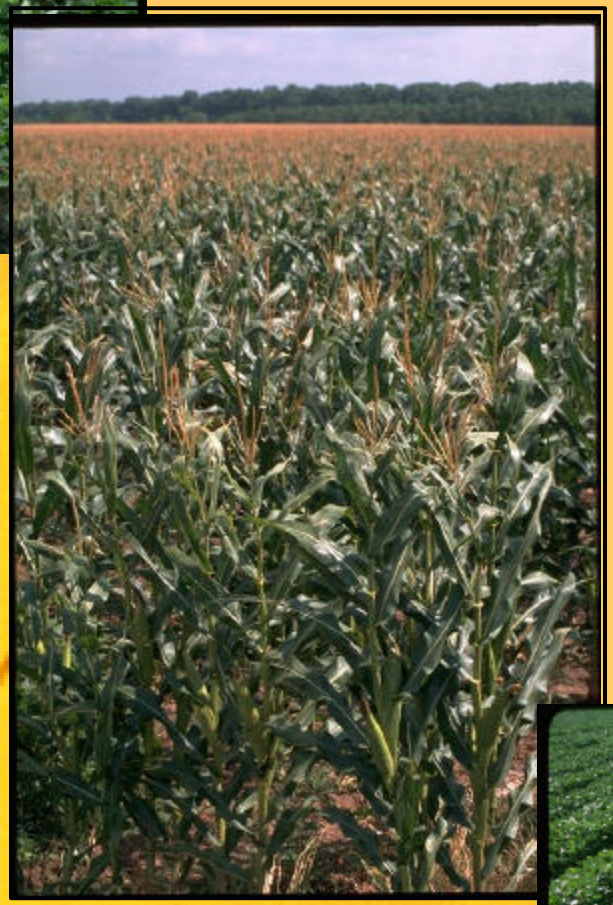
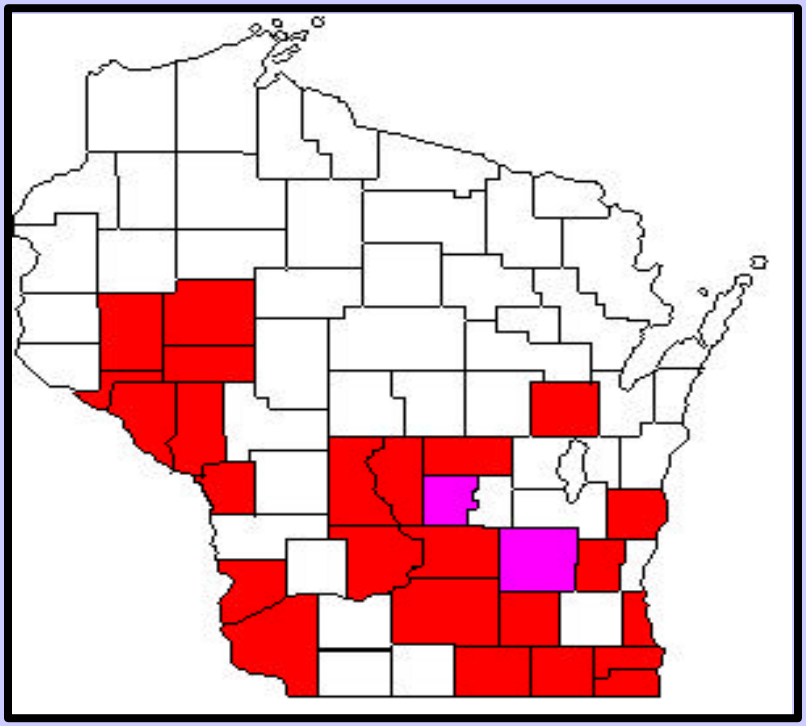
Rotational Effects on The Soybean Cyst Nematode



Ann MacGuidwin
UW Plant Pathology

Approximately 20% of the soybean acreage in Wisconsin is infested with Soybean Cyst Nematode (SCN). The SCN has been detected from 26 counties to date.



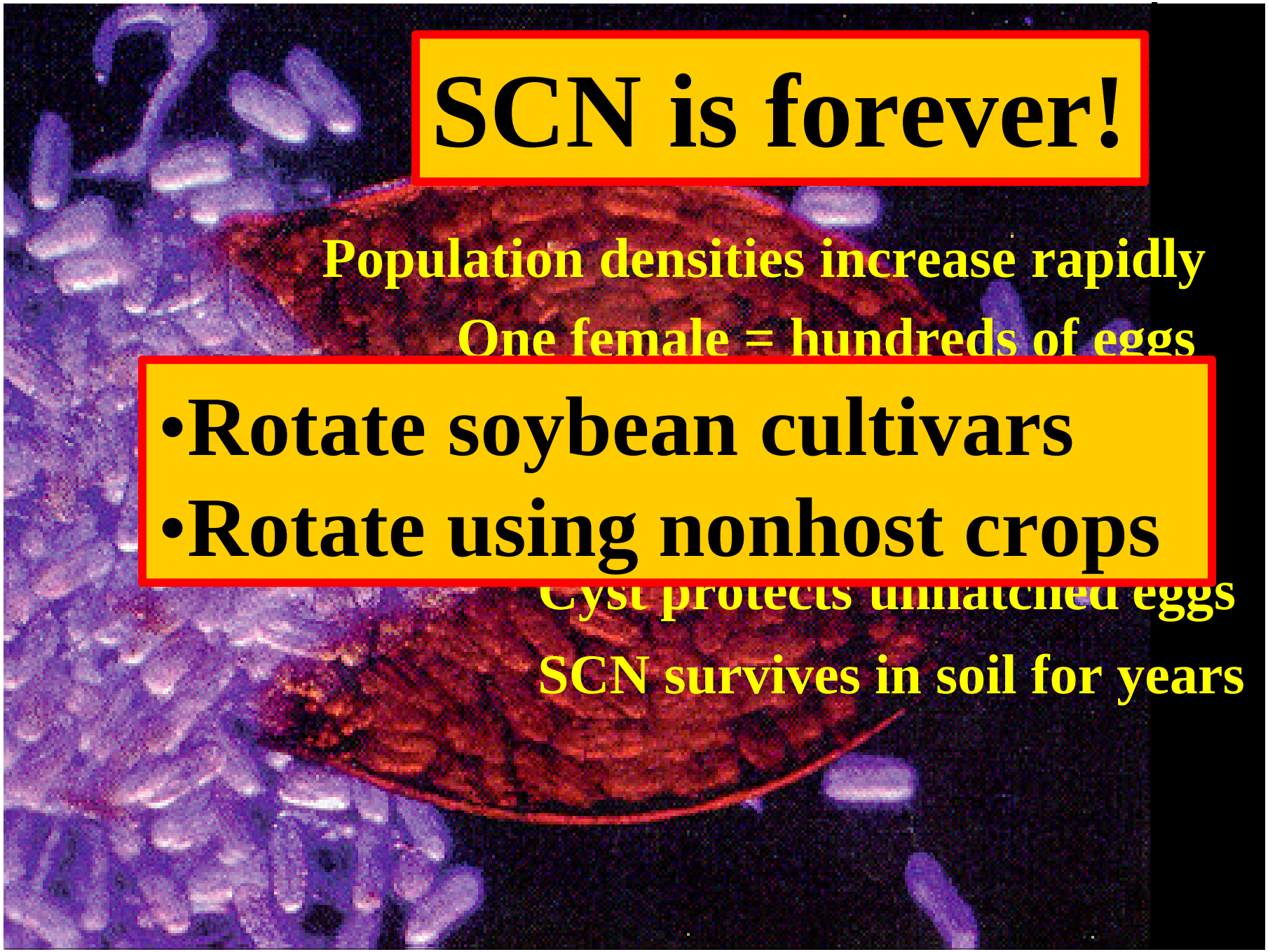
Adams
Buffalo
Chippewa
Columbia
Crawford
Dane
Dodge
Dunn
Eau Claire
Grant
Jefferson
Juneau
Kenosha
La Crosse
Marquette
Milwaukee
Outagamie
Pepin
Racine
Rock
Sauk
Sheboygan
Trempealeau
Walworth
Washington
Waushara

SCN Assays – UW Disease Clinic

- 275 samples submitted in 2002 for SCN
- 31 positive for SCN
- Other cyst nematodes present

Take the test. Beat the pest.

The SCN COALITION

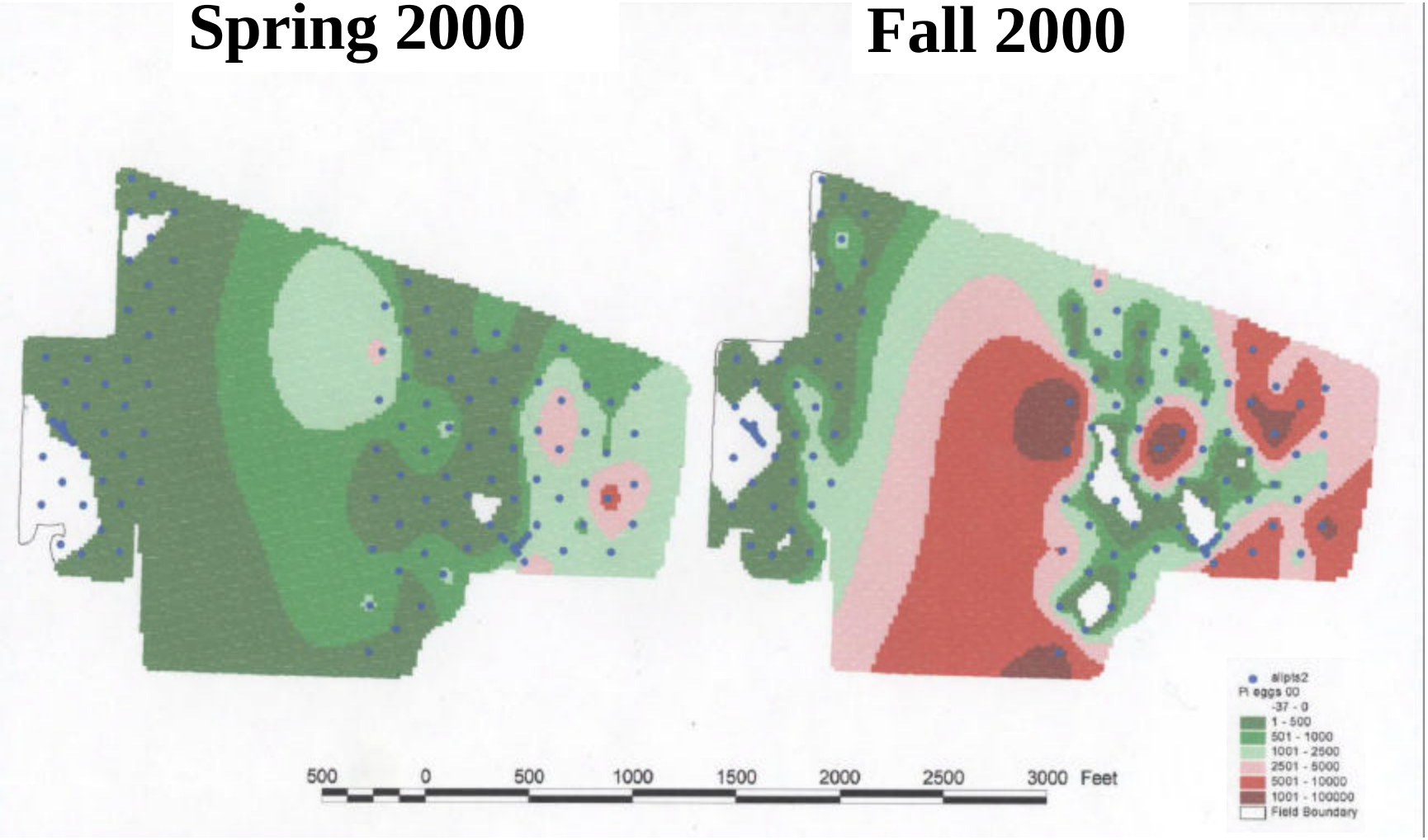

SCN is forever!
Population densities increase rapidly
One female = hundreds of eggs
•Rotate soybean cultivars
•Rotate using nonhost crops
Cyst protects unhatched eggs
SCN survives in soil for years

We studied population density and spatial pattern of SCN in > 30 soybean fields

Enterprise	Years studied	Year in corn	# samples positive for SCN	Cultivar planted year 1	Average final vs initial SCN egg densities during soybean 1[a]	Average % remaining at start of soybean 2[b]
1	2000-02	2001	55	res	4.13	55%
2	2000-02	2001	39	res/sus	3.58	74%
3	2000-02	2001	13	res/sus	1.00	77%
4	2000-02	2001	19	sus	2.72	66%
5	1999-01	2000	49	res/sus	1.85	100%
6	1999-01	2000	55	res/sus	7.09	60%
7	1999-01	2000	13	res	1.00	79%

Research funded by the WSMB

Spring 2000 **Fall 2000**

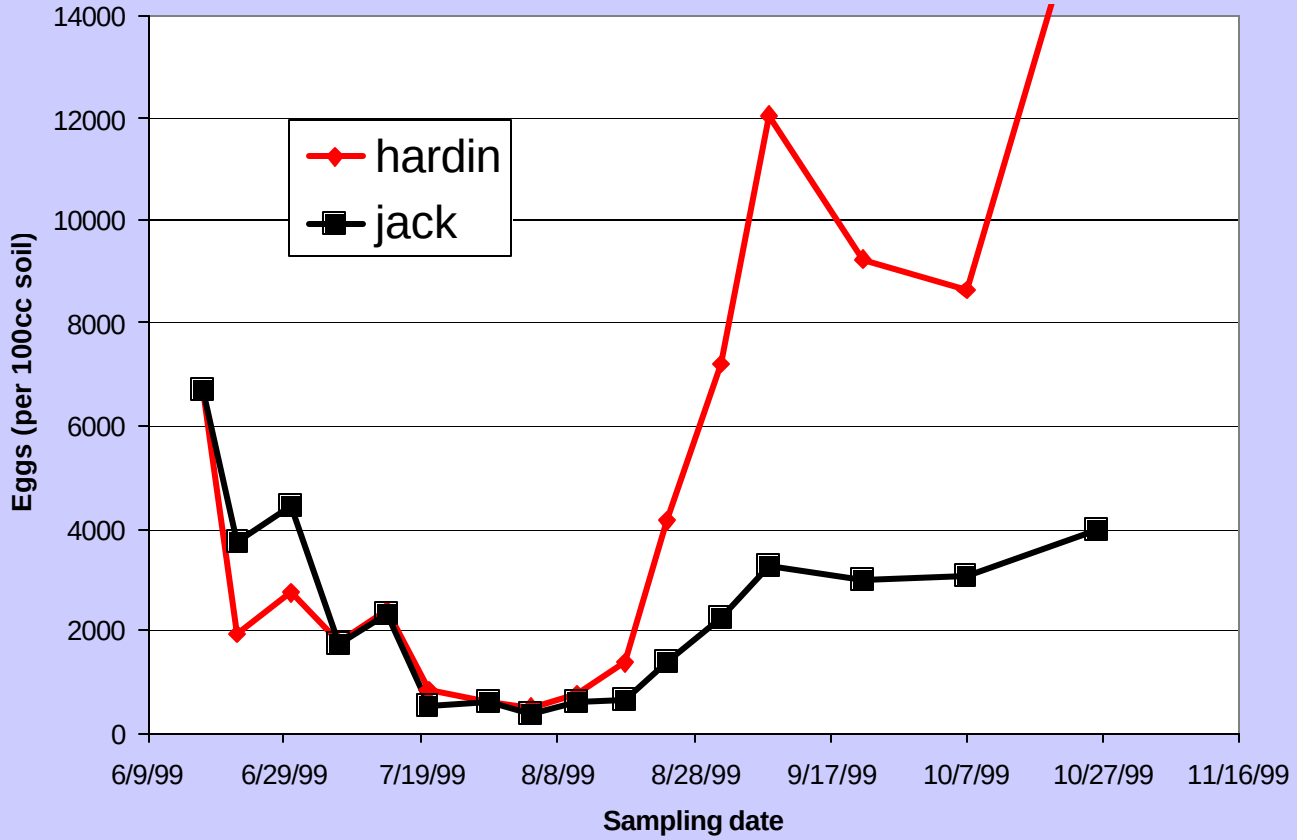


Eggs / 100 cm^3 soil – green=low / red=high

Why do SCN population densities increase in some fields planted with SCN-resistant cvs?

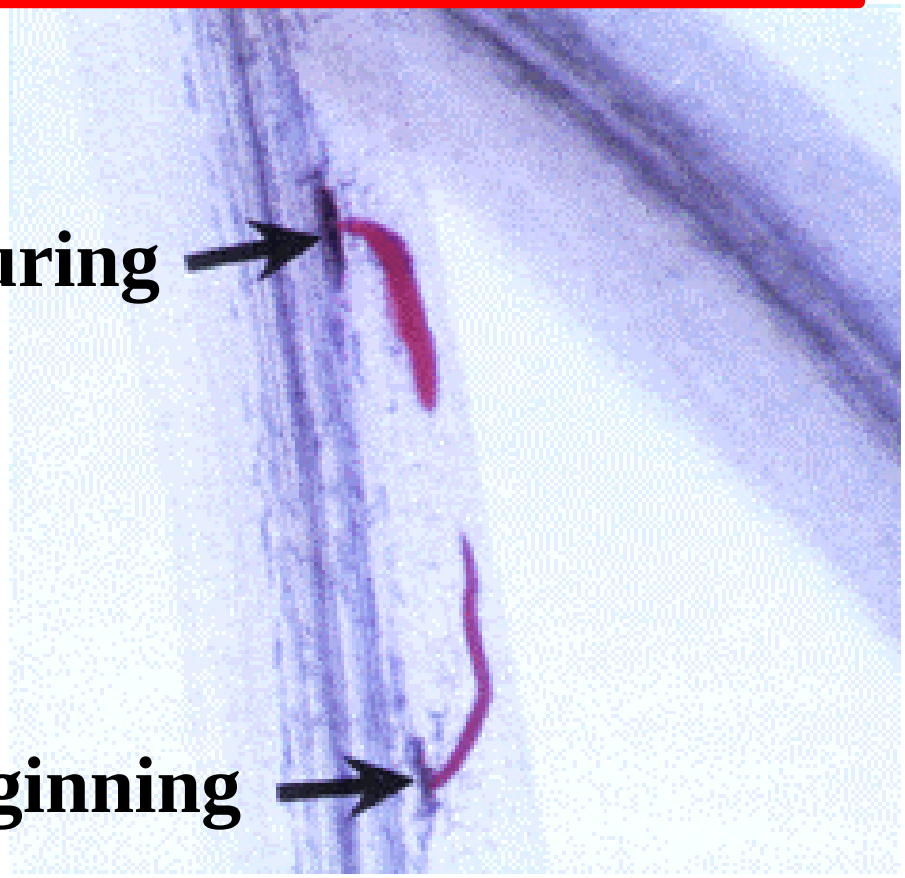
- **Cultivar may not have a high level of resistance to SCN.**
- **SCN population may adapt to SCN-resistant cultivar.**

Resistance = low level of reproduction by SCN

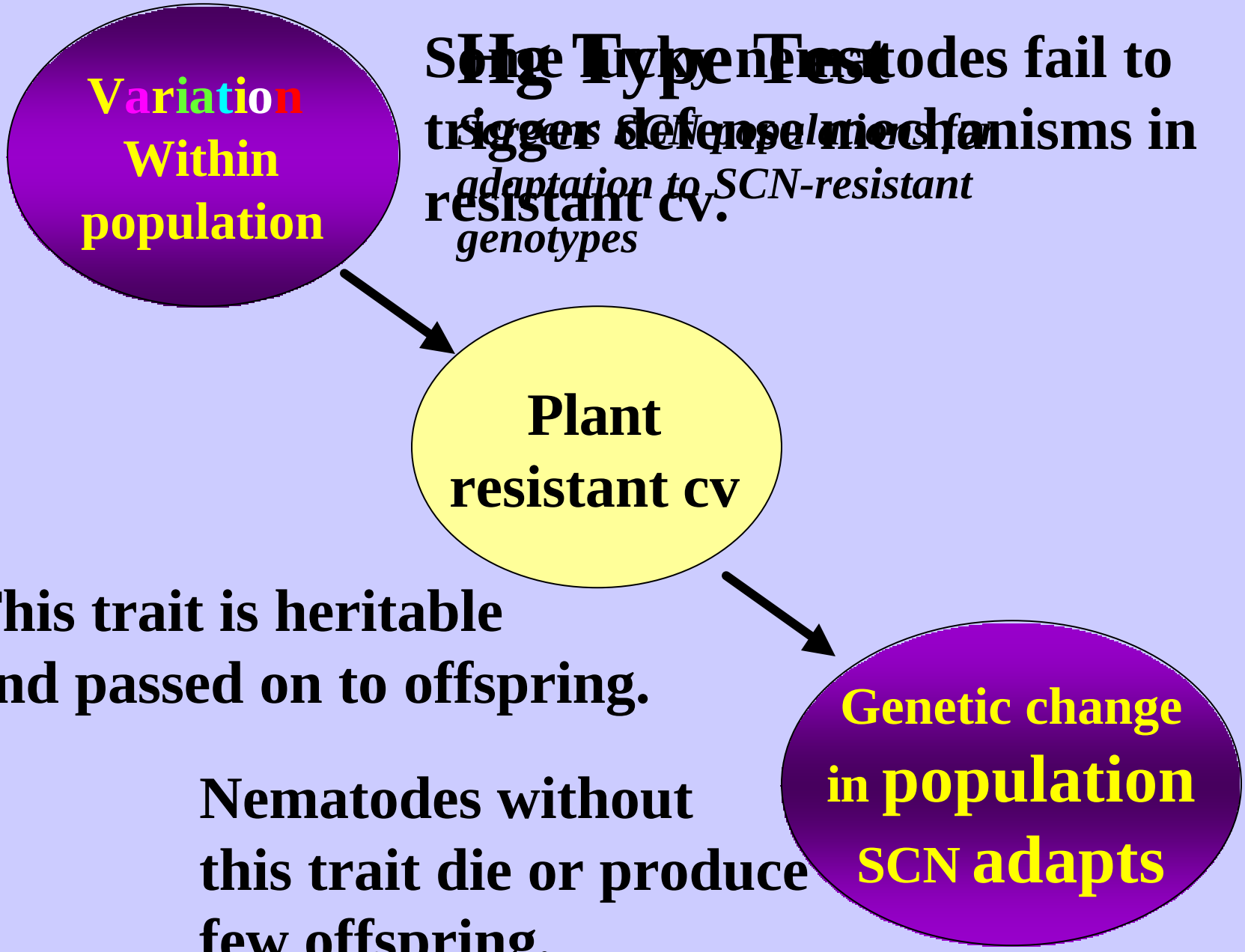


Nematodes infect resistant cultivars, but develop slower and produce fewer eggs than on susceptible cultivars

Juvenile feeding and maturing



Second-stage juvenile beginning to feed


Variation Within population
Some Type 1 nematodes fail to trigger defense mechanisms in resistant cv.
Plant resistant cv
This trait is heritable and passed on to offspring.
Nematodes without this trait die or produce few offspring.
Genetic change in population SCN adapts

Even SCN-resistant cultivars will fail to reach full yield potential if SCN population densities are high enough.

Average reduction in SCN population densities after one year of corn = 27%

Enterprise	Years studied	Year in corn	# samples positive for SCN	Cultivar planted year 1	Average final vs initial SCN egg densities during soybean 1[a]	Average % remaining at start of soybean 2[b]
1	2000-02	2001	55	res	4.13	55%
2	2000-02	2001	39	res/sus	3.58	74%
3	2000-02	2001	13	res/sus	1.00	77%
4	2000-02	2001	19	sus	2.72	66%
5	1999-01	2000	49	res/sus	1.85	100%
6	1999-01	2000	55	res/sus	7.09	60%
7	1999-01	2000	13	res	1.00	79%

Research funded by the WSMB

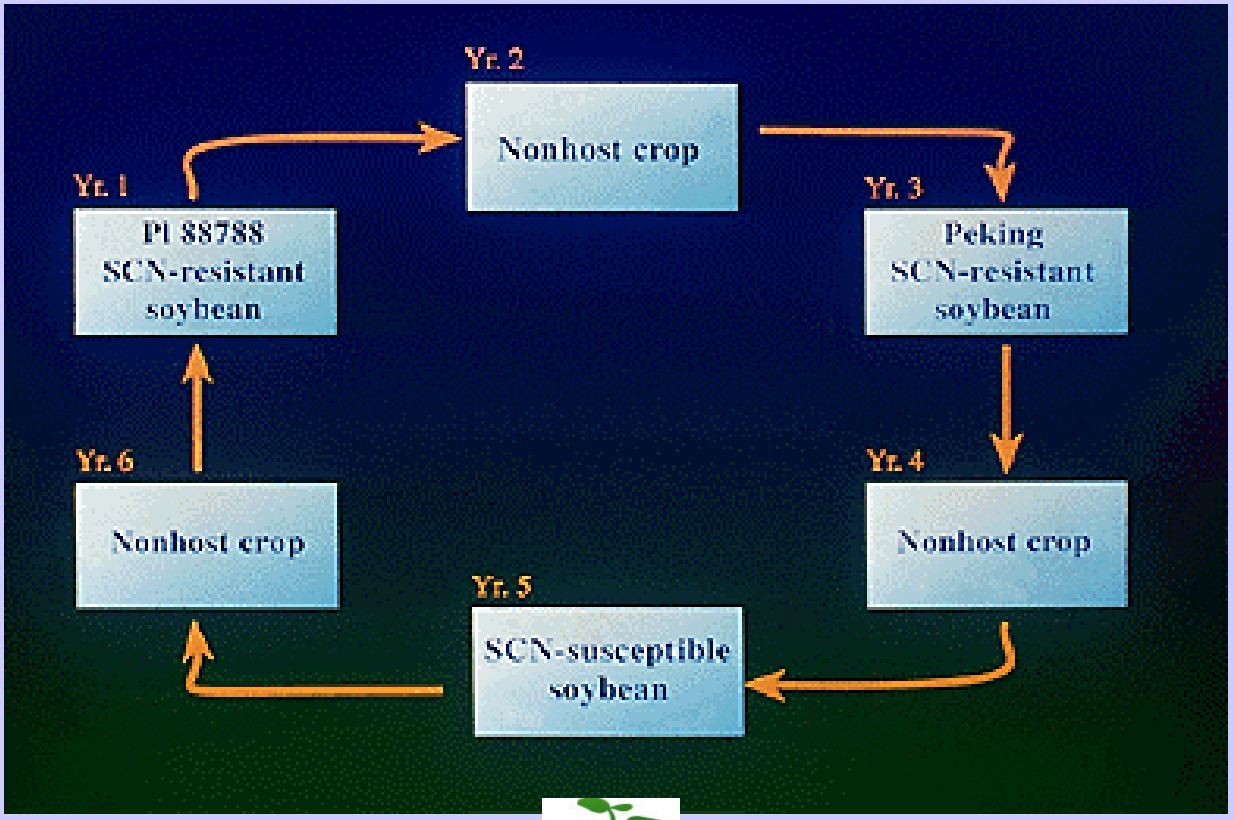
Manage SCN with rotation

Soybean Year

- **Match cultivar to SCN population**

Rotation Year

- **Choose appropriate crop(s) & duration of rotation**
- **Try new approaches**



Take the test. **Beat the pest.**

Monitor SCN The SCN COALITION **every soybean year.**