A Survey of Botrytis fruit rot in Santa Maria strawberry fields with and without fungicides

Yu-Chen Wang
Plant pathology advisor
UC Cooperative Extension
Serving Santa Cruz, Monterey, San Benito counties

UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

LEARN BY DOING
CAL POLY
Strawberry Center

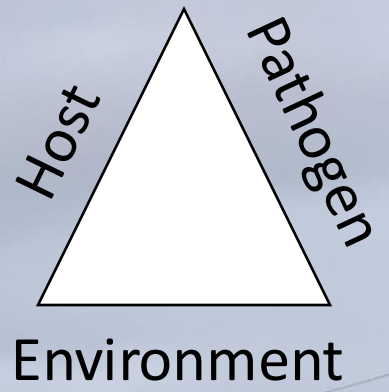
Adapted from Pestrasch et al. 2019


(Koike and Bolda, 2016)


G. J. Holmes

Optimal temperature (62°F -77°F) and prolonged free moisture (>13 hr, from rain, fog, dew, irrigation) are critical for disease development.

(Mertely et al. 2018)



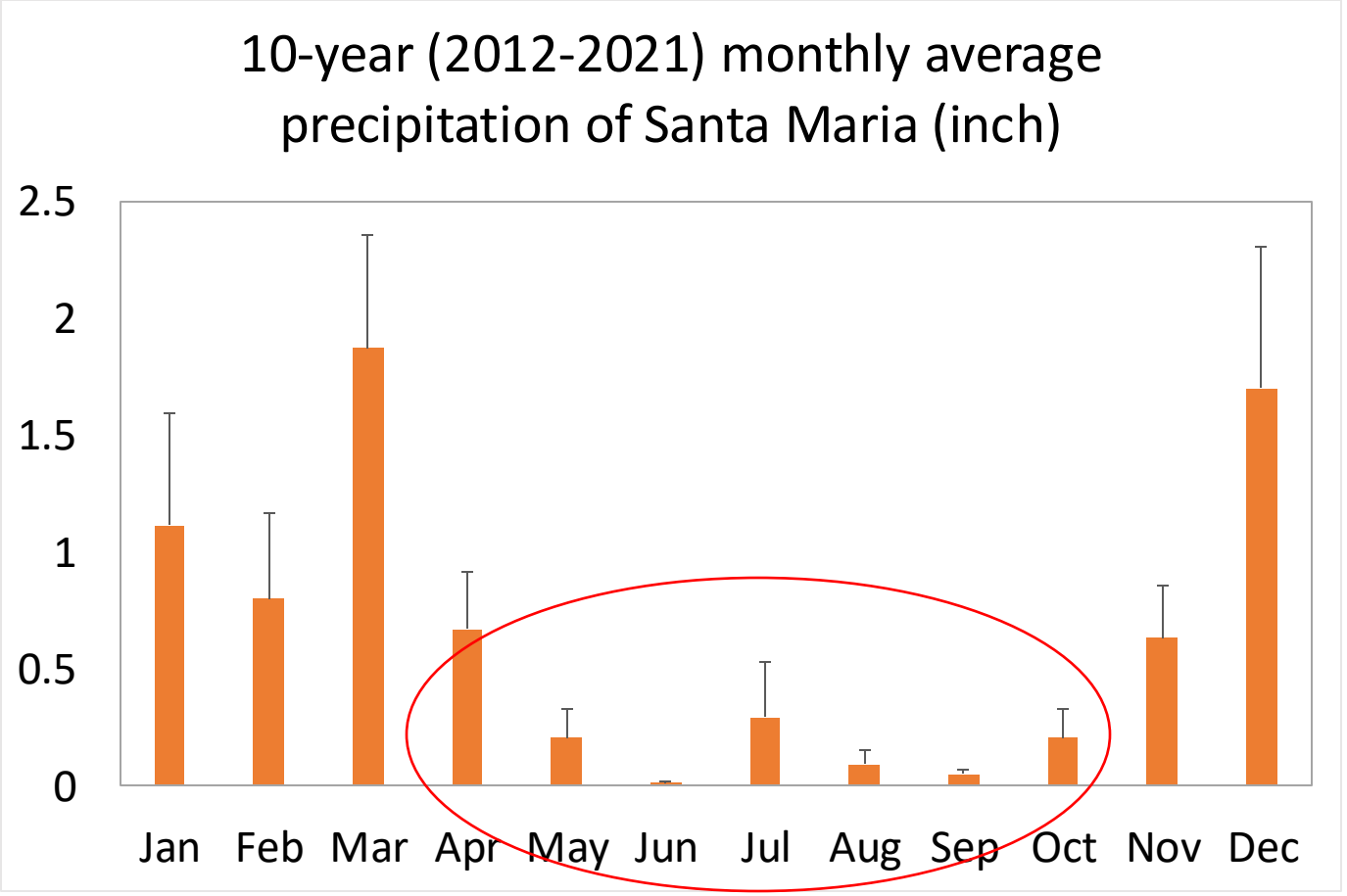
Frequent fungicide application for BFR

- Fungicide use pattern for BFR
  - 15 applications/season
  - 11.7 days of application interval
- Risk
  - Cost ($80-$100/acre)
  - Fungicide residues in fruit
  - Fungicide resistance

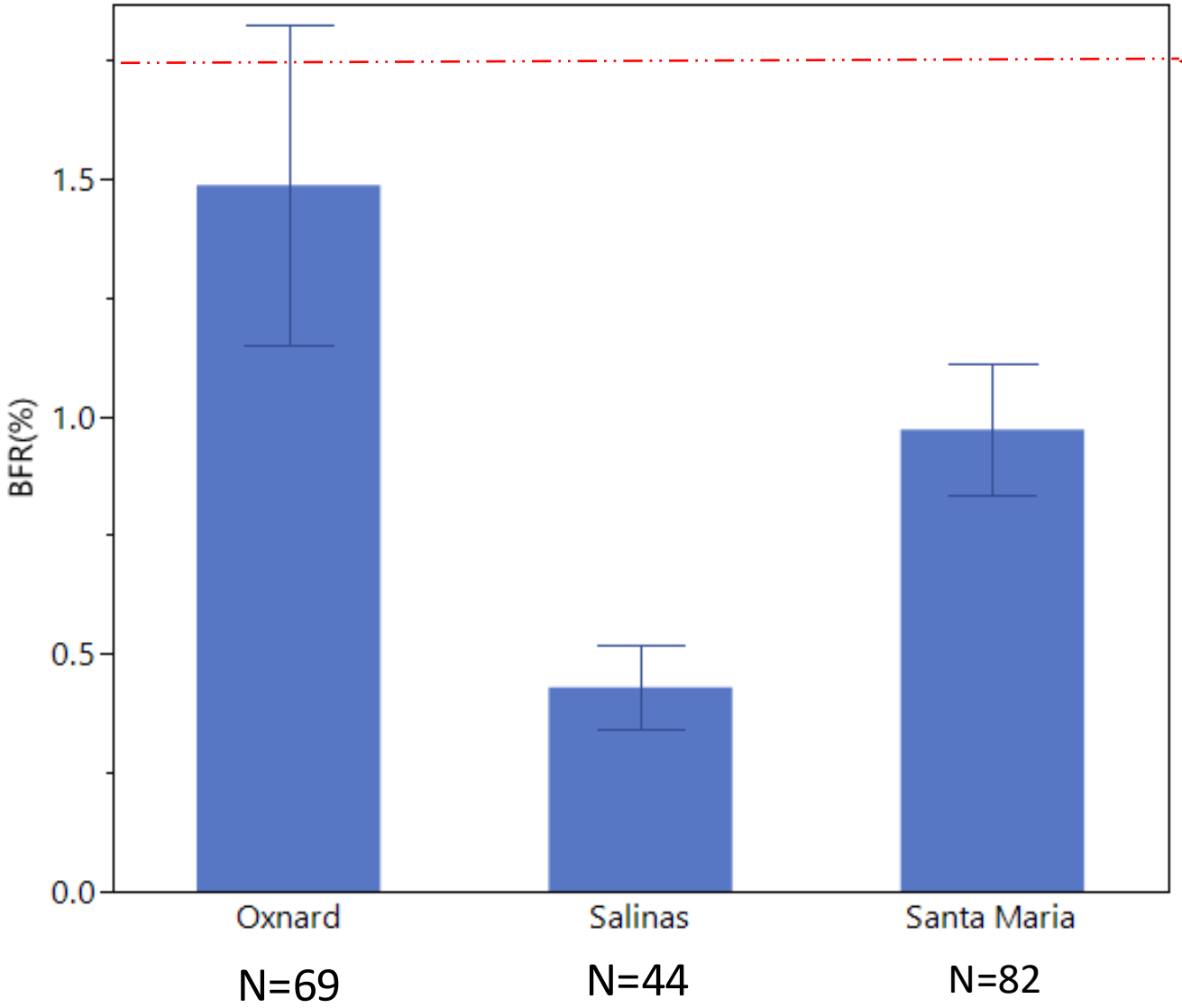
(Cosseboom et al., 2019)

Low rainfall in the production season

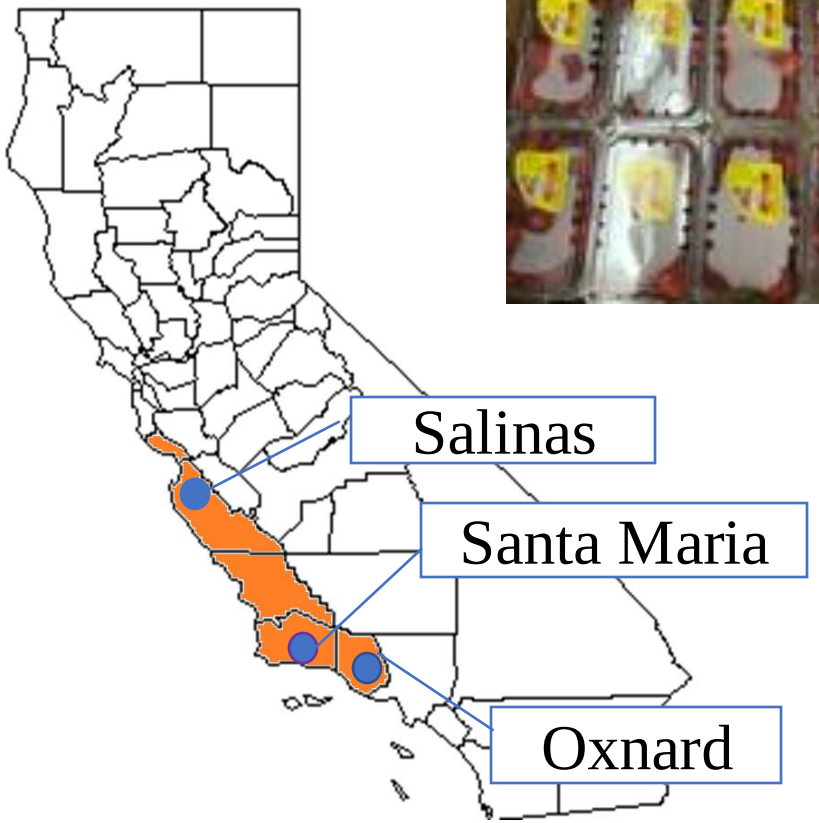
- Critical environment conditions for BFR:
  - Optimal temperature (62 -77°F; 16-25°C)
  - **Prolonged free moisture (>13 hr)**



2020: Low levels of BFR were found in all three districts



U.S. No.1 grade
<2% decay

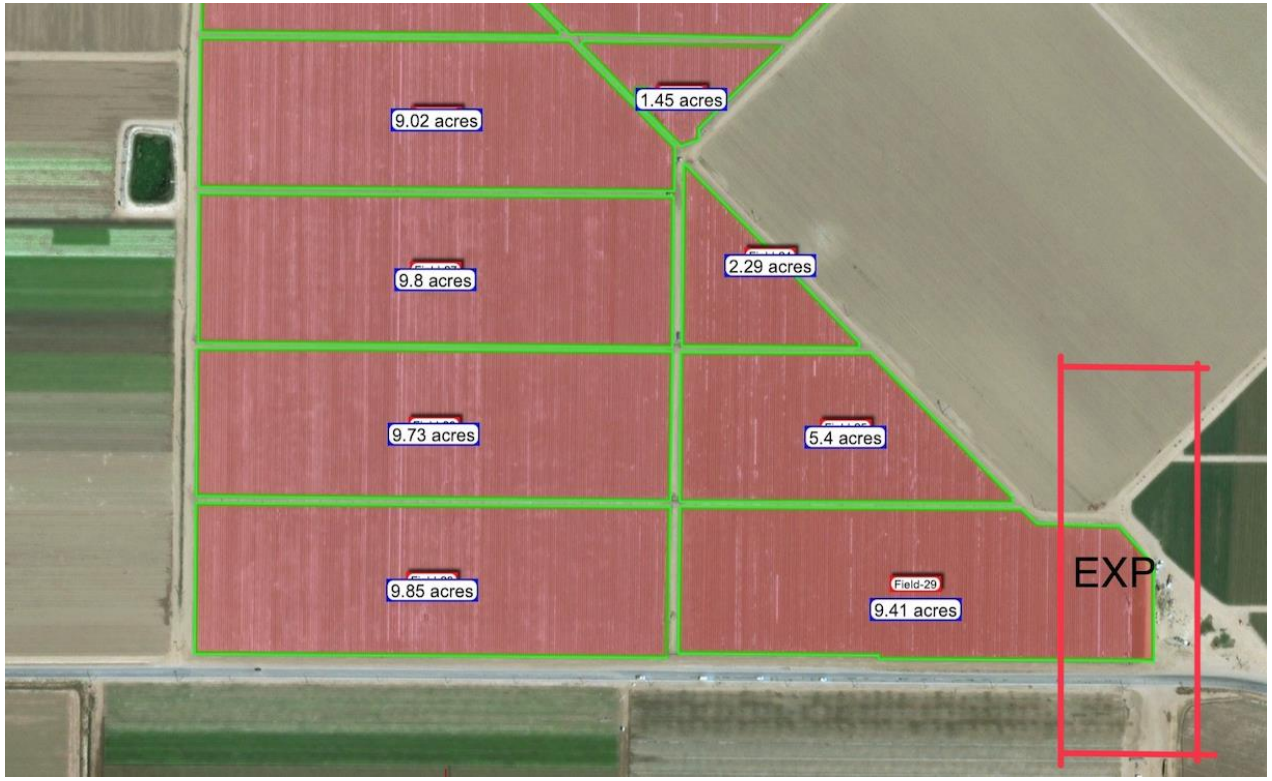


What happens if we don’t spray for BFR?

- A survey in grower’s fields to compare BFR incidence in
  - Fungicide treatment (Grower’s practice)
  - No-fungicide treatment

Fungicide and no-fungicide treatments

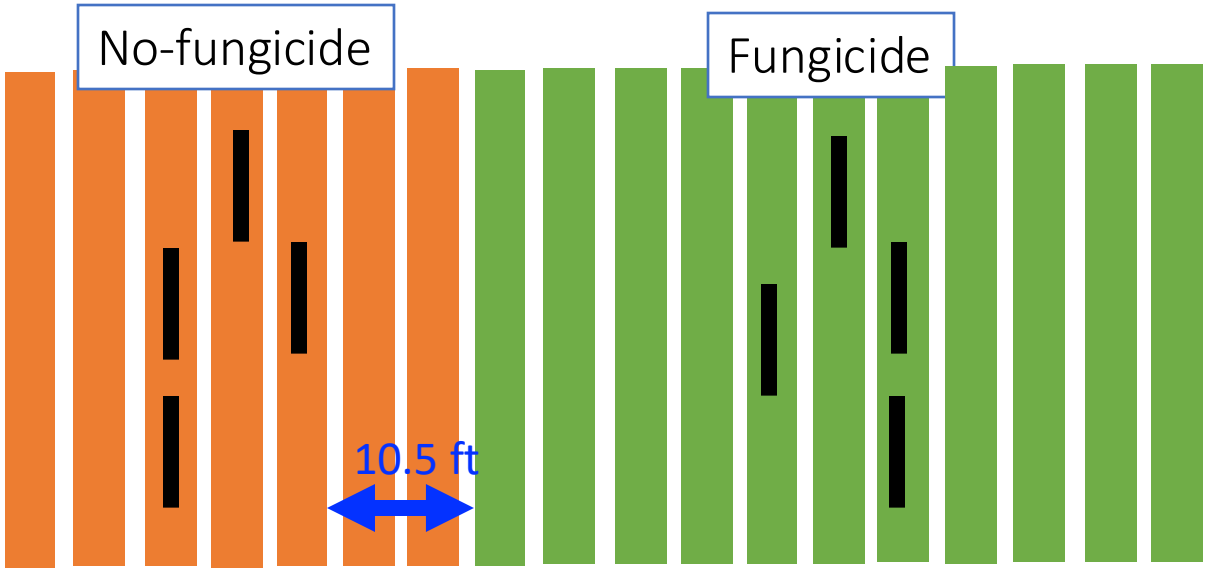
- 7 contiguous beds (about 0.2 acre) no-fungicide spraying



In-field BFR assessment

- Weekly in-field assessment:

  sampling size: 50 fruit x 4 measurements = 200 fruit

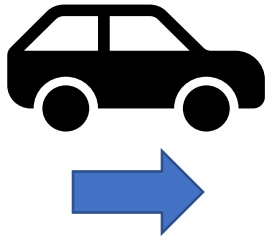


- BFR incidence (%): $\frac{\text{Number of BFR fruit}}{\text{Number of total fruit}}$ *100%

Postharvest BFR assessment

- Weekly postharvest assessment:

Marketable fruit (2 boxes) was picked and transported to Cal Poly.

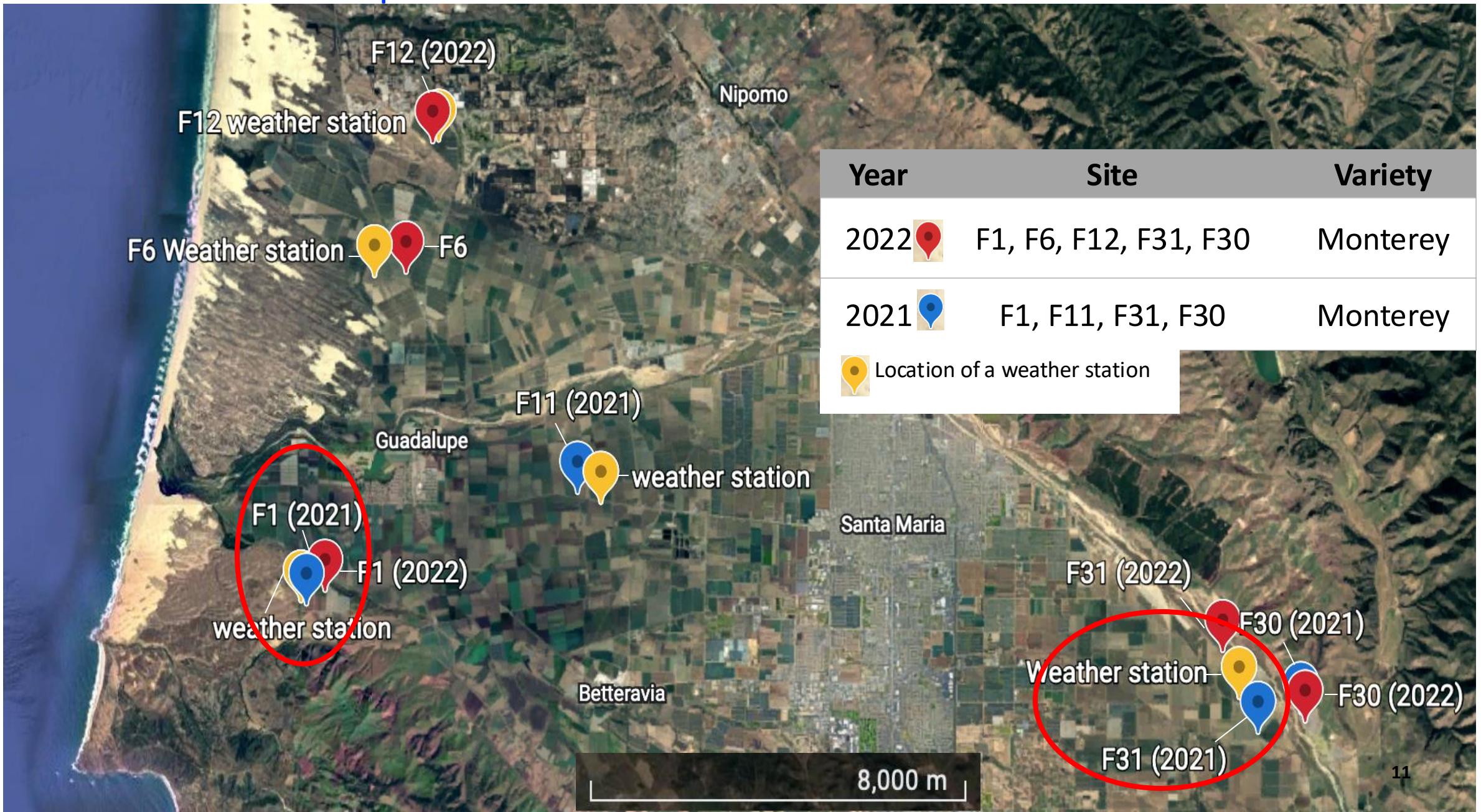


7 days storage at 36 °F (4°C)

BFR assessment

- BFR incidence (%): $\frac{\text{Number of BFR fruit}}{\text{Number of total fruit}}$ *100%

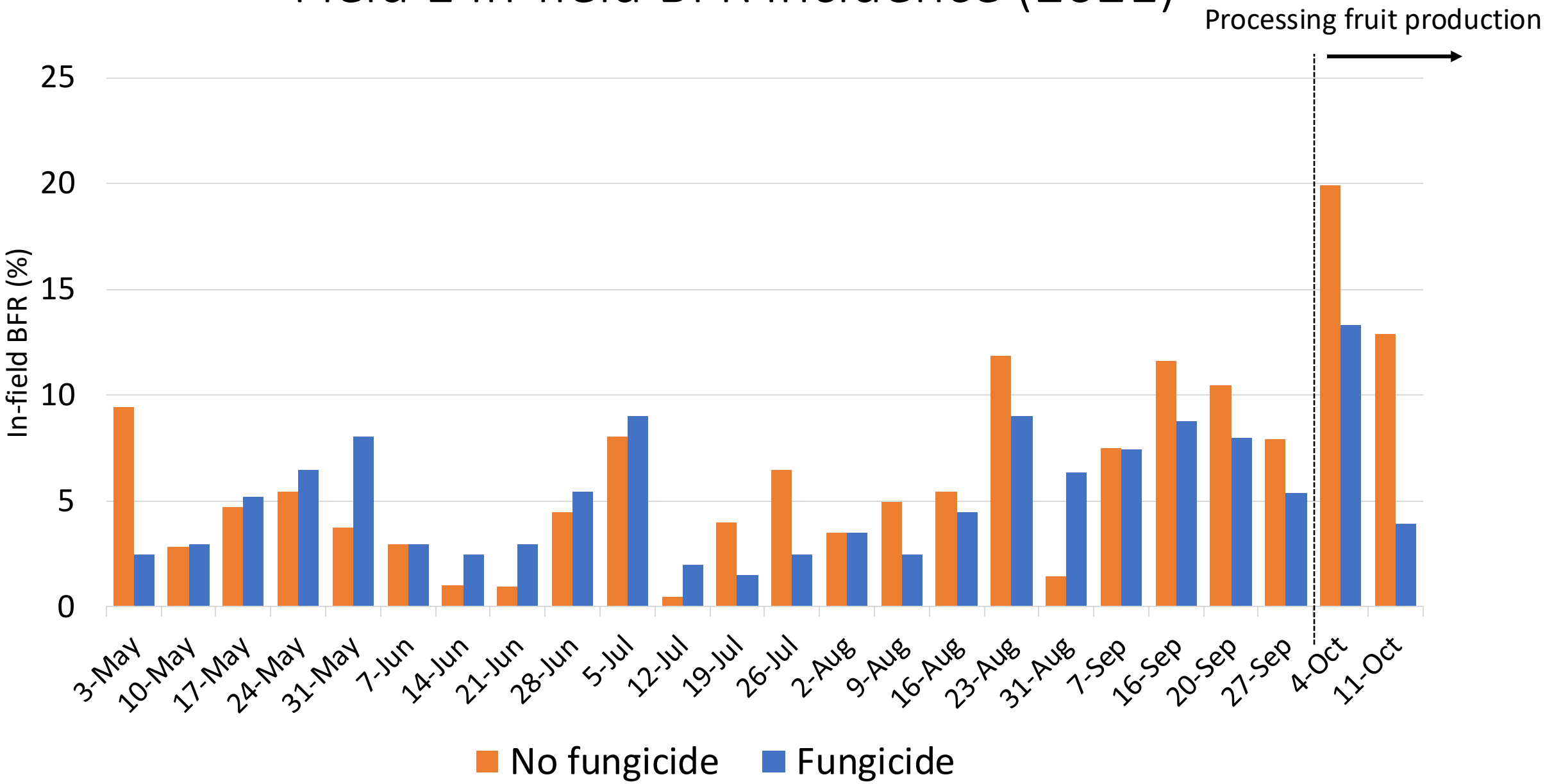
Experimental sites in Santa Maria area



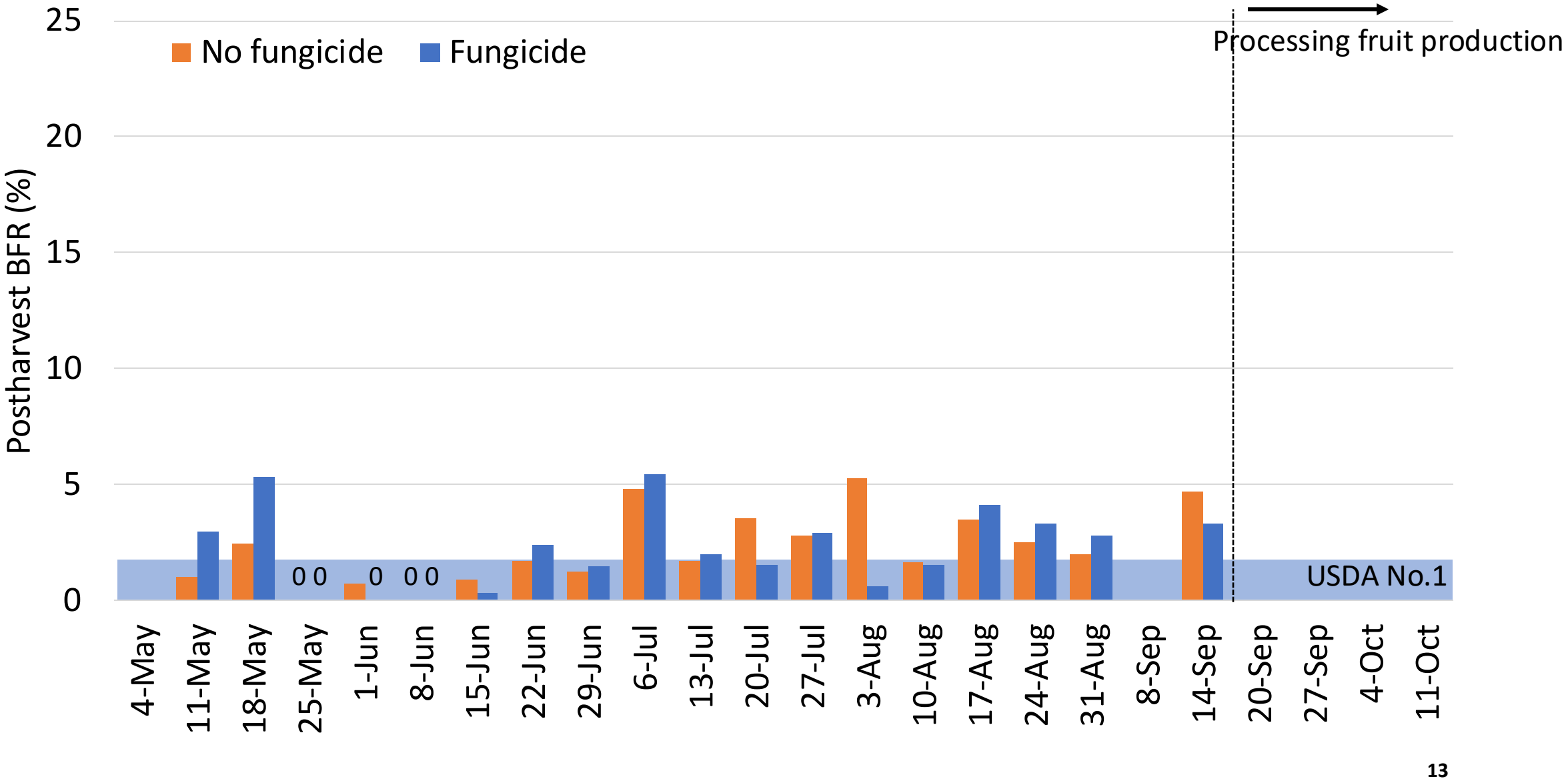
Year	Site	Variety
2022	F1, F6, F12, F31, F30	Monterey
2021	F1, F11, F31, F30	Monterey

Location of a weather station

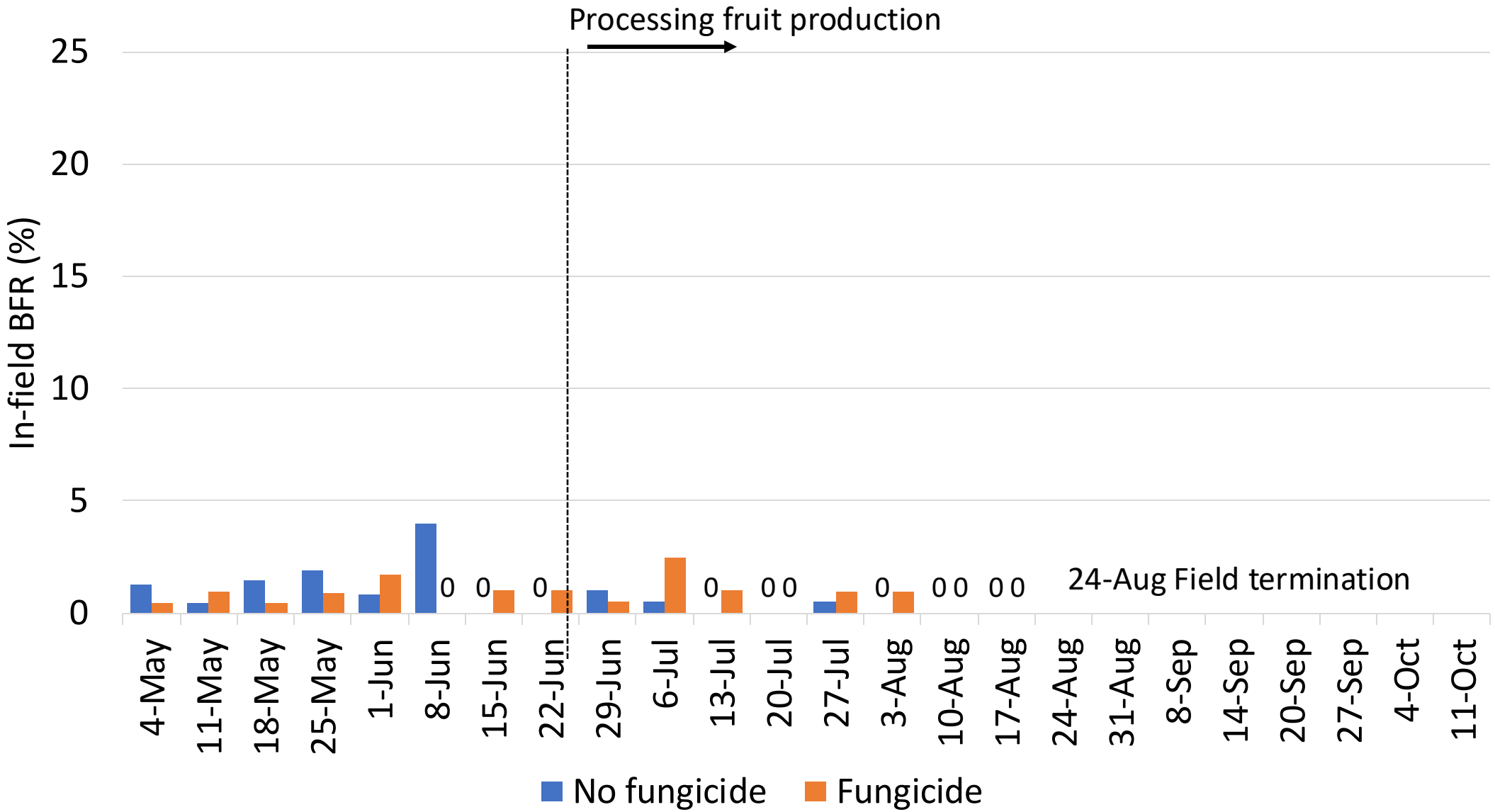
Field 1 In-field BFR incidence (2021)



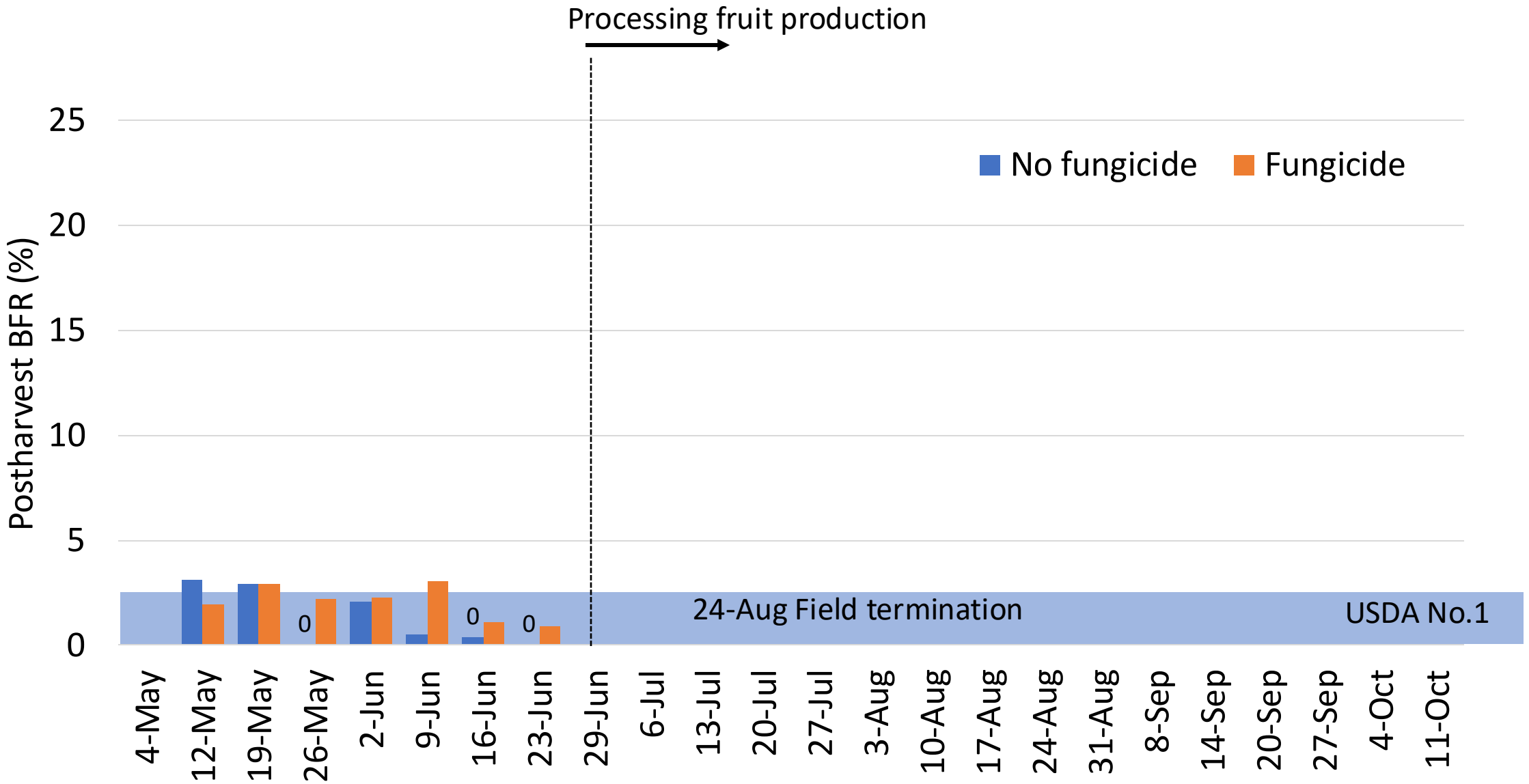
Field 1 Postharvest BFR incidence (2021)



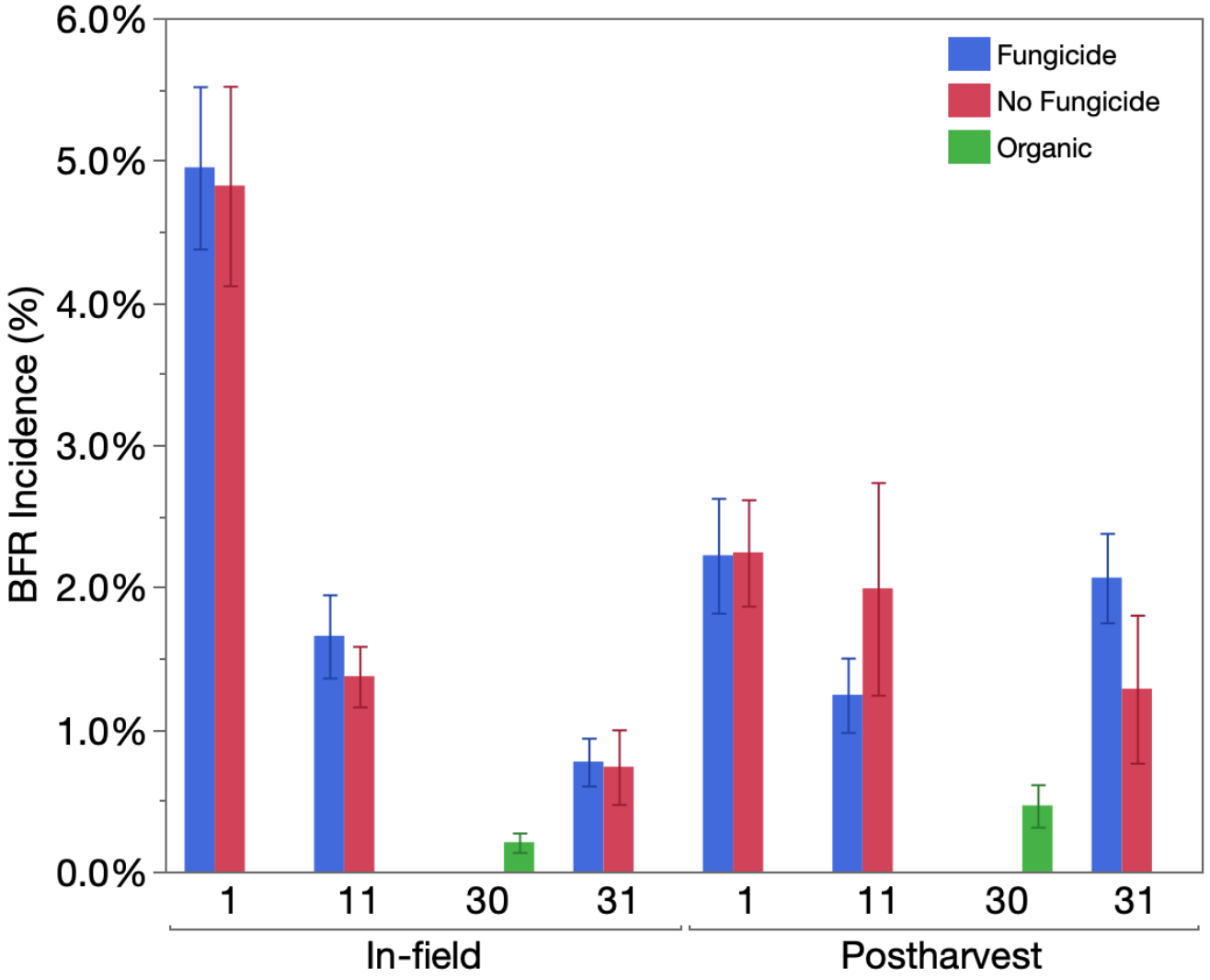
Field 31 In-field BFR incidence (2021)



Field 31 Postharvest BFR incidence (2021)

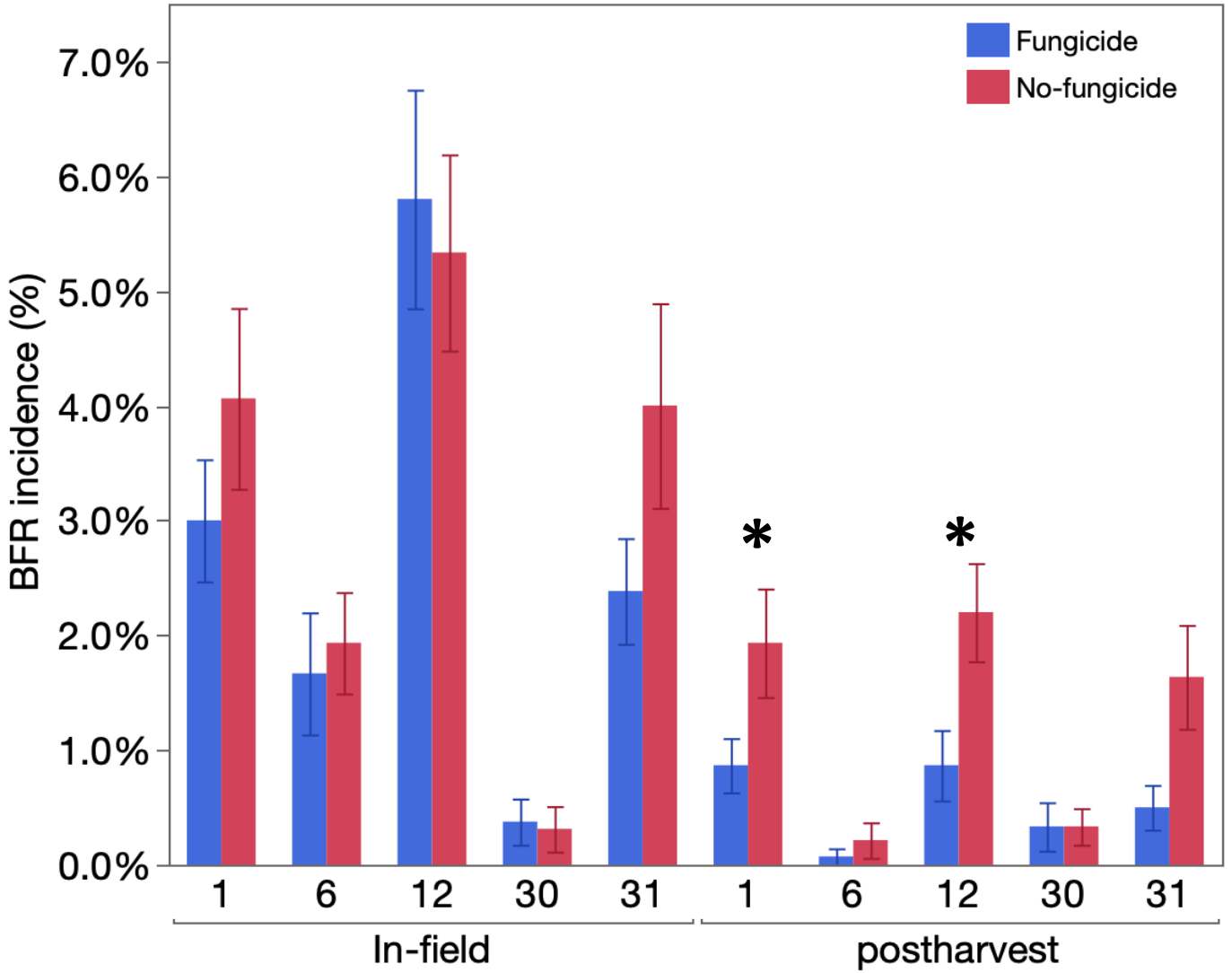


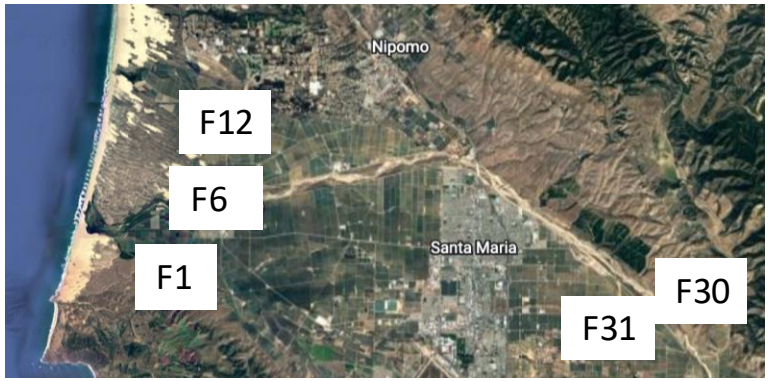
2021: No significant differences between fungicide and no fungicide treatments in BFR incidence



- A regression model to the square-root transformed proportion of diseased fruit; Post-hoc test using Student's t-test at $P<0.05$

2022: No fungicide treatment showed high BFR postharvest incidence; No significant differences in in-field BFR incidence

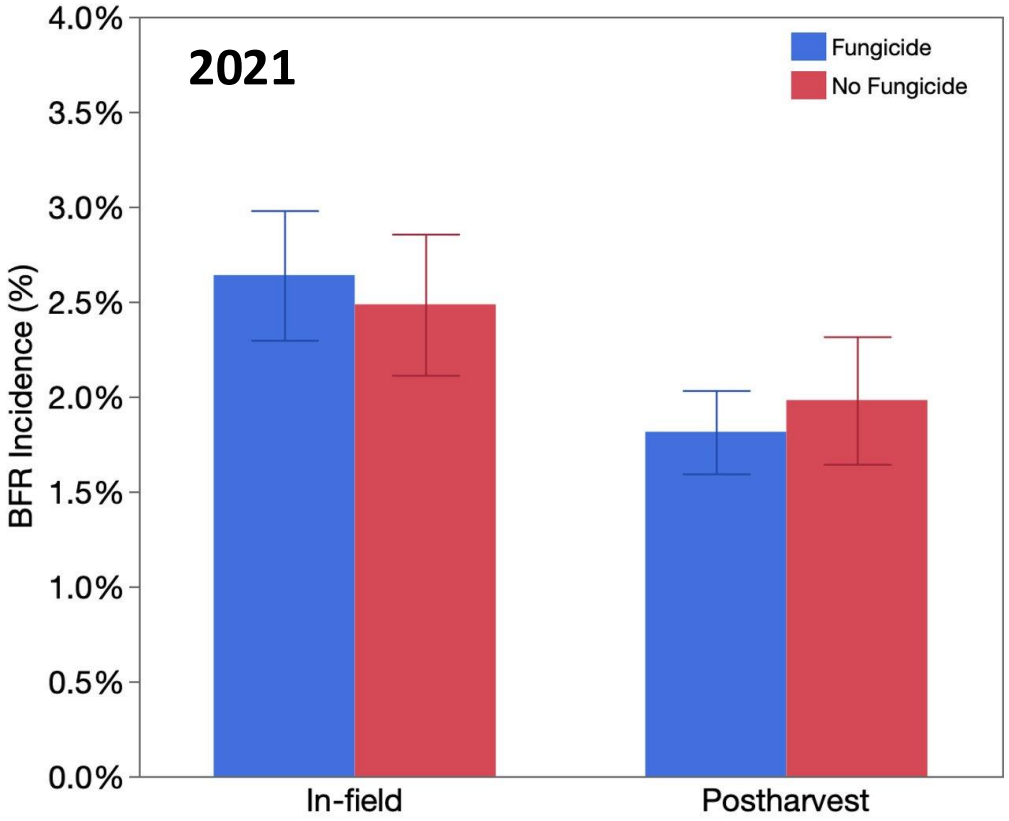


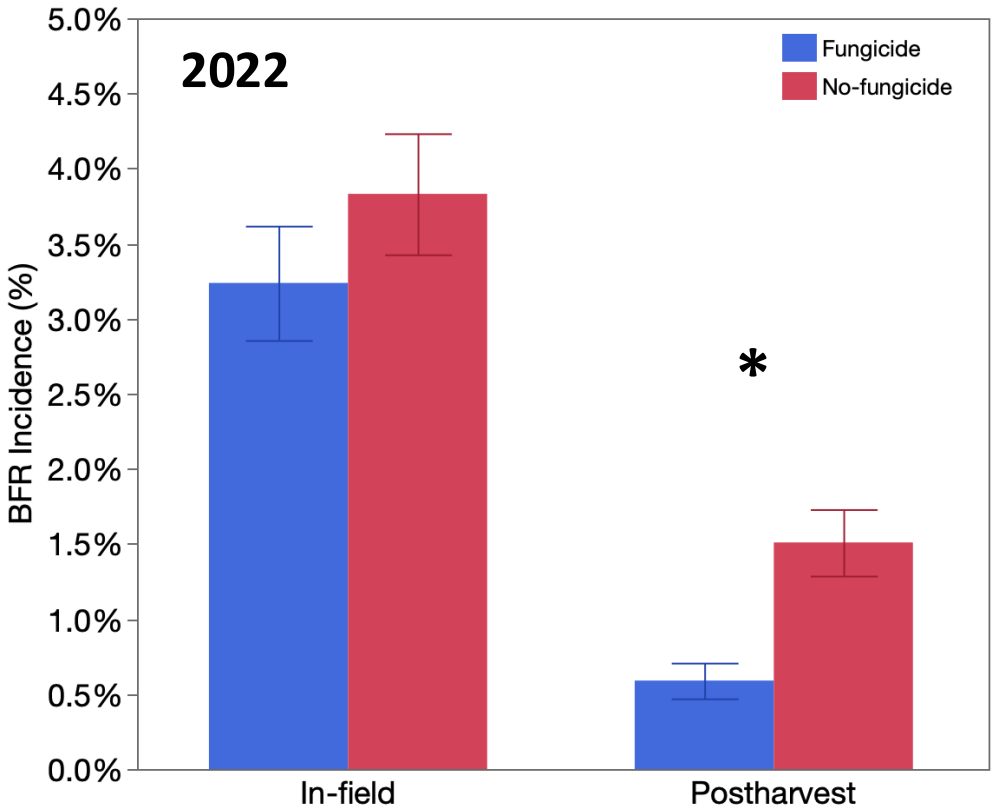


- A regression model to the square-root transformed proportion of diseased fruit; Post-hoc test using Student's t-test at $P<0.05$

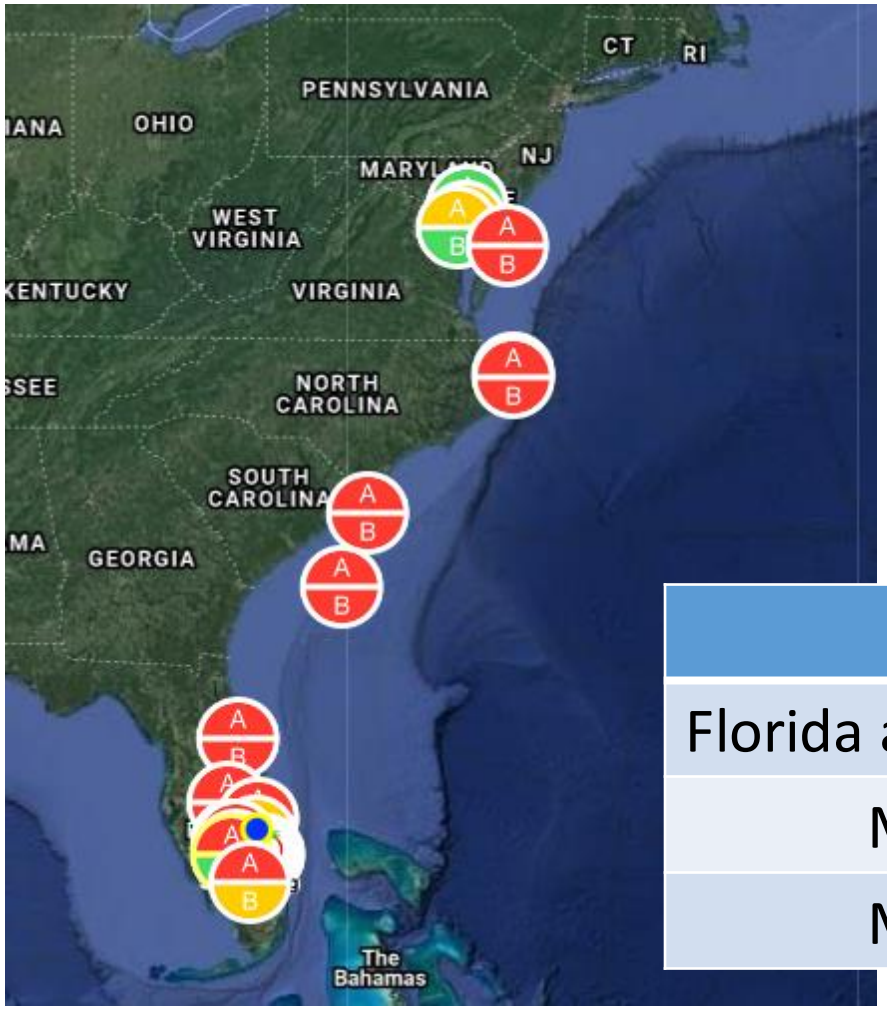
Conclusions

- Low BFR incidence was found between fungicide and no-fungicide
- A potential of reducing fungicide use without compromising BFR control





Decision support tools to time fungicide application



- The Strawberry Advisory System (StAS)
- StAS validation- reduce fungicide use without compromising the yield

Location	Fungicide use	Reference
Florida and South Carolina	↓50%	(Cordova et al. 2017)
Mid-Atlantic	↓50%	(Swett et al. 2020)
Mid-Atlantic	↓18-55%	(Hu et al. 2021)

Acknowledgements

- Strawberry growers
  - Bryan Gresser
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Thank you! Questions?

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yckwang@ucanr.edu