DISTRIBUTION OF SCN HG TYPES IN WISCONSIN

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This project is sponsored by the WISCONSIN SOYBEAN MARKETING BOARD

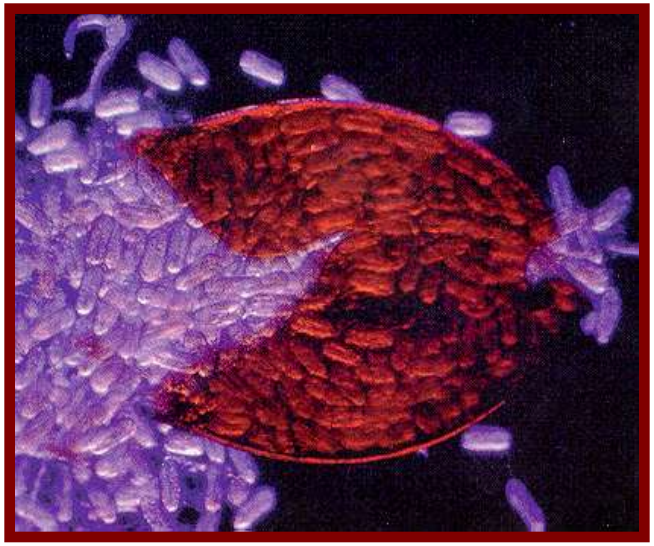
The soybean cyst nematode is a permanent resident in fields

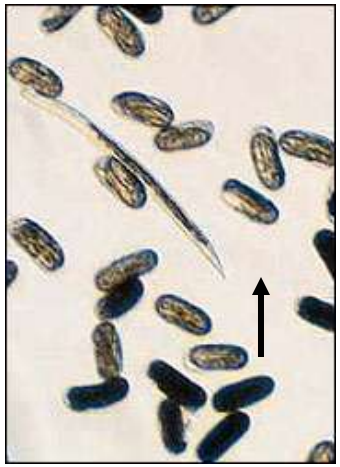
- Eggs remain in dead body of female (cyst)
- New eggs are produced on every soybean crop (and weeds)
- Eggs don't age and hatch when a host plant is present.

➢ SCN is a site characteristic that should be monitored and considered in the farm management plan.

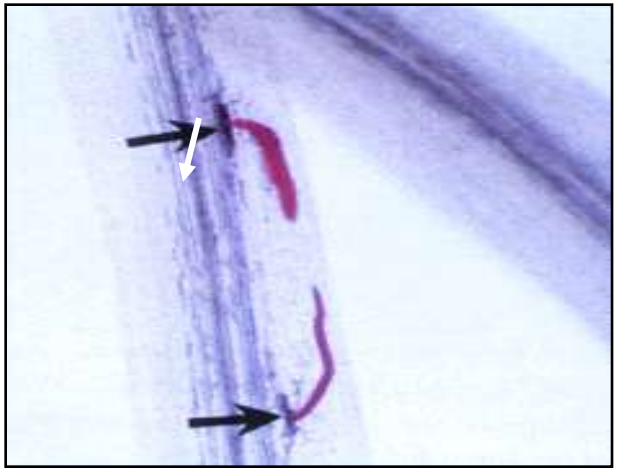
SCN life cycle

Adult female turns into a cyst, sheltering eggs.



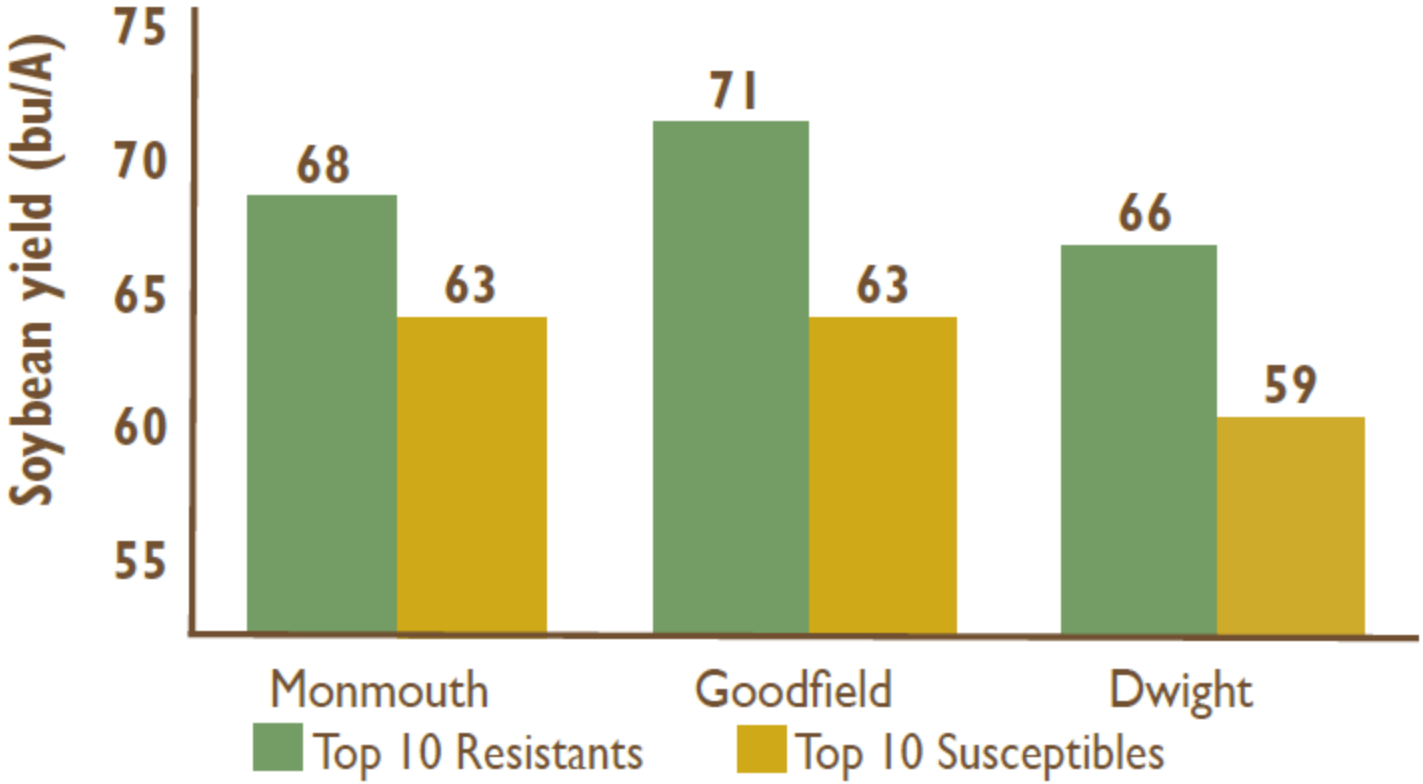


Juveniles hatch from eggs and infect roots.



They grow and break through roots by the adult stage.

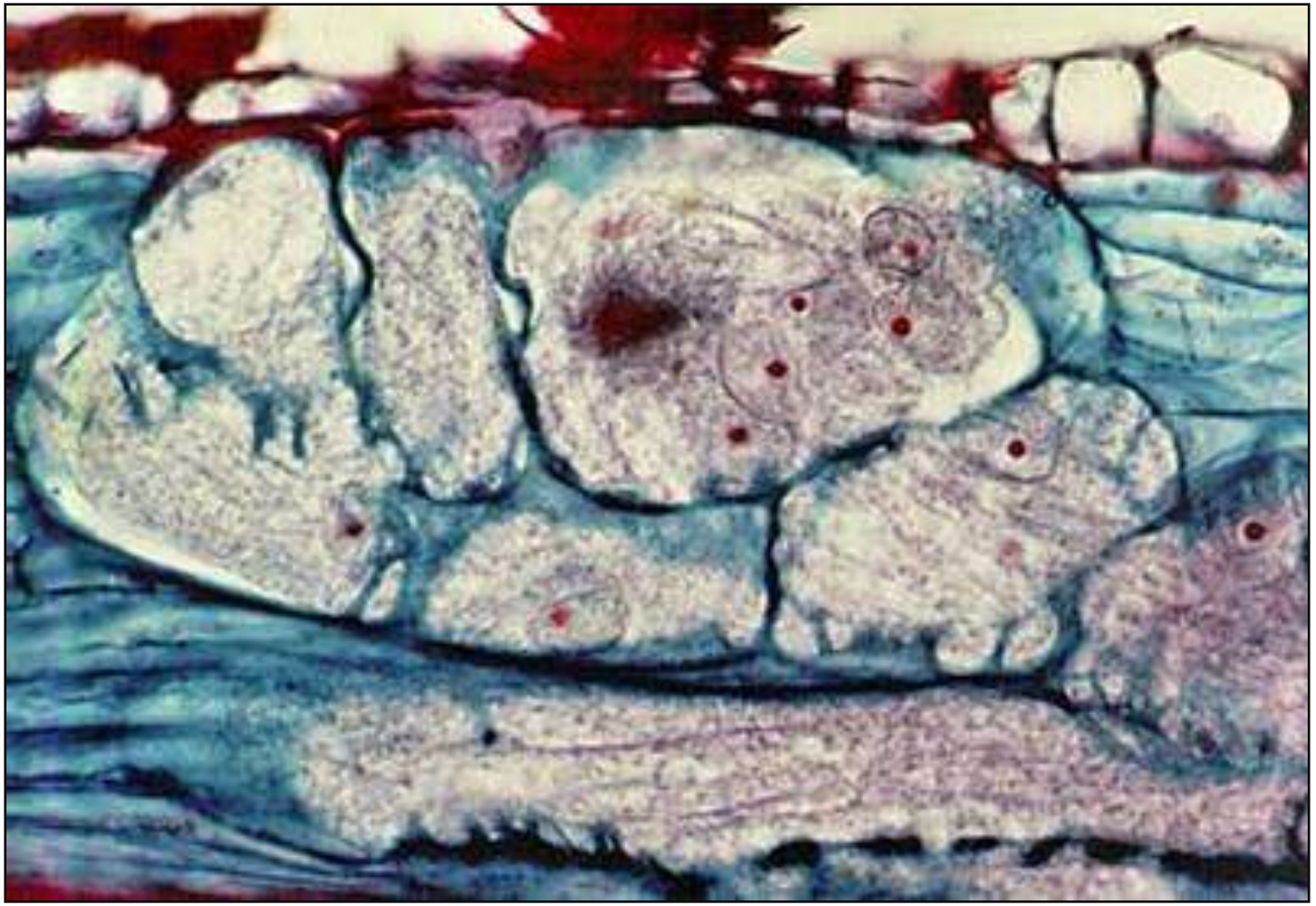
SCN-resistant varieties out-yield susceptible varieties



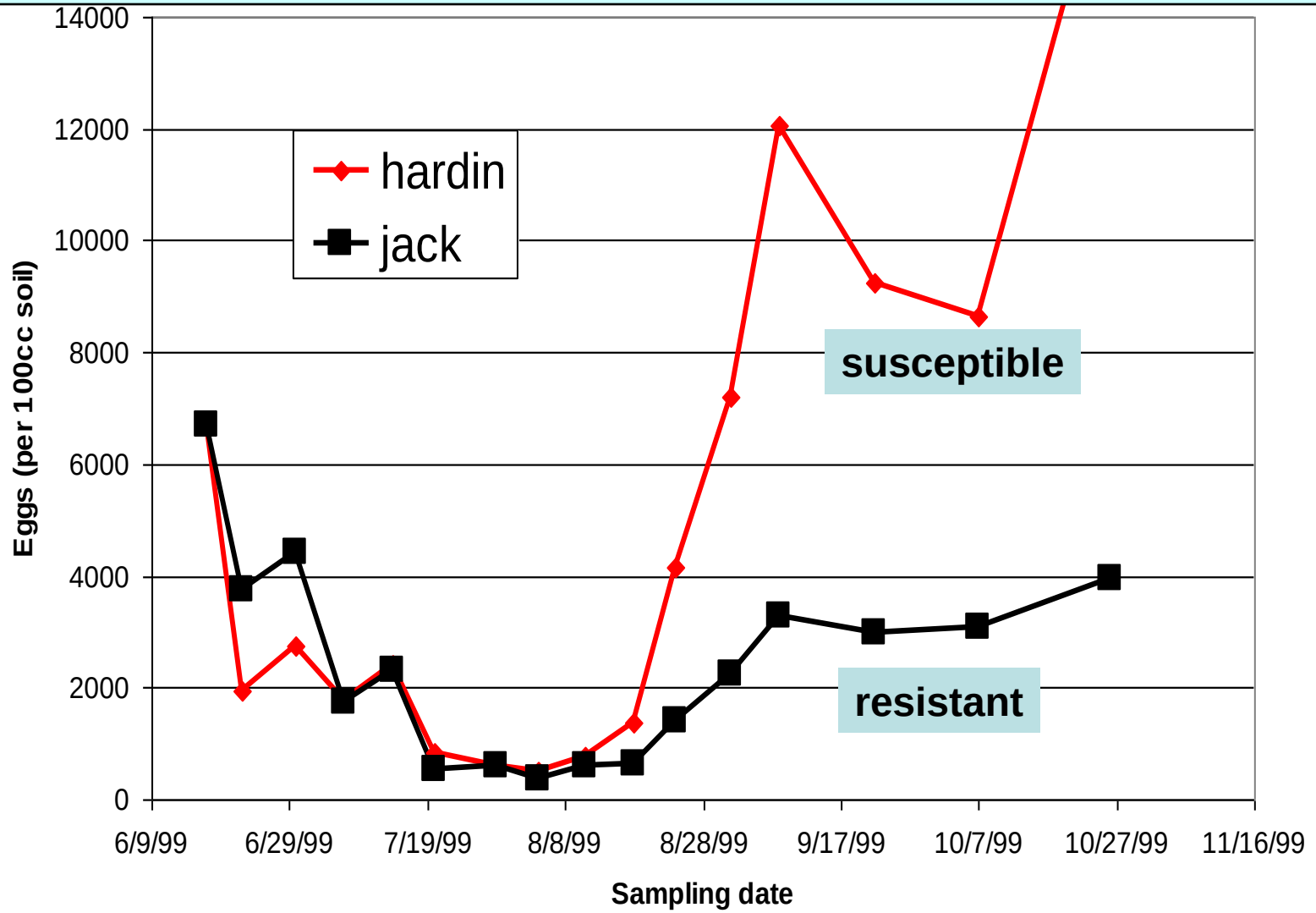
Yield Trial Results

The bars in this graph show "Top 10" comparisons: yields of the 10 highest-yielding SCN-resistant varieties compared with the 10 highest-yielding susceptible varieties in three central Illinois locations in 2006 variety trials. All three locations were infested with moderate SCN population levels.

SCN depend on the host plant to develop specialized feeding cells. Susceptible varieties do this – resistant varieties don't.



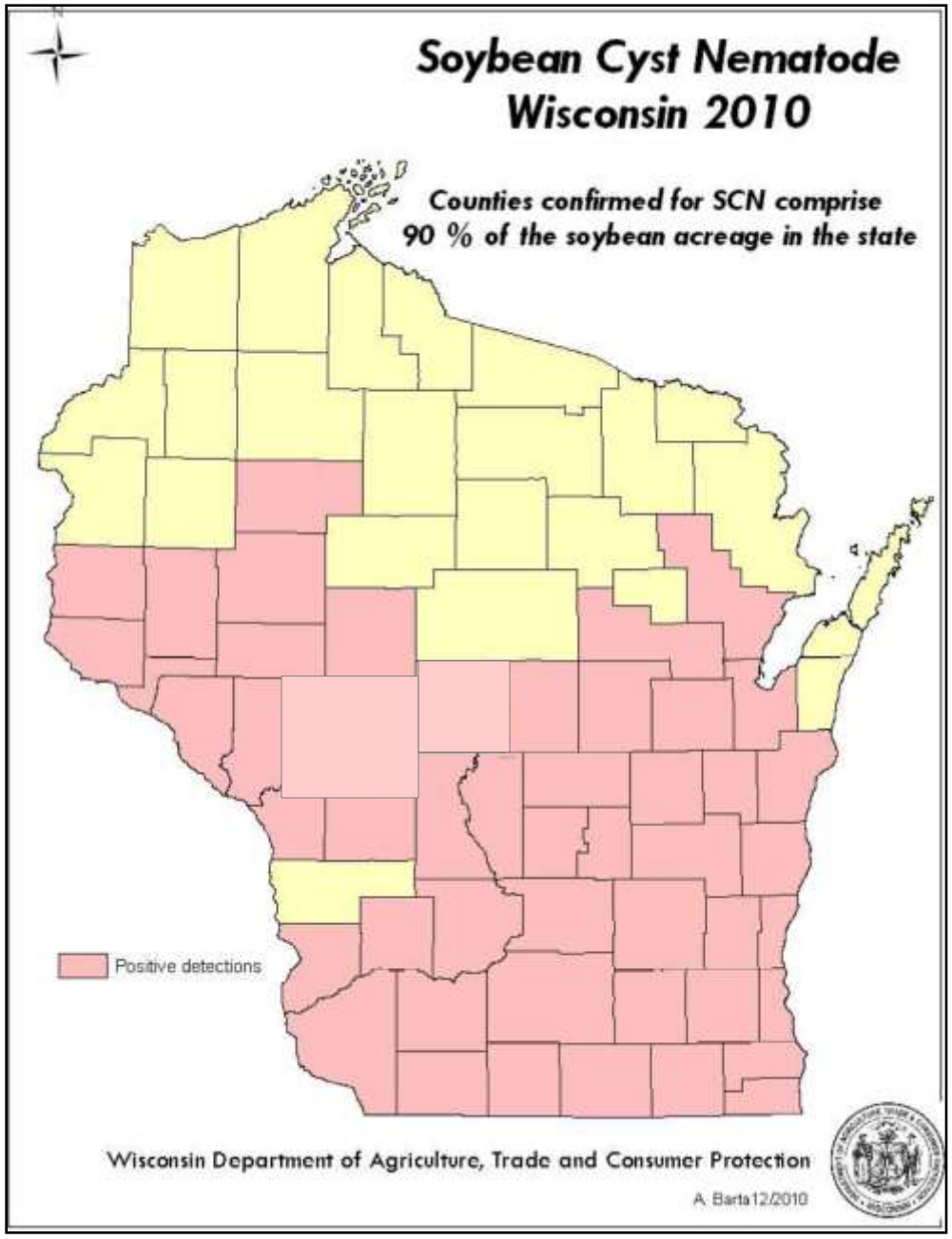
Less damage when development is aborted



Fewer eggs means less pressure for the next soybean crop

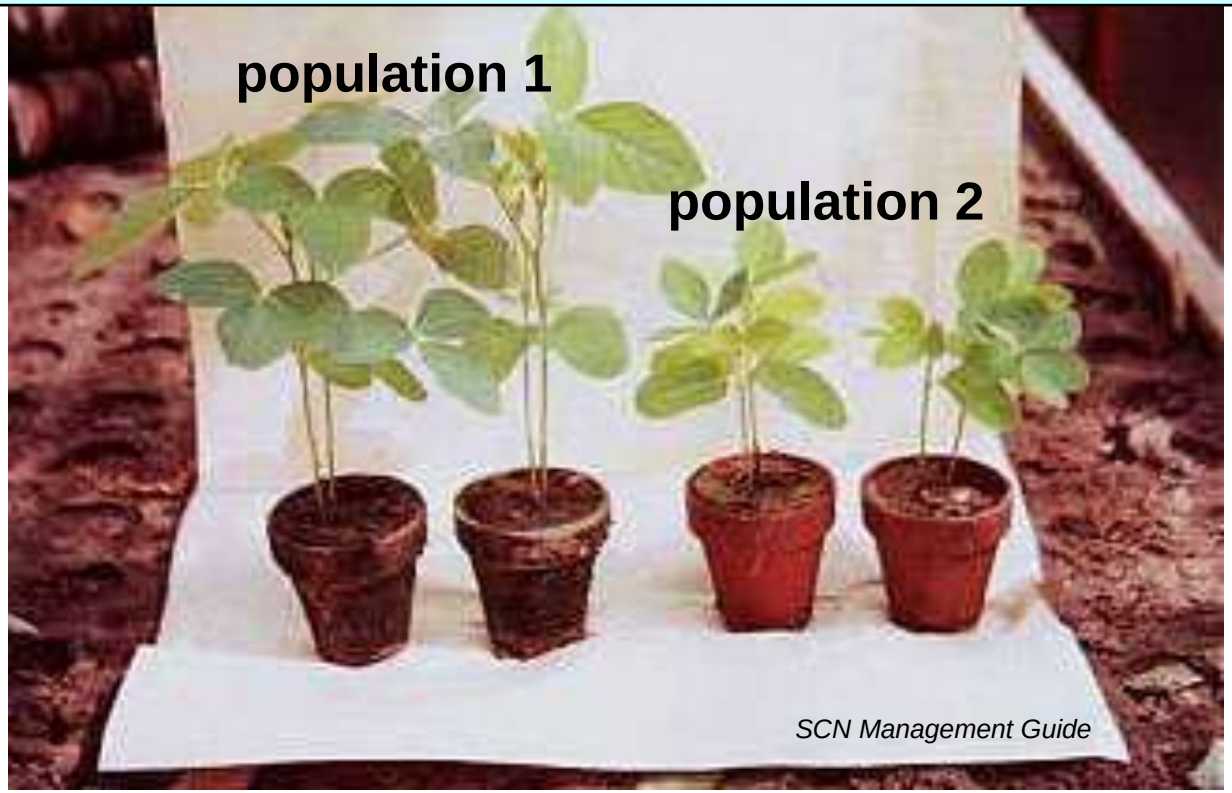
Even resistant plants can be damaged at high SCN inoculum levels

SCN egg densities higher in foreground than background of this plot


Soybean Cyst Nematode
Wisconsin 2010
Counties confirmed for SCN comprise
90 % of the soybean acreage in the state
Positive detections
Wisconsin Department of Agriculture, Trade and Consumer Protection
A. Barta12/2010

SCN populations differ in their ability to develop on and damage the same resistant soybean variety.

Shown here is one variety infected with the same inoculum level of two SCN populations.



Results from variety trials conducted at multiple locations show this is true in Wisconsin

Virulence: ability of a population to develop on a resistant variety

Virulence Profile:

description of a population for the ability to develop on a set of resistant varieties

Virulence profile important for:

- understanding difference in performance of soybean varieties among locations
- guiding decisions of soybean variety selection
- informing the seed industry of WI needs

Hg Type Test profiles SCN populations for virulence using 7 SCN resistant lines

- PI 548402 (Peking) + “Pickett”
- PI 88788
- PI 90763 SCN Race Test
- PI 437654 (Hartwig)
- PI 209332
- PI 89772
- PI 548316 (Cloud)

PI 88788 is in the pedigree of most of the SCN-resistant varieties developed for WI

HG Type Test

- Increase SCN on susceptible soybean
- Infest soil with SCN eggs & plant Hg lines
- Harvest plants after 30 days; remove female SCN and count

$$\text{Female Index} = \frac{\text{avg. \# females on differential}}{\text{avg. \# females on 'Lee' 74}} \times 100$$

HG Type Naming Convention

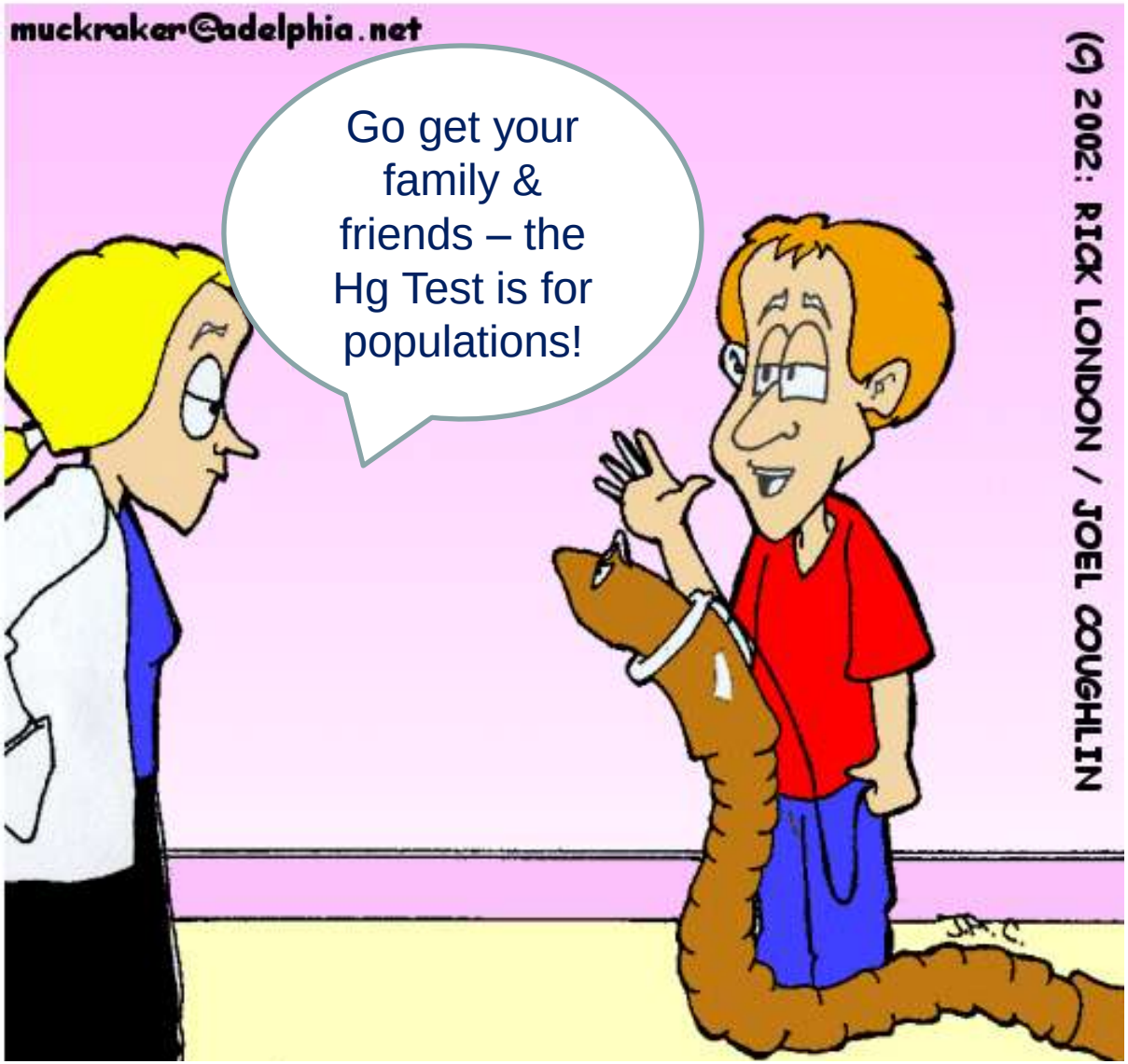
- If the FI is greater than 10, the SCN population is considered to be virulent

- Hg names reflect the virulence of the populations for all 7 differential testing lines.

Hg Type 0	not virulent on any line
Hg Type 1.3.6	virulent on 'Peking', PIs 90763 & 89772
Hg Type 2.5.7	virulent on PIs 88788, 209332, & 548316
Hg Type 1.2.3.5.6.7	virulent on all but 'Hartwig'

The FI value for a SCN population is useful for predicting yield potential of resistant varieties

Benefit of planting a variety with PI 88788 resistance	Against a SCN population with a FI on PI 88788 of ____
Excellent	Less than 10
Ok for now, but watch	10 - 30
Likely to have problem	30 - 60
Little to no yield gain	60 – 100



The WSMB funds the MacGuidwin lab to conduct Hg Tests on samples submitted to the SCN-Testing Program

126 farms have been tested for SCN Hg Type

Region	2003 - 05	2006	2007	2008	2009	2010	Total
Southwest	2	1	1	2	3	0	**9**
Southeast	6	7	4	1	0	1	**19**
S. Central	3	6	3	10	11	4	**37**
W. Central	3	3	4	7	7	6	**30**
Central	3	0	0	1	2	4	**10**
E. Central	0	3	4	0	10	1	**18**
Northwest	0	0	1	1	0	0	**2**
Northeast	1	0	0	0	0	0	**1**
Total	**18**	**20**	**17**	**22**	**33**	**16**	**126**

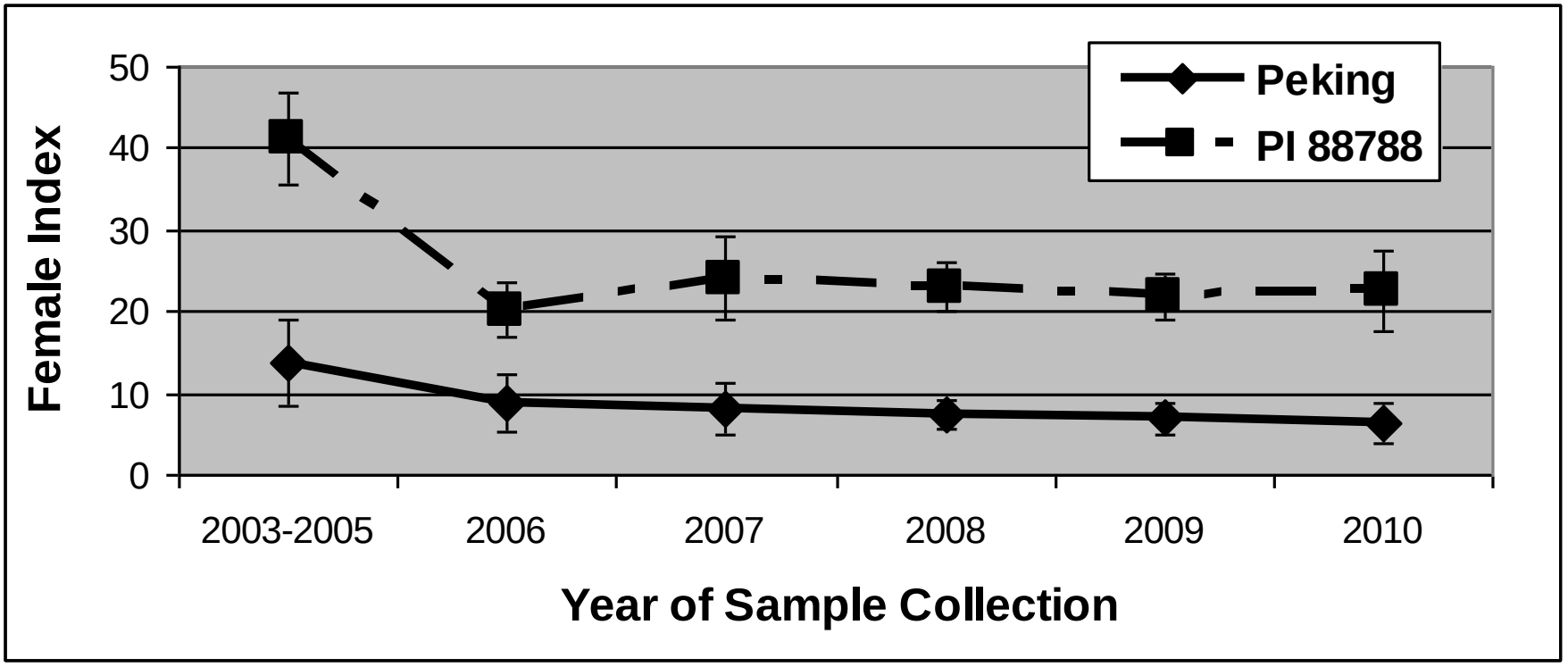
For the counties making up each region, see the Wisconsin Agricultural Statistics Publication

% of farms infested with SCN Hg Type 0

Region	2003-2005	2006	2007	2008	2009	2010
Southwest	0	0	100	0	0	*
Southeast	0	29	0	0	*	0
S. Central	0	33	33	10	27	25
W. Central	0	0	0	0	14	17
Central	0	*	*	0	0	25
E. Central	*	0	25	*	20	100
Northwest	*	*	0	0	*	*
Northeast	0	*	*	*	*	*
State Average	0	12	26	2	12	33

For the counties making up each region, see the Wisconsin Agricultural Statistics Publication

Average female index for Wisconsin SCN populations on ‘Peking’ and PI 88788 is steady



BUT - About 12% of the farms infested with SCN do not have or are at high risk for losing the yield benefit of varieties with PI 88788 resistance

Year	# Virulence Assays	Median FI on PI 88788	Median FI on 'Peking'	% of Samples with FI > 50 on 'Peking'	% of Samples with FI > 50 on PI 88788
2006	20	17	2	5	5
2007	17	14	3	0	18
2008	22	22	5	0	5
2009	34	17	2	3	12
2010	16	18	1	0	19

Adaptation to the Peking source is not a problem now, but could be in the future – particularly for producers in the eastern part of Wisconsin

Region	Median Female Index		% of samples with virulent SCN populations			
	Peking	PI 88788	Hg 0	Hg 1	Hg 2	Hg 1.2
East	4	15	16	6	44	32
Central	2	14	23	7	57	19
West	1	23	6	3	81	10

And eventually for EVERY ONE – SCN is a contagious disease!

Early detection is the key to maintaining yield

- Damage related to population density of SCN
- Yield can be depressed without showing symptoms
- Most newly identified infestations in Wisconsin are at low risk level for yield loss
- Take advantage of the WSMB-sponsored SCN testing program!

SCN can be managed!

- Moniter risk level of SCN in a field (submit samples to WSMB-soil testing program)
- Plant a SCN- resistant variety
- Rotate

  crops, sources of resistance, varieties
- Watch yields and contact UW if resistant varieties no longer out-perform susceptible


Questions
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