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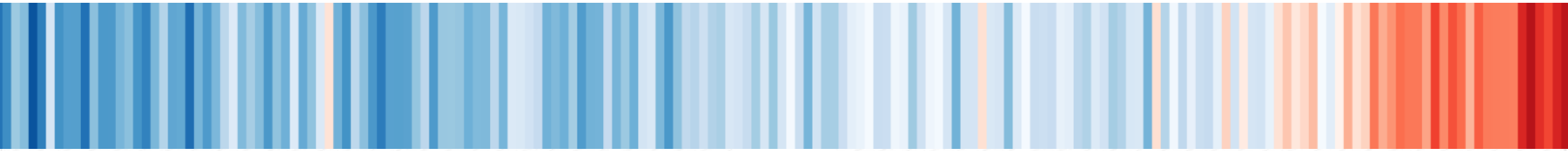
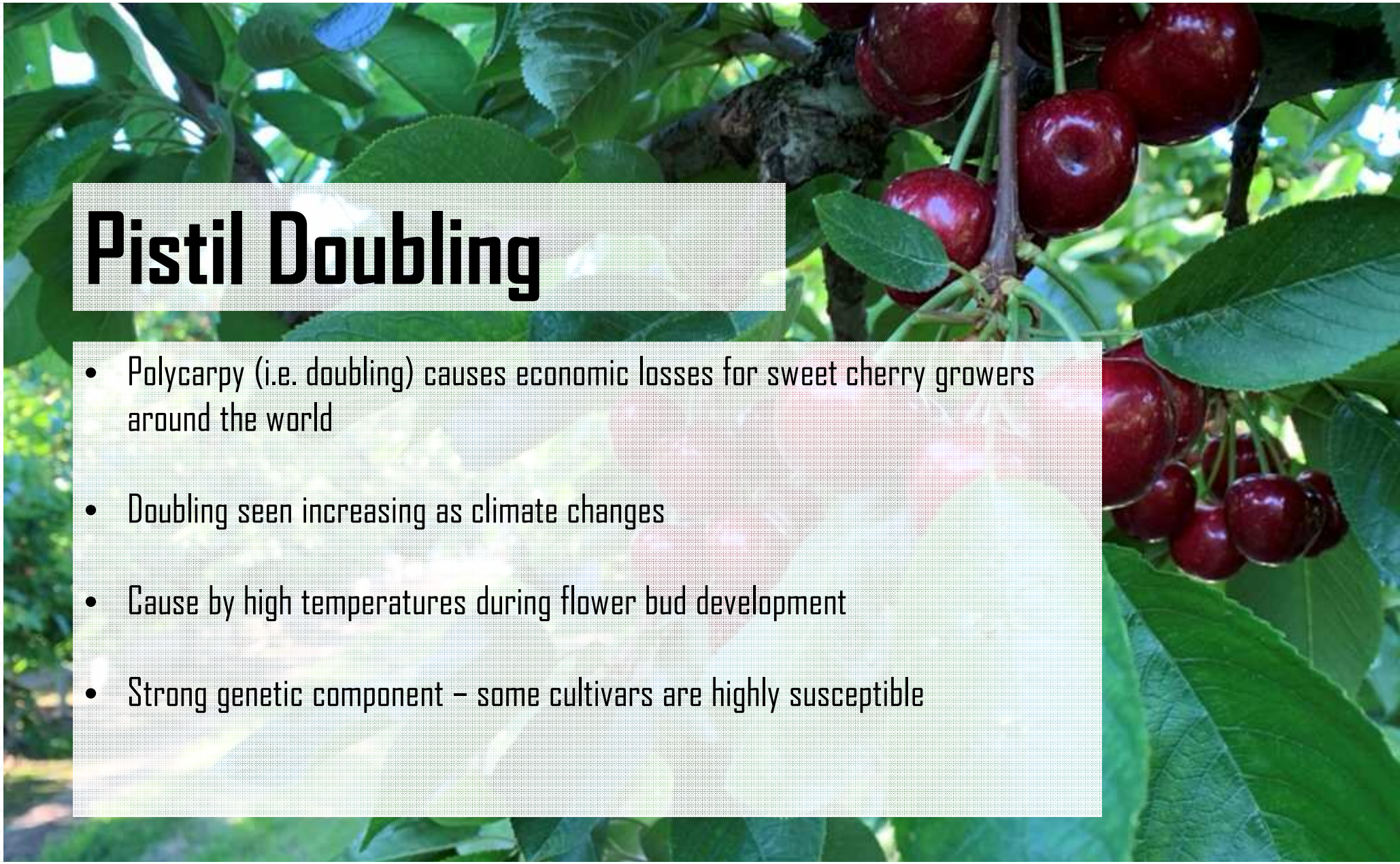
Causes of, and cures for polycarpy in sweet cherry

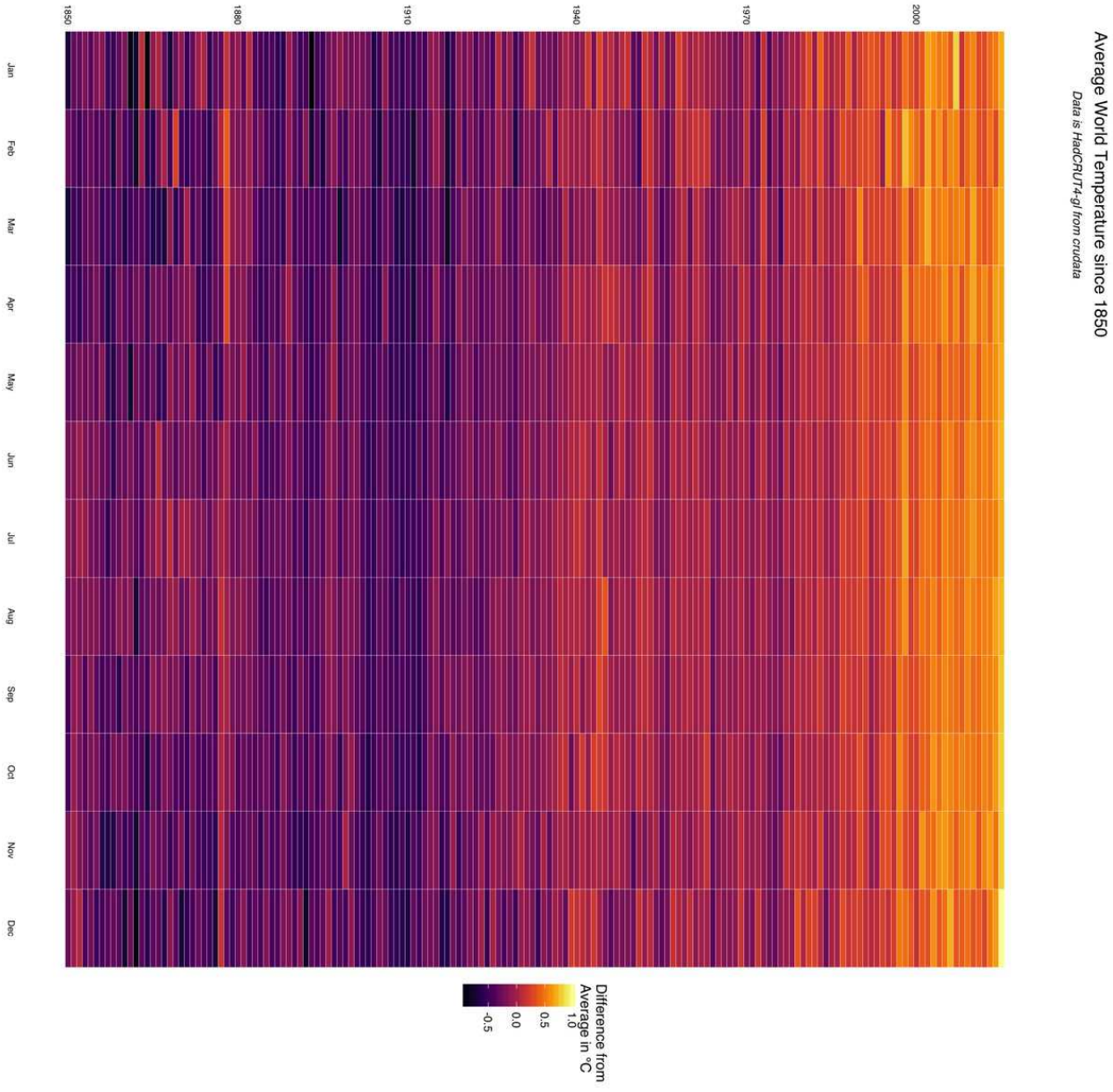
Matthew Whiting
Department of Horticulture





Pistil Doubling

- Polycarpy (i.e. doubling) causes economic losses for sweet cherry growers around the world
- Doubling seen increasing as climate changes
- Cause by high temperatures during flower bud development
- Strong genetic component – some cultivars are highly susceptible


Average World Temperature since 1850
Data is HadCRUT4-gl from crudata
1850
1880
1910
1940
1970
2000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Difference from Average in °C
-0.5
0.0
0.5
1.0

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Our Research Objectives:

1. Elucidate seasonal trends in flower bud initiation and organ differentiation for many cultivars
2. Determine seasonal susceptibility to doubling
3. Determine time-temperature threshold for doubling
4. Compare efficacy of practical means for reducing pistil doubling

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1. Floral Organ Differentiation

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1. Organ differentiation

22 May
198 GDU

A - Chelan
B - Tieton
C - Bing
D - Skeena
E - Sweetheart

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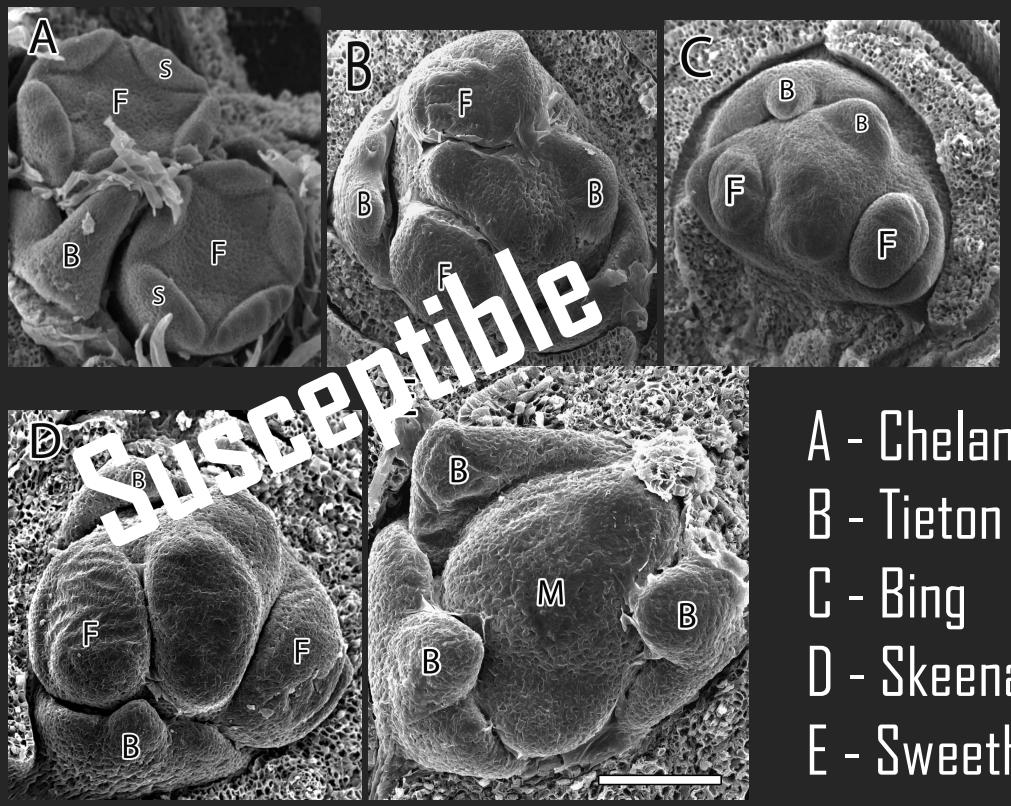
1. Organ differentiation

31 July
1405 GDU



A - Chelan
B - Tieton
C - Bing
D - Skeena
E - Sweetheart

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1. Organ differentiation

17 Aug
1733 GDU

A - Chelan
B - Tieton
C - Bing
D - Skeena
E - Sweetheart

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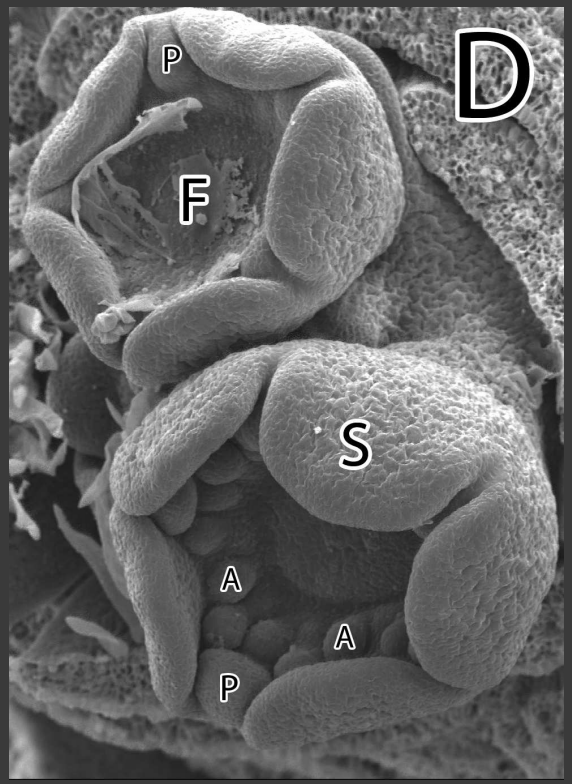
1. Organ differentiation

Significant findings:

- Significant seasonal variation in organ differentiation among cultivars
  - Early-maturing were advanced vs late
  - Variability in organ differentiation among flowers on tree, spur, and bud level



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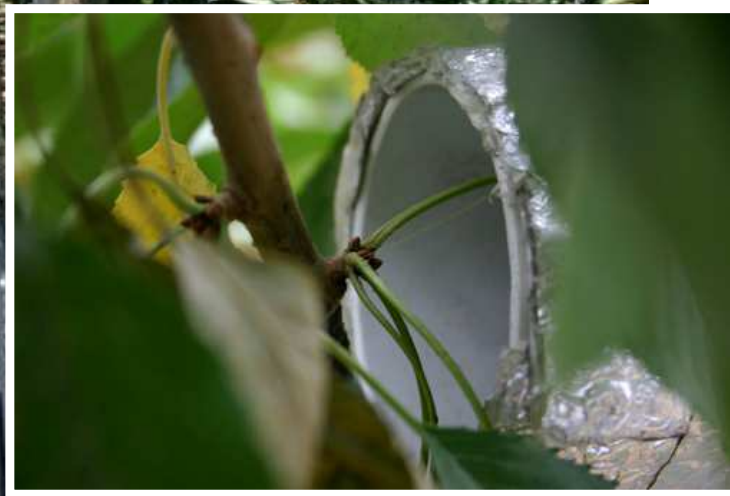
2. Periods of Susceptibility

- Research tool used to heat and cool buds (+/- 5C)

2005 – three 2-week periods
2006 – six 2-week periods
2007 – pre-heat treatment



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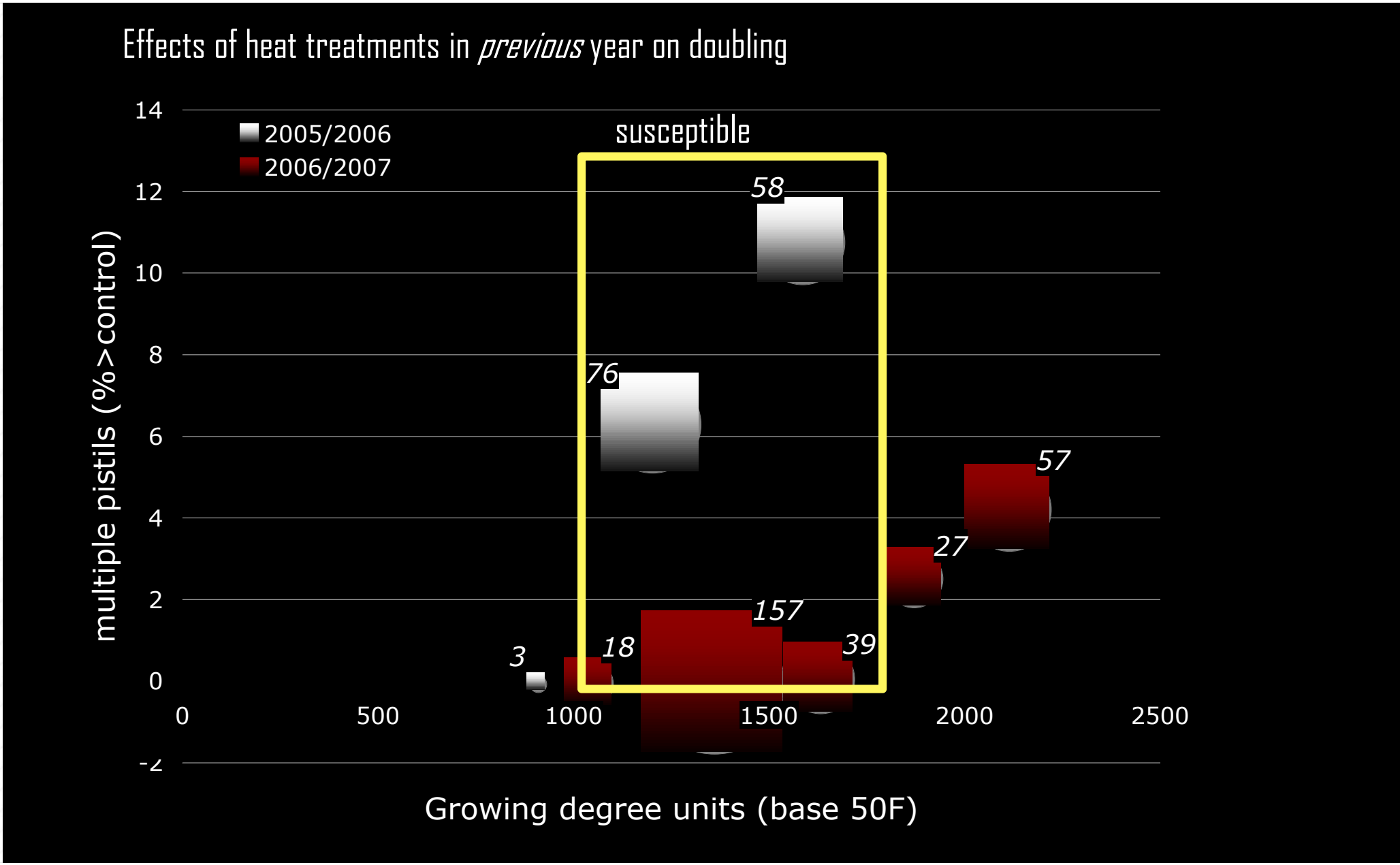

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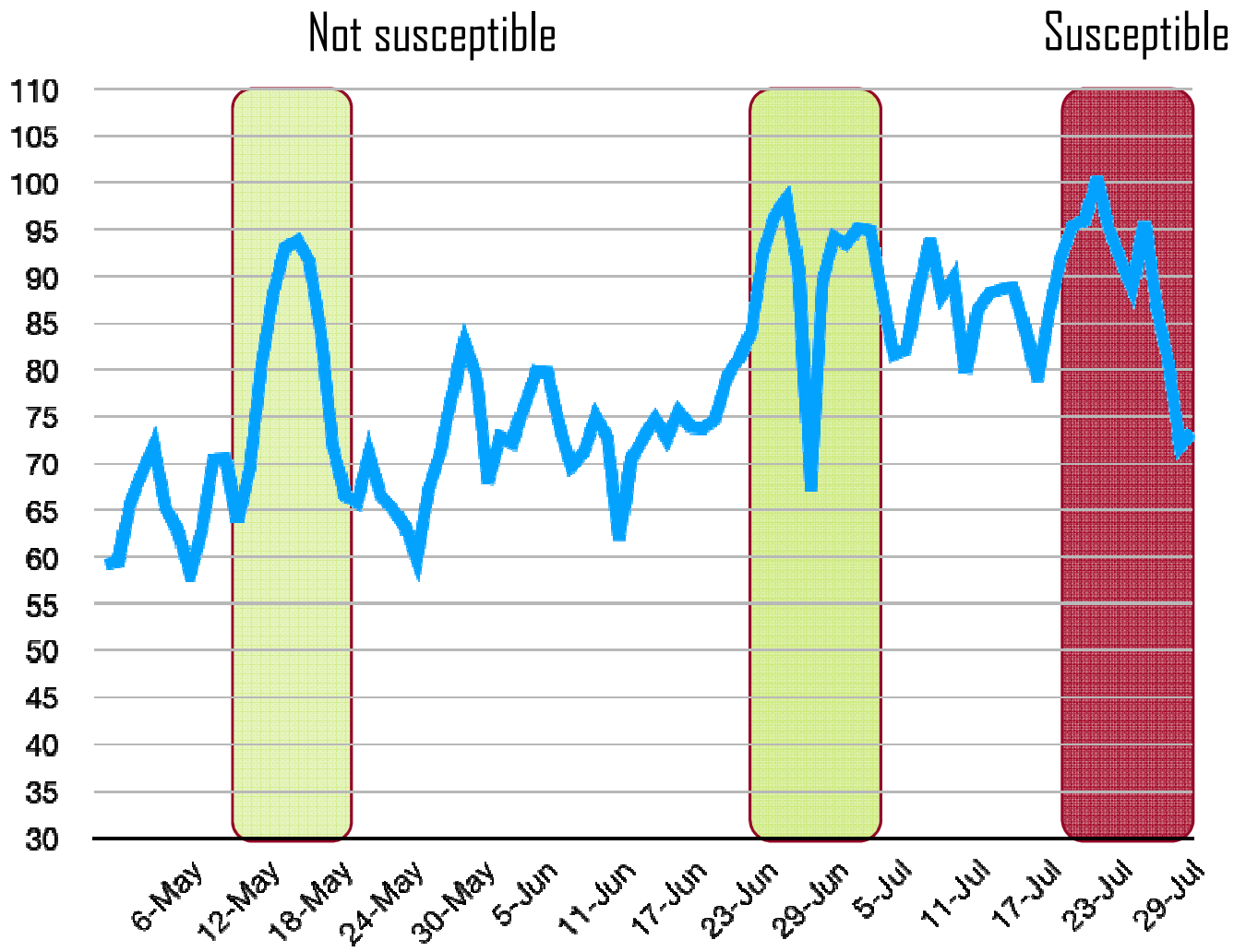
Max air temperature (2006)

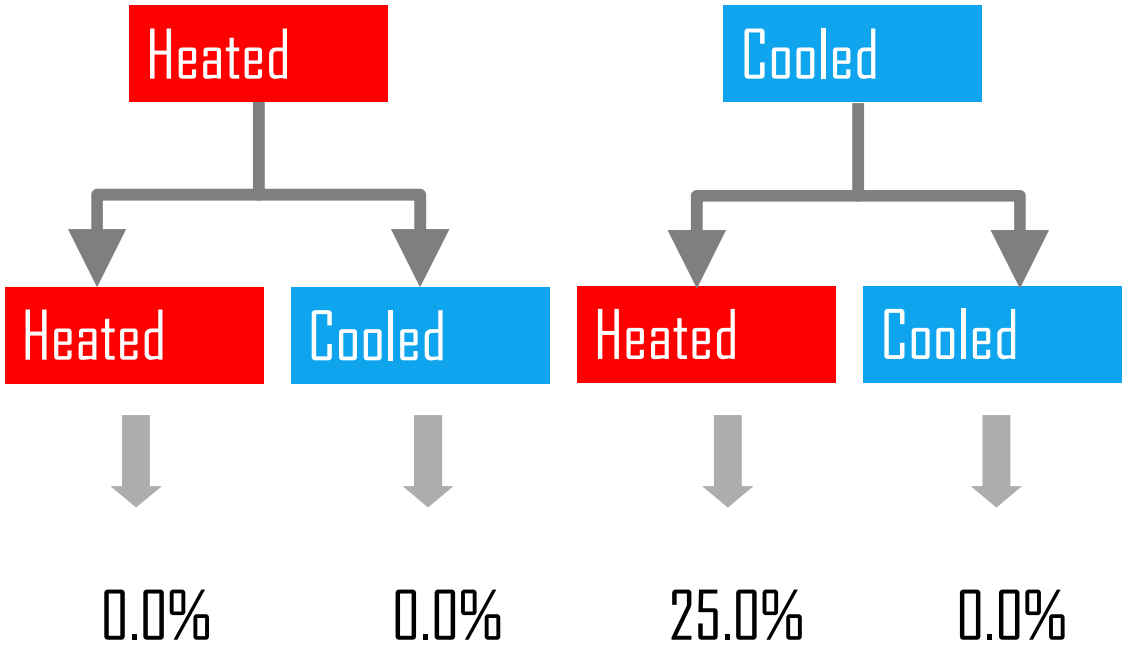


- Early heat events
- Acclimation?

Pre-heat trial

29 Jun – 7 July
Not susceptible

25 July – 10 Aug
Highly susceptible



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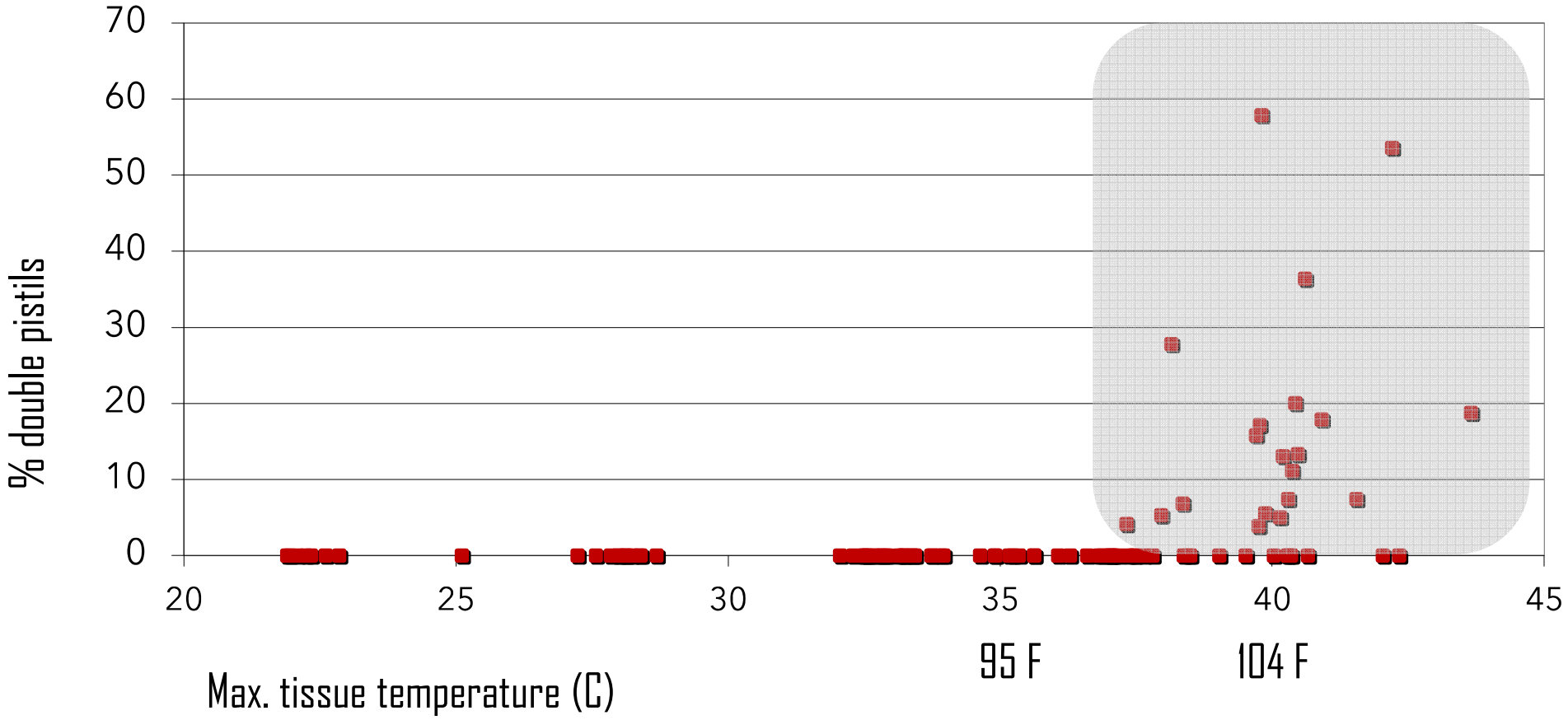
Tissue temp vs. doubling



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2. Periods of Susceptibility

- Susceptibility varies seasonally
- Not susceptible during June/early July
- Doubling induced between late July - early September
- Early heat eliminated doubling
- Doubling induced at tissue temperature exceeding ca. 37 C

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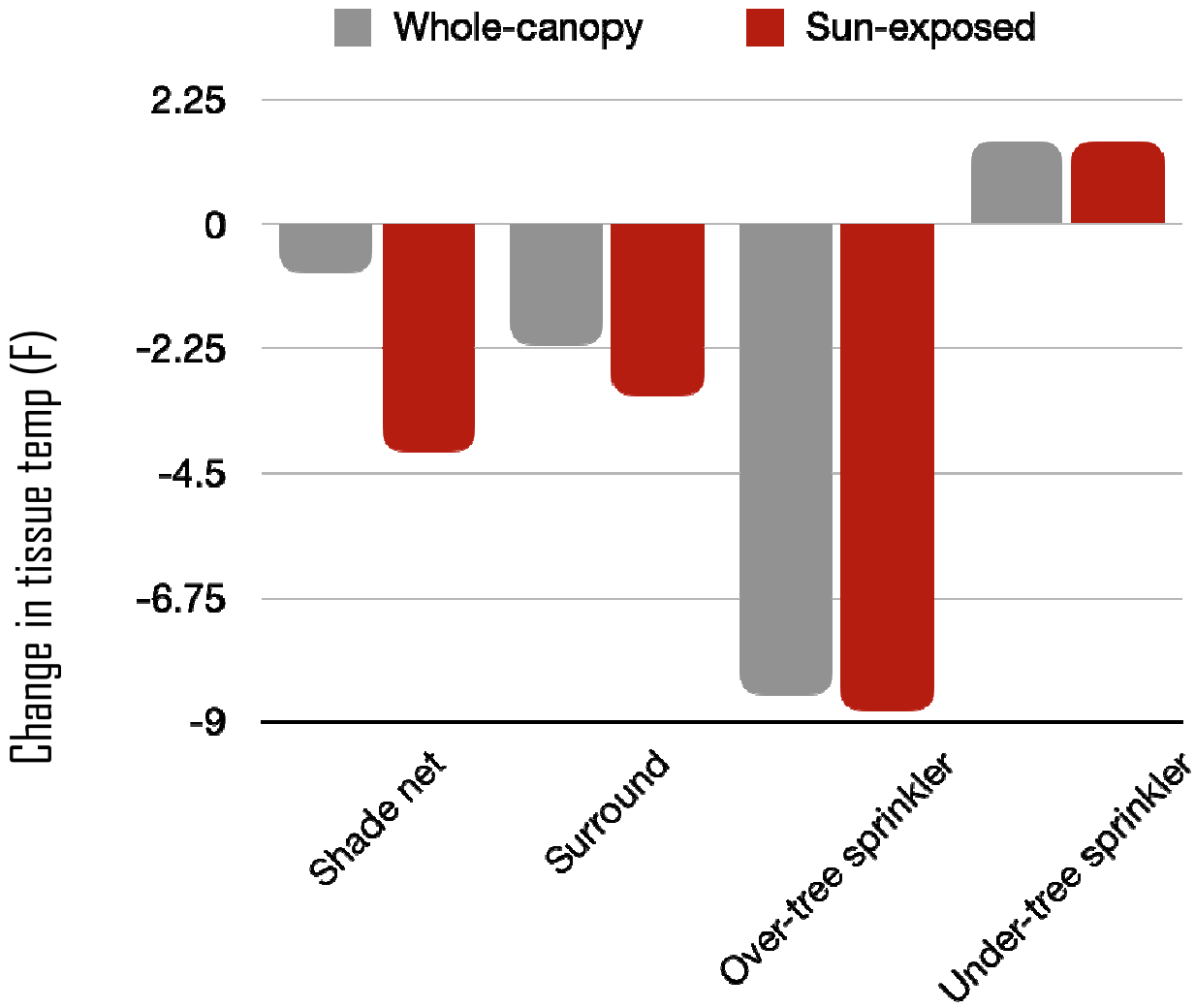
4. Preventative studies:



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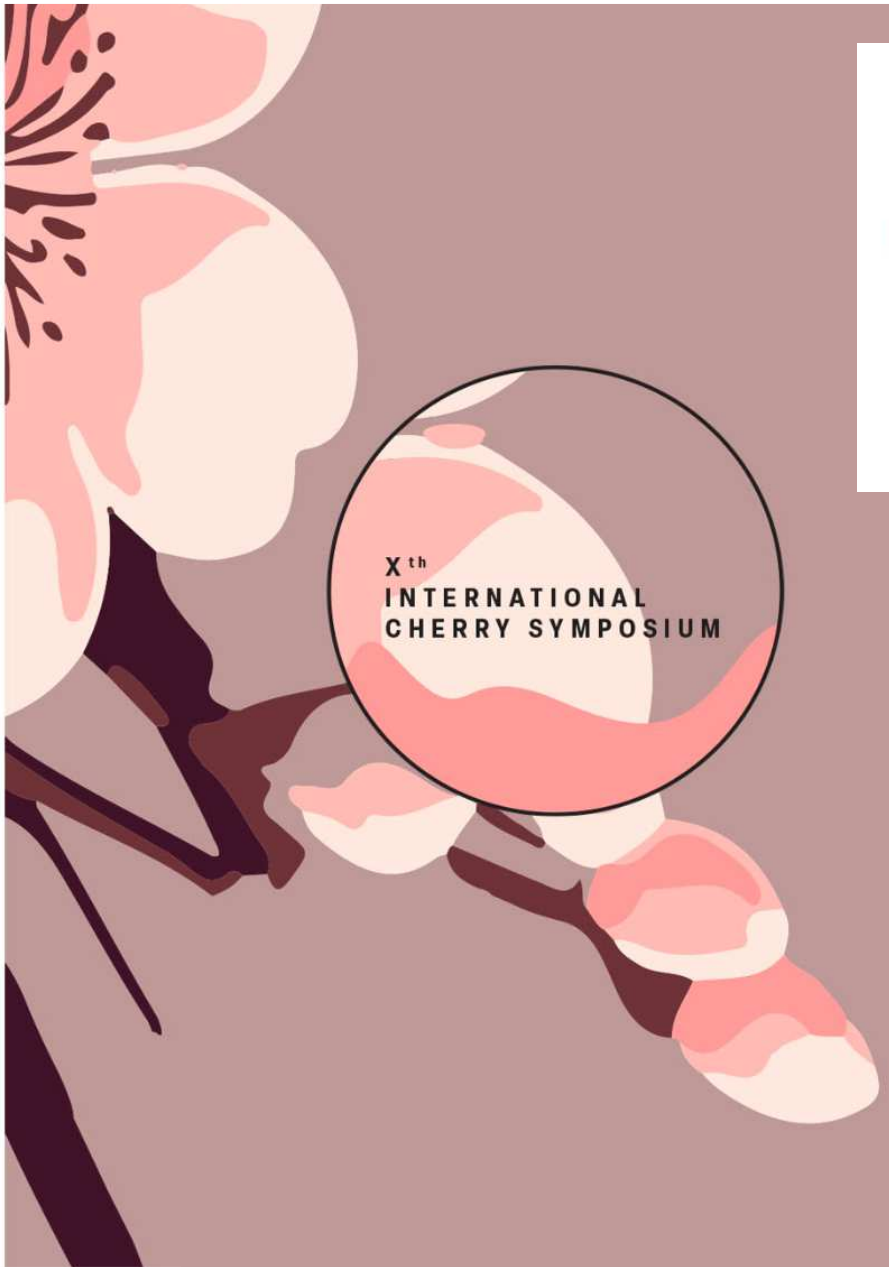
4. Preventative studies:

- Over-tree evaporative cooling is most effective at reducing T_{canopy}
- Under-tree micro sprinklers increase T_{canopy}
- Over-tree EC and Surround reduced doubling by 50% in grower trials
- Must assess doubling on whole-tree basis



10 INTERNATIONAL CHERRY SYMPOSIUM

ISHS

10th International Cherry Symposium

Washington State, USA

June 1-5, 2025

https://www.xishscherrysymposium.com/

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QUESTIONS?

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