

Monitoring insecticide resistance in California DBM populations

Ian Grettenberger, Daniel Hasegawa,
Kevin Goding, and Ricky Lara

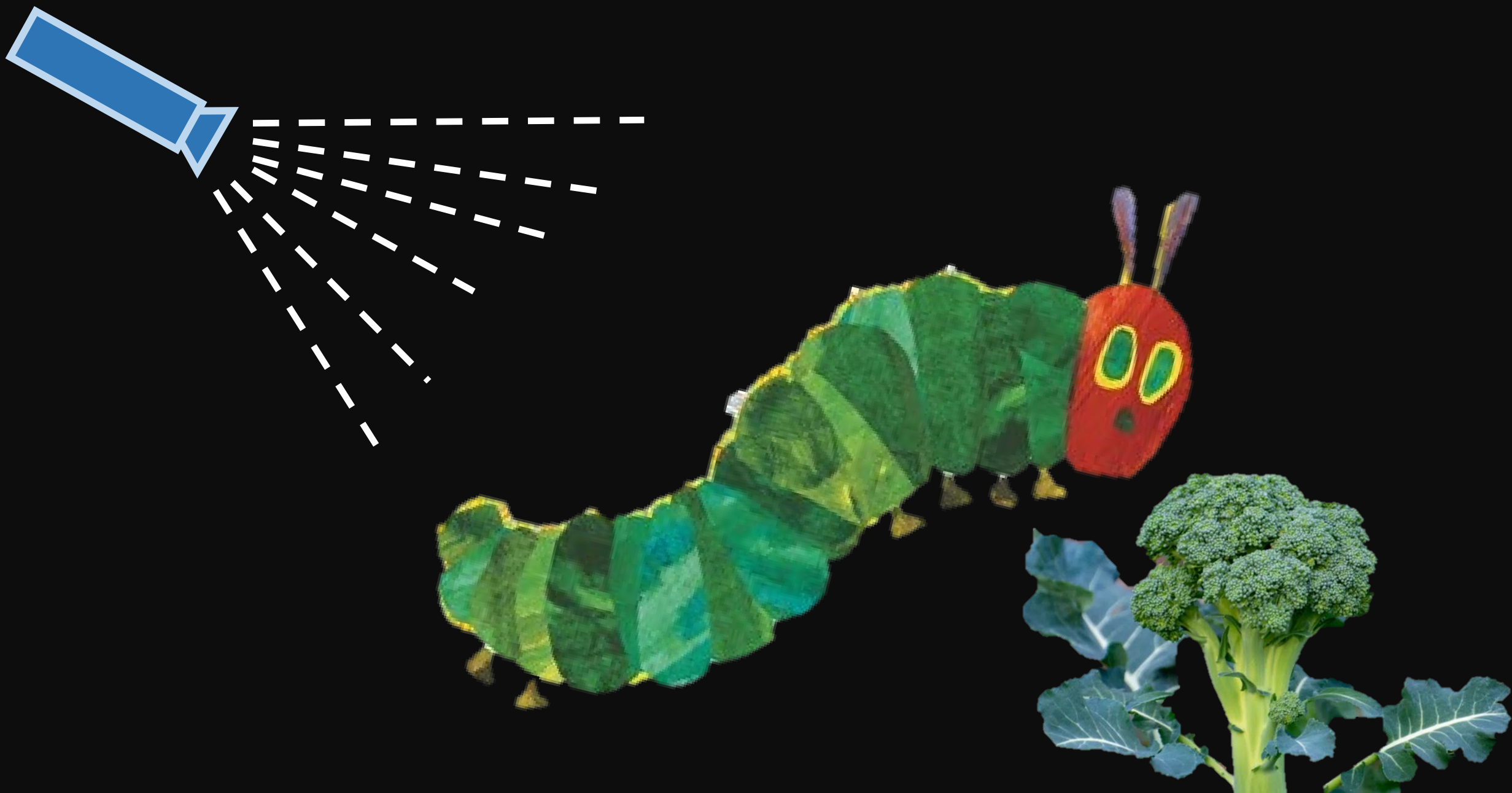






UGA1328039







About 19,700 results

Insecticide resistance of diamondback moth (Lepidoptera: Plutellidae) in North America

[AM Shelton](#), [JA Wyman](#), [NL Cushing](#)... - *Journal of Economic ...*, 1993 - [academic.oup.com](#)

... role of **insecticide resistance** in management of diamondback **moth**, we surveyed susceptibility to commonly used **insecticides** ... to the three most commonly used classes of **insecticides** ...

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Assessment of insecticide resistance after the outbreak of diamondback moth (Lepidoptera: Plutellidae) in California in 1997

[AM Shelton](#), [FV Sances](#), [J Hawley](#)... - *Journal of Economic ...*, 2000 - [academic.oup.com](#)

... newer **insecticides** and can also help explain the occurrence of outbreaks caused by factors ... than **insecticide resistance**. KEY WORDS *Plutella xylostella*, **resistance**, **diamondback moth** ...

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[HTML] Gut Microbiota Mediate Insecticide Resistance in the Diamondback Moth, *Plutella xylostella* (L.)

[X Xia](#), [B Sun](#), [GM Gurr](#), [L Vasseur](#), [M Xue](#)... - *Frontiers in ...*, 2018 - [frontiersin.org](#)

... of **insecticides** by gut bacteria. We also suggest that the influence of gut bacteria on **insecticide resistance** ... Our work advances understanding of the evolution of **insecticide resistance** in ...



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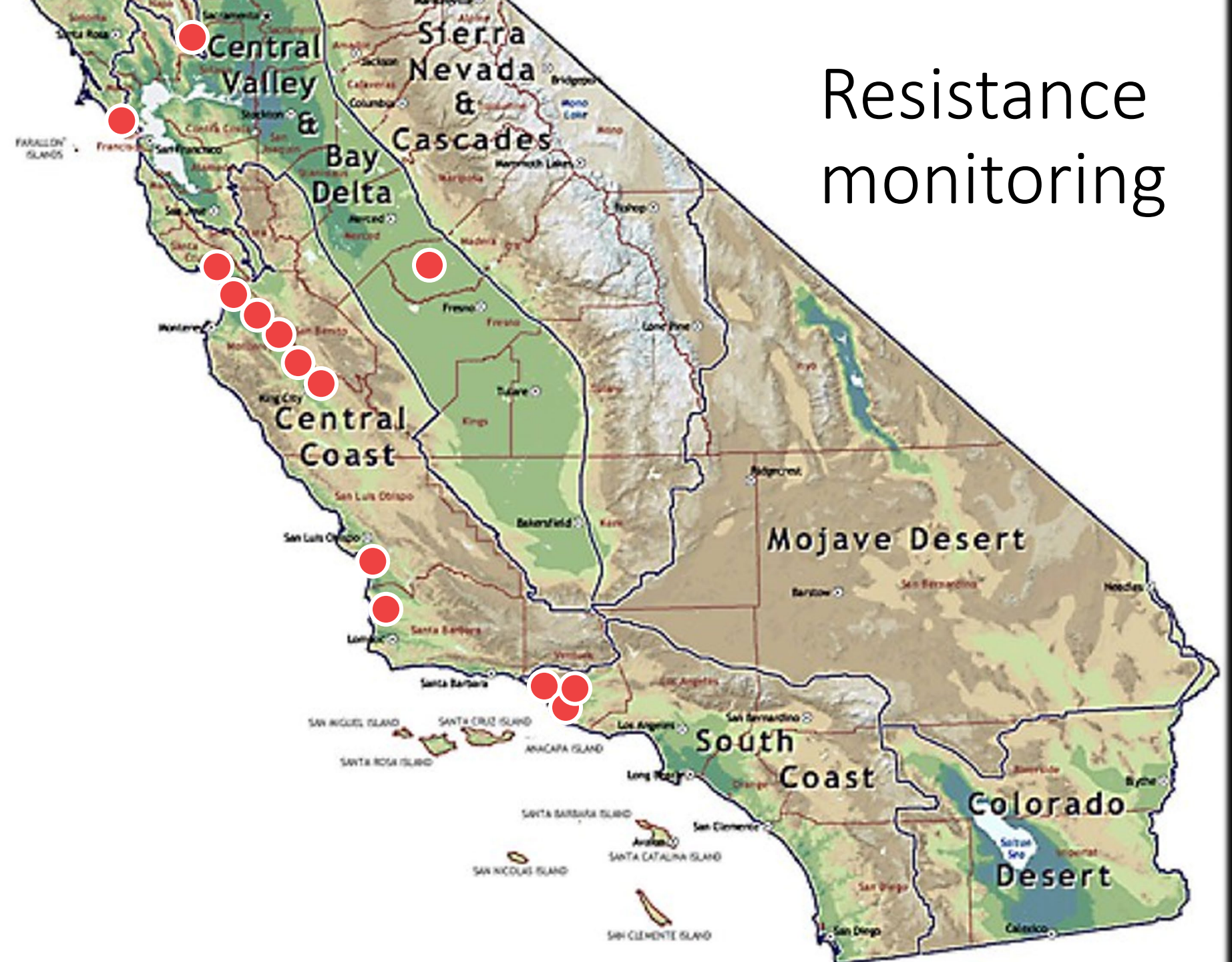
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Insecticide resistance is a *major* issue for diamondback moth management



Oleg Daugovich – Ventura Co.

Resistance monitoring



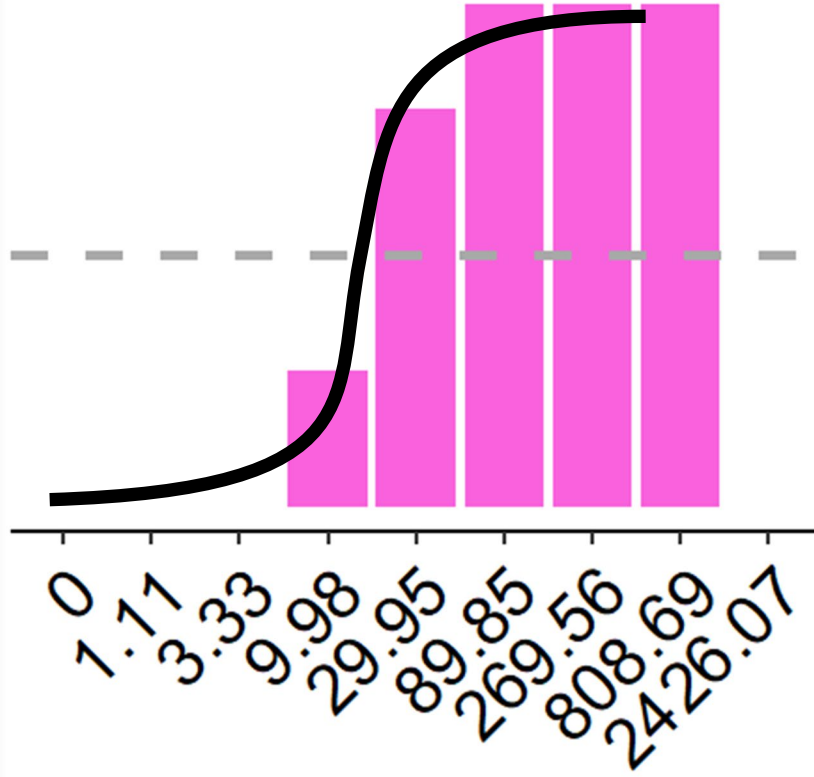
Resistance monitoring – leaf dip assay





Salinas 2022

% Mortality

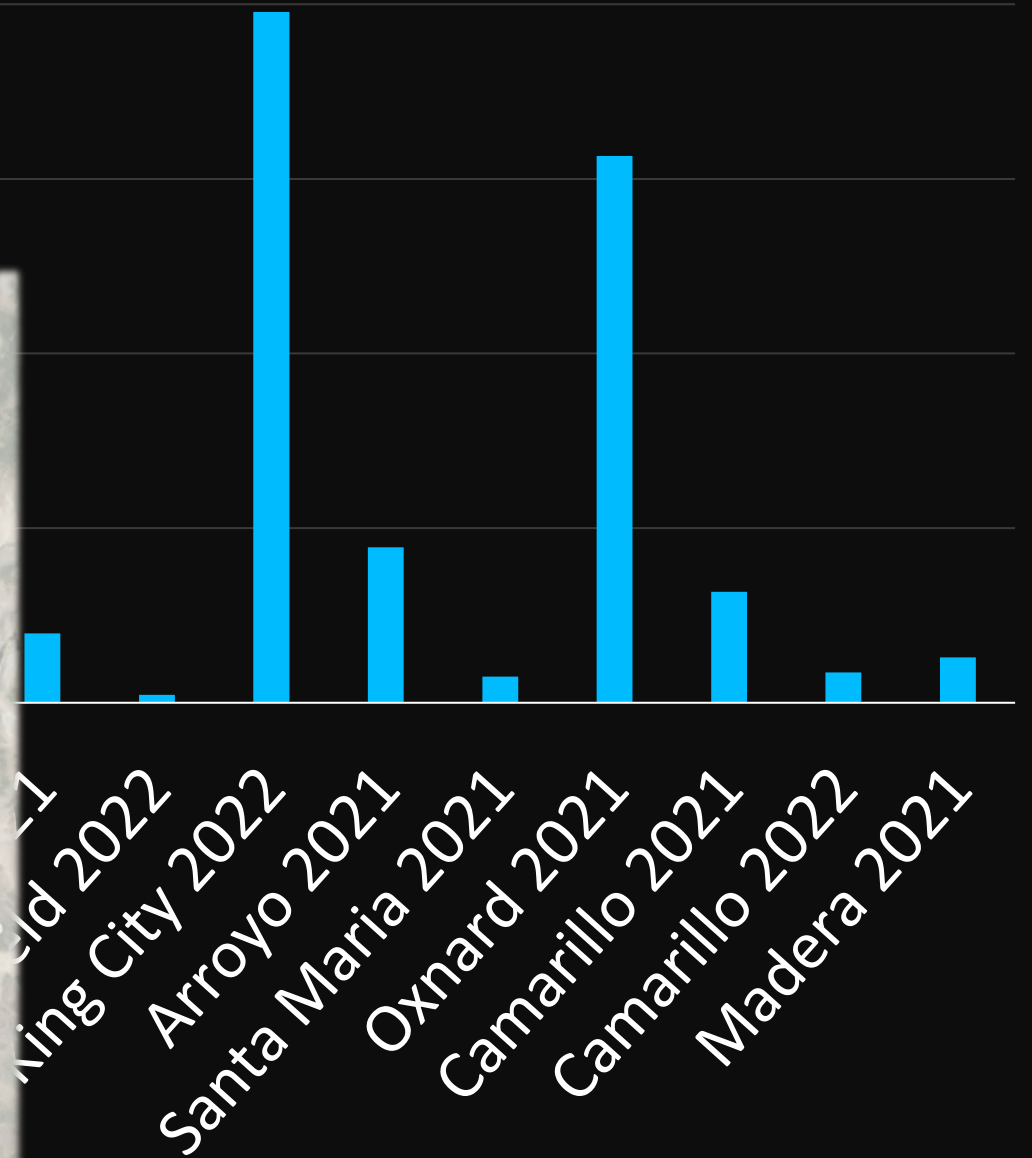


Chlorantraniliprole
Coragen
(diamide)

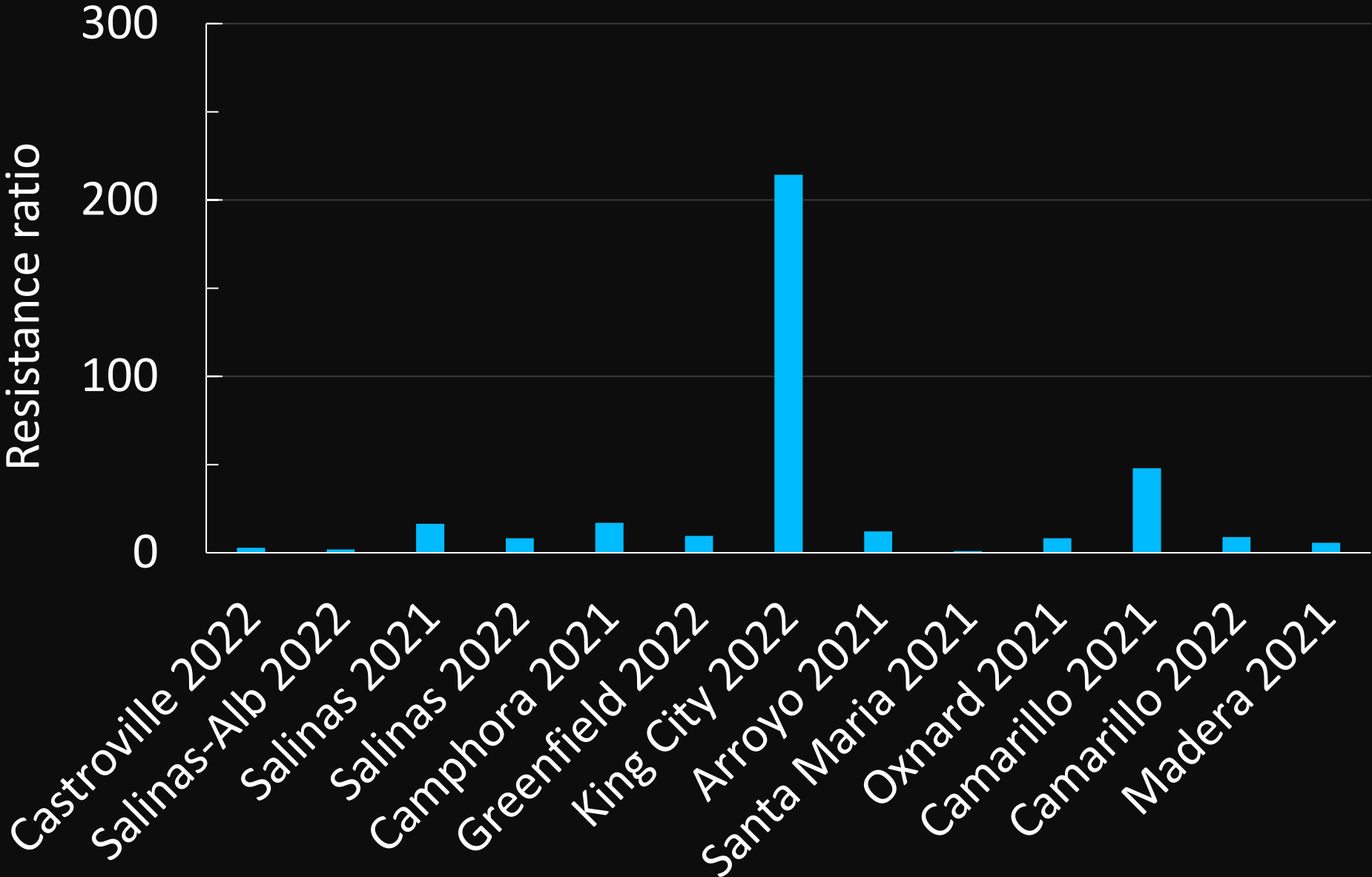
Ratio

1600

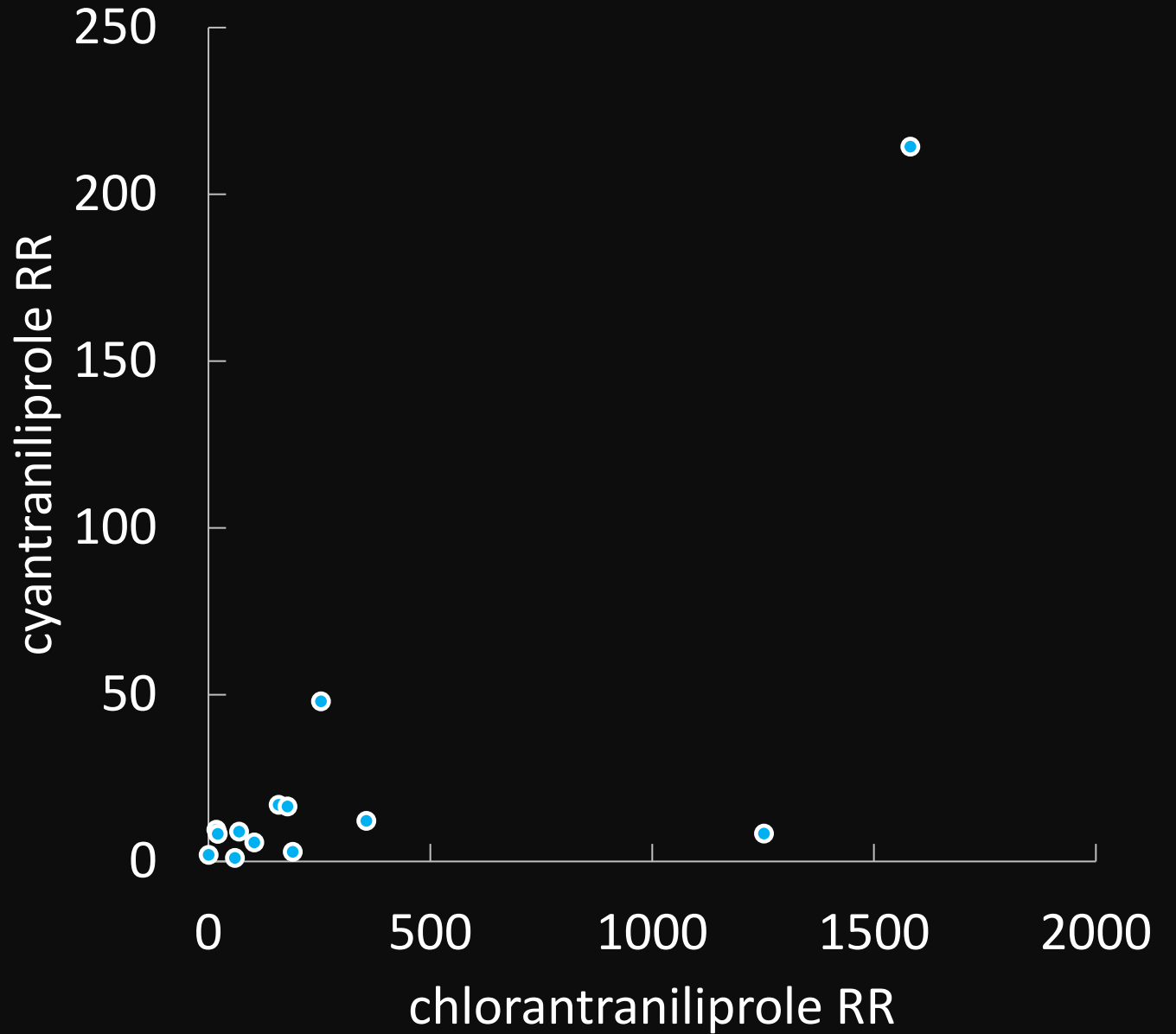
1200



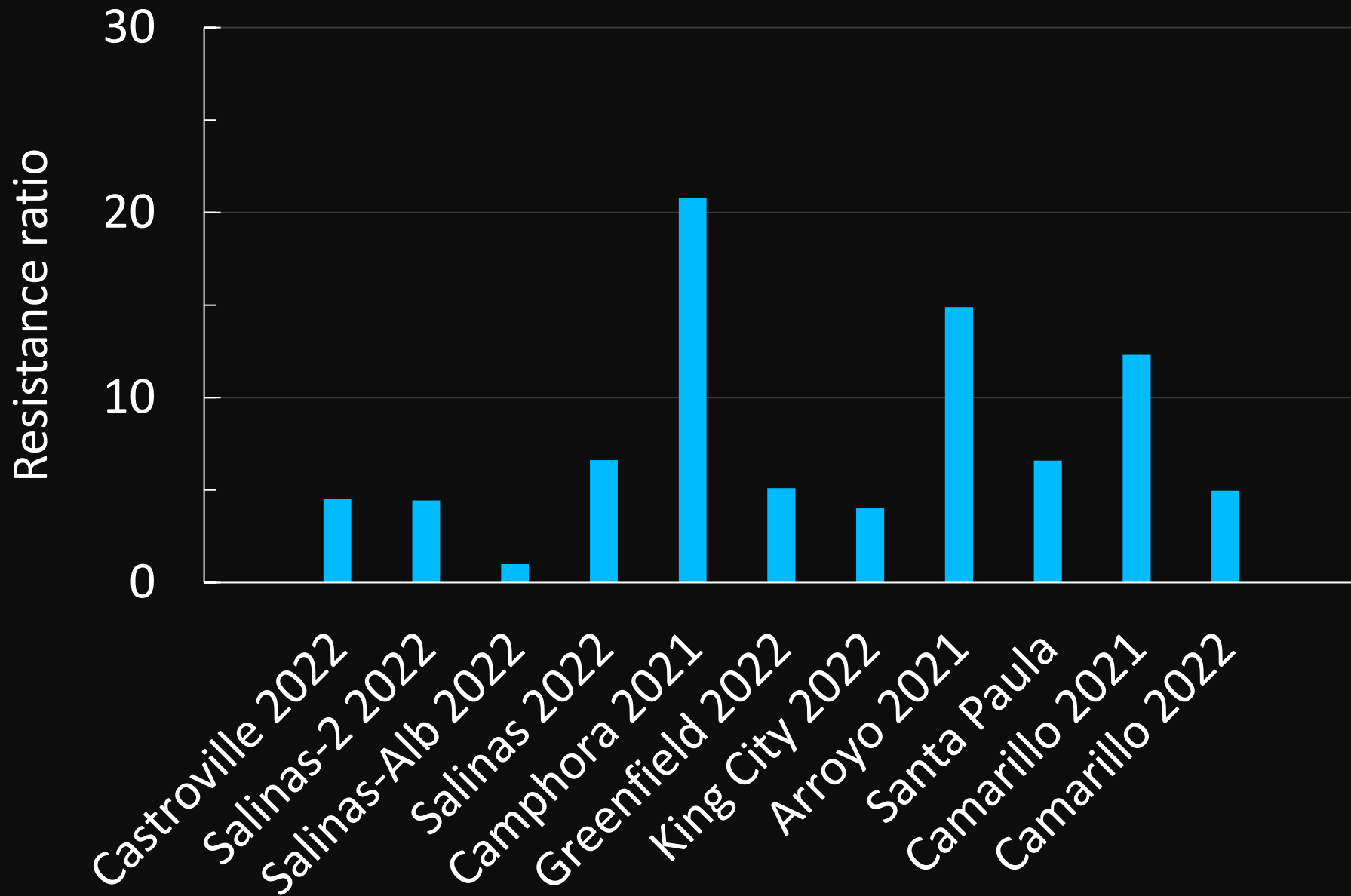
Cyantraniliprole
Exirel
(diamide)



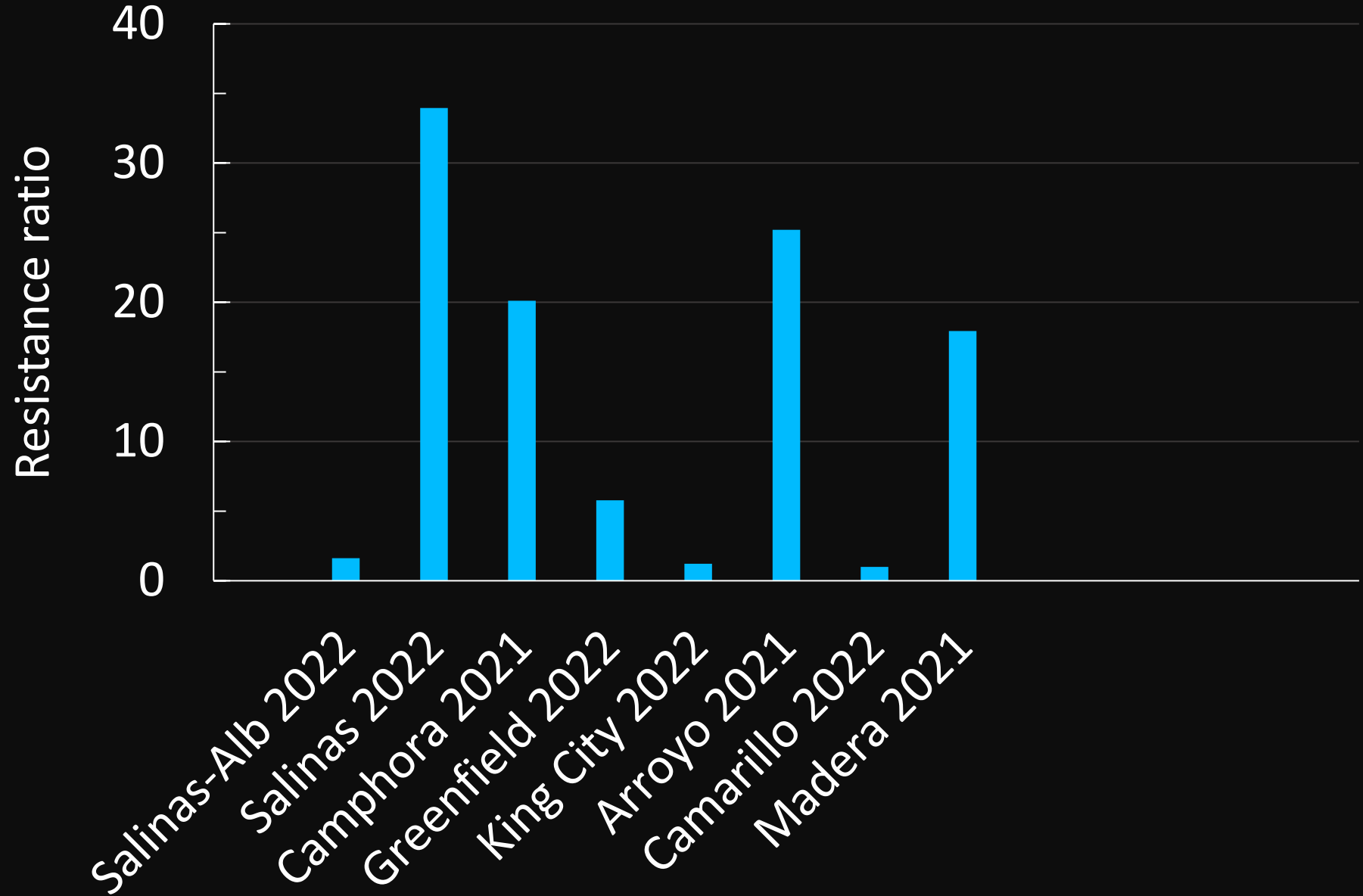
Chlorantraniliprole/Coragen vs. Cyantraniliprole/Exirel



Spinetoram
Radiant
(spinosyn)

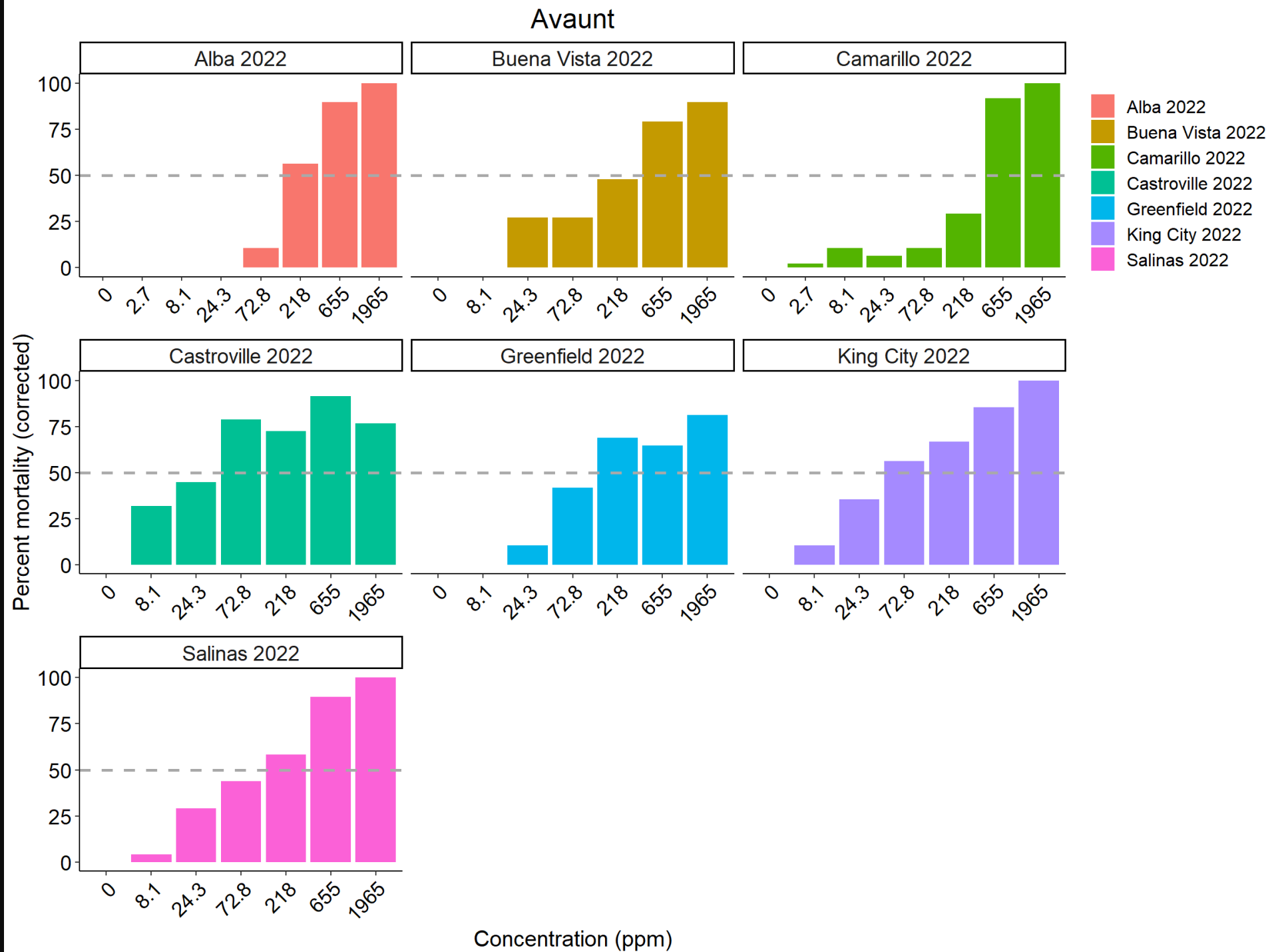


Emamectin
benzoate
Proclaim

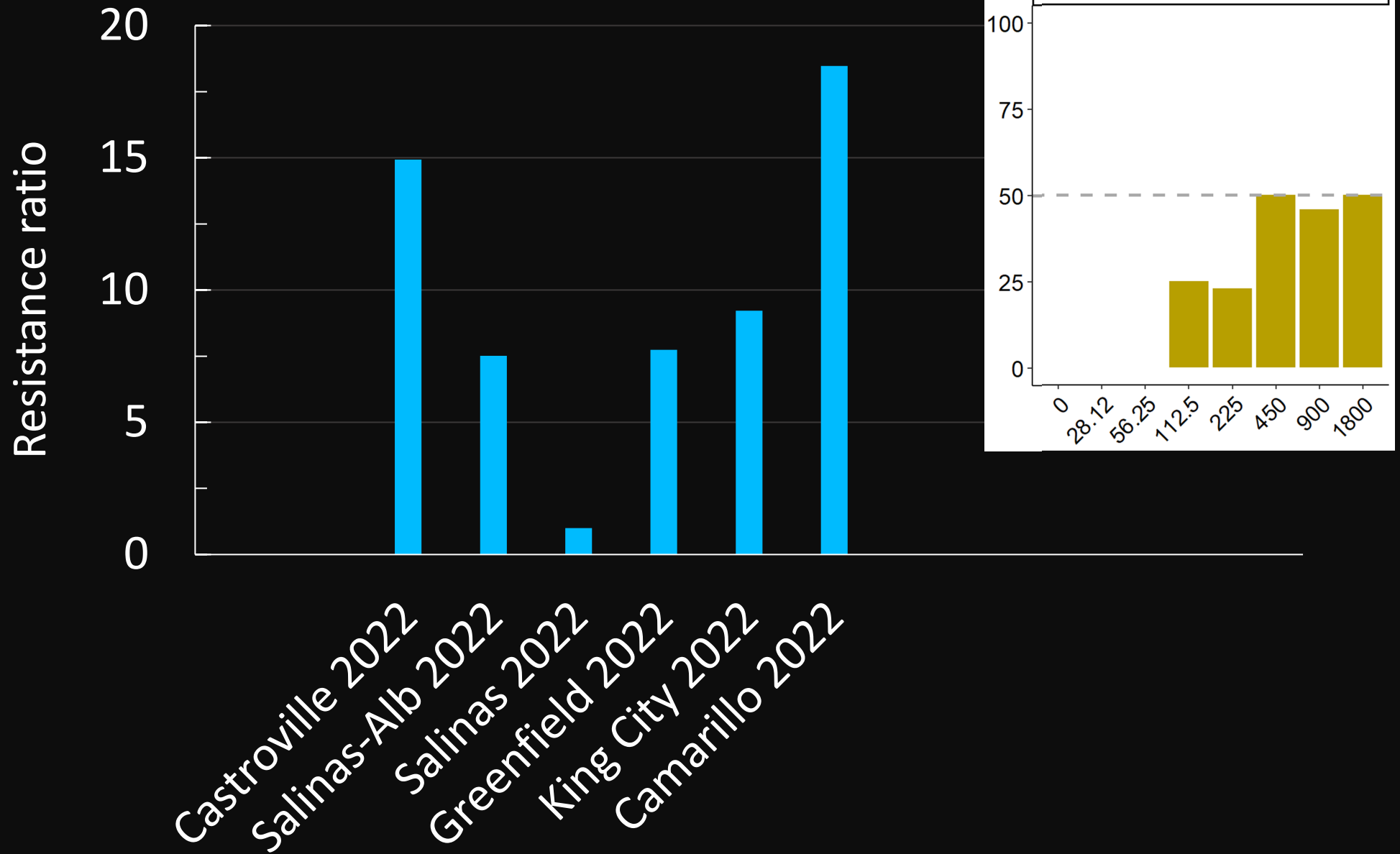


Indoxacarb Avaunt

But....



Bacillus thuringiensis/ Bt – aizawai
Xentari



Resistance summary

- Diamides: intense resistance to chlorantraniliprole, but not cyantraniliprole (comparatively)
- Indoxacarb – low RR's, but appear to be issues
- Other materials – appear to be sporadic issues across the board with moderate RR's

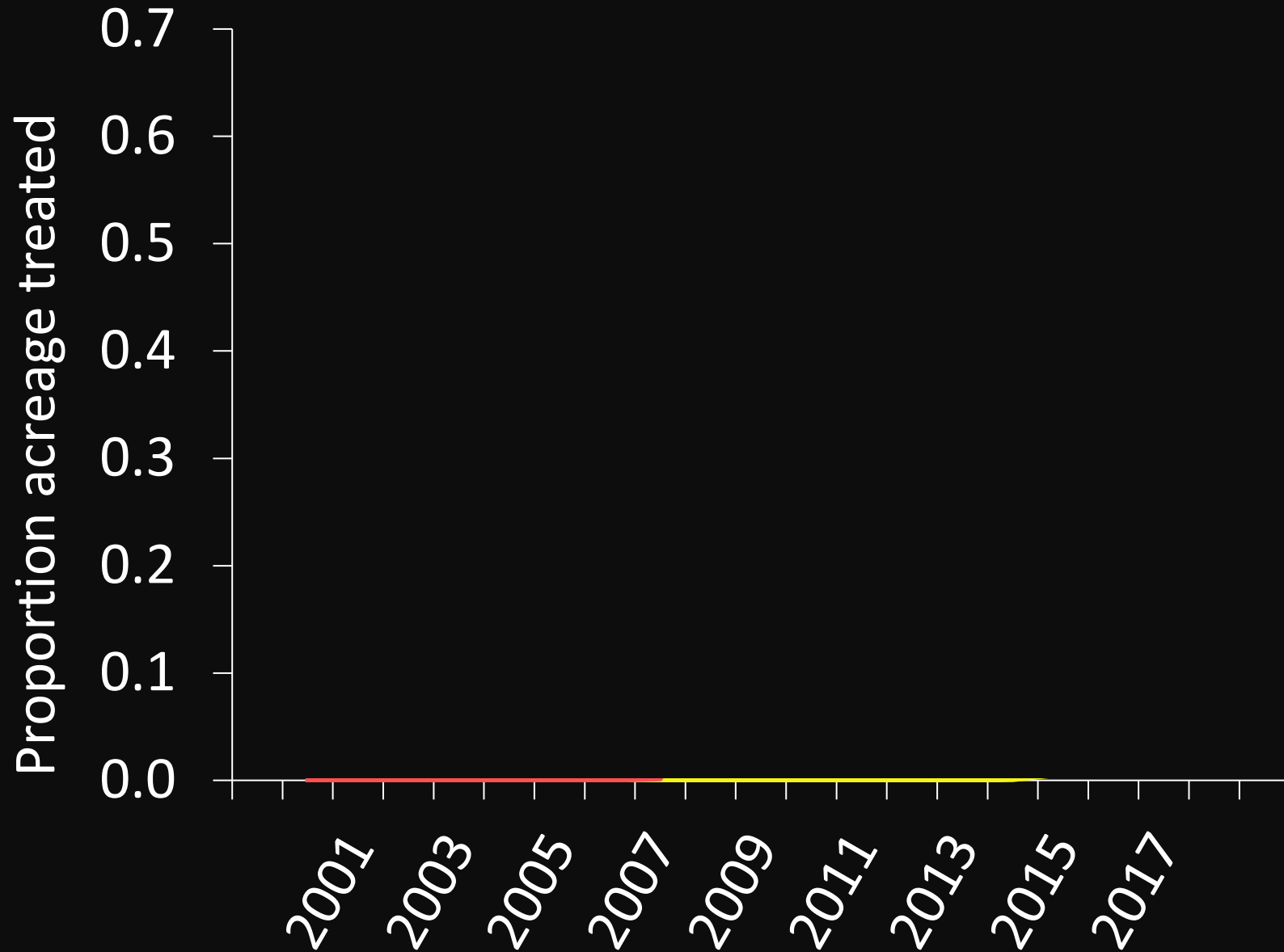


What has been the insecticide selection pressure in CA cole crops?

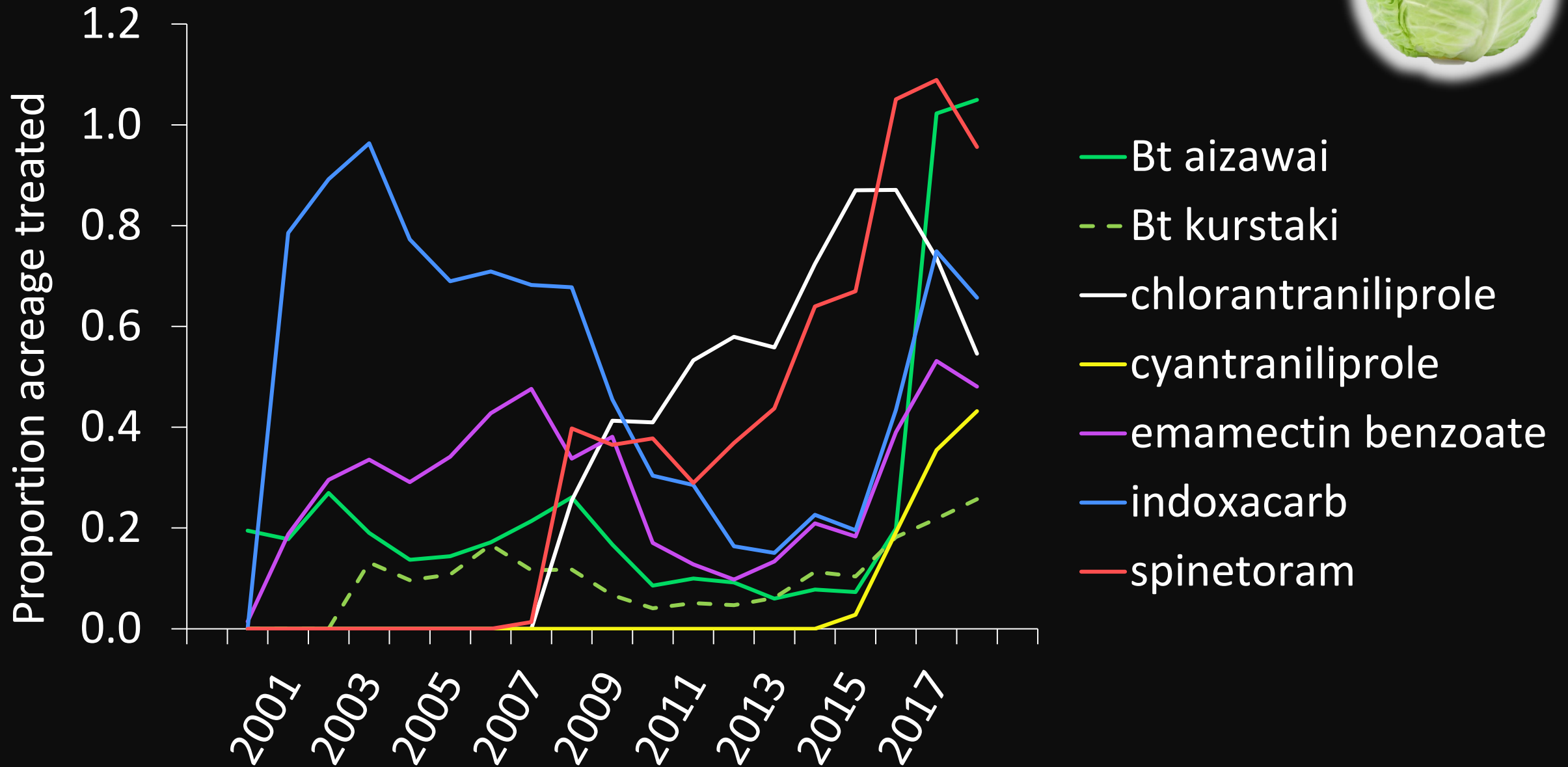
- Chemicals
- Crops
- Counties



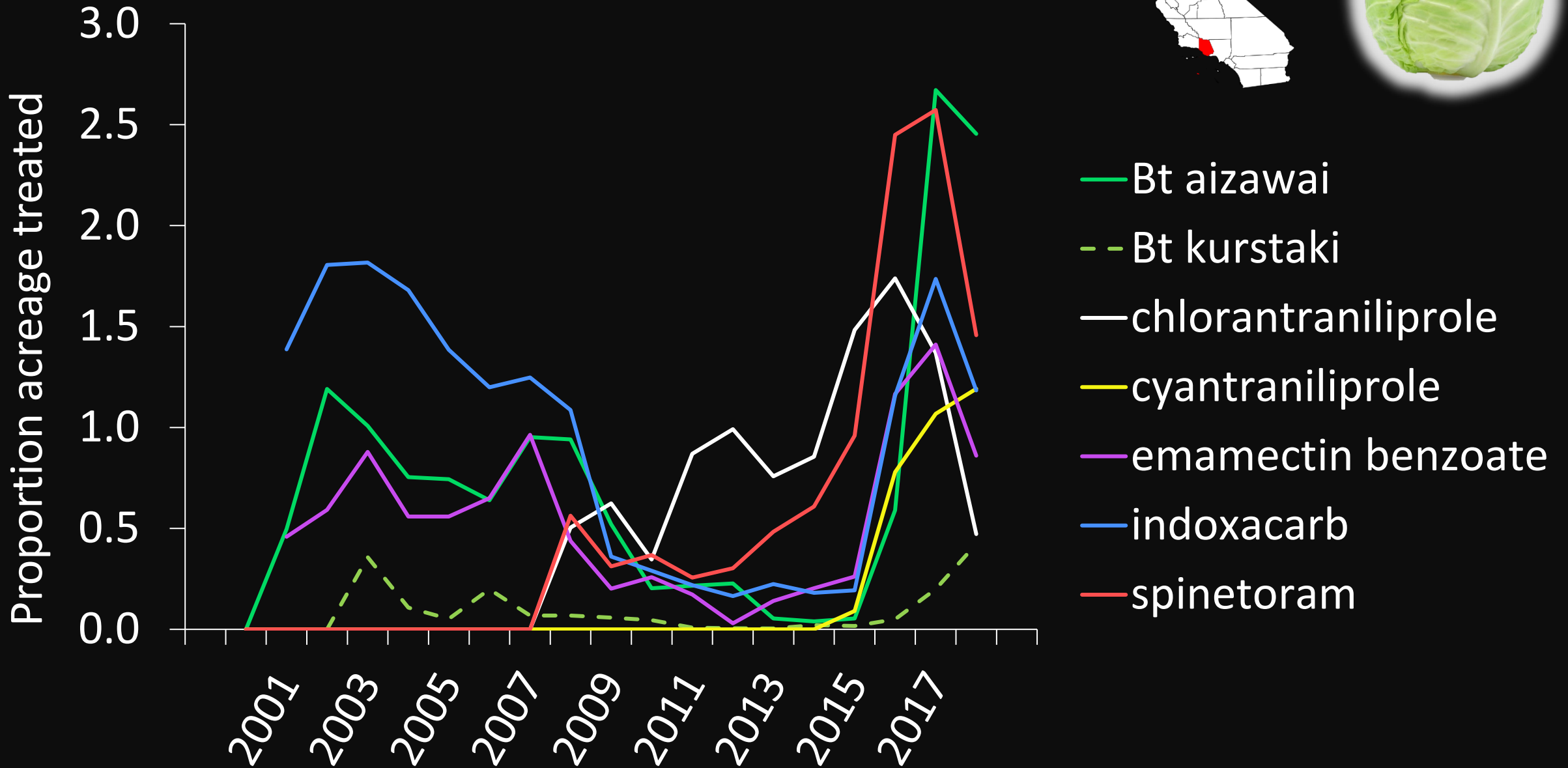
Statewide-broccoli



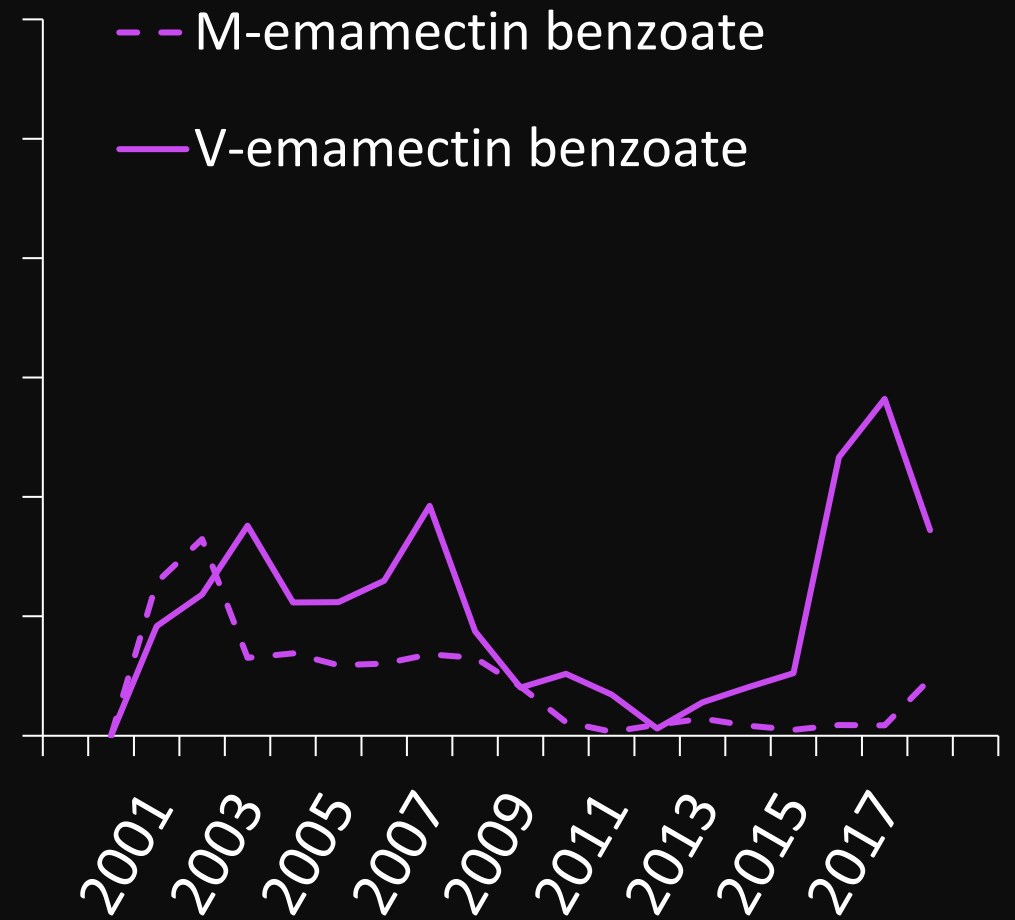
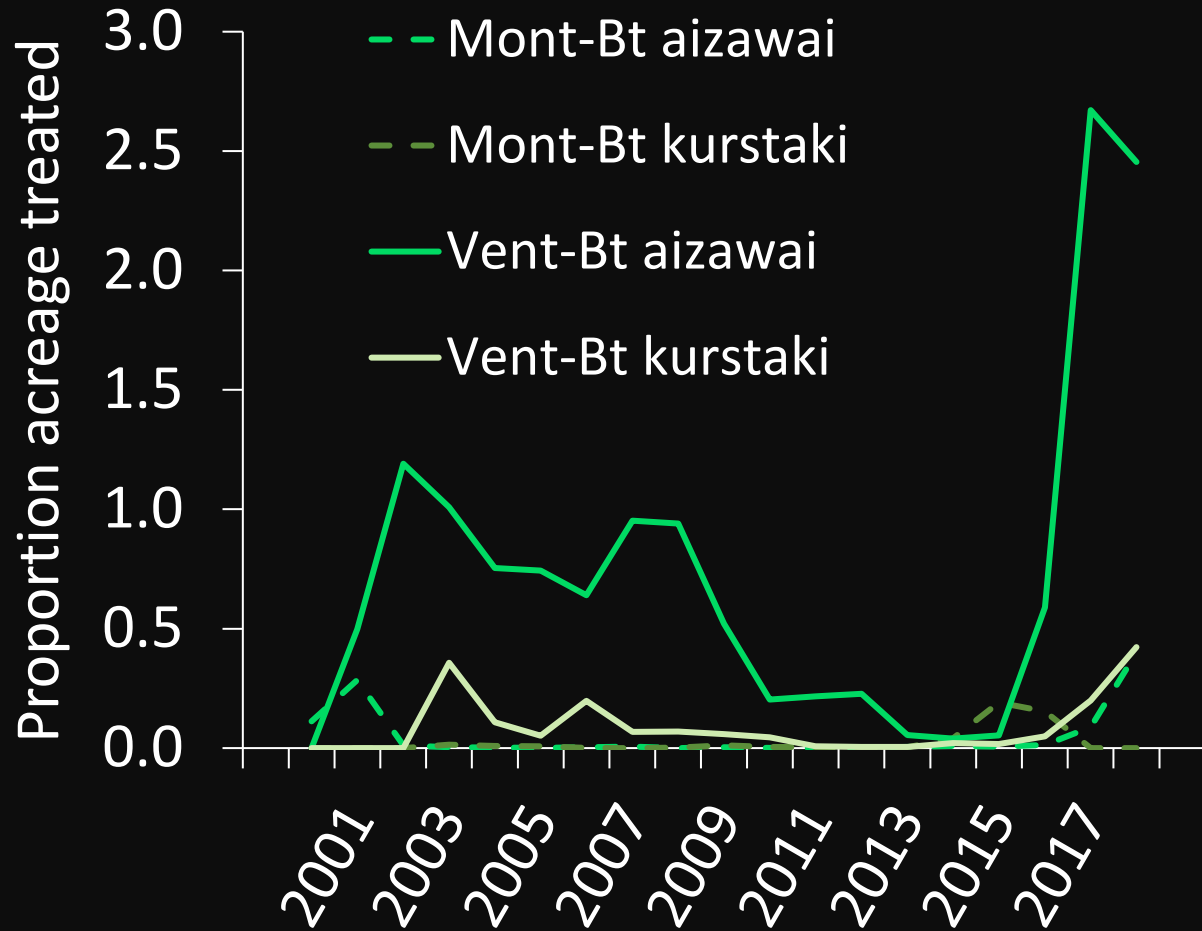
Statewide - cabbage



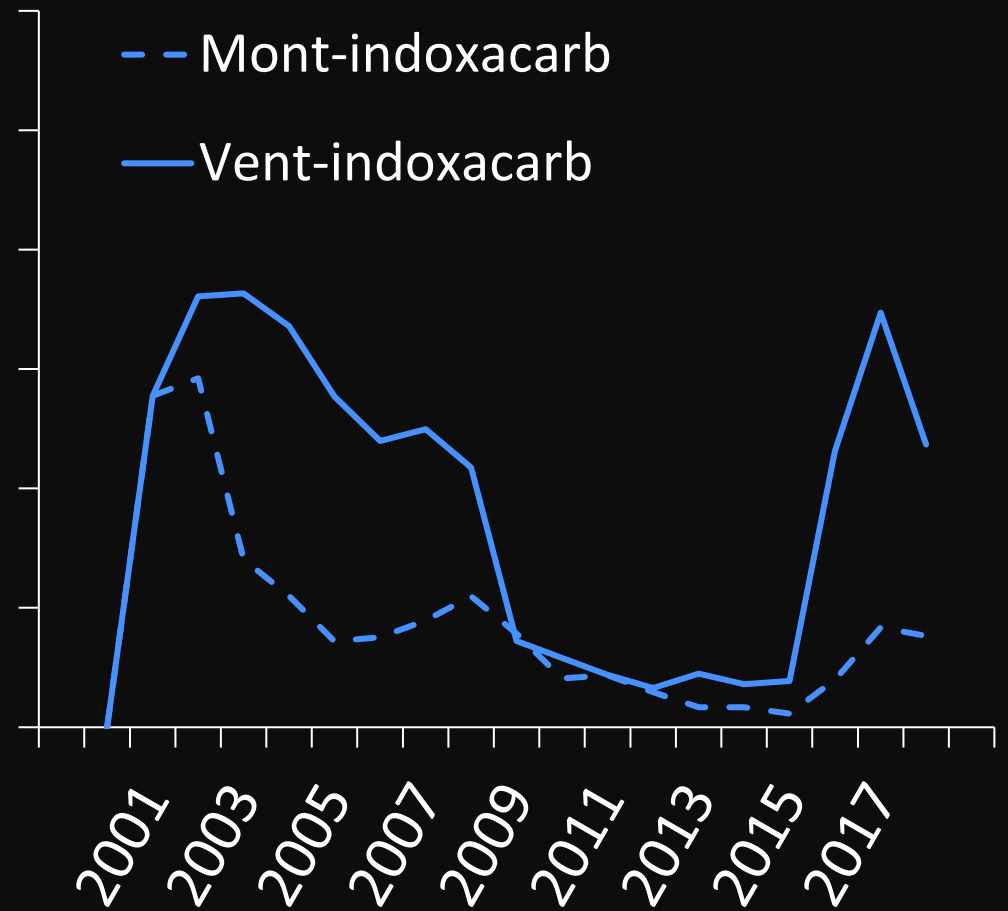
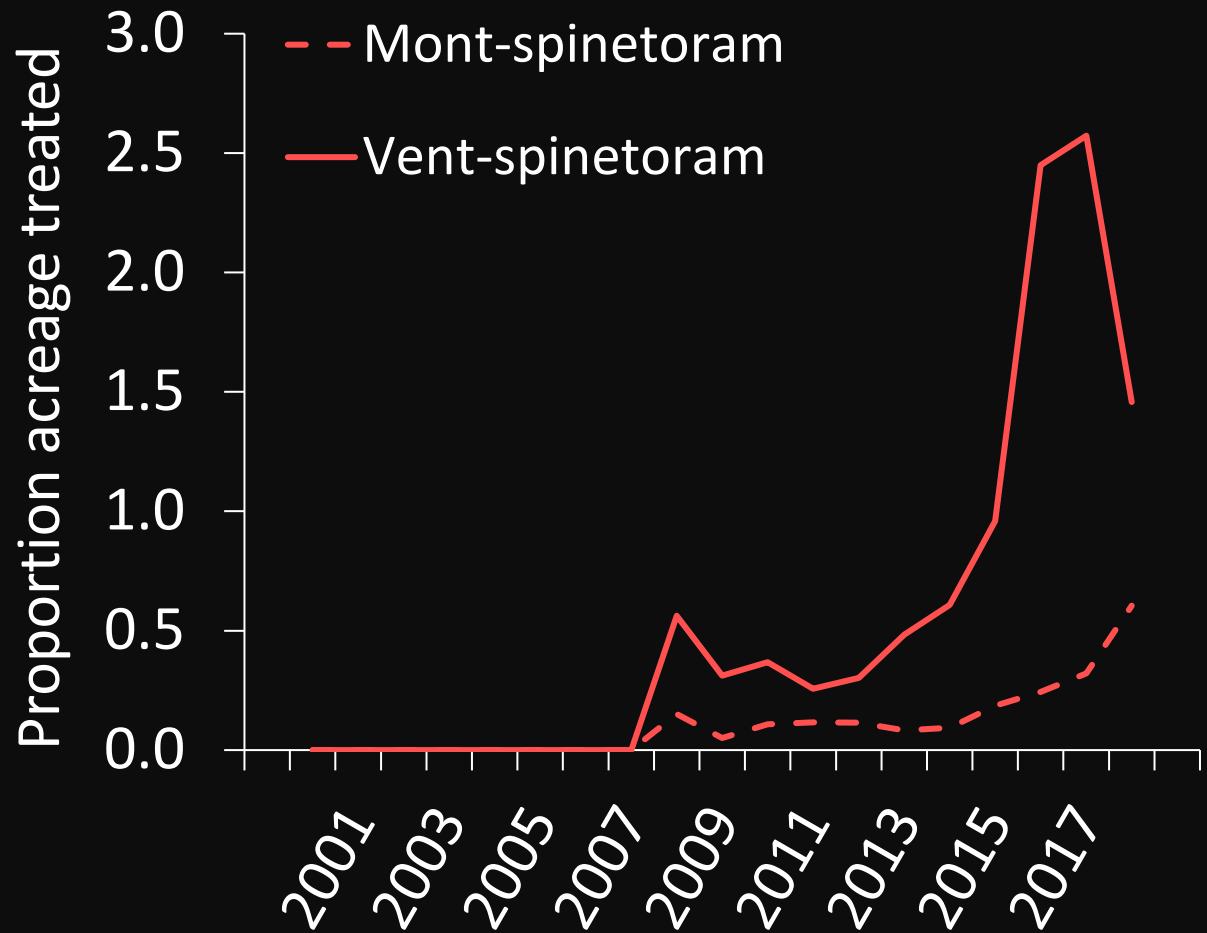
Ventura Co. - cabbage



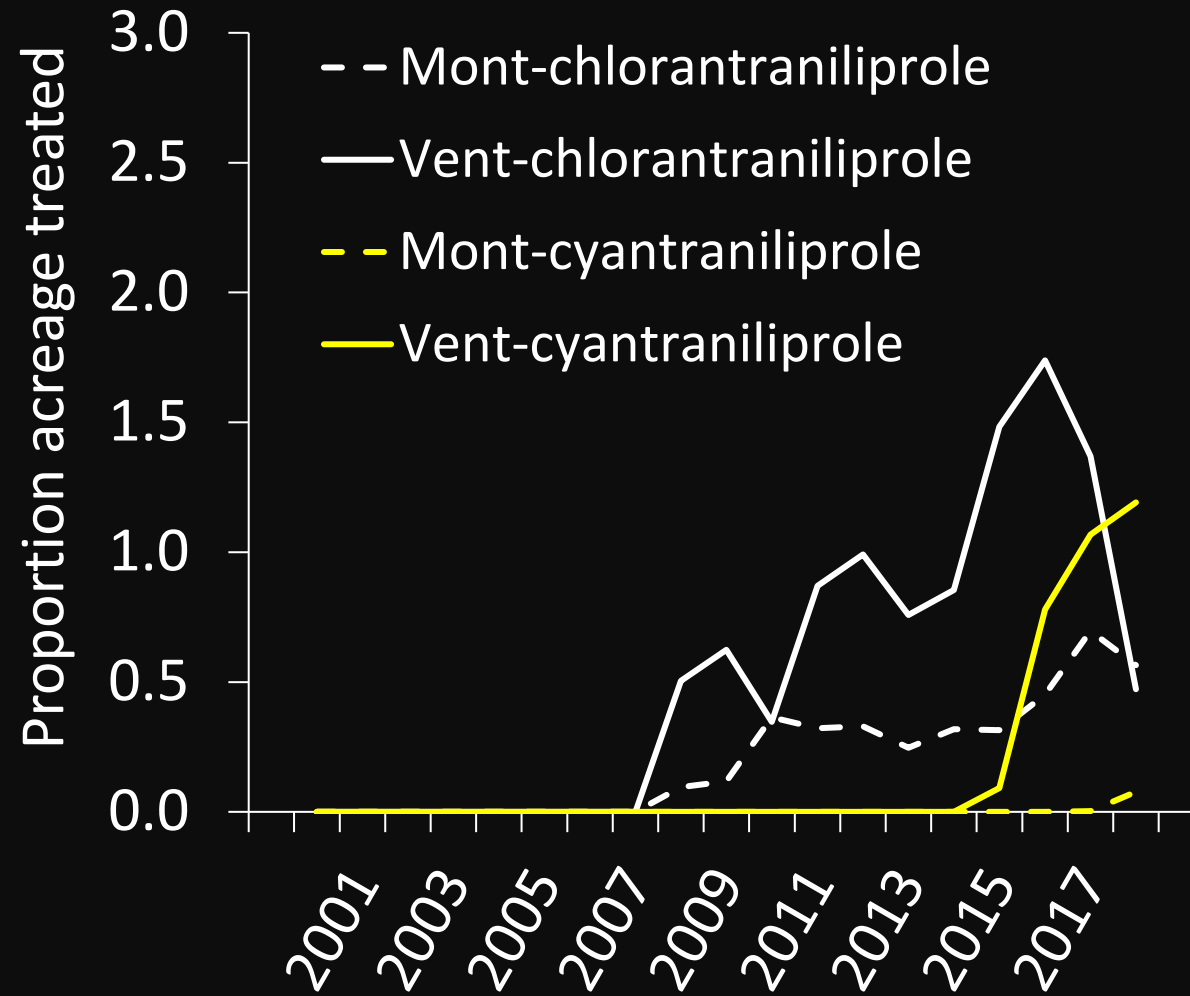
Monerey and Ventura Co. - cabbage



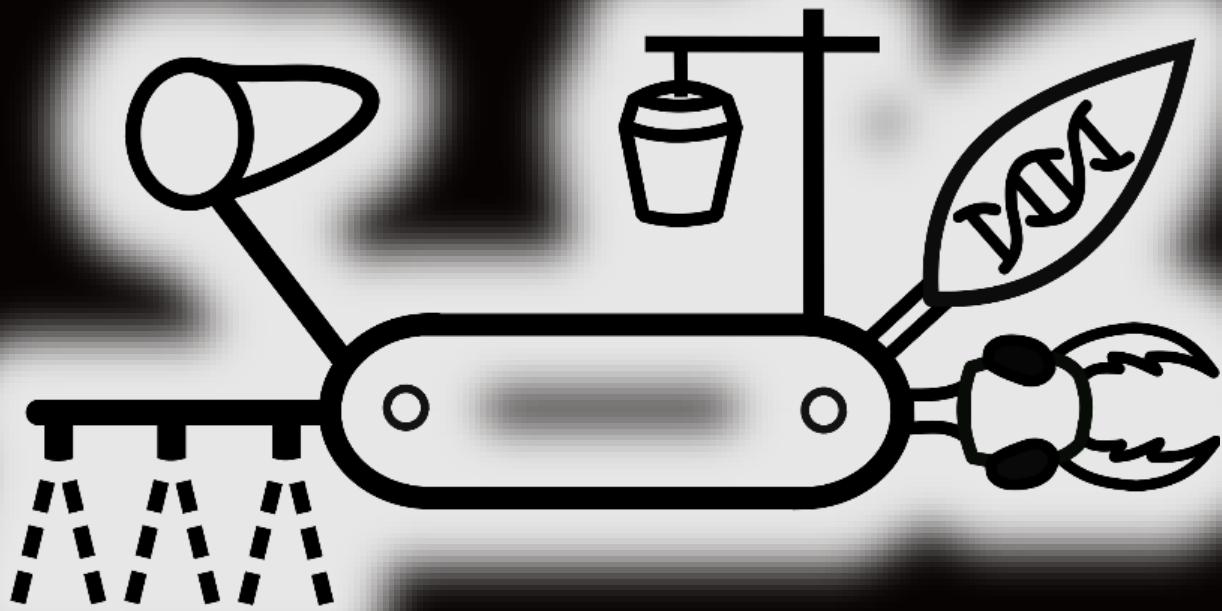
Monerey and Ventura Co. - cabbage



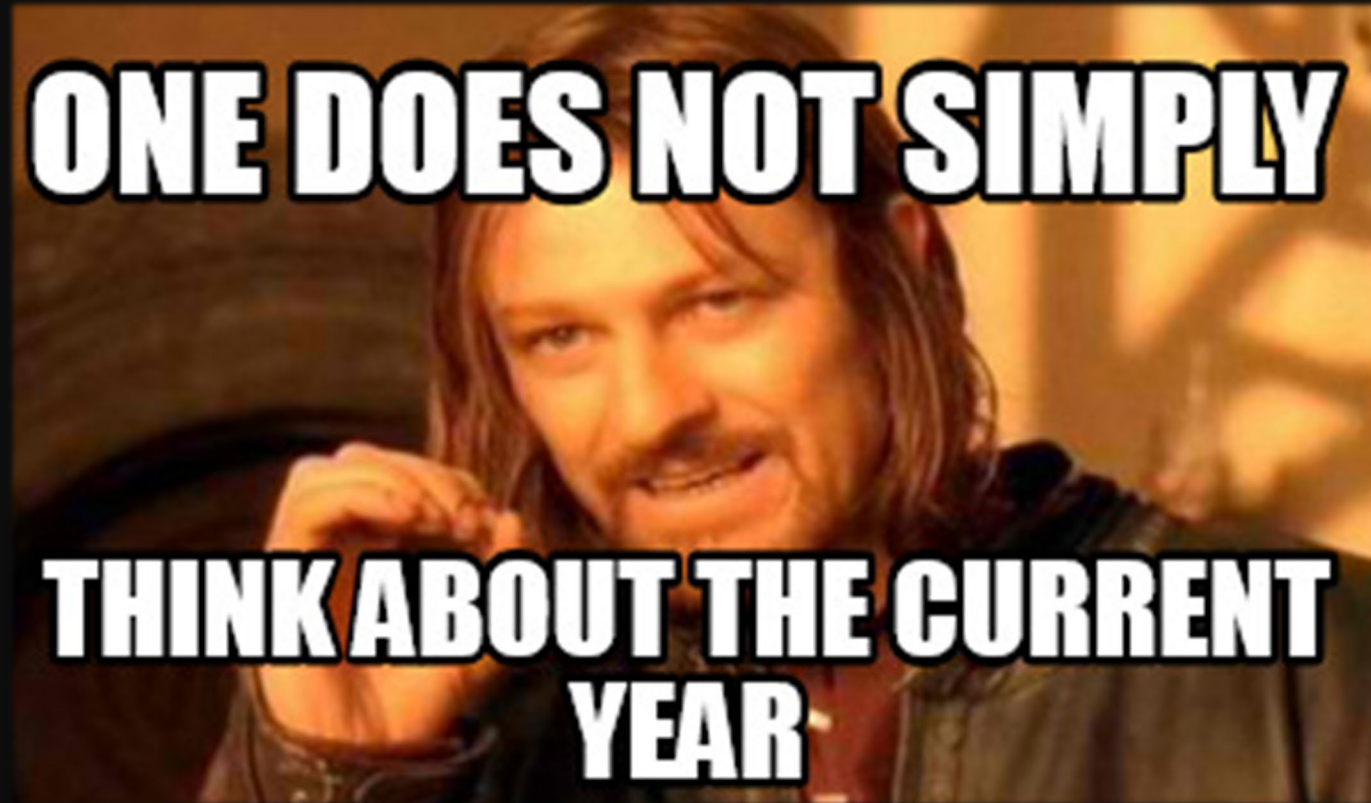
Monerey and Ventura Co. - cabbage



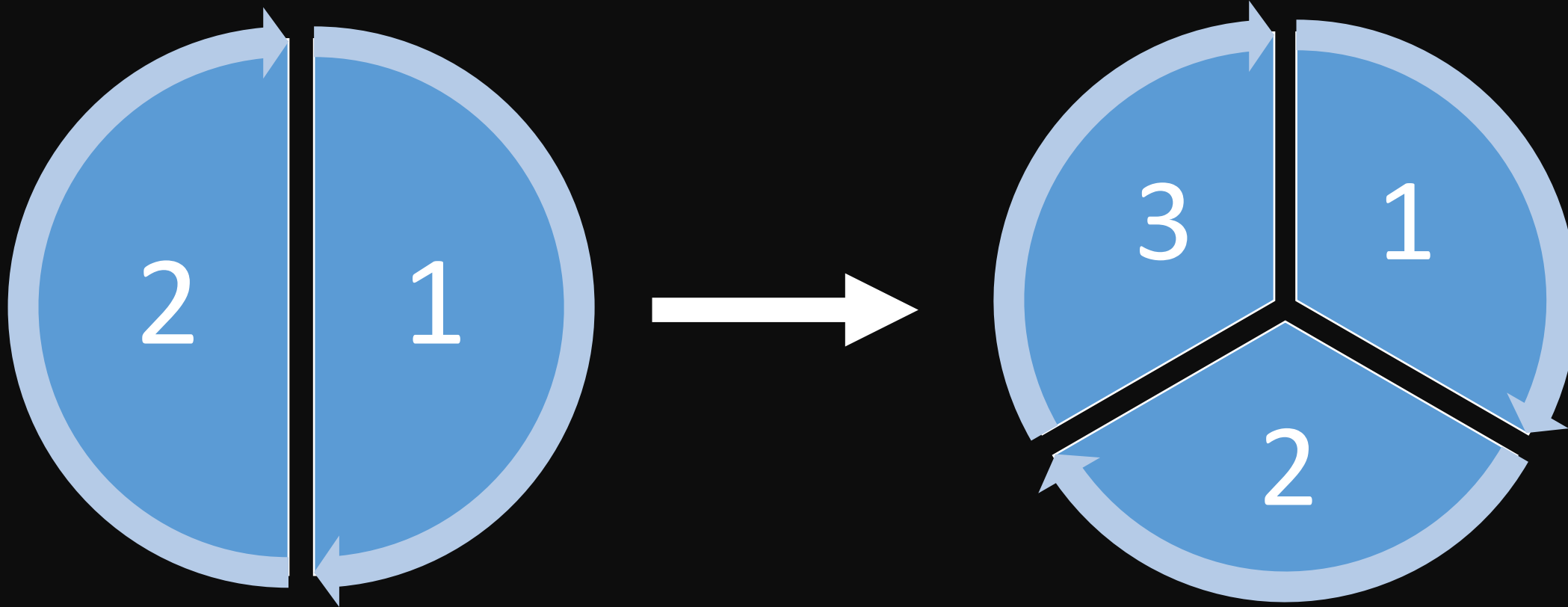
What will it take to continue to manage diamondback moth?



What can we do?



Rotation is necessary



Rotation is necessary





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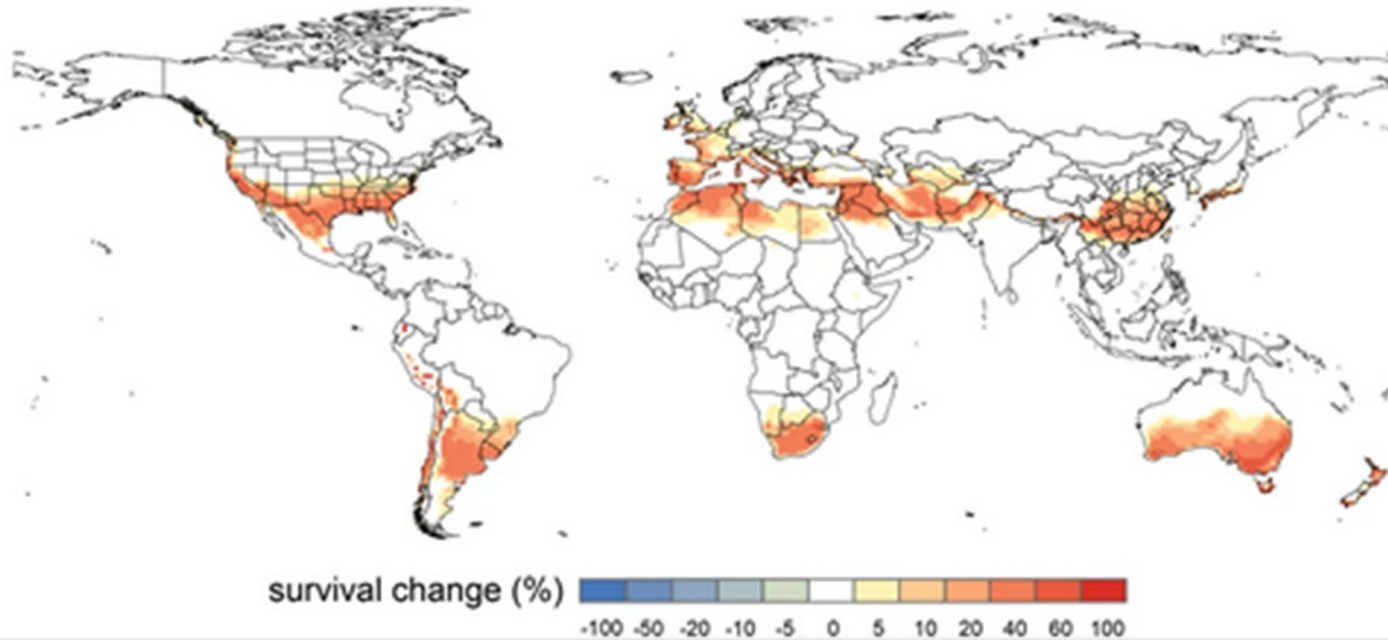
Climate warming promotes pesticide resistance through expanding overwintering range of a global pest

[Chun-Sen Ma](#) , [Wei Zhang](#) , [Yu Peng](#), [Fei Zhao](#), [Xiang-Qian Chang](#), [Kun Xing](#), [Liang Zhu](#), [Gang Ma](#), [He-Ping Yang](#) & [Volker H. W. Rudolf](#)

[Nature Communications](#) **12**, Article number: 5351 (2021) | [Cite this article](#)

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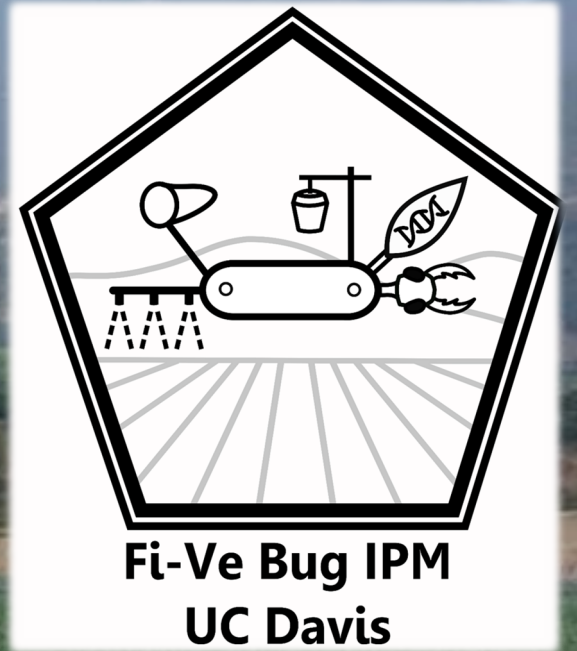
Future expansion (2012-2016 +2 °C vs. 1967-1971)



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Acknowledgements

- Kevin Goding
- Field-Vegetable IPM lab undergraduates
- Industry cooperators/FMC
- PCA/grower cooperators



Questions?

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