

Nematode management in carinata production

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Plant-parasitic nematodes: A yield-limiting factor in the Southeast



- Stunted cotton from reniform nematode
- Estimated 4% cotton yield loss [\$250+ million] from nematodes (Lawrence et al., 2021)



Peanut root-knot nematode damage in peanut

Carinata-nematode relationship important factor for adoption!

Carinata-nematode questions

1. Does carinata help manage nematodes for subsequent cash crops?
2. Do any nematodes affect carinata productivity?



How could carinata manage nematodes?

1. Host status
 - Does nematode reproduce on crop?
 - **Varies by nematode-crop combination!**
 2. Biofumigant effect
 - Contains compounds (glucosinolates) toxic to nematodes
 - Effect under growing conditions?
- **Focus on reniform nematode**
(*Rotylenchulus reniformis*)



Reniform nematode on cotton roots (C. Overstreet)

Does reniform nematode reproduce on carinata (greenhouse)?



Good host
(nematodes increase)



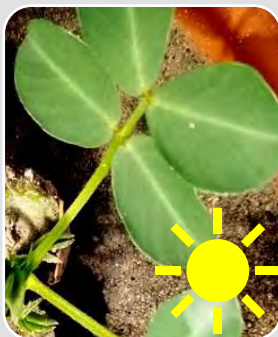
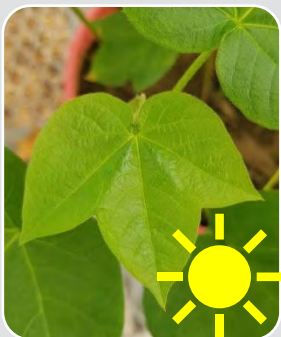
Poor host
(nematodes decline)



Winter Crop



Summer Crop



Cotton



Hairy Vetch



Carinata



Canola



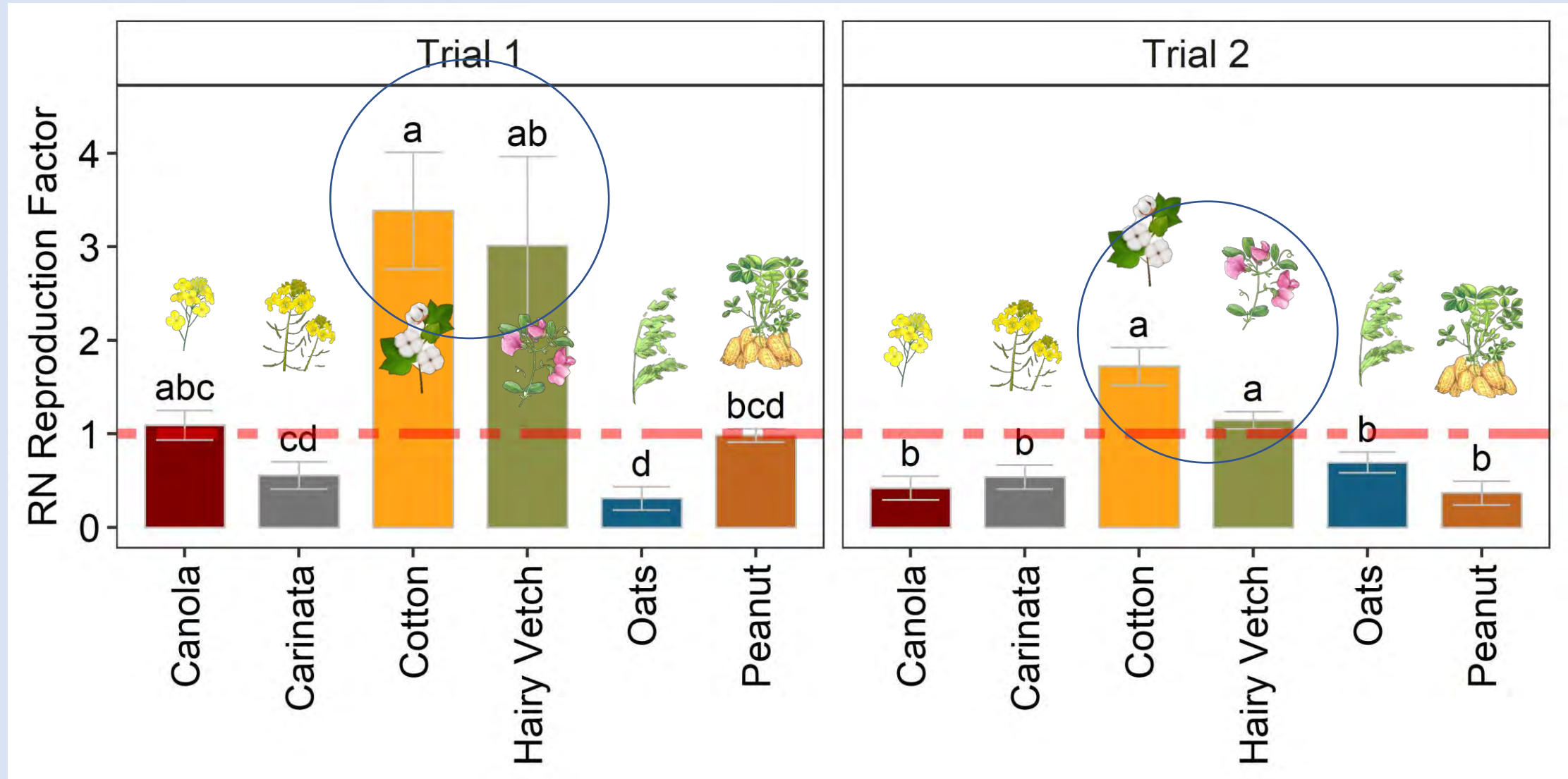
Oats



Peanut



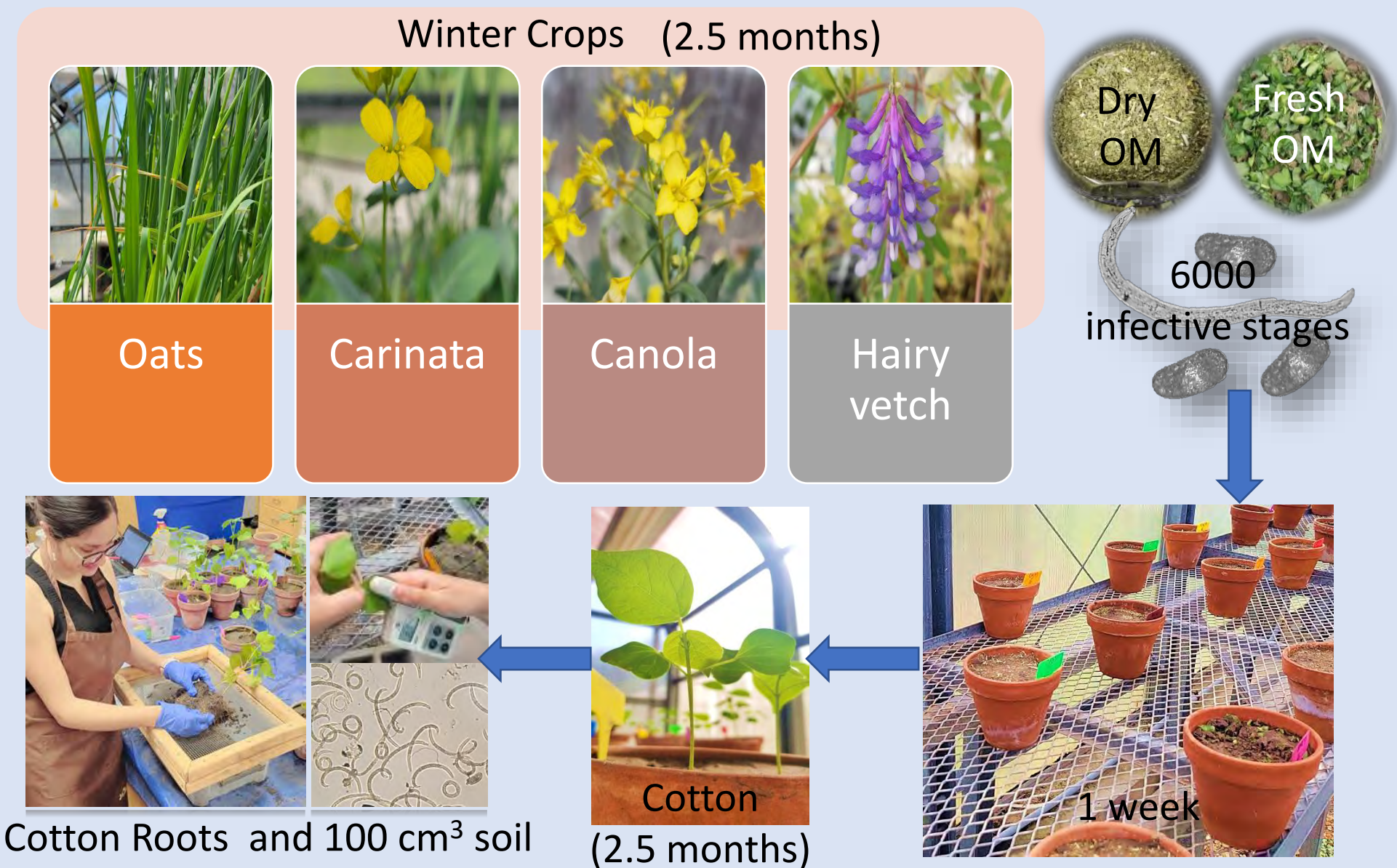
Carinata does not increase on reniform nematode (great!)



Reproductive factor > 1: nematode increases (bad);
Reproductive factor < 1: nematode decreases (great)

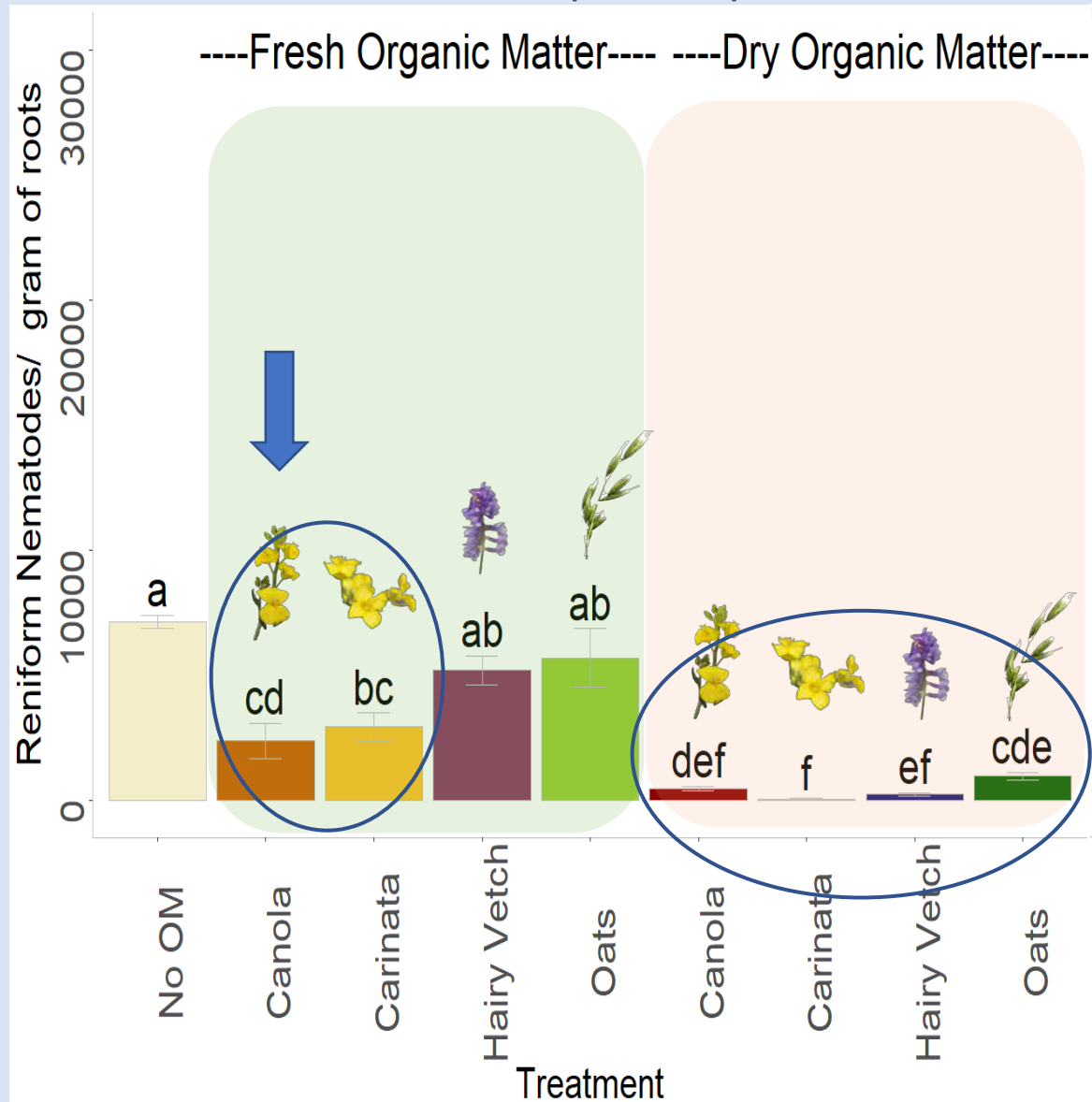
Kruskal- Wallis with P. adj=Bonferroni. $\alpha=0.05$

Does carinata biofumigate (dry and fresh matter) in greenhouse?

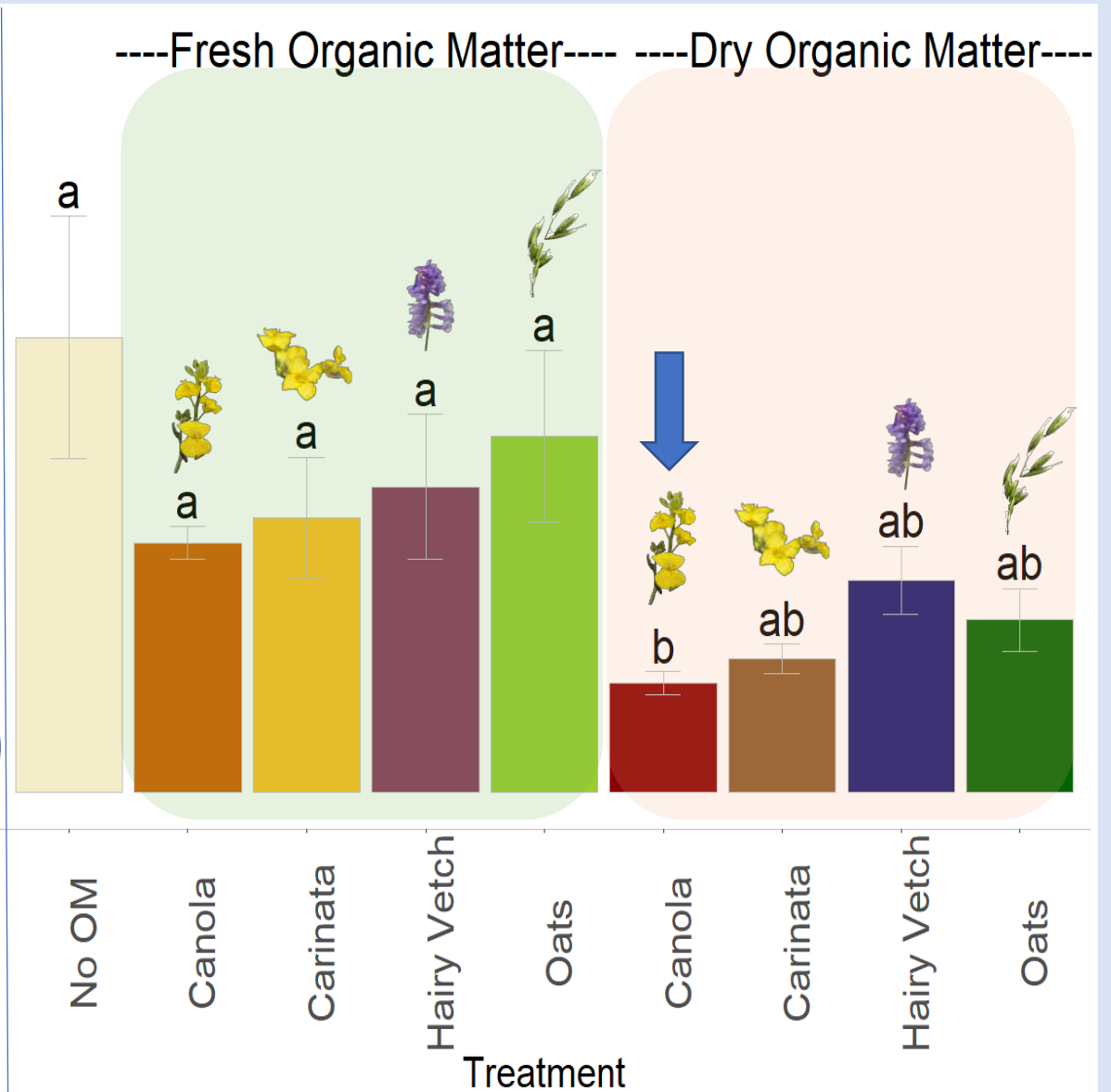


Carinata similar to current winter crops for biofumigation

Trial 1 (Winter)

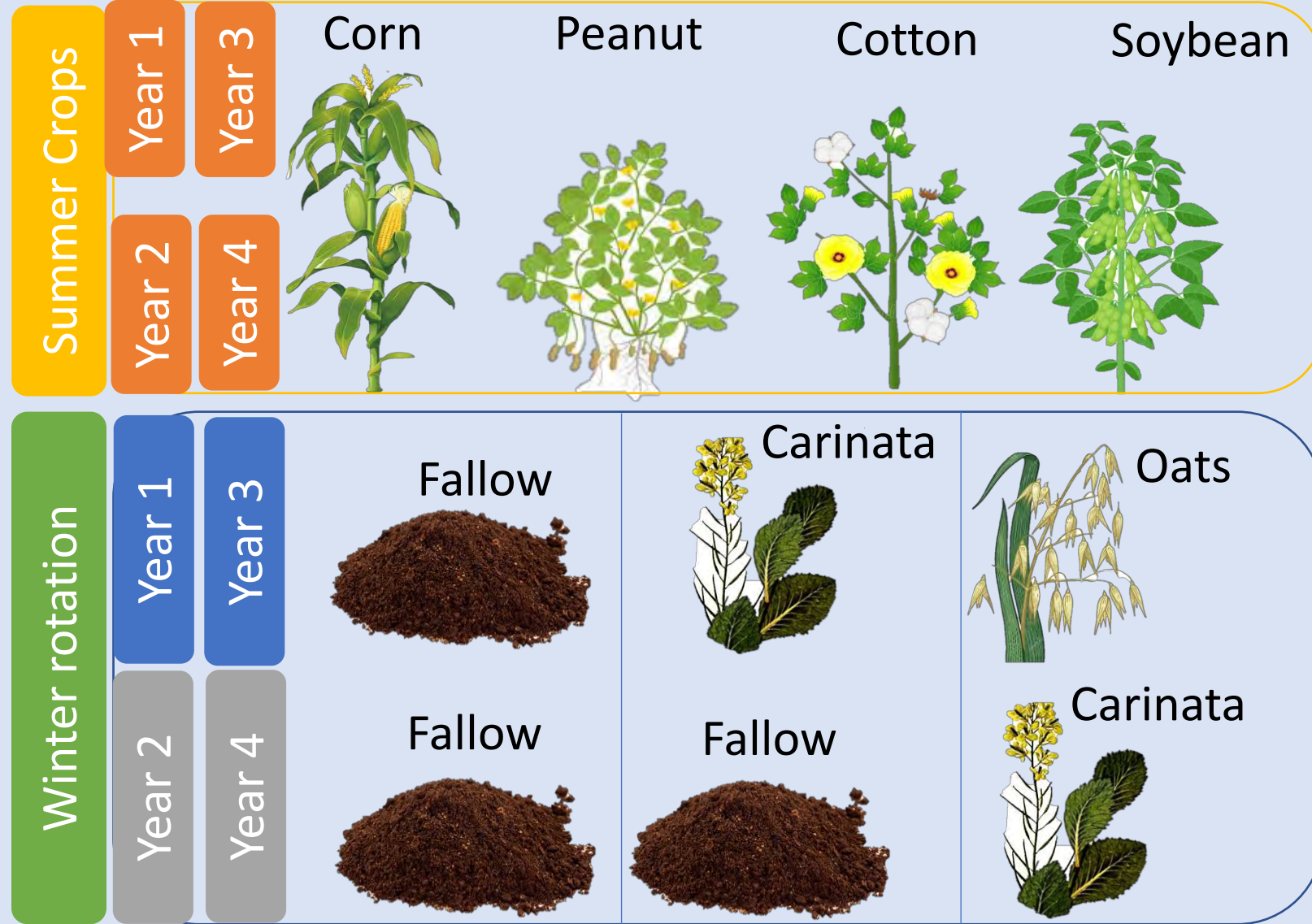


Trial 2 (Spring)



Does carinata manage reniform nematode in the field?

4 Year
Rotation at
Quincy
(2017-2021)



Sampling
season

Fall

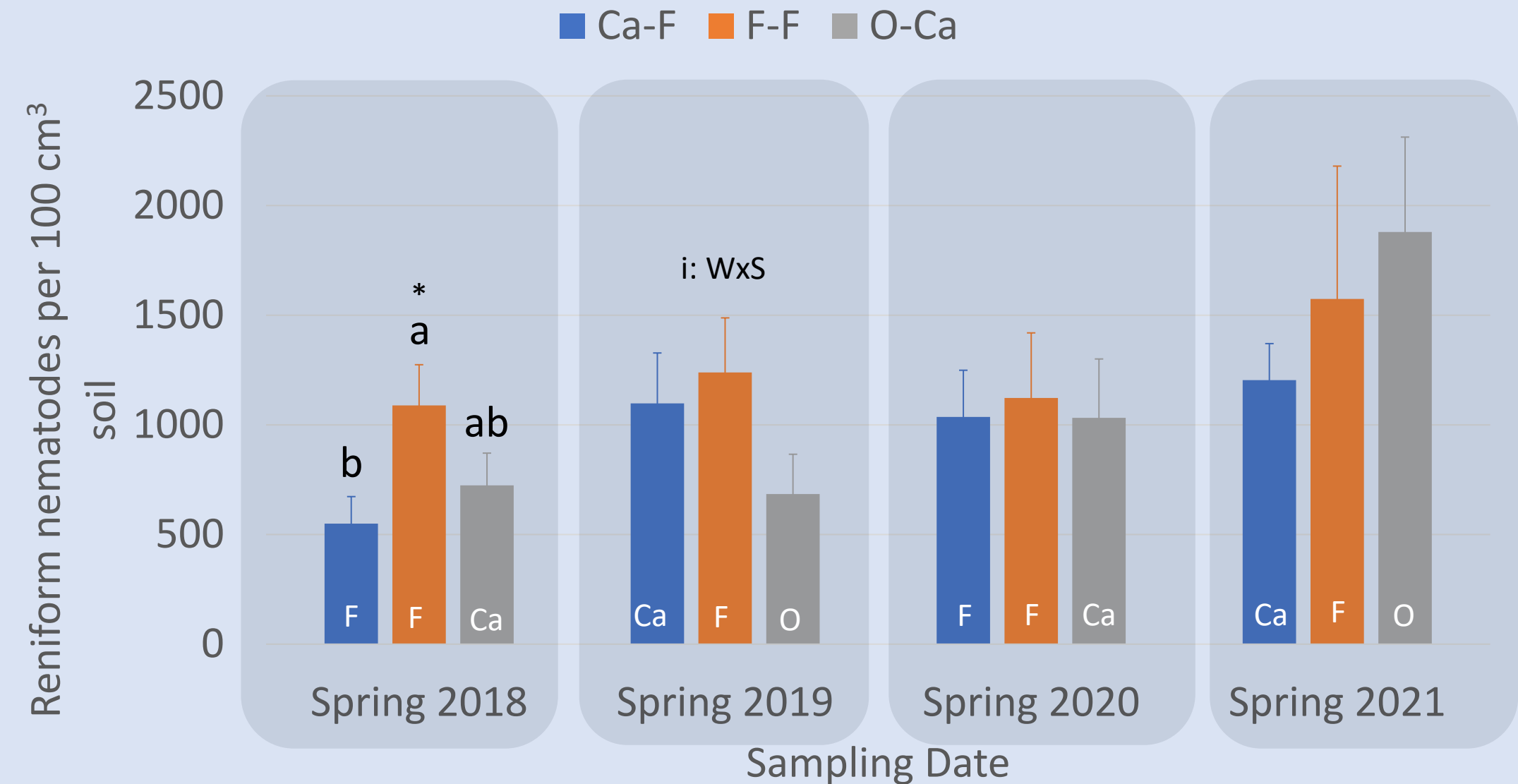


Spring



Nematode soil
counts to 4' deep

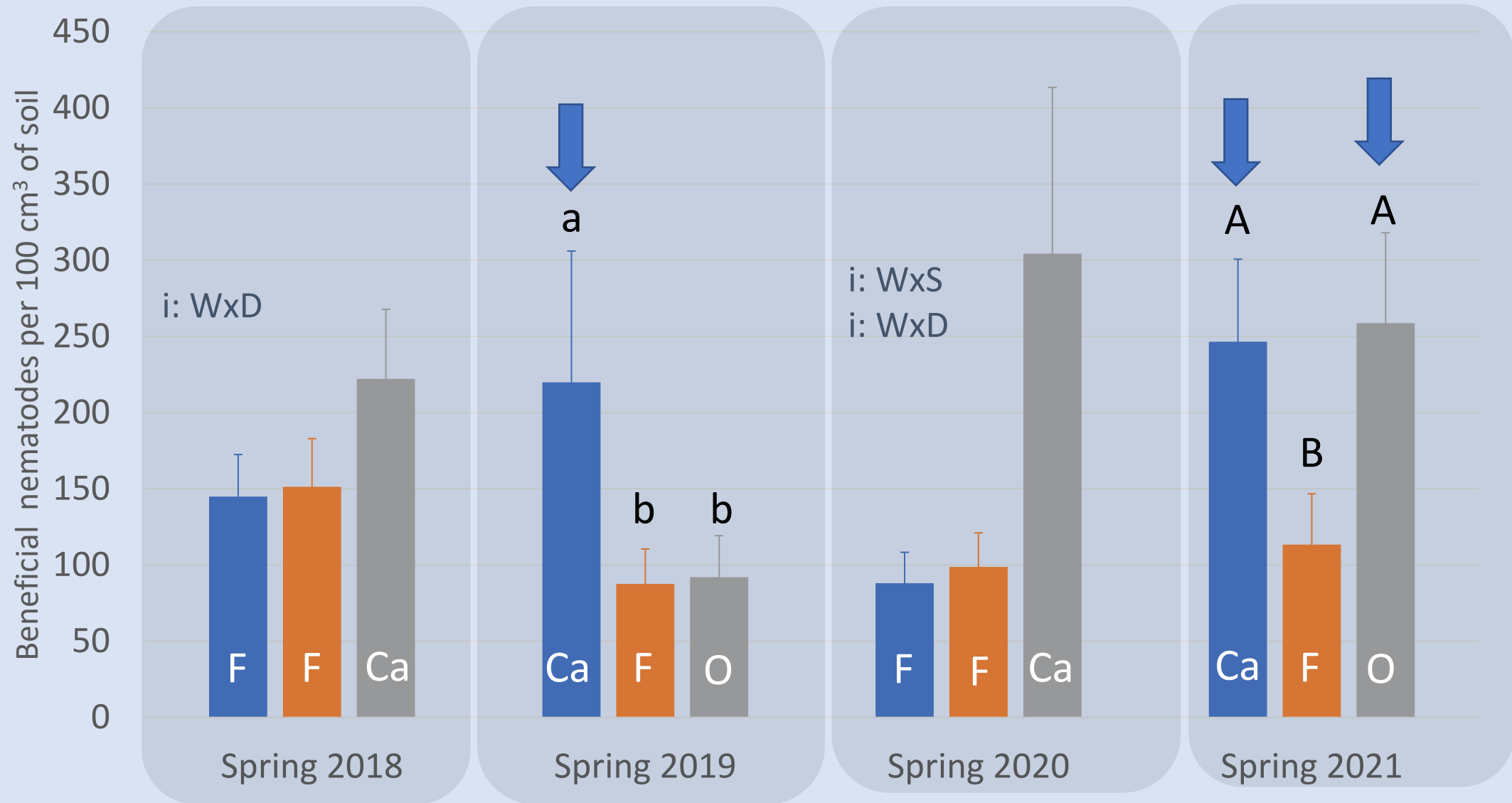
Reniform nematode management similar among crops in field



ANOVA, Tukey, $P < 0.05$

Carinata increases beneficial nematodes

■ Ca-F ■ F-F ■ O-Ca



ANOVA, Tukey, $P < 0.05$

Summary of carinata-reniform nematode interaction

1. Reniform nematode does not infect carinata
 - Will not affect carinata yield
 - Help manage for following crops
2. Not better than current non-host winter crops for management

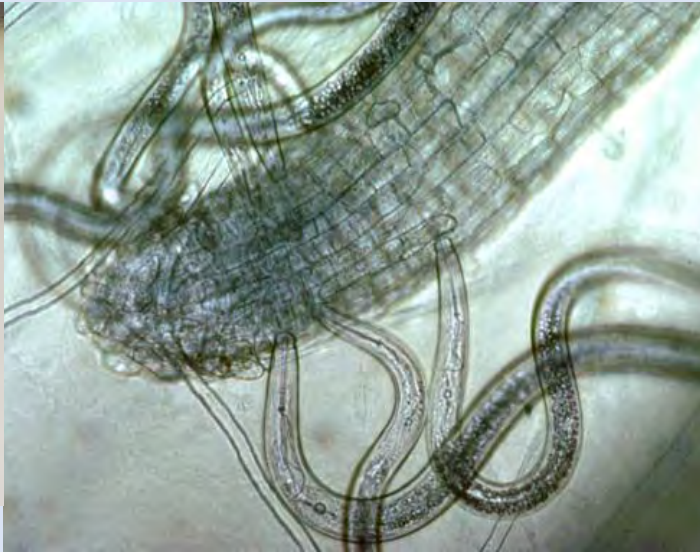


Remaining questions

How does carinata affect other nematodes?



Root-knot nematode female
in carinata root



Sting nematode feeding on root

Improve biofumigation with different practices?



Tillage, incorporation methods, variety



Upcoming work on
peanut root-knot nematode



Questions from you

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