



2017 NATIONAL SUNFLOWER ASSOCIATION SURVEY

Project Leaders:

Tom Gulya, Retired Plant Pathologist ARS

Ryan Buetow, Extension Agronomist, Dickinson

Hans Kandel, Extension Agronomist

NDSU Plant Science Department

The background features a dark blue gradient with faint, light blue circular patterns and a scale. The scale is a semi-circular arc with tick marks and numerical labels: 160, 180, 190, 200, 210, 220, 230, 240, 250, and 260. The text is centered and rendered in a bold, yellow, sans-serif font.

DISEASE EVALUATIONS

2017

TOM GULYA – USDA (RETIRED)

FEBINA MATHEW - SDSU

Diseases Evaluated

- Sclerotinia Wilt
- Sclerotinia Mid-Stem Rot
- Sclerotinia Head Rot
- Rhizopus Head Rot
- Phomopsis Canker
- Rust
- Phoma Black Stem
- Downy Mildew
- Verticillium Wilt
- Charcoal Rot

GOOD NEWS – MOST DISEASES LOWER IN 2017

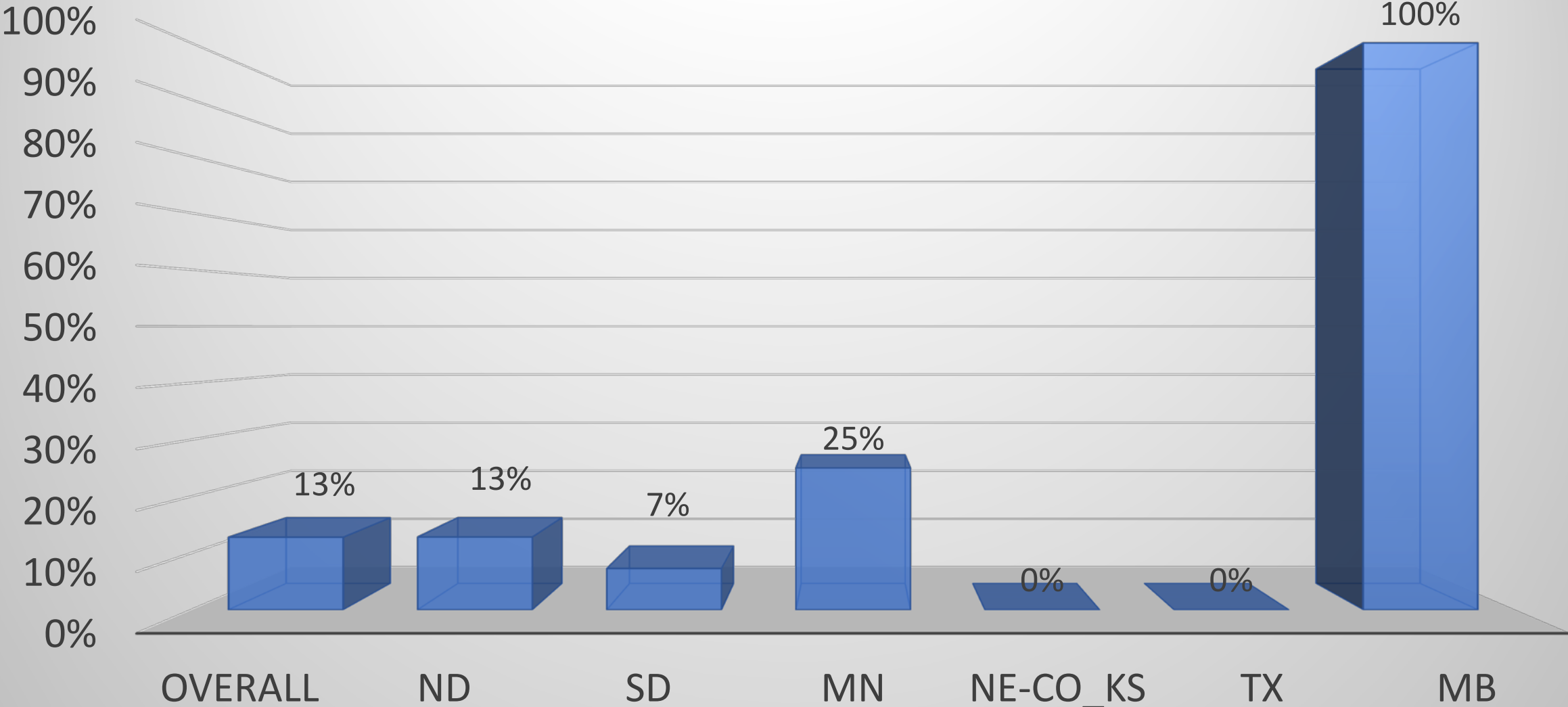
	2013	2015	2017	
Sclerotinia Wilt	12%	25%	13%	↓
Sclerotinia Mid Stem Rot	17%	21%	15%	↓
Sclerotinia Head Rot	20%	19%	22%	↑
Rhizopus Heat Rot	22%	39%	19%	↓↓
Rust	65%	62%	38%	↓↓
Phomopsis	52%	61%	15%	↓↓↓
Phoma	66%	80%	59%	↓↓
Downy Mildew	7%	16%	9%	↓
Verticillium	12%	11%	12%	~
Charcoal Rot	4%	1%	1%	~

	2017	2015	2013
Yield Limiting Factors	1st	1st	1st
<i>No Problem (0)</i>	9%	11%	11%
<i>Drought (3)</i>	31%	11%	15%
<i>Hail (5)</i>	3%	1%	1%
<i>Disease (2)</i>	11%	24%	17%
<i>Weeds (10)</i>	8%	8%	4%
<i>Birds (1)</i>	4%	7%	6%
<i>Insects (7)</i>	2%	4%	1%
<i>Plant Spacing (9)</i>	19%	13%	26%
<i>Lodging (8)</i>	3%	8%	10%
<i>Uneven Plant Growth (4)</i>	2%	4%	2%
<i>Herbicide Damage (6)</i>	0%	NC	NC
<i>Others (11)</i>	8%	9%	7%

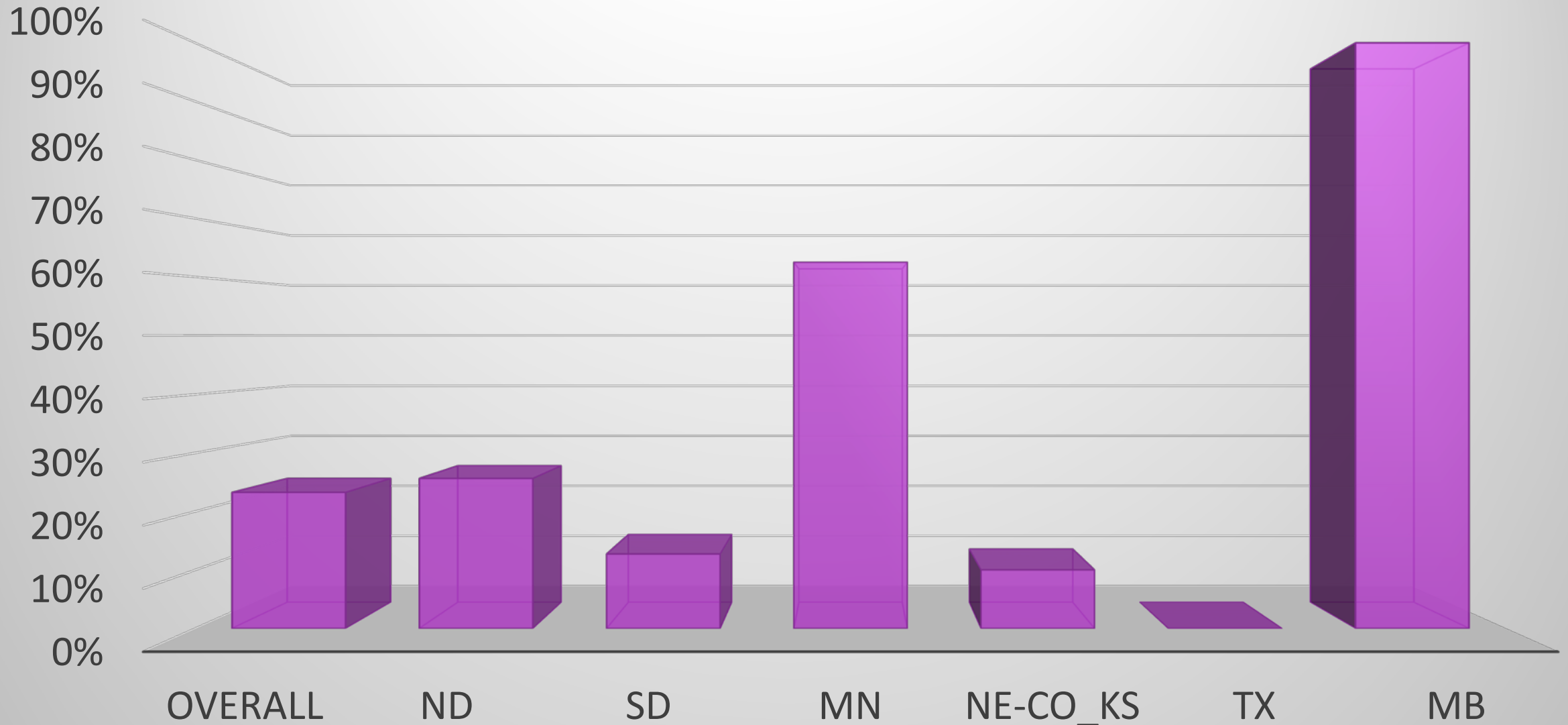
***INCIDENCE & GEOGRAPHIC TRENDS WITH
MAJOR SUNFLOWER DISEASES IN 2017***

The background is a dark blue gradient with a subtle pattern of small white dots. On the right side, there are several technical-style graphics: a large circular gauge with a scale from 0 to 210, a smaller circular gauge with a scale from 0 to 100, and various dashed and solid lines forming circular and radial patterns.

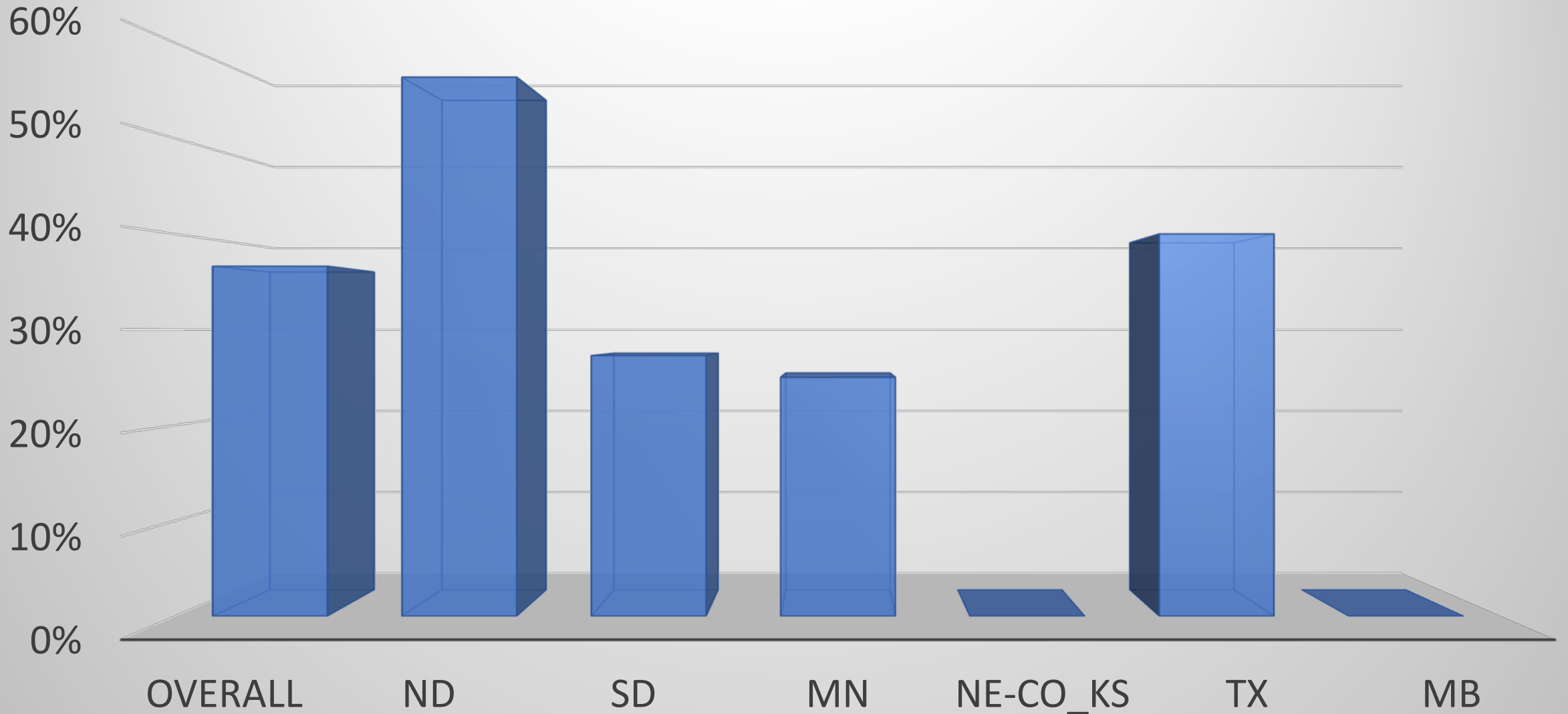
Sclerotinia Wilt



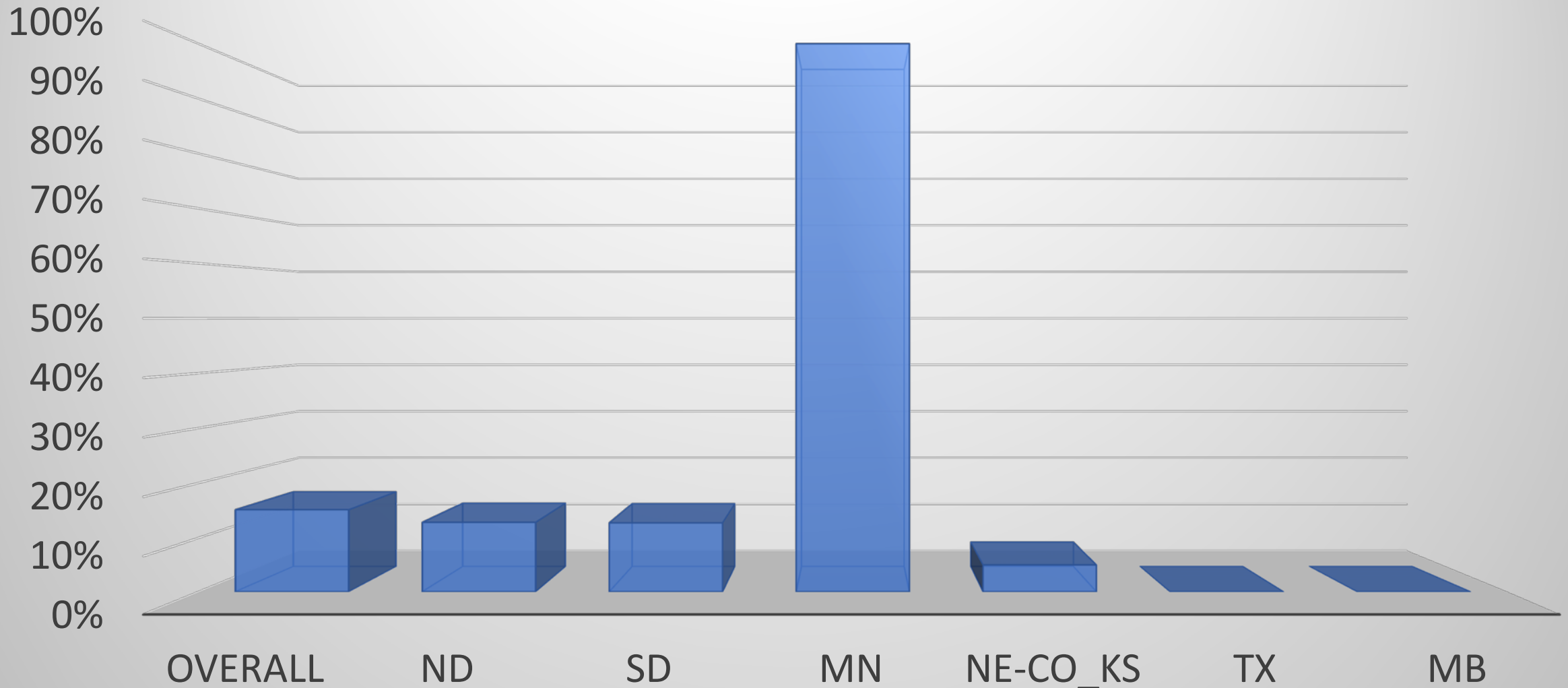
Sclerotinia Head Rot



Rust



Phomopsis



NEW CONCERN – MULTIPLE SPECIES OF PHOMOPSIS !

Phomopsis helianthi identified as cause of new stem canker in Yugoslavia in mid-1980s.

Two competing groups of pathologists in Yugoslavia: one claiming multiple species, other saying “**ONLY ONE.**”

With new molecular identification methods, 35 years later, two scientists in Australia (Sue Thompson) and the U.S. (Febina Mathew) have identified multiple **NEW *Phomopsis*** species causing disease on sunflower.

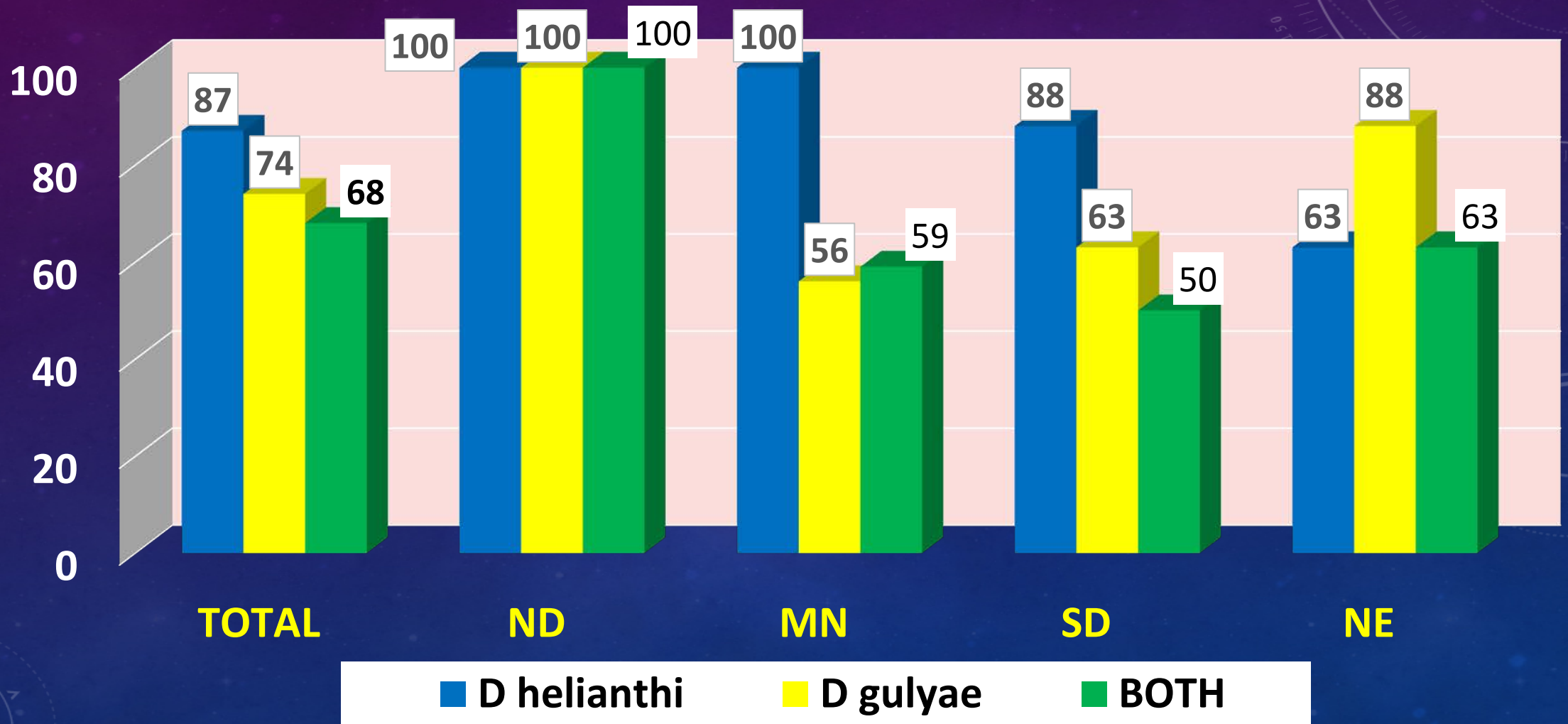
PHOMOPSIS/DIAPORTHE SPECIES NEWLY REPORTED ON SUNFLOWER

	USA				AUSTRALIA		
	SF	Soy	Weeds		SF	Soy	Weeds
<i>D. helianthi</i>	XX		XX				
<i>D. gulyae</i>	XX	XX	XX		<i>D. gulyae</i>	XX	XX
<i>D. stewartii</i>	XX				<i>D. kongii</i>	XX	XX
					<i>D. kochmanii</i> <i>(sojae)</i>	XX	XX
					<i>D. masirevici</i>	XX	XX
					<i>D. mirici</i>	XX	XX
					<i>D. goulteri</i>	XX	XX
					<i>D. sackstoni</i>	XX	
					<i>D. serafiniae</i>	XX	
					Five more new	XX	
					species yet to be published		

PHOMOPSIS SPECIES IDENTIFICATION VIA SURVEY-COLLECTED STALKS

- Funded by NSA Grant to Febina Mathew, SDSU
- PCR assays (developed by Taylor Olson) done by Marina Johnson and Brian Kontz – SDSU
- 100+ field samples hoped for, but with low Phomopsis in 2017, stalks from 31 fields received
- *Phomopsis helianthi* and *P. gulyae* recovered from FOUR states (ND, MN, SD, NE)

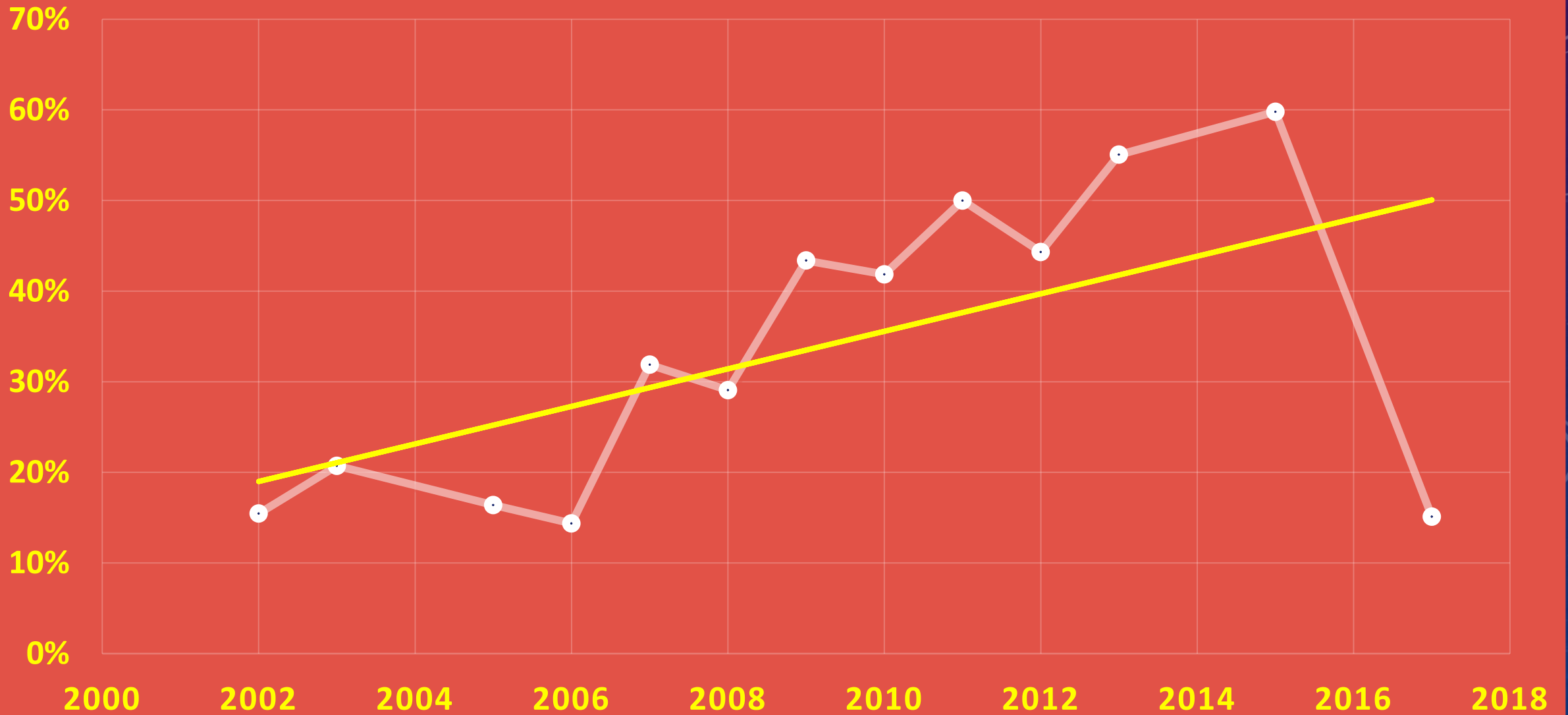
PHOMOPSIS SPECIES IDENTIFICATION VIA SURVEY-COLLECTED STALKS IN 2017 USING A PCR ASSAY



HOW HAS PHOMOPSIS INCIDENCE CHANGED OVER TIME ? USING NSA SURVEY DATA FROM 2002 TO 2017

The background is a dark blue gradient with faint, light blue technical graphics. On the right side, there are several circular gauges or dials with numerical scales (0, 90, 100, 110, 120, 130, 140, 150, 180, 190, 200, 210) and arrows. There are also some dashed lines and circular patterns scattered across the background.

PHOMOPSIS - INCIDENCE



% Crop Affected by Phomopsis



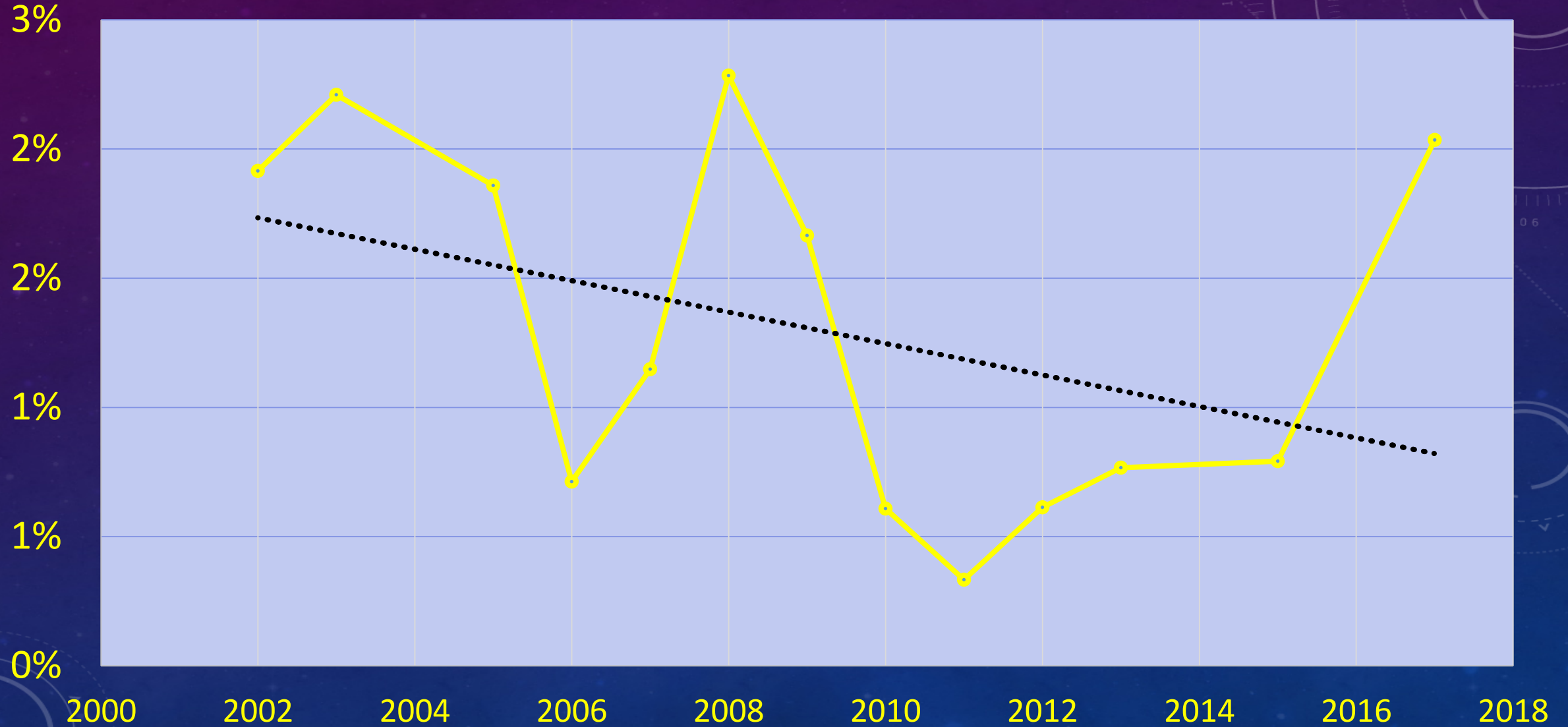
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WHAT TRENDS OVER TIME DO WE SEE WITH MAJOR DISEASES?

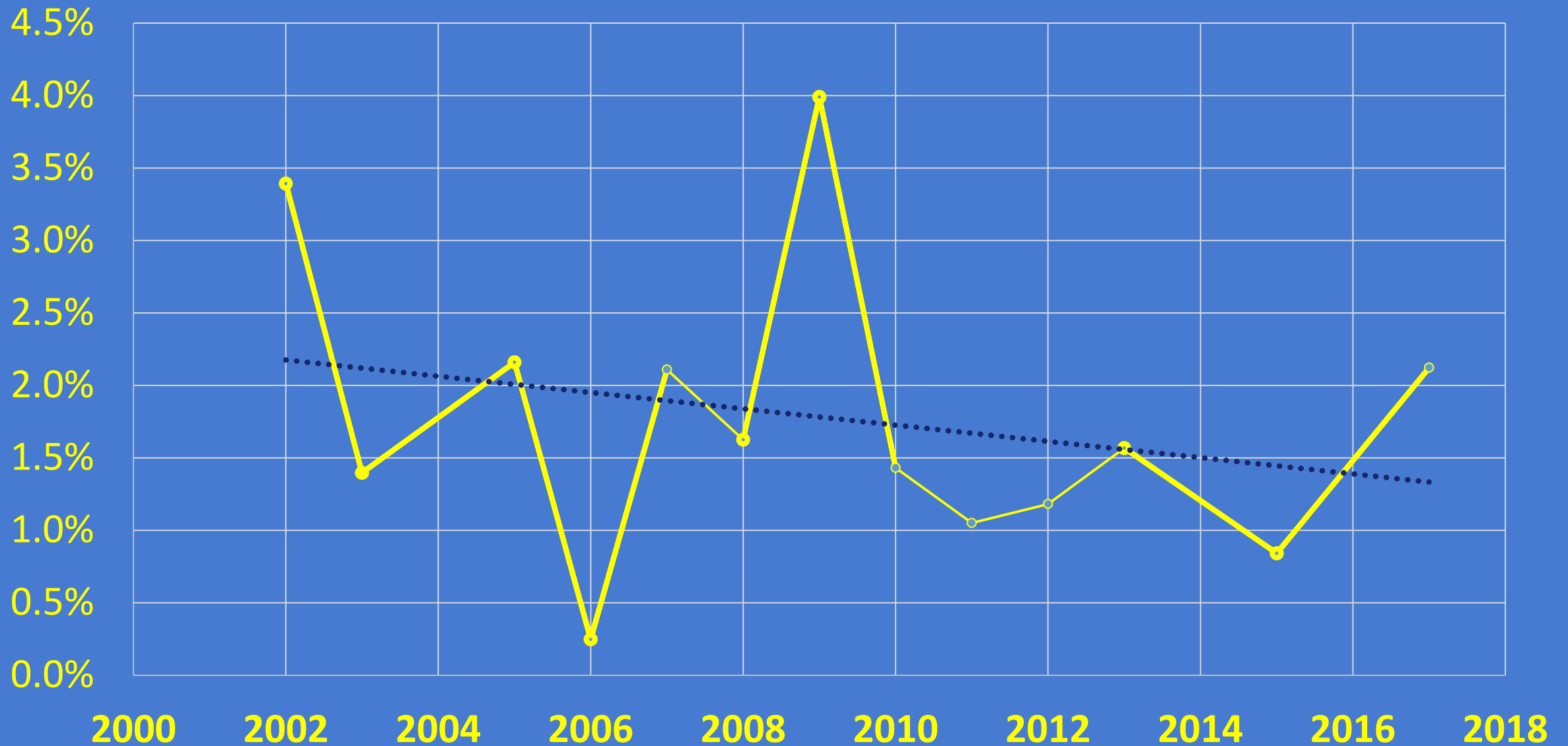
SCLEROTINIA WILT - SCLEROTINIA HEAD ROT - PHOMOPSIS

SCLEROTINA WILT (BASAL STALK ROT)

% U.S. Crop Affected

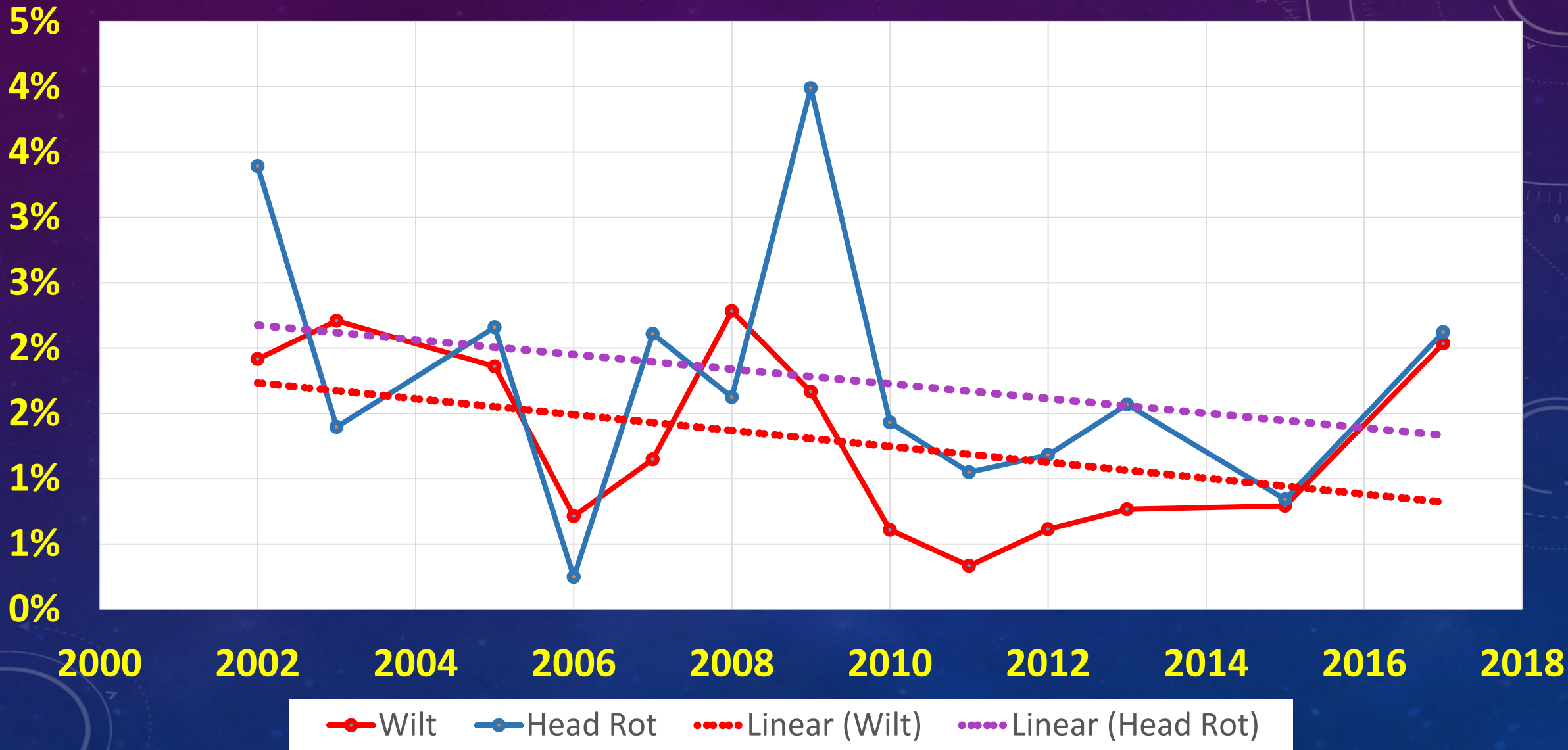


% U.S. Crop Affected by Sclerotinia Head Rot

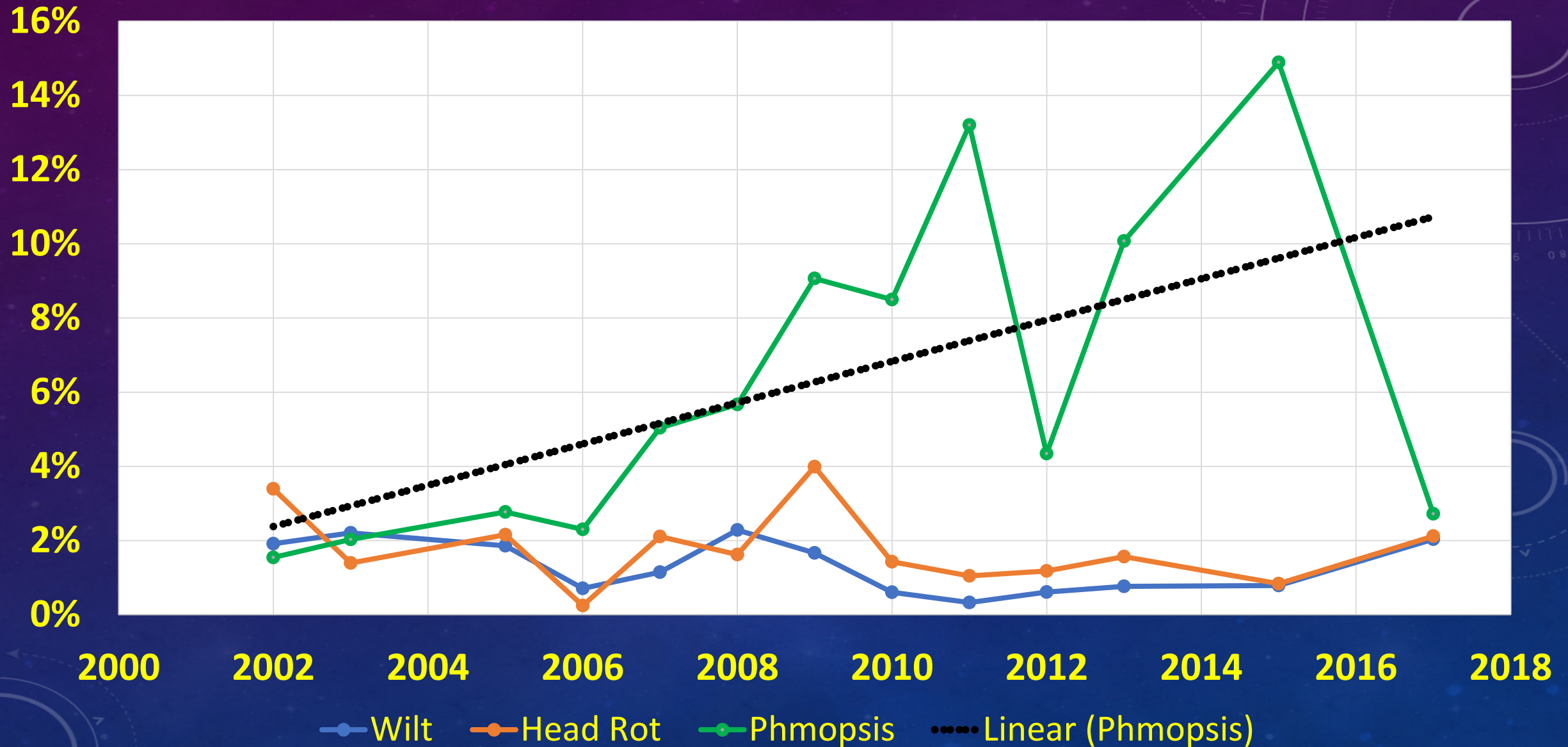


COMPARISON OF SCLEROTINIA WILT & HEAD ROT

% USA Sunflower Crop Affected



% U.S. Sunflower Crop Affected by Three Major Diseases



CONCLUSIONS –

- The sunflower public and private research community is making progress in decreasing the impact of *Sclerotinia* wilt and head rot, through genetic resistance and grower education.
- *Phomopsis* “diseases” continue to increase, both in geographic distribution and % of the U.S. crop affected.
- Multiple *Phomopsis* species are already present in the U.S. (with more likely to be identified).
- Genetic resistance to one *Phomopsis* species may not confer resistance to other species.... Thus the development of resistant inbreds and hybrids will be more of a challenge.