Historical trends in cranberry pest populations and their dependence on key climate variables

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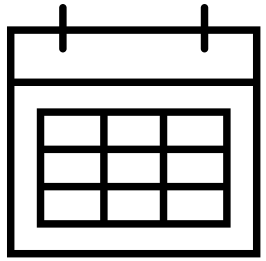
Background

- Early pest detection can help farmers to effectively manage pest problems & protect our food systems
- **Changes in weather can affect the timing of insect development and abundance**



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Insects & Temperature

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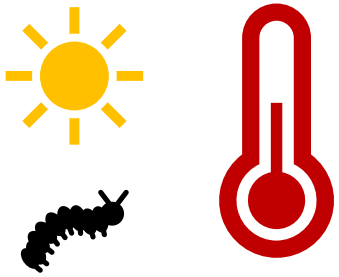

Insects & Temperature

- Insects accumulate degree days or "***heat units***" over time from daily temperatures
- Daily temperatures need to be above their **minimum temperature threshold** for them to **properly grow, develop and reproduce**

Insects & Freezing Days

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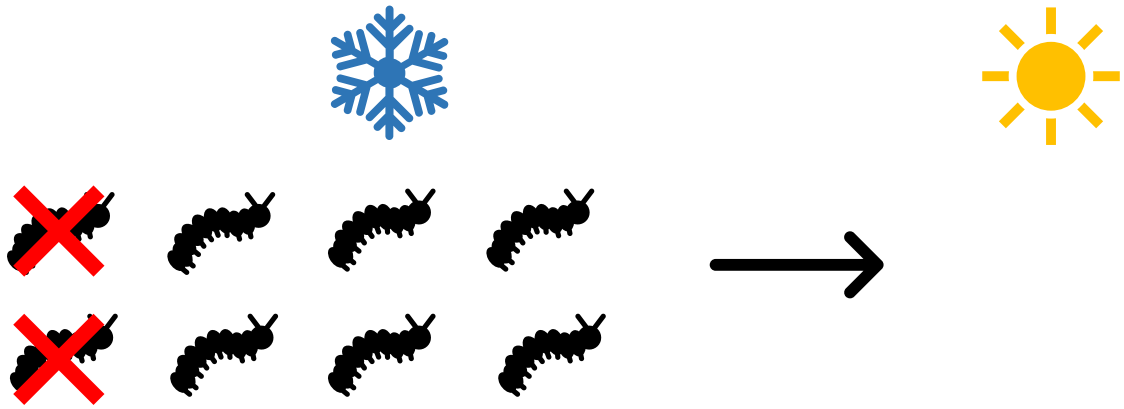

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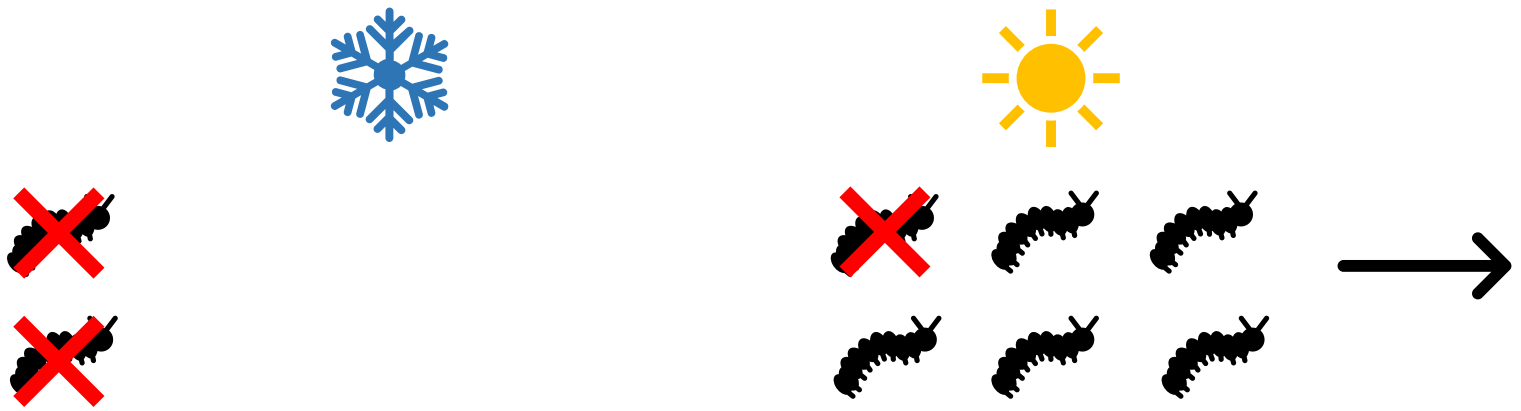
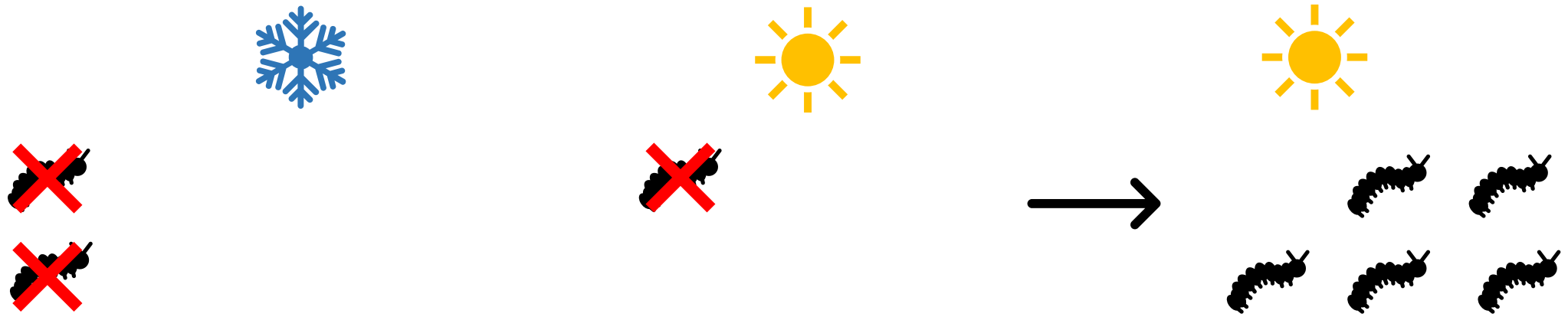
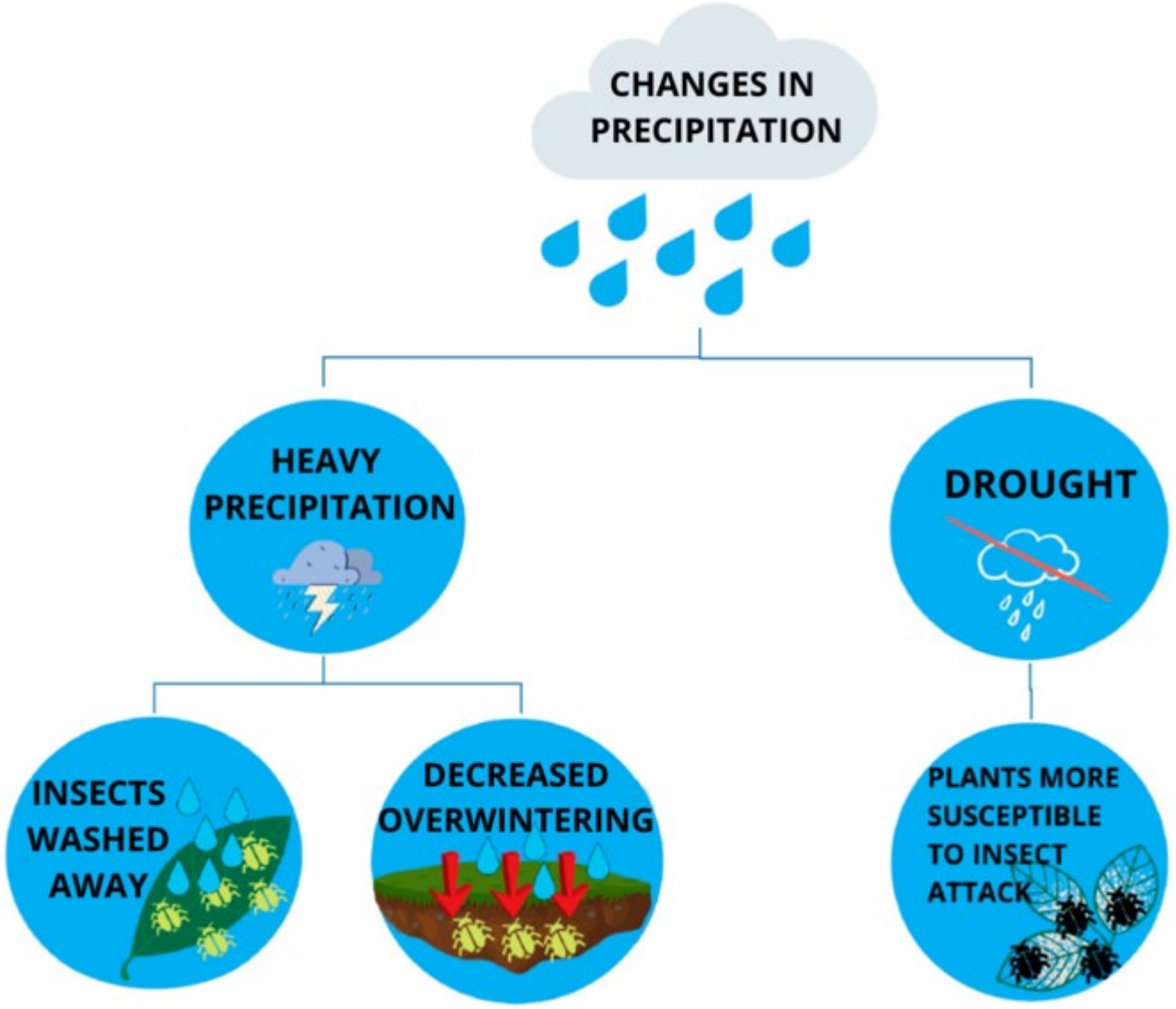


Insects & Freezing Days

- **Fewer days** of freezing during overwintering:
  - Shortens overwintering period (**emerge earlier next season**)
  - Increases survival, not cold enough to supress populations (**higher abundance next season**)



Insects & Precipitation



Skendžić et al., (2021)

Project

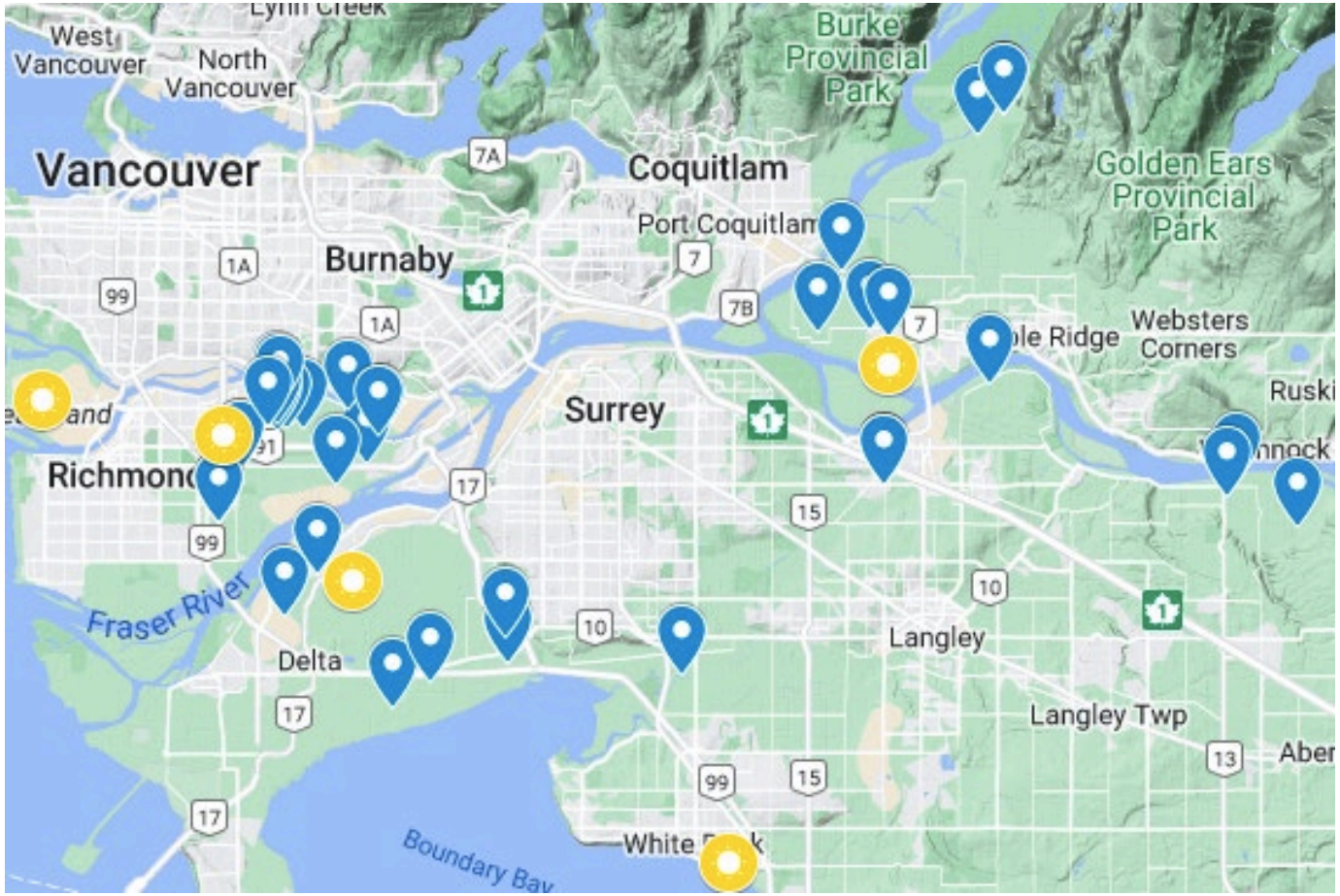
- British Columbia (BC), Canada produces >$35 million/year in cranberry sales
- Integrated pest management (IPM) supports production levels, by monitoring lower mainland, BC fields and providing pest management recommendations

Project

- Compiling decades worth of yearly IPM monitoring records can provide information on:
  - Long-term insect pest biology patterns
  - Understand how they affected by weather variables
  - Help determine future control methods

E.S. Cropconsult Fields & Sites

Sites	Years
Richmond	1991 – 2020
Delta	1994 – 2020
Langley	1995 – 2020
Pitt Meadows	1995 – 2020



Google Maps, 2023

Cranberry Insect Pests

Blackheaded fireworm
(*Rhopobota naevana*)

Cranberry girdlers (*Chrysoteuchia topiaria*)

Cranberry sparganothis fruitworm
(*Sparganothis sulfureana*)

Cranberry fruitworm (*Acrobasis vaccinii*)

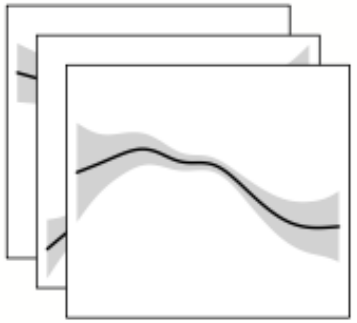
Main Questions

1) Which **field sites** show differences in insect abundance levels?
2) Are they changing **over time**?
3) Are **climatic variables** causing differences to insect population levels **among field sites and over the years?**

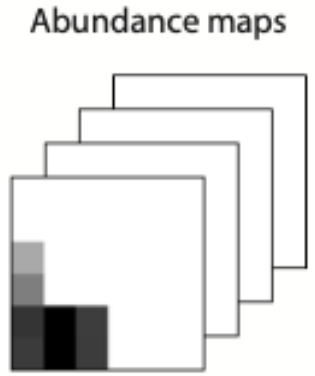
Methods & Analysis

1. Different sites and years

2. Understand relationships between abundance and climatic variables ***Make predictions**



3. Represent abundance among sites and over time
***Does it change and which years or sites?**
***Which climate variables are causing changes?**



(1) Government of BC Maps ArcGIS ERSI, 2023 & (2,3,4) Lacasella F et al., 2017

Significance

- Inform future cranberry pest management practices
- Proactively mitigate pest risks effectively with changing weather patterns

Thank You & Acknowledgments

Thank you!

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