



University  
of Manitoba

Alberta  
Government

# Wintering Method and *Nosema ceranae* Control in Honey Bees under Canadian Prairie Conditions

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# Effects on the Colony



# Fumagillin Treatment

## Recommendation

- 1 million spores/bee
- Spring and/or Fall



# Albertan Winter



# Outdoor



# Indoor



# Objective

**Location**

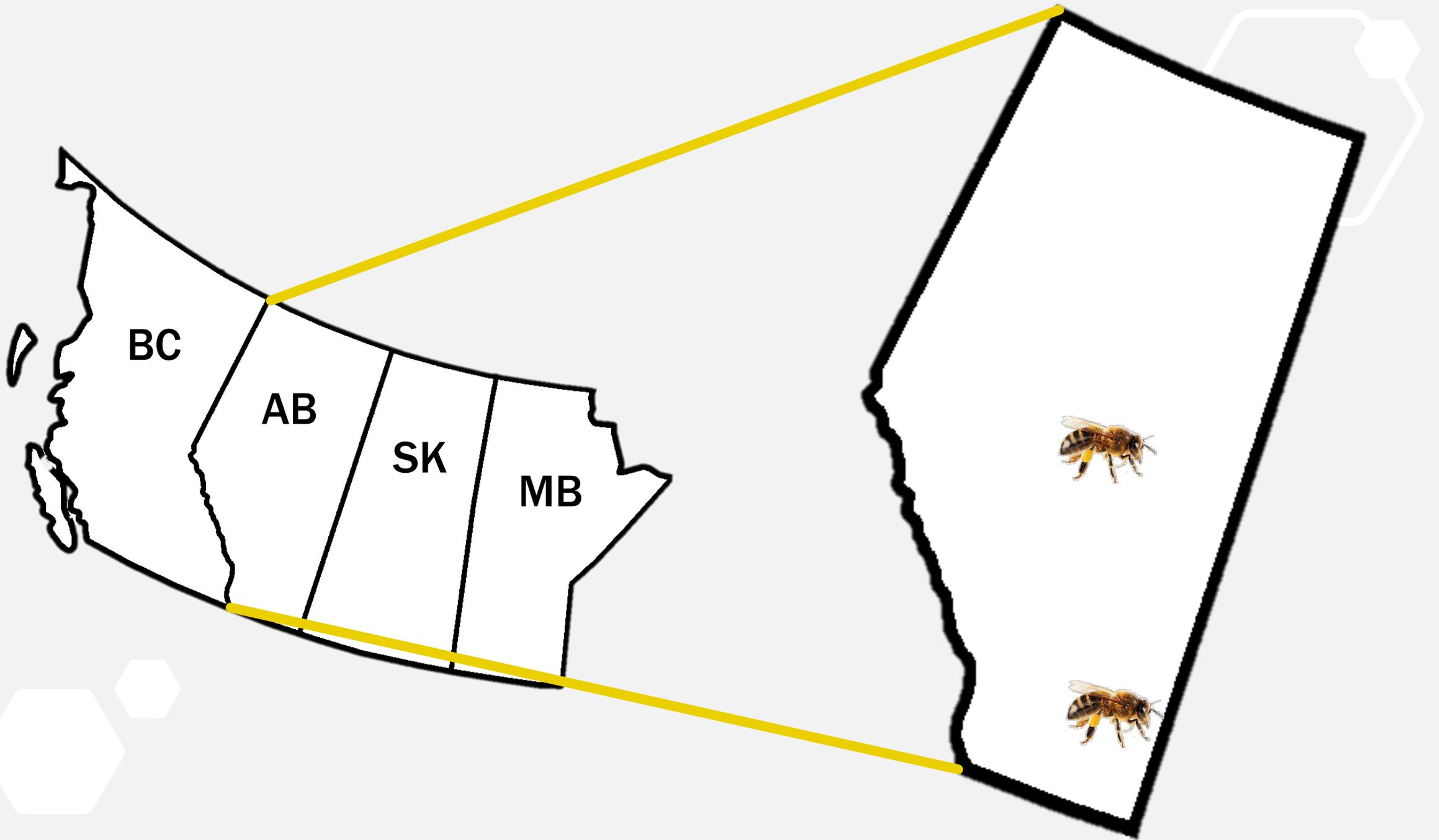
**Winter  
Management**

**Treatment**

***Nosema*  
abundance**

**Colony  
Strength**

**Winter  
Survival**



# Treatments



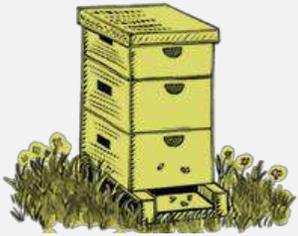
**Spring only**

**8 replicates per  
treatment**



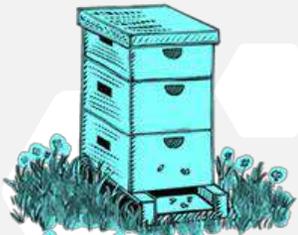
**Fall only**

**32 colonies per  
apiary**



**Spring & Fall**

**4 apiaries**



**Control**

**Total: 128 colonies**



# Spring Treatment

## Drenching

- 250 ml 4X, every 4 days
- 1:1 sugar syrup
- Total: 1 litre
- 68 mg fumagillin/hive



# Fall Treatment

## Bulk Feeding

- 3.7 litres at once
- 2:1 sugar syrup
- 120 mg fumagillin/hive



# Sampling & Processing

## Nosema

- ~100 bees
- Super or outer honey frames
- Mean spore abundance – Hemocytometer
- Species- qPCR



# Colony Assessment



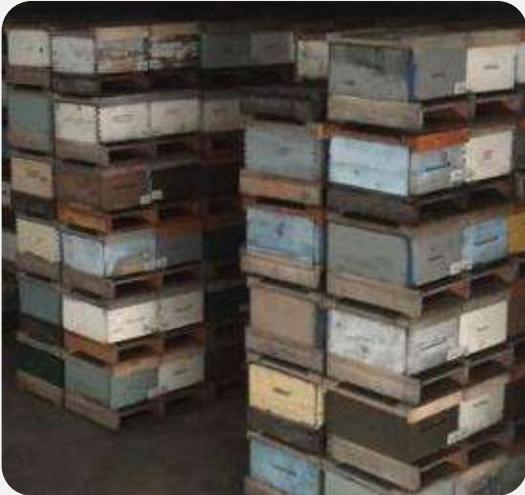
# Winter Treatment

## North

Apiary 1



Apiary 2



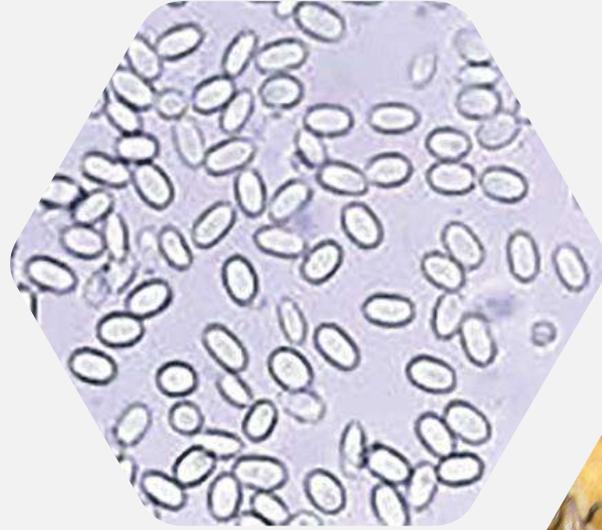
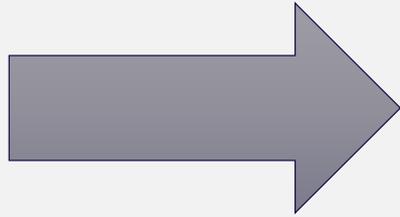
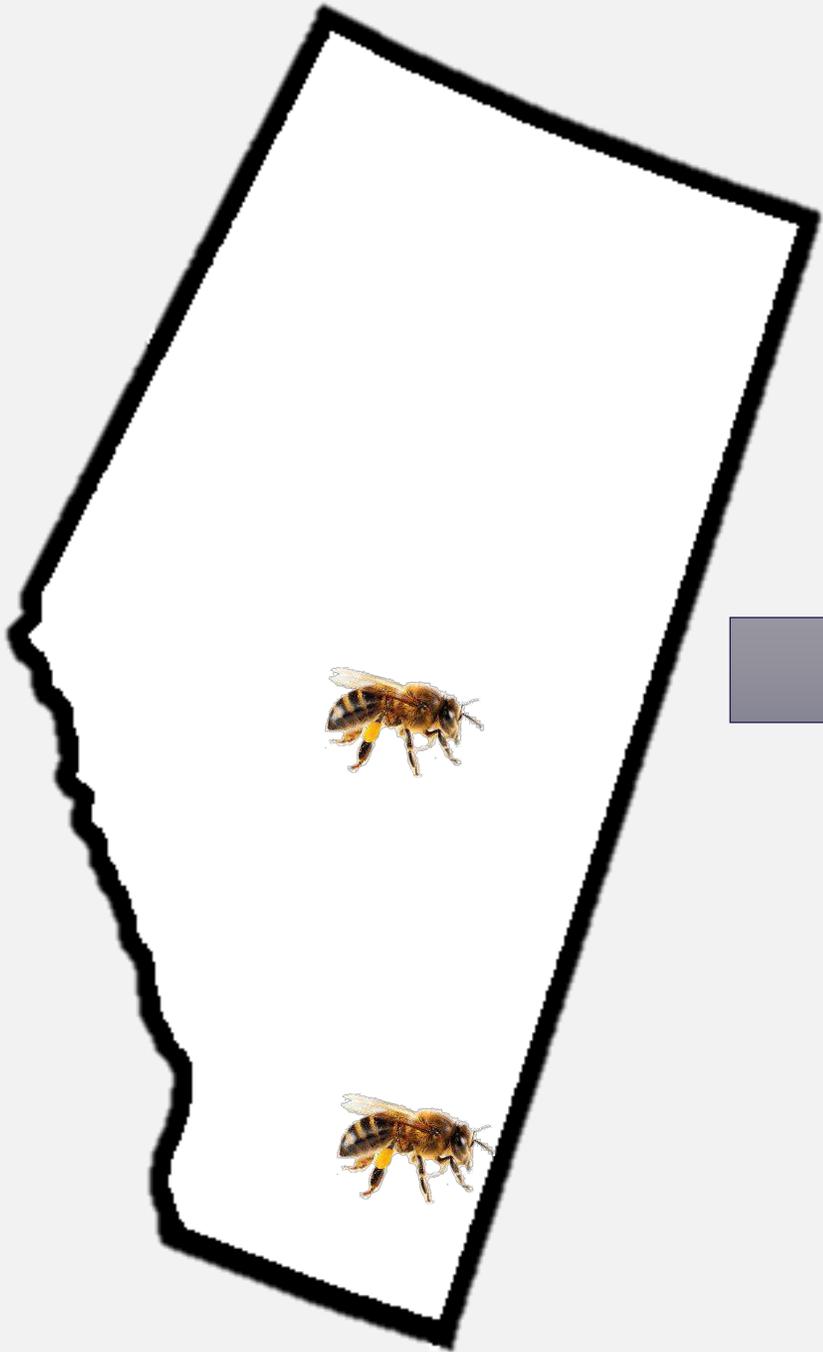
## South

Apiary 1

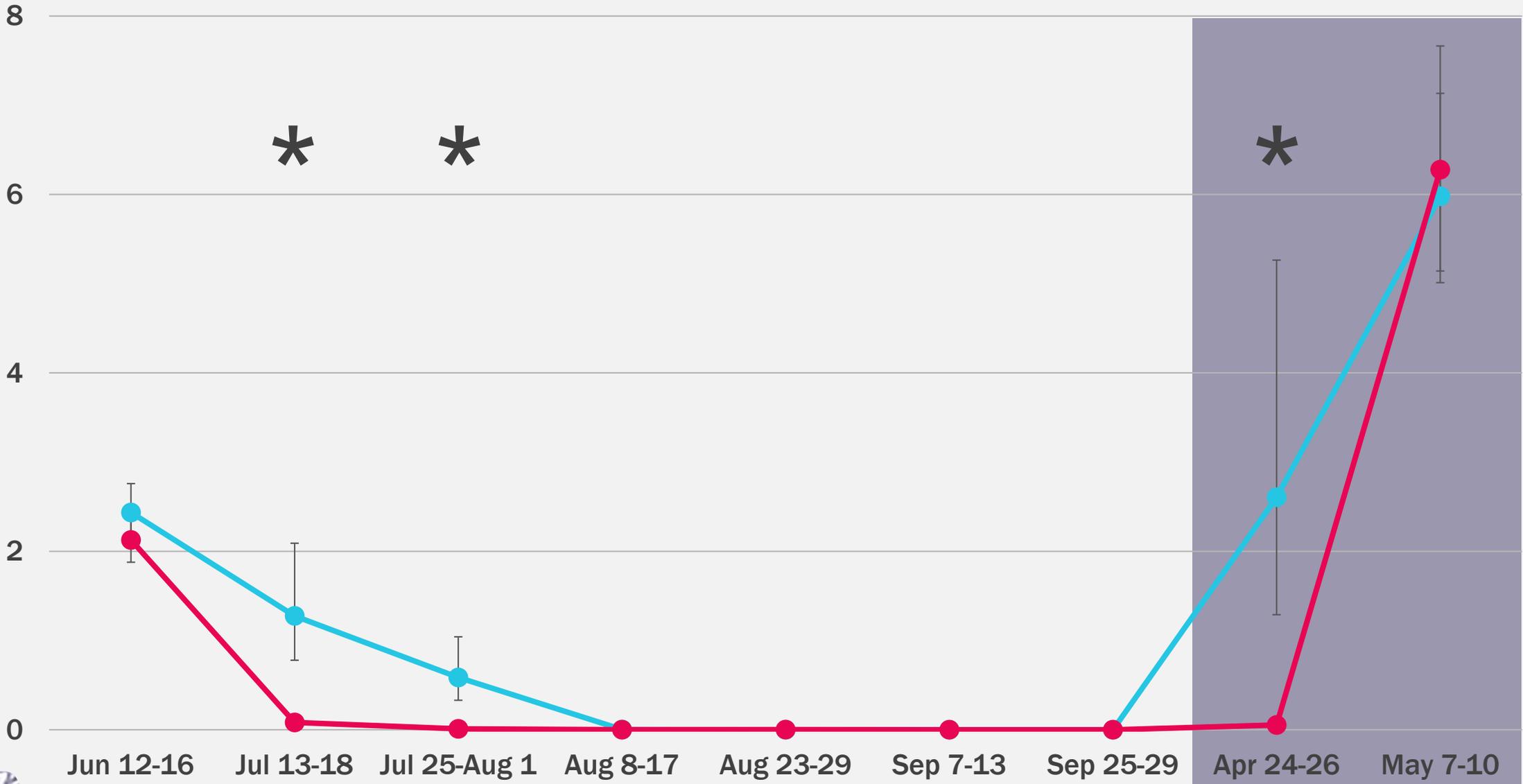


Apiary 2



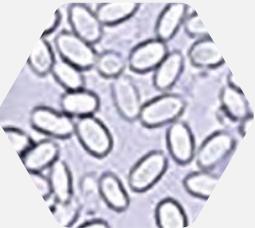


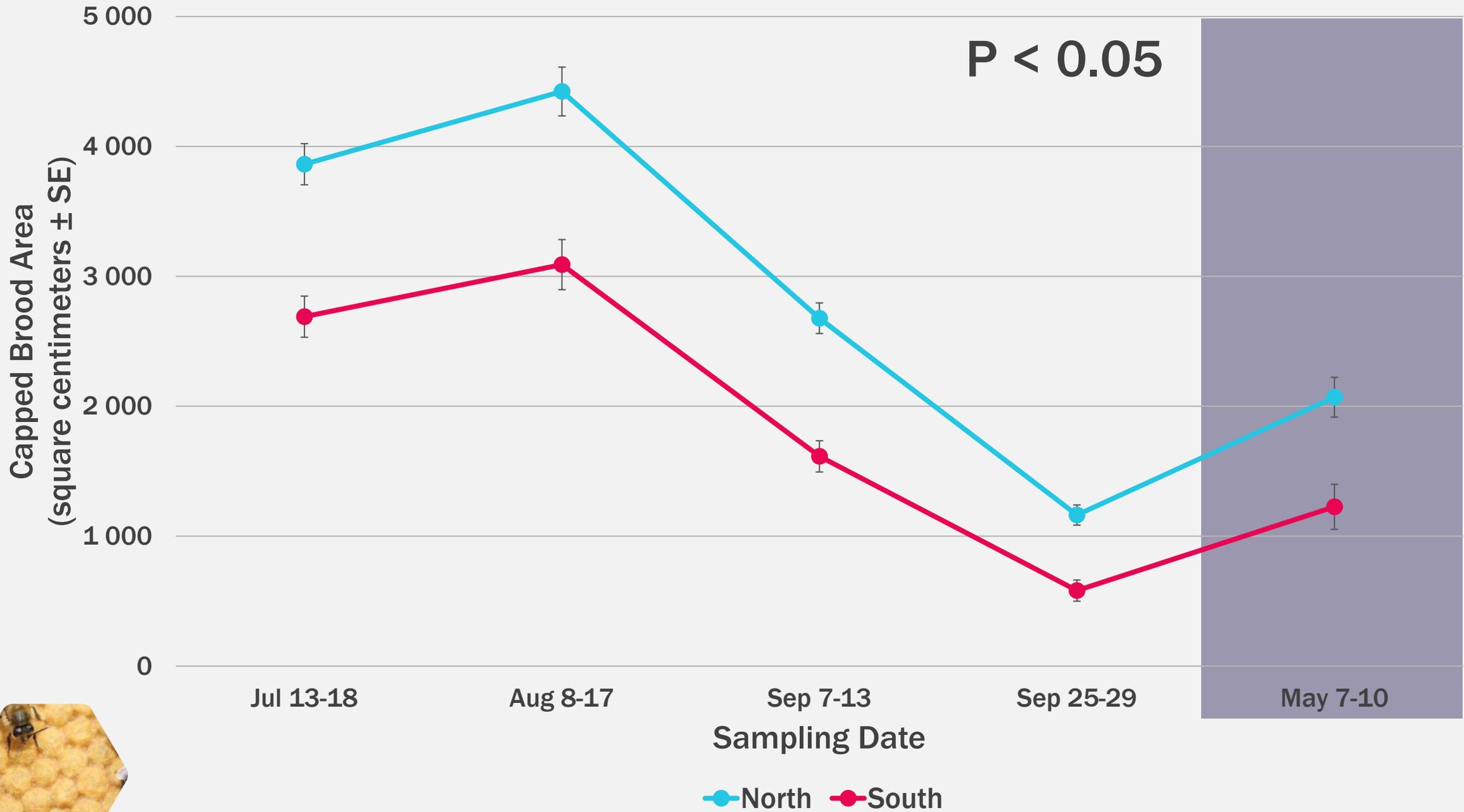
Mean Nosema Abundance  
(million spores per bee  $\pm$  SE)

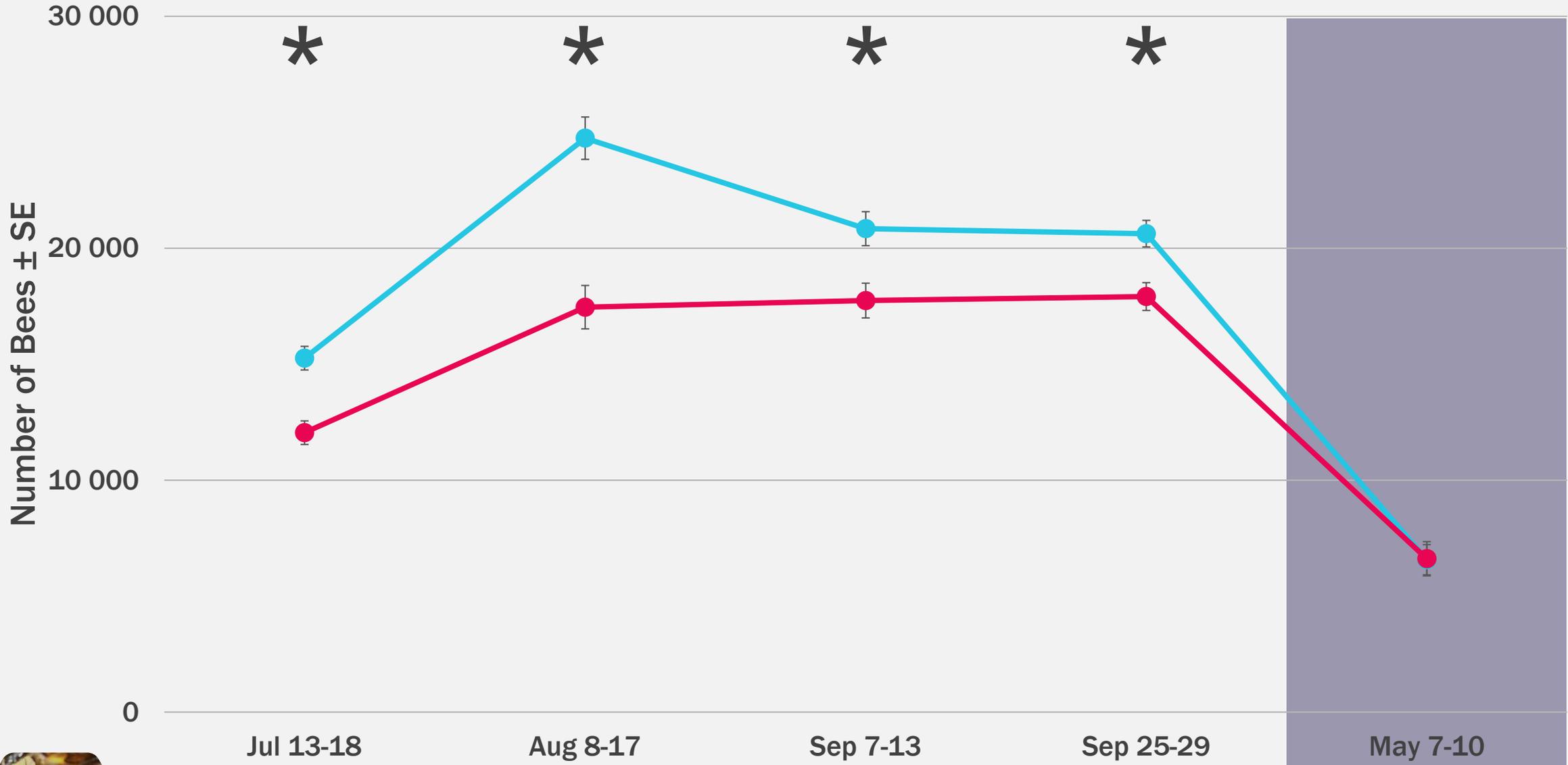


Sampling Date

North South





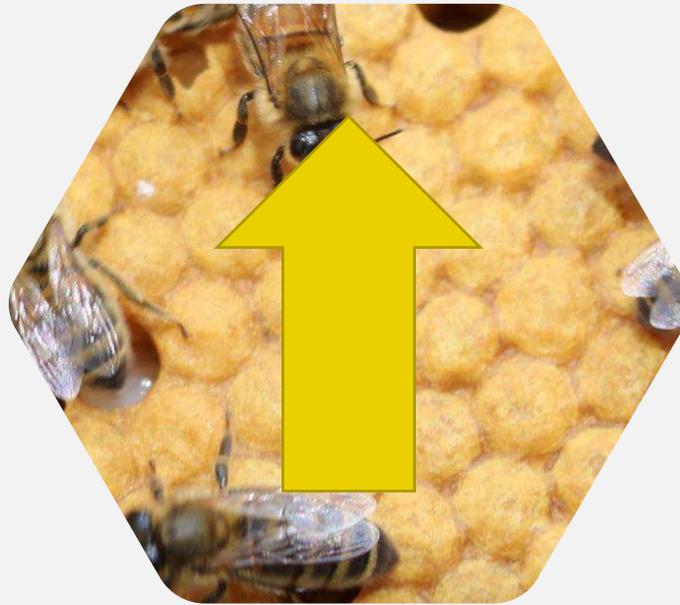
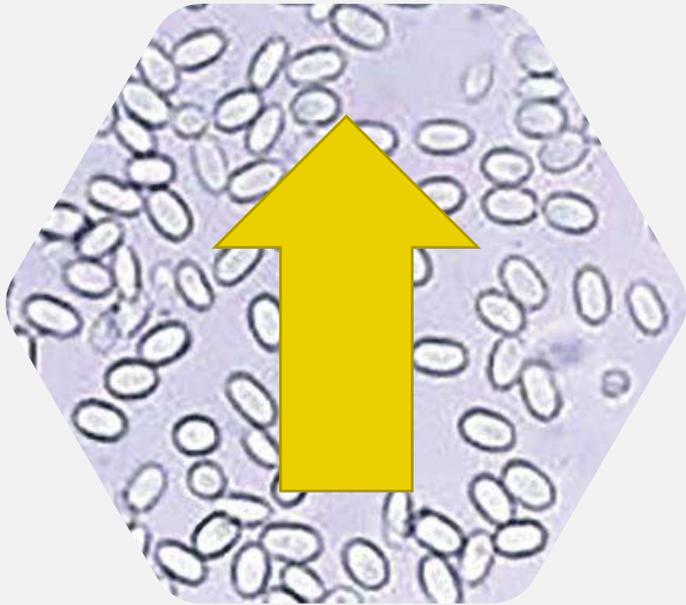


● North ● South



# Location Effects

## *North*



# Spring Treatment Applied (Jun 30-Jul 18)

Mean Nosema Abundance  
(million spores per bee  $\pm$  SE)

3  
2  
1  
0

Treated

NOT Treated

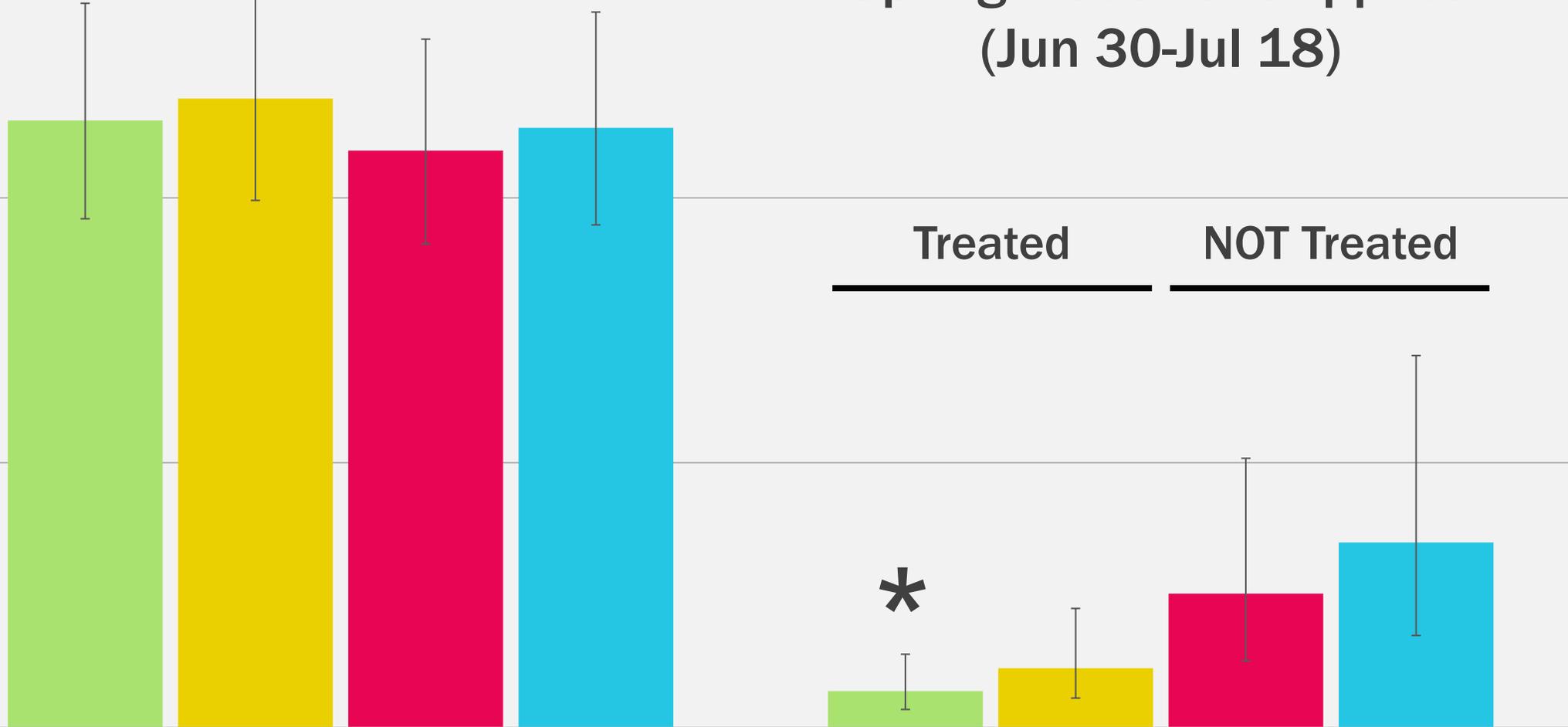
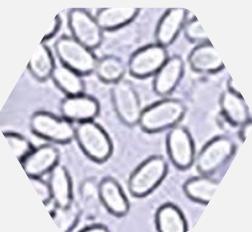
\*

Jun 12-16

Jul 13-18

Sampling Date

Spring Spring-Fall Fall Control



# Fall Treatment Applied (Sep 6 & 8)

Mean Nosema Abundance  
(spores per bee  $\pm$  SE)

200

100

0

Sep 7-13

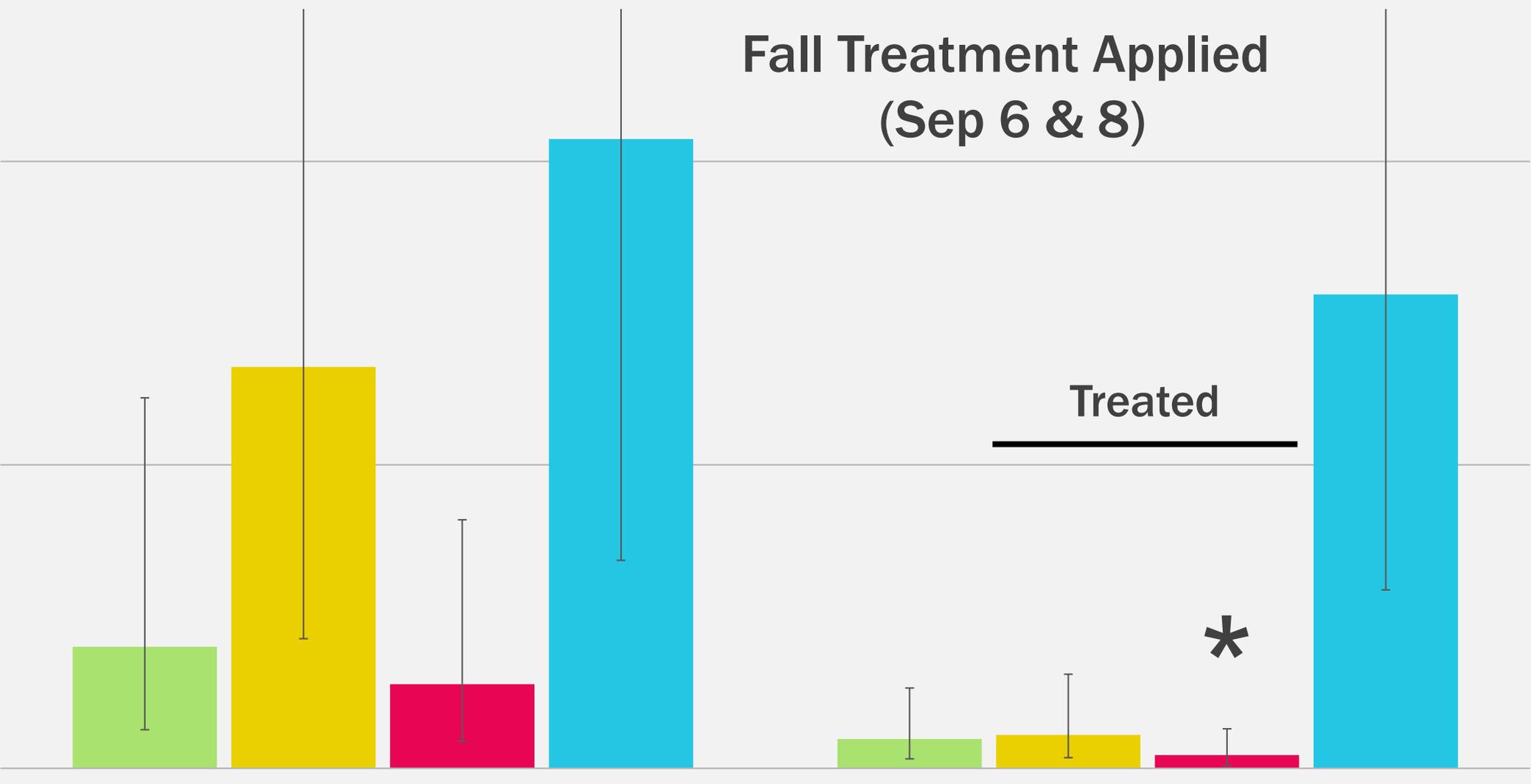
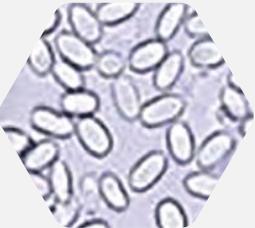
Sep 25-29

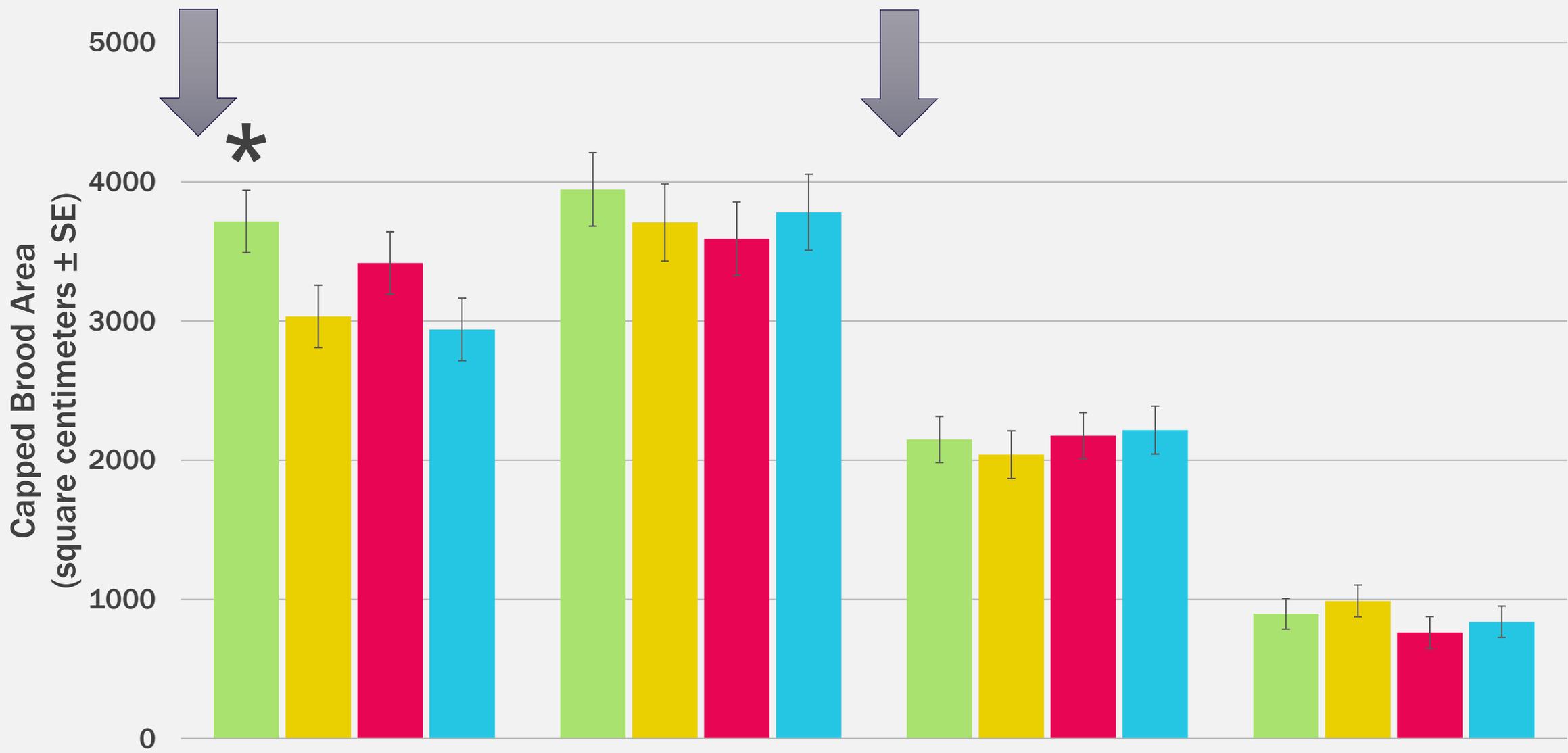
Sampling Date

Treated

\*

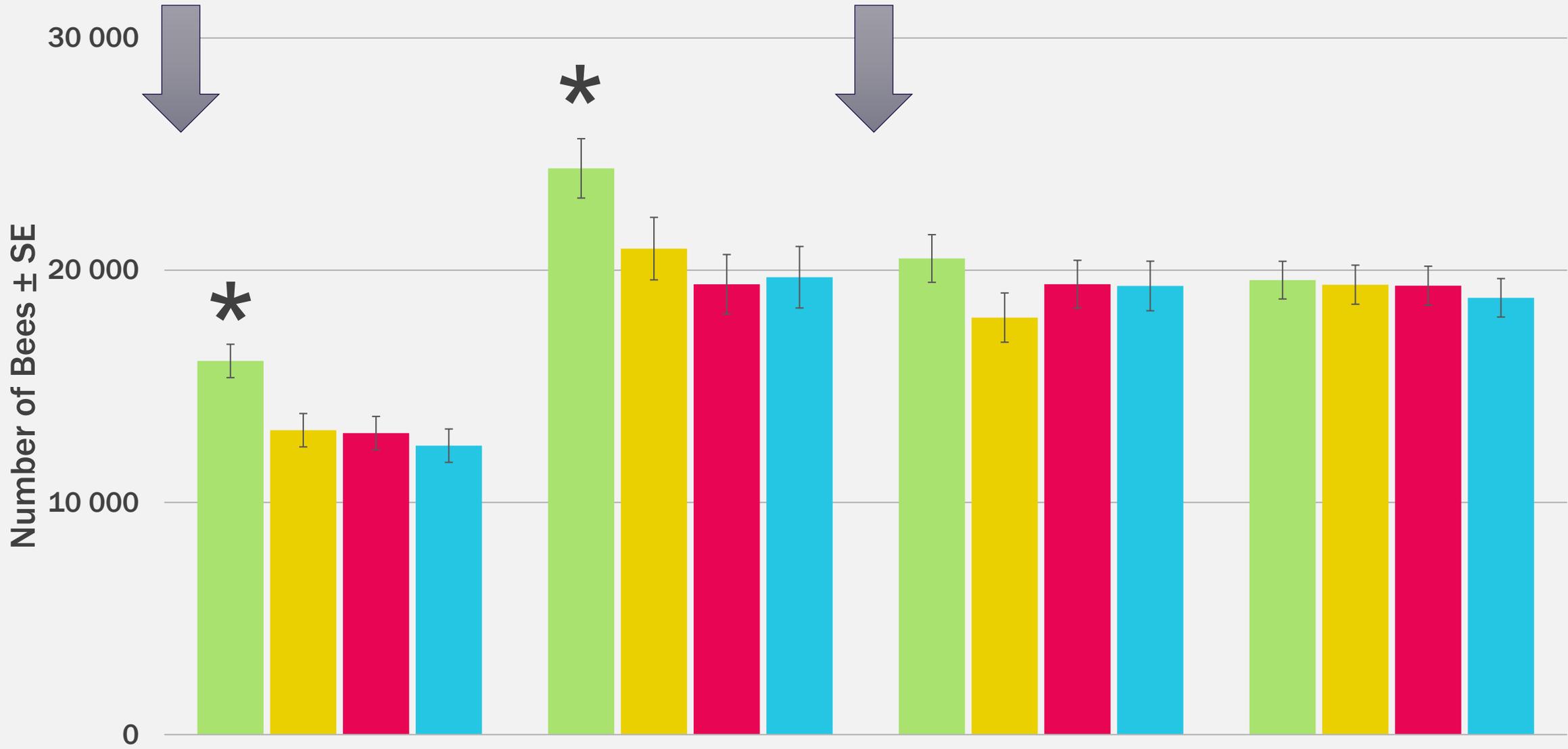
Spring Spring-Fall Fall Control





Spring Spring-Fall Fall Control





Jul 13-18

Aug 8-17

Sep 7-13

Sep 25-29

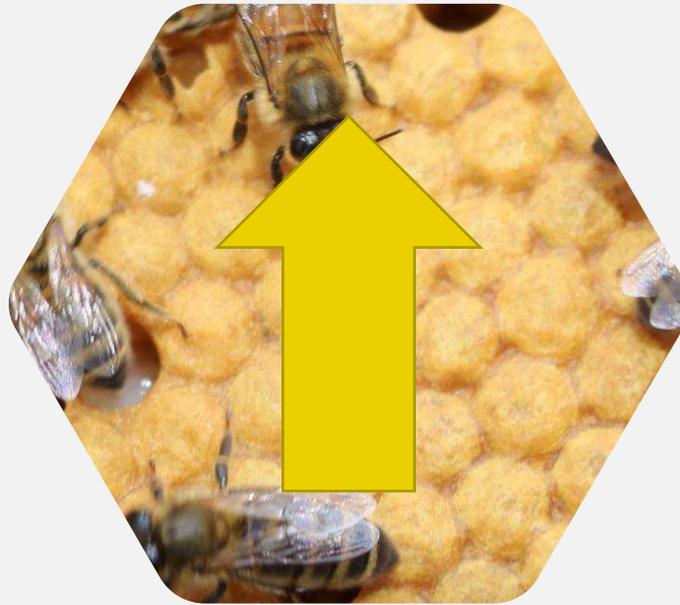
Sampling Date

Spring Spring-Fall Fall Control



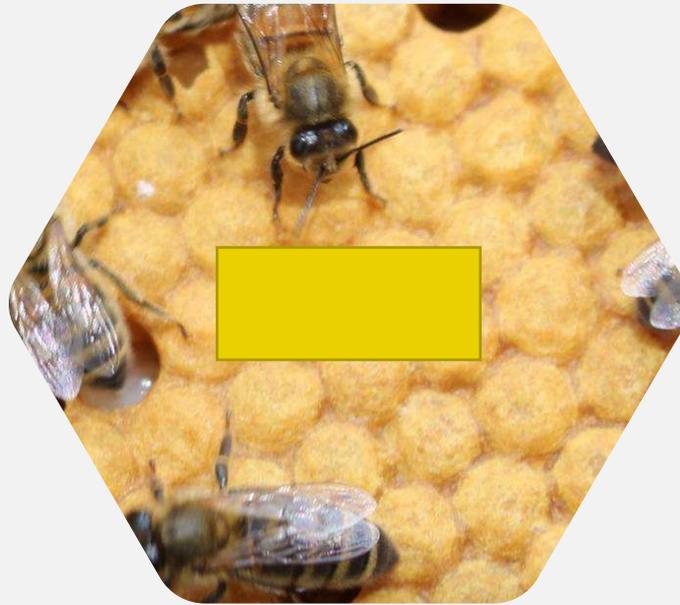
# Treatment Effects

## *Spring*

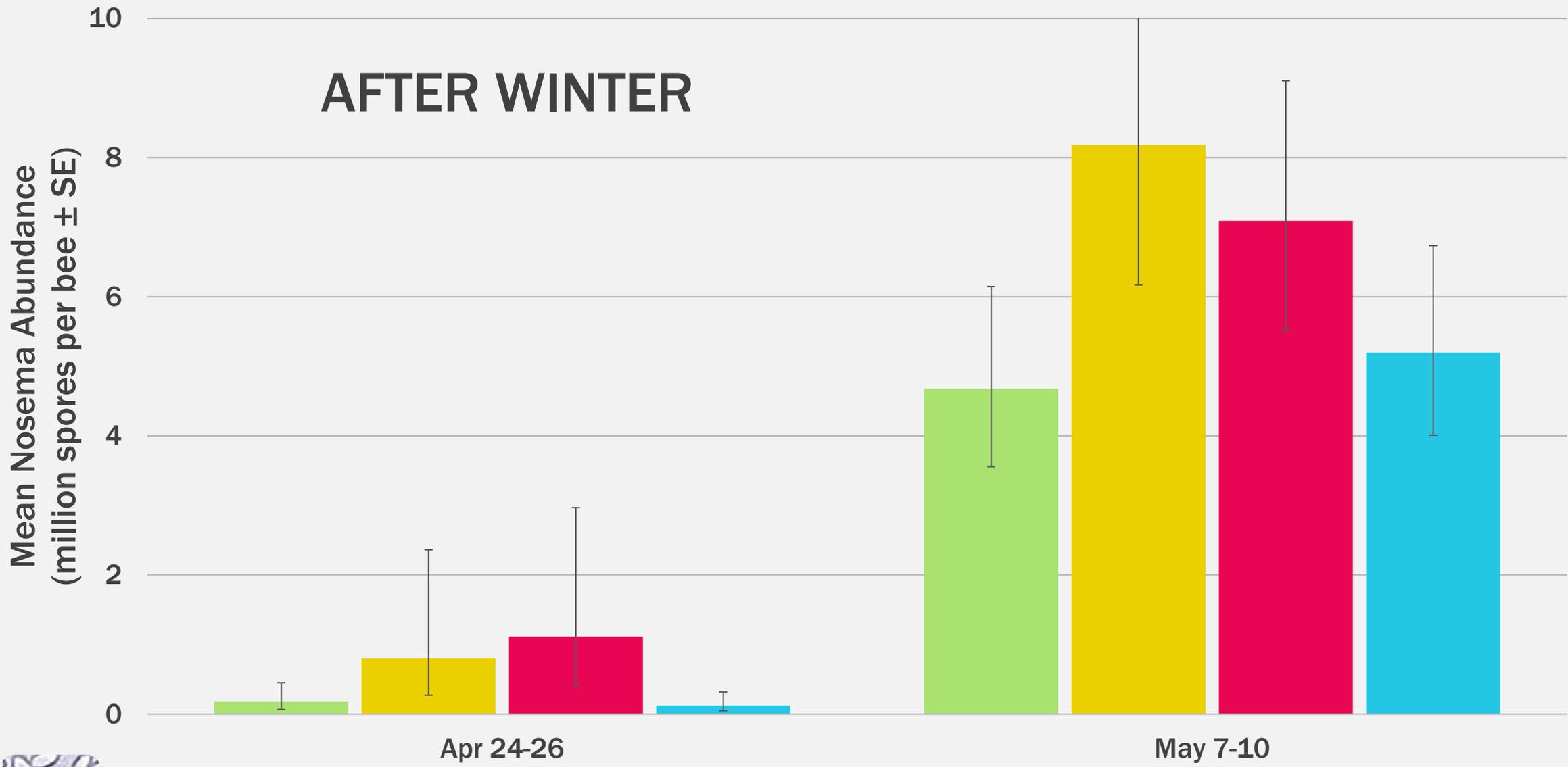


# Treatment Effects

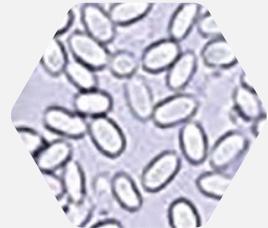
## *Fall*

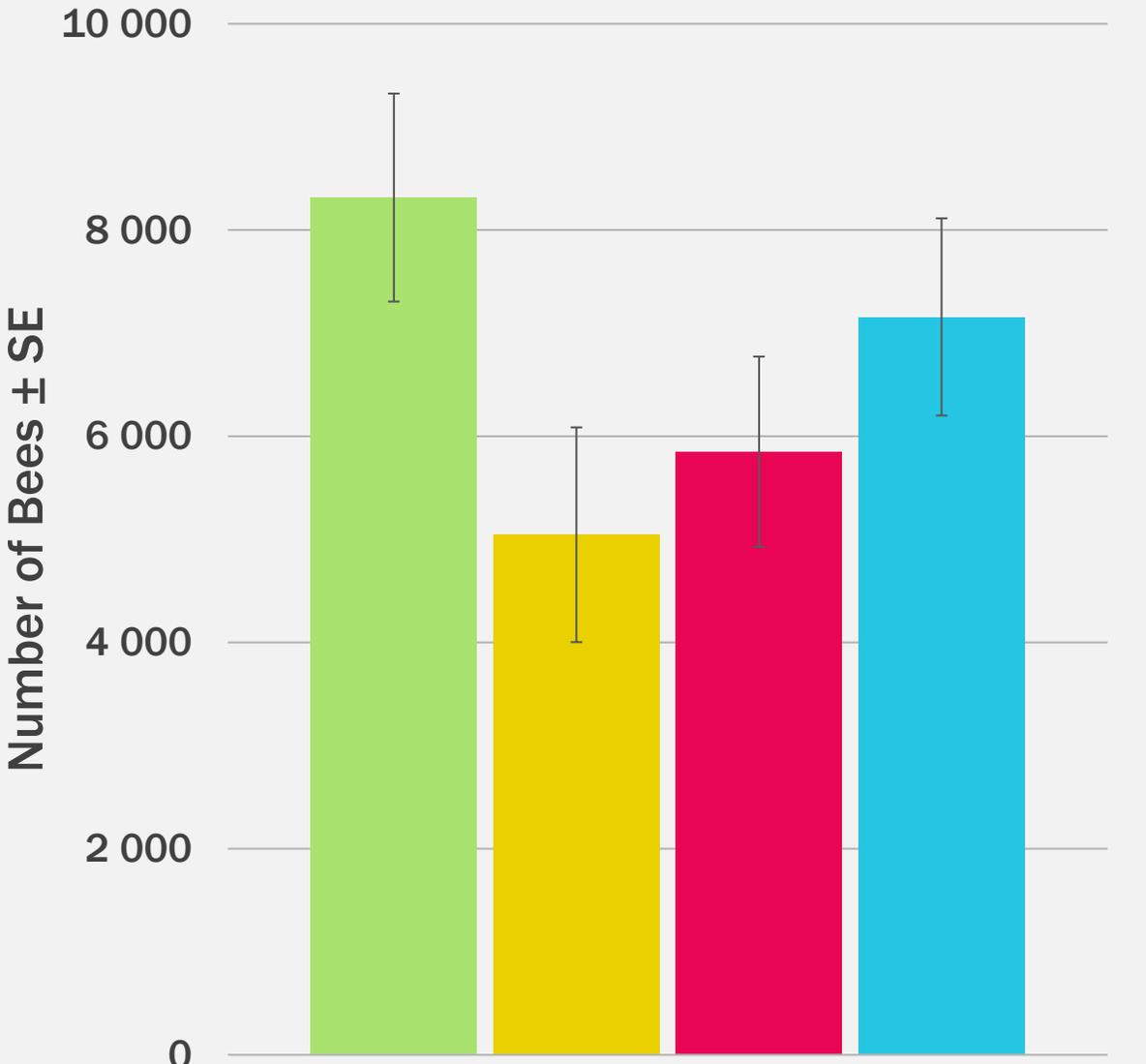
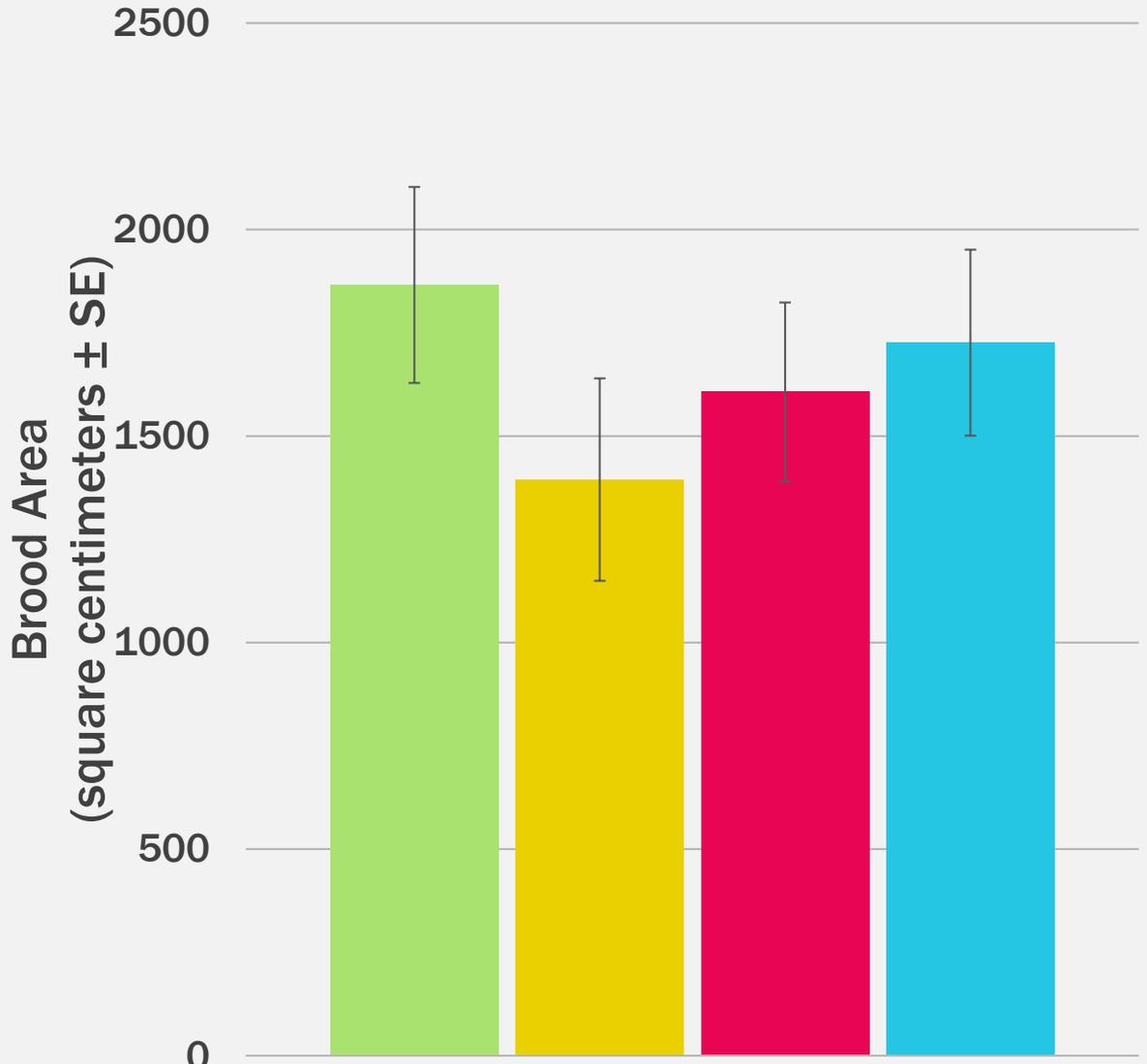


# AFTER WINTER



Spring Spring-Fall Fall Control



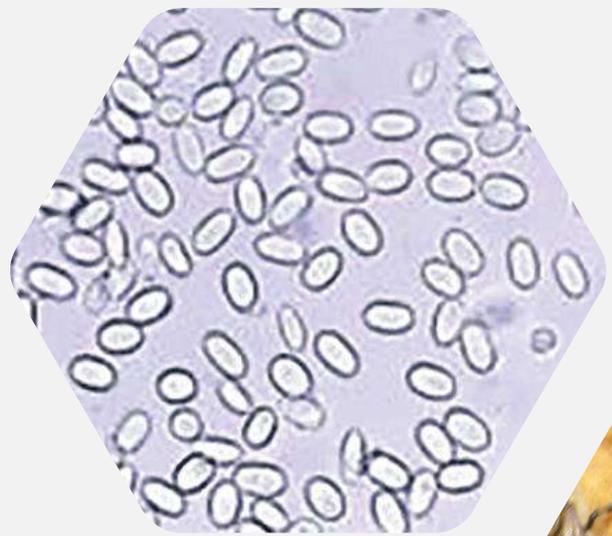
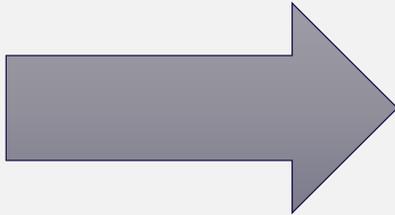


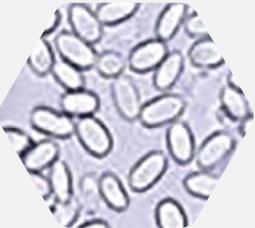
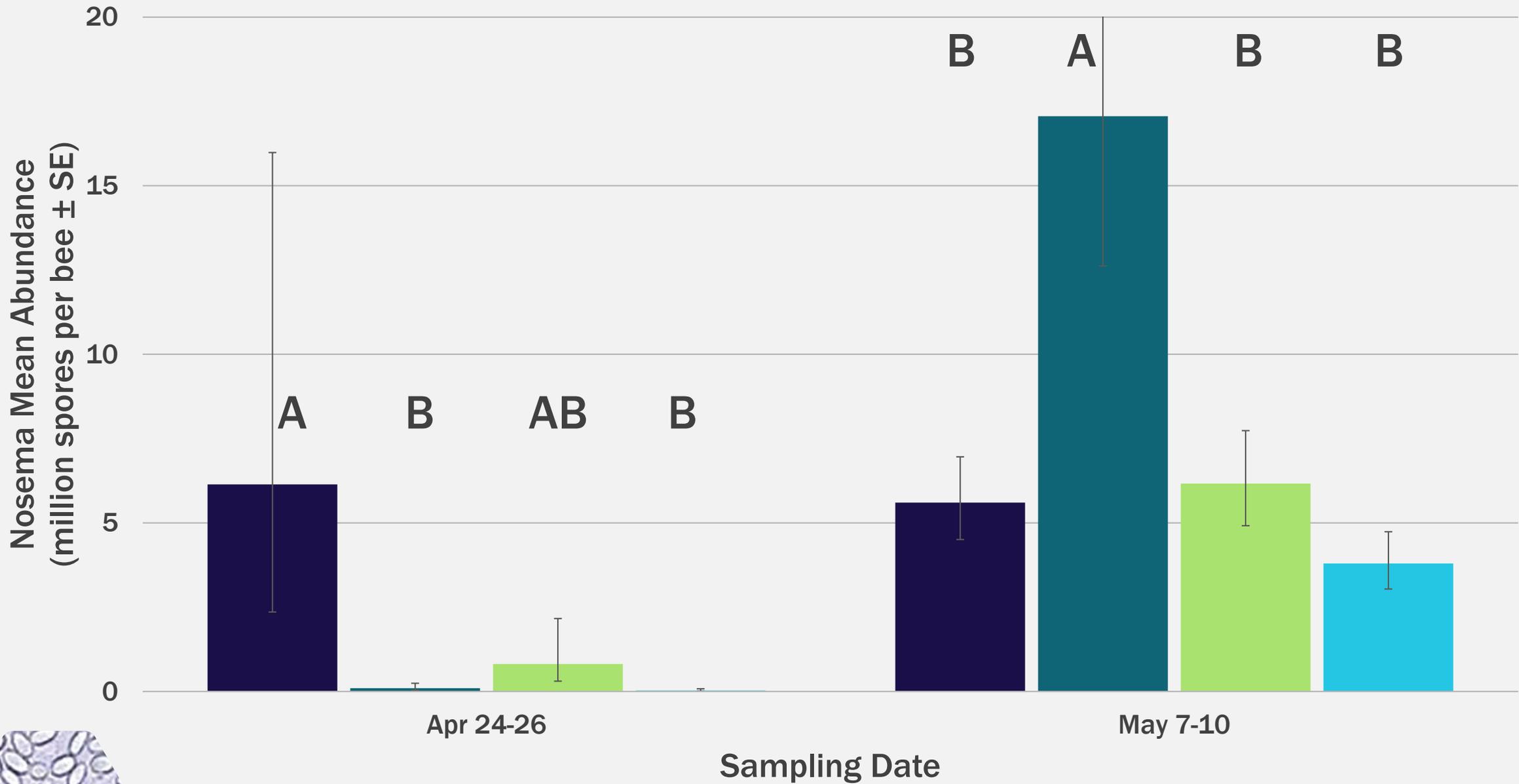
May 7-10

May 7-10

Spring Spring-Fall Fall Control

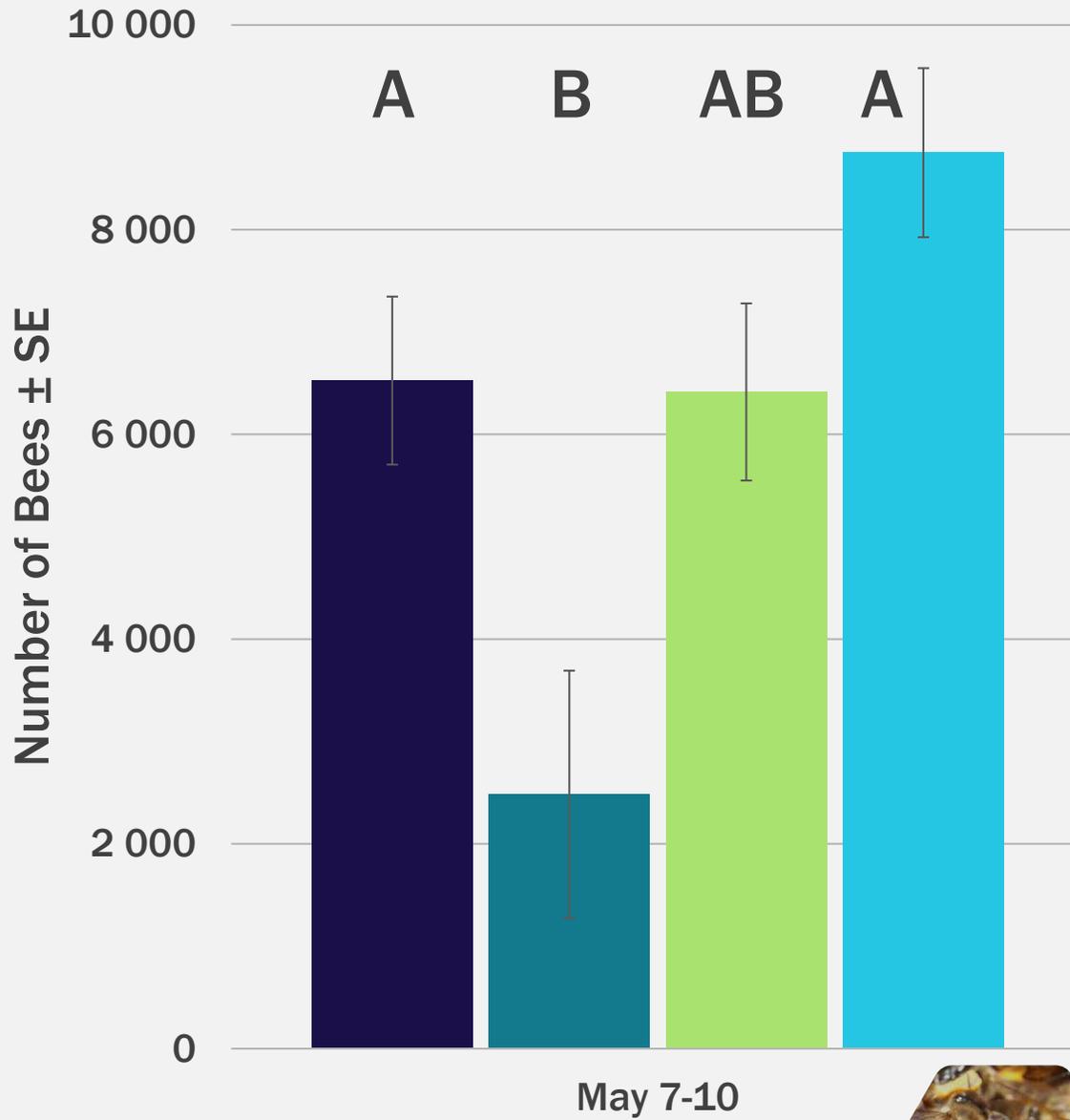
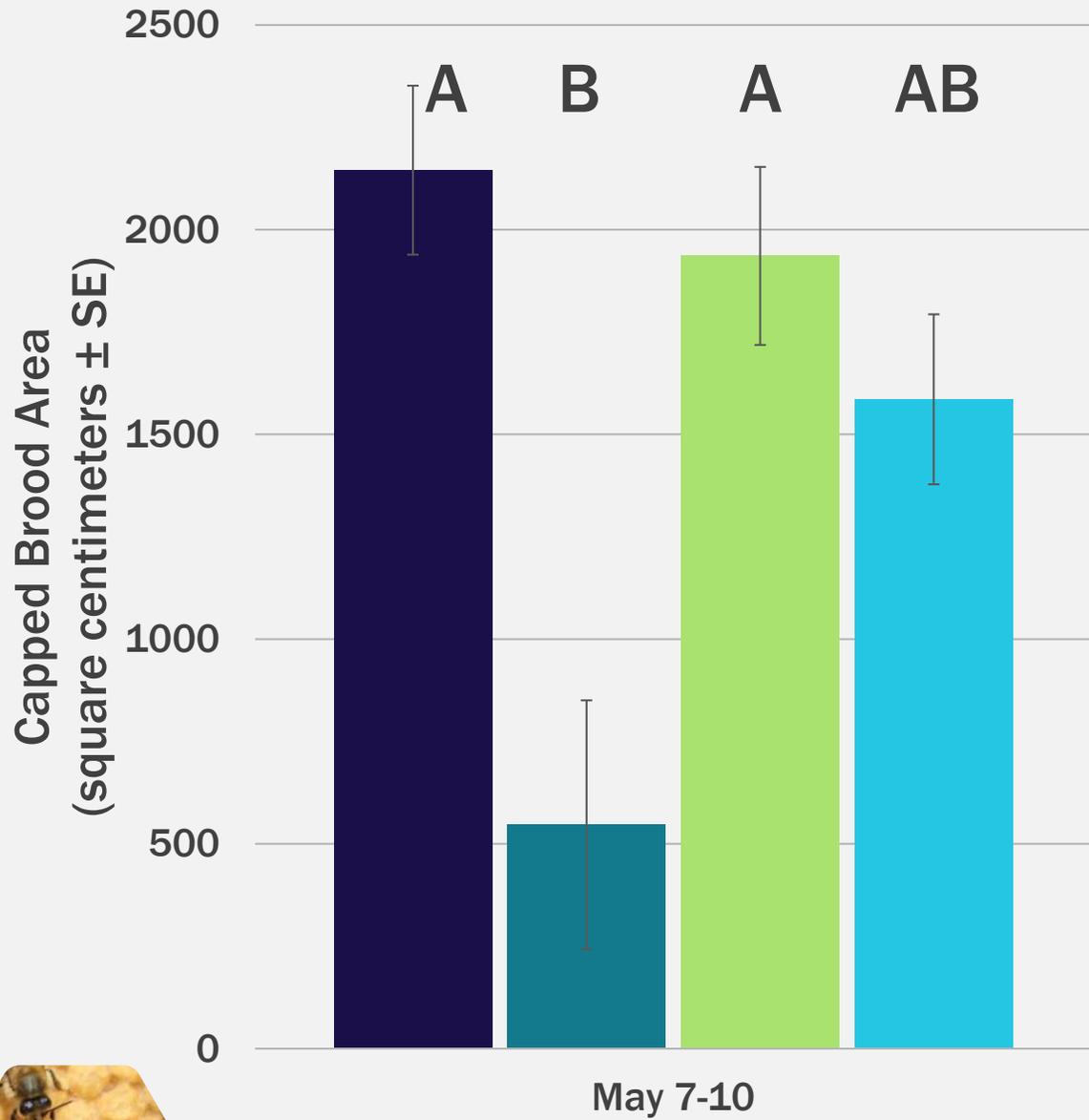






North Outdoor
  South Outdoor
  North Indoor
  South Indoor



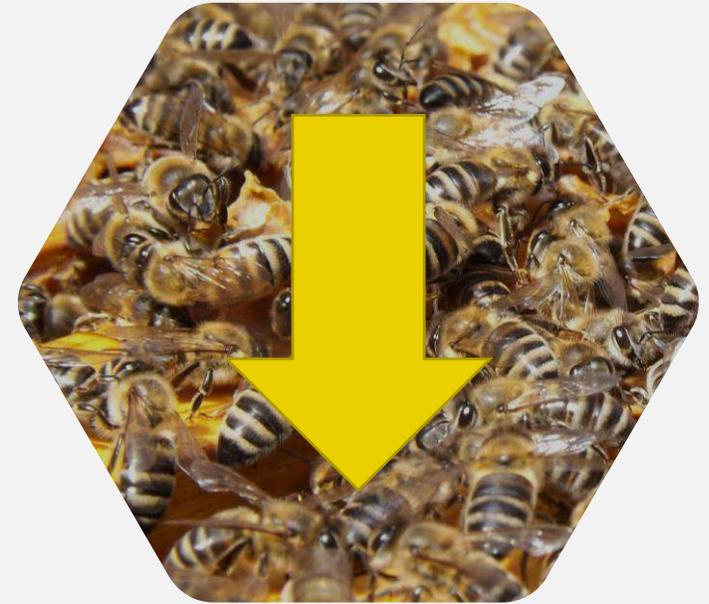
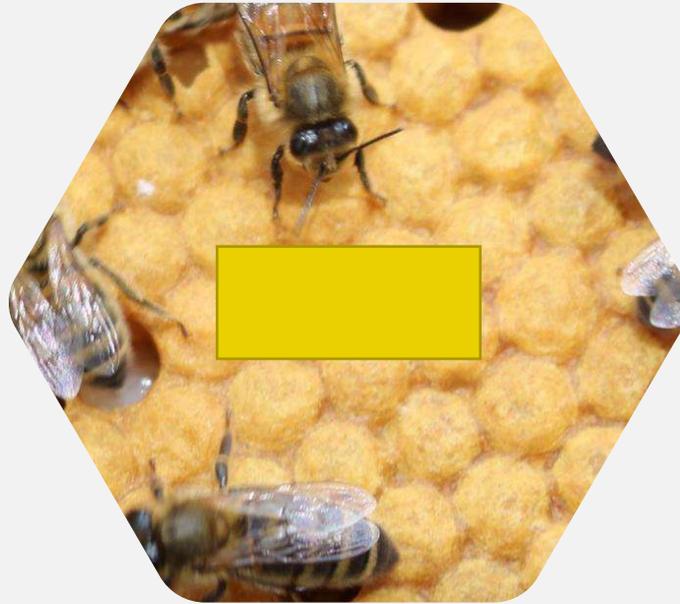
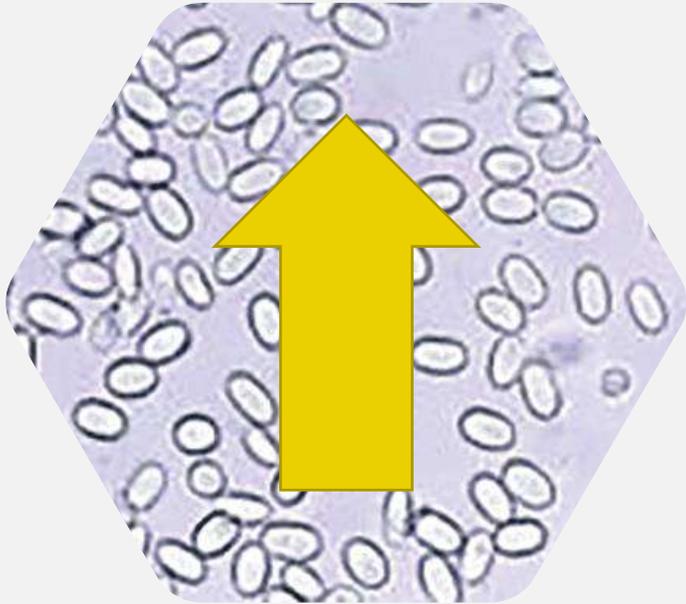


North Outdoor
  South Outdoor
  North Indoor
  South Indoor

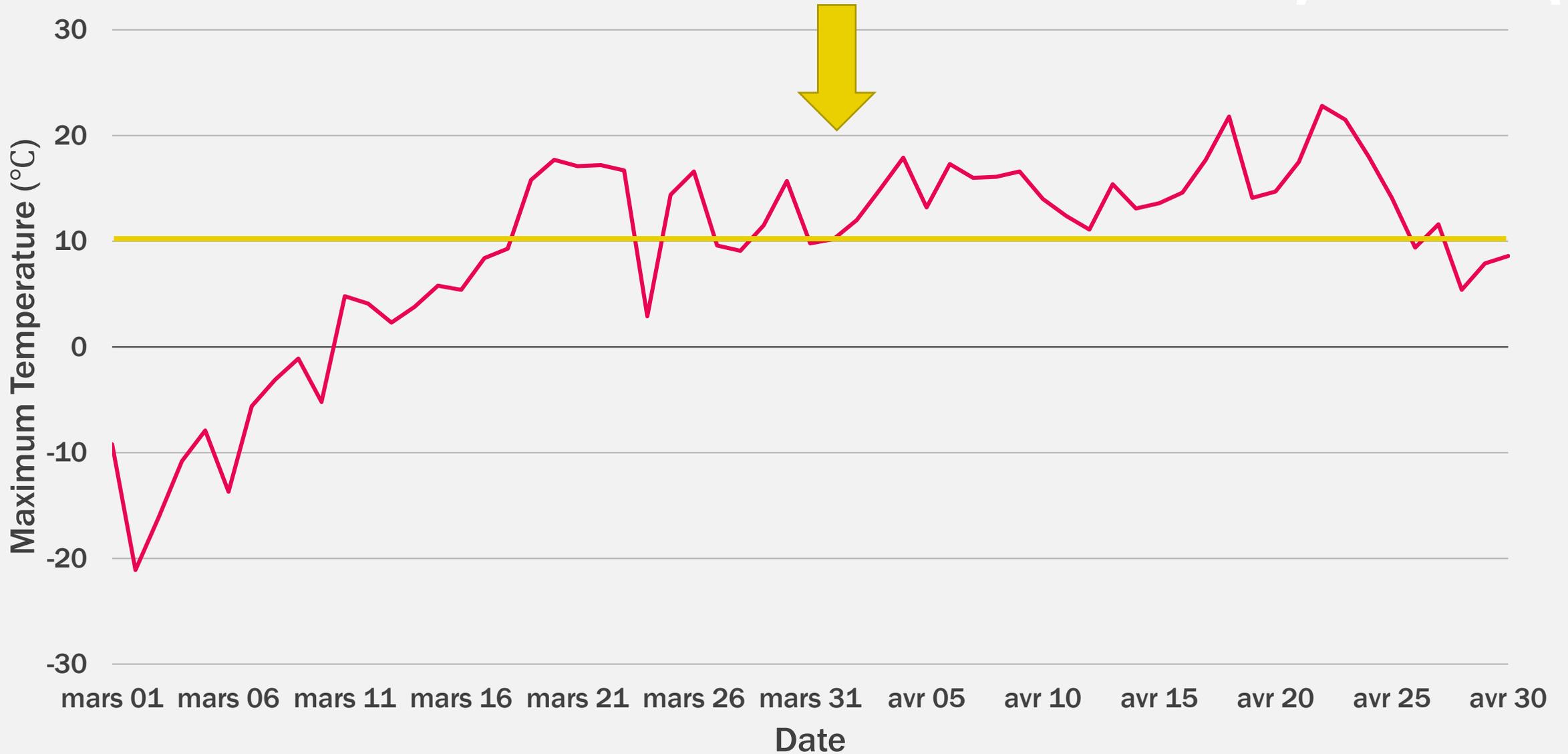
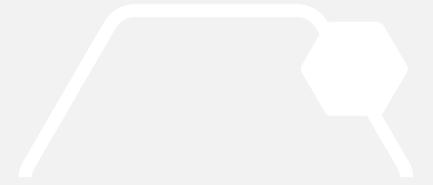


# South Location Effects

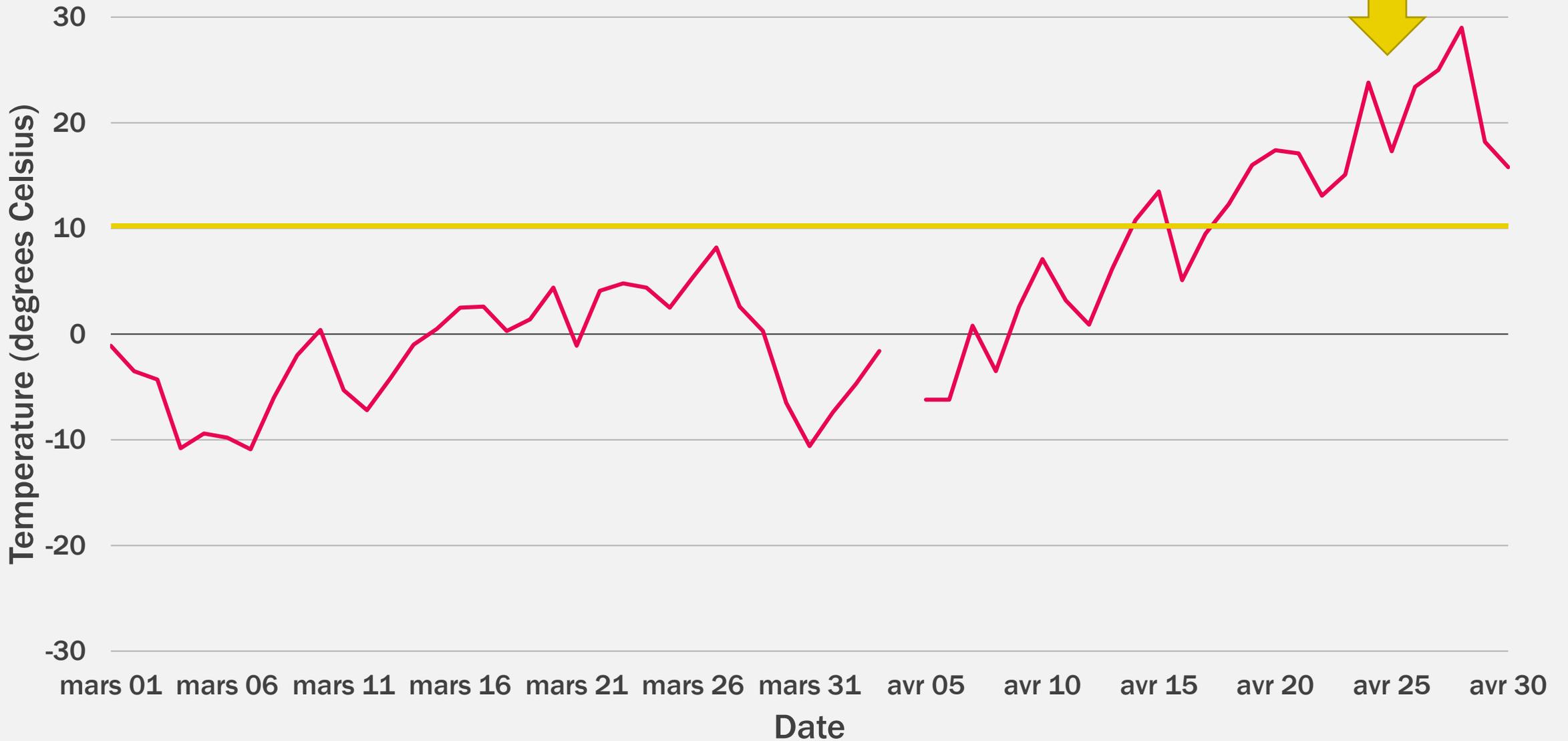
## *Outdoor*



# Brooks - Spring 2019



# Brooks - Spring 2018

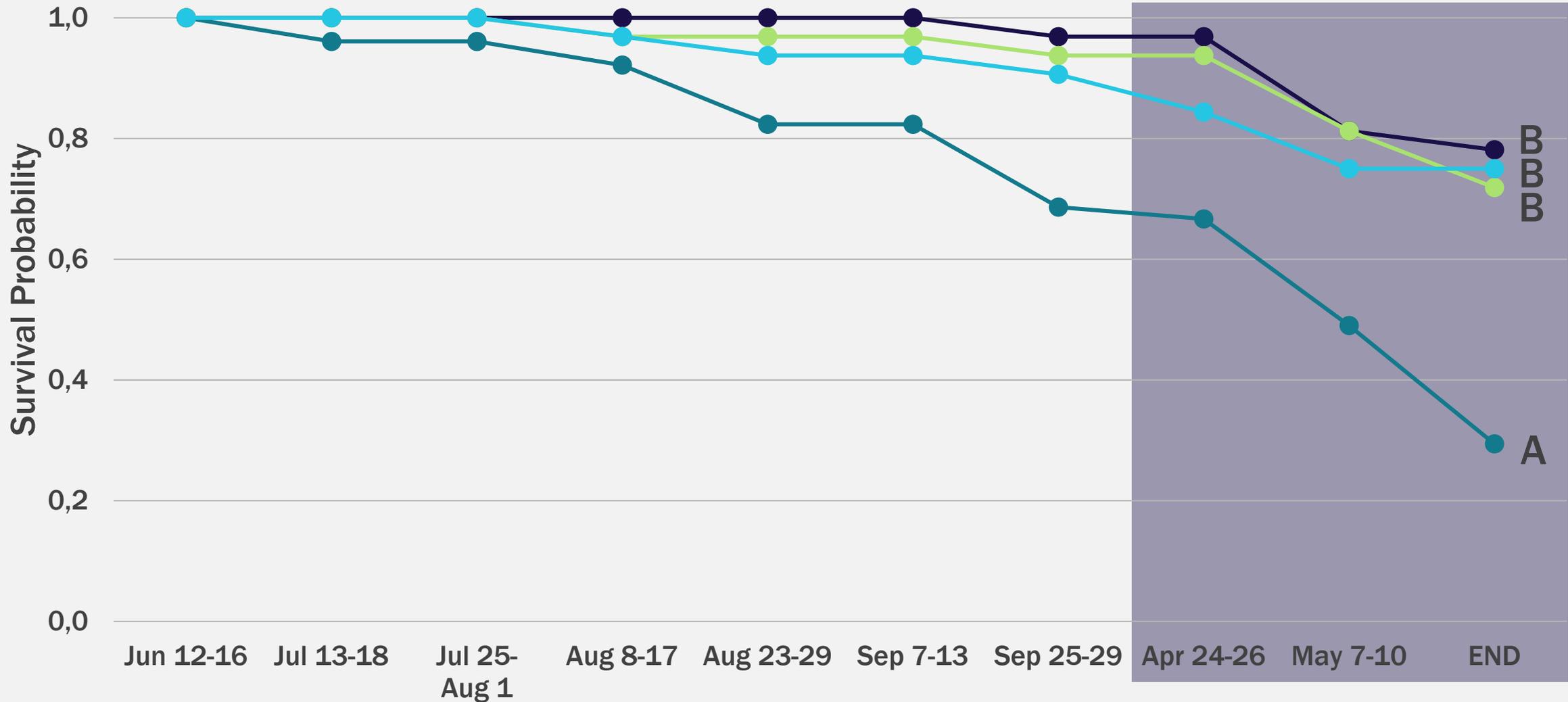




SA31 SA34

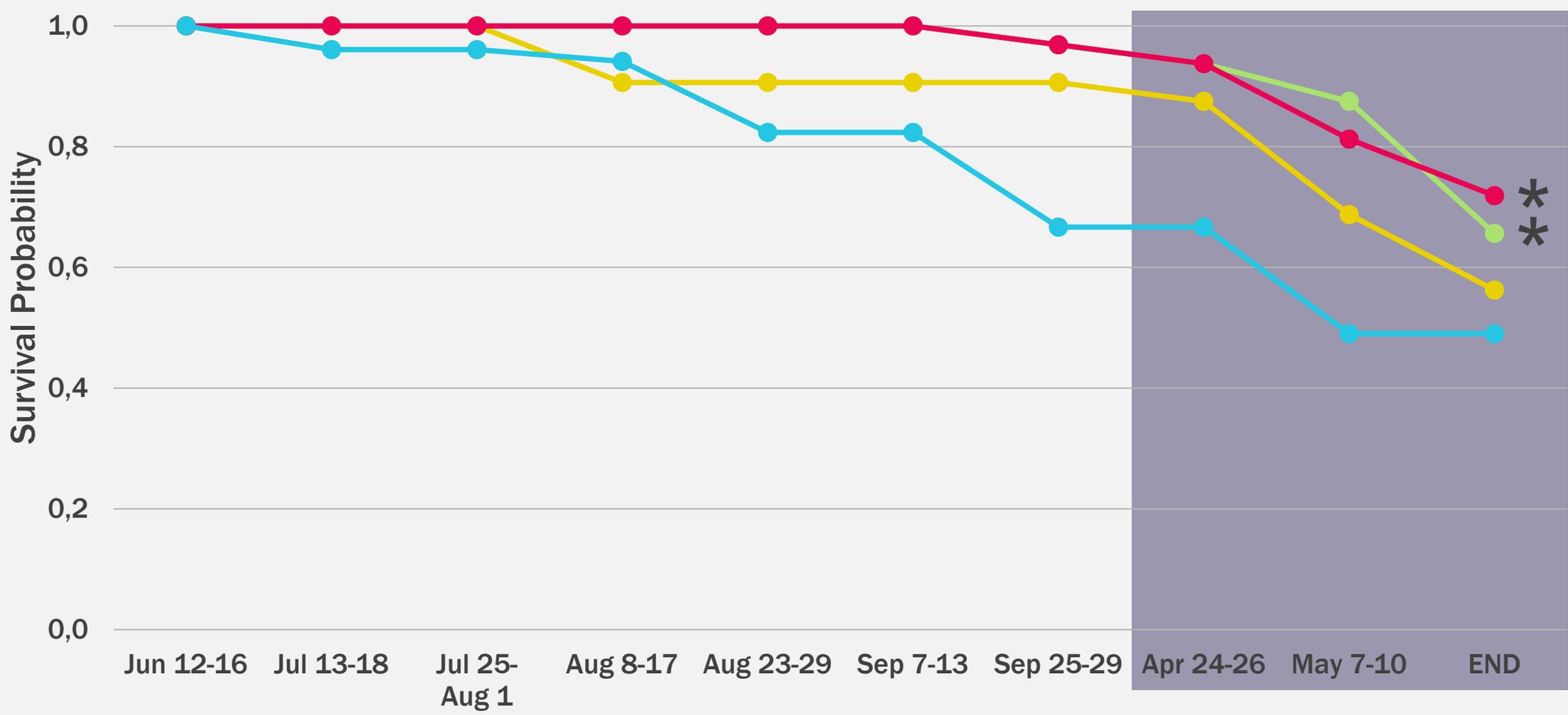
SA33 SA38





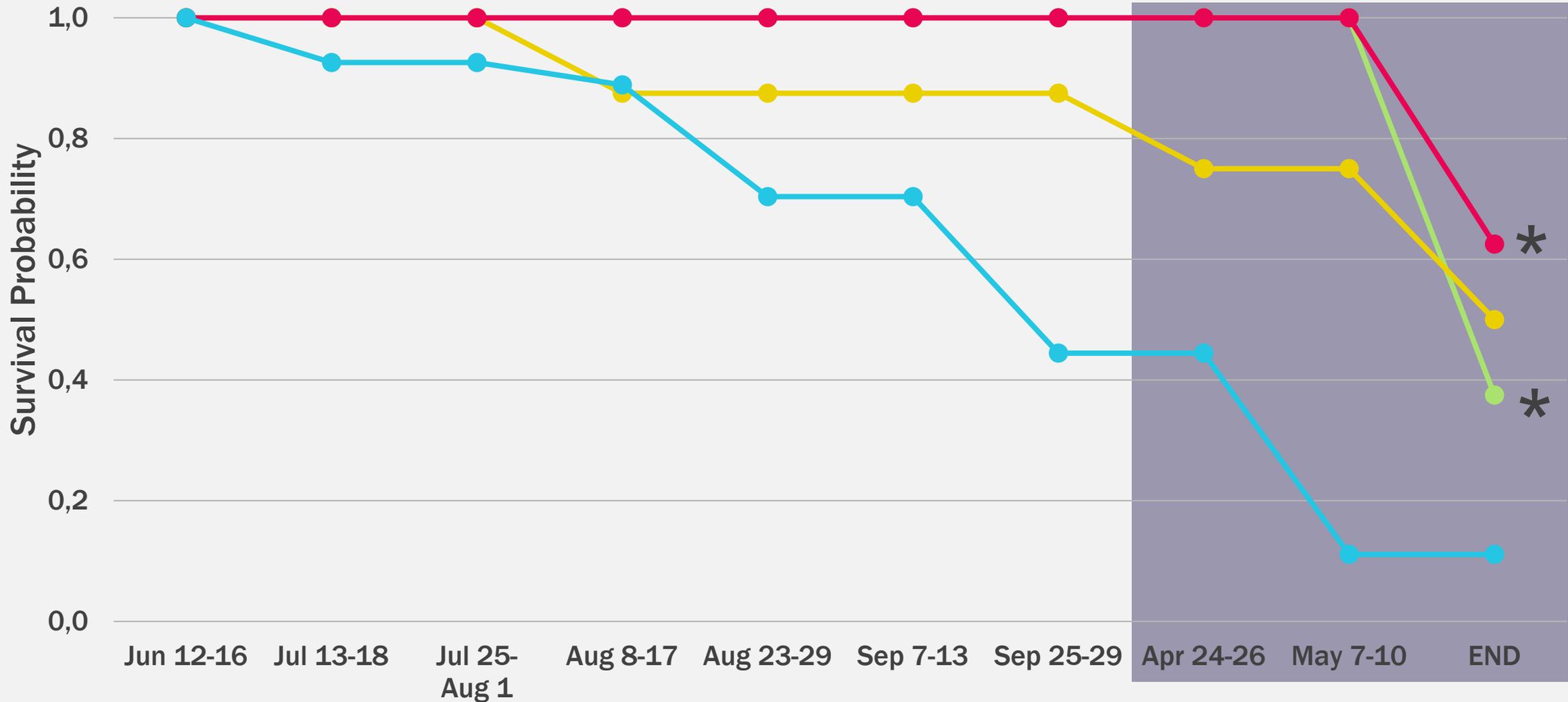
● North Outdoor   
 ● South Outdoor   
 ● North Indoor   
 ● South Indoor





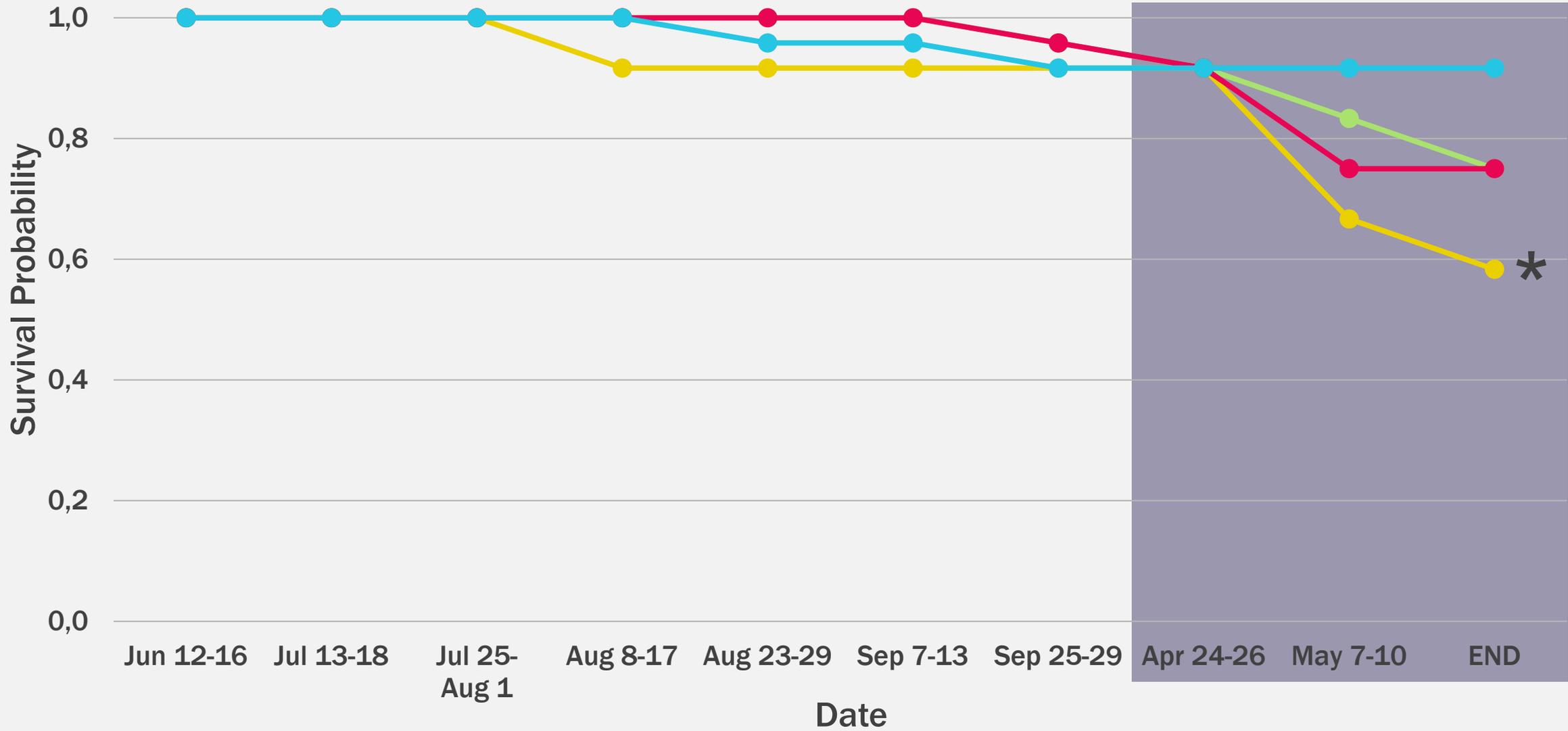
Spring Spring-Fall Fall Control





● Spring 
 ● Spring-Fall 
 ● Fall 
 ● Control





● Spring  
 ● Spring-Fall  
 ● Fall  
 ● Control



# Summary

- Spring- decrease nosema, increase colony strength
- Fall- decrease nosema, low spore load
- Treatment did not affect nosema levels following winter
- South Outdoor colonies suffered from long winter
- Survival varies





Alberta  
Beekeepers  
Commission



**Canadian  
Honey  
Council**



**Supervisors: Dr. Rob Currie &  
Dr. Shelley Hoover**

**Dr. Medhat Nasr**

**Committee: Dr. Jason Gibbs &  
Dr. Emma McGeough**

**Beekeepers: Reece Chandler &  
Gerard Sieben**

**Alberta Bee Team: Dr. Rassol  
Bahreini, Cass Docherty, Michelle  
Fraser, Olivia Hares, Jeff Kearns,  
Samantha Muirhead, Emily Olson,  
Lynae Ovinge, Ali Panasiuk, Sian  
Ramsden, Paul Schmermund,  
Karlee Shaw, Glyn Stephens,  
Sarah Waterhouse**

