

Optimum Planting Dates for Carinata in the Southeast

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Main Things to Consider

Minimize

Minimize risk of crop failure

Maximize

Maximize production

Fit

Fit into cropping systems that maximize grower farmgate income and add flexibility

Minimize Crop Failure

This is number one on my list.

If a crop or cultivar is released for the first time and there is a crop failure, growers will tend not to return to that crop or cultivar the next year.

It may not be seed related – but growers have a tendency to blame it on the seed. A cultivar should be released with high 'stability' across environments.

Minimize Crop Failure

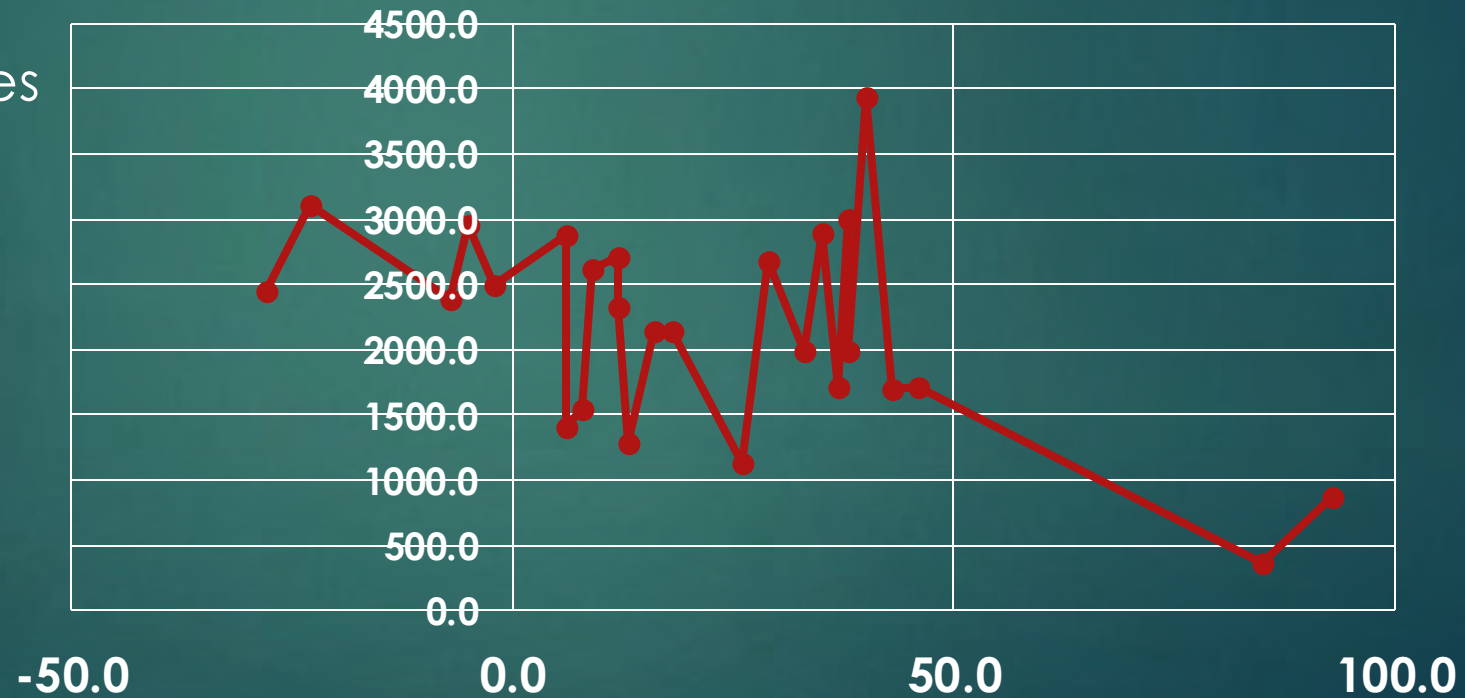
Reasons for crop failure

- Weather related
 - Freeze that kills or significantly reduces yields. Planting early enough to avoid early freeze events is essential.
 - Soil moisture aspects –Make sure that there is adequate moisture for good, even and fast emergence at planting.
- Disease
- Weeds – primary concern is wild radish

Maximize yields: Reasons for reduced yield

- ▶ Weather
- ▶ Soil fertility
- ▶ Pests and diseases
- ▶ Planting time?

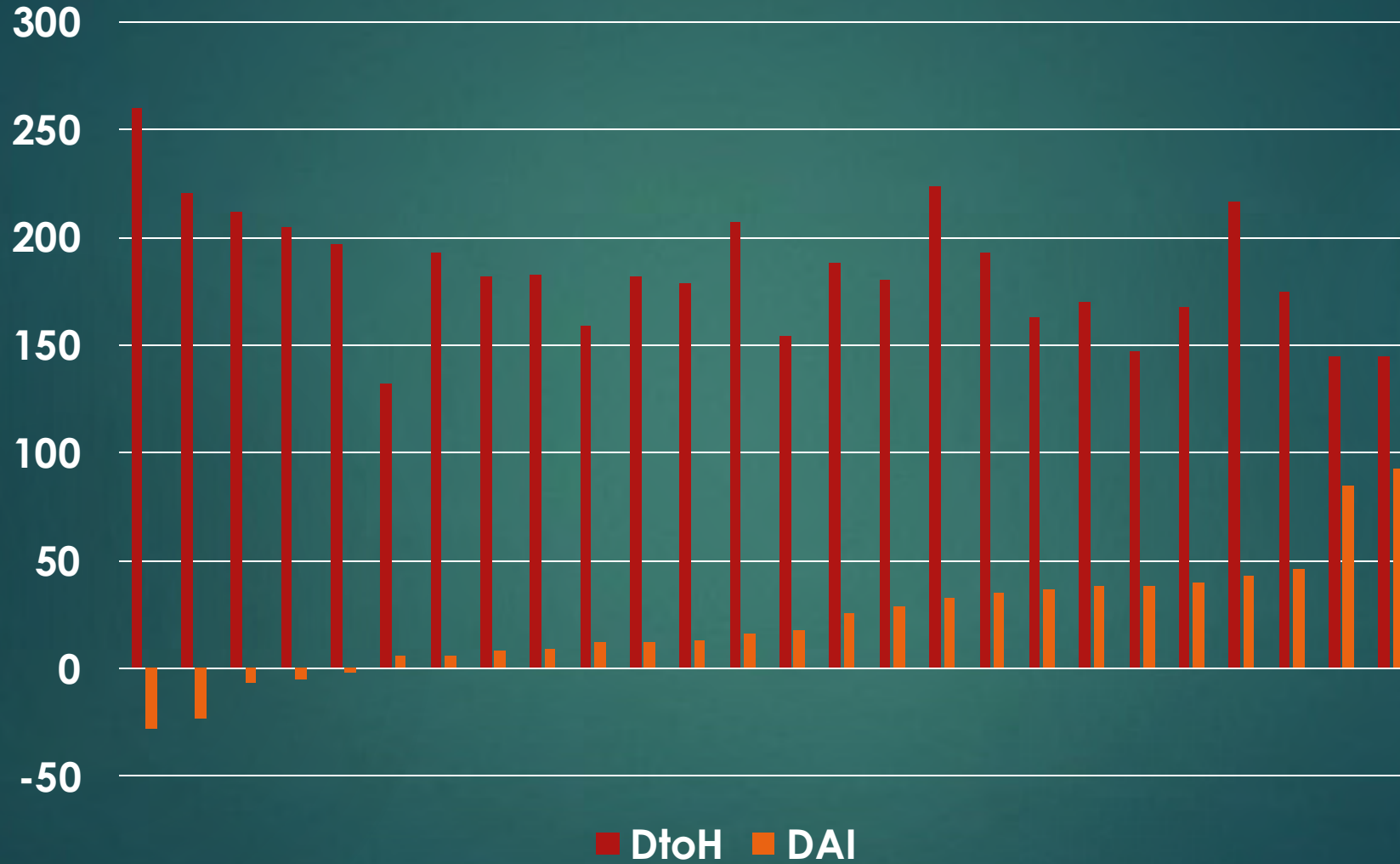
Yield versus Optimum Planting Time



Will planting earlier allow harvest earlier while maintaining yields?

- 1) The ultimate goal would be for carinata to fit into current summer crop rotations such that farmgate net income would increase and allow growers the incentive to continue to include carinata as a winter oil seed/cover crop.
- 2) Current data shows that a corn/soybean rotation fits best, however that is not a current rotation that is common in the SE US.
- 3) Can carinata be planted earlier (after corn) to allow earlier harvest in the spring for planting of either peanut or cotton?
- 4) Is there enough of a difference in harvest date of carinata from earlier planting to positively affect early harvest and then planting of peanut or cotton? Planting dates of cotton are more flexible with growers than for peanut.

Days to Harvest vs. Optimum planting date



Does the number of days to harvest stay the same if planted early?

Year	Location	Plant Date	Harvest D	Yield	Days from Opt Plant	Days to H
2019-2020	Williamson, GA	10/1/2019	6/19/2020	2442.0	-28.0	260
2017-2018	Shorter, AL	9/28/17	6/5/18	3111.8	-23.0	221
2019-2020	Florence, SC	10/18/2019	5/18/2020	2385.0	-7.0	212
2019-2020	Tifton (Belflower)	11/4/2019	5/28/2020	2953.0	-5.0	205
2017-2018	Quincy, FL	11/9/17	5/24/18	2489.0	-2.0	197
2017-2018	Citra, FL	11/28/17	5/8/18	2877.1	6.0	132
2019-2020	Shellman, GA	11/7/19	5/19/2020	1410.0	6.0	193
2019-2020	Brewton, AL	11/11/2019	5/12/2020	1549.0	8.0	182
2018-2019	Quincy, FL	11/20/18	5/22/19	2612.0	9.0	183
2018-2019	Midville, GA	12/6/2018	5/30/219	1708.0	46.0	175

Agrisoma 994

Jan. 15, 2014

Oct. PD



Nov. PD



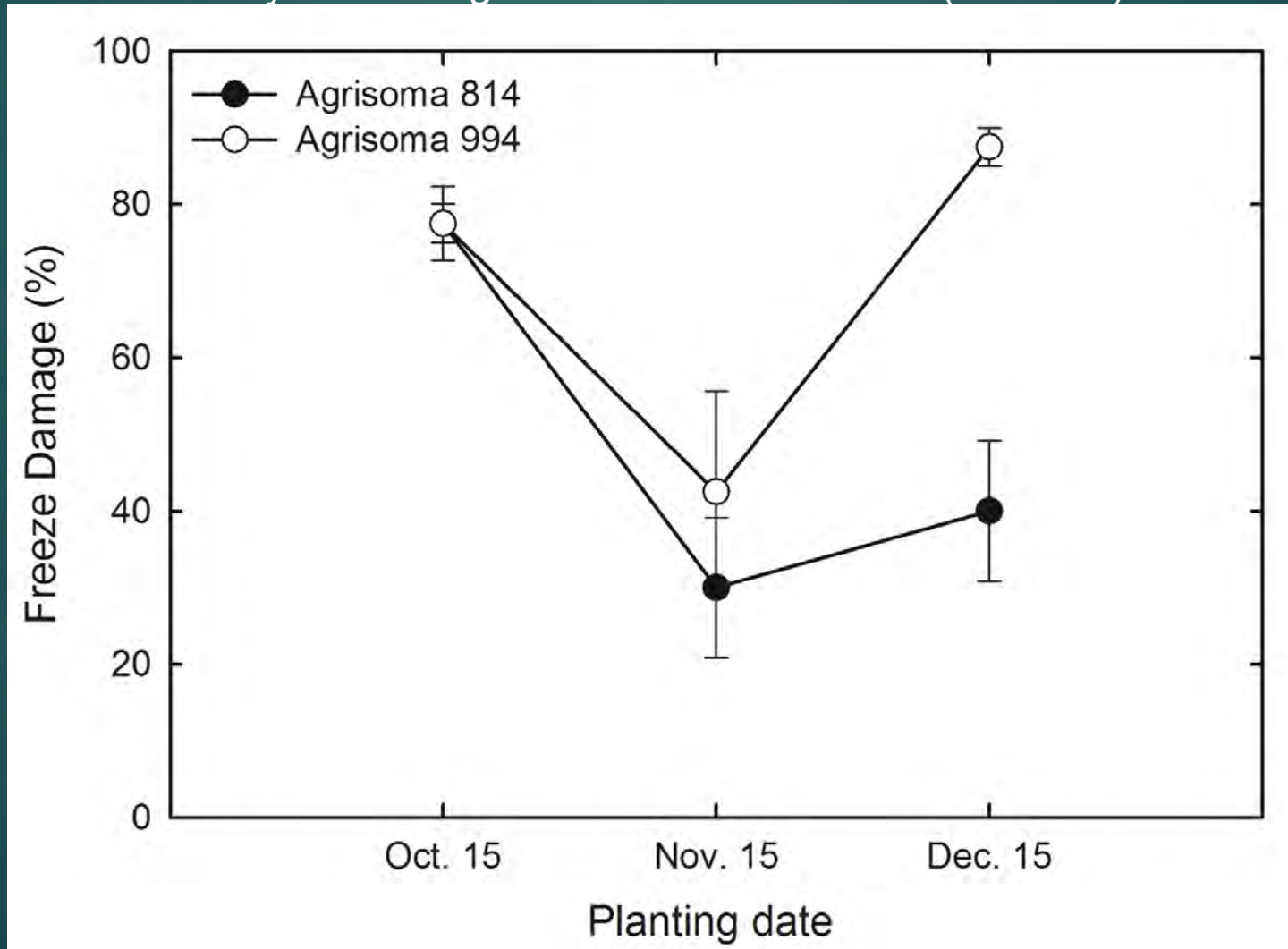
Dec. PD



Planting date effect

Carinata Freeze Injury

Variety × Planting date interaction effect ($P = 0.02$)



Nov. PD

Dec. PD

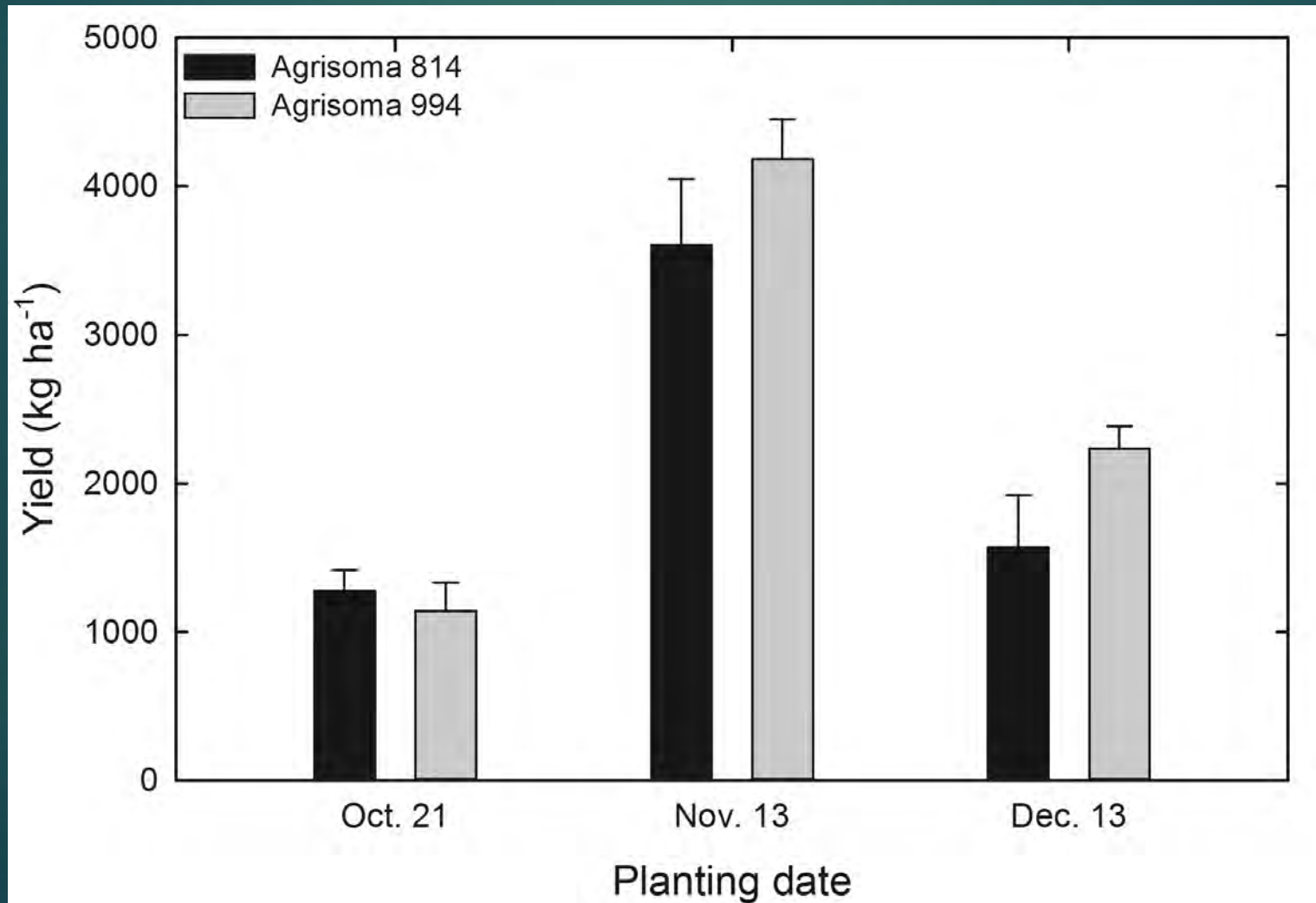
Oct. PD



Planting date effect

Carinata Grain Yield

Planting date effect ($P < 0.0001$)



Planting date effect

Carinata Grain Yield Components

Planting Date	Primary Branches	Secondary Branches	Pods Plant ⁻¹	Pod Length	Seeds Pod ⁻¹	Seeds Plant ⁻¹	Dry Matter plant ⁻¹	1000 SW	Yield	Plant Density
	no.			mm	no.	g			kg ha ⁻¹	plants m ⁻²
Oct. 21	20.3 a†	91.2 a	1727.3 a	55.3 ab	14.5 a	62.4 a	239.1 a	2.9 a	1308 c	12.8 c
Nov. 13	14.9 b	59.7 b	658.0 b	51.7 a	13.1 a	26.9 b	89.7 b	2.9 a	3989 a	65.7 a
Dec. 13	11.3 c	28.2 c	262.3 c	48.1 b	13.1 a	12.5 c	41.8 c	3.2 a	1737 b	43.5 b
LSD	3.1	16.8	357.2	2.7	2.3	13.2	43.8	0.4	858	16.8

† Within columns, means followed by the same letter are not different ($P > 0.05$)

Climate risks and potential effects on Summer crops

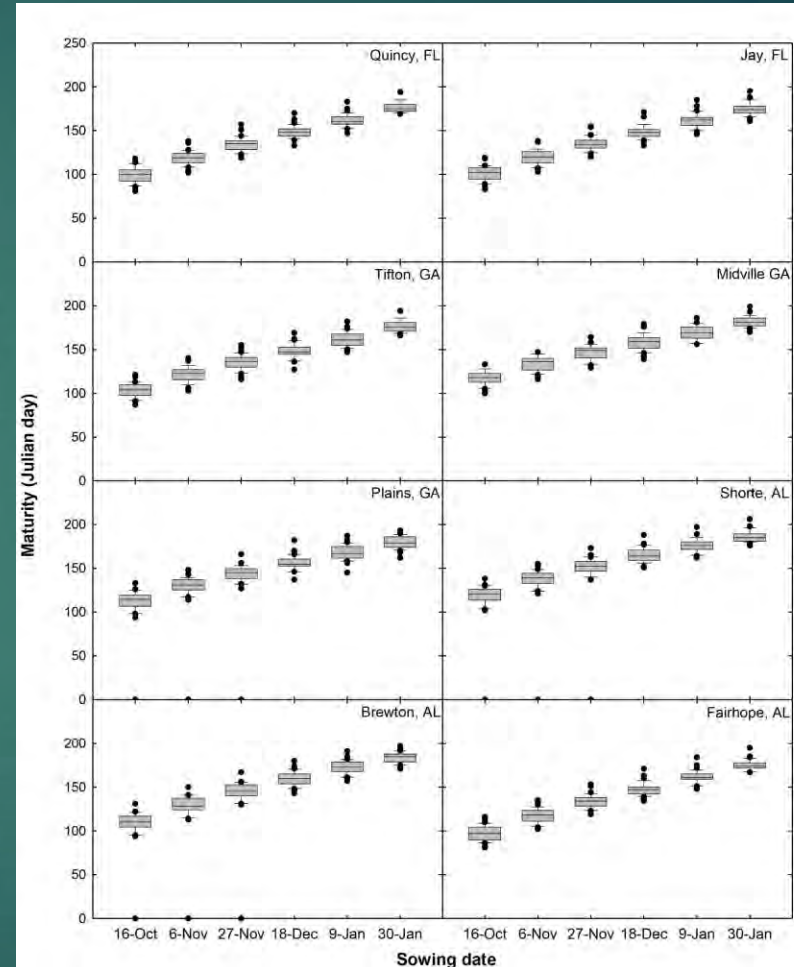
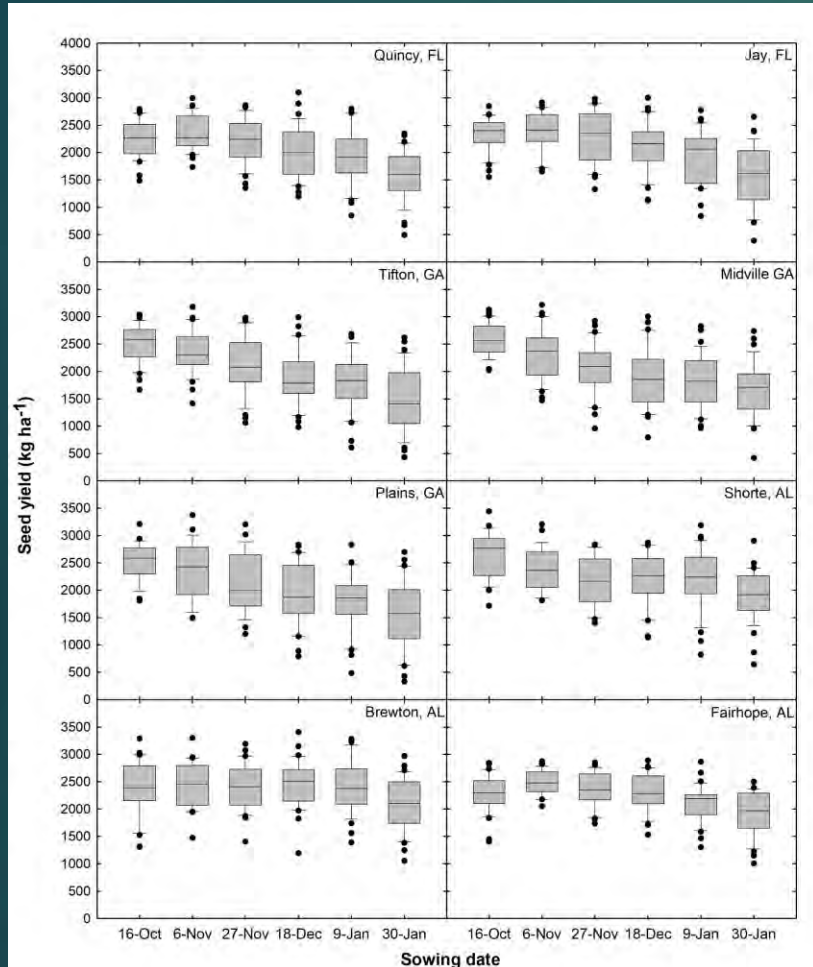
- ▶ 1) Delaying sowing to January or later reduced the number of extreme weather events during the carinata vegetative phase, but increased the number of HT and HR events during the reproductive phase
- ▶ 2) In Florida, sowing from the end of October through the middle of November resulted in a reduction of the number of extreme events in both phenological phases
- ▶ 3) In the northernmost regions (i.e. Florence, SC, Midville, GA, and Brewton, AL), the lowest number of extreme events on vegetative and reproductive phenological phases occurred when carinata was sown from the beginning through the middle of October.
- ▶ 4) For most locations, simulated cotton yield was higher when carinata was sown from mid-October through mid-November. Sowing either early (September and October) or delayed (January and later) caused cotton and peanut yield losses.

Brassica carinata as an off-season crop in the southeastern USA: Determining optimum sowing dates based on climate risks and potential effects on summer crop yield Rogério de Souza N'óia Júnior^{a,*}, Clyde W. Fraisse^{b,*}, Mahesh Bashyal^c, Michael J.

Mulvaney^c, Ramdeo Seepaul^d, Mauricio A. Zientarski Karrei^b, Joseph Enye Iboyi^c, Daniel Perondi^b, Vinicius Andrei Cerbaro^b, Kenneth J. Boote^b

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CROPGRO Model Predictions



Boote KJ, Seepaul R, Mulvaney MJ, et al. Adapting the CROPGRO model to simulate growth and production of *Brassica carinata*, a bio-fuel crop. *GCB Bioenergy*. 2021;13: 1134–1148. <https://doi.org/10.1111/gcbb.12838>

Conclusions

- ▶ For the least risk of crop failure and highest yields, planting between 3 and 4 weeks before the average first freeze days would be best.
- ▶ Earlier planting can be done but may or may not result in earlier maturity and earlier harvests.
- ▶ Earlier planting will need to be monitored closely and timing of fertilization may be adjusted to prevent premature development of reproductive growth.