

# Disease Activity and Adaptability of Carinata in Alabama

A. K. Hagan

Department of Entomology and Plant Pathology



# Sclerotinia Stem Rot

- *Sclerotinia sclerotiorum*
- Hosts include most wild, oilseed, forage, vegetable brassica.
- Host range – 75 families in 278 genera and 408+ species.
- Frequent showers and mild temperatures favor stem rot onset and development.
- In Canada, 11 to 15% yield loss in canola.





# Sclerotinia Stem Rot



# Sclerotinia Stem Rot Assessment - 2017

- **Incidence** – Stem rot incidence is expressed as the % of symptomatic plants in a 20 plant sample.
- **Severity** – Rated on a 1 to 6 scale with 1 = no stem rot symptoms, 2 = blighting in seed head, 3 = Lesion on stem(s) that have potential to affect up to  $\frac{1}{4}$  of seed formation or filling, 4 = Lesion on stem(s) that have potential to affect up to  $\frac{1}{2}$  of seed formation or filling, 5 = Lesion on stem(s) that have potential to affect up to  $\frac{3}{4}$  of seed formation or filling, and 6 = Main stem lesion, plant killed.  
(Kutcher and Wolf, 2006).



# Stem rot incidence and severity on advanced breeding lines at BARU, 2017

| Breeding Line | Stem rot      |          | Breeding Line | Stem rot      |          |
|---------------|---------------|----------|---------------|---------------|----------|
|               | Incidence (%) | Severity |               | Incidence (%) | Severity |
| Avenza 641    | 8.8 cde       | 1.45 cde | CR01129.B036  | 16.3 a-d      | 1.83 a-d |
| 3A2B          | 26.3 a        | 2.30 a   | M-01          | 27.5 a        | 2.40 a   |
| 312E          | 0.0 e         | 1.00 e   | M-04          | 16.3 a-d      | 1.78 abc |
| 3B1           | 11.3 a-d      | 1.55 a-d | M-06          | 2.5 de        | 1.15 de  |
| 3B2           | 11.3 a-d      | 1.58 a-d | W-01          | 8.8 cde       | 1.45 cde |
| CR0020.141    | 3.8 de        | 1.23 de  | AU052-1       | 2.5 de        | 1.15 de  |
| CR0040.342    | 8.8 bcd       | 1.45 bcd |               |               |          |

# Recommended Fungicides for Stem Rot Control at BARU, 2017

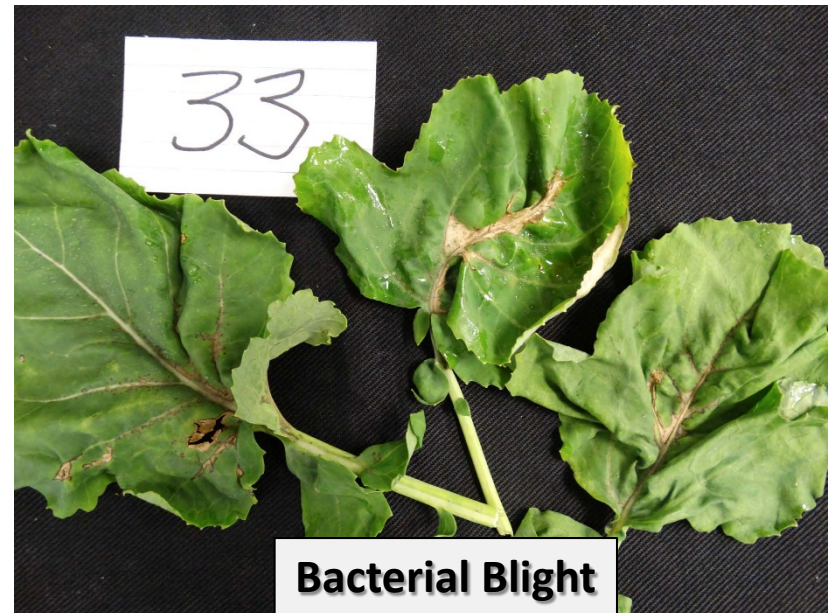
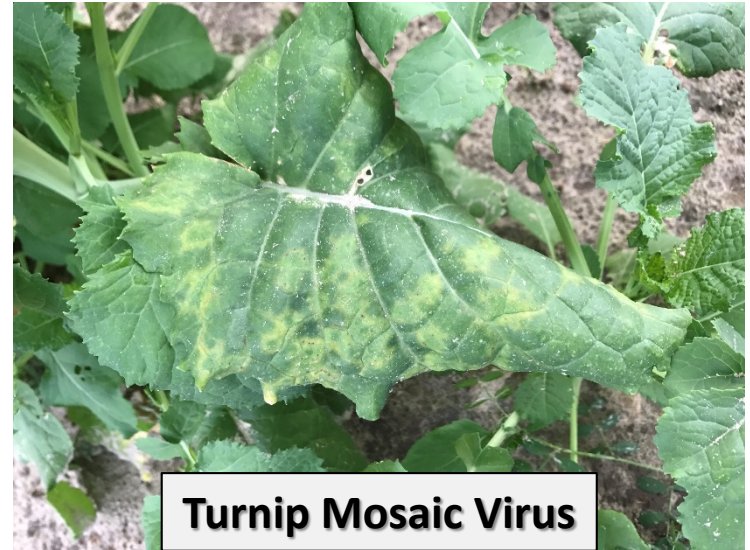
| Source of Variation      | Sclerotinia Stem Rot |          |
|--------------------------|----------------------|----------|
|                          | % Incidence          | Severity |
| Crop                     | 16.69**              | 32.29**  |
| Fungicide program        | 2.42*                | 2.08^    |
| Crop × Fungicide program | 1.86^                | 1.63     |
|                          |                      |          |
| Crop                     |                      |          |
| Canola 5525CL            | 0.1 b                | 1.0 b    |
| Carinata Avenza 641      | 7.4 a                | 1.3 a    |





| Fungicide and Rate/A | Spray No. | Carinata Avenza 641 | Canola 5525CL |
|----------------------|-----------|---------------------|---------------|
| Control              | ---       | 14.9 ab             | 1.3 de        |
| Aproach 9 fl oz      | 2         | 3.8 cd              | 0.0 e         |
| Quash 4 fl oz        | 1         | 8.8 abc             | 0.0 e         |
| Priaxor 4 fl oz      | 2         | 3.8 cd              | 0.0 e         |
| Headline SC 6 fl oz  | 2         | 8.8 abc             | 0.0 e         |
| Endura 5 oz          | 2         | 1.3 e               | 0.0 e         |
| Quadris 9 fl oz      | 1         | 15.0 a              | 0.0 e         |
| Elatus 7.3 oz        | 1         | 7.5 bc              | 0.0 e         |
| Elatus 7.3 oz        | 2         | 2.5 de              | 0.0 e         |

# Diseases of Interest





# Stem Rot Epidemiology Project

- Sclerotinia stem rot epidemics are driven by ascospores
  - After 'conditioning', ascocarps develop from sclerotia
  - Ascospores are then released from ascocarps
- ID temperature and wet periods that trigger ascocarp development and ascospore release.



# Fungicide Advisory Project

- Control is possible with a single properly timed fungicide application.
- Fungicide timing might depend on the ‘conditioned’ state of sclerotia, such that favorable temperature and wet periods could be “advisory” for fungicide application.



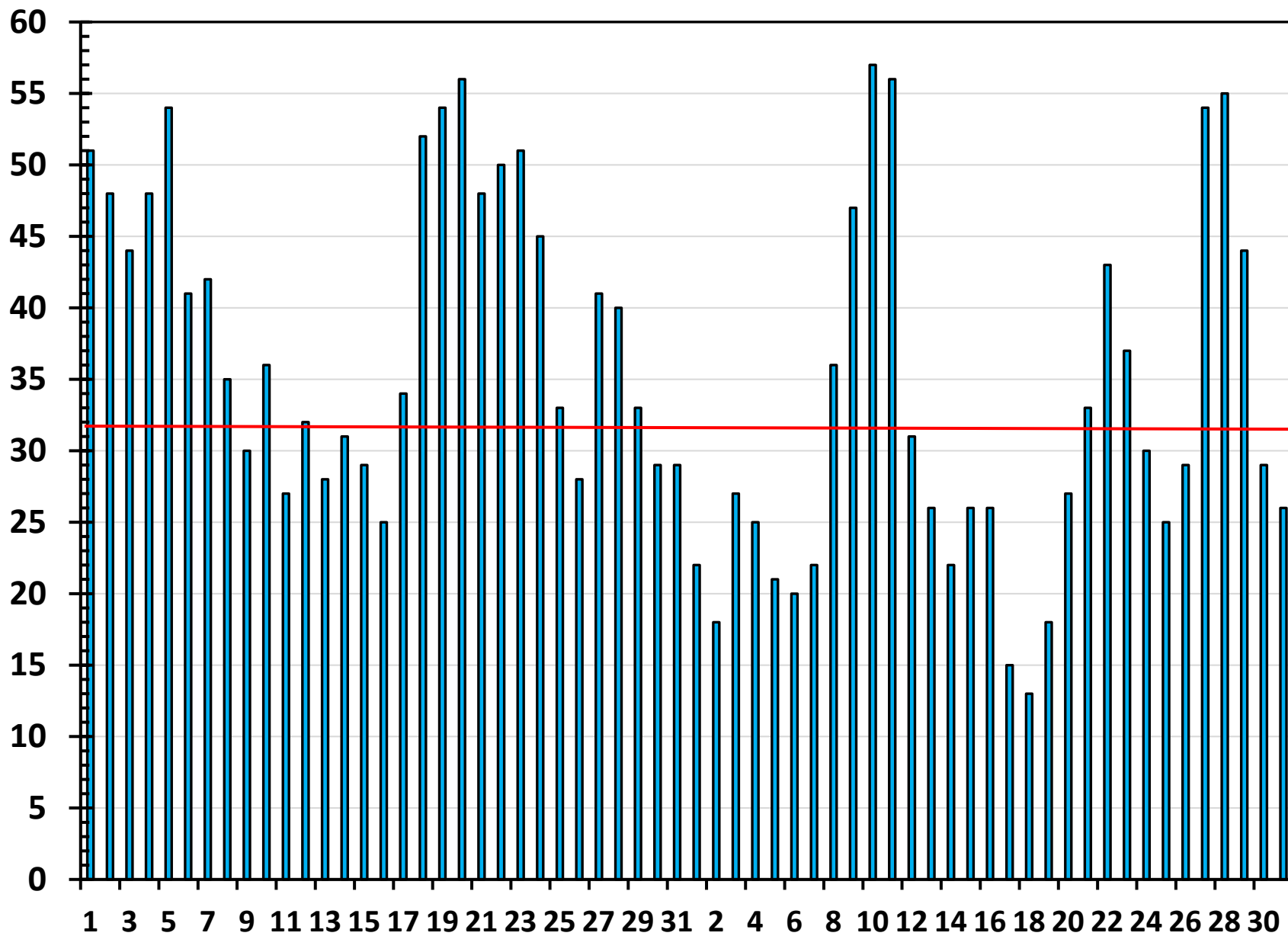


# Carinata Cold Adaptability





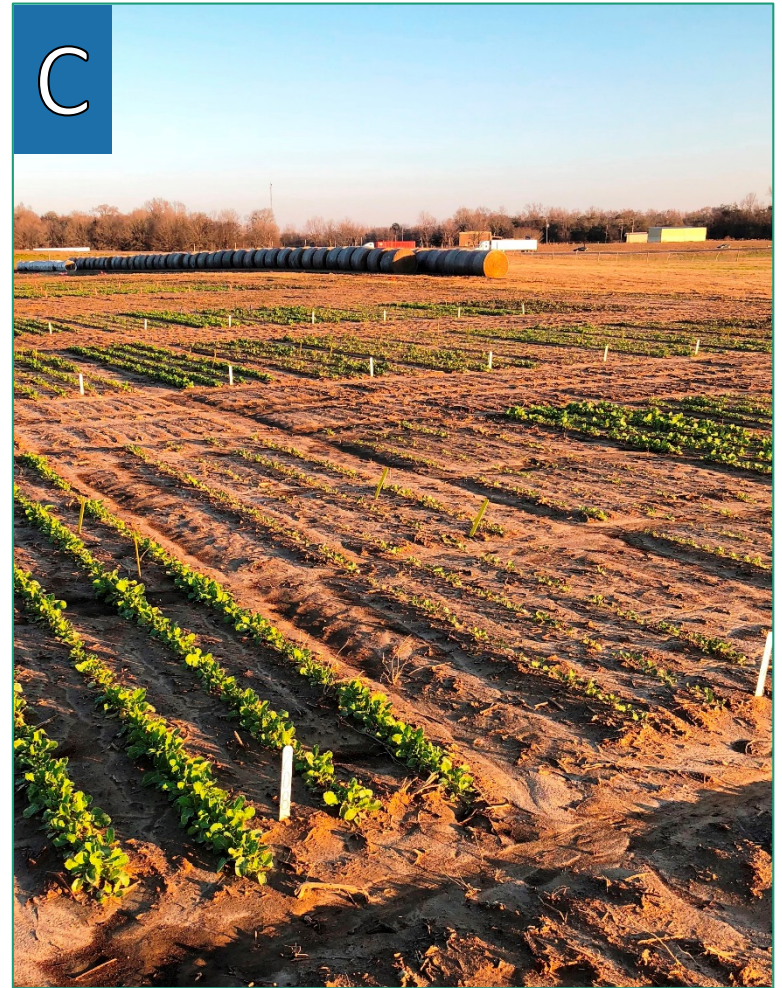
Low Temperature °F



December 2017

January 2018





A & B) Carinata breeding lines with considerable low temperature injury. C) Noticeable differences in top growth with some breeding lines looking very good.



Extreme variability in plots for one variety in Midville, Ga.





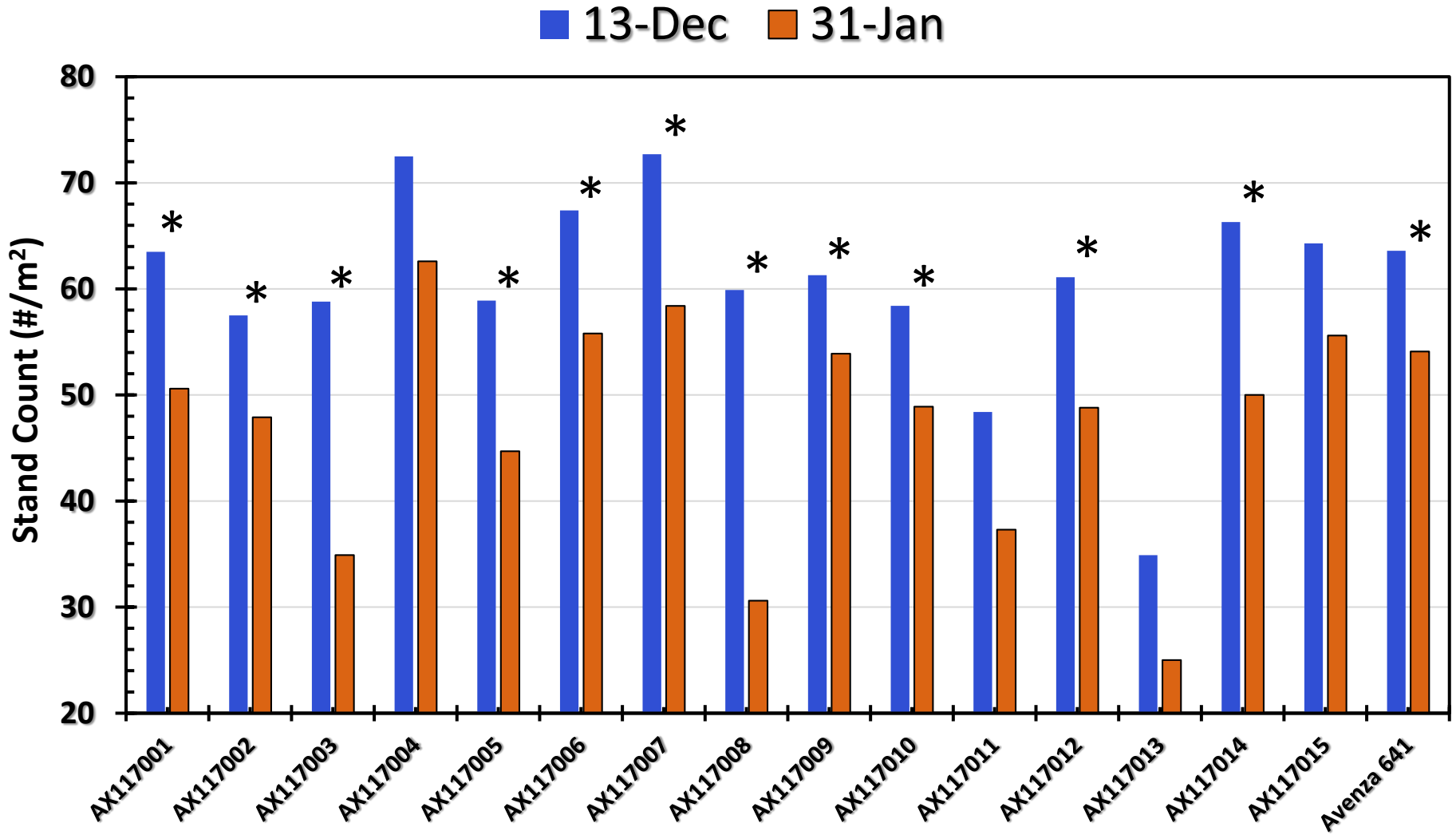
# Carinata Cold Tolerance

- Growth stage ~ 1.5 is less cold sensitive than GS 3+ (bolting) carinata.
- Breeding lines differ in their low temperature sensitivity.
- Stand loss of 30% or more.





# Stand counts before and after January freeze events at Field Crops Unit, E. V. Smith Research Center



The background of the slide is a close-up photograph of a plant with several small, light purple flowers and green buds. The flowers have four petals and yellow centers. The green foliage is out of focus, creating a soft, natural background.

# **Field Day**

April 5 @ 7:30 AM

Field Crops Unit, E. V. Smith Research Center,  
Shorter, AL

# Questions





Avenza 641



3A2B



312E



M-04



AU052-1



M-06



M-01



CR01129.B3036





# Fungicide Advisory Project

- In addition, we will develop a quantitative PCR assay for detecting and quantifying *S. sclerotiorum* spores.
- Spore densities at field sites will be compared to disease incidences and fungicide application timing.
- We may find that fungicide application timing more accurate when based on spore density.

