Goss's Wilt of Corn

2012 Wisconsin Crop Management Conference

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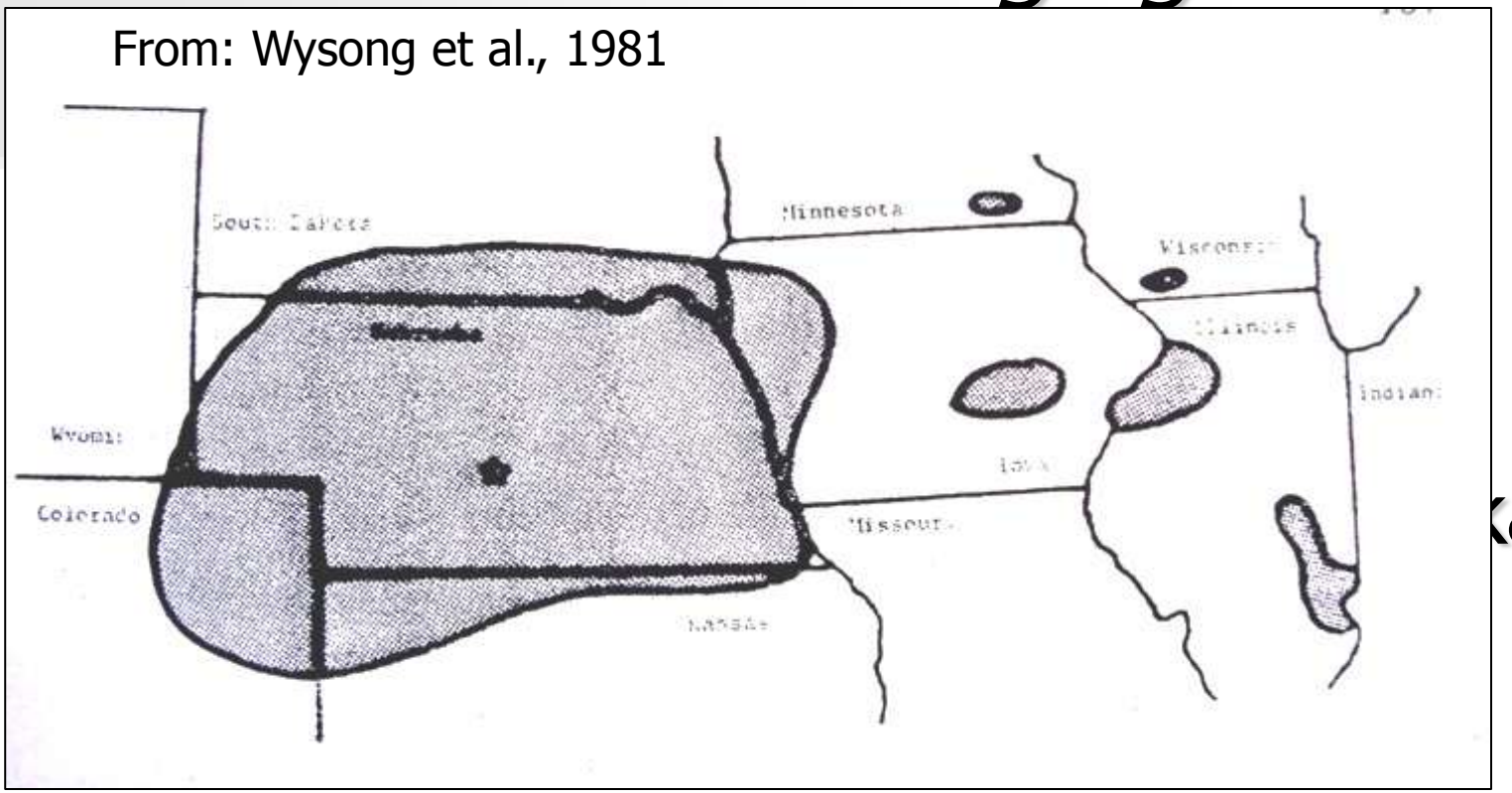
Goss's wilt: *a re-emerging disease*

From: Wysong et al., 1981



- First reports from Illinois and Wisconsin came in 1980 and 1981, respectively

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Goss's wilt in Illinois

- 2008 – 2009
  - Some scattered reports of Goss's wilt symptoms in Illinois
- 2010
  - Goss's wilt occurrences more widespread- some samples to UI Plant Clinic
- 2011
  - Widespread Goss's wilt, confirmed in 31 counties by UI Plant Clinic

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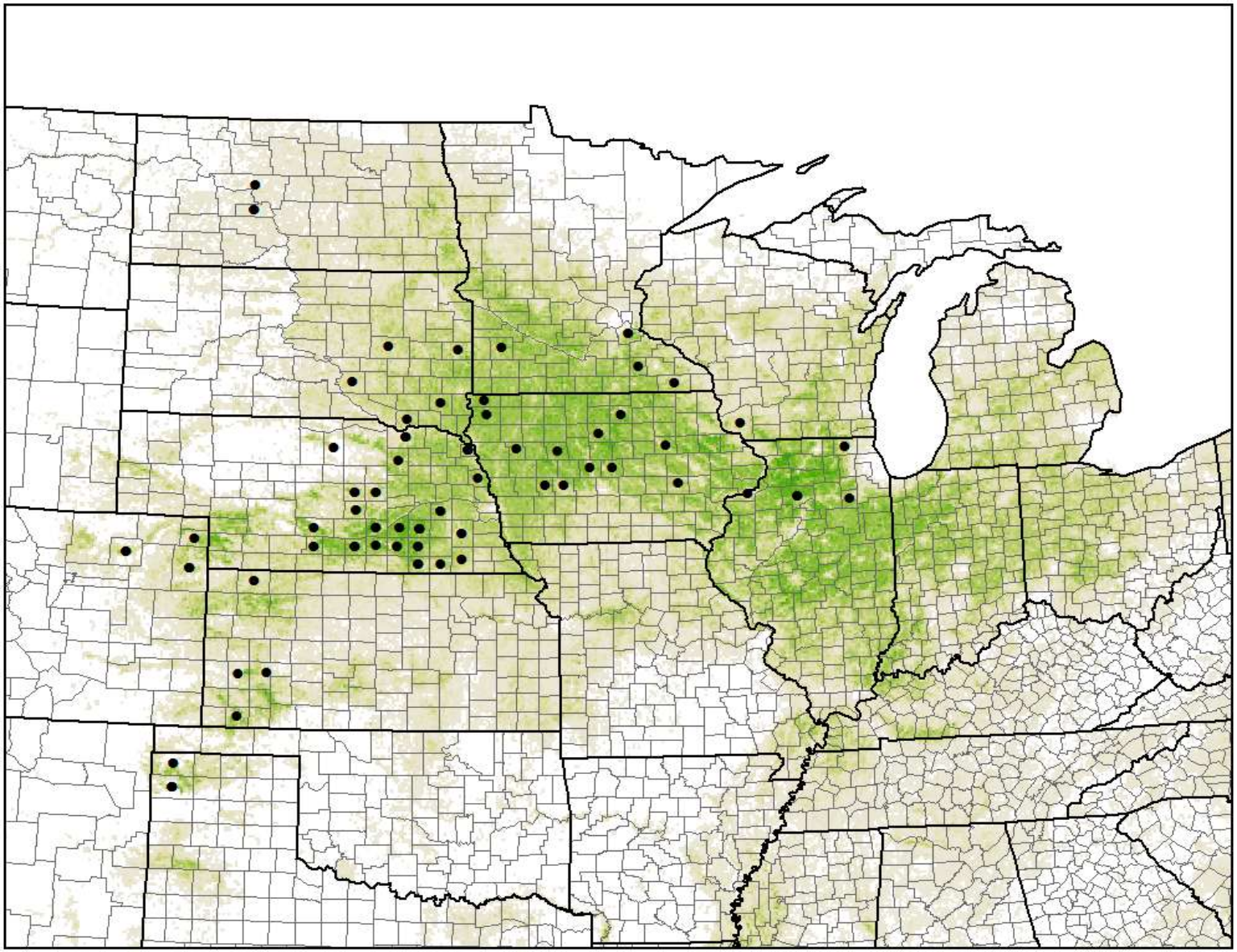
Tracking Goss' Wilt

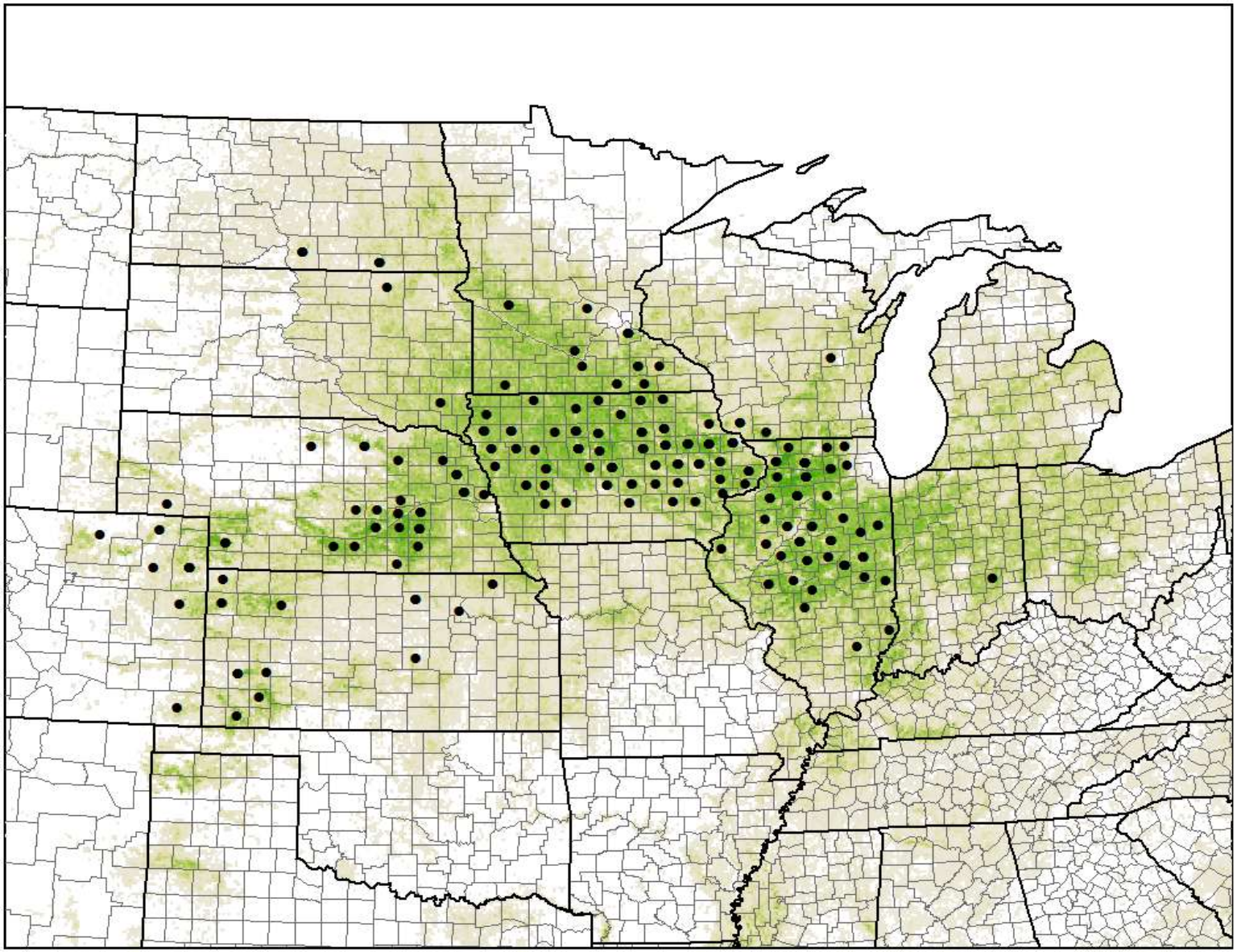
2010 observations



Slide courtesy ZedX, North Carolina State Univ., Penn State Univ.

Tracking Goss' Wilt

2011 observations



Slide courtesy ZedX, North Carolina State Univ., Penn State Univ.

Goss's wilt symptoms & signs

- Large leaf lesions with wavy margins and "water-soaking"
- "Freckles" inside lesions
- Bacterial exudates may be evident on the lesions
- Vascular wilt (becomes systemic thru the xylem) – discoloration in the vascular system

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Bacterial exudates on leaf surface

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Systemic infection

- Infection of vascular tissue
- Appears orange early, then turns brown
- Can cause wilting and stalk degradation

Slide courtesy Dr. Kiersten Wise, Purdue University

Goss's Wilt

- Overwinters in corn debris
  - Also, survives on some other hosts: i.e. barnyard grass, shattercane, or green foxtail)
- Bacterial cells are disseminated onto corn leaves via wind and splashing rain
- Bacteria enter plant tissue through wounds and/or natural openings
  - Hail damage, high wind damage

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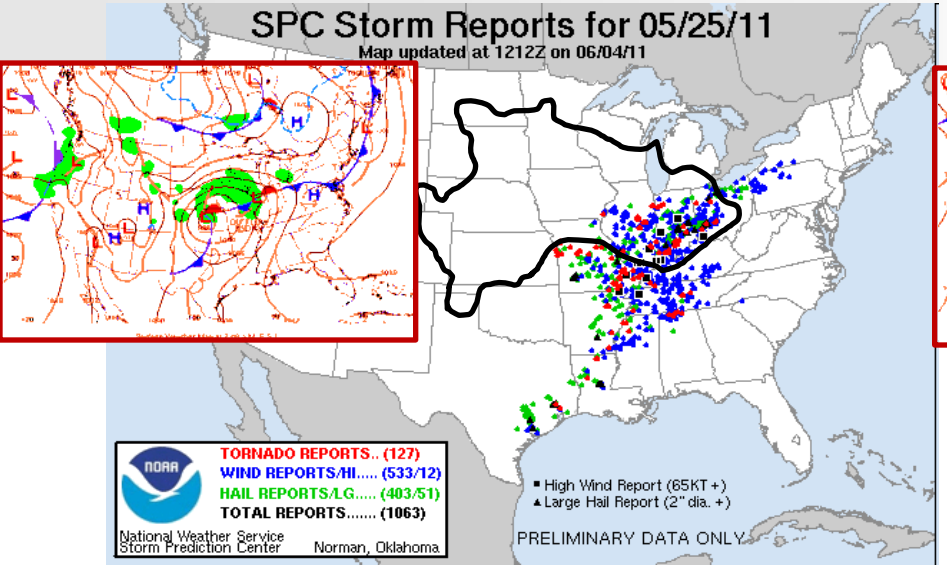
VASCULAR WILT

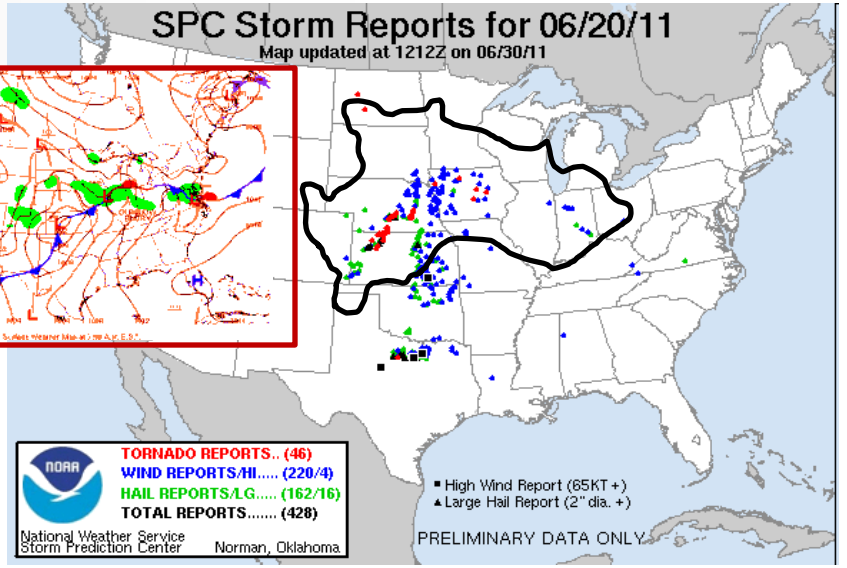
early infection

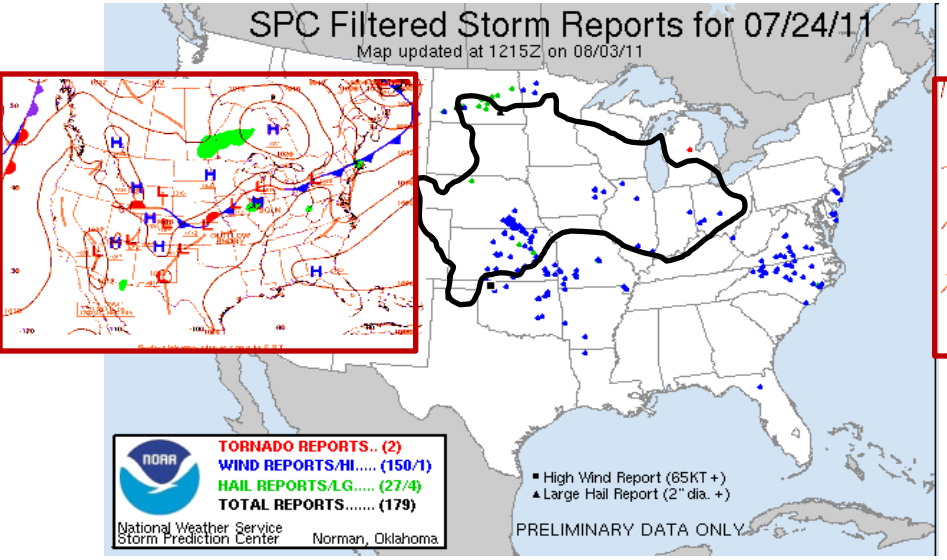
near harvest

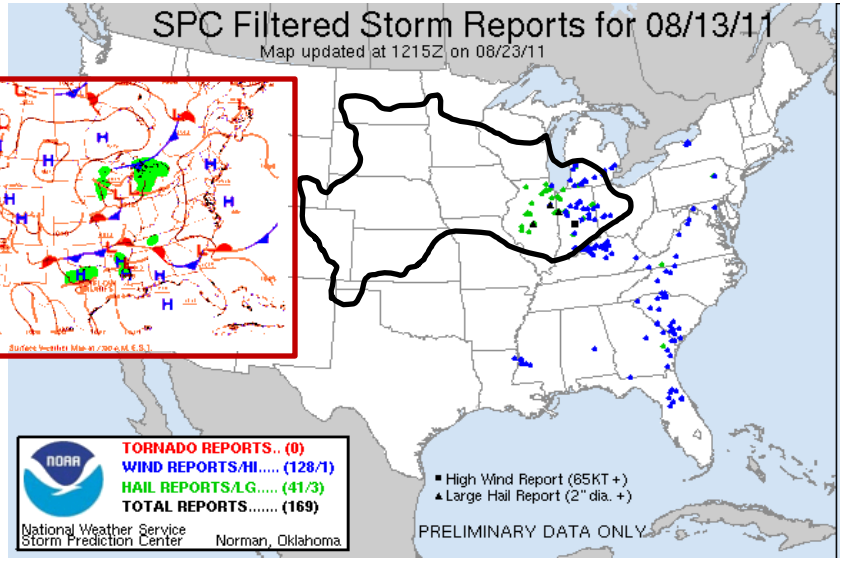
Tracking Goss' Wilt

Tornado, wind, and hail events during 2011 season









Slide courtesy ZedX, North Carolina State Univ., Penn State Univ.

Ford County Illinois - 2010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Goss's Wilt Identification

- Confirmation of Goss's wilt based on:
  1) Symptoms – *must match Goss's wilt*

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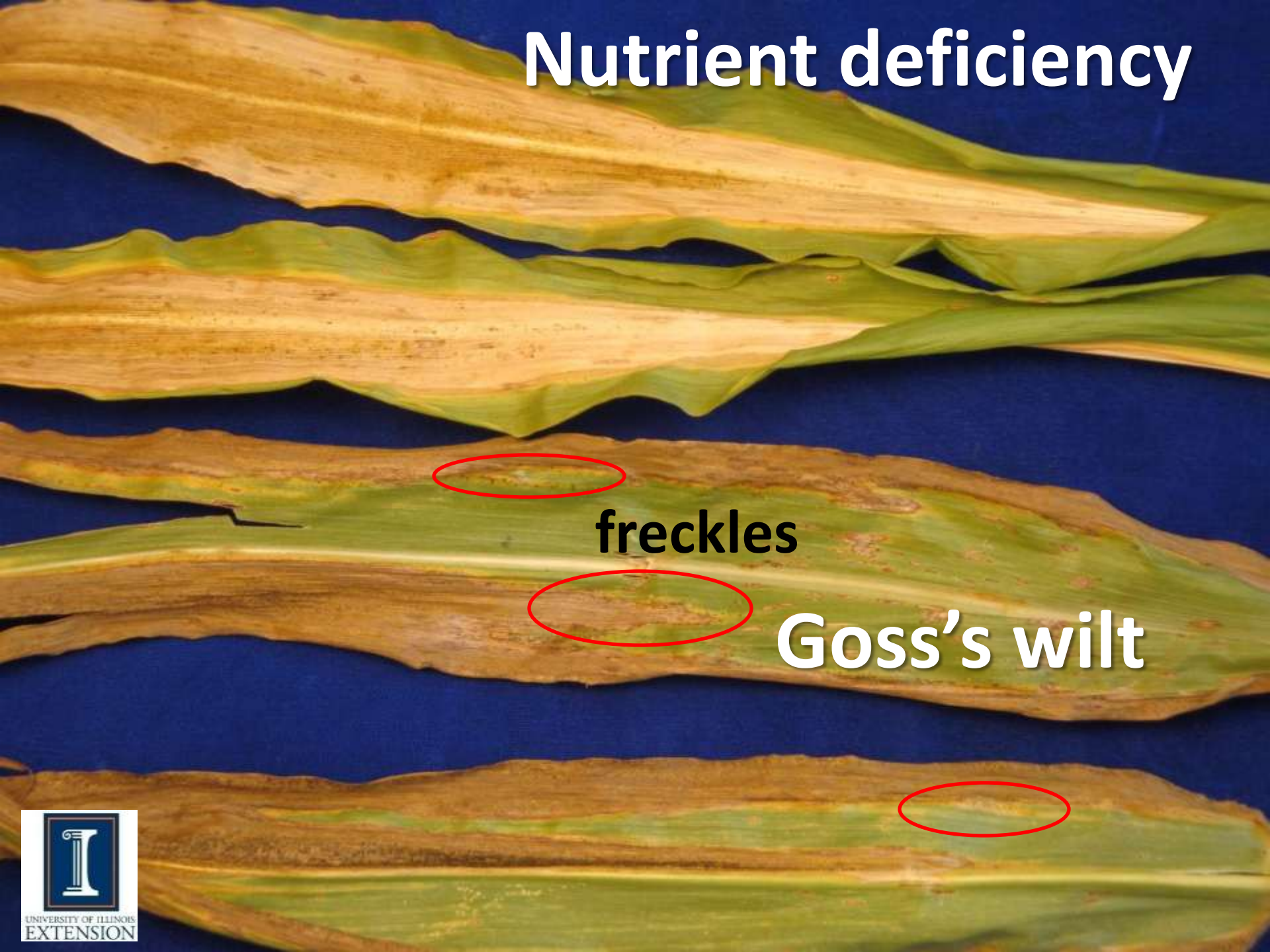
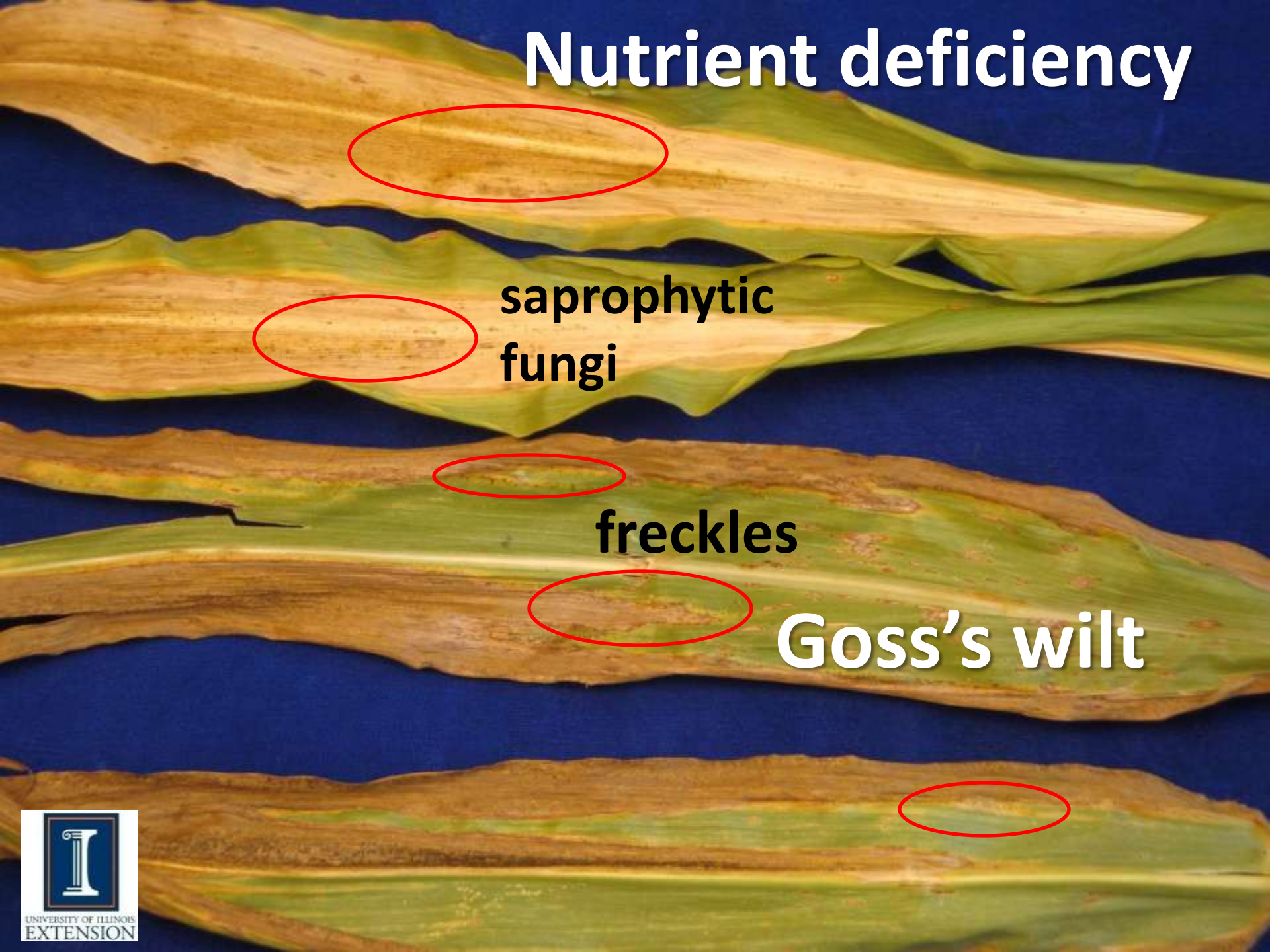
Nutrient deficiency
Goss's wilt


Nutrient deficiency
freckles
Goss's wilt


Nutrient deficiency
saprophytic fungi
freckles
Goss's wilt

Goss's Wilt Identification

- Confirmation of Goss's wilt based on:
  1) Symptoms – *must match Goss's wilt*
  2) **Ooze test (conducted in laboratory) – *bacteria streaming from affected areas***

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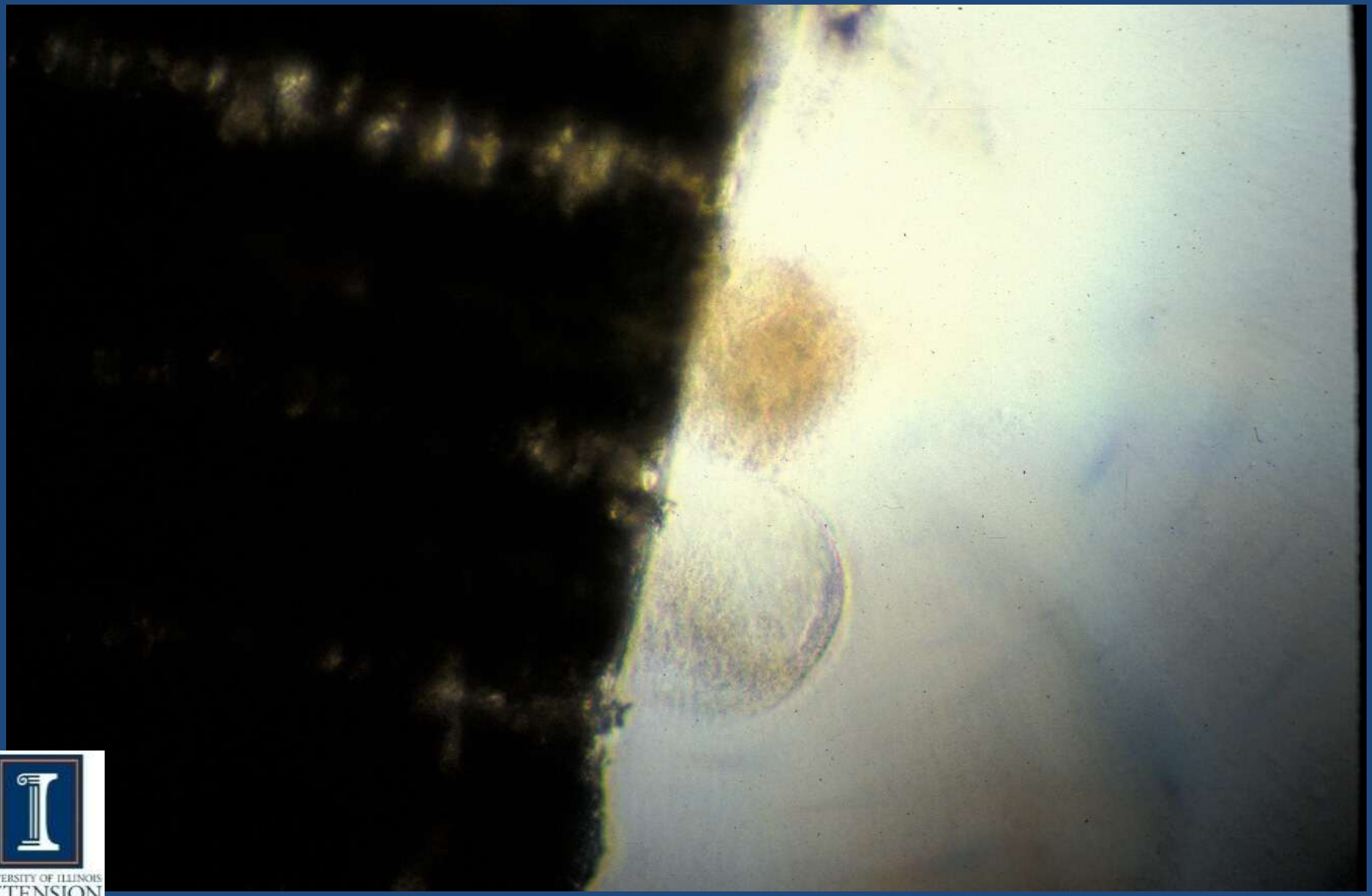
Bacterial ooze



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Nutrient deficiency

no ooze

Goss's wilt

ooze

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Goss's Wilt Identification

- Confirmation of Goss's wilt based on:
  1) Symptoms – *must match Goss's wilt*
  2) Ooze test (conducted in laboratory) – *bacteria streaming from affected areas*
  3) **Immunostrip test (available from AgDia) – *cannot rely solely on this because of false positives***

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AgDia (Elkhart, IN) – Immuno Strip test

Clavibacter michiganensis michiganensis

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AgDia (Elkhart, IN) – Immuno Strip test

Clavibacter michiganensis nebraskensis

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AgDia (Elkhart, IN) – Immuno Strip test

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XYLEM-INVADING PATHOGENS

Stewart's wilt

Goss's wilt

Northern leaf blight


Stewart's wilt
• chlorotic streaks
• following veins
• become necrotic
Goss's wilt
• grayish water-soaking, expands
• larger area, necrosis, freckles

Goss's Wilt

- freckles

- ooze

NCLB

- cigar-shaped
- sporulation

- conidia

Goss's Wilt Management

- First step – IDENTIFICATION
- If determined to be Goss's wilt:
  - Till to break up corn residue after harvest (quicker decomposition will reduce inoculum)
  - Rotate field to a non-host crop the next year (i.e. soybean)
  - Plant a hybrid with the highest level of resistance available the next time corn is in that field

Host resistance

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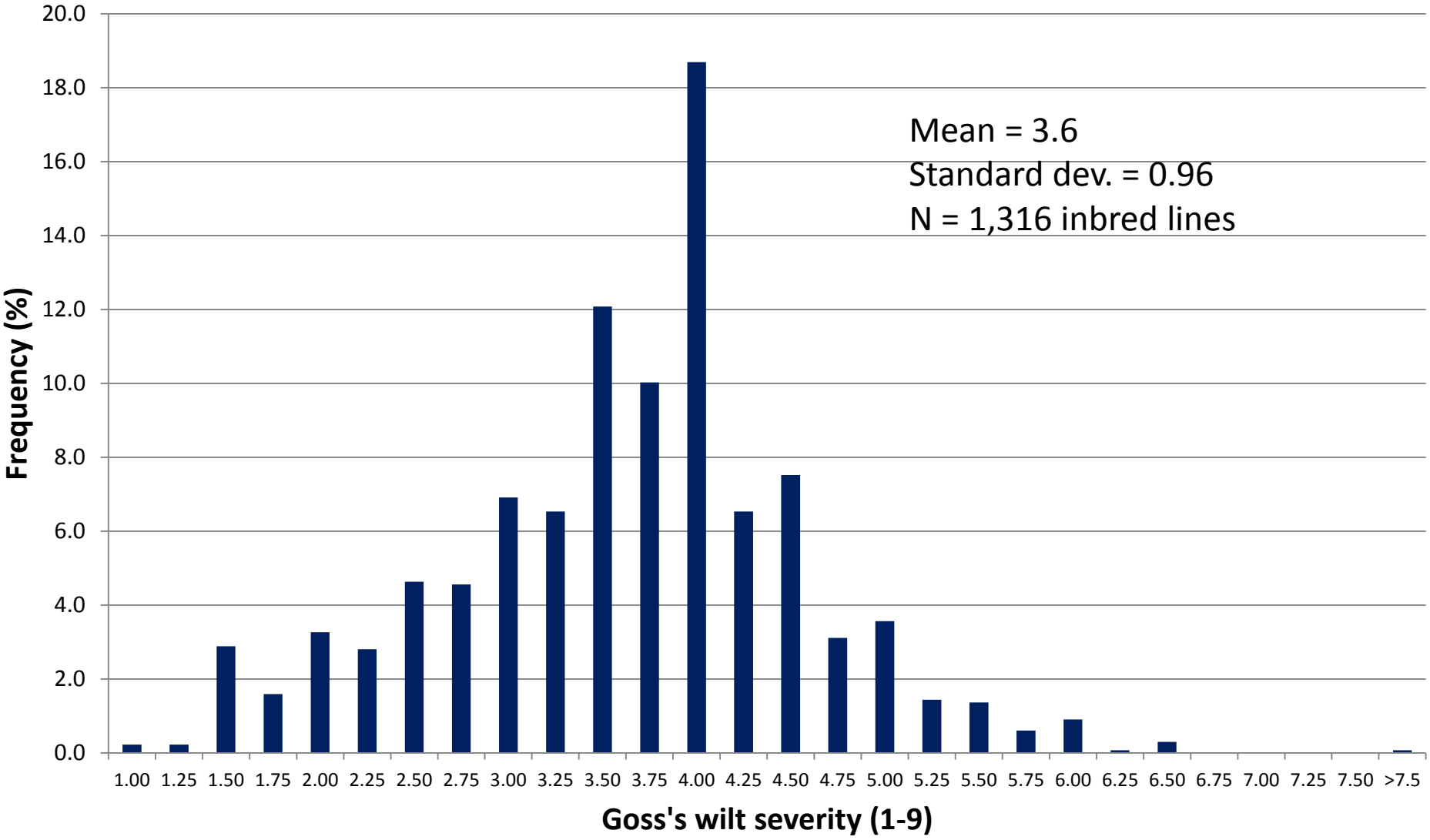
Results of 2011 – Screening of Univ. of Illinois Corn Inbred Lines for Goss's Wilt Resistance

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Goss's Wilt Management

- First step – IDENTIFICATION
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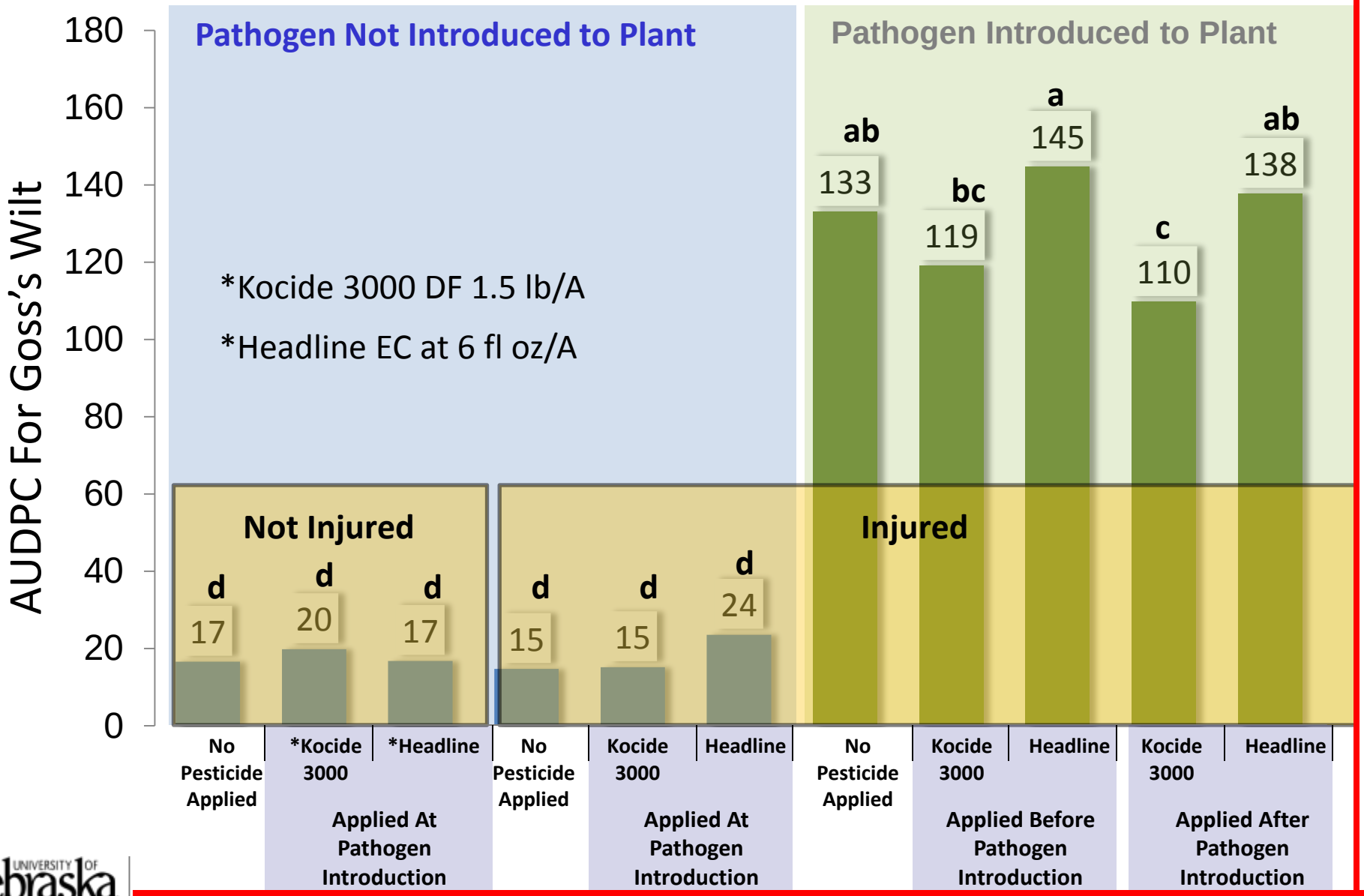
  - Rotate field to a non-host crop the next year (i.e. soybean)
  - Plant a hybrid with the highest level of resistance available the next time corn is in that field
- **Fungicides are NOT EFFECTIVE**

Goss's Wilt Management Trials

- Applications made by CO_2 pressurized backpack sprayer
- 3 application timings
- 6 replications
- 2009
  - 2 hybrids at 105 day RM
  - 2 products
- 2010
  - 4 hybrids – 105 & 110 day RM
  - 5 product/rate combinations
  - Early season flooding = very high variability
- Monsanto Water Utilization Center – Gothenburg, NE

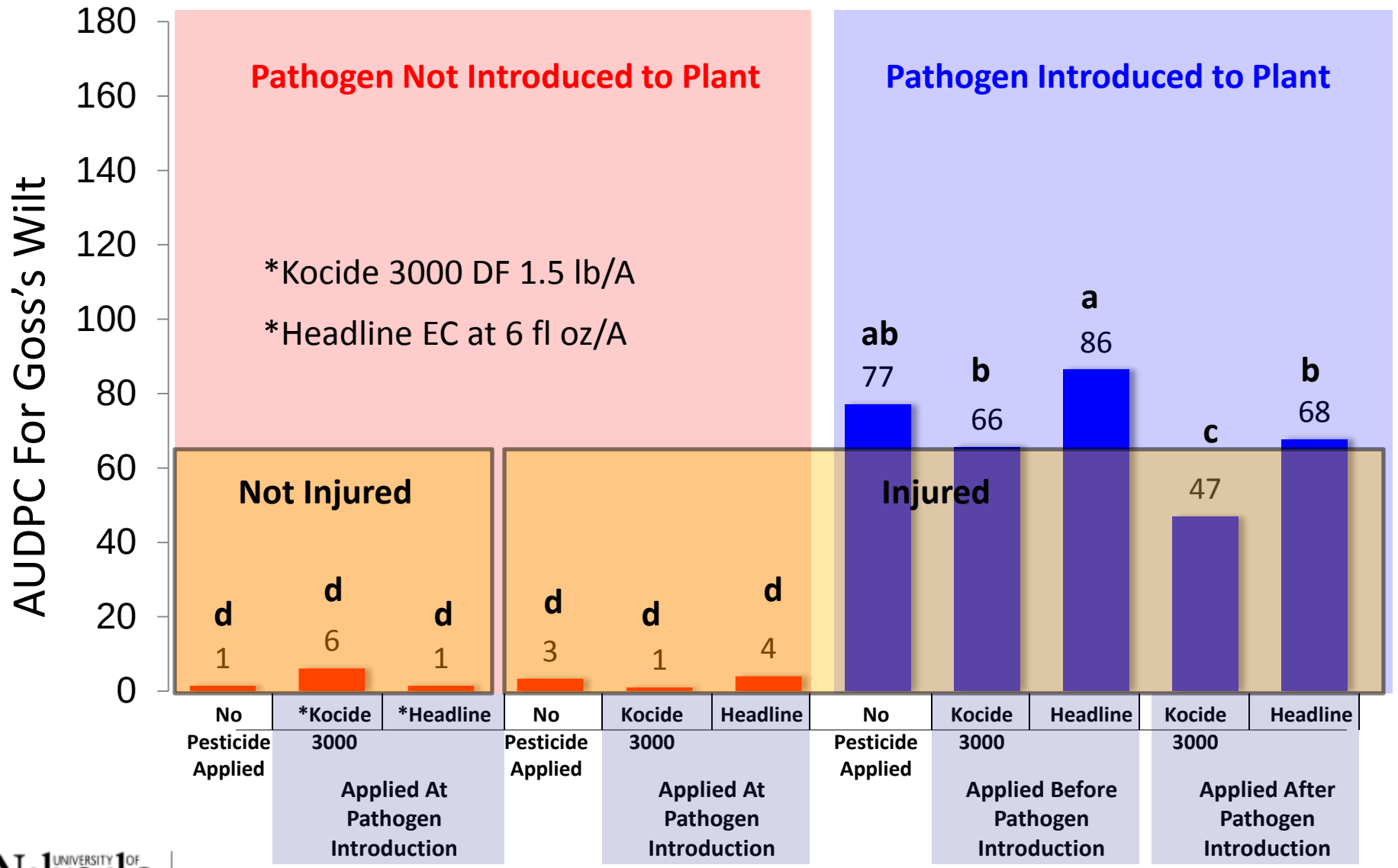
Area Under the Disease Progress Curve (AUDPC)

105RM Susceptible Hybrid (rating = 7/poor)

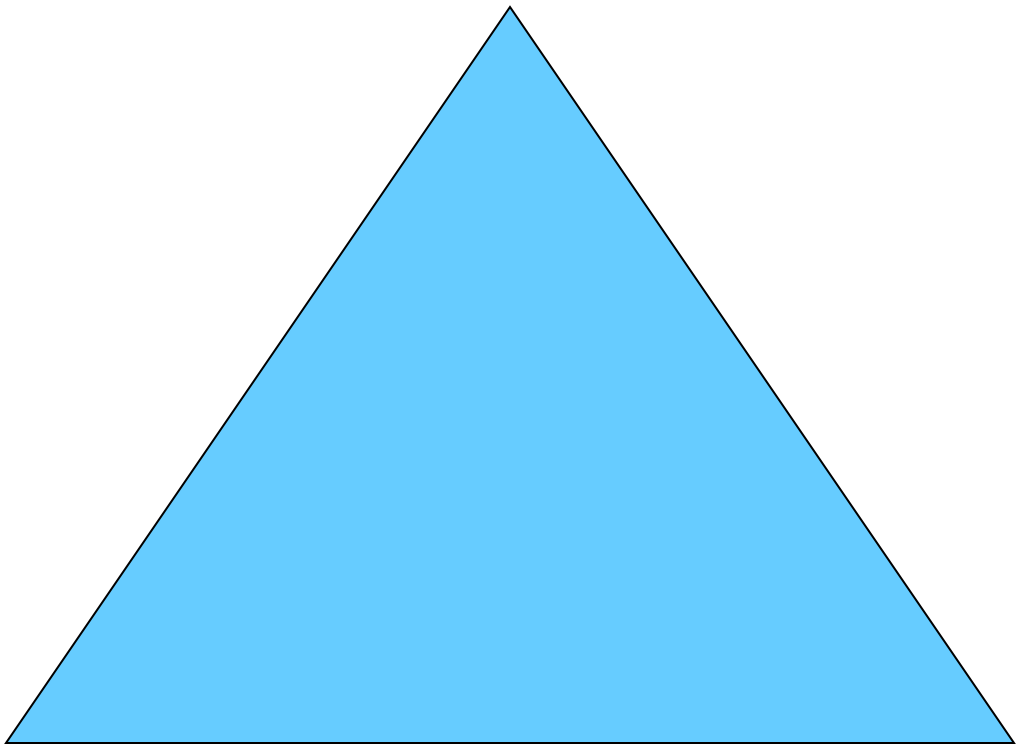


Area Under the Disease Progress Curve (AUDPC)

105RM Resistant Hybrid (rating = 3/very good)



Why (re-)emergence of diseases?



Disease Triangle

Thanks for your attention

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