

# Nematode Management in Sugarcane



**Louisiana Agricultural Technology  
& Management Conference**  
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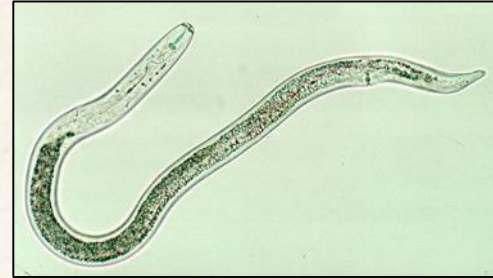


Tristan Watson  
Assistant Professor of Nematology  
Plant Pathology and Crop Physiology  
LSU AgCenter



# Outline

## 1. Nematode Pests of Sugarcane



## 2. Nematode Distribution



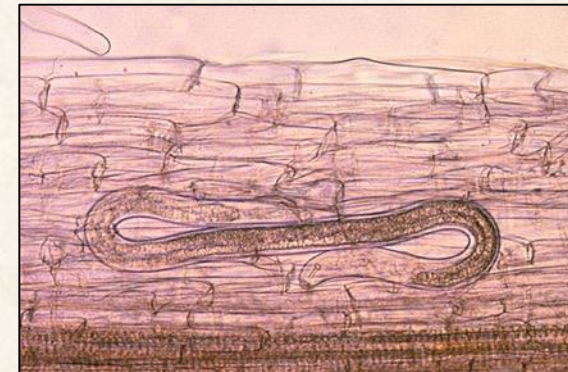
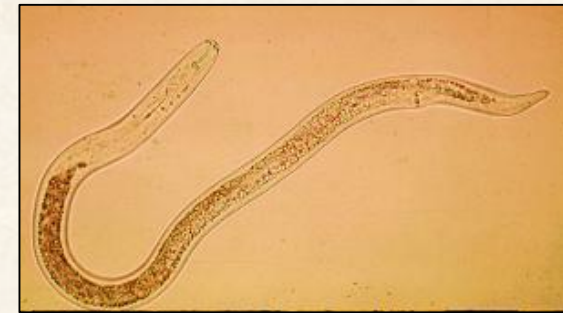
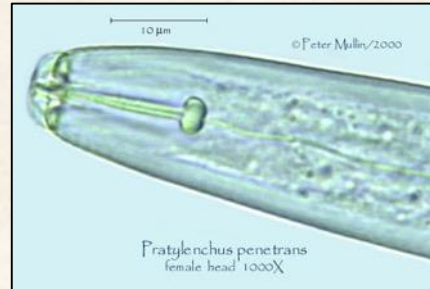
## 3. Nematode Management

## 4. 2023 Nematicide Field Trial

# Sugarcane Nematodes

## Lesion Nematode

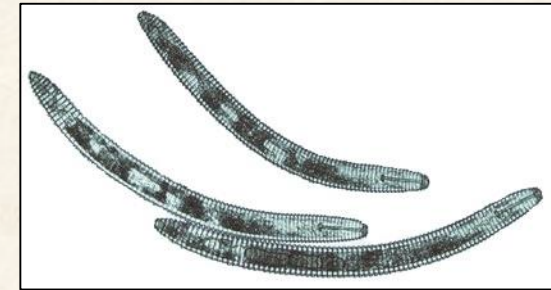
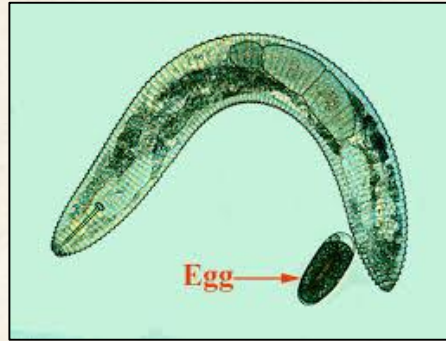
- Migratory endoparasites
- Feeding causes necrotic lesions
- Reduces root growth
- Predisposes to secondary pathogens



# Sugarcane Nematodes

## Ring Nematode

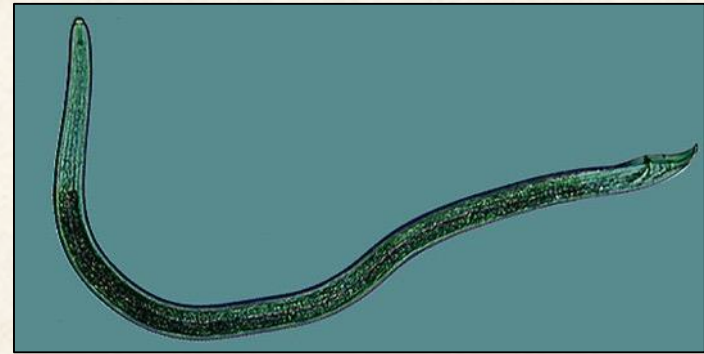
- Ectoparasite
- Feeding halts root elongation
- Reduced plant biomass



# Sugarcane Nematodes

## Stunt Nematode

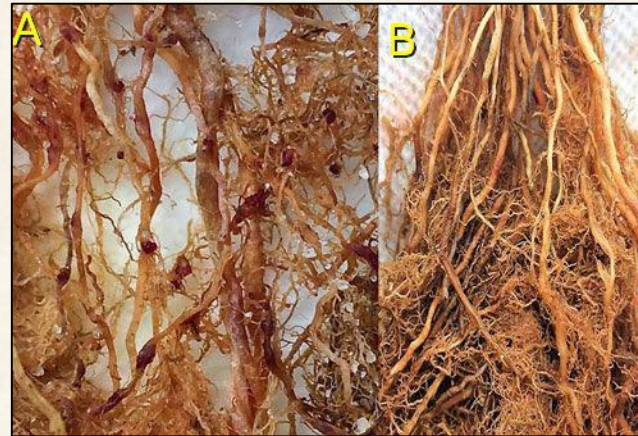
- Ectoparasites
- Feeding halts root elongation
- Reduced plant biomass



# Sugarcane Nematodes

## Root-Knot Nematode

- Sedentary endoparasite
- Causes root galling symptoms
- Stunted growth in patchy distribution

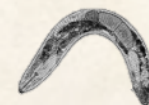


# Distribution of Nematodes in LA

Sampled 62 commercial fields in six major sugarcane producing parishes (2020)

Parish	Fields (#)	Stunt (%)	Lesion (%)	Spiral (%)	Ring (%)	Lance (%)	Pin (%)
Ascension	6	50	50	50	67	0	0
Avoyelles	1	0	0	100	0	0	0
Iberville	22	55	41	41	55	14	5
Pointe Coupee	16	69	63	25	50	25	0
St. James	3	33	33	66	0	0	0
West Baton Rouge	14	71	57	7	79	0	0

Stunt, Lesion, Spiral, and Ring nematodes are widespread



# Influence of Soil Texture



## Abundance of Nematodes (#/500 mL soil)



Soil Type	Fields (#)	Stunt (#)	Lesion (#)	Spiral (#)	Ring (#)
Clay	6	200	53	213	40
Silty Clay Loam	17	151	127	282	217
Silty Loam	35	265	217	133	214
Sandy Loam	4	400	100	20	260

- Soil texture did not impact the abundance of **Stunt** nematode
- **Lesion** and **Ring** nematode are more abundant in coarse-textured soils
- **Spiral** nematode is more abundant in fine-textured soils



# Influence of Crop Stage

## Abundance of Nematodes (#/500 mL soil)

Crop Stage	Fields (#)	Stunt (#)	Lesion (#)	Spiral (#)	Ring (#)
Plant Cane	12	73	67	0	54
First Ratoon	9	309	193	36	156
Second Ratoon	19	265	274	236	194
Third Ratoon	17	344	160	301	391

Nematode population density increased with crop stage



# Damage Potential of Nematodes

## Nematode Advisory Service Data

- Lesion Nematode >250 nematodes / 500 mL of soil
- Ring Nematode > 500 nematodes / 500 mL of soil

## Australian Sugarcane Production

- Up to 10% yield loss associated with nematodes



## 1990s Field Trials in Louisiana

- Yield increase after nematicide applications

Nematodes = Hidden Yield Loss

# Nematode Management - Nematicides

- **Mocap 15G (a.i: ethoprop)**
  - Registered in 1963
  - Acetylcholinesterase inhibitor
  - Toxic to non-target organisms



## Nimitz® (a.i: fluensulfone)

- Registered in 2014
- Fatty Acid Oxidase Inhibitor
- Less toxic to humans and non-target organisms



# Nematicide Greenhouse Trial

Site	Parish	Soil Texture	Initial Nematode Density (#/500 mL soil)				
			Stunt	Lesion	Spiral	Ring	Lance
SC8	West Baton Rouge	Silt Loam	240	40	0	0	0
SC12	Pointe Coupee	Silt Loam	720	80	0	0	20
SC20	Ascension	Silt Loam	710	30	20	180	20
SC48	Avoyelles	Silt Loam	0	0	2640	0	0
SC49	Pointe Coupee	Silt Loam	680	320	0	200	0
SC51	Pointe Coupee	Silty Clay Loam	0	40	320	0	0
SC57	Pointe Coupee	Silt Loam	1960	160	0	320	0

Treatments	Rate	Amount per pot	Drench
Untreated	-		-
Sterilized	-		-
Mocap 15G	26 lb/A (3.6 lb/1000 row ft at 6-ft spacing)	53 mg/pot	-
Nimitz	7 pints/A	14.9 uL/pot	25 mL

# Nematicide Greenhouse Trial

## Plant Growth Response:

Sterilization - 56% more tillers

Mocap 15G - 5% more tillers

Nimitz - 44% more tillers



# Nematicide Greenhouse Trial

## Nematode Response:

Sterilization - 98% fewer nematodes

Mocap 15G - 67% fewer nematodes

Nimitz - 42% fewer nematodes



# Nematicide Field Trial



# Nematicide Field Trial

## Field Trial

- Sugar Research Station  
(St. Gabriel, LA)
- Planted in September 2022
- L01-299 variety
- Nematode Infestation:
  - **Lesion nematode** (moderate)
  - **Ring nematode** (moderate)
  - **Stunt nematode** (low)
  - **Spiral nematode** (low)





# Nematicide Field Trial



Treatments	a.i.	Application Method	Rate
Untreated	-	-	
<b>MOCAP 15G</b>	ethoprophos	At plant	3.6 lbs/1,000 row ft
<b>Nimitz 1X</b>	fluensulfone	At plant	7 pints/A
<b>Nimitz 2X</b>	fluensulfone	At plant + Spring 2023	7 pints/A + 7 pints/A
<b>Experimental 1X</b>	cyclobutrifluram	At plant	250 mg/ha
<b>Experimental 2X</b>	cyclobutrifluram	At plant + Spring 2023	250 mg/ha + 250 mg/ha

# Nematicide Field Trial



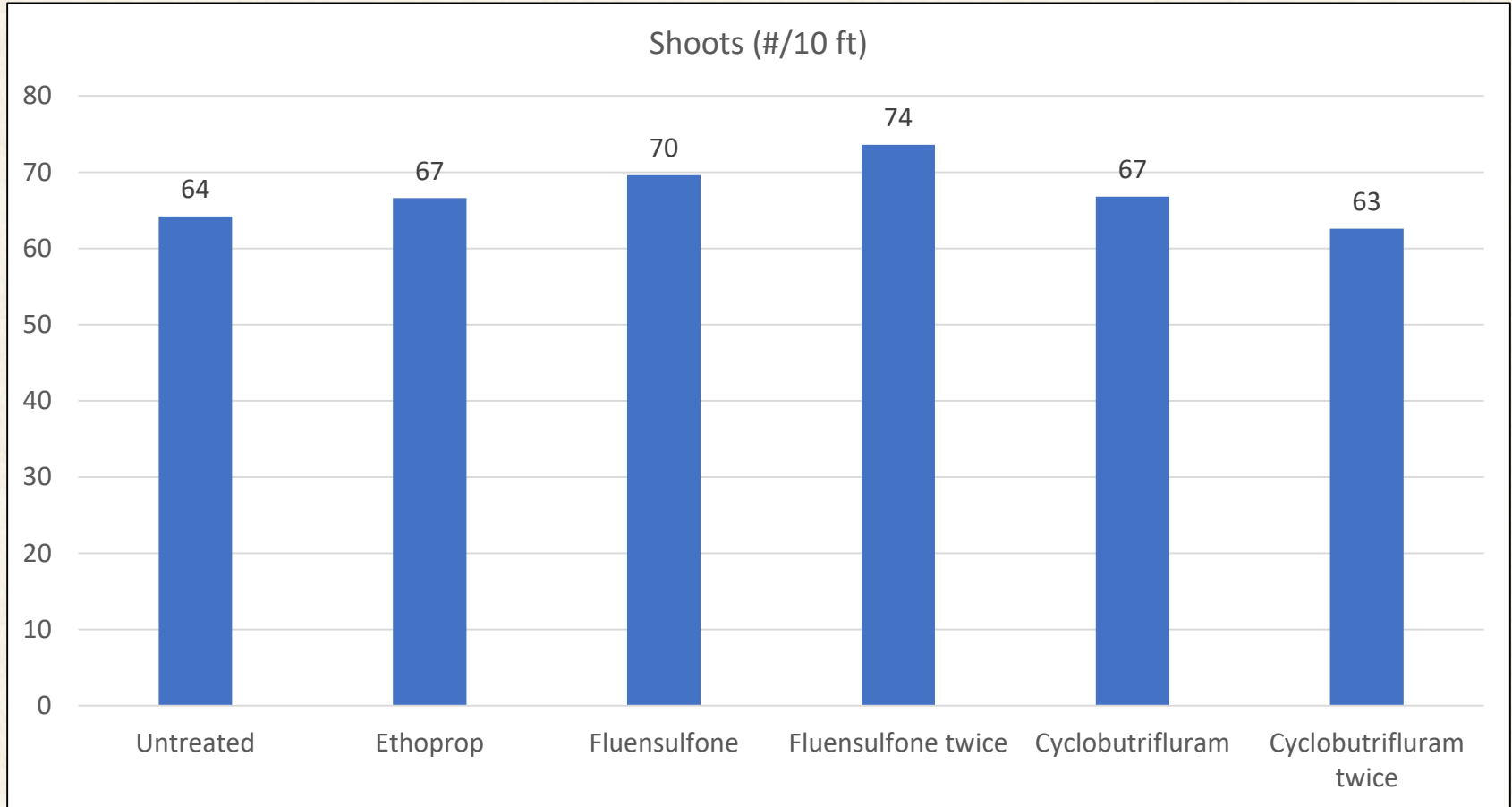
# Nematicide Field Trial



# Nematicide Field Trial

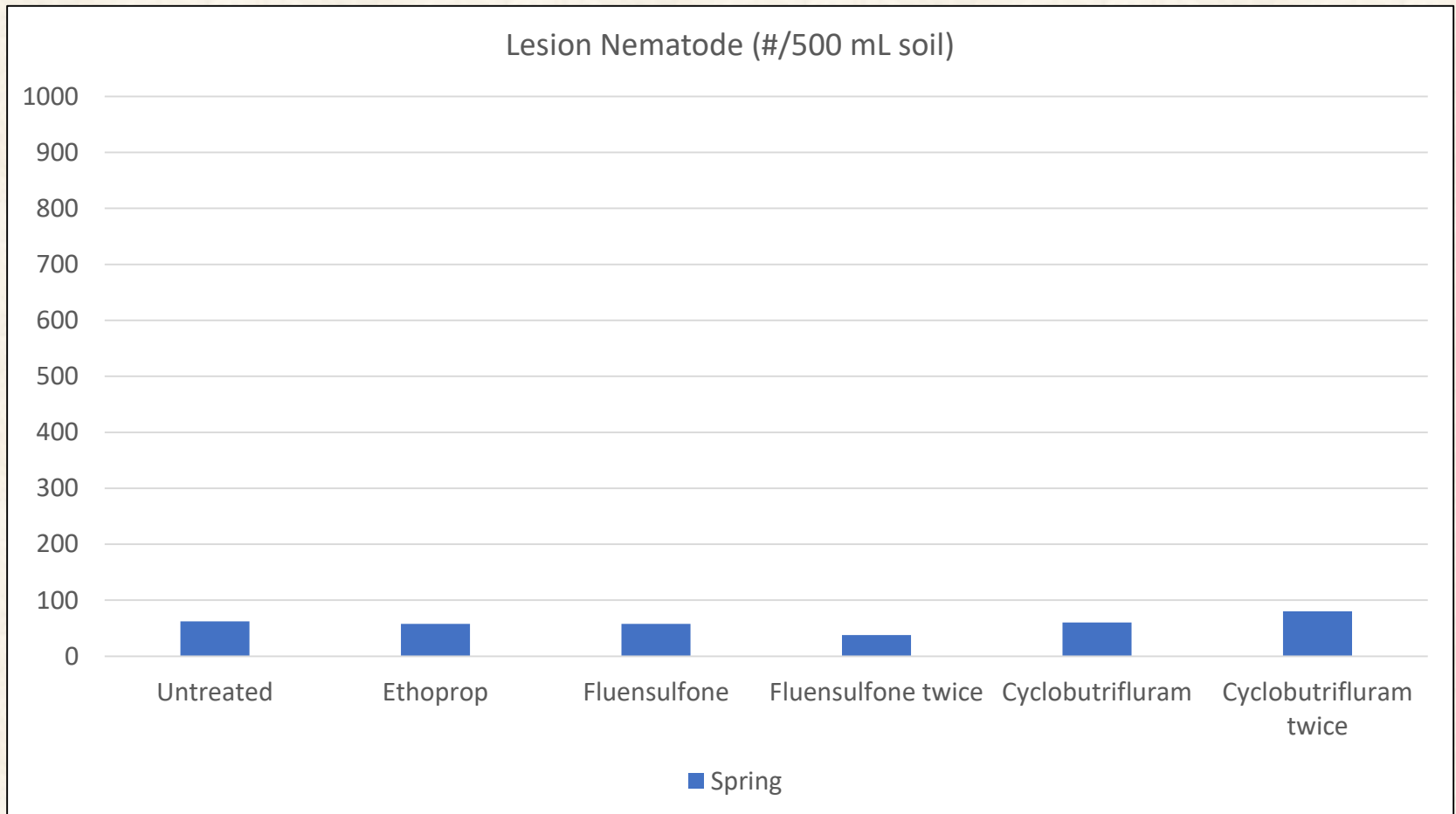


# Early Season Shoot Emergence



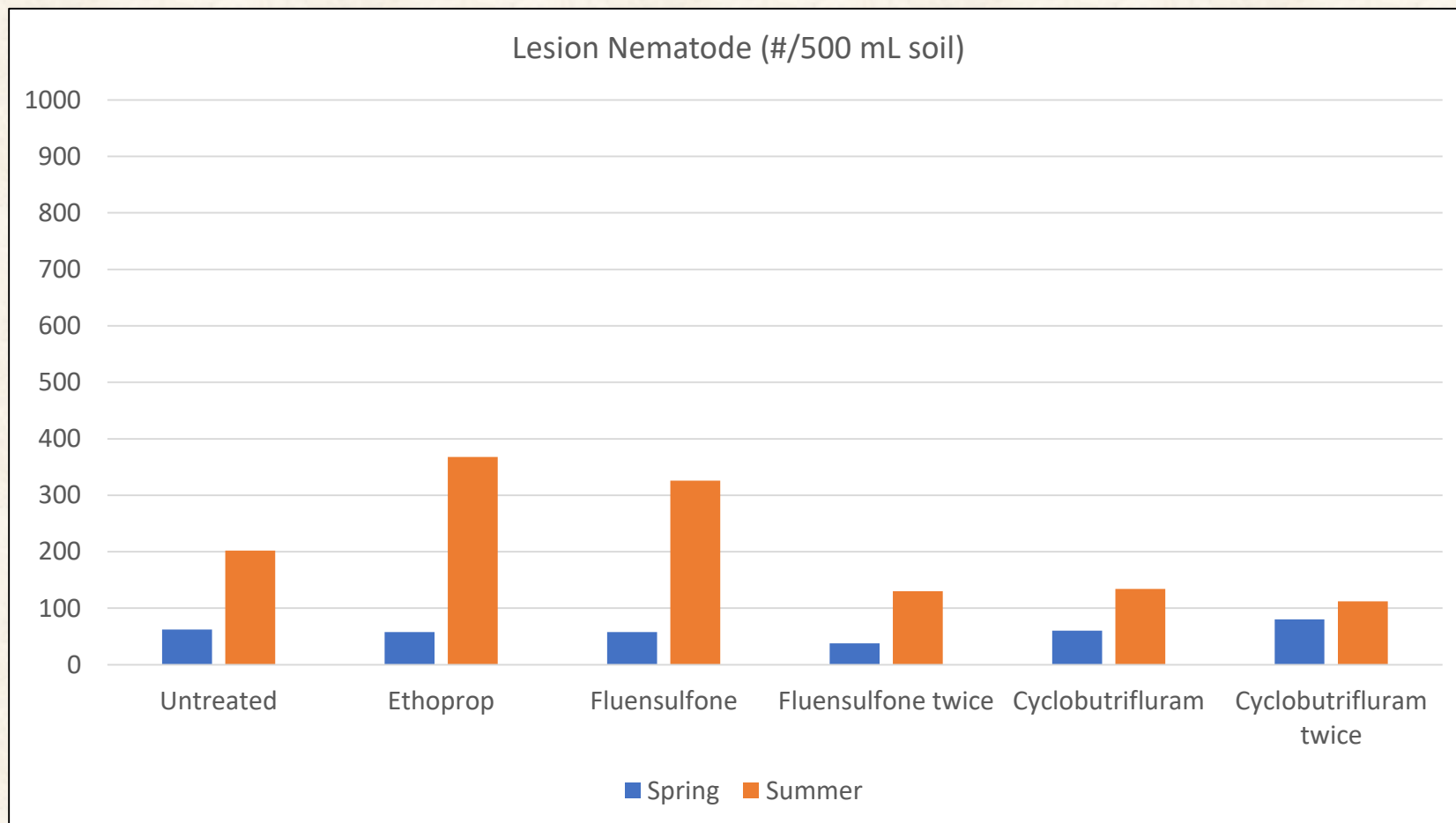
No effect of nematicides on shoot emergence

# Lesion Nematode Population Development



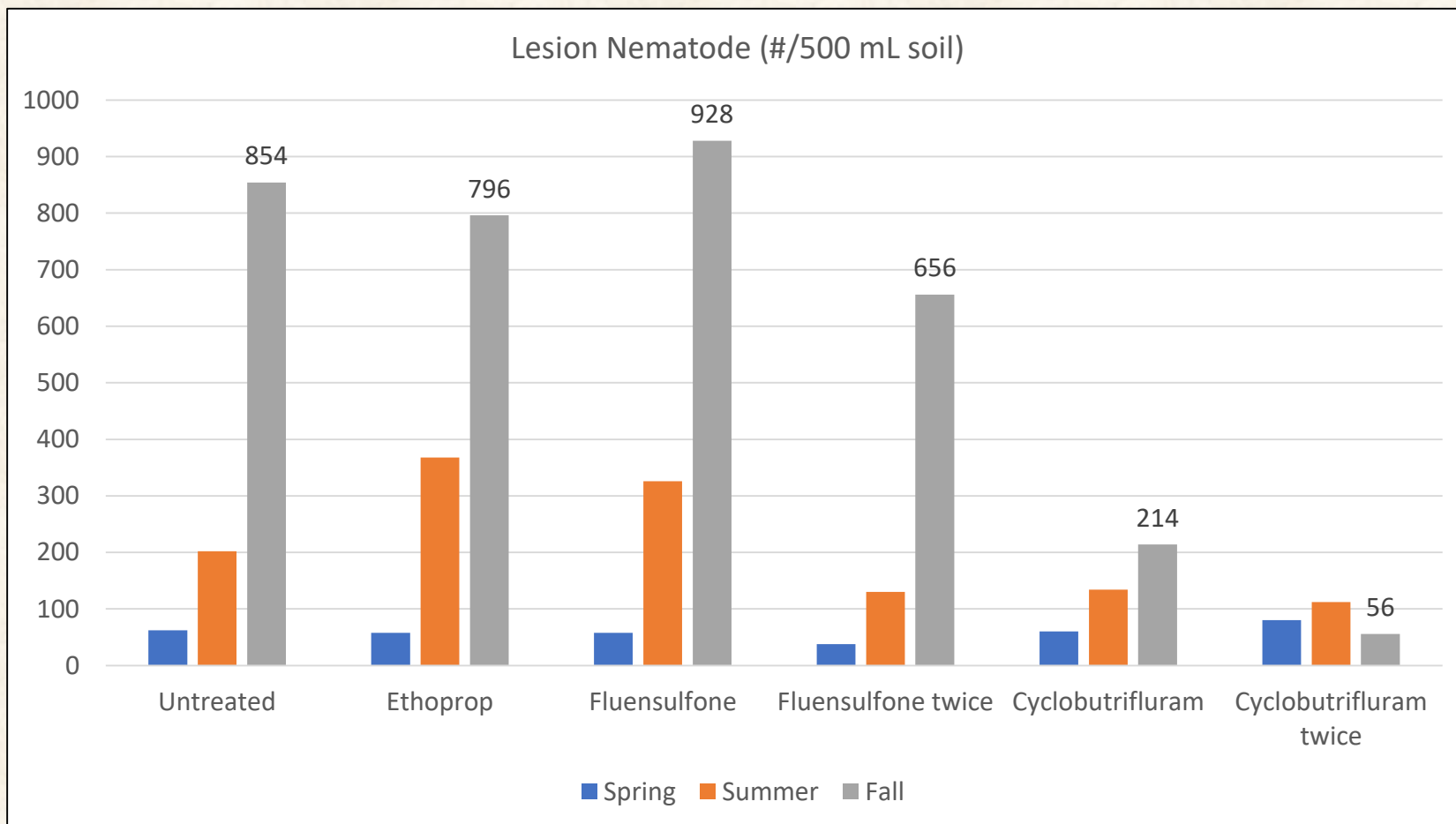
No effect of nematicides on lesion nematodes in spring 2023.

# Lesion Nematode Population Development



No effect of nematicides on lesion nematodes in summer 2023.

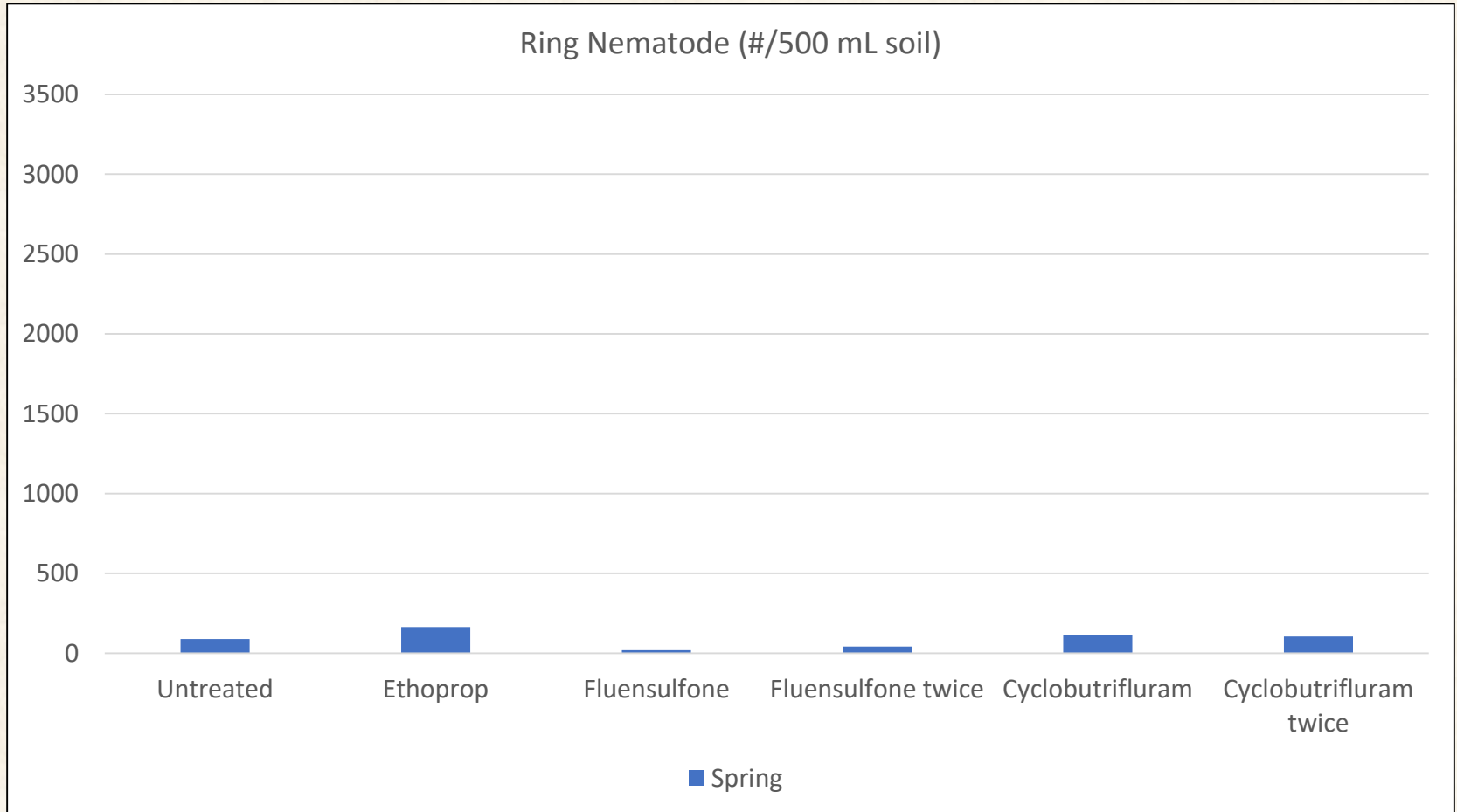
# Lesion Nematode Population Development



Lower lesion nematode densities at harvest with cyclobutrifluram.

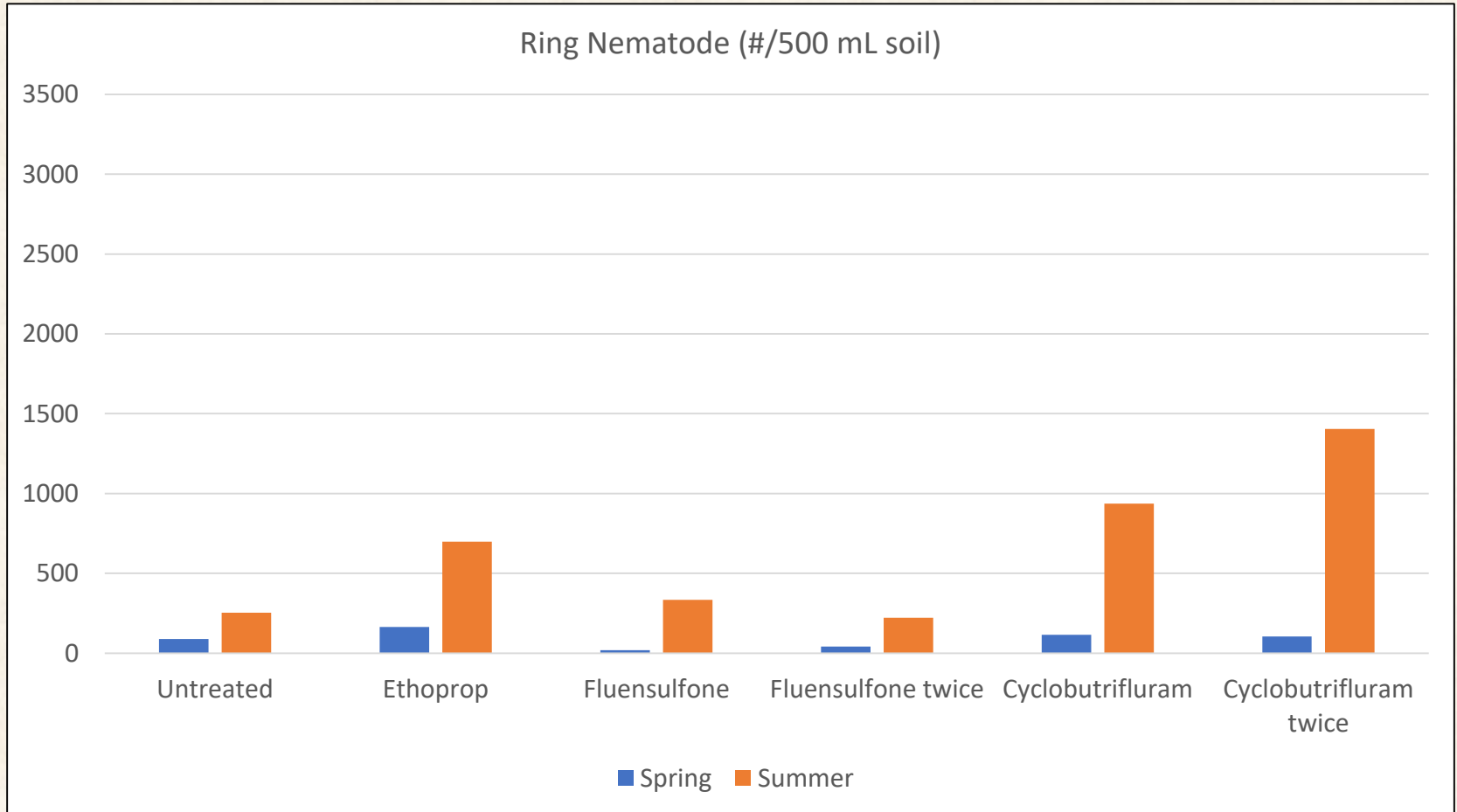


# Ring Nematode Population Development



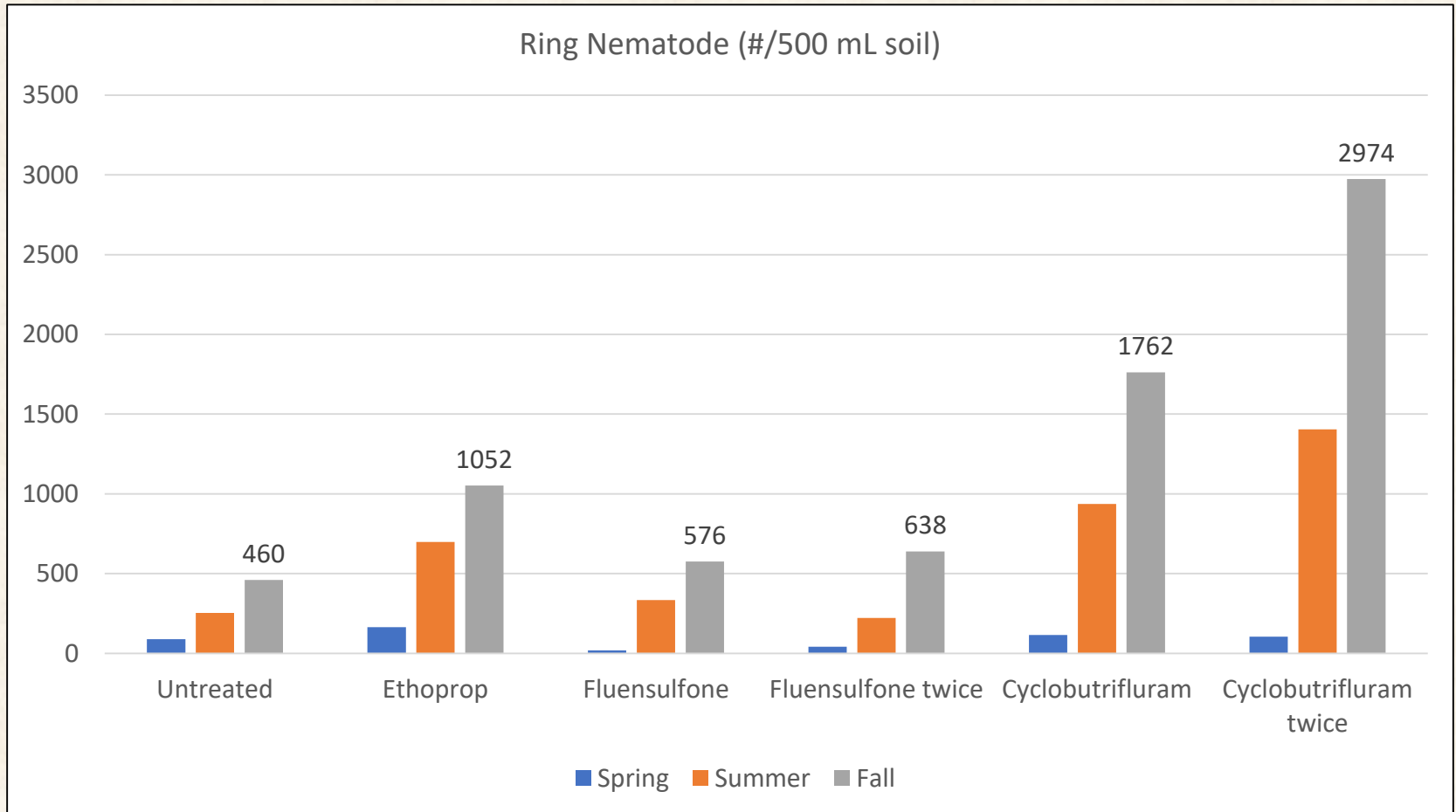
No effect of nematicides on ring nematodes in spring 2023.

# Ring Nematode Population Development



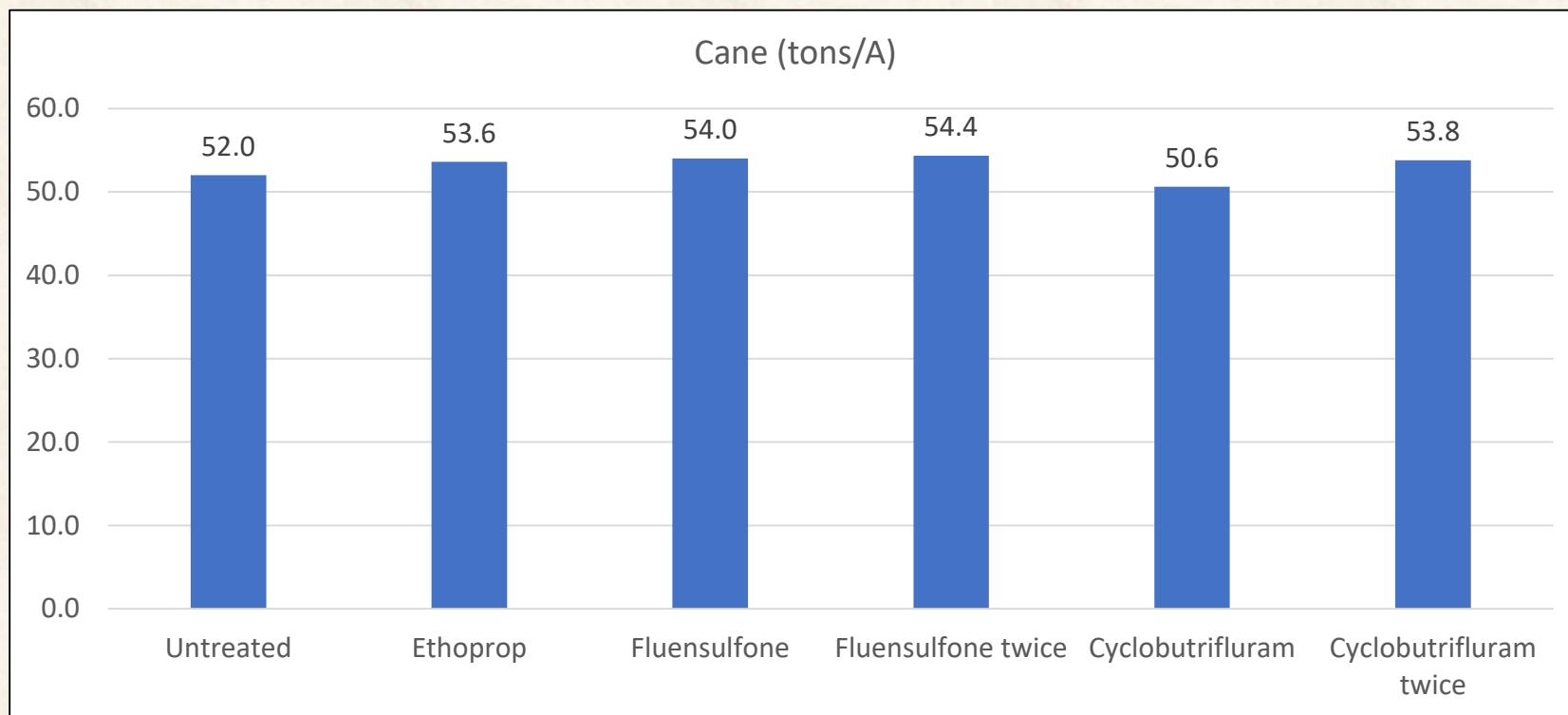
No effect of nematicides on ring nematodes in summer 2023.

# Ring Nematode Population Development



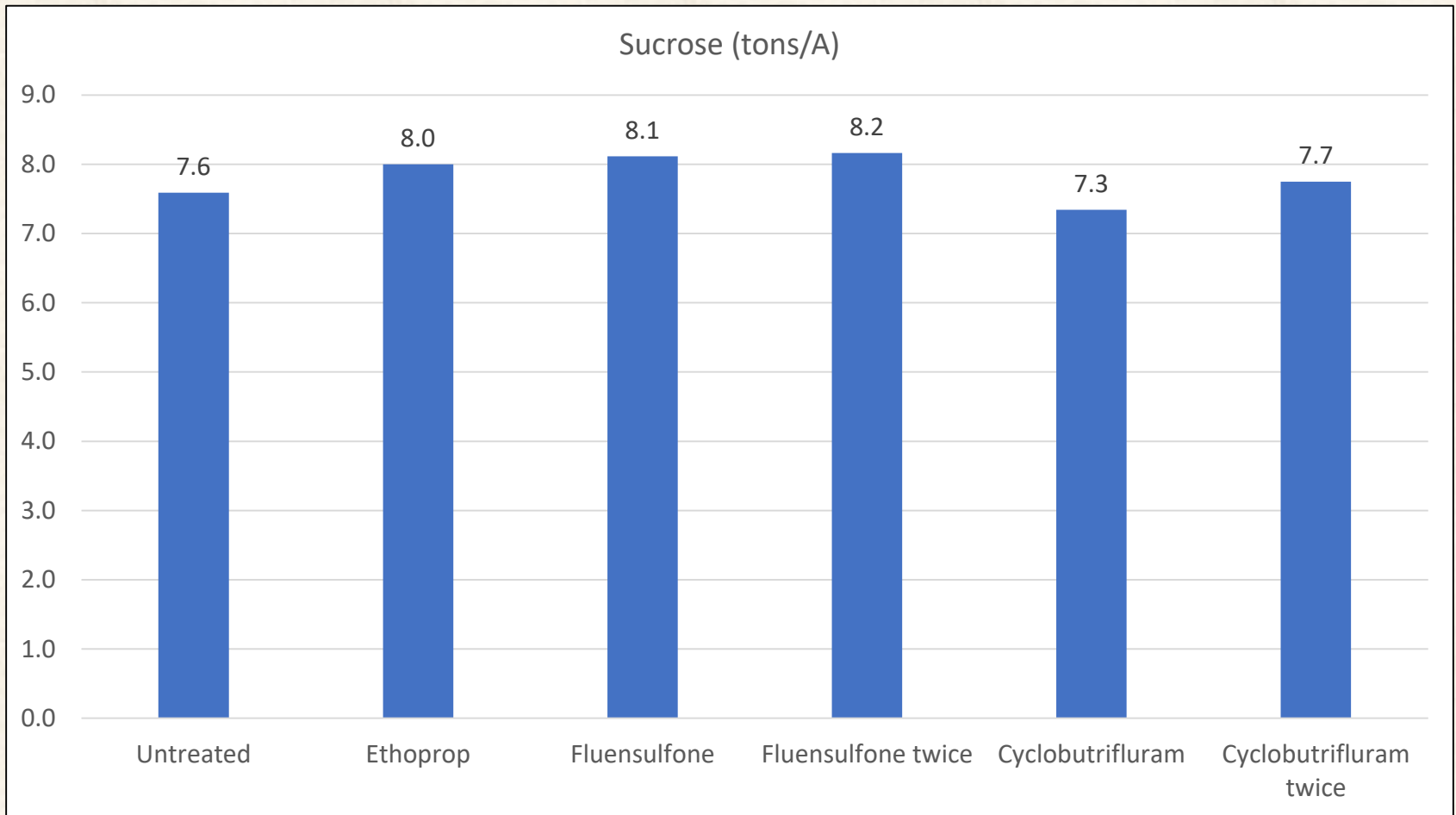
Higher ring nematode densities after cyclobutrifluram application.

# Yield – Cane Tonnage



No effect of nematicide on cane tonnage.

# Yield – Sucrose



No effect of nematicide on sucrose yield.

# Summary

- Nematode population densities are increasing after planting.
- Cyclobutrifluram and fluensulfone applied twice reduced **lesion nematode** densities in soil and roots.
- Cyclobutrifluram application resulted in higher **ring nematode** densities in soil.
- No effect of nematicide on **cane tonnage** or **sucrose yield**.

Continued monitoring of this field trial will be key to determining the value of nematicide applications in sugarcane.

# Acknowledgements

## Watson Lab Team:

Dr. Josie Rezende (Research Associate)

David Galo (PhD candidate)

Lucy Kiarie (PhD student)

Iris Aguilar (MS student)

International Interns

Past lab members



## Sugar Research Station:

Dr. Al Orgeron (Resident Coordinator)

Farm Crew

## Funded By:



Questions?

