United Soybean Board.

This Special Report is an example of our coalition working together. I want to thank Syl Marking and the staff at *Soybean Digest* for their efforts in raising awareness about SCN through past feature stories and this SCN Special Report.

Paulette Pierson
SCN Regional Education Coordinator

New Coalition Launches All-Out Assault On SCN

Its mission: to control No. 1 profit stealer

by Syl Marking



A ground-breaking partnership of state soybean checkoff boards and land grant universities from 10 North Central states has formed the Soybean Cyst Nematode (SCN) Coalition.

The coalition's goal: to get soybean growers to test for SCN, and if they find they have it, take the necessary steps to manage the problem – which ranks No. 1 as a profit stealer.

The coalition's slogan, which you will hear and see a lot in the next year is, "Take the test. Beat the pest."

The massive coalition effort is being largely underwritten by the North Central Soybean



White SCN cysts clinging to roots can each contain hundreds of eggs.

Take the test.  Beat the pest.

The
SCN
COALITION

Research Program. That's an alliance created by 10 state soybean checkoff boards.

Cooperating states include: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, South Dakota and Wisconsin.

In addition to grower check-off funds, the coalition is getting financial backing from several seed companies and ag cooperatives.

Industry partners, besides the American Soybean Association and the United Soybean Board, include Asgrow Seed Co., Cargill Hybrid Seeds, Cenex/Land O'Lakes, Dekalb Genetics, Growmark/Countrymark, Mycogen Seeds, Novartis Seeds and Pioneer Hi-Bred International.

Besides extension and research scientists at each of the North Central land grant universities, representatives from seed companies, farm cooperatives, crop consulting firms and ag media will be involved in executing the regional umbrella program.

SCN has spread so that it has now been identified in virtually every state where soybeans are grown. It has also been written

about and talked about in educational efforts.

So why is such a special, all-out effort needed now?

The answer is simple, says Bryan Hieser, an Illinois soybean grower and chairman of the North Central Soybean Research Program: It's volume.

"We feel the urgency of our message wasn't reaching the grower," he declares. "By enlisting partners from state soybean boards and private industry, we could reach more growers and have greater impact with our key messages of testing soils for SCN and using the management tools available to prevent further damage, if you have the problem."

There's another reason – and it's a very key one, notes Greg Tylka, Iowa State University nematologist and coalition leader for the scientists cooperating in this regional effort.

"This whole idea of having significant yield loss without seeing any above-ground symptoms," he emphasizes, "is a concept that obviously hasn't been getting through to growers and needs to be pushed."

Now it will be. So, the next move is up to soybean growers.○

The SCN Land Rush

Pest invades most growing areas

by Stacey Hager



Like the pioneers of the Oklahoma land rush, soybean cyst nematodes are moving west and staking claim to new land.

Paulette Pierson, regional education coordinator for the SCN Coalition, believes it's actually an old claim just up for renewal.

First identified in North Carolina in 1954, SCN spread west and north, eventually reaching the heart of the nation's Soybean Belt. Recent diagnoses in parts of the Midwest are thought by many to be

a continuation of the pest's migration.

But Pierson figures most of the movement took place years ago.

"The spread or introduction of SCN occurred some time in the past," she states. "I believe it's just now being identified."

Very high SCN populations are being found in areas where the pest previously had never been identified. The high numbers indicate SCN has been there for years, she says.

For example, counts of over a quarter million eggs in 200 cc of soil were found last year in a previously "SCN-free" county in Ohio.

"Those are extremely high counts if you consider 250 eggs in the same volume of soil can

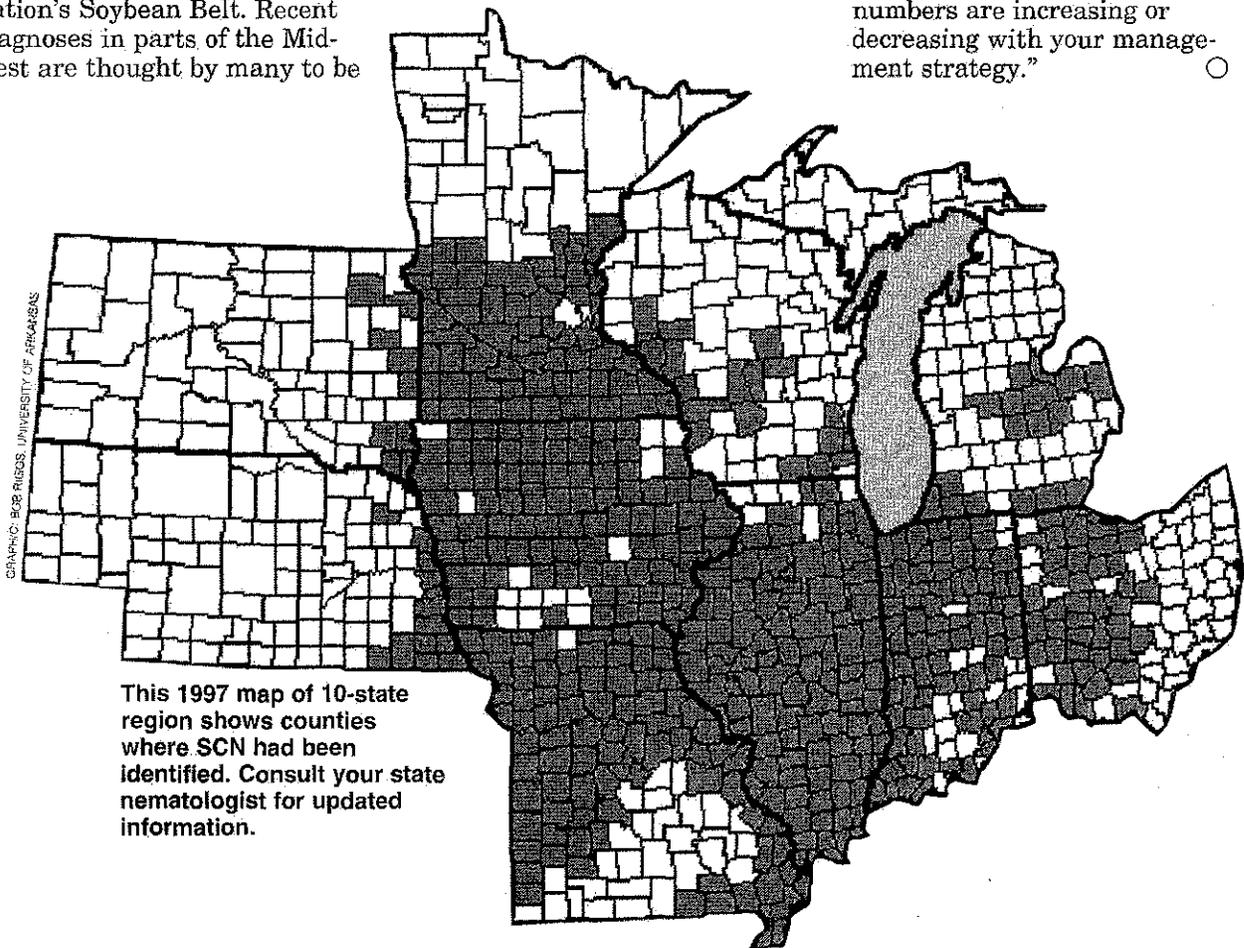
cause damage to SCN-susceptible soybeans," says Pierson.

She says SCN is probably present in more counties than the map below indicates.

In fact, it likely infests most soybean-growing counties.

"Growers really haven't been sampling. Where it hasn't been identified, it probably hasn't been looked for." The fact that SCN probably infests most fields emphasizes the need for growers to identify the problem and adopt a control program. That program should include periodic soil testing to monitor nematode populations.

"SCN can be managed," she says. "But you can't say I'm going to put a Band-Aid on it and just plant resistant varieties. You need to know if SCN numbers are increasing or decreasing with your management strategy." ○



GRAPHIC: BOB RIGGS, UNIVERSITY OF ARKANSAS

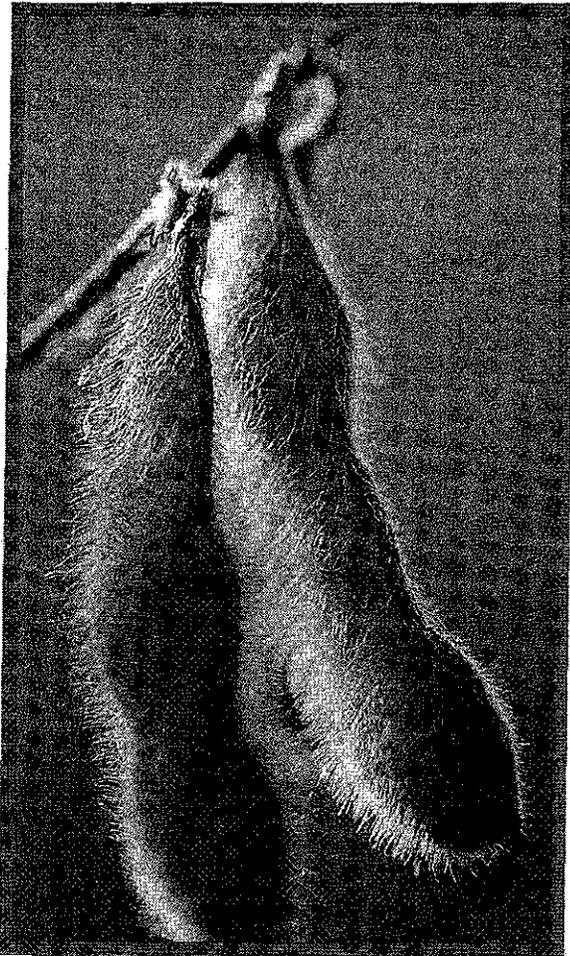
This 1997 map of 10-state region shows counties where SCN had been identified. Consult your state nematologist for updated information.

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Stop Nomadic Nematodes

Here's how you can prevent them from spreading

by Fae Holin



They'll hitch a ride on anything that moves, be it dust, Canada geese or water.

But the main way soybean cyst nematodes spread? Maybe the answer's in your mirror.

"The biggest way is through impatient farmers who are out working fields that are too wet," says Pat Donald, a University of Missouri extension nematologist.

"They get mud on everything and just carry dirt from field to field."

To keep SCN from spreading, work fields not known to have nematodes first, then move your rig into infested fields.

Or power-wash equipment between fields. Just don't move soil back and forth between fields, she reiterates.

"I never knew I had a problem, so I didn't clean my equipment off," admits Dave Broghamer, Decorah, IA. He's in his first year of fighting SCN on 60 acres.

"I just assumed this year that I had already spread it to all the other fields, so all the soybeans I planted are nematode-resistant," says Broghamer.

"Some think soybean cyst came into this country with soil that was brought in as inoculant," Donald says.

Others surmise that SCN has been around all along and that it



Power-washing tillage equipment will help stop the spread of SCN from field to field.

PHOTO: FAE HOLIN

was surviving on weeds, says Jamal Faghihi, a Purdue University research nematologist. "When soybean cultivation became widespread, it started showing up in different places," Faghihi adds.

Once it was found in North Carolina, it was discovered throughout the Southeast and later into the Midwest, reports John Ferris, a Purdue University nematologist.

"We first found it in 1970 in southern Indiana. Eight years later we found it in the northern border of the state. Then we found it all over."

However it got here, SCN is here to stay. Canada geese and other waterfowl are active carriers of the costly pest. So is water, says Donald.

"We know that water moves it; I documented in the flood of '93 that it was being brought into different areas along the Missouri River."

Blowing soil also carries SCN, says Walker Kirby, University of Illinois plant pathologist. He, too, suggests scrubbing and spraying tillage tools, tires and fender wells, for example. Custom harvesters should especially be asked to wash equip-

ment because "you have no idea where they are coming from."

"If you take time to do this, it will reduce the spread," Kirby says. ○

Publication Lists Resistant Varieties

For a listing of SCN-resistant soybean varieties, check out Marion Shier's *Soybean Varieties With Soybean Cyst Nematode Resistance*, an 18-page publication.

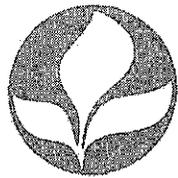
Shier, a Crop Systems Unit educator with the University Of Illinois Cooperative Extension Service, listed varieties alphabetically by company code in Maturity Groups I through VIII. The information is useful from Louisiana to Minnesota, according to Shier.

Check out the listing on the Internet at: www.ag.uiuc.edu/~wardt/cover.htm, or get a copy the old-fashioned way: send for it.

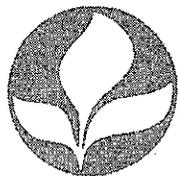
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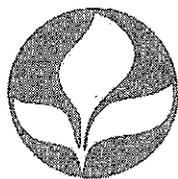
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SCN Symptoms: What You Can't See Hurts

Sneaky pests leave few early signs

by Fae Holin



Dave Broghamer had never been satisfied with yields from one of his farms. It's 60 acres of "pretty good ground" he rotates between corn and soybeans.

But last year the Decorah, IA, grower had enough.

"It was easy to see I had a problem; plants were not developing properly," Broghamer says. "They were smaller than normal."

Although parts of fields produced healthy plants, plants a few rows away were struggling. So he called in his local co-op agronomist, who suggested soil tests.

Soybean cyst nematodes strike again.

Broghamer is just one of many farmers who early on failed to recognize the above-ground symptoms of SCN. That's because there aren't any — until the nematodes are fully entrenched in a field and affecting yield.

"Unfortunately, the message got out fairly early that growers could see above-ground symptoms of soybean cyst nema-

todes," says University of Missouri extension nematologist Pat Donald.

"And that, if they had chlorotic leaves or dying plants, then they had SCN, and that's not necessarily true."

What is true is that the main early SCN symptom is a "half-empty weigh wagon vs. an overflowing one," says John Ferris, a Purdue University nematologist.

Walker Kirby, a University of Illinois plant pathologist, says the soils in his area are rich enough to support vigorous plant growth, even in the presence of nematodes.

"But the plants tend to set fewer flowers and have fewer pods, so they generally don't yield as well. To growers driving by the field, they look absolutely perfect."

And there's the rub, Donald says.

"Our biggest problem is getting people to get out of the pickups and sample fields," she states. "I recommend, if you have a field going into soybeans, that you sample. Period."

"We have people who say they've been growing soybeans forever and don't have a problem because they don't see any symptoms. When I finally get them to do egg counts, the egg counts come back at a level of



Dave Broghamer (left) and agronomist Kelly Holthaus discuss SCN-resistant varieties.

40,000 eggs per cup of soil."

That's enough to cause damage, even on resistant varieties, says Donald.

"The big symptom you don't visually notice is the cyst nematode feeding on the roots," says Kelly Holthaus, Broghamer's agronomist and branch manager of the Winneshiek Co-op, Burr Oak.

"The cysts basically eat off the root system and starve the plant," Holthaus explains. "After they start eating, the roots can't take up the nutrients. Then the visual effects start showing up."

By then it's too late to do something that year for that

crop, Donald says.

Growers who've noticed uneven patches in their fields should dig up roots and check their condition. Broghamer's roots "didn't finger out like they should have."

Other than little white cysts clinging to roots, you might find adult females actually feeding on them.

Most experts recommend sampling right ahead of or during harvest. But the best time to dig up and view roots is late June or early July, depending on the soil temperature and when the crop was planted, Donald says.

Symptoms growers do see — when SCN populations are quite

high and yields may be reduced by 10 bu/acre or more — include stunted, yellowing plants.

Yellowing is more visible in drought years and in sandy soils, Ferris says.

Plants are also smaller and less vigorous. Dead or uneven patches appear in fields.

"One of the things that I do, when the timing is right, is go out and look at the field with a producer and say, 'Look, this field is very uneven; there are a lot of different heights in the field,'" says Donald.

SCN also prevents good canopy closure, which increases weed pressure, she warns.

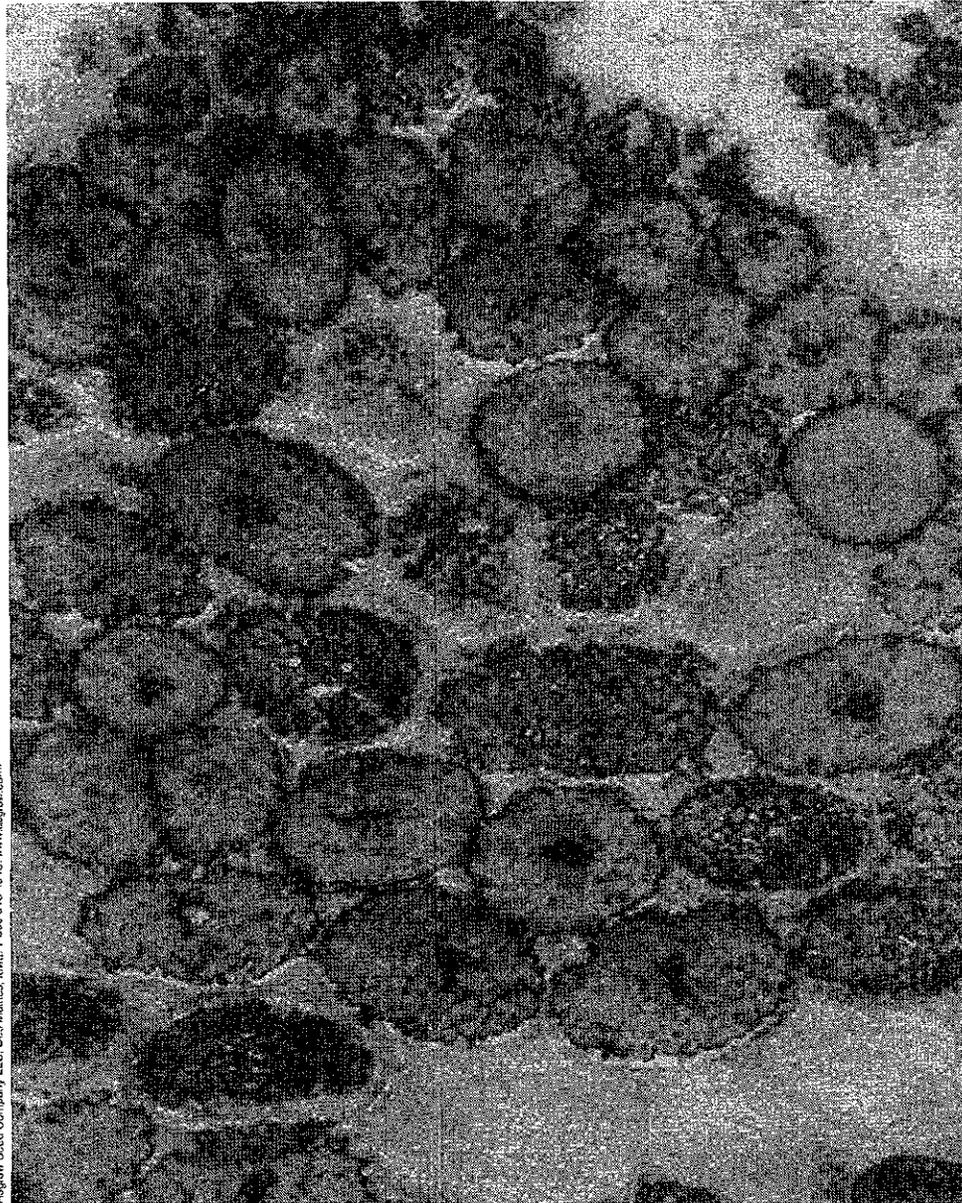
"There should be a light bulb

going off when they see weeds where they haven't seen weeds before."

And that leads to something else Donald would love to see growers do: track their field histories.

"You need to get a field history so that you know that the management techniques you're using are actually working. If you're doing something that's making the problem worse, and if you don't test repeatedly, then you don't know whether you're helping."

"You may delude yourself into thinking that you're really taking care of something when you are not."



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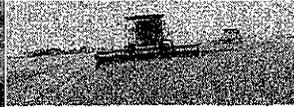
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SCN Signals Can Trick You

by Fae Holin



Most growers seem to want to find anything but soybean cyst nematode in problem fields.

Maybe that's why it's usually the last thing they look for.

"Farmers will look at pesticides, fertility, soil compaction," says Walker Kirby, University of Illinois plant pathologist. "Soil sampling (for SCN) is usually one of the last things they do."

Maybe that's because SCN is a sneaky little devil, sometimes posing as compaction, herbicide carryover, a nutrient deficiency or any fungal disease imaginable.

"What growers are first seeing is a yellowing of the plants," says John Ferris, a Purdue University nematologist.

That can mean that SCN has a firm hold on those plants – or that the crop has a nutrient deficiency.

SCN is commonly confused with iron chlorosis. But iron

chlorosis symptoms usually appear in June; SCN yellowing occurs in July or August.

Some growers hope to cure the yellowing with a shot of manganese, Ferris says. If the crop isn't manganese deficient, however, the beans may look better, but not yield better.

Dry, sandy fields in southern Illinois are often accused of having potash deficiencies rather than SCN. Symptoms of both include a burning or dying of leaf margins, Kirby says.

SCN can be confused with most any fungal-type root disease, Ferris adds.

Some growers may have pockets of phytophthora root rot, rhizoctonia or fusarium root rot, especially if they have heavy soil that stayed wet and cool all spring, warns Pat Donald.

Donald, a University of Missouri extension nematologist, recommends that growers be "good scouts and problem solvers and look at a wide range of things. The best thing a producer can do is dig up a plant and the soil around it and take it to a diagnostic lab to see if there

are any diseases."

"Or if they have a thin stand, they can take seed in for a germination test. If they think they have herbicide carryover, they need to go back and look at their records and see what they put on the fields.

"And they can always do a soil test and see if soybean cyst nematodes are present."

Actually, Donald recommends soil testing every soybean field for SCN, whether it appears to have a problem or not. ○

SCN Fooled These Growers

"We got knocked over the head with it last year."

Gary Klaassen is referring to the SCN problem that clobbered his 60-70 clients in 1997.

"We could find the symptoms about everywhere," says Klaassen, a Pioneer sales rep in northwestern Iowa.

He knew there was SCN in his territory, but thought it was limited to a small area. Spotty plant yellowing in other areas was blamed on iron chlorosis, and growers planted chlorosis-tolerant varieties to combat it.

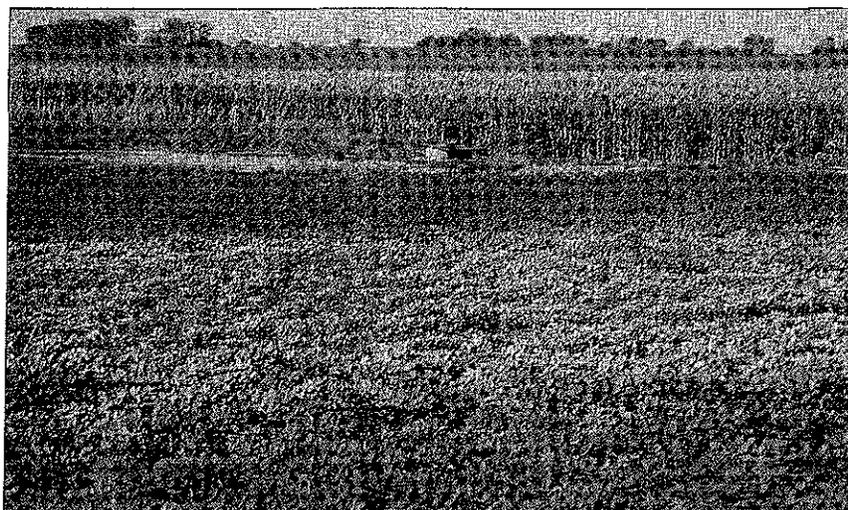
But the spots kept getting bigger, and last year the problem worsened when late-summer weather turned dry.

"The drouth enhanced our cyst nematode problem," he says.

After attending a scouting school at Iowa State University, Klaassen dug up plants and examined the roots with a magnifying glass.

"We found out what the real problem was," he states.

Clients who planted SCN-resistant soybean varieties last year got about 10 bu/acre higher yields than those who didn't. ○



Classic SCN symptoms were confirmed in the above field, but these symptoms are often confused with those for iron chlorosis.

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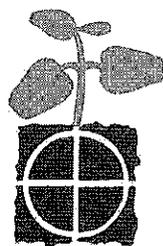
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Take the rest. Beat the pest.
The SCN

Soil Testing Diffuses Soybean Time Bomb

Here's how to collect samples

by Stacey Hager



SCN is like a time bomb in the soil waiting to explode.

That's how Ann MacGuidwin describes this yield-robbing, microscopic pest.

MacGuidwin, a University of Wisconsin nematologist, says it's important that every grower diffuse the bomb by having soil tested for SCN and then using recommended practices to control the pests.

MacGuidwin recommends that growers test regularly for SCN.

Negative test results can ease growers' minds, but are not a guarantee there won't be future problems.

She advises sampling in the fall before every other soybean crop, although samples can be accurately analyzed at any time during the year.

Guidelines for collecting soil samples:

1) Limit the number of acres represented in a single sample. Usually 10-20 acres is ideal. If the field is bigger than that, break it into 10- to 20-acre units.

2) Collect 10-20 soil cores from each field or unit using a probe, hand trowel or shovel. The intensity of sampling depends on the information at hand. If there are problem spots that show up year after year, then sampling efforts can be limited to that area. When there

are no obvious symptoms, use the 10-20 cores approach.

In any case, its never a good idea to take fewer than five soil cores because the sample will not be very representative of the field. The more spots you sample, the better.

- Take samples from a depth of 6-8" in the plant root zone.
- Combine the soil in a bucket and mix well. A composite sample mixed well will represent the area better.

- Place 1 pint of soil in a plastic bag or paper soil-test bag.

- Keep samples out of the sun and ship them ASAP to a university or private soil lab. See page 23 for a soil lab listing in your state. Cost ranges from \$5 to \$24, but some state checkoff boards cover processing costs.

3) Include the following when submitting your samples:

- Name, address and telephone number of farmer or sample collector.

- County and nearest town where samples were collected.

- Estimated acreage of areas sampled.

- Cropping history of areas sampled.

- Current crops of areas sampled.

Each test will give an estimate of SCN population density based on the volume of soil. The standard volume used is 100 cubic centimeters (cc) of soil.

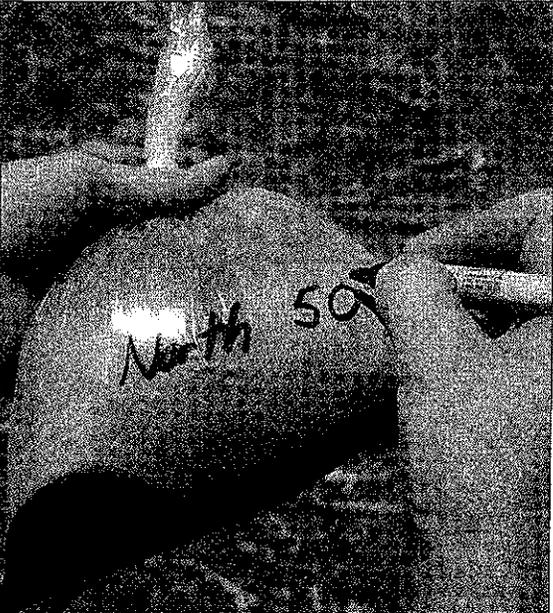
Most labs report the number of SCN eggs, but some give the number of cysts. Cyst and egg counts are not directly comparable. A low cyst count does not equal a low egg count, since each cyst can contain hundreds of eggs.

PHOTO: SYL MARKING

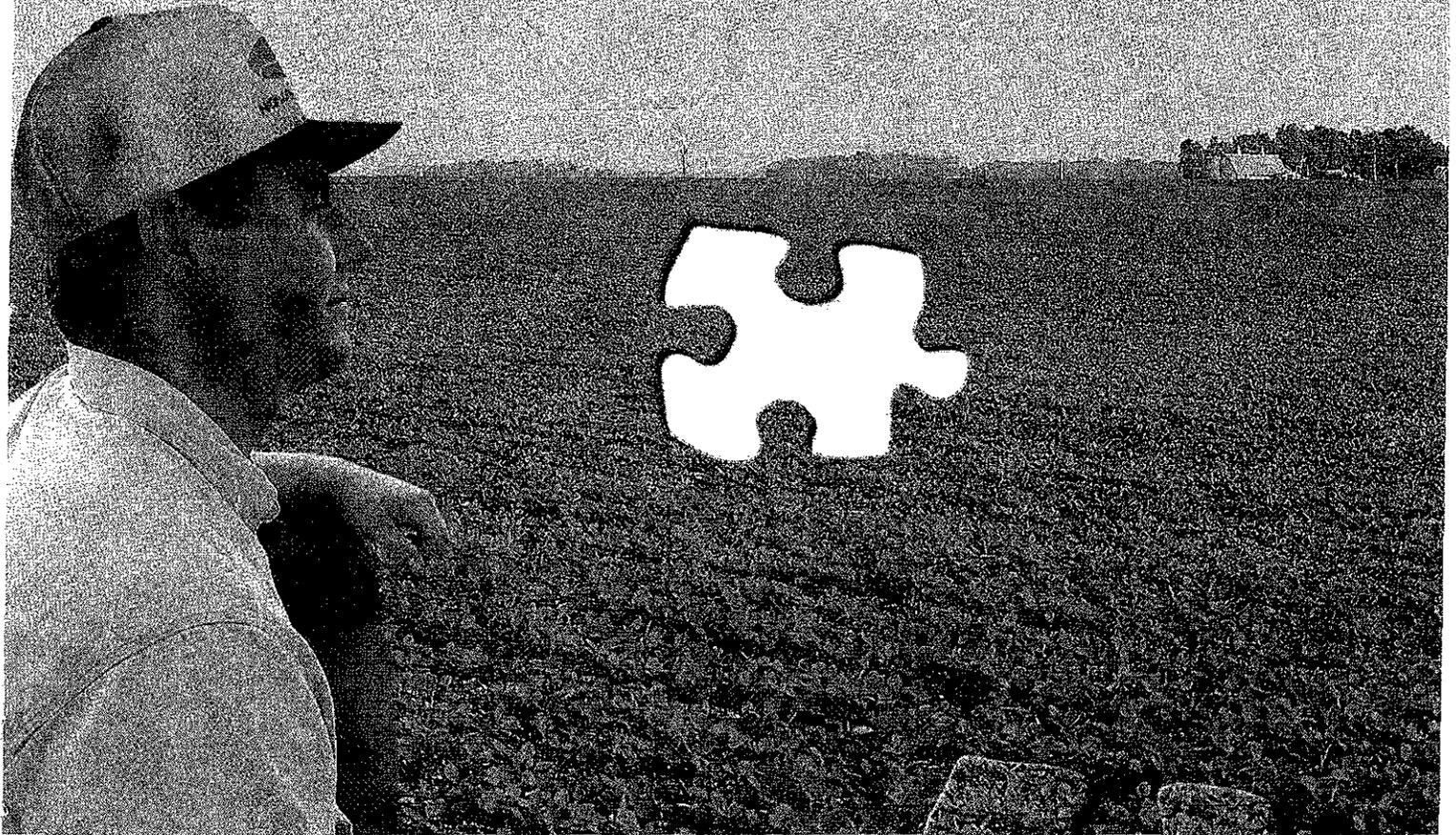


University of Wisconsin nematologist, Ann MacGuidwin, tests a soil sample, like the one collected at right, for SCN.

PHOTO: SCN COALITION



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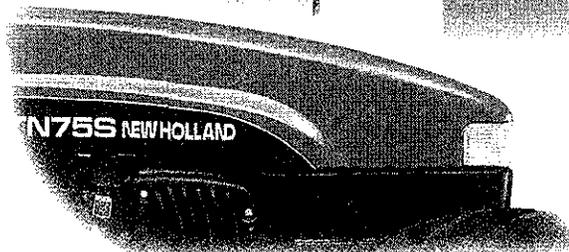
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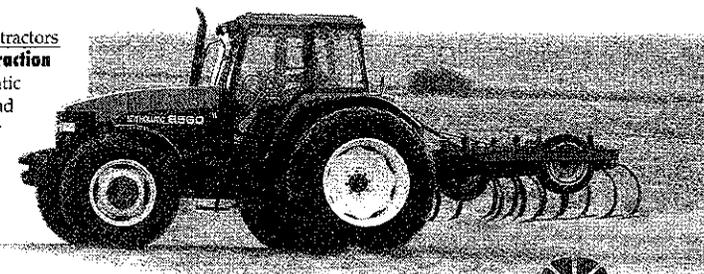
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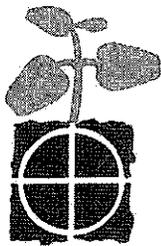


NEW HOLLAND

Outmaneuver SCN

Use crop rotation,
resistant varieties —
and patience

by Fae Holin



To win the fight against soybean cyst nematodes, rotate crops, plant resistant varieties, and don't be sloppy about weed control, since some weeds are hosts.

But don't expect miracles, says Pat Donald, a University of Missouri extension nematologist.

"It's a long-term proposition. The way you manage nematodes is you starve them out gradually," Donald says.

Just remember that once they infest a field, cyst nematodes can't be totally eliminated.

The year after you discover SCN, plant a non-host crop such as corn, suggests Walker Kirby, a University of Illinois plant pathologist. "The following year, plant a soybean cyst-resistant variety. The third year, plant corn and retest."

If SCN numbers are below threshold, consider planting a susceptible soybean the fourth year. Then go with a corn-to-resistant soybean rotation the two following years, says Kirby.

"The idea behind using a susceptible is that we know there are different races or distinct genetic populations in Illinois and other states. We also know that if you go three to four years with the same resistant soybean in the field, you can shift the race from one that cannot feed

on that bean to one that can."

Following resistant beans with resistant beans — rather than a non-host crop — can cause an even quicker race shift, notes Kirby.

Knowing what SCN race you have isn't important in picking a resistant variety because you may have several races within a field, Donald says.

Certain labs will test for race designation, but it takes a month to get results.

"We discourage it," states John Ferris, a Purdue University nematologist. "It's laborious and costly. Once the grower does know the race, the question is, 'so what?'"

"We have four races here in Indiana, only one of which has seed labeled for resistance to it. Even if you have a race and plant a variety that says it is resistant to it, there's no guarantee that it will be resistant in that field."

Donald agrees.

"We know there is a lot of genetic diversity in the cyst nematode population. It isn't entirely a moot point whether you have a race 3 or race 5 variety. But, in general, it's better to have some resistance than no resistance."

So how does a grower pick a nematode-resistant variety?

Donald advises Missouri growers to look at variety trial results, especially if some of those sites are infested with SCN.

"Try to match geographically,"

PHOTO: BOB FLBERT



Growers should plant resistant varieties if SCN numbers are above threshold levels.

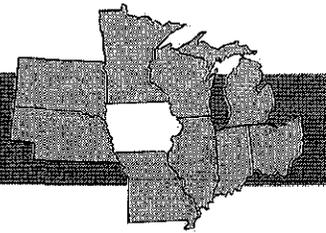
she says. "Also keep in mind what the egg level is at that site compared to what's in your fields."

Other ways to combat SCN: keep plants as healthy and fields as clean as possible, Donald says. That means using good overall management and cleaning equipment between fields.

An option that's really not an option to hold back SCN is using nematicides, says Kirby.

"Number one, a lot of pesticides are water-soluble. If you get a heavy rain after application, it actually washes below the root zone," he says.

"Number two, some of these nematicides cause a rebound effect. They cannot kill 100% of the population. The individuals it leaves behind are now able to feed on a root system that is in top condition. More nematodes will reproduce and more will survive." ○



Iowan Takes Extra Steps To Battle SCN



Doug Blomgren says there are two types of farmers in his area: those who have soybean cyst nematodes and those who will. And if you're wondering

how he knows, the Boone, IA, farmer has battled the pests himself for nearly a decade.

"We started noticing clusters or circles of yellowing plants in a field near our home," he says of his 1988 introduction to SCN. "It looked like chlorosis but different. Not much was known about SCN at the time."

But with help from Iowa State University and hard work, Blomgren, with his brother Dick and uncle Don, started managing SCN for the long haul. After learning they had egg counts of over 14,000 per half cup of soil, the Blomgrens altered their cultural practices and eventually whittled that number to a more manageable 1,200 to 1,300 count.

"Initially, we began working fields from clean areas in toward the bad spots and after working the bad spots, we'd clean and wash the equipment in the field," Blomgren recounts. "We did this for several years and held the problem in check in those hot spots."

In addition, the Blomgrens scout their fields four to six weeks after planting, and dig plants to see if adult females are

present on roots. They also rotate to non-host crops, plant SCN-resistant varieties and continue their in-field equipment sanitation regimen.

As illustrated by the Blomgrens, managing SCN isn't something you do in one year. A planned, well-thought-out strategy covering several years is needed when battling this yield-robbing pest.

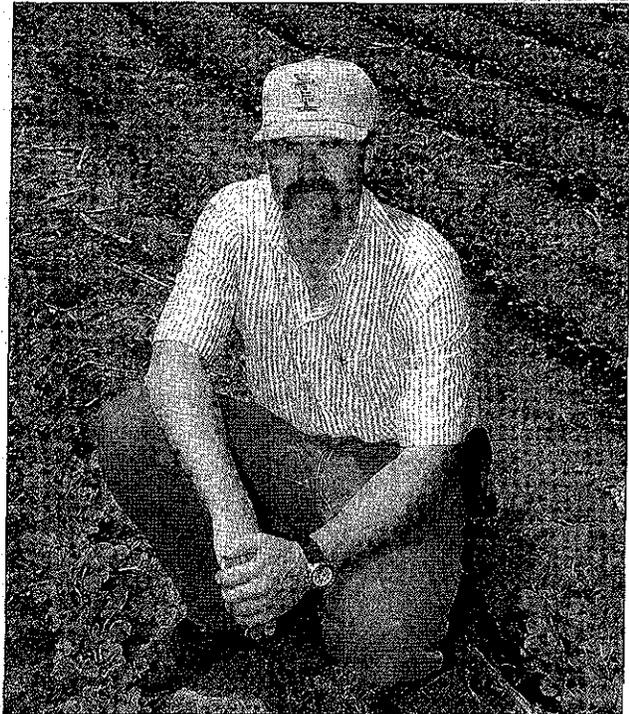
The first step is simple: sampling your soils for SCN.

"There's no question that SCN management begins with submitting a soil sample for analysis," says Greg Tylka, an Iowa State University nematologist. "It's the best way to verify the presence and population densities of SCN. Also, despite the fact that visual effects of SCN sometimes include yellowing and stunted plants, the only consistent symptom of SCN is yield loss, and that can't be determined by looking at your crop."

Tylka emphasizes that yield

losses typically can range from 10 to 50% – and even higher in extreme cases. But, with proper management and using SCN-resistant varieties, SCN's impact can be dramatically reduced. However, it does require that producers become familiar with SCN identification, soil testing and management options. That's where the SCN Coalition comes in.

The SCN Coalition originated from funding provided by the North Central Soybean Research Program (NCSRP), a 10-state
(Continued on page 23)



Doug Blomgren has battled SCN for almost a decade.

PHOTO: STACEY HAGER



Cyst Nematode Management Recommendations For Iowa



Preplant soil sampling:

Sample fields to determine SCN population densities, preferably before buying soybeans for the next season but certainly before planting soybeans.

Although SCN population density is only one component in yield loss, it is indicative of the potential for yield loss and is

information vital for sound SCN management decisions.

Resistant varieties: SCN-resistant soybean varieties are an important tool in SCN management. Planting resistant varieties will reduce yield loss due to SCN and prevent increases in SCN population densities.

Although some of the first resistant varieties lagged behind susceptible varieties in yield, even these early resistant vari-

eties outyielded susceptible varieties in SCN-infested fields. Newer SCN-resistant varieties do not suffer the same yield penalty of their predecessors on non-infested fields.

Resistant varieties should be planted when SCN eggs are detected, since yields of susceptible soybeans likely will be reduced and SCN population densities will increase greatly. Resistant varieties are not immune and should not be

planted when SCN egg counts exceed 5,000 eggs per 100 cc of soil. Their yield can be reduced by root damage or lack of nitrogen-fixing nodules due to high SCN population densities.

Fields with high SCN population densities always should be rotated to non-host crops to reduce SCN numbers before planting even resistant soybeans. Crop rotation will maximize yield and prevent SCN race shifting and the loss of the usefulness of certain resistant varieties.

Rotation with non-host crops: Non-host crops grown in rotation with SCN-resistant varieties are the cornerstones for SCN management. Growing non-host crops will reduce SCN population densities. High SCN population densities (>5,000 per 100 cc of soil) are best managed by rotating to a non-host crop such as corn, a small grain or alfalfa until population densities are lowered.

Once population densities have been reduced below 5,000 eggs per 100 cc of soil, a six-year rotation scheme incorporating non-hosts, SCN-resistant and susceptible soybean varieties can prevent SCN population density buildup and race shifting and reduce soybean yield loss.

Suggested crop rotation

- Year 0 – identification of SCN.
- Year 1 – non-host crop.
- Year 2 – PI 88788 SCN-resistant soybean variety.
- Year 3 – non-host crop.
- Year 4 – Peking SCN-resistant soybean variety.
- Year 5 – non-host crop.
- Year 6 – SCN-susceptible soybean variety.

Cultural practices: Providing a plant the best possible growing conditions will reduce stress and yield loss due to SCN. Maintain optimum soil fertility to optimize plant growth and development. Weed control not only reduces plant stress, but some weeds act as alternate hosts of SCN. Disease control and insect control maintain plant health and minimize SCN damage.

Sanitation: Avoid spreading SCN from infested to uninfested fields. If possible, plant non-infested fields first and power-wash equipment after working infested fields.

Nematicides: Nematicides may reduce yield loss of SCN-susceptible varieties planted in infested fields, but will increase the cost of production. Although a nematicide application may give early season protection against yield loss, it will not reduce nematode population densities in the long term. Final SCN population densities often are as high as if a nematicide had not been used.

Results obtained from nematicides may vary by soil type, weather and many other factors.

Consequently, growers are advised to try nematicides in strips first to determine the potential for economic benefit before implementing field-wide applications.

For information, contact:

Greg Tylka
Dept. of Plant Pathology
Iowa State University
351 Bessey Hall
Ames, IA 50011
Phone: 515-294-3021
Email: gtylka@iastate.edu

Please send soil samples to:

Plant Disease Clinic
323 Bessey Hall
Dept. of Plant Pathology
Iowa State University
Ames, IA 50011

Extra Steps

(Continued from page 21)

alliance of state soybean check-off boards which fund soybean research projects. The 10-member farmer board designated SCN a priority and approved the creation of an education and awareness program.

"The rapid spread of SCN into the North Central grain-producing region requires producers to scout, sample and manage their soils for SCN," says Paulette Pierson, SCN regional education coordinator for the SCN Coalition. "SCN is responsible for millions in lost soybean yields and profits in Iowa. If we're successful in educating producers about the value of SCN management, our effort's impact on a producer's bottom line could be significant."

And if you don't believe managing SCN can have a big impact on a grower's bottom line, just ask Doug Blomgren.



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They're tiny. They're sneaky. They're knocking bushels off soybean yields all



When dug carefully, adult SCN females are visible to the naked eye.

over the country. Worse yet, spotting soybean cyst nematodes (SCN) can be tricky. Infestations can simmer beneath the surface for years before symptoms become evident.

Don't go it alone.

Help is available.

Sound management reduces SCN impact on yield and profit.

Crop rotation, equipment sanitation and SCN-resistant varieties can bring the infestation under control. Help is available from the newly-formed SCN Coalition.

If you'd like information on testing and management, contact the SCN Coalition today.

Soil testing is your best weapon.

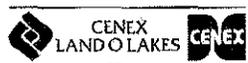
SCN spreads by wind, water, machinery, seed, animals and farm workers. It's nearly impossible to stop distribution, so soil testing is critical to controlling SCN. In fact, a soil test is the *only* way to know whether a field is infested.

The SCN Coalition
P.O. Box 381
Jefferson, WI 53549
or call toll-free,
1 • 877 • SCN TEST
(1 • 877 • 726 • 8378).

Take the test.  Beat the pest.



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