

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

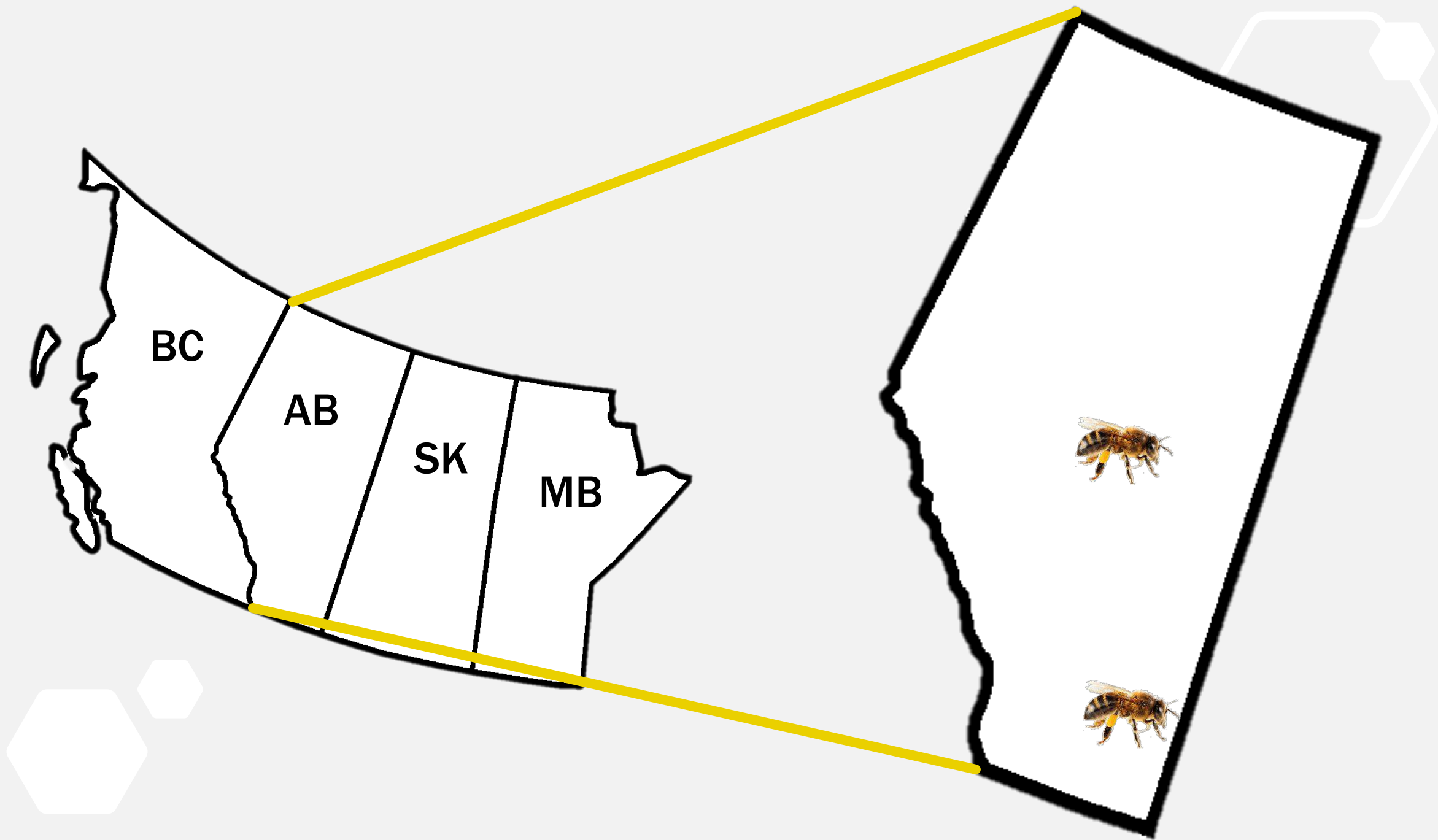
**Winter
Management**

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



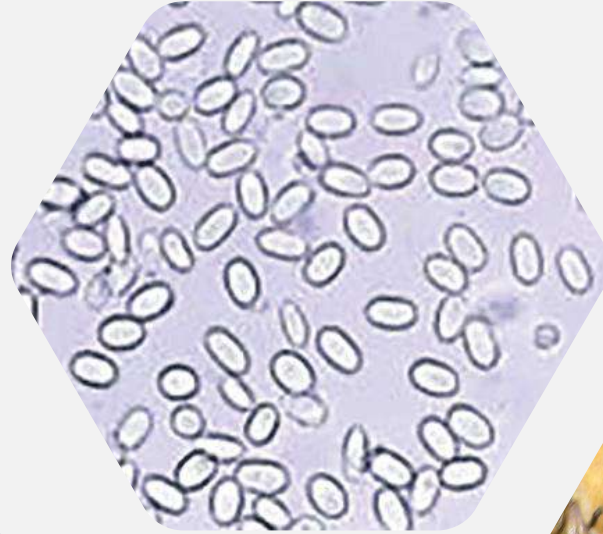
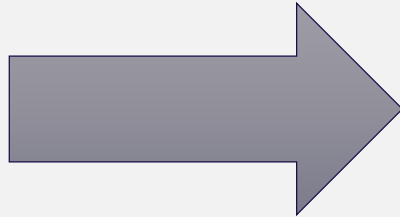
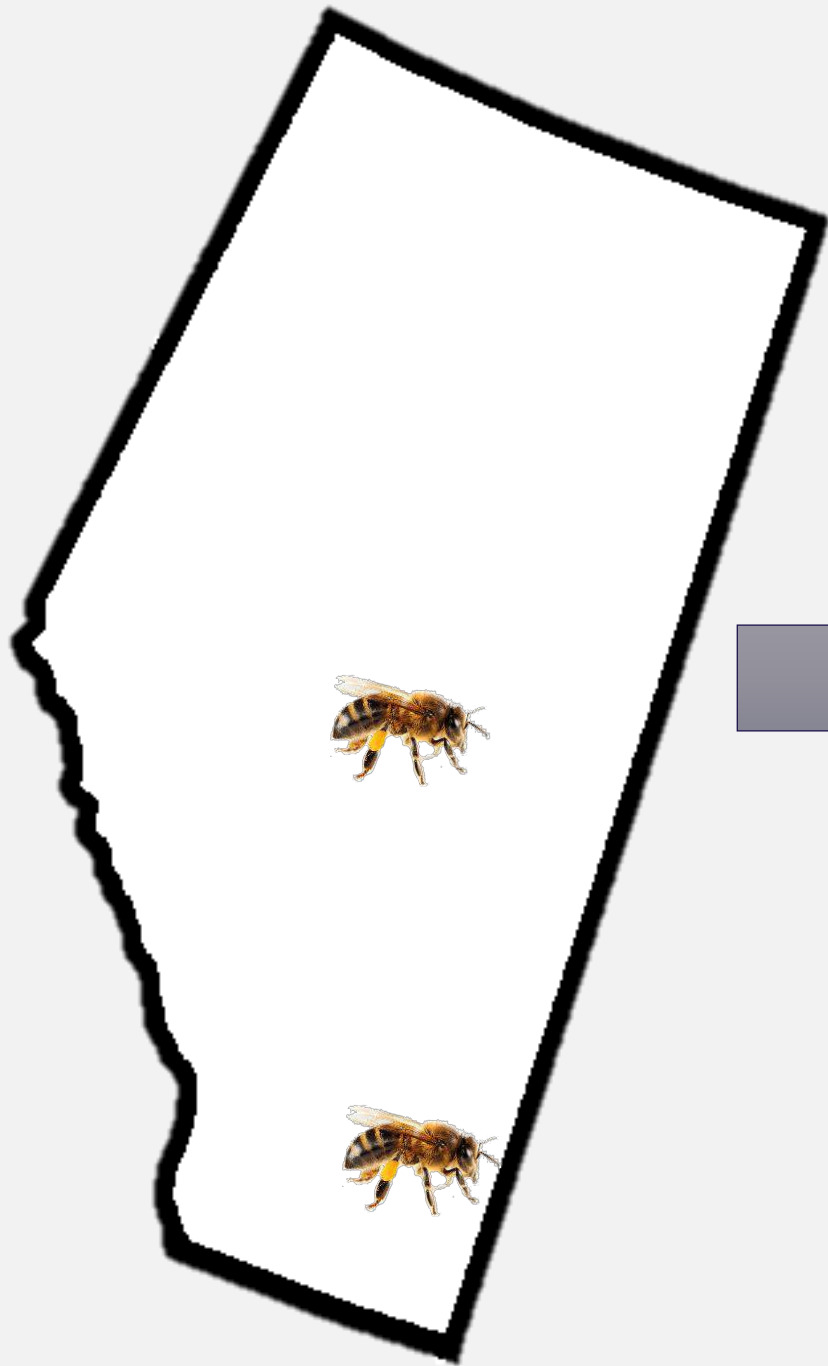
South

Apiary 1



Apiary 2





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

8

6

4

2

0

Jun 12-16

Jul 13-18

Jul 25-Aug 1

Aug 8-17

Aug 23-29

Sep 7-13

Sep 25-29

Apr 24-26

May 7-10

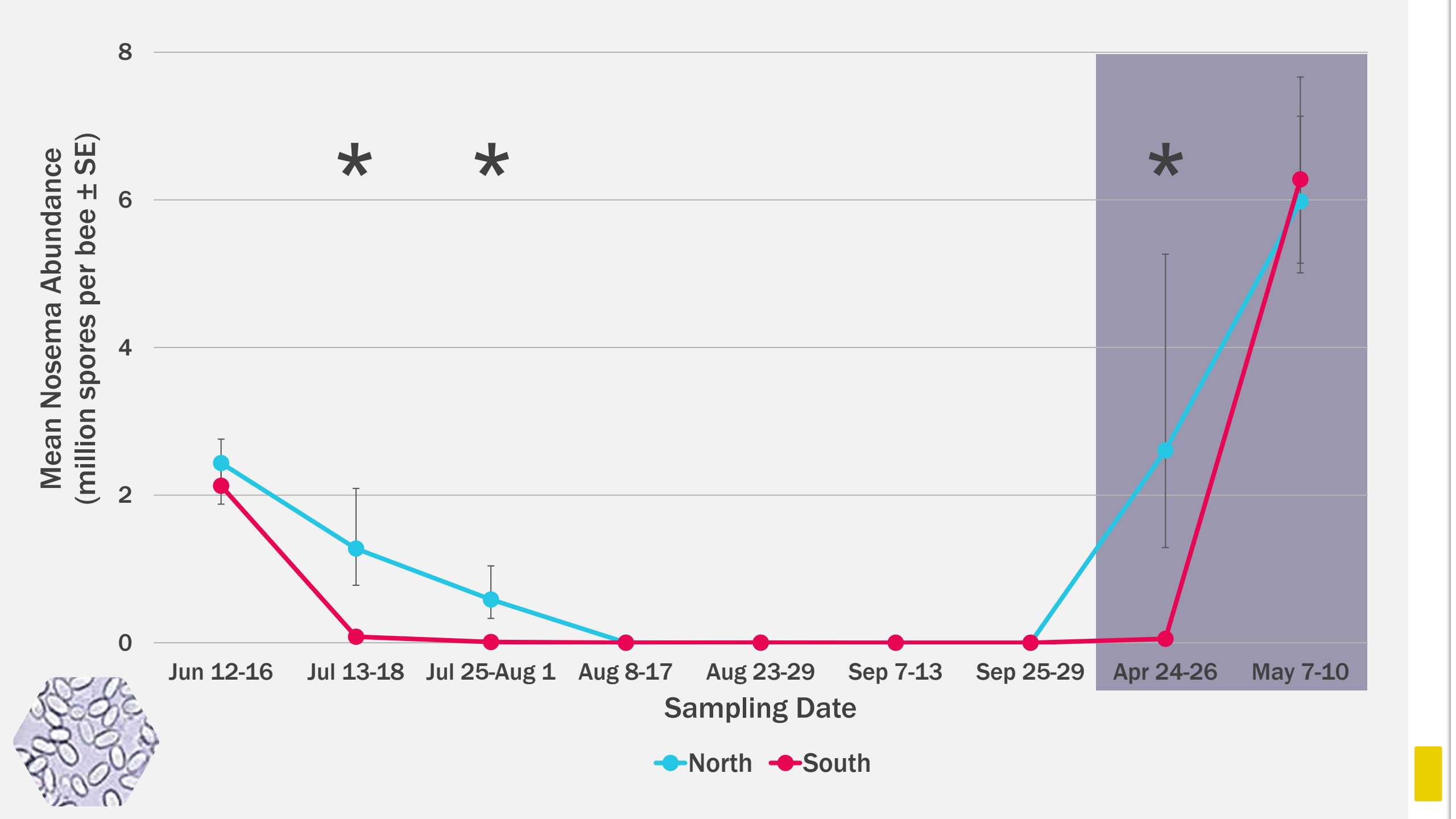
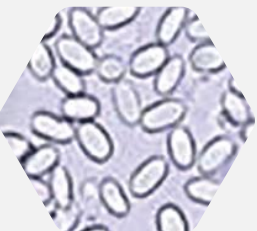
Sampling Date

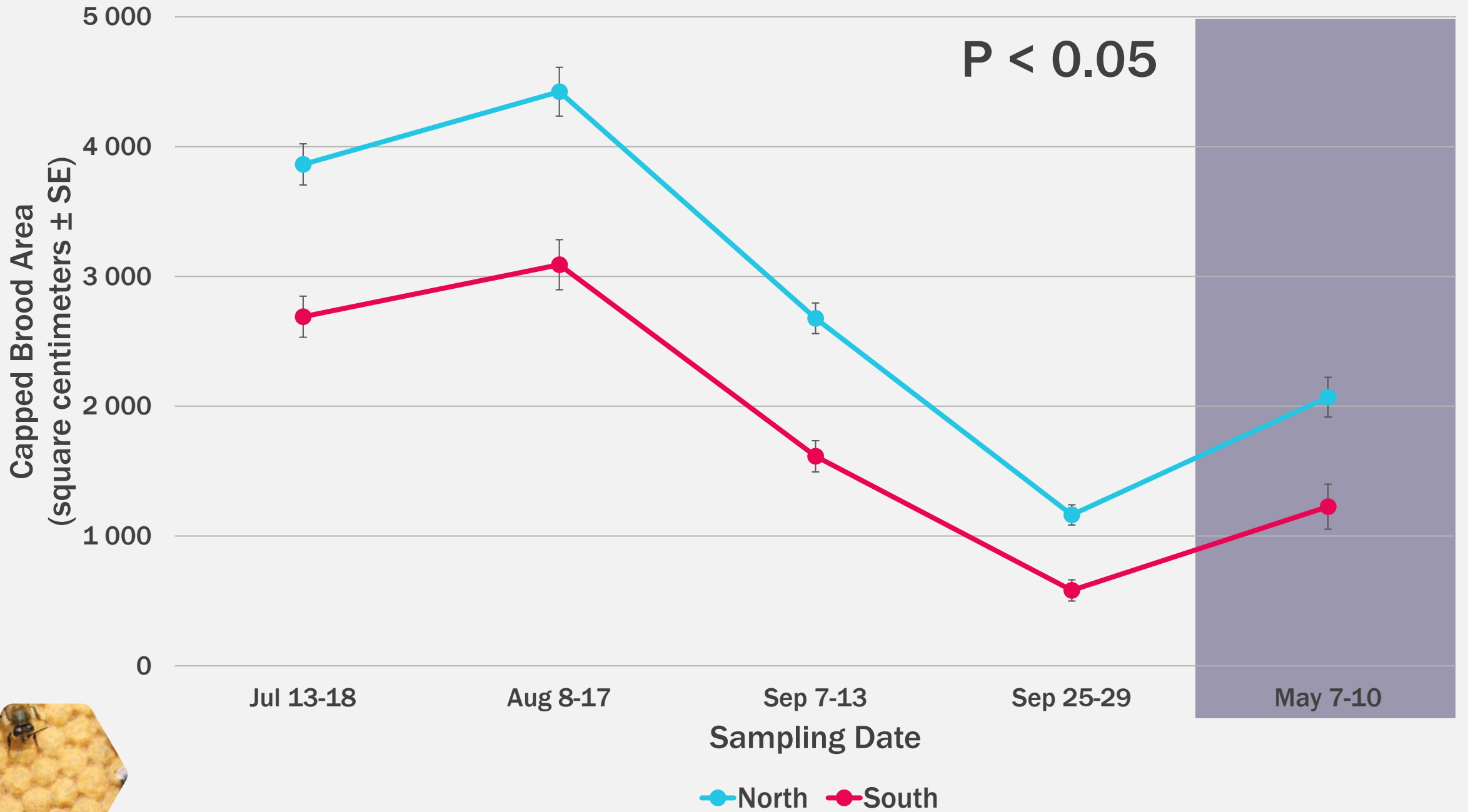
North South

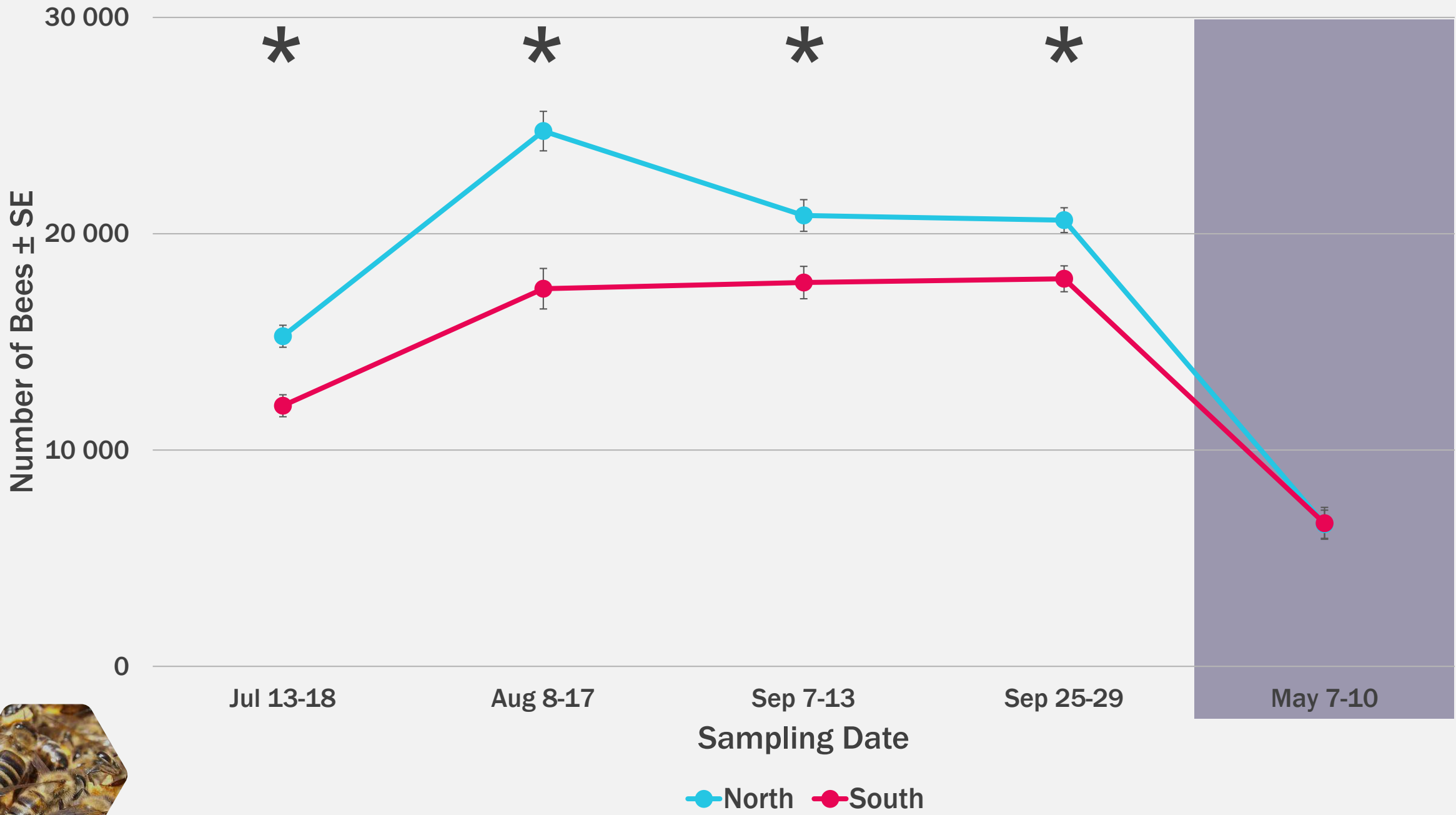
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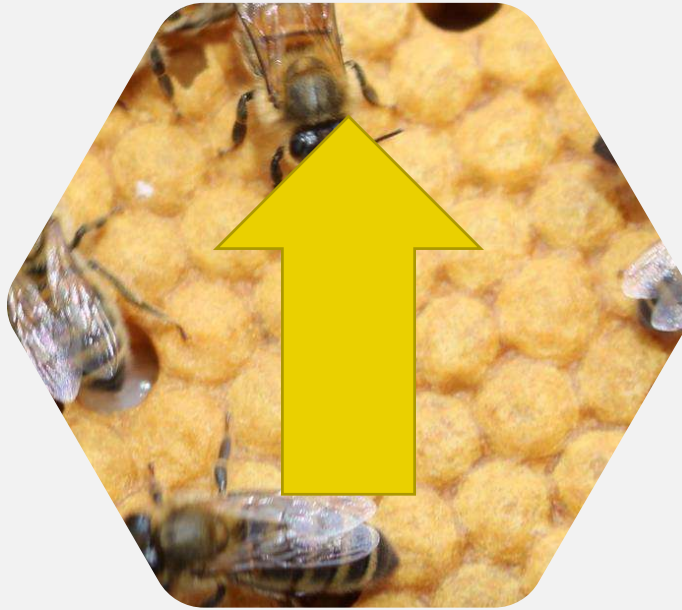






Location Effects

North



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

Spring Treatment Applied (Jun 30-Jul 18)

Treated

NOT Treated

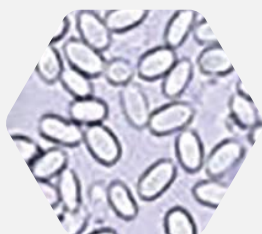
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Jun 12-16

Jul 13-18

Sampling Date

Spring Spring-Fall Fall Control



3

2

1

0

Fall Treatment Applied (Sep 6 & 8)

Mean Nosema Abundance
(spores per bee \pm SE)

Treated

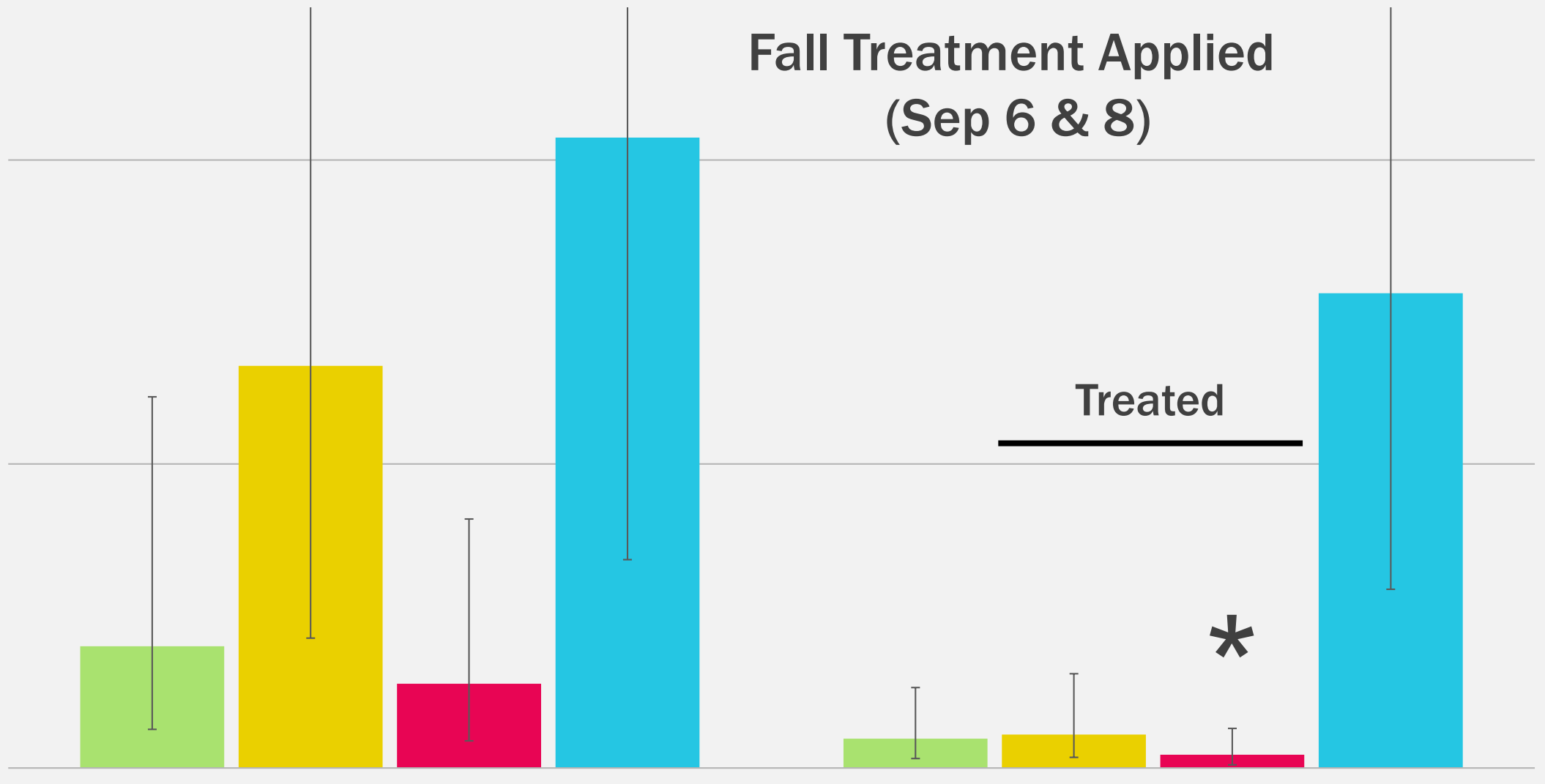
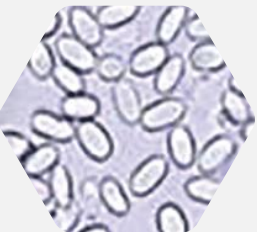
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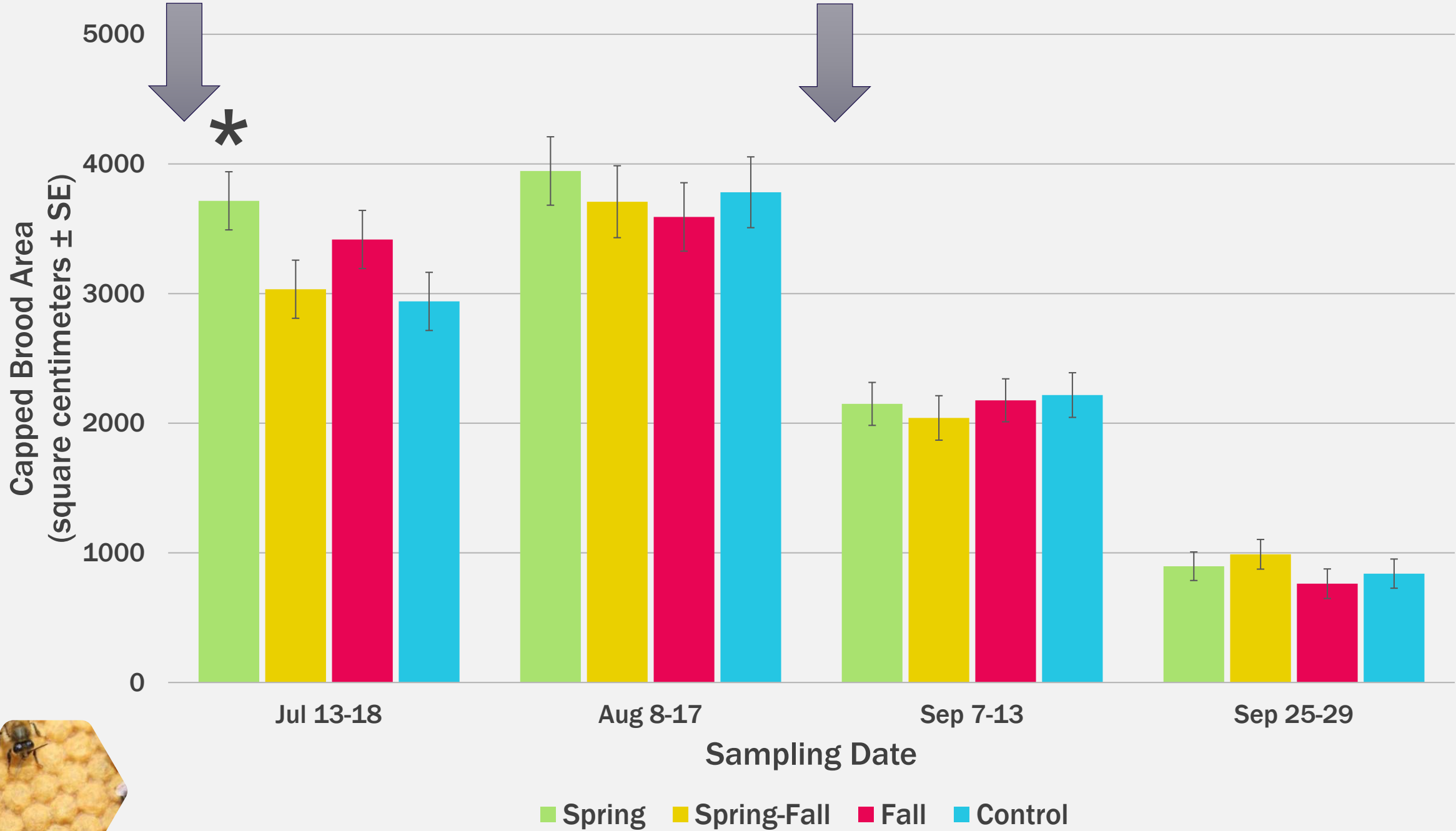
Sep 7-13

Sep 25-29

Sampling Date

Spring Spring-Fall Fall Control





Number of Bees \pm SE

30 000

20 000

10 000

0

Jul 13-18

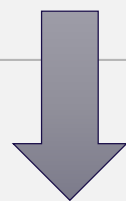
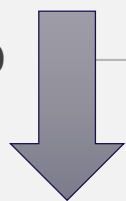
Aug 8-17

Sep 7-13

Sep 25-29

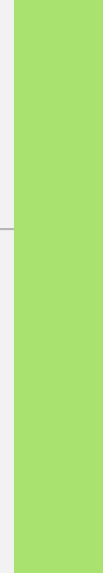
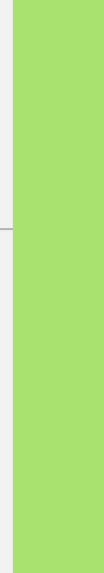
Sampling Date

Spring Spring-Fall Fall Control



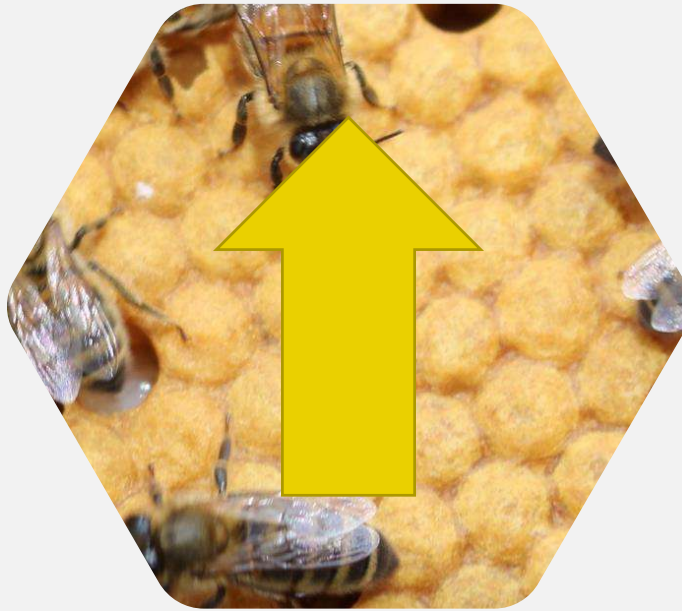
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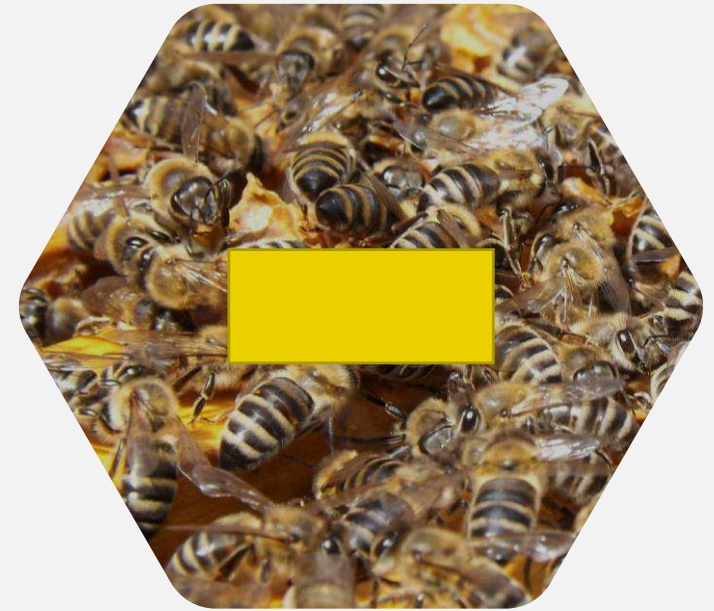
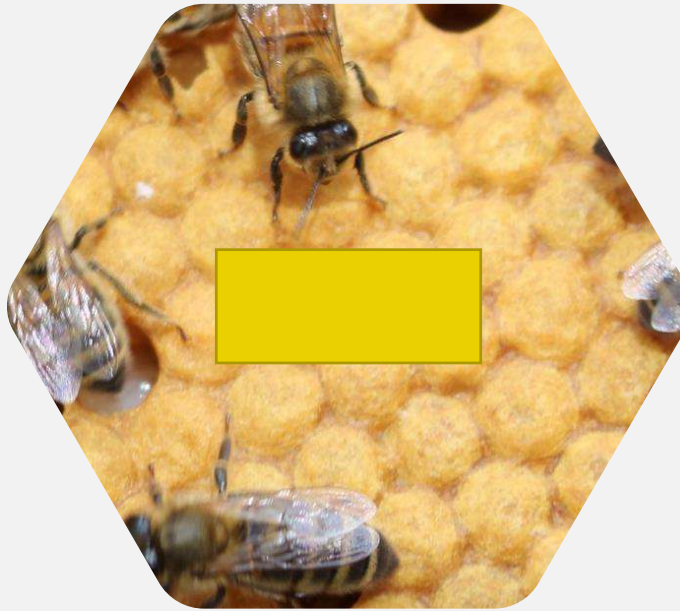
Treatment Effects

Spring



Treatment Effects

Fall



AFTER WINTER

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

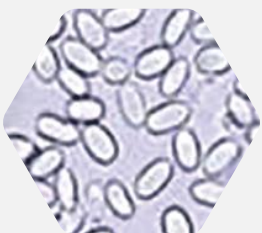
10
8
6
4
2
0

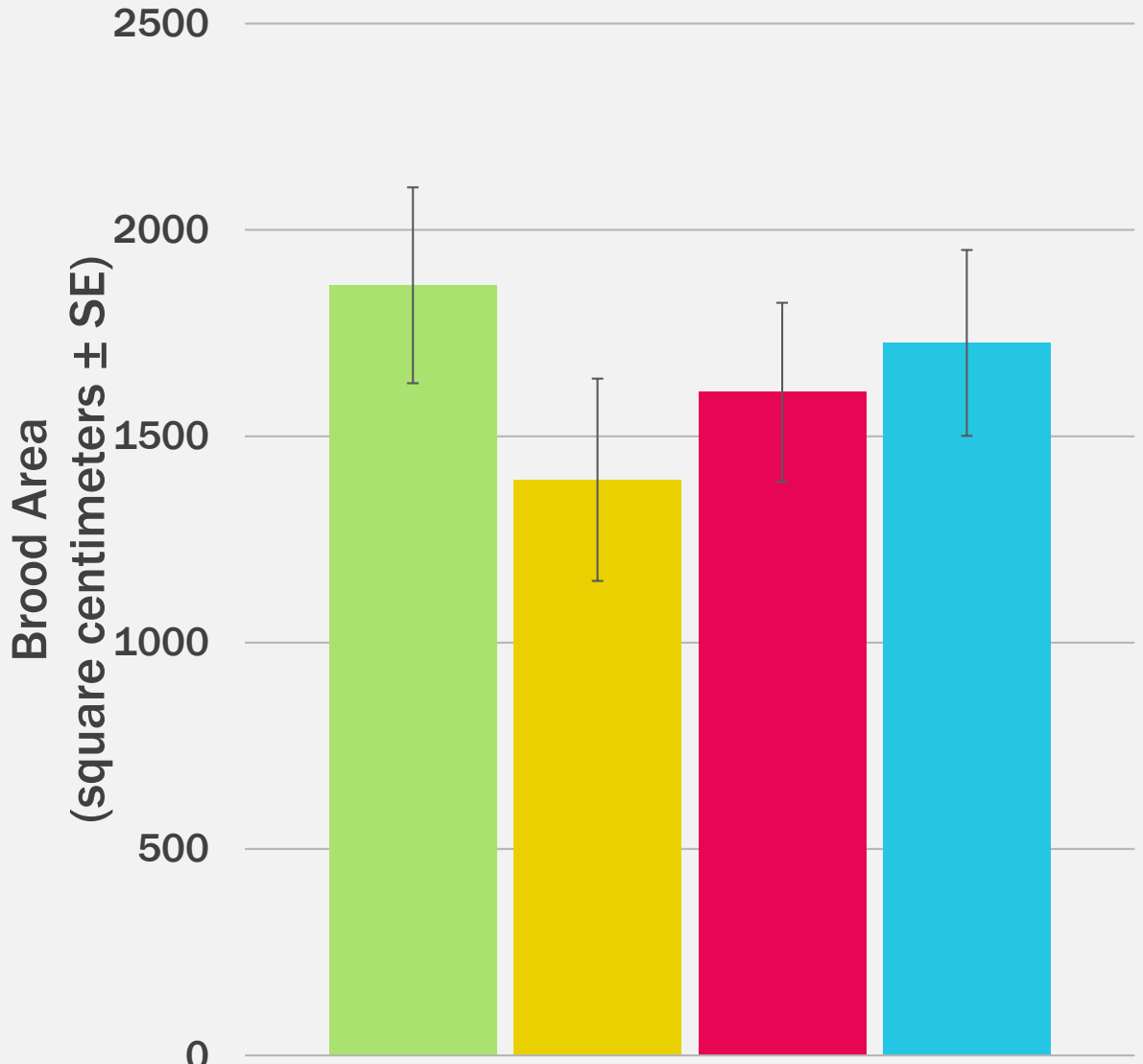
Apr 24-26

May 7-10

Sampling Date

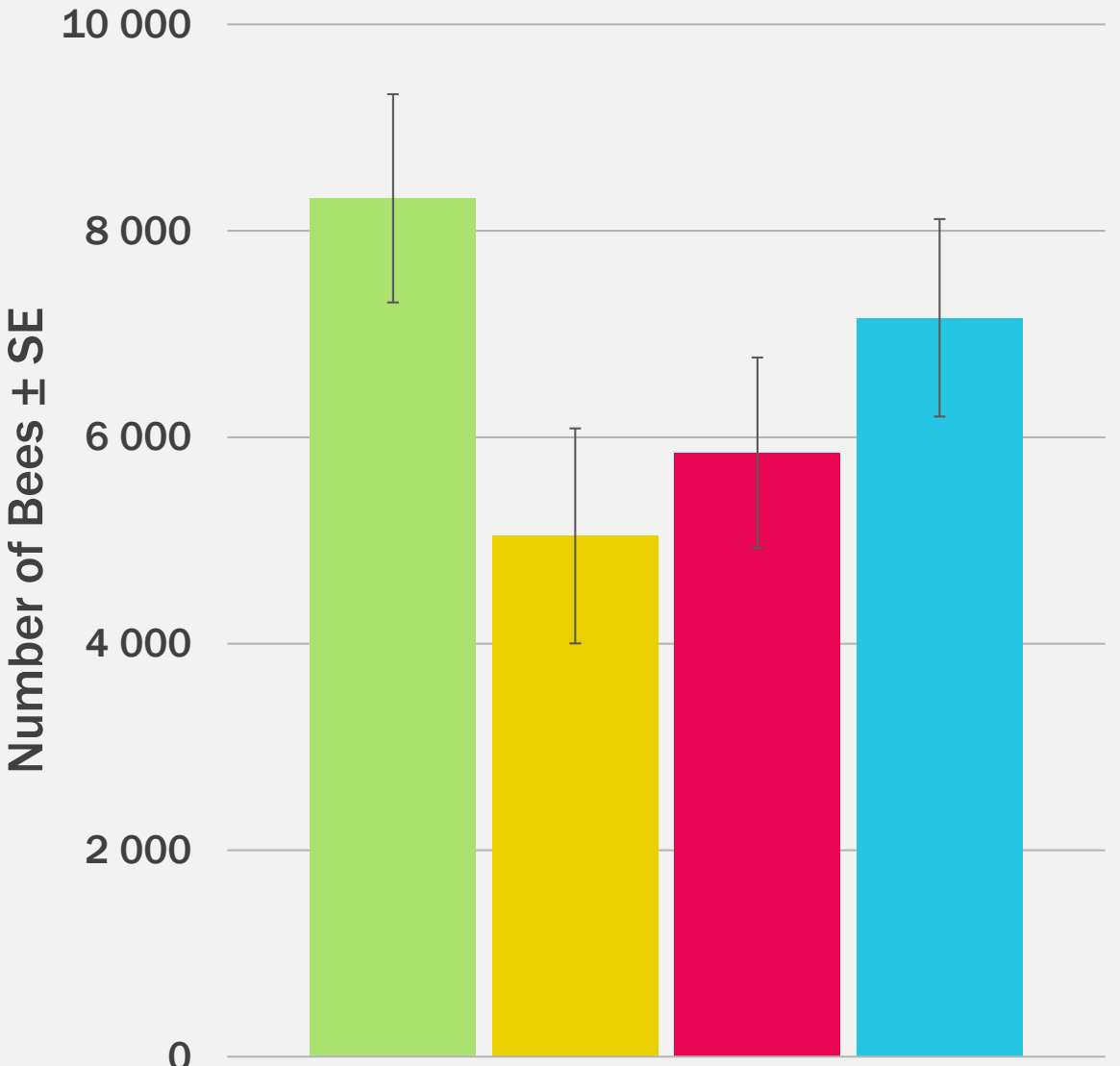
Spring Spring-Fall Fall Control



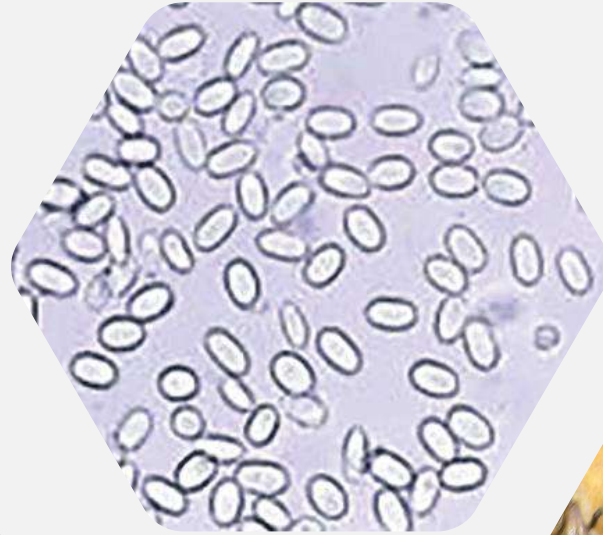
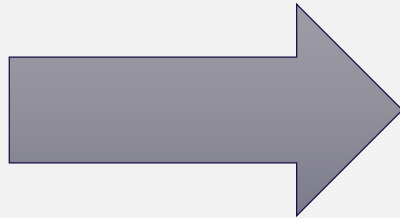


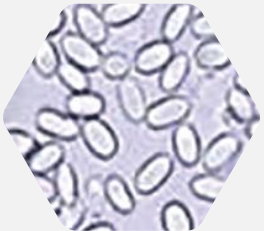
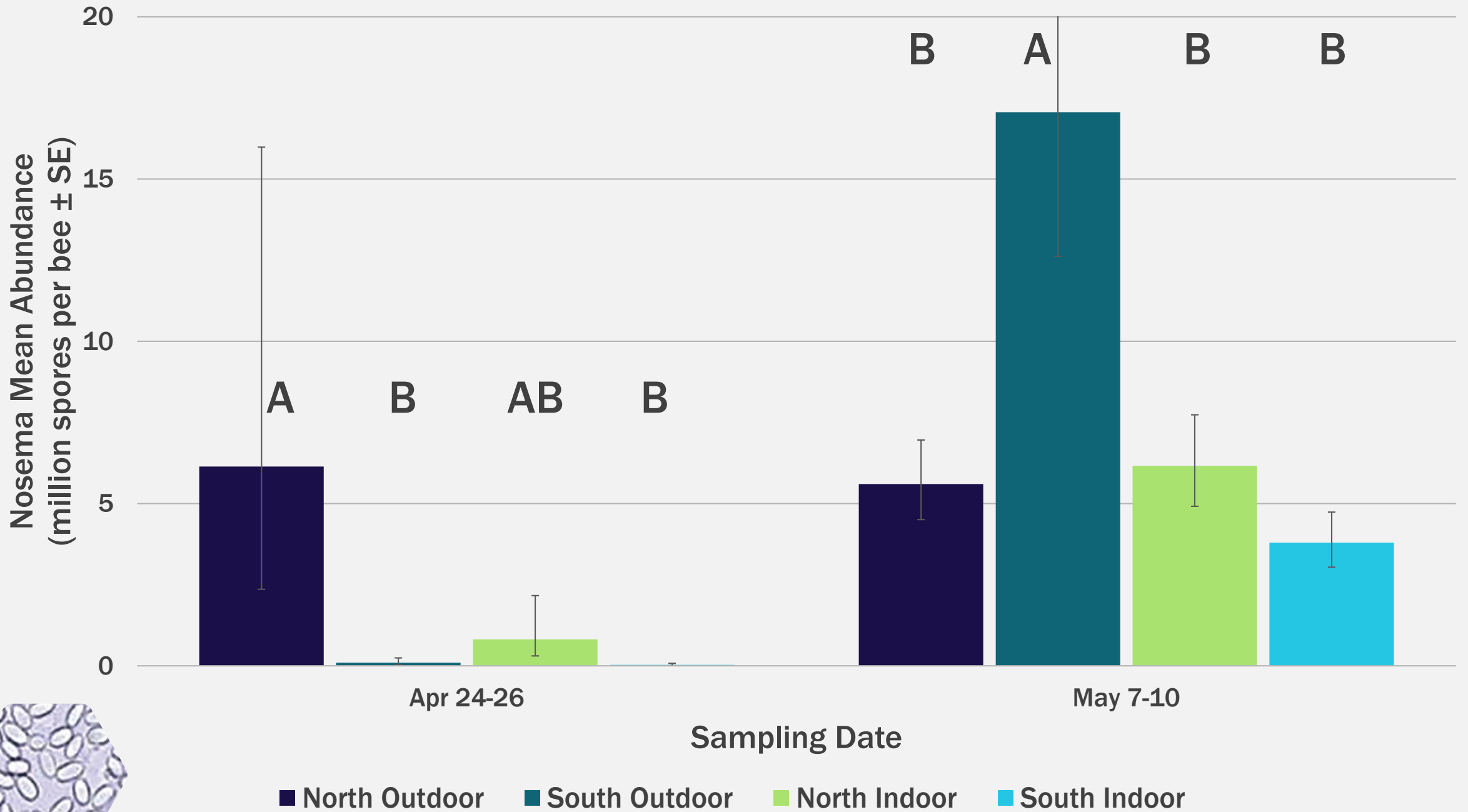
May 7-10

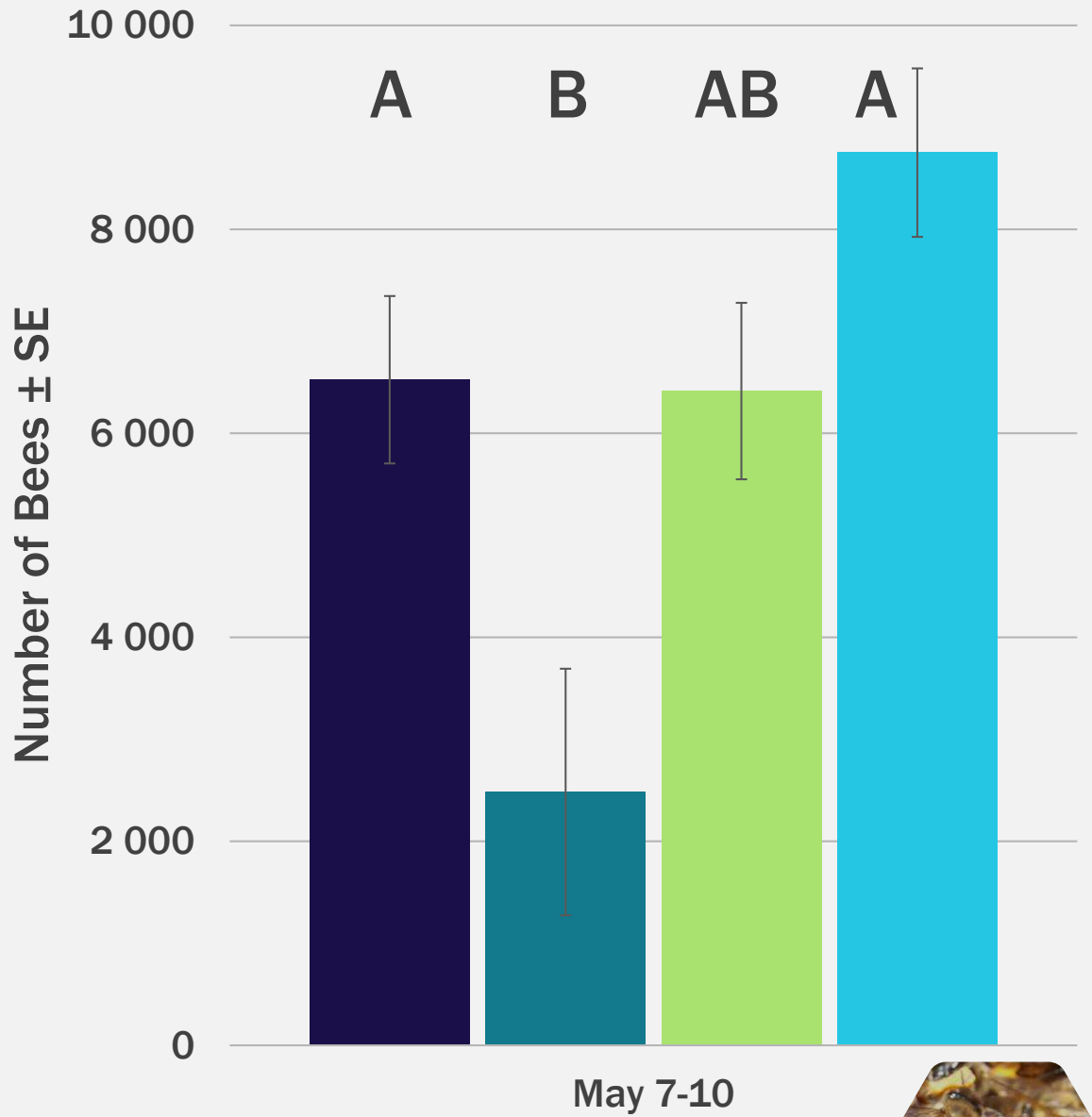
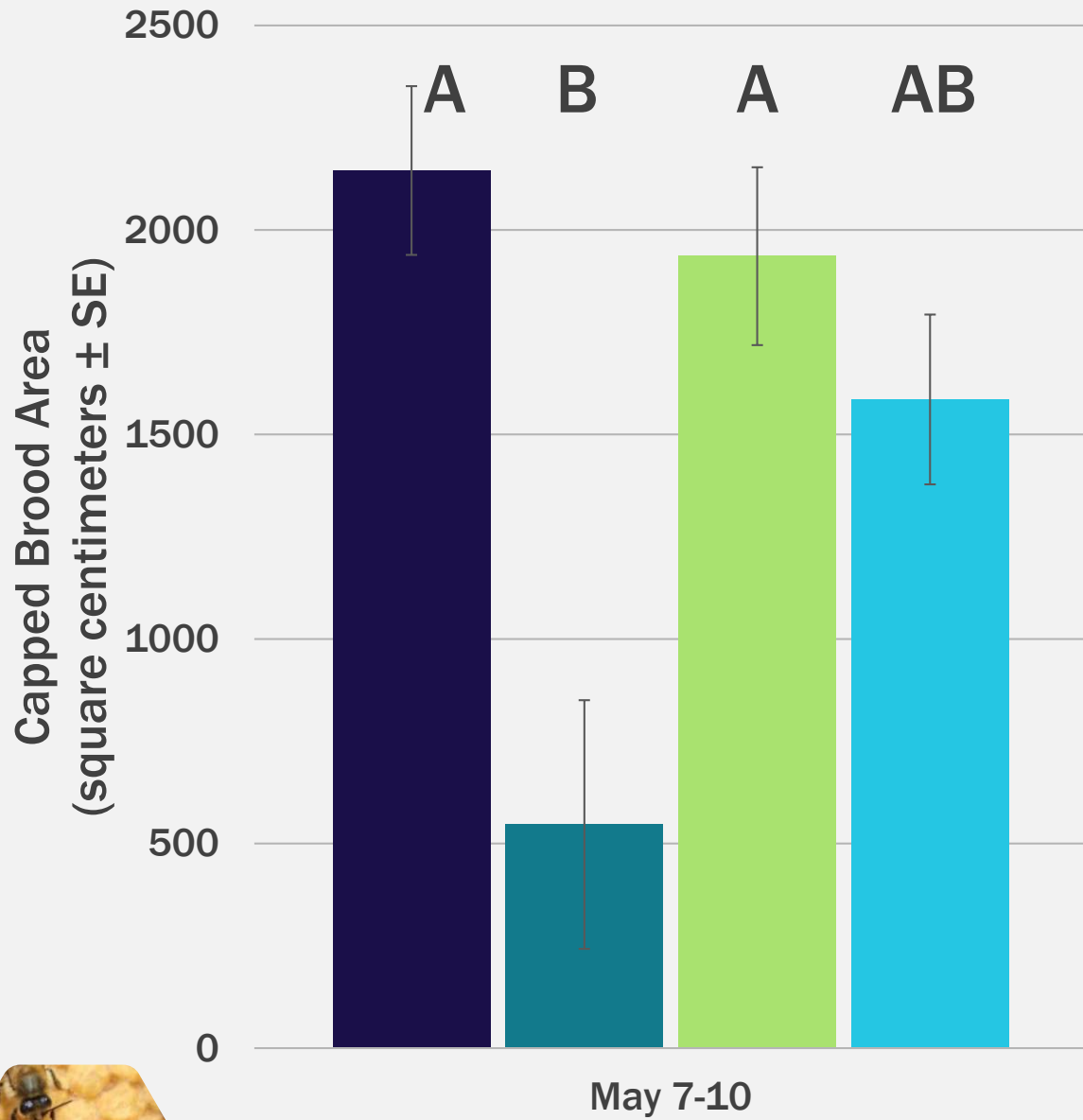
Spring Spring-Fall Fall Control



May 7-10







■ North Outdoor

■ South Outdoor

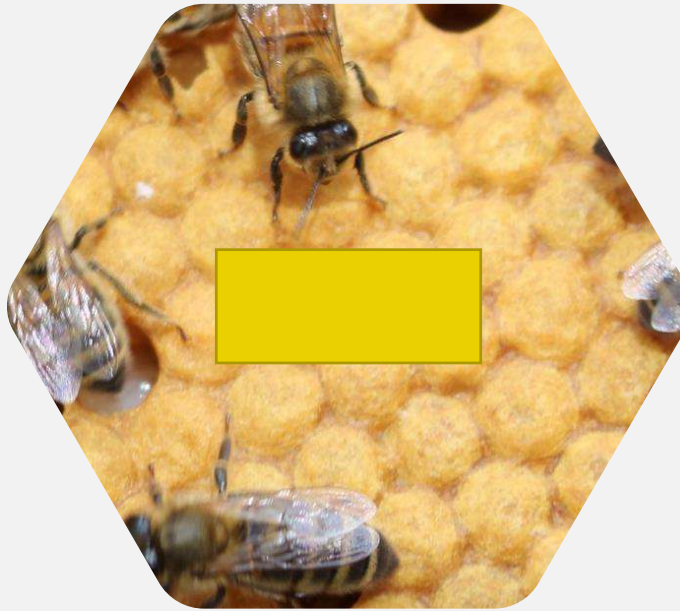
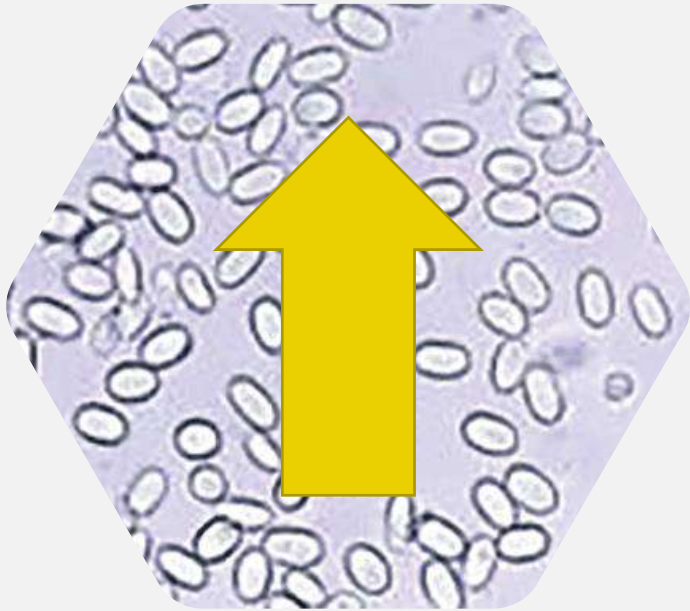
■ North Indoor

■ South Indoor

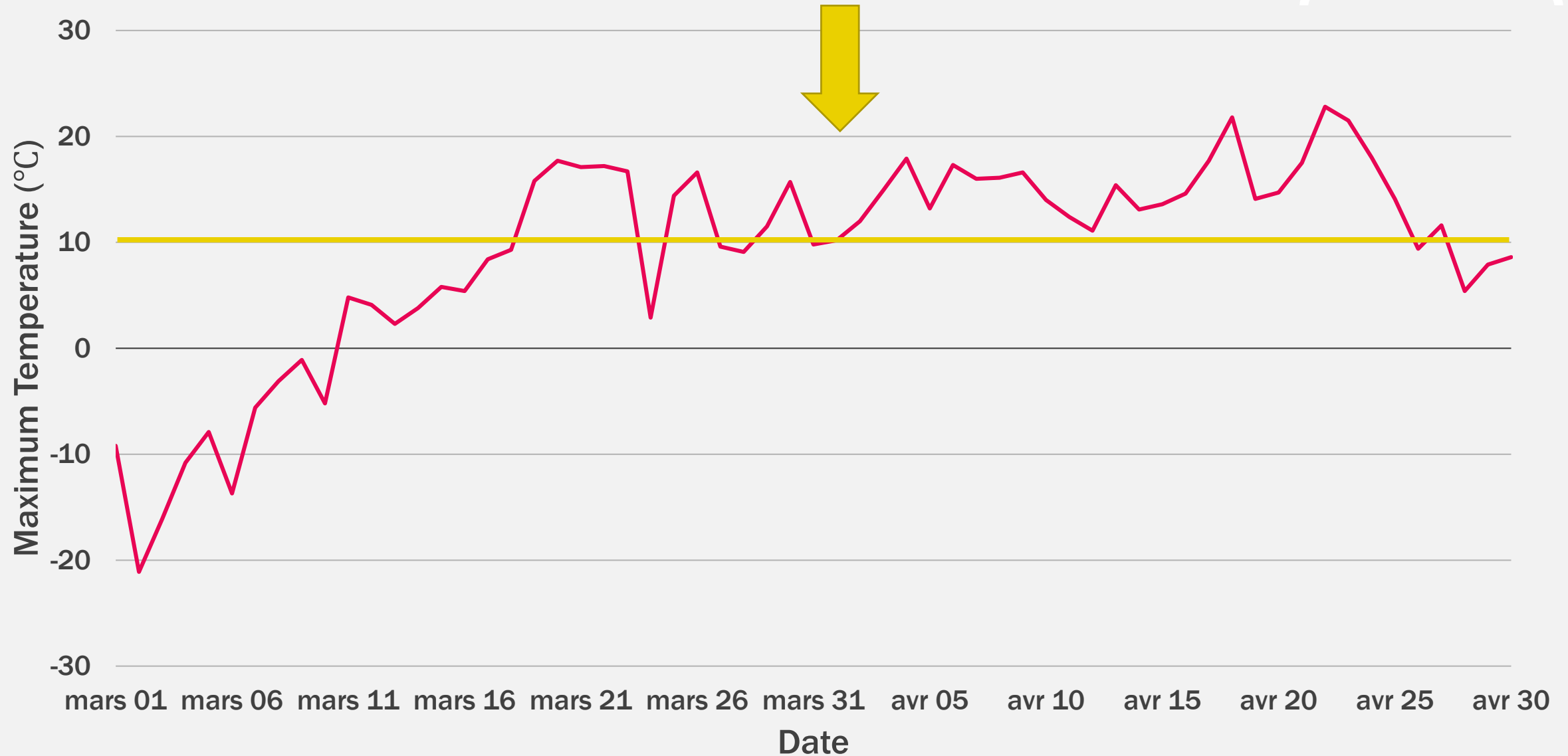
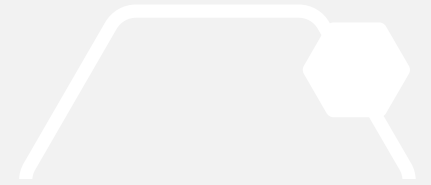


South Location Effects

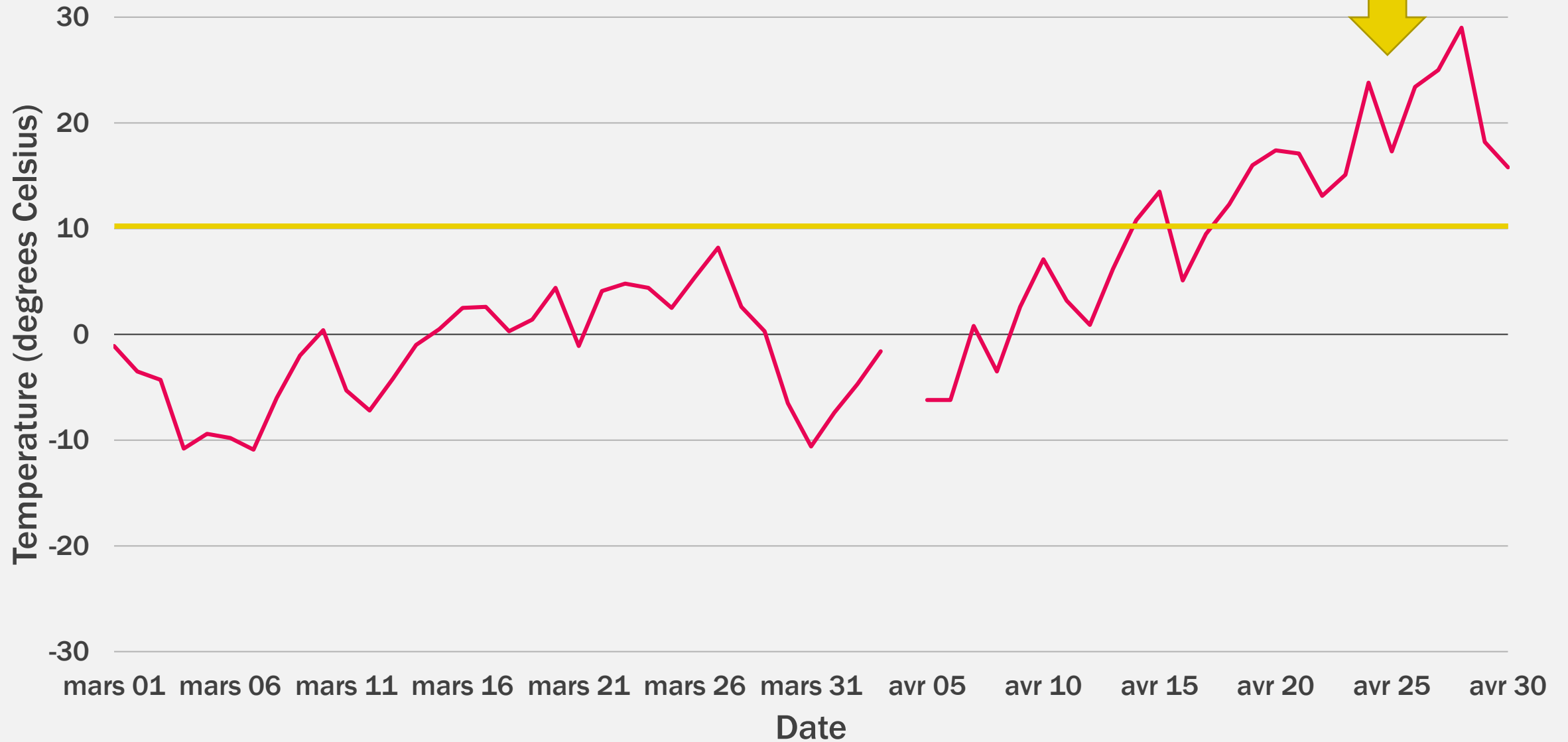
Outdoor



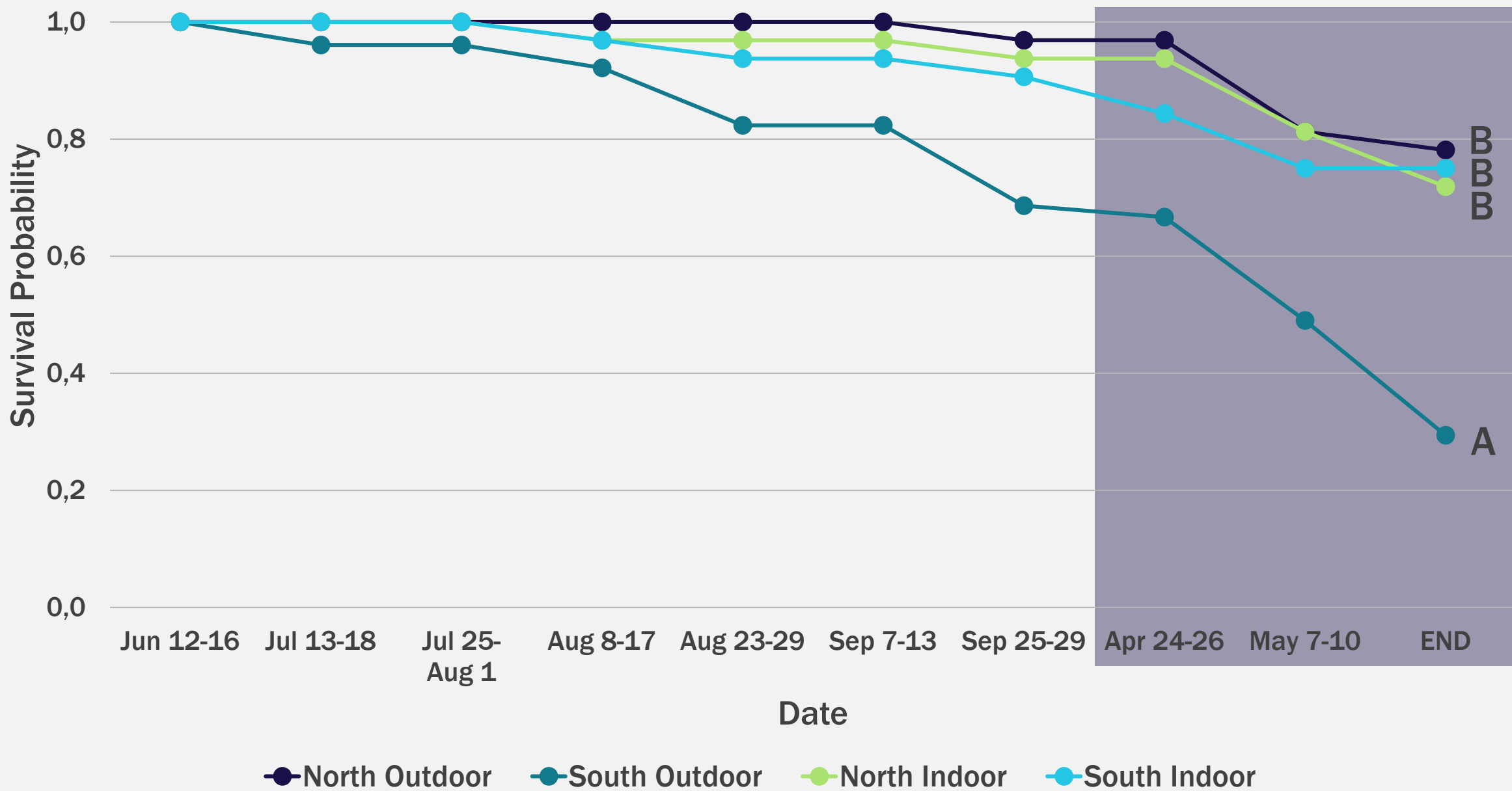
Brooks - Spring 2019

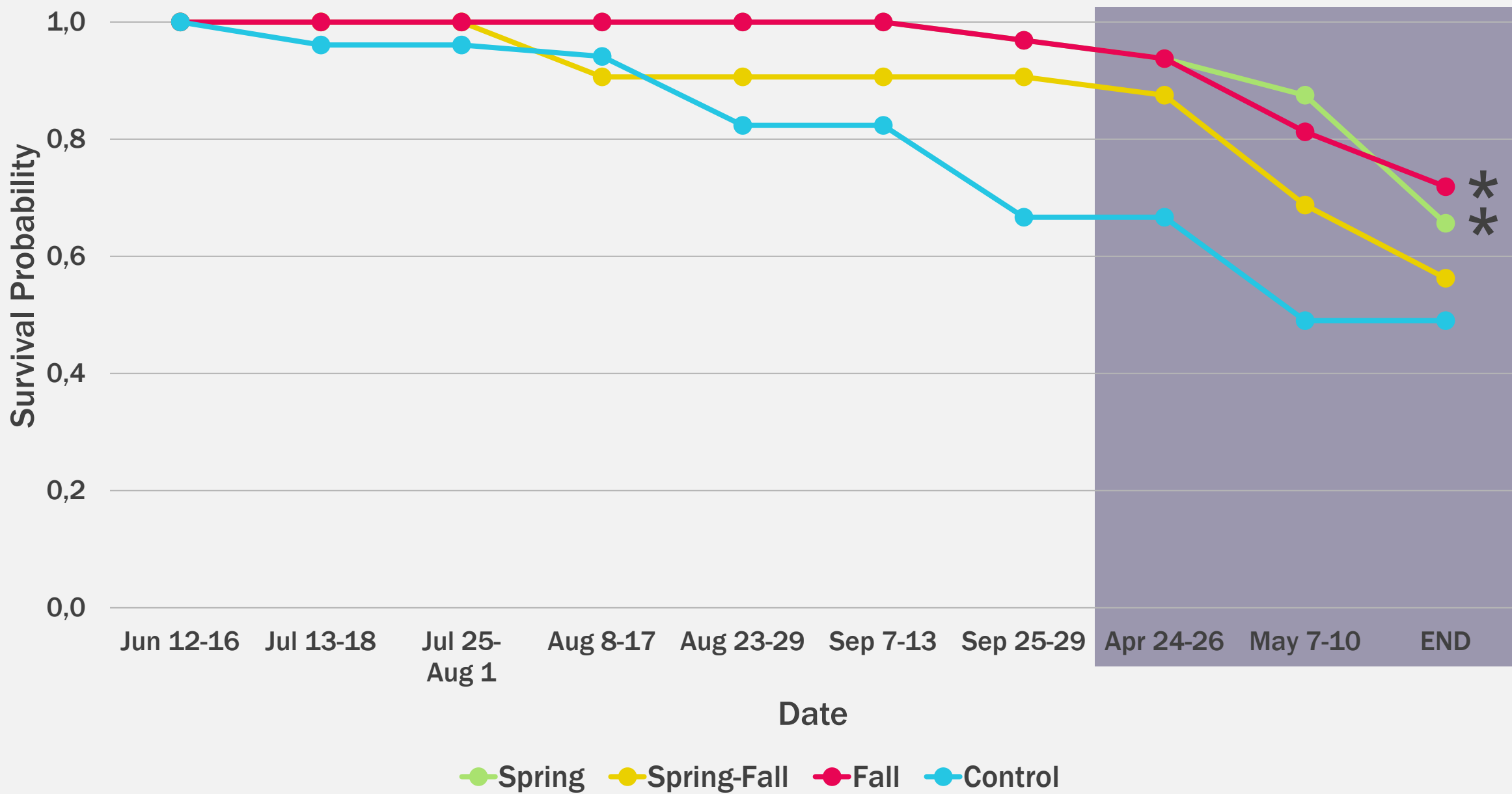


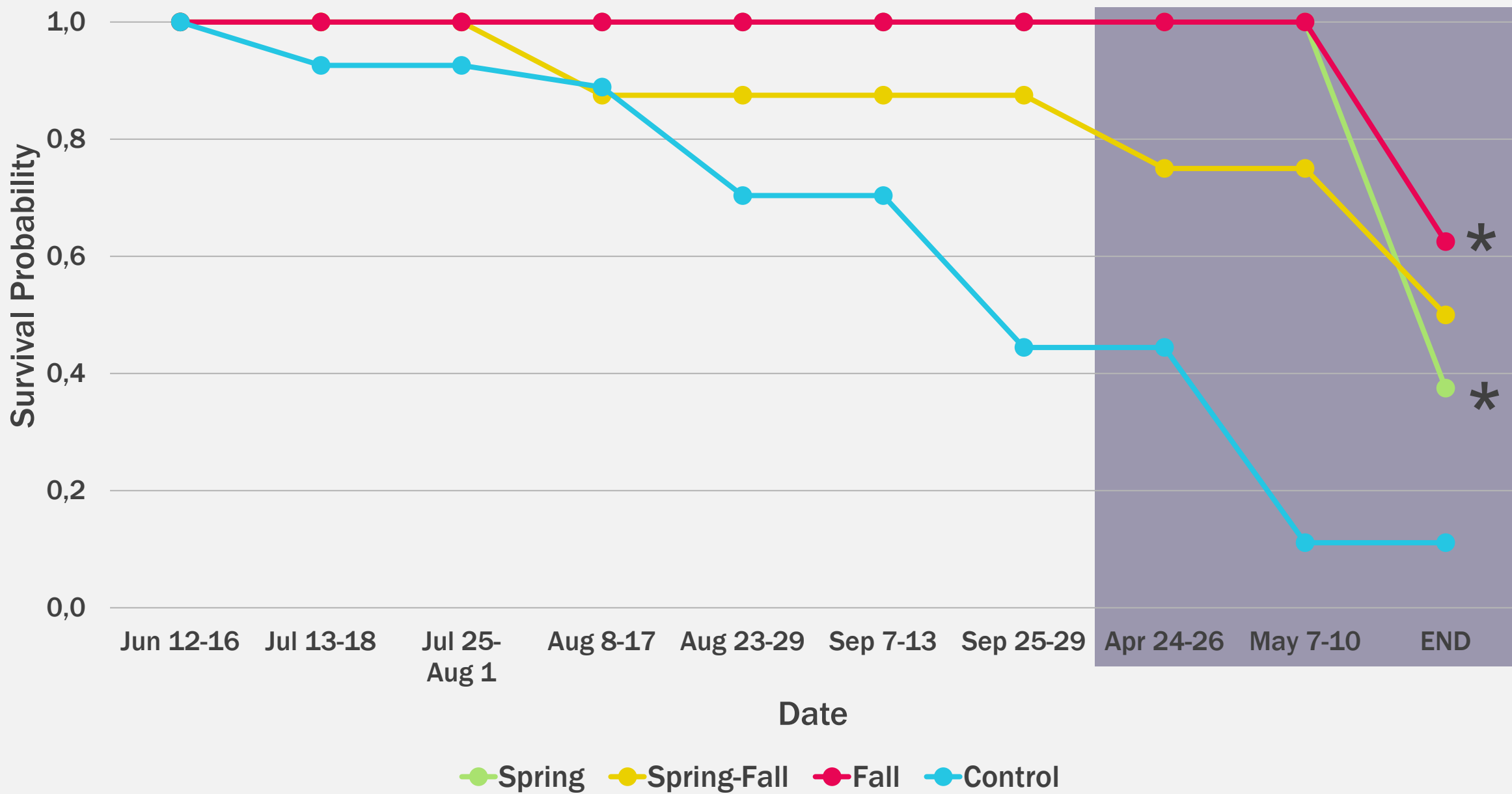
Brooks - Spring 2018

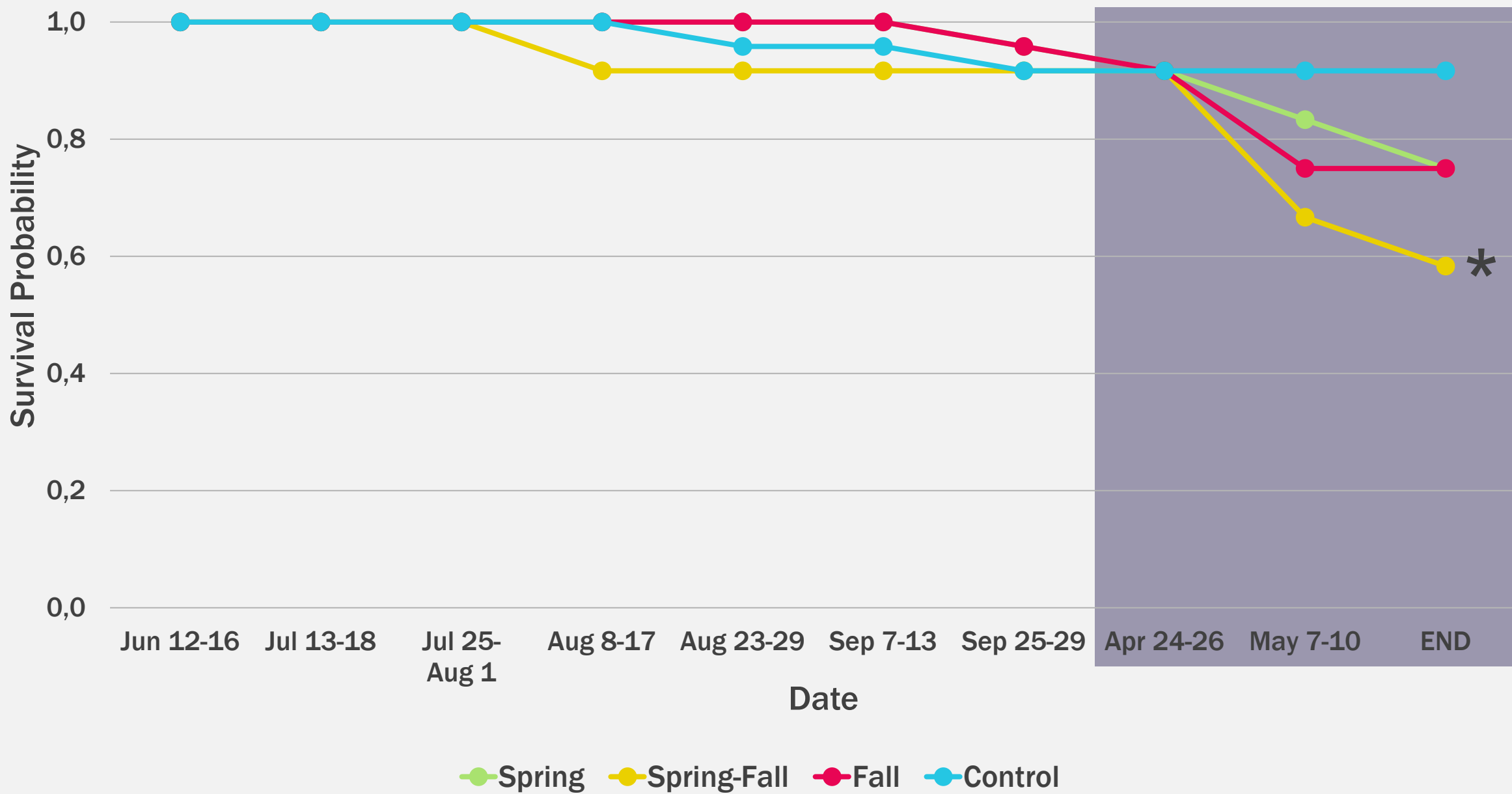












Summary

- 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**

