

## Corn stunt: A reemerging disease in US.

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- Corn stunt spiroplasma (*Spiroplasma kunkelii*)
- Maize bushy stunt phytoplasma
  - *Candidatus Phytoplasma asteris* subgroup 16SrI-B)
- Maize rayado fino virus
- Maize striate mosaic virus (Not present in the USA)

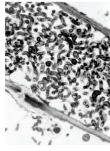
**Corn stunt has been associated with a complex of four pathogens found either alone or in combination in fields and in individual infected plants**

- Corn stunt spiroplasma (*Spiroplasma kunkelii*)

*Spiroplasma kunkelii* is considered the most important and widespread pathogen associated with corn stunt.

### *Spiroplasma kunkelii*

- Molluscite
- Smaller than bacteria
- Lack of cell wall
- Do not possess flagella
- Primary vector
  - Corn leafhopper, *Dalbulus maidis*



Davis and Shuman, 1972; Texas A&M University, USA



Photo courtesy of Brian McCombs

*Dalbulus maidis*

### *Spiroplasma kunkelii*

- A phloem-restricted pathogen
- Move with the flowing photosynthate => localized in actively growing tissues and organs
- *S. kunkelii* can be detected in the leaves, roots, and tassel.
- The rapid pathogen translocation and multiplication => rapid reacquisition
- Colonization in younger plants happen faster than older plants
- Not transmitted from corn plants to its seeds
- Not transmitted from leafhopper females to their spawn

- Oklahoma – August 7<sup>th</sup>, 2024



- Corn Leafhopper was confirmed in Oklahoma
- Corn stunt was suspected



**Dr. Maira Rodrigues Duffeck**  
Assistant Professor  
Entomology & Plant Pathology  
Oklahoma State University

**Corn Leafhopper (CLH) was reported in Kansas for the first time during the 2024 (Statewide & in HIGH numbers)**



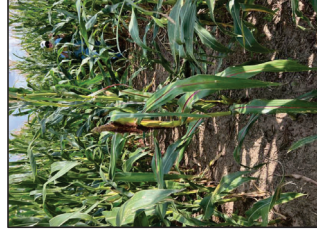


# Corn Leafhopper was reported in Kansas for the first time during the 2024 Statewide & in HIGH numbers

A variety of symptoms were found in Kansas  
Is it just CSS???



- Stunted plant growth
- Chlorotic stripes



- Purplish leaf veins



# CSS incidence varied across fields



# Chlorosis streaks



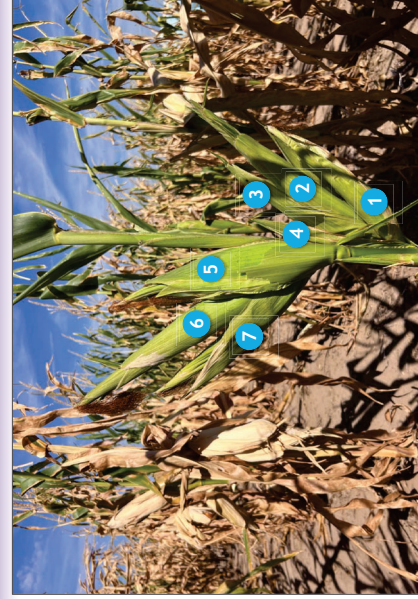
## Missing kernels, light kernels



Dr. Maria Rodrigues Duffeck



Proliferation of ears was observed in several fields



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## Stay green affect – High incidence across Kansas

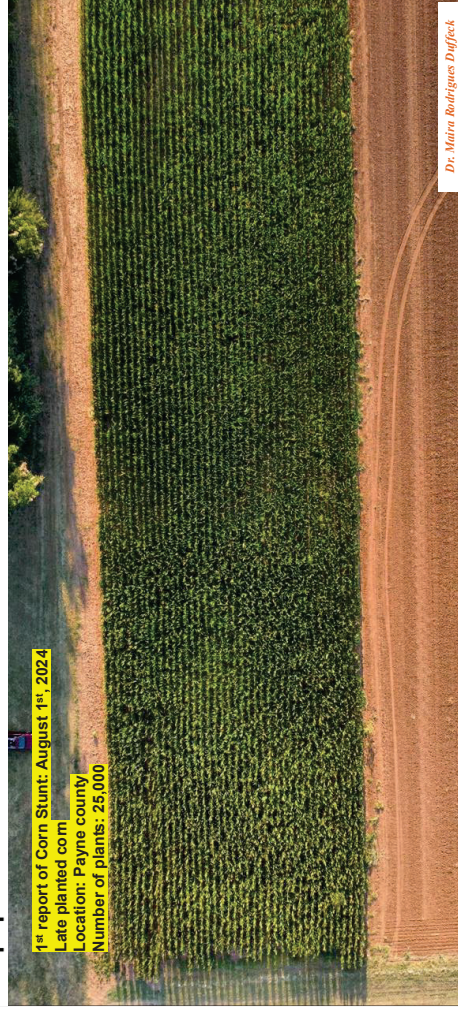


## Rice County, Kansas August 27<sup>th</sup>, 2024

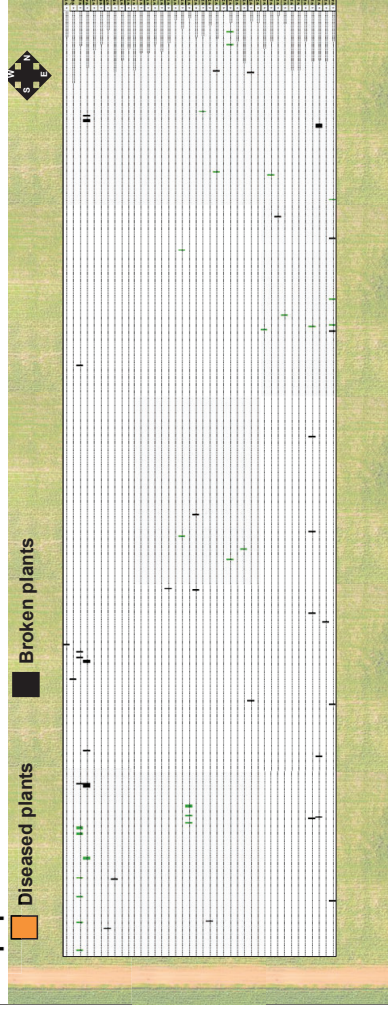
- Hundreds of CLH
- CSS was confirmed
- Symptoms observed:
  - Stunted plants
  - Chlorotic stripes
  - Reddening of the leaf tips
- Severe yield loss bu/a\*



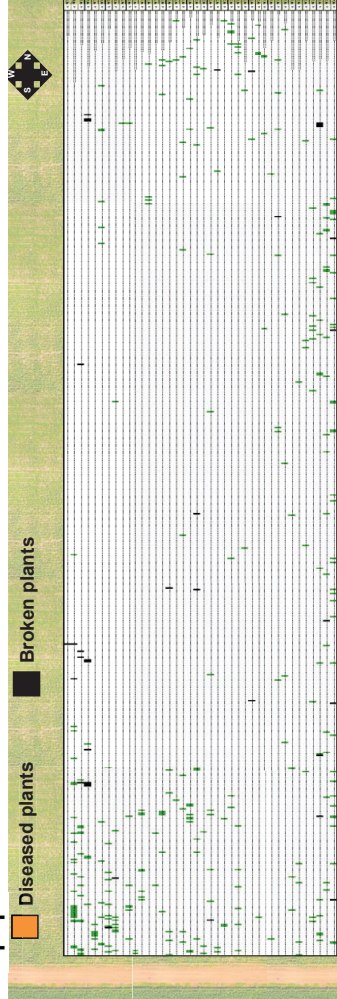
## What is the temporal and spatial distribution of Corn Stunt symptoms?



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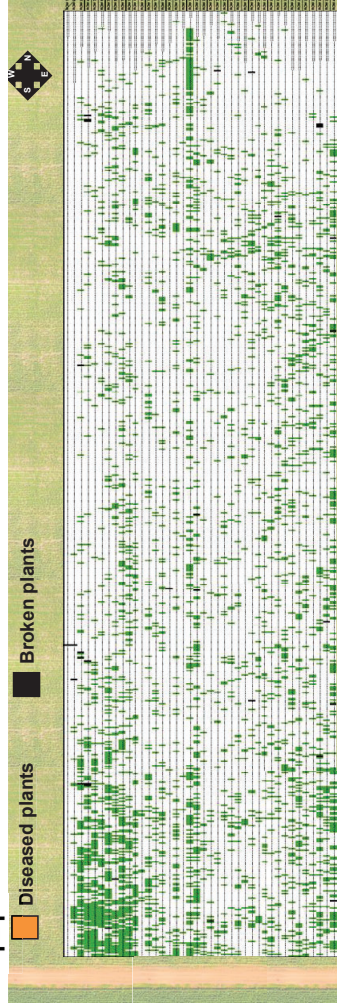
Number of plants: 25,500

2<sup>nd</sup> week — 08/22

*Dr. Marina Rodrigues Duffeck*

*Knowledge for Life*

# What is the temporal and spatial distribution of Corn Stunt symptoms?



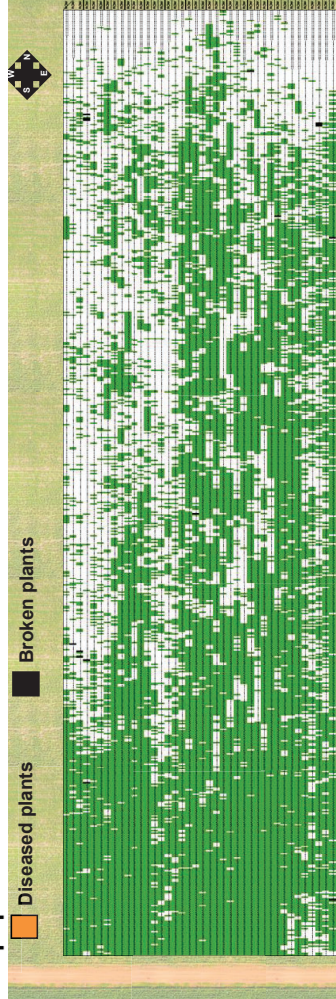
Number of plants: 25,500

3<sup>rd</sup> week — 08/30

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# What is the temporal and spatial distribution of Corn Stunt symptoms?



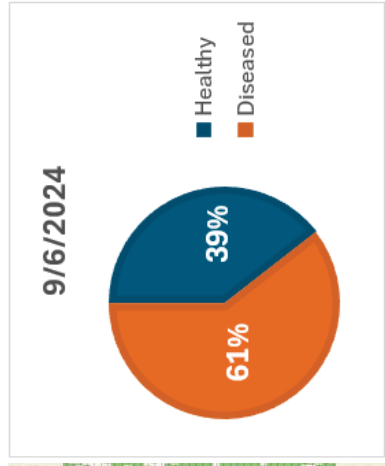
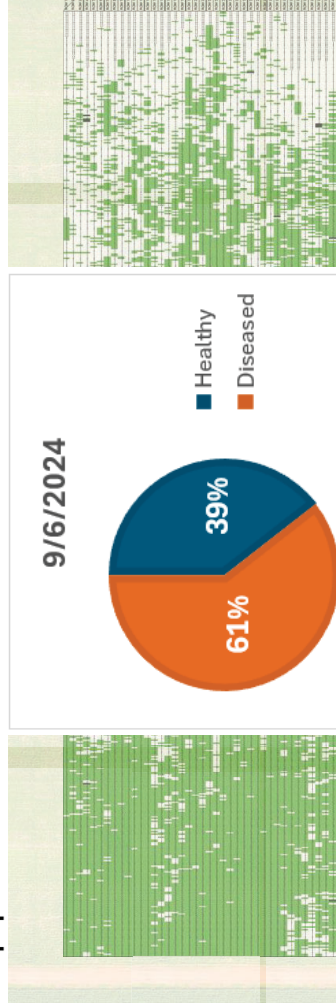
Number of plants: 25,500

4<sup>th</sup> week — 09/06

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# What is the temporal and spatial distribution of Corn Stunt symptoms?

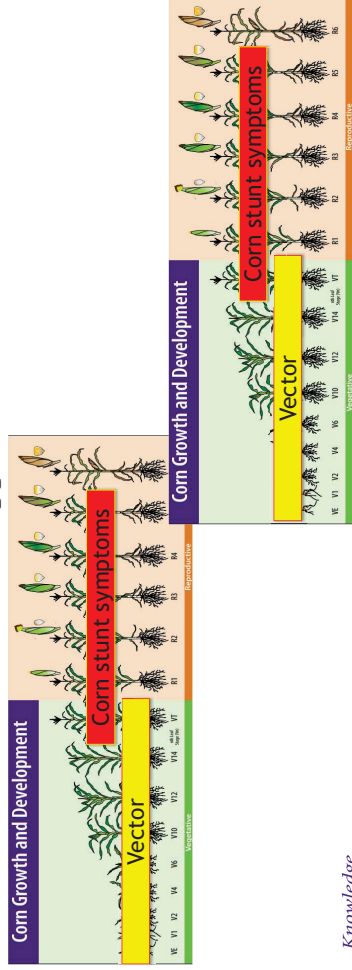


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## 2024 Corn Season

High levels of CSS were found in late-planted and double-cropped corn in Kansas



## Corn stunt spiroplasma symptoms

- Stunted plant growth
- Chlorotic stripes
- Reddening of the leaf tips
- Irregular reddish/purplish streaks between leaf veins or in the leaf tips
- Proliferation of ears
  - Few kernels, sterility of male flowers, and stunted ears

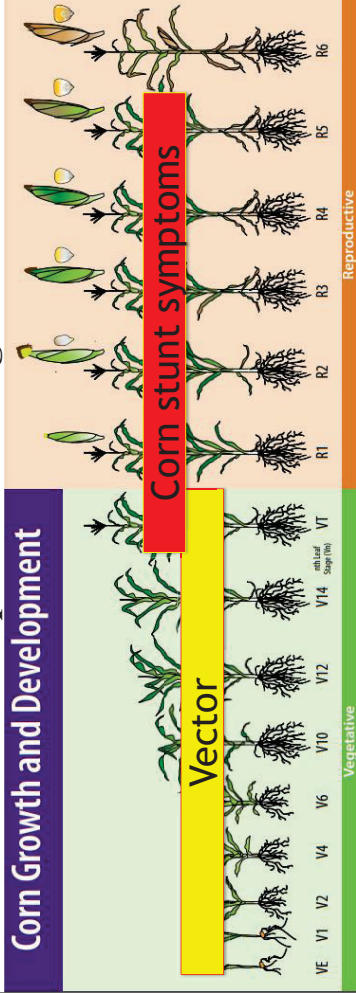


## Symptom expression and yield impact may vary from field to field

- Corn germplasm
- Pathogen strain
- Environmental conditions
- Inoculation timing
- The interaction of all these factors

## CSS symptoms are typically more evident during reproductive stages

### Corn Growth and Development



## 2024 Corn Season



### Corn Leafhopper Leads to Corn Stunt Disease Across Oklahoma – August 12, 2024

Published Aug 2024 | 48 594-2347  
By Katherine E. Sims, Maira Duffeck



HOME / NEWS / FIRST CASE OF CORN STUNT CONFIRMED IN MISSOURI

#### First case of corn stunt confirmed in Missouri

Published Friday, August 16, 2024  
Writer: LINDA GOSSE



#### Agronomy eUpdate August 29th, 2024

ISSUE: 01713

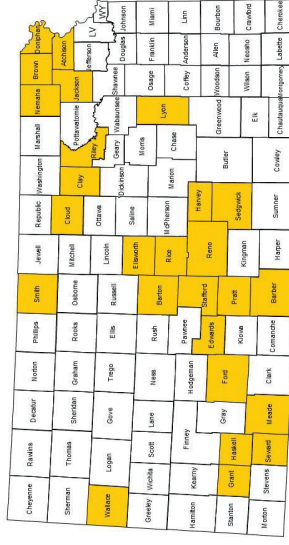
#### Low levels of corn stunt disease have been confirmed in Kansas

Corn stunt disease and its associated vector, the corn leafhopper, have been recently confirmed in Kansas. For more information on this disease and how to identify the disease in the field, visit the Agronomy eUpdate. For more information on the disease, visit the Agronomy eUpdate. For more information on the disease, visit the Agronomy eUpdate.



Search Events

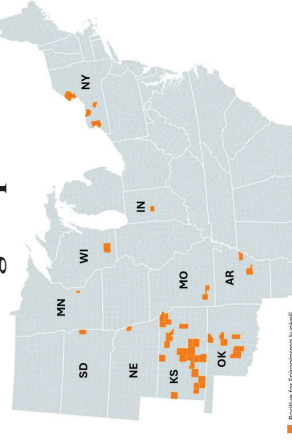
## CSS was confirmed in 26 counties in Kansas in 2024 CLH was found statewide



Legend  
Confirmed positives

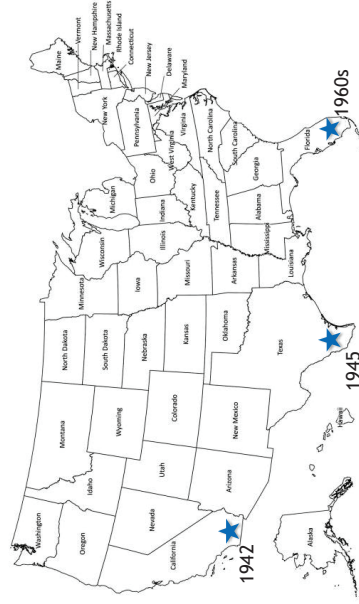
## CSS was confirmed in 10 NEW states in 2024 & sudden range expansion of CLH

(Duffeck et al.)



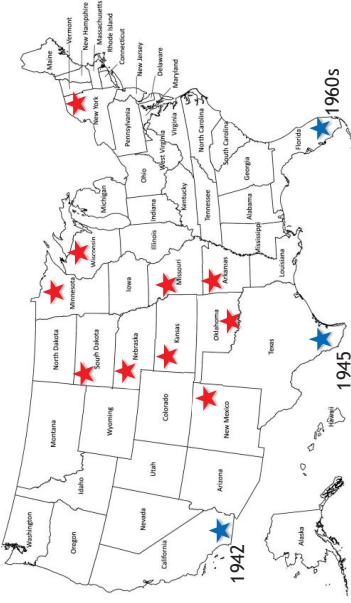
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## Corn stunt spiroplasma: a re-emerging disease in US





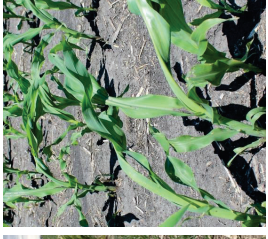
## Corn stunt spiroplasma: a re-emerging disease in US



## Corn Leafhopper Monitoring is Crucial

2024

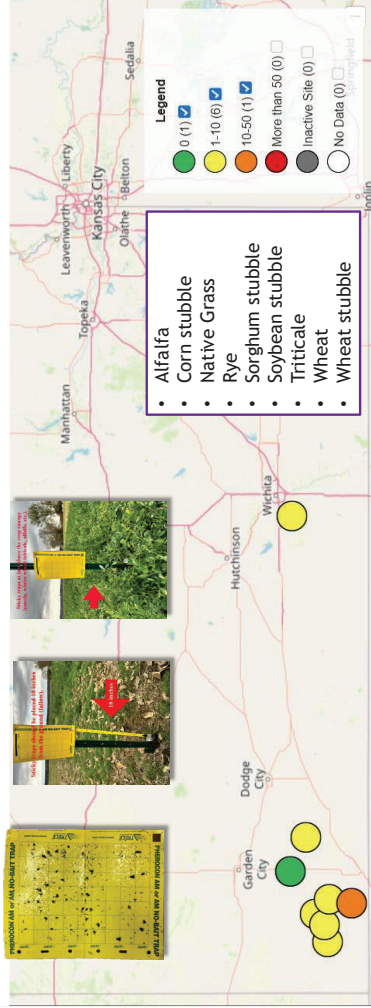
Early Season



Mid-Late Season

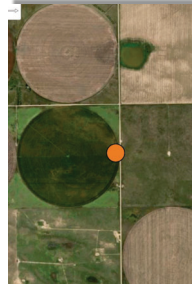
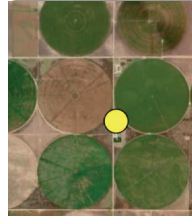
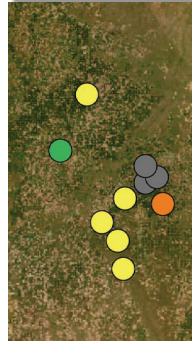


## Can CLH overwinter in Kansas?



12/9/2024

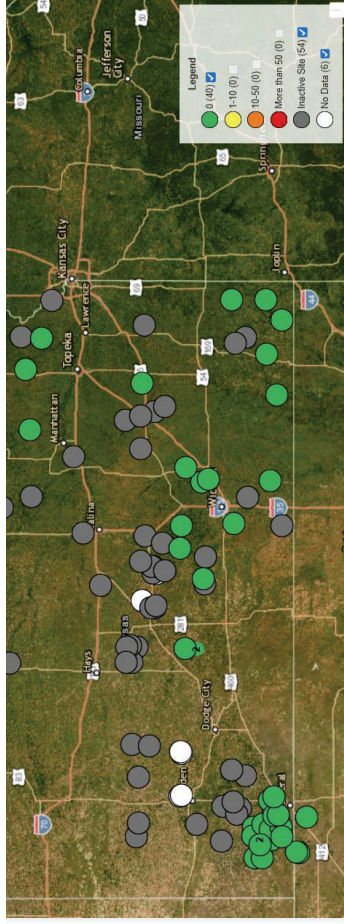
## Will CLH become an annual problem or an extremely rare problem?



K-Trap Monitoring System 12/9/2024

## K-Trap Monitoring System

85 locations  
40 K-Trappers

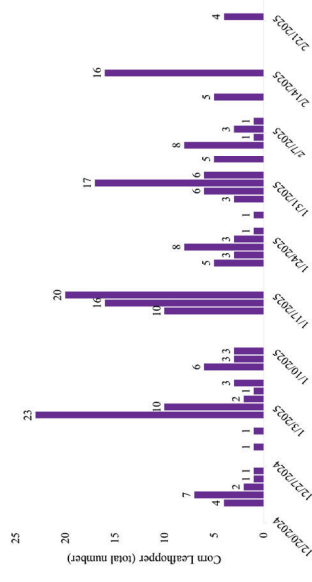


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## Preliminary data suggests overwinter potential of CLH in Kansas

*Next steps: molecular identification of *Dalbulus maidis*  
and other leafhopper species trapped during the winter months in Kansas*



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## Take Home Message

- There are no curative strategies for Corn stunt
- Diversity of disease symptoms
- Between VE to V8 plants are most susceptible
- Reaction of hybrids to Corn stunt is unavailable
- Avoid late planting date and/or double crop corn
- Do not plant next to fields that have symptomatic plants
- Volunteer corn plants – source of inoculum
- Testing and monitoring for Corn stunt pathogens are key for management – Submit samples to the K-State Plant Diagnostic Lab

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Research and Extension

## Acknowledgement

- Anthony Zukoff, KSU Entomologist SWKS Research Center
- Dr. Tina Sullivan, KSU Agronomist, NEKS
- KSRE Crop Agents – K-TRAPPERS

ka<sup>o</sup>cc  
Kansas Assn. of Independent Crop Consultants

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## Questions?

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