



# CCA ADVANTAGE

by Tom Kenp,  
Chair, ICCA Board

## The constant of change

It is often said that there is only one thing in life that is constant, and that one thing is change. Most of us have heard this expression for all of our lives and have found it to be true. We must accept the fact that change is a part of life even though most of us are not really fond of change. Now change is coming to the structure of the Certified Crop Advisers (CCA) program, and we must face the reality of those changes. The best way to face those changes is to take a realistic look at them and understand the actual effects the changes will have on the CCA program and the CCA membership.

The first thing that CCAs need to realize is that most CCAs will not be affected by the structural changes to the program. Furthermore, the changes will not change what we do as CCAs. The changes are designed to allow the American Society of Agronomy (ASA) and CCA to do a better job of fulfilling their individual purposes while concentrating on serving the needs of each group. After conversing with the ASA leadership, I find that I share the vision of ASA. Simply put, that vision is that we are both seeking to have a positive business structure that helps each other. The question then becomes how can the ASA and CCA benefit one another?

In actuality, the needs of ASA and CCA blend quite well together. Practicing CCAs need education. This education needs to come from nonbiased professionals who have the capability of networking with different state/provincial universities. The ASA has the educators and researchers needed to meet this demand. In turn, for its educational and research programs to maintain relevancy, the ASA needs data from people who are in essence working in the trenches of the agricultural industry. The CCA program offers the ASA a virtual storehouse of data from more than 13,500 professionals from various states and provinces.

The needs of the ASA and CCA seem to complement each other well, but for this to

happen there are some challenges to be met. First of all, the influence of the CCA program in each state and province needs to be expanded. There is much work to be done, and many workers are needed. Local CCA boards, as well as individual CCAs, need to become involved in communicating what CCAs have to offer to the agricultural industry. They need to share what is actually going on in the world of practicing CCAs. It has been said that the International Certified Crop Adviser (ICCA) board is not grounded in the real world. This problem could easily be fixed by CCAs who are willing to step forward and communicate their concerns with regional ICCA board members.

Another challenge that the CCA faces is encouraging growth among local CCA programs while keeping the programs consistent in the different states and provinces. Having consistent programs is of utmost importance to the international policy makers. States and provinces obviously have different needs, but their common goal should be to help the CCA program as a whole.

The ultimate challenge for the CCA program has been to find a way to create a structure that benefits the ASA and CCA while meeting the stringent requirements set forth by the IRS. In order to do this, the CCA program faced many obstacles, but thanks to Dave Sleeper and Jerry Hatfield, these roadblocks are being conquered, and the ASA and the CCA will have a new future that will better serve the memberships. People always want to know what benefits the CCA and ASA program have to offer. One answer is now obvious—education. Put a value on that, and just see what your bottom line is.

Thank you for the experience and education you are giving me as the new chair of the ICCA. I hope to serve you well and ask that you help me by letting me or your regional representative know of your concerns. Together we can work to make the CCA program better for us all. **AG**



**“Local CCA boards, as well as individual CCAs, need to become involved in communicating what CCAs have to offer to the agricultural industry.”**

# ICCA board elections

**“Each board member is a CCA that has volunteered to serve to help provide leadership and direction for the overall policy and procedures of the program. They donate their time and talent without any direct compensation.”**

Each year the International CCA board holds elections for vice chair and regional representatives. The board is comprised of three executive committee members, the vice chair is one of them, and 10 regional representatives plus committee chairs and government agency representatives. The vice chair is the beginning of a three-year rotation through chair and past chair while the regional representatives are three-year terms from different parts of the U.S. and Canada. Each board member is a CCA that has volunteered to serve to help provide leadership and direction for the overall policy and procedures of the program. They donate their time and talent without any direct compensation.

Thank you to all who have and are serving at the international and local levels. We could not do it without you. To provide some perspective, there are more than 400 volunteers serving on committees and boards throughout the CCA program. There are 37 local boards that represent the program at the state or provincial level plus the international board that sets the overall policies. Currently, there are more than 13,500 CCAs practicing the profession of agronomy, in all aspects and levels of the ag industry.

Here is an introduction to those who have successfully completed the 2006 election cycle.

## KIM POLIZOTTO



Kim Polizotto was elected to vice chair of the ICCA board by the board members. Kim's term began October 2006. He will rotate to chair in 2007 and then past-chair in 2008. Kim is chief agronomist of PotashCorp/PCS Sales. PotashCorp is the world's largest integrated producer of nitrogen, phosphorus and potassium fertilizers.

He earned his bachelor's degree from Butler University in biology, his master's degree from Indiana State University in plant physiology and

his doctorate from Purdue University in plant physiology/mineral nutrition. Dr. Polizotto has been an agronomist with PCS for 20 plus years and chief agronomist for more than 15 years. As chief agronomist for PotashCorp, he is responsible for all new product research and development, customer and industry agronomic education and related customer service.

He presently serves on the Research and Education Committee of the Fluid Fertilizer Foundation and on the Program Advisory Committee of the Potash and Phosphate Institute. He was chair of the ICCA standards and ethics committee and also is on the board, and past chairman, of the Indiana CCA board. He is active on the agronomic committees of The Fertilizer Institute (TFI) and is chairman of the Fertilizer Committee of the Illinois Fertilizer and Chemical Association (IFCA). He serves on several committees of the American Society of Agronomy (ASA). Dr. Polizotto lives in Greenfield, Ind., and works out of the PotashCorp sales office in Northbrook, Ill.

## JIM PECK



Jim Peck was elected as the Northeast Region representative. Peck is president of ConsulAgr, Inc., which provides consulting services to more than 125 agricultural clients on more than 50,000 acres in the Finger Lakes Region of western New York. This acreage includes fruits, vegetables, grains, golf courses and dairy farms. The consulting emphasis is on soil, plant, animal nutrition, business management and environmental issues.

Peck has a bachelor's degree in animal science and ag economics from Cornell University. He is an Accredited Agricultural Consultant and has served in many professional organizations. He is associated with Brookside Laboratories, Inc.

and has served on their board and as director of education. He has many years of experience in farm management and continues that as part of his consulting business. He is also certified to develop animal waste management plans for concentrated animal feeding operations (CAFO). Peck serves on the Northeast Region CCA Board.

### HOWARD BROWN



Howard Brown was re-elected to serve a second term as one of the North Central Region representatives. Brown is the manager of agronomy services for GROWMARK, Inc.

Brown has a bachelor's degree in plant and soil science from Southern Illinois University and a master's degree from Purdue University. In 1996, he graduated with a doctorate in soil fertility from the University of Illinois. Brown was in the GROWMARK System at Corn Belt FS for eight years before leaving to work as a field agronomist for Pioneer Hi-Bred Int'l., Inc. He joined the GROWMARK, Inc. system in 1998 where he currently leads the group that provides member cooperatives with technical support.

Brown served on the Illinois CCA board as chair of the exam committee for four years, chair of the board in 2001, and chair of the annual CCA Conference from 2002 to 2004. He currently serves as an ex-officio member on the Illinois board and has served on the ICCA board the past three years.

### JAMES SMITH



James Smith was elected as the Western Region representative. Smith was born in Lewiston, Idaho. Smith works for the McGregor Company as the Adams area manager and lead fieldman.

He was named manager of the year in 1996 and 2001. Prior to his current position, he worked for Colfax Grange and Canyon Equipment Company as a branch manager.

Smith was raised in the small agricultural community of Genesee, Idaho, and graduated from Genesee High School in 1981. Smith attended the University of Idaho for a short time. He is a licensed consultant in Idaho, Oregon and Washington. He is the current Northwest CCA board chair, a past board member of the Oregon Agricultural Chemicals & Fertilizers Association (OACFA), and has served as a city council member for the town of Athena, Ore. He serves on the Natural Resources Conservation Service's (NRCS) basin working group and is chair for the Weston McEwen Vo-Ag committee.

### NORM FLORE



Norm Flore was re-elected to serve a second term as one of the Canada Region representatives. He grew up on a grain and livestock farm in east central Alberta and attended the University of Alberta where he earned a bachelor's degree in agriculture. Flore is an account manager for Westco. He has served in different capacities for Westco including research, extension, crop diagnostics and training. He has worked with a wide range of crops across the many agro-ecological zones of western Canada.

Flore is a strong proponent of the "grassroots" professional program because he sees the growing role that CCAs will play in bridging the gap between the developers of best management practices (BMPs), i.e., the scientific community and the grain producers who are just one of the many beneficiaries of BMP adoption. He is the current Prairie Provinces CCA Board Chair and has been serving on the International CCA board for the past three years. **AG**



## CCA ADVANTAGE

Continuing Education  
Self-Study Course

# ROTATION CROP FOR MANAGEMENT OF THE SOYBEAN

BY D. R. MILLER, S. Y. CHEN, P. M. PORTER, G. A. JOHNSON, D. L. WYSE, S. R. STETINA, L. D.

The soybean cyst nematode, *Heterodera glycines* Ichinohe, was first detected in Minnesota in 1978 (MacDonald et al., 1980). Since then, SCN has been detected in 55 counties in southern and central Minnesota where soybean [*Glycine max* (L.) Merr.] is grown. The nematode has become a major yield-limiting factor in the state.

Management of the nematode has been dependent on planting resistant cultivars and the use of crop rotations. A number of studies have reported on the effect of rotation crops on SCN populations and soybean yields. In these studies, however, only one or a few nonhost (mainly corn [*Zea mays* L.], wheat [*Triticum aestivum* L.], and sorghum [*Sorghum bicolor* (L.) Moench]) or poor-host crops were compared with soybean.

In general, SCN population densities following a nonhost or poor host were lower than following soybean. The effectiveness of crop rotation depends on the host status of crop species, the number of years of rotation crops and geographical location. For example, in North Carolina, one to two years of a nonhost in a rotation was generally sufficient to lower SCN population density to below damaging levels. In contrast, five years of nonhost and SCN-resistant soybean may be needed in Minnesota to reduce the SCN population density to a lower level where a susceptible cultivar can be grown without significant yield loss.

Annual ryegrass (*Lolium multiflorum* Lam.) was more effective than other nonhosts in reducing infectivity of soybean by SCN. In a field study, corn appeared to be more effective than sorghum in lowering SCN second-stage juvenile population densities

at the end of the following soybean season.

The mechanisms through which rotation crops affect SCN populations are not fully understood. Some nonhost and poor-host crops may be effective in lowering nematode population densities by producing root exudates or decomposition products toxic to the nematodes. Therefore, growing a poor-host crop may reduce SCN population density.

Riga et al. (2001) looked at the potential of plant residues and plant root exudates to protect soybean from SCN and found that incorporation of residues from a number of plant species into the soil reduced nematode population densities compared with incorporation of soybean residues alone.

In southern Minnesota, corn is almost exclusively used as the nonhost crop in rotation with soybean. The SCN egg densities were reduced 20 percent to 80 percent during a year when corn was grown. The overwinter survival rate of SCN is high in the northern regions of the U.S., however, and consequently more frequent use of nonhost crops is necessary compared with the southern U.S. Increasing the number of years of corn in a rotation sequence to reduce SCN is not advisable due to the yield penalty associated with corn following corn. Therefore, a need exists to find alternative, economically acceptable nonhost crops for use in rotation with soybean for long-term effective management of the nematode.

Field crops commonly produced in Minnesota that were classified as nonhost or poor-host crops for the SCN include alfalfa (*Medicago sativa* L.), barley (*Hordeum vulgare* L.), canola

(*Brassica napus* L.), corn, sorghum, oat (*Avena sativa* L.), pea, potato (*Solanum tuberosum* L.), rye (*Secale cereale* L.), red clover (*Trifolium pretense* L.), sugarbeet (*Beta vulgaris* L.), sunflower (*Helianthus annuus* L.), and wheat. Our objective was to evaluate crops common to Minnesota for their potential use as rotation crops with soybean in the management of the SCN.

## MATERIALS AND METHODS

This research was conducted on three commercial farms in south-central (Waseca), southwest (Lamberton), and west-central (Morris) Minnesota in 2001 and 2002. At each location, a field was selected and planted with SCN-susceptible soybean in 2000. In the spring of 2001, the Waseca, Lamberton and Morris fields had natural SCN infestations of 4,120; 20,700; and 26,300 SCN eggs per 100 cm<sup>3</sup> of soil, respectively.

The experiment consisted of 24 treatments in a completely randomized block design with six replicates. The 24 treatments were combinations of crops and fallow with appropriate herbicides. The experimental unit was a 4.57 by 3.05 meter (15 ft. by 10 ft.) plot. The 16 crops commonly produced in Minnesota or having potential use in the state were selected as rotation crops for this study: barley, flax (*Linum usitatissimum* L.), oat, sorghum, wheat, buckwheat (*Fagopyrum sagittatum* Gilib), canola, corn, rye, sugarbeet, potato, sunflower, alfalfa, hairy vetch (*Vicia villosa* Roth), red clover and pea. The controls included an SCN-resistant soybean cultivar (Pioneer 9234), an SCN-susceptible soybean cultivar (Parker) and fallow ground with each

# EVALUATION CYST NEMATODE IN MINNESOTA

KLOSSNER, and G. A. NELSON

herbicide commonly used for these crops (fallow with Buctril, fallow with Liberty, fallow with Prowl, fallow with Pursuit, fallow with hand weeding and fallow without weed control).

Nematode egg densities were determined at planting (Pi), at midseason (Pm, two months after planting), and at harvest (Pf) both years. In 2001, a composite soil sample consisting of 20 cores was taken with a 2.5-cm-(1 in.) diameter soil probe to a 20-cm (8 in.) depth across the central area of approximately 3.5 by 1.5 m (12 by 5 ft.) of each plot. In 2002, the soil samples were taken from near the soybean root zone of the two central rows of each plot.

To determine nematode population change during the crop season, population change factors (PCF) were computed. The PCF at midseason 2001, at harvest 2001, and at planting 2002 were determined by dividing the egg densities from Pm01 (at midseason in 2001), Pf01 (at harvest in 2001), and Pi02 (at planting in 2002), respectively, by the egg densities from Pi01 (at planting in 2001). The PCF at harvest of soybean in 2002 was determined by dividing the egg densities from Pf02 (at harvest in 2002) by the egg densities from Pi02.

The data were initially analyzed using SAS repeated measures Analysis of Variance (ANOVA) with whole plots at the three locations, blocks within locations, and treatments within blocks. At Lamberton, severe iron-deficiency chlorosis affected late season growth across two blocks and consequently these two blocks were removed from the data set before analysis. To determine differences among groups of crop treatments, the

data were averaged in four groups: (i) monocots (barley, oat, sorghum, wheat, corn, and corn-rye); (ii) nonleguminous dicots (flax, buckwheat, canola, sugarbeet, potato and sunflower); (iii) leguminous nonhosts or poor hosts (alfalfa, red clover and pea); and (iv) fallow with herbicide treatments. Soybean and hairy vetch were hosts of the nematode and were excluded from any of the groups.

## RESULTS AND DISCUSSION

All rotation crops resulted in lower SCN egg population density, PCF or both than susceptible soybean at least at one sampling occasion. This suggests that these crops can be used in rotation for SCN management in Minnesota.

After one year of any of these crops, however, the nematode population densities were still greater than 1,000 eggs per 100 cm<sup>3</sup> of soil, which can cause significant yield loss to a susceptible soybean. These results were similar to the results of previous studies with corn as the rotation crop, which did not reduce SCN egg population densities to below damaging levels in one year.

In general, five years of a corn and resistant soybean rotation were needed for effective SCN management. A similar rotation period may be needed with any of these crops, but further studies are necessary to develop a rotation scheme including any of the alternative crops for SCN management.

Subtle differences in SCN populations among the rotation crops were detected in this study. Leguminous nonhosts and poor hosts appeared to be the best crops for



PHOTO COURTESY OF USDA-ARS/R.R. SMITH

Red clover

reducing the SCN population density, while monocots appeared to be the least effective. Similar results have been obtained in greenhouse studies.

Pea as a trap crop has been shown to reduce SCN population density compared with non-trap-crop treatments in the corn-growing season. The leguminous nonhosts and poor hosts may release root exudates to stimulate the SCN to hatch, but the nematodes are not able to develop and reproduce well in these crops, resulting in a population decline. Pea is presently grown in many parts of southern Minnesota and is sometimes double-cropped with soybean. Although it may not be cost effective to use pea as a trap crop interseeded with corn for SCN management, it may be a preferred crop for use in rotation with soybean and corn for SCN management.

Alfalfa and red clover are perennial crops, and they can be used in rotation with soybean for SCN management where practical. These crops are currently being studied for their potential as cover crops in corn-soybean production systems. Their agronomic and economic potential in the production systems in Minnesota will be further evaluated.

Fallow is rarely used in corn-soybean production in the region. We included fallow with different weed control treatments for the purpose



of identifying any herbicide effect on SCN, which might confound the rotation crop effect when different herbicides were used in the different crops. Although the effect of herbicides on SCN population has been reported, no effect of herbicide on SCN population density was observed in this study except that the Pf02 was higher in the no-weeding treatment than in treatments with either Buctril or Pursuit. Thus, the rotation crop effect on SCN was unlikely to be due to herbicide treatment.

Hairy vetch, a leguminous crop, supported the development of SCN females on the roots in the field and was probably a moderate host of SCN. This is probably why the PCF for hairy vetch was relatively high across the three sites. High PCF was also observed for buckwheat, but the reason is unclear.

Theoretically, the nematode population increases if PCF is greater than 1. In this study, however, PCF was greater than 1 for a number of the rotation crops at some sampling occasions, especially at the Lamberton site. This doesn't mean that the nematode population increased in these crops. The higher PCF than what we expected was due to experimental error in soil sampling and sample processing. At the Lamberton site, the average Pi01 was lower than Pm01 and Pf01. The reason for this is unclear.

In the 2002 soybean growing season, predicted equilibrium population density was similar among the three sites. Nematode equilibrium population density is a function of the size of the food source and the efficiency of a nematode population using that food source in producing offspring. Both the size of the food source and the efficiency of use are

affected by many factors including cultivar and environment.

The predicted equilibrium population density was the sum of the effects of factors that may have affected food source and the SCN's efficiency in using the food source at the three sites. These factors can be different among sites although the sum of the effects was similar. The equilibrium population density can also be different among years at the same site. The population densities at harvest in 2002 were lower than the population at planting in 2001 at Lamberton and Morris, suggesting that the environmental conditions were more favorable for SCN population development in the 2000 soybean growing season than the 2002 season.

Yield response to the rotation crop was also limited. Soybean yield was not (at Lamberton and Morris) or weakly ( $r = -0.19$ ,  $P = 0.02$  at Waseca) correlated with SCN population density, suggesting that there was little yield benefit from SCN management with the rotation crop for one year.

The response of soybean yield to the treatments, however, varied between sites probably due to different environmental conditions. Yields were highest at Waseca, but no difference was detected except for the corn-rye treatment, which had a lower yield than most other treatments at this site, probably due to poor germination of the soybean in this treatment due to the rye residue effect.

At Lamberton, the soybean yields following corn or corn-rye were lowest; they were significantly lower than the yield following potato and sunflower treatments. By group, fallow treatments resulted in the highest yield followed by nonleguminous dicots, monocots, leguminous nonhosts and poor hosts. Iron-deficiency chlorosis in the field was a major factor influencing soybean yield, which was negatively correlated with the iron-deficiency chlorosis rating ( $r = -0.74$ ,  $P < 0.0001$ ). Complete yield loss occurred in 47 out of the 144 plots at this site.

At Morris, heavy rainfall in June affected early season plant growth and consequently reduced yields. The hairy vetch and sunflower treatments produced higher yields than the canola, flax, or oat treatments. By group, treatments of leguminous nonhosts and poor hosts and monocots resulted in higher ( $P < 0.05$  or  $0.01$ ) yields than nonleguminous dicots and fallow.

The difference in yield among some crop treatments in Lamberton and Morris was probably due in part to agronomic factors. There were greater differences in soybean yields among crop treatments in Lamberton and Morris, but the trends appear to be opposite between the two sites. At Lamberton, yields following nonleguminous crops and fallow were higher than leguminous nonhosts and poor hosts or monocots; at Morris, the leguminous nonhosts and poor hosts and monocots resulted in higher yields than nonleguminous crops or fallow. The reason for the difference between the two sites is unclear. At Lamberton, however, these treatments may have affected the development of iron-deficiency chlorosis; treatments with monocots apparently increased iron-deficiency chlorosis compared with nonleguminous dicots, especially sugarbeet and canola (data not shown). Subsequently, the soybean yield following monocots was lower than following nonleguminous dicots.

In conclusion, there was large variability in the SCN populations and soybean yields at the three sites. Nevertheless, significant treatment effects were detected at all sites. While all of the rotation crops lowered SCN population compared with SCN-susceptible soybean, there were subtle differences among the individual rotation crops and among different groups of crops. Leguminous nonhosts and poor hosts were probably the best crops in reducing SCN population density. Corn, the most common rotation crop in Minnesota, was in the group that was the least effective in reducing the nematode population. **AG**



# Rotation crop evaluation for management of the soybean cyst nematode in Minnesota

## October Self-Study Examination

1. Factors that can influence SCN populations include all of the following EXCEPT

- a. specific crop rotations.
- b. weather conditions.
- c. the time of year.
- d. SCN asexual reproduction.

2. The crop used most commonly in rotation with soybeans in SCN areas is

- a. sorghum.
- b. corn.
- c. wheat.
- d. rice.

3. An objective of this study was to

- a. evaluate rotation crops for their potential use in managing SCN in Minnesota.
- b. rate the relative effectiveness of nematicides in northern conditions.
- c. measure how climate affects SCN populations.
- d. develop crop varieties that better resist nematode populations.

4. A characteristic of the research methods of this study was

- a. four locations.
- b. mixtures of natural and introduced SCN populations.
- c. 16 crops evaluated.
- d. different sources of genetic resistance to SCN.

5. The standard used for reporting SCN populations is

- a. eggs per 100 cm<sup>3</sup> of soil.
- b. active larvae index.
- c. parts per million.
- d. root exchange ratio.

6. A factor that severely impacted soybean yields at one location was

- a. weed patches.
- b. iron deficiency chlorosis.
- c. sudden death syndrome.
- d. high organic matter soils.

7. The reason for including fallow in the study was to

- a. identify any herbicide effects separate from crop effects.
- b. test to see if SCN populations could be eliminated.
- c. analyze nutrient/SCN interactions.
- d. ensure the soil was uniform between crop treatments.

8. In addition to soybean, a crop that supported SCN female development on the roots was

- a. wheat.
- b. hairy vetch.
- c. alfalfa.
- d. oats.

9. The crop that reduced SCN egg populations below damaging levels in one year was

- a. canola.
- b. sorghum.
- c. sugar beet.
- d. none of the above.

10. The best crops at reducing SCN populations in this research were

- a. leguminous nonhosts and poor hosts.
- b. monocots.
- c. non-leguminous dicots.
- d. monocious root crops.

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This exam is worth 1 CEU in **Pest Management**. An exam score of 70% or higher will earn CEU credit. The International CCA program has approved self-study CEUs for 20 of the 40 CEUs required in the two-year cycle.

### DIRECTIONS

1. Read the self-study article on pages 40-42 carefully.
2. Answer the questions by clearly marking an "X" in the box next to the best answer for each question.
3. Complete the self-study exam registration form on the back of this page.
4. Clip out this self-study examination page, fold and place in envelope.
5. Enclose a check for \$10.00 made payable to the American Society of Agronomy, for processing fees.
6. **Mail your self-study exam and fee to:**  
ASA c/o CCA Self-Study Exam, 677 S. Segoe Road, Madison, WI 53711. *Please allow 60 days for processing.*
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**Enclose a \$10 check payable to American Society of Agronomy.**

X \_\_\_\_\_

Signature of Registrant as it appears on Code of Ethics

I certify that I alone completed this self-study course and recognize that an ethics violation may revoke my CCA status.

**This exam issued October 2006 expires October 2009.**

## SELF-STUDY EXAM EVALUATION FORM

**Rating Scale: 1=Poor 5=Excellent**

Information presented will be useful in my daily crop advising activities: 1 2 3 4 5

Information was organized and logical: 1 2 3 4 5

Graphics/tables were appropriate and enhanced my learning: 1 2 3 4 5

I was stimulated to think how to use and apply the information presented: 1 2 3 4 5

This article addressed the stated competency area and performance objective(s): 1 2 3 4 5

Briefly explain any "1" ratings: \_\_\_\_\_

Topics you would like to see addressed in future self-study materials: \_\_\_\_\_

