

# Switchgrass Midge in Ontario: 2022 and 2023 Update

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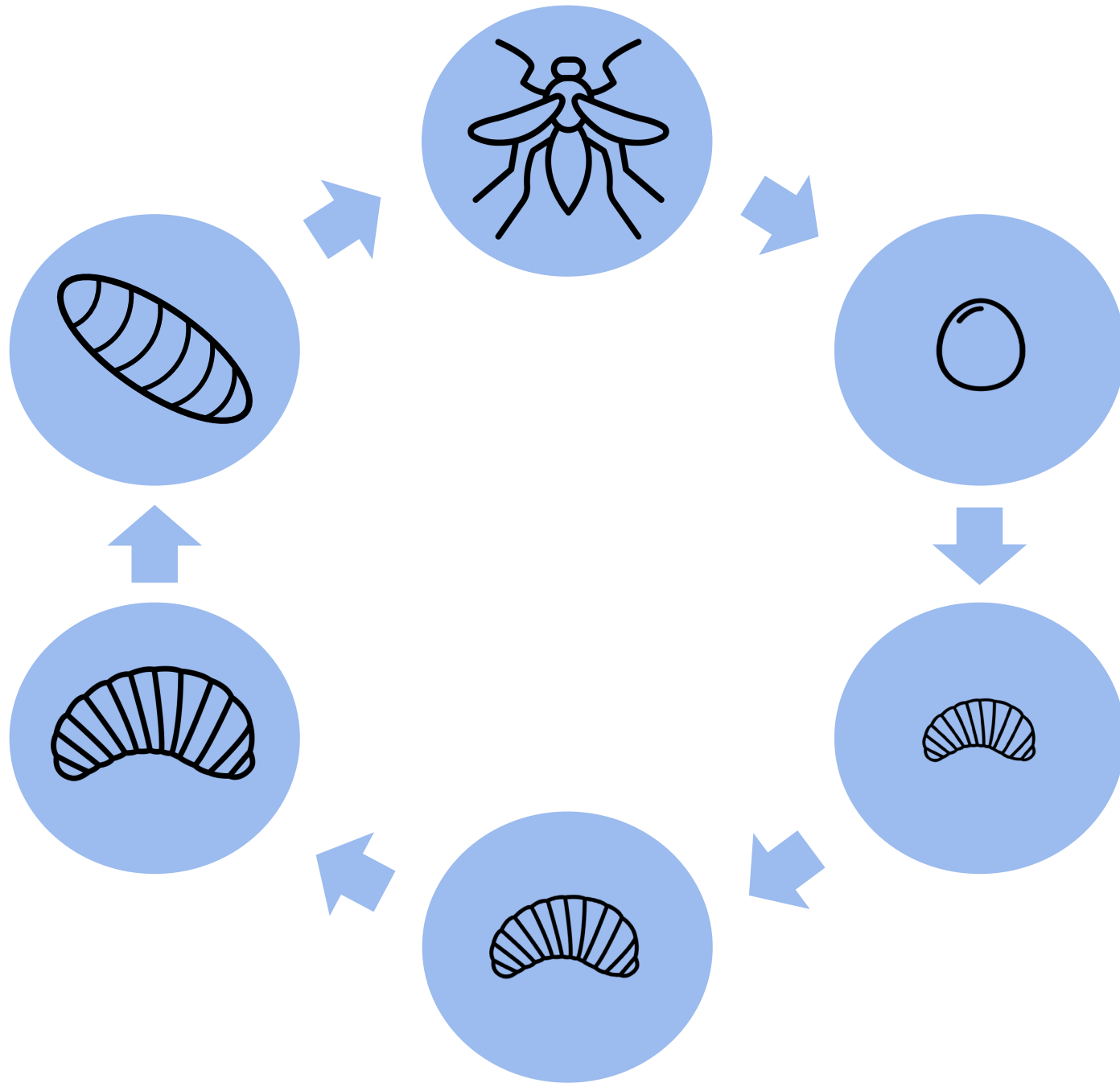
# Switchgrass midge

2008: discovered in South Dakota

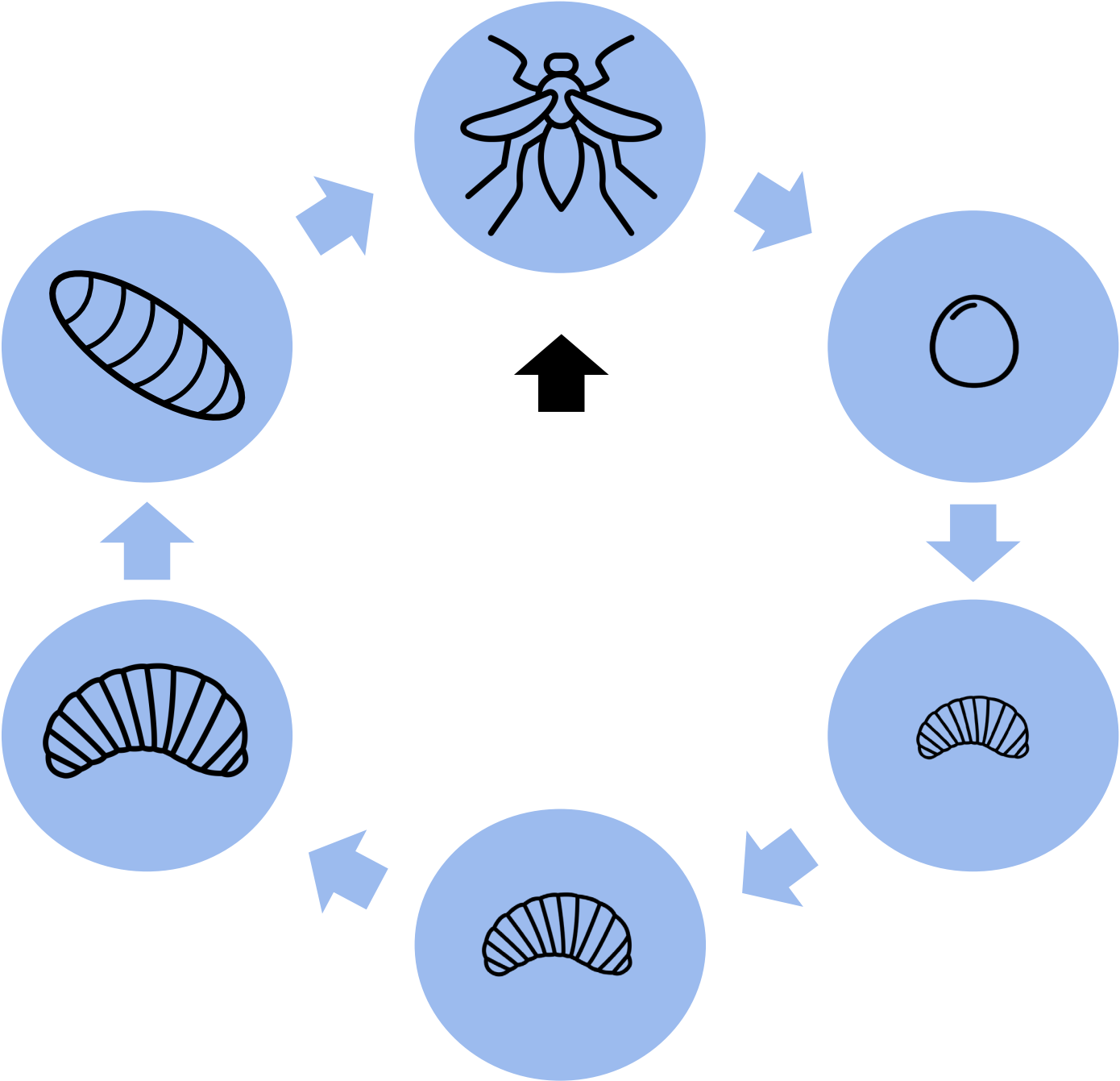
2020: first observed in Ontario



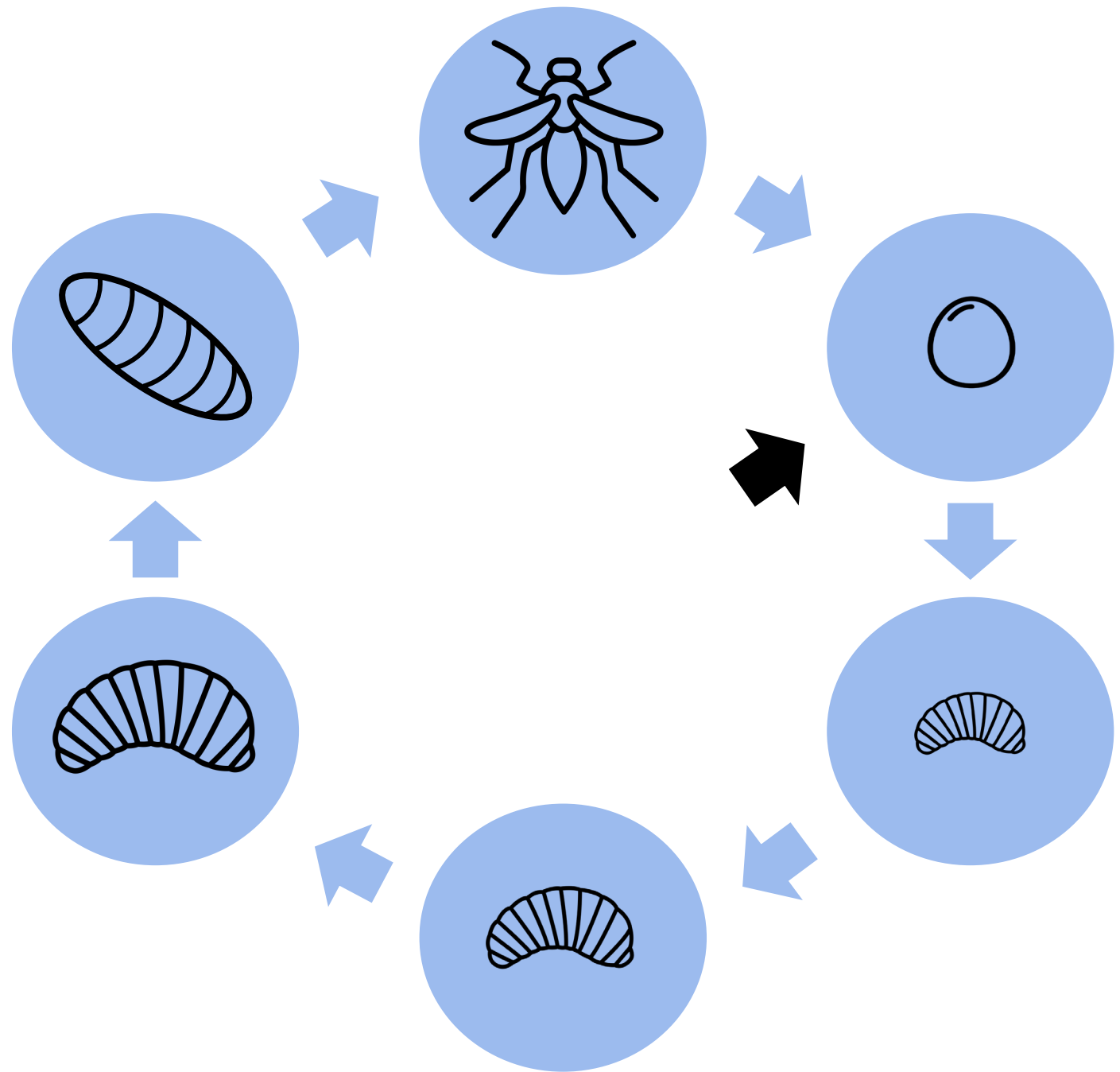
Photo:  
Hannah Fraser



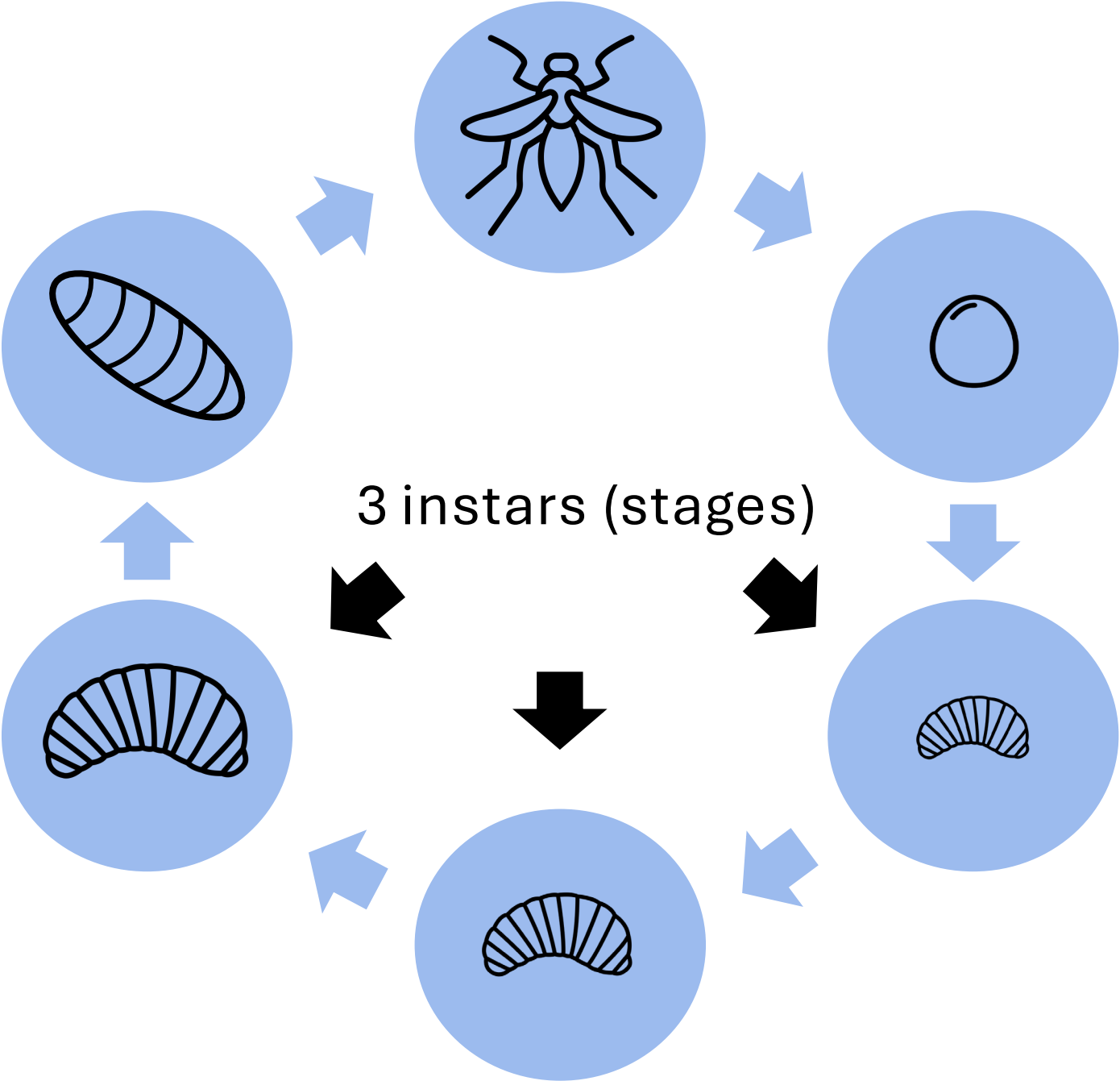
adult



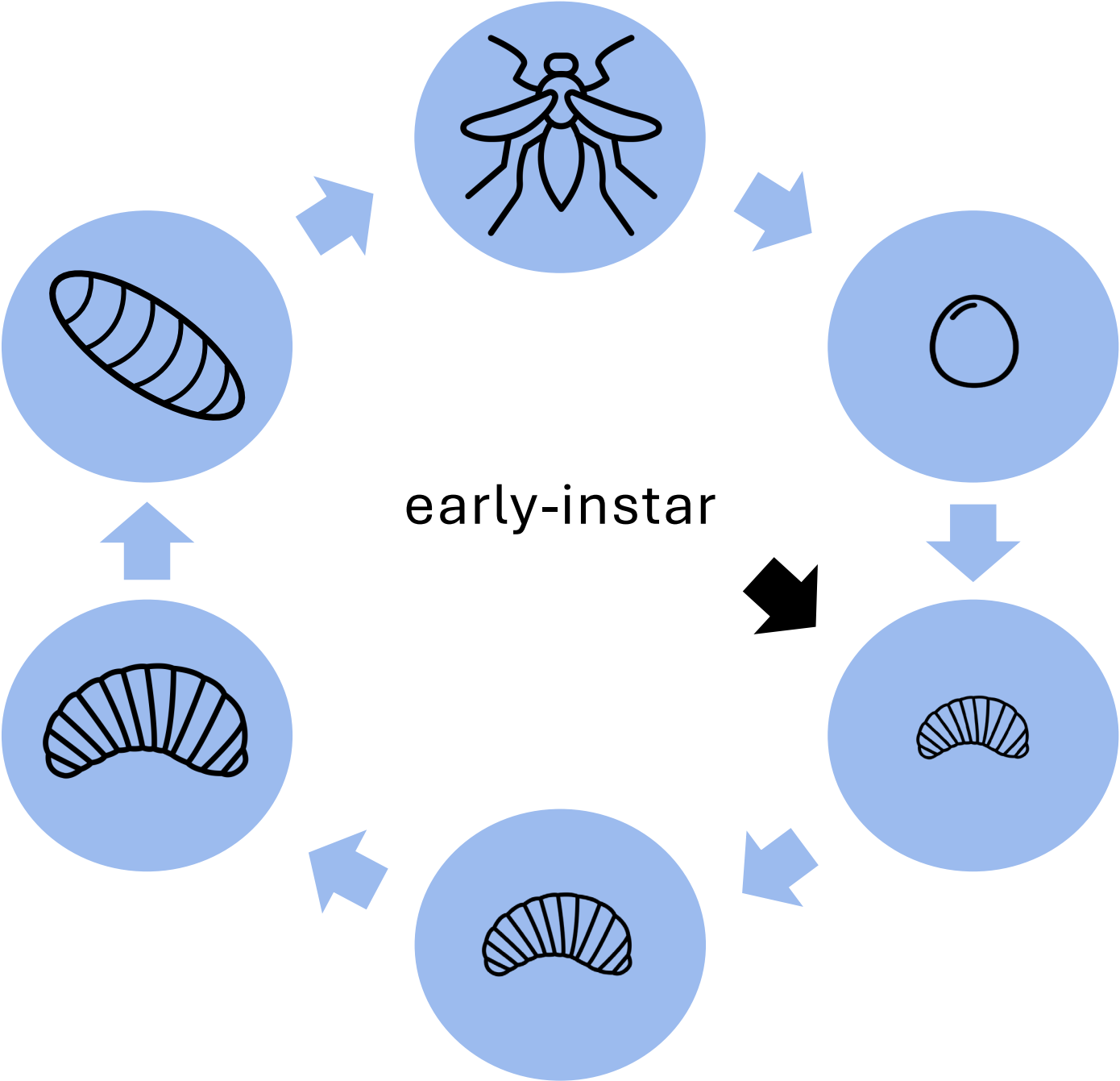
egg



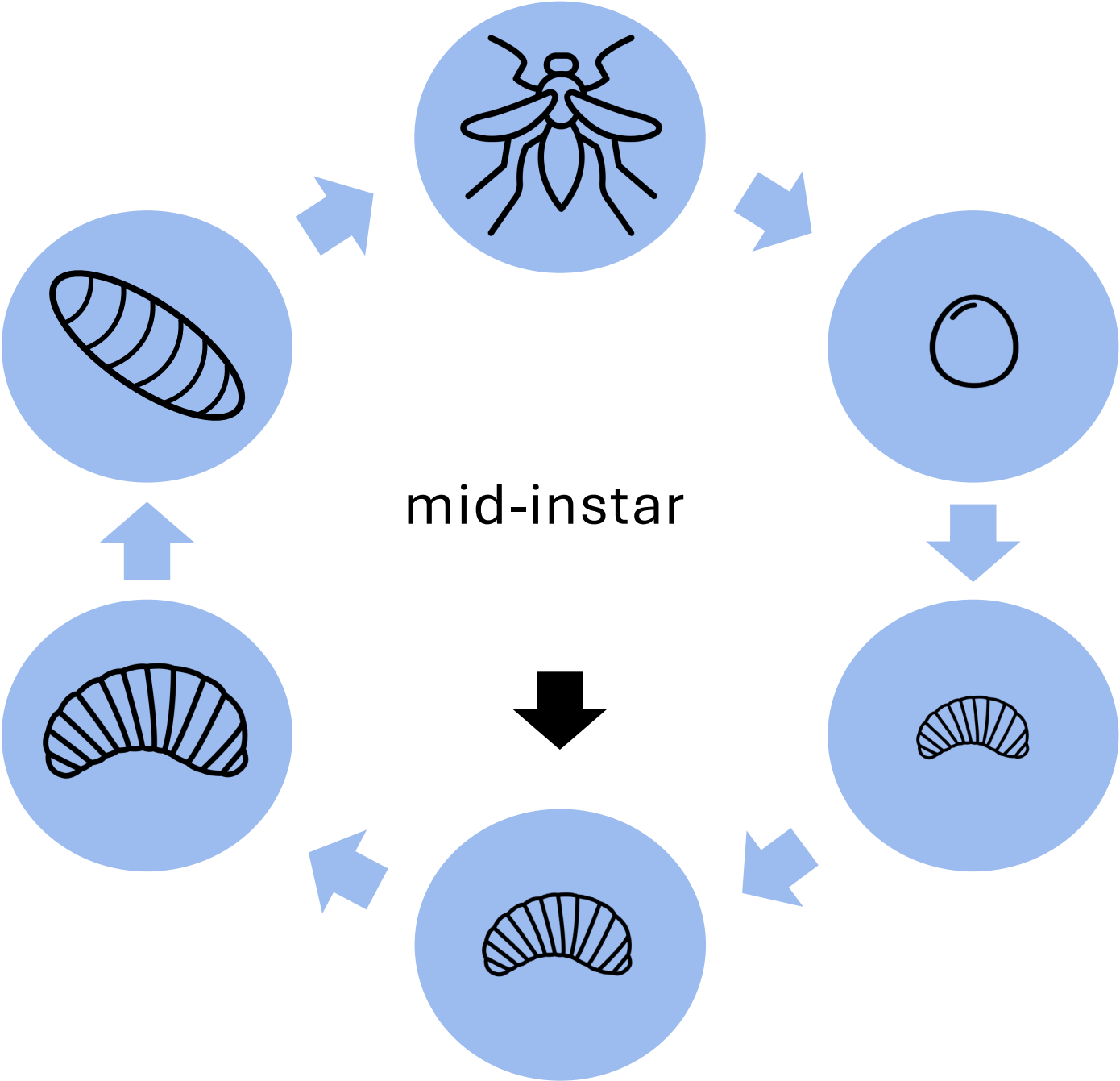
larva



larva

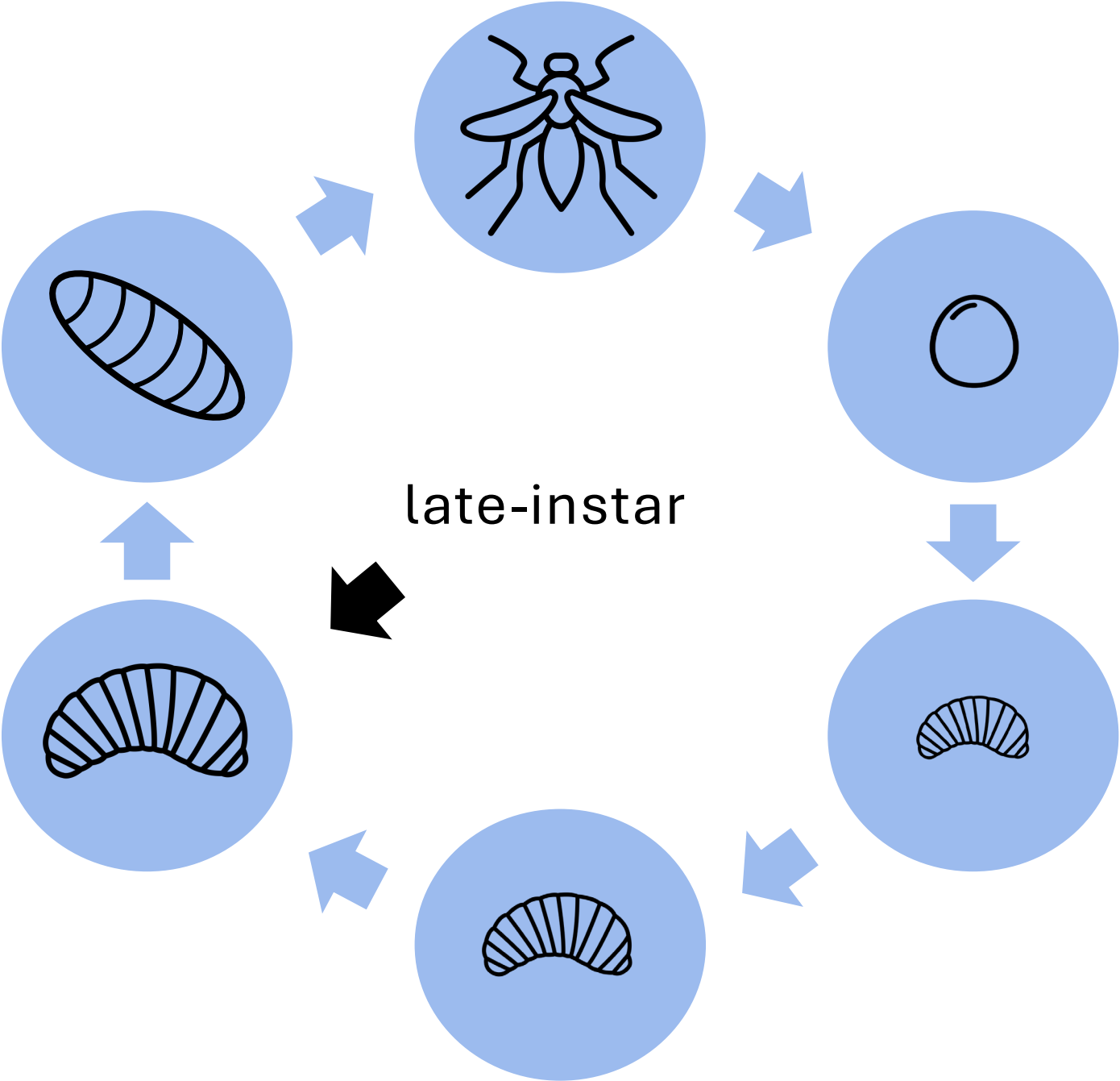


larva

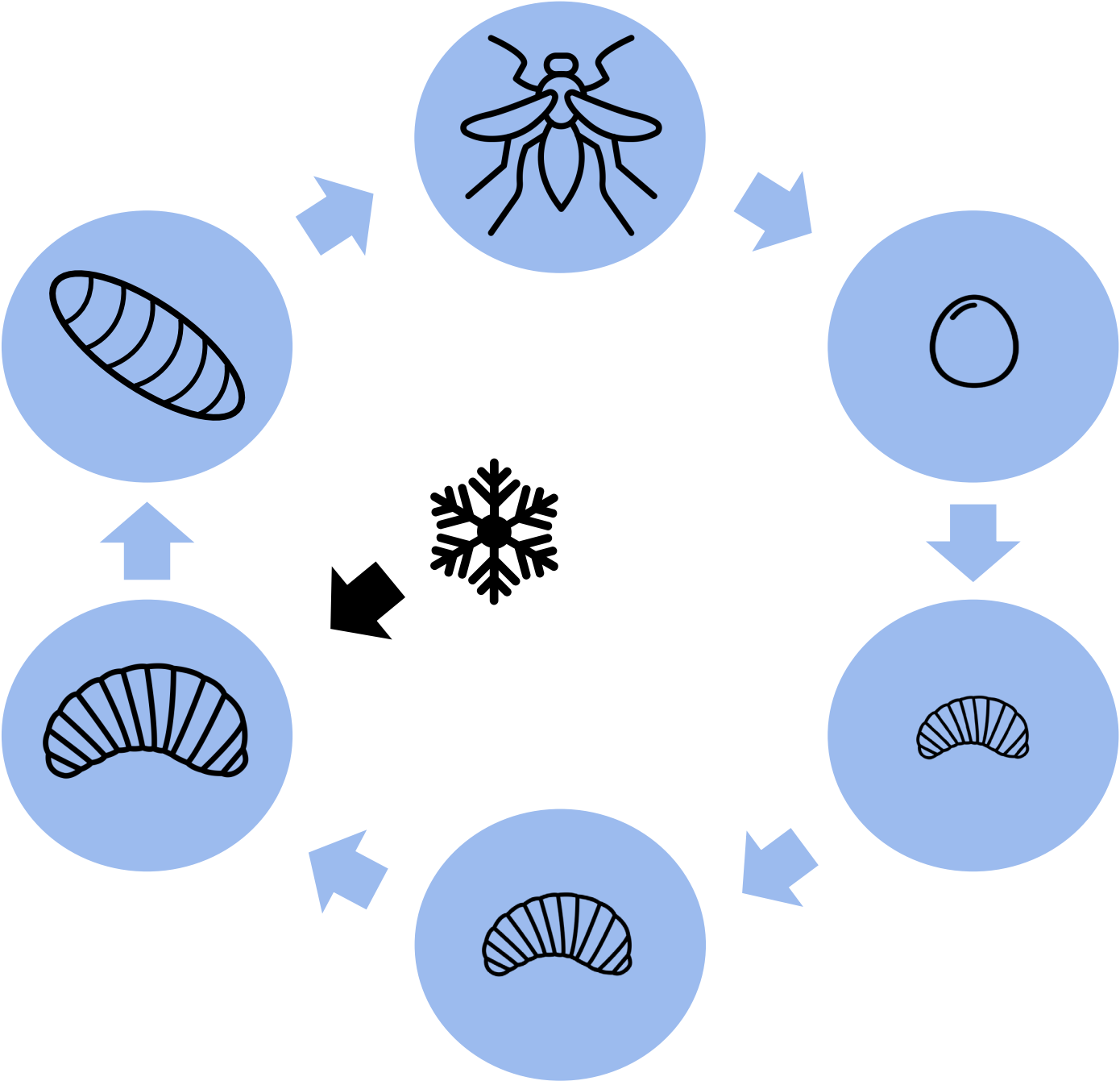




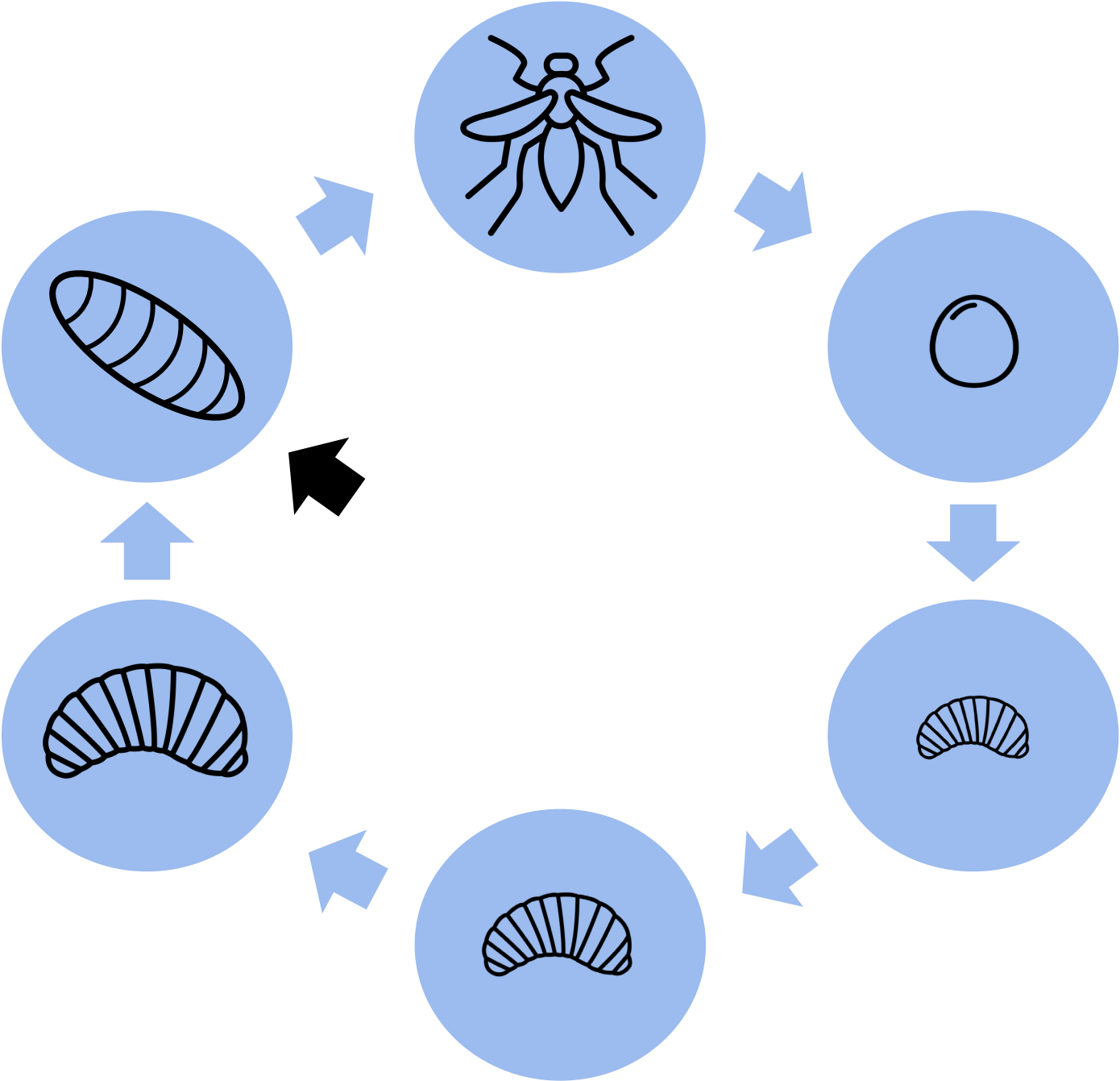
larva



larva



pupa



# Switchgrass midge

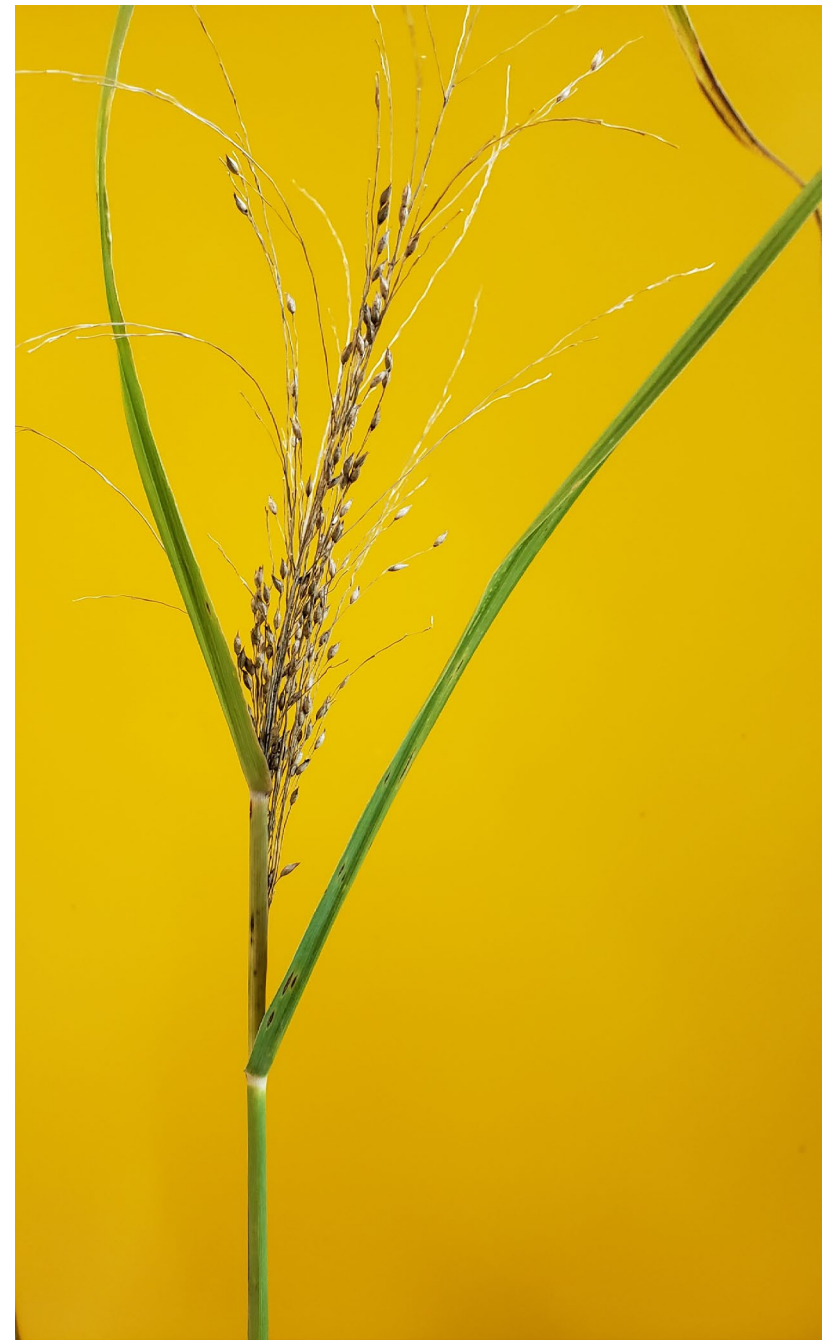
larvae feed on reproductive tissue

- stunted tillers, panicle not fully emerged

not well studied

economic relevance not known

biology and pest status in Ontario  
not known



# Project objectives

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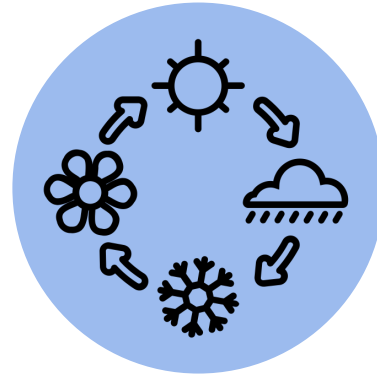
Ontario distribution

# Project objectives

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Ontario distribution



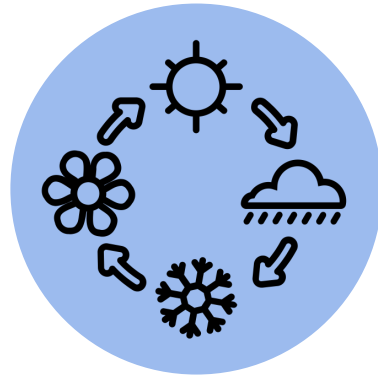
seasonal occurrence

# Project objectives

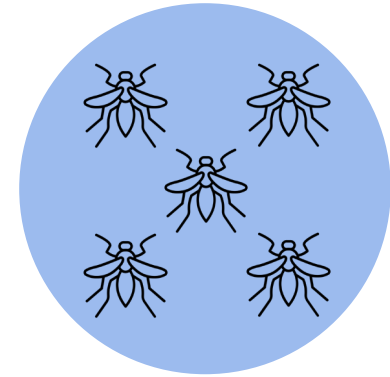
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Ontario distribution



seasonal occurrence



infestation rates

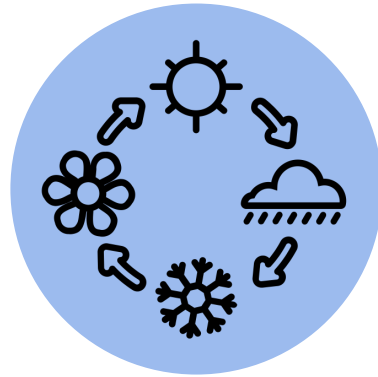


# Project objectives

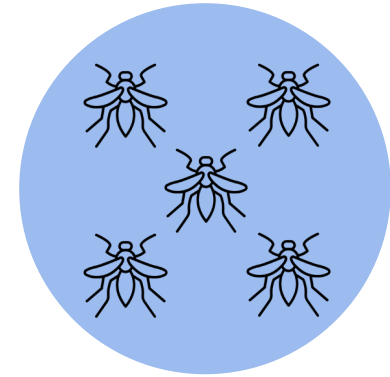
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Ontario distribution



seasonal occurrence



infestation rates



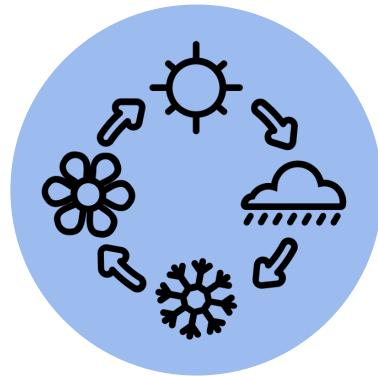
injury symptoms

# Project objectives

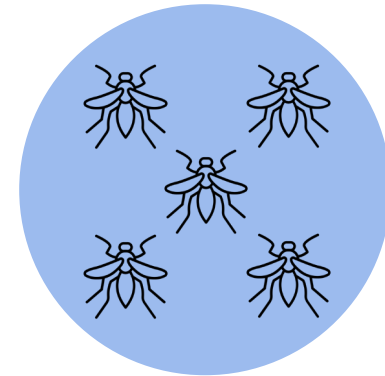
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Ontario distribution



seasonal occurrence



infestation rates



injury symptoms



in-field distribution

# Project objectives

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monitor

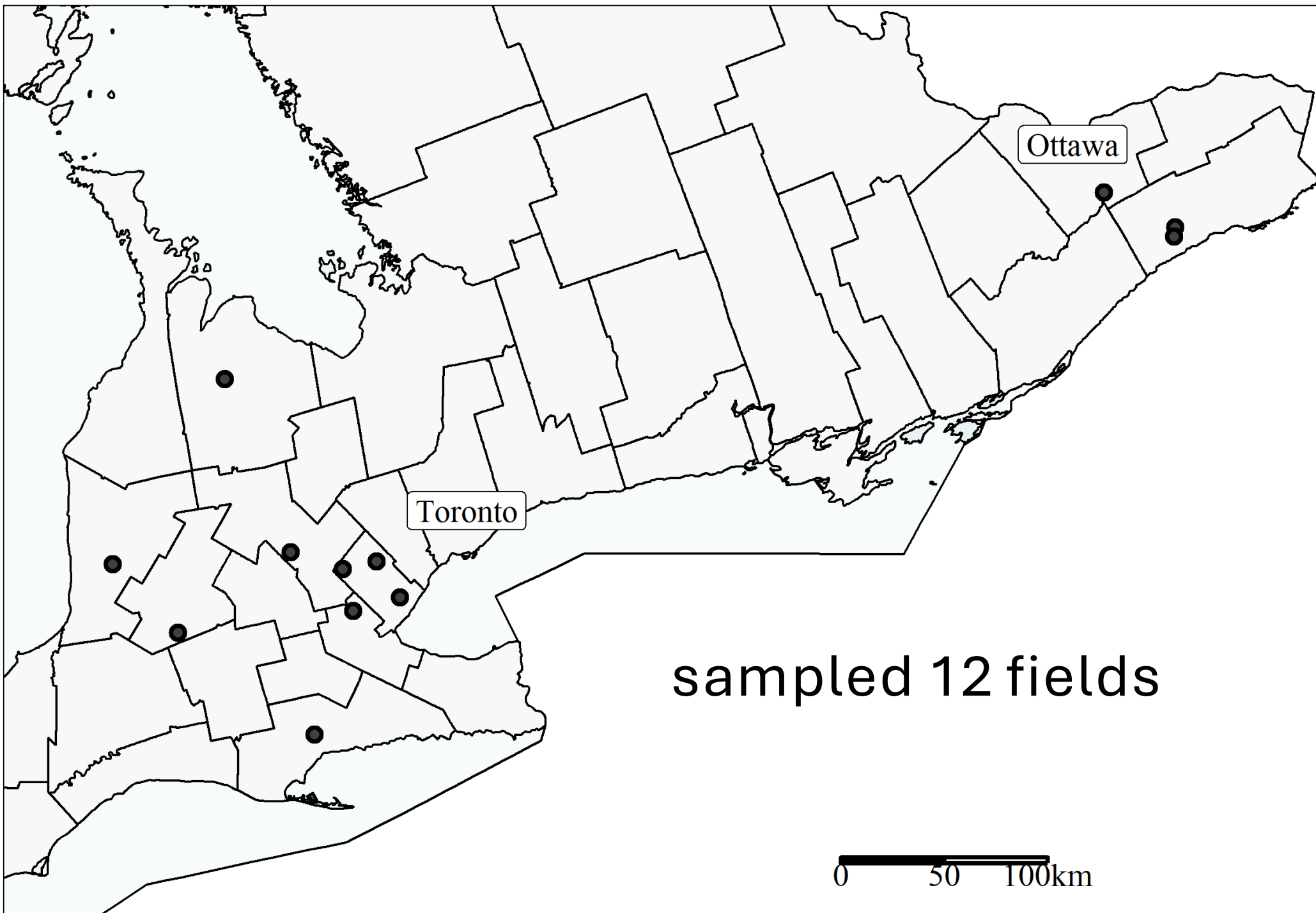


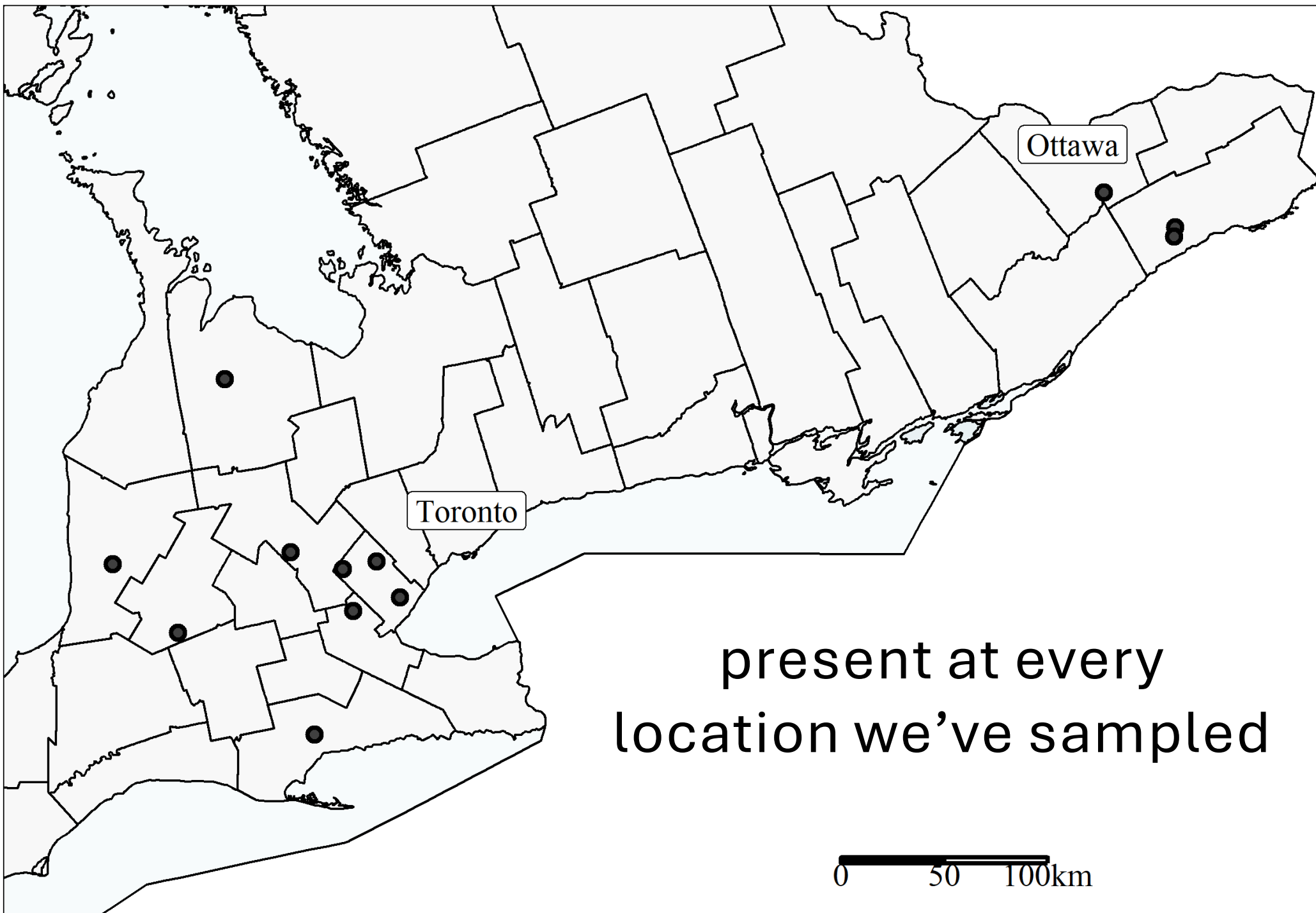
manage



# Distribution in Ontario

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# Seasonal occurrence and infestation rates

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# Plant sampling

2022 (1 field) and 2023 (3 fields)

weekly plant sampling

- May → October (until cutting)
- before reproductive stage: randomly sampled 80 plants
- as of reproductive stage: sampled 50 plants with SGM-like injury

November, January → May (until cut crop removed)

- occasional or weekly sampling of standing and cut plants

dissected plants and looked for SGM





# Adult trapping

2022: sticky traps at edge of field

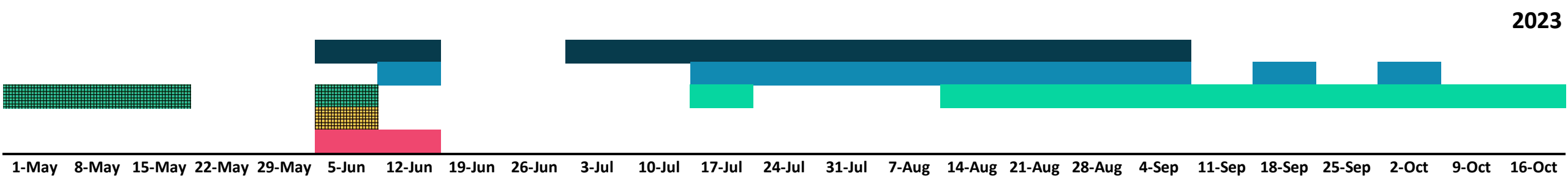
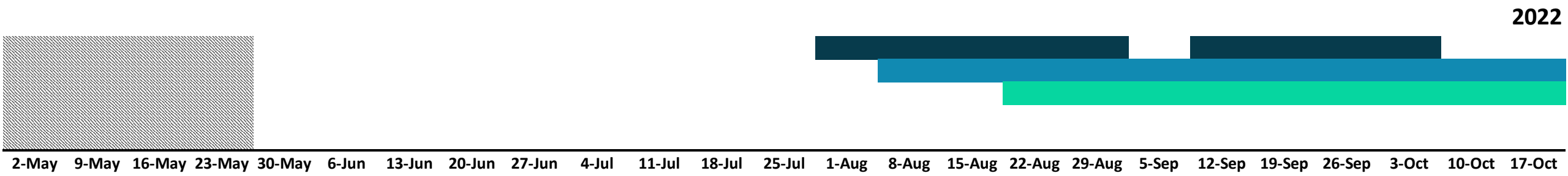
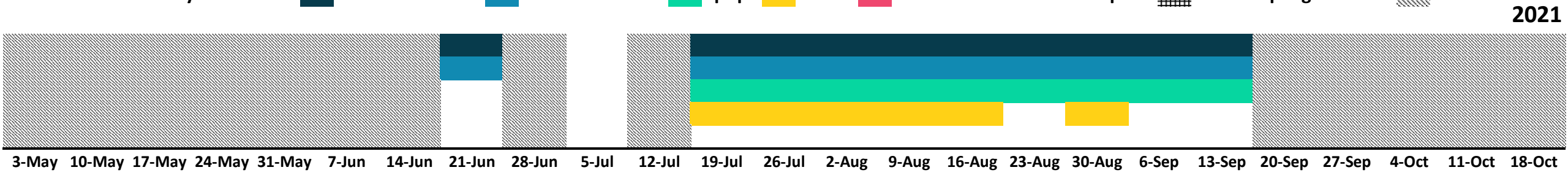
2023: cages at edge of field

- one/field, May → July
- placed overwintered (from 2022 crop) cut and standing plants inside and placed sticky traps around top inside border



# SGM seasonal occurrence

early-instar larva 
 mid-instar larva 
 late-instar larva 
 pupa 
 adult 
 found on overwintered plant 
 no sampling occurred 



Sampling Week

# Infestation rates

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overall, generally low

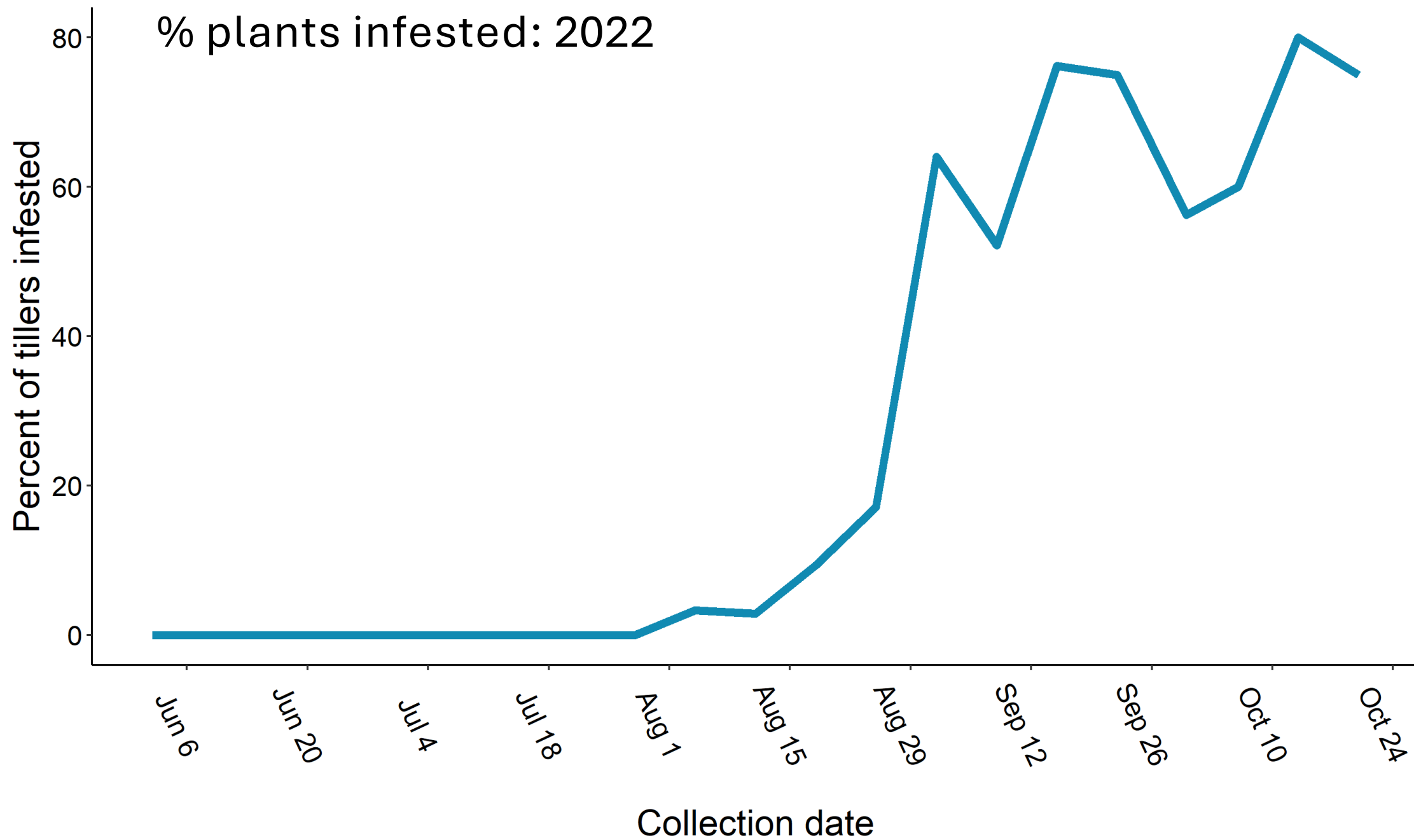
- varies from field to field
- varies from year to year within a field

2022: 1150 plants sampled, 143 (12%) contained SGM

2023: 3828 plants sampled, 913 (24%) contained SGM



# % plants infested: 2022



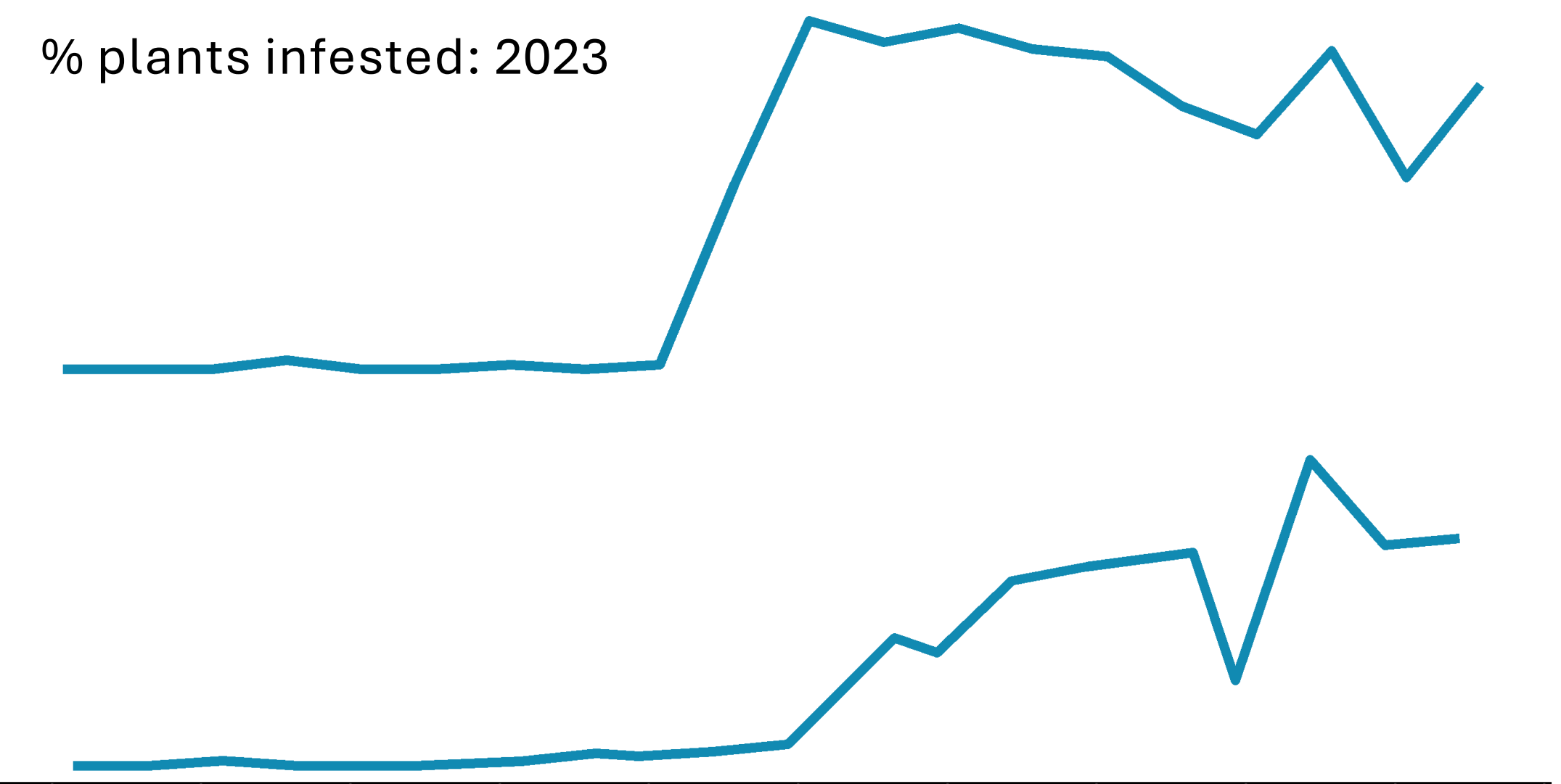
% plants infested: 2023

Percent of tillers infested

100  
75  
50  
25  
0  
100  
75  
50  
25  
0

May 23 Jun 6 Jun 20 Jul 4 Jul 18 Aug 1 Aug 15 Aug 29 Sep 12 Sep 26 Oct 10

Collection date



# larvae/plant: 2022

Number SGM larvae per tiller

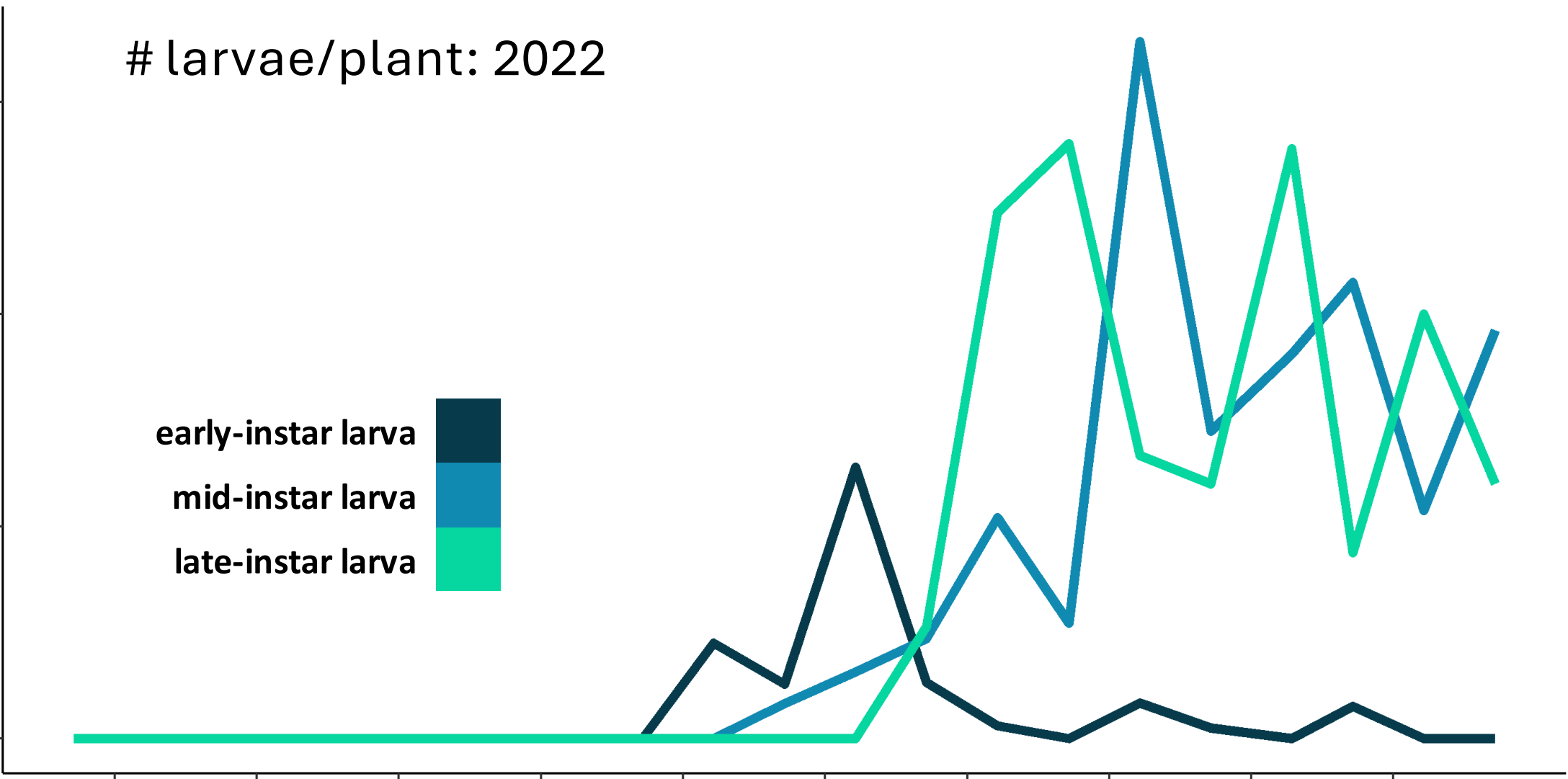
early-instar larva  
mid-instar larva  
late-instar larva



6  
4  
2  
0

Jun 6 Jun 20 Jul 4 Jul 18 Aug 1 Aug 15 Aug 29 Sep 12 Sep 26 Oct 10

Collection date



# larvae/plant: 2023

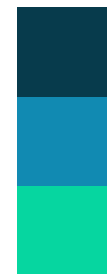
Number SGM larvae per tiller

30  
20  
10  
0

early-instar larva

mid-instar larva

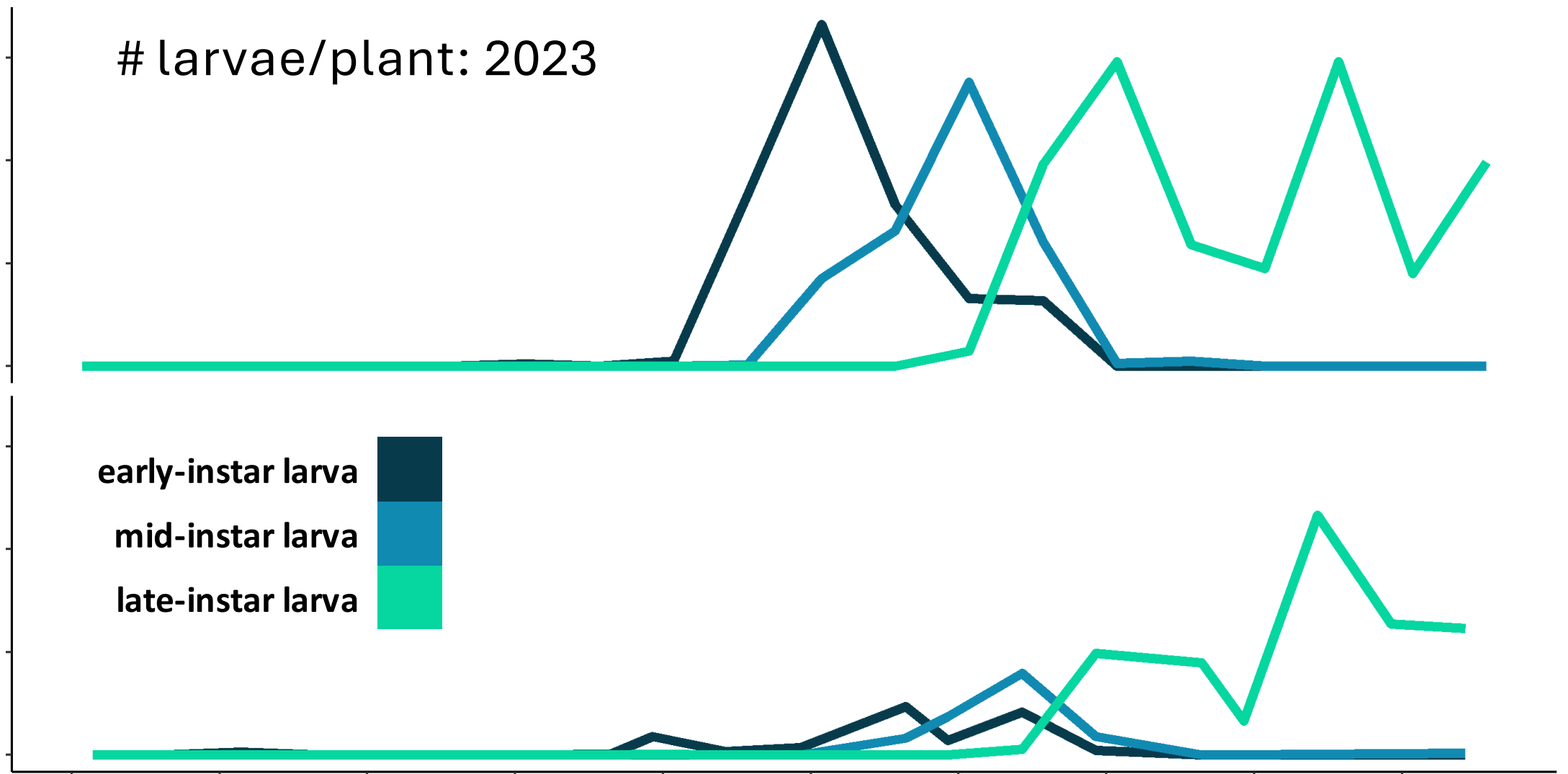
late-instar larva



30  
20  
10  
0

May 23 Jun 6 Jun 20 Jul 4 Jul 18 Aug 1 Aug 15 Aug 29 Sep 12 Sep 26

Collection date



# Pupae and adults

finding them in the field has been tricky

pupate in the spring

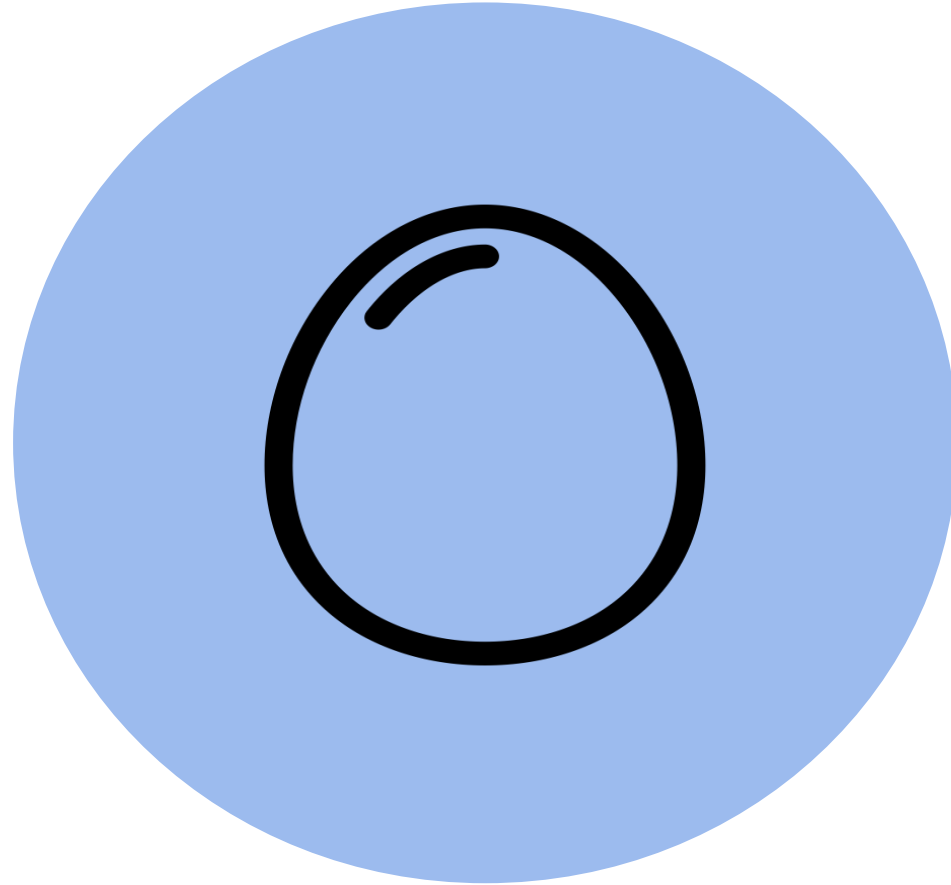
- in switchgrass plants → removed with crop?
- likely also use wild plants as hosts
- some may pupate in soil

have trapped only 2 adults

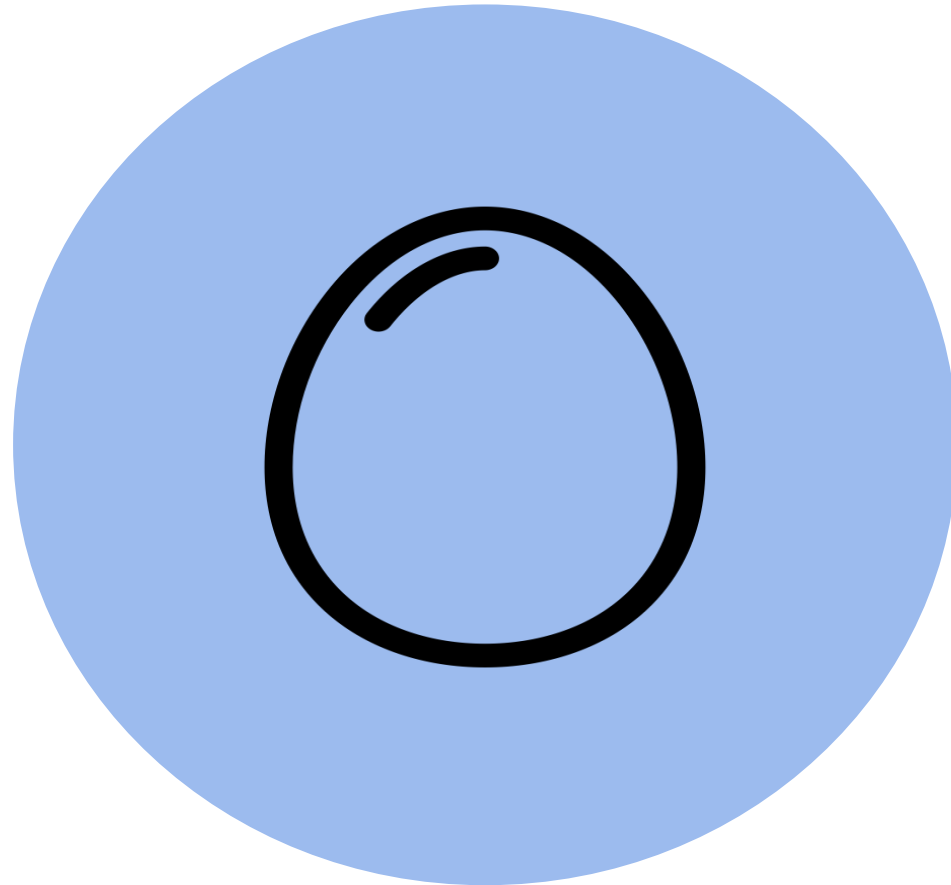




# Eggs



# Eggs



can't find them!



adults(?)



eggs(?)



larvae



pupae(?)

May

Jun

Jul

Aug

Sep

Oct

Nov

Dec

Jan

Feb

Mar

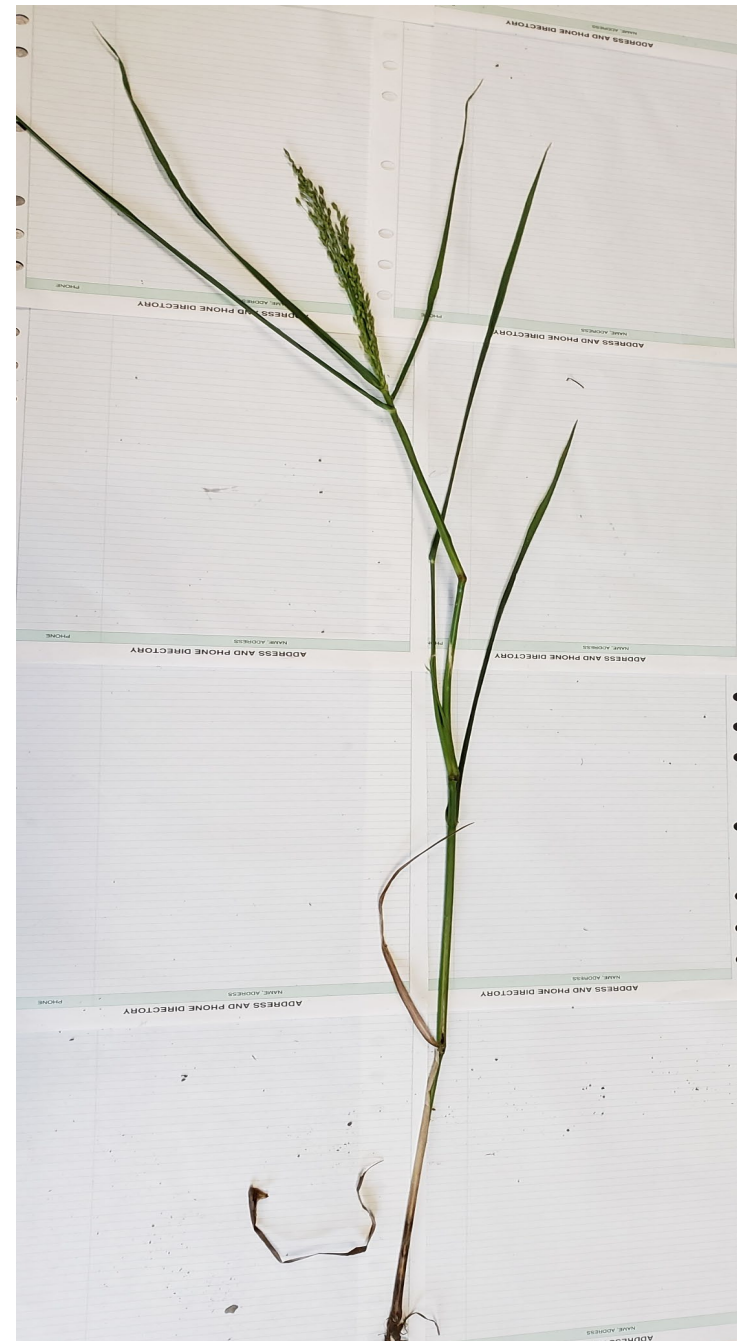
Apr

May

# Injury symptoms

2023: took a photo and recorded growth stage of every plant we sampled

- currently analyzing
- general injury description
- does injury correlate with larval numbers?
- what proportion of injured plants contain SGM?





# In-field distribution

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2022



2023



120 m

480 m



# Next steps





# What we're doing next

## more weekly sampling

- sampling from uncut 2023 stand throughout spring (thanks, James!)
- hopefully find pupae

## more adult trapping

- new type of cage



Photo:  
Hannah Fraser

# What we're doing next

cage studies: eggs

- release adults on caged plants

more field transects

new MSc student: Clarissa Capko



Photo:  
Hannah Fraser

# What we're doing next

more funding: NSERC Alliance grant

DNA barcoding of SGM and parasitoids

identify and synthesize SGM pheromone

- lure for trapping and monitoring adults



# Acknowledgements

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funding: grants from Ontario Agrifood Innovation Alliance and NSERC Alliance

Ontario Biomass Producers Cooperative

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