Vegetable IPM Research Update

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Kirsten Pearsons, and Daniel Hasegawa

Addie's projects:

New tools for IPM of thrips and aphids in lettuce

Inundative/inoculative releases of natural enemies using drones to control aphids and thrips in lettuce

Rotating cylinders with evenly spaced holes distribute predators at a consistent rate

PARABUG

Inundative/inoculative releases of natural enemies using drones to control aphids and thrips in lettuce

In-field releases of green lacewing and predatory mites


2 trials – aphid and thrips targeted

3 releases directly over crop field

Release of Orius sp. over insectary plantings

1 trial – thrips targeted

1 release over insectary planting

Release of Orius sp and predatory mites over ice plant

1 trial – thrips targeted

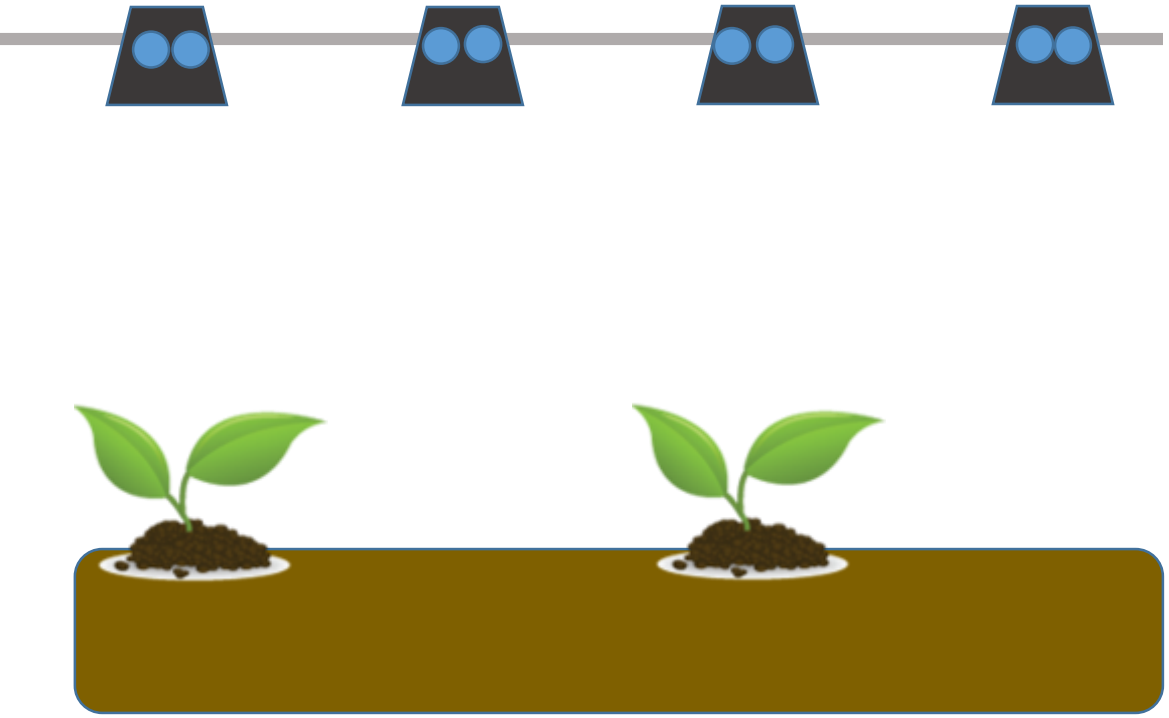
2 releases over non-crop area

Precision insecticide sprays in improve application of aphid-targeted materials

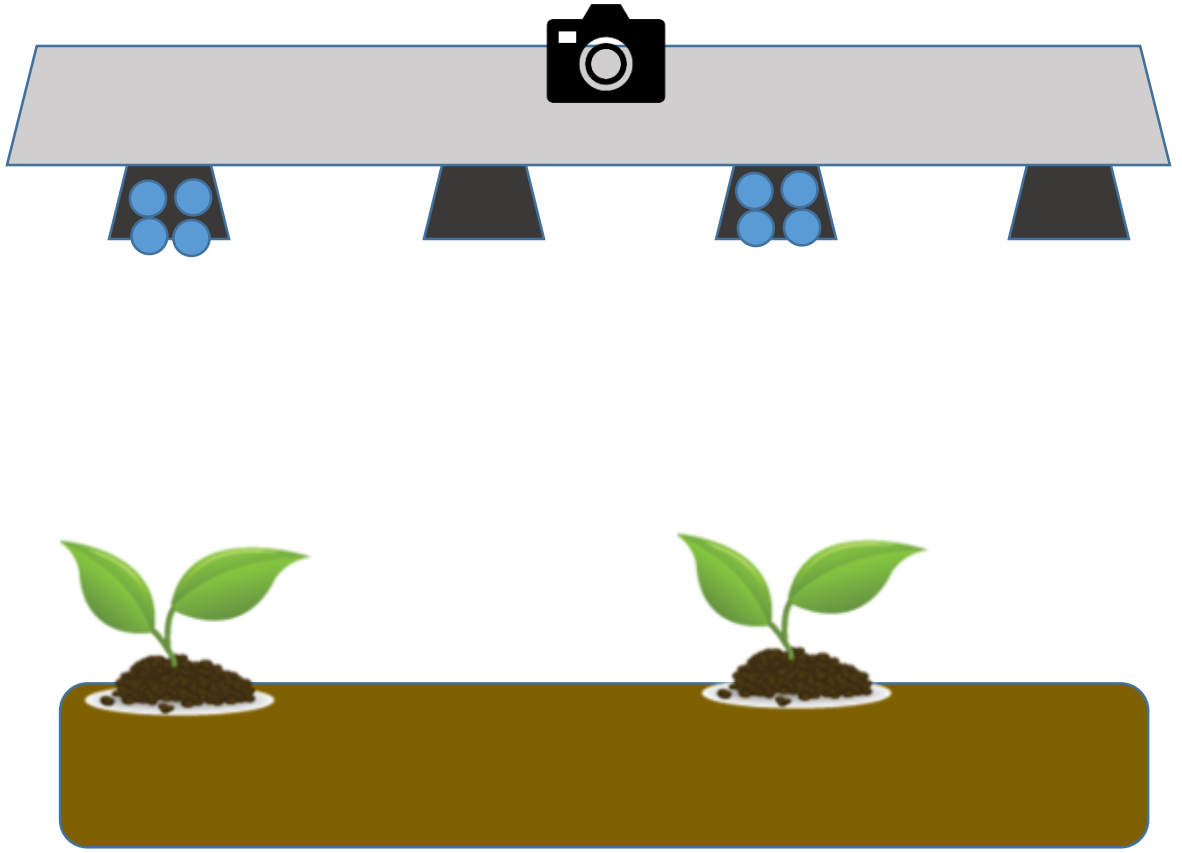
Where it started:
Broadcast sprayer

Where it’s going:
Precision sprayer

Broadcast sprayer



Precision sprayer



Same per acre rate, different per plant rate

Precision insecticide sprays in improve application of aphid-targeted materials

Rates experiment

2 trials

2 products tested

2 application systems

3 application rates

Timing of applications consistent

Extended Control experiment

2 trials

2 products tested

2 application systems

2 application rates

2 application timings

Application rate experiment

Conventional romaine lettuce 2 weeks post-planting → *spray band covers ~ 10% of the bed*

2 pesticide applications spaced 10-14 days apart

Random complete block design with 8 treatments + untreated control

5 replications per trial x 2 trials

2 chemistries

- Spirotetramat
- Thiamethoxam

Thiamethoxam Precision

Applied at 5.5, 1.8 and 0.55 oz/acre

Thiamethoxam Broadcast

Applied at 5.5 oz/acre

Spirotetramat Precision

Applied at 5, 1.7 and 0.5 oz/acre

Spirotetramat Broadcast

Applied at 5 oz/acre

Thiamethoxam Precision

Applied at 5.5, 1.8

Thiamethoxam Broadcast

at 5.5 oz/acre

Untreated control

Spirotetramat

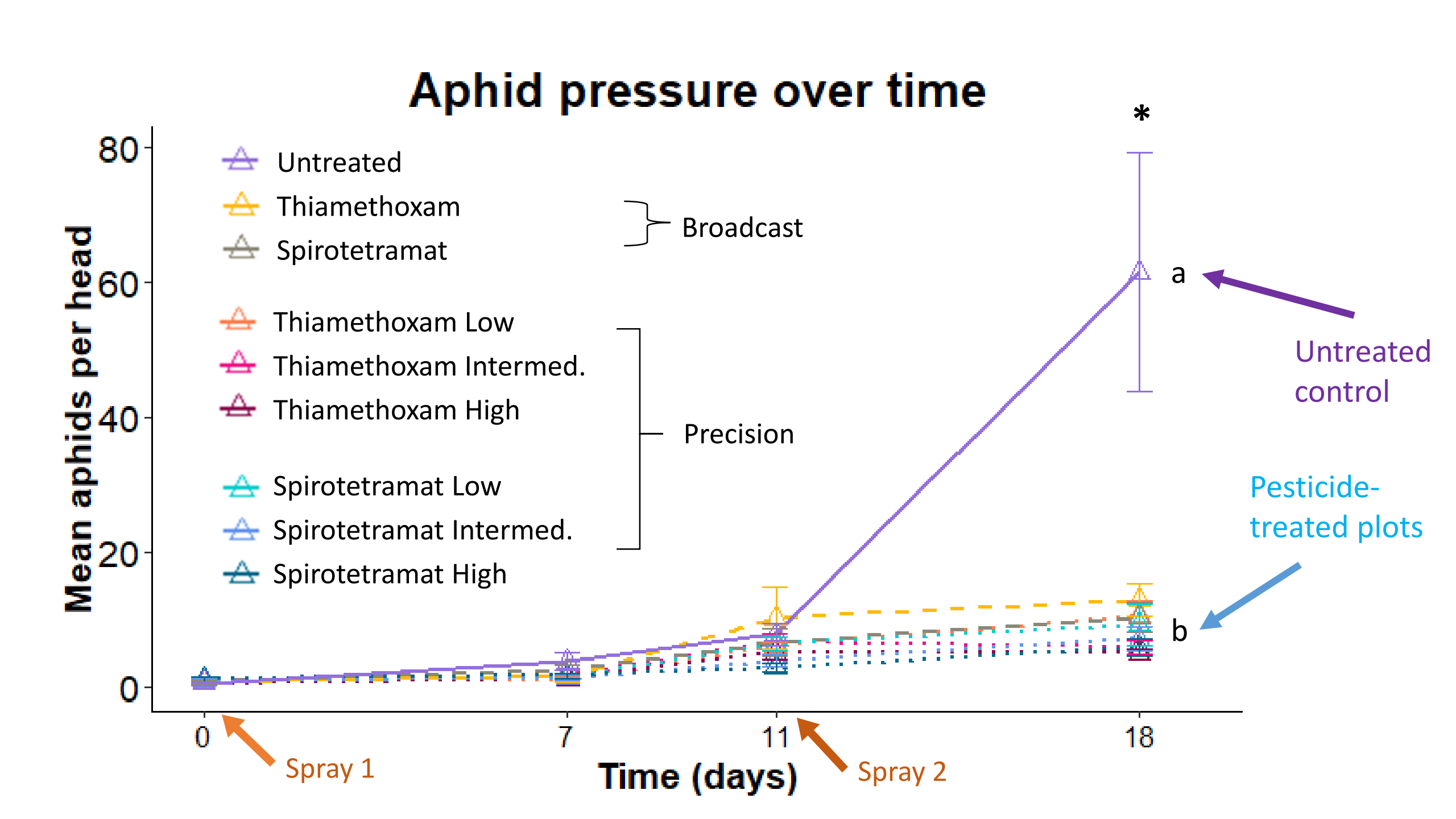
Applied at 5, 1.7 and 0.5 oz/acre

amat Broadcast

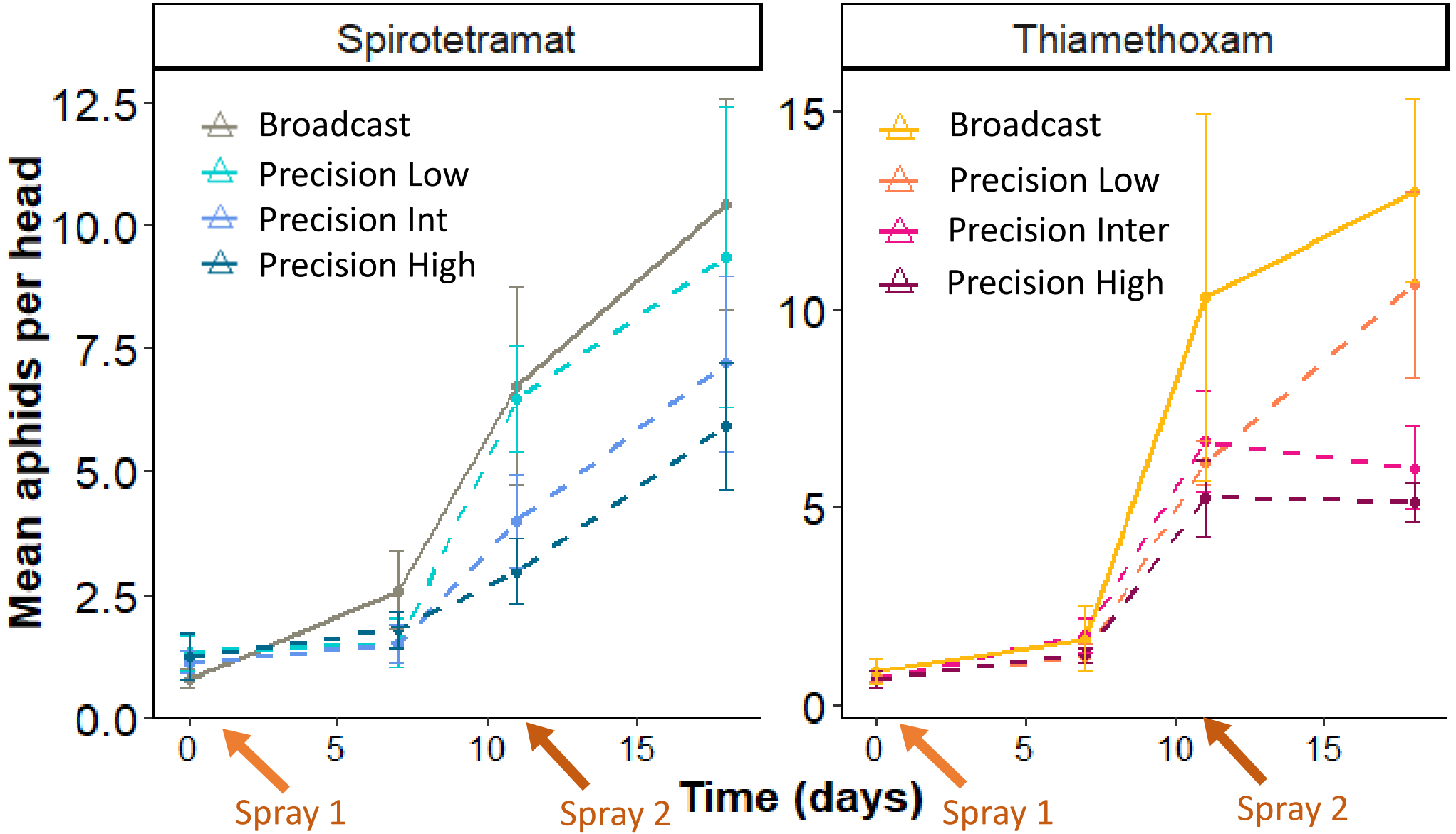
Applied at 5 oz/acre

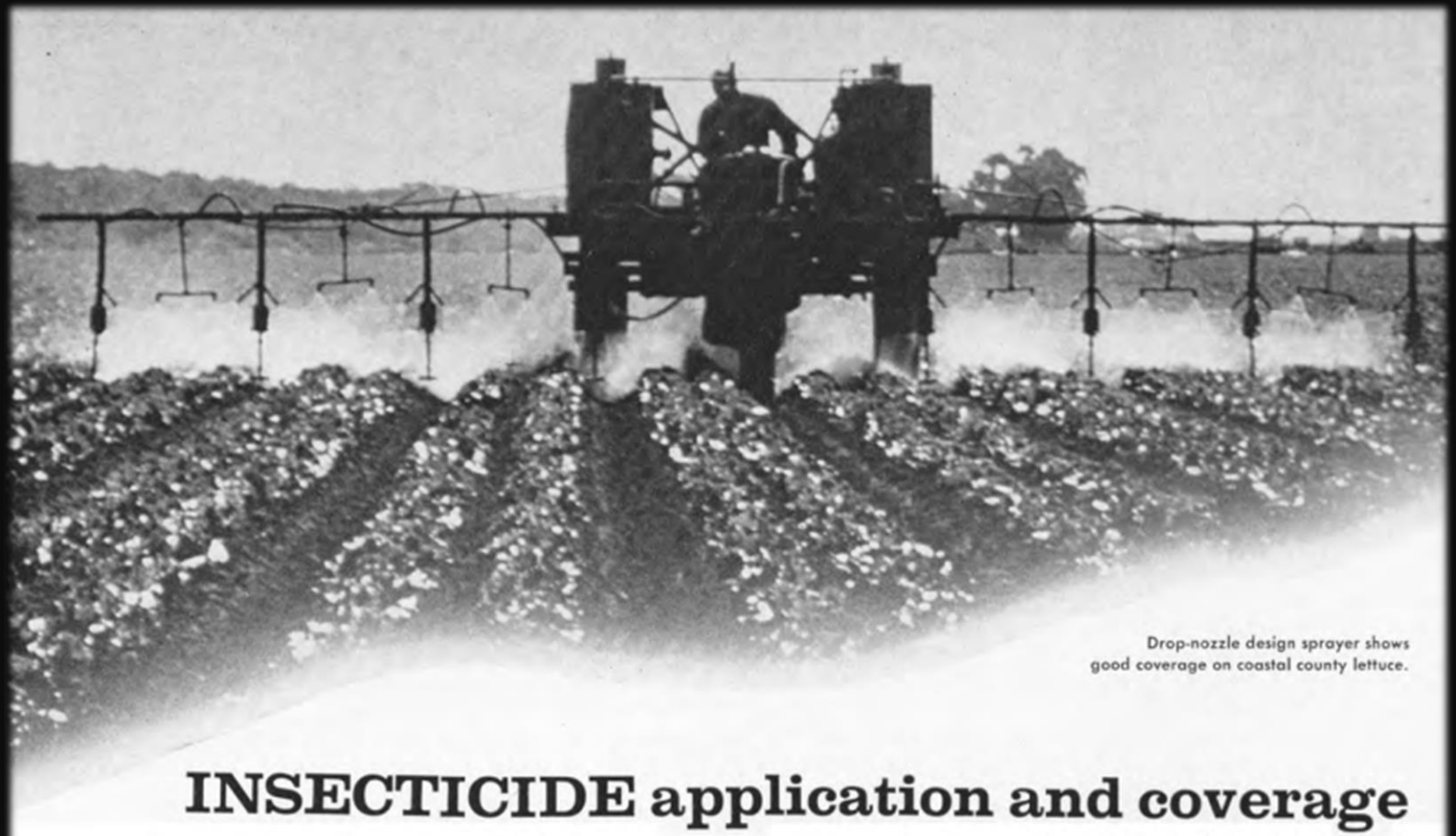
Treatment table with per acre and per plant rates for each application

Treatment	Application method	Insecticide	rate per acre (oz/acre)	rate per plant (mg/plant)	notes
1	Untreated control	none	--	--	
2	Broadcast spray	Spirotetratmat	5	0.22	label max
3	Precision spray	Spirotetratmat	5	2.2	label max
4	Precision spray	Spirotetratmat	1.7	0.73	label max / 3
5	Precision spray	Spirotetratmat	0.5	0.22	label max /10
6	Broadcast spray	Thiamethoxam	5.5	0.24	label max
7	Precision spray	Thiamethoxam	5.5	2.4	label max
8	Precision spray	Thiamethoxam	1.8	0.8	label max / 3
9	Precision spray	Thiamethoxam	0.55	0.24	label max / 10


Aphid pressure over time
Mean aphids per head
80
60
40
20
0
Untreated
Thiamethoxam
Spirotetramat
Broadcast
Thiamethoxam Low
Thiamethoxam Intermed.
Thiamethoxam High
Precision
Spirotetramat Low
Spirotetramat Intermed.
Spirotetramat High
*
a
b
Untreated control
Pesticide-treated plots
0
7
11
18
Time (days)
Spray 1
Spray 2

Aphid pressure over time, controls excluded



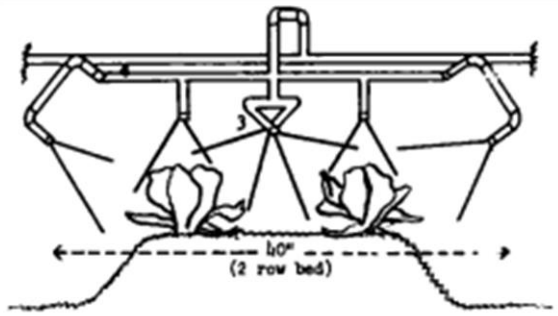


Drop-nozzle design sprayer shows good coverage on coastal county lettuce.

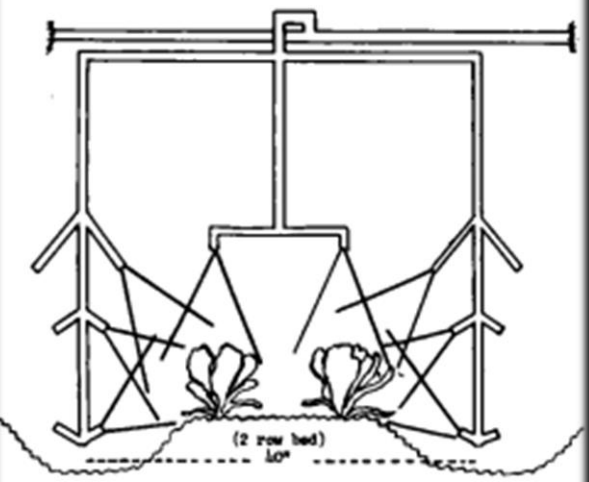
INSECTICIDE application and coverage

Drop Nozzles and Higher Gallonage Applications Improve Aphid Control on Lettuce

J. E. DIBBLE



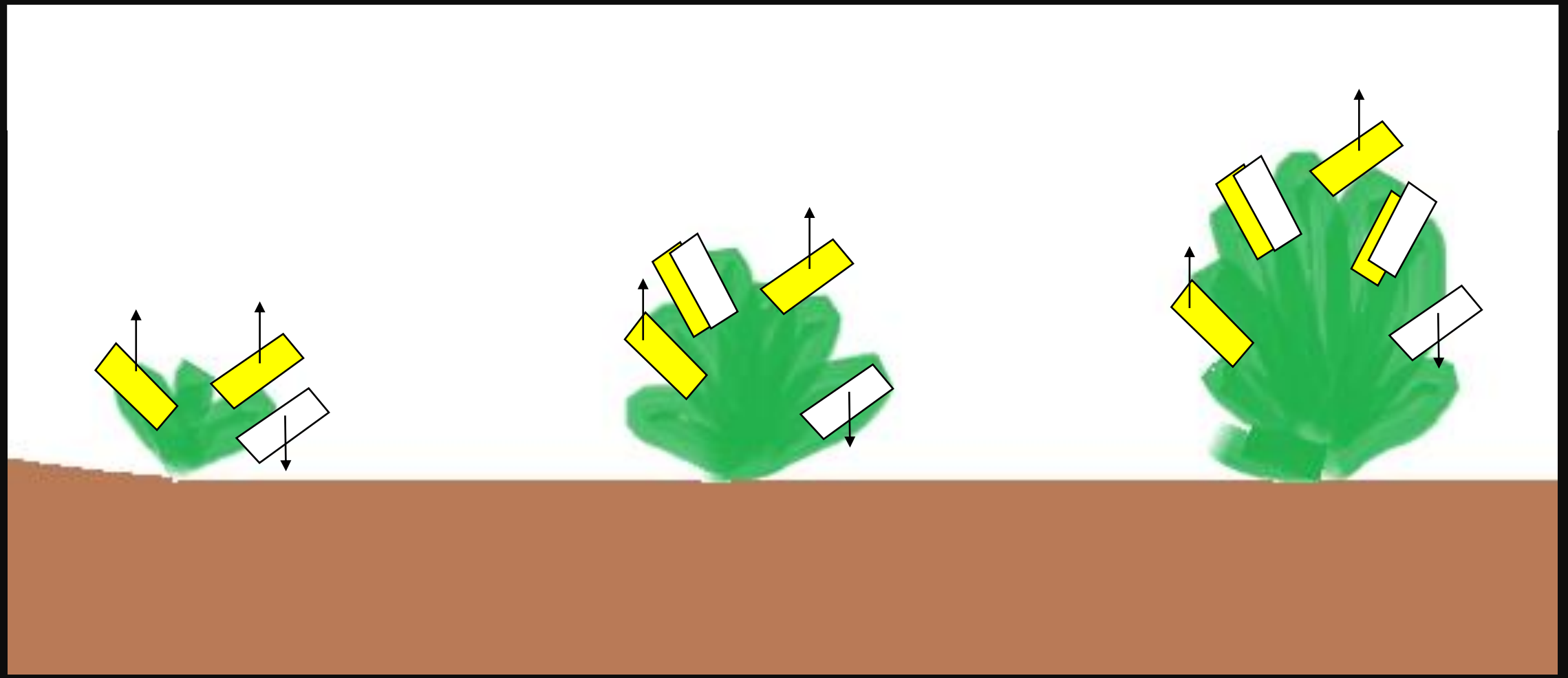
Sketch of regular sprayer manifold in use by commercial applicators for row-crop insect control, above, compared with improved drop-nozzle design, below, which sprays upward from bottom of rows for better coverage of under sides of leaves.

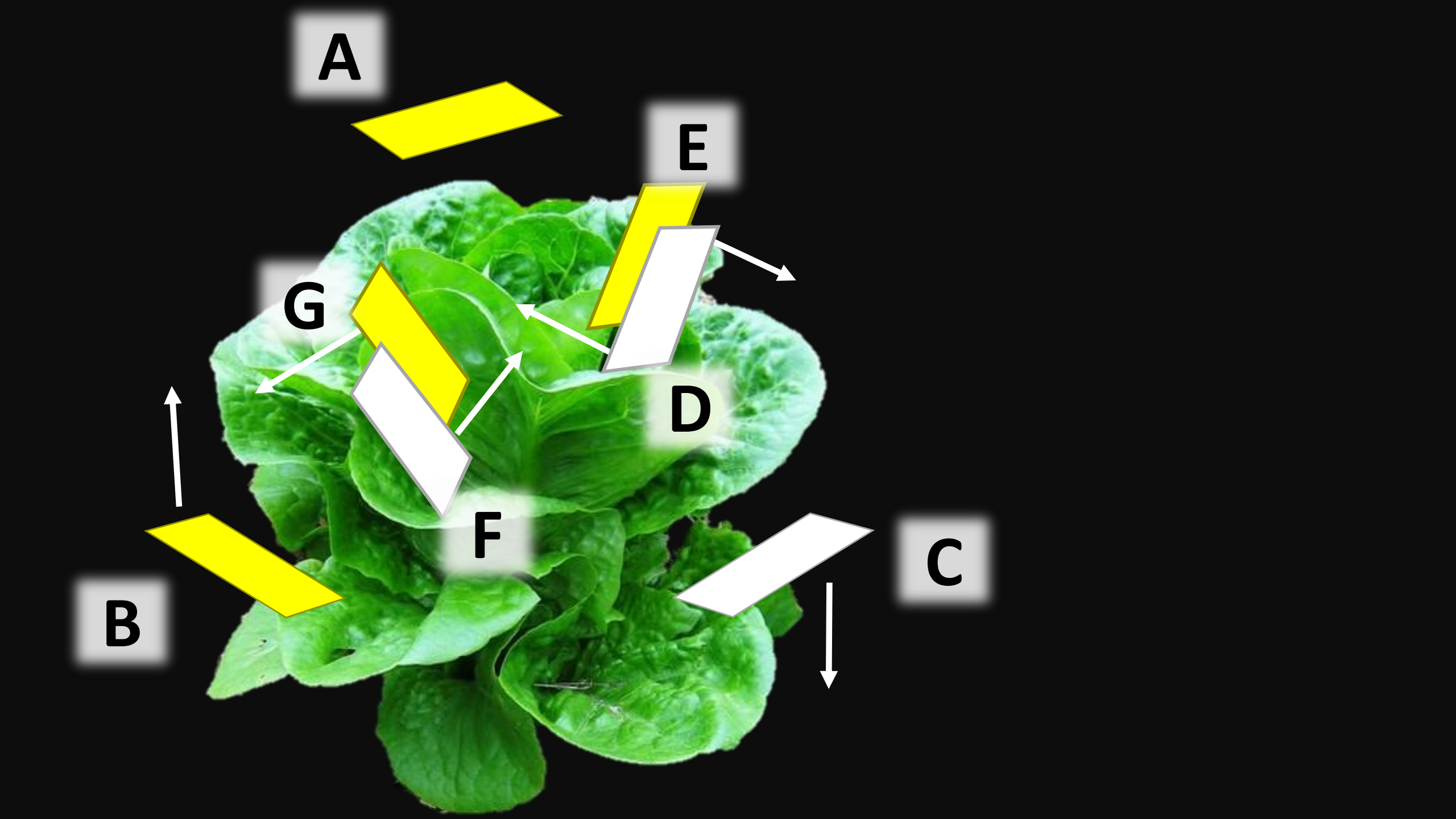


3 cards

5 cards

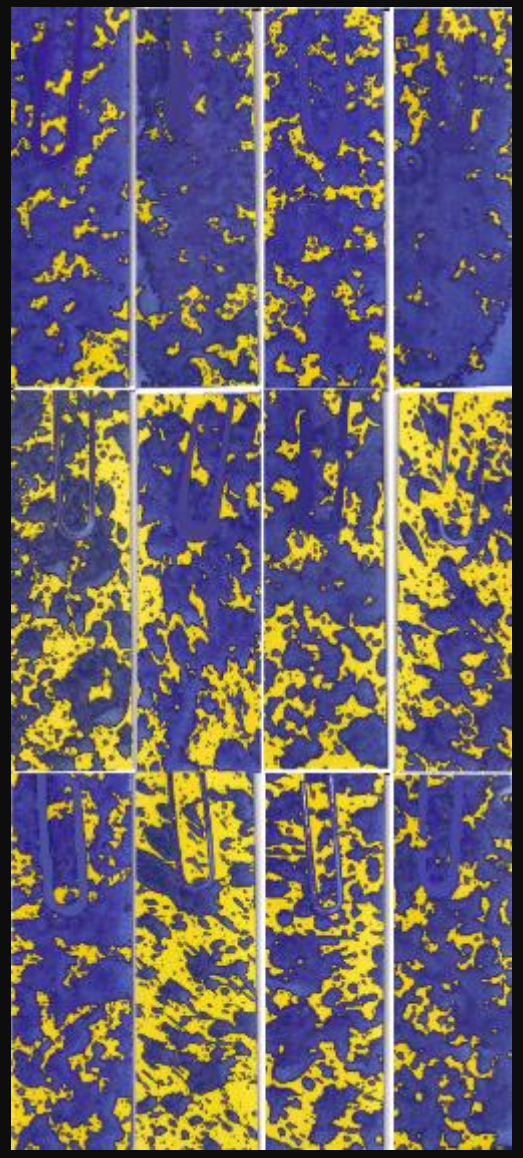
7 cards



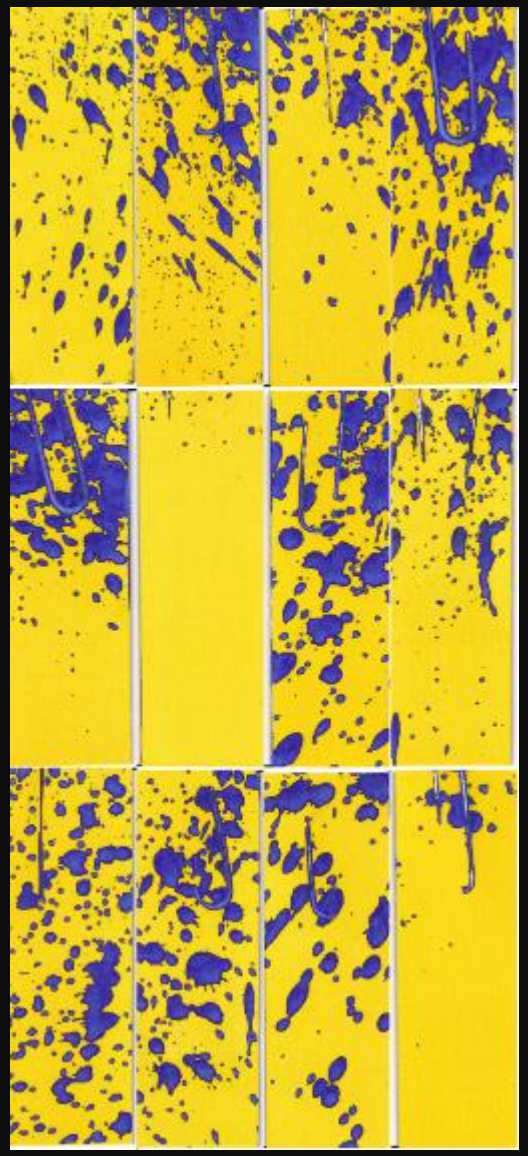

A
E
G
D
F
B
C



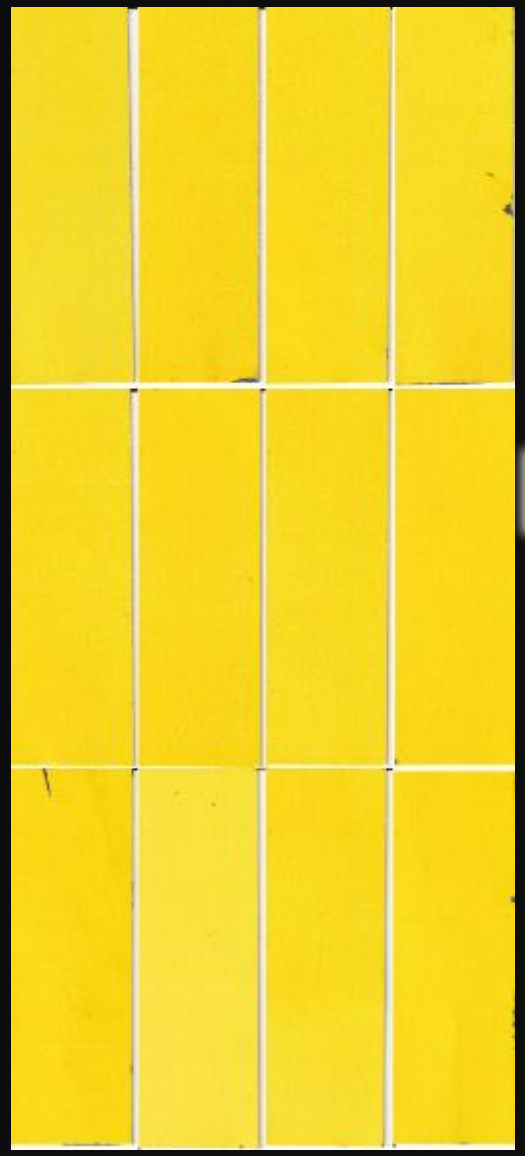
A

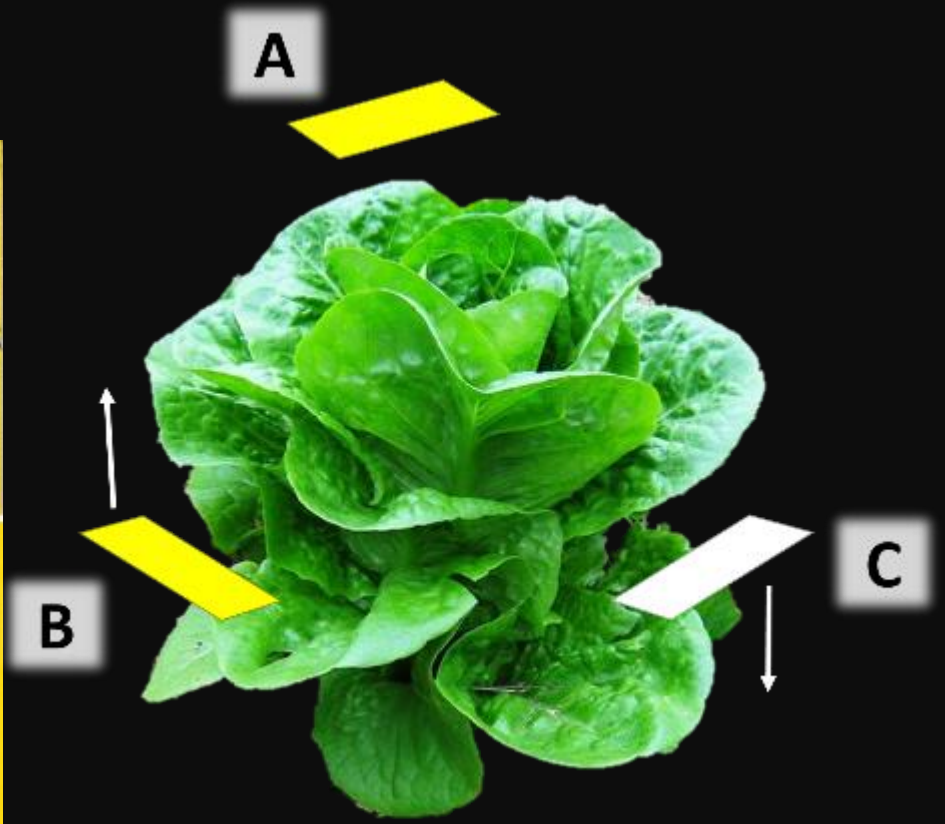


B



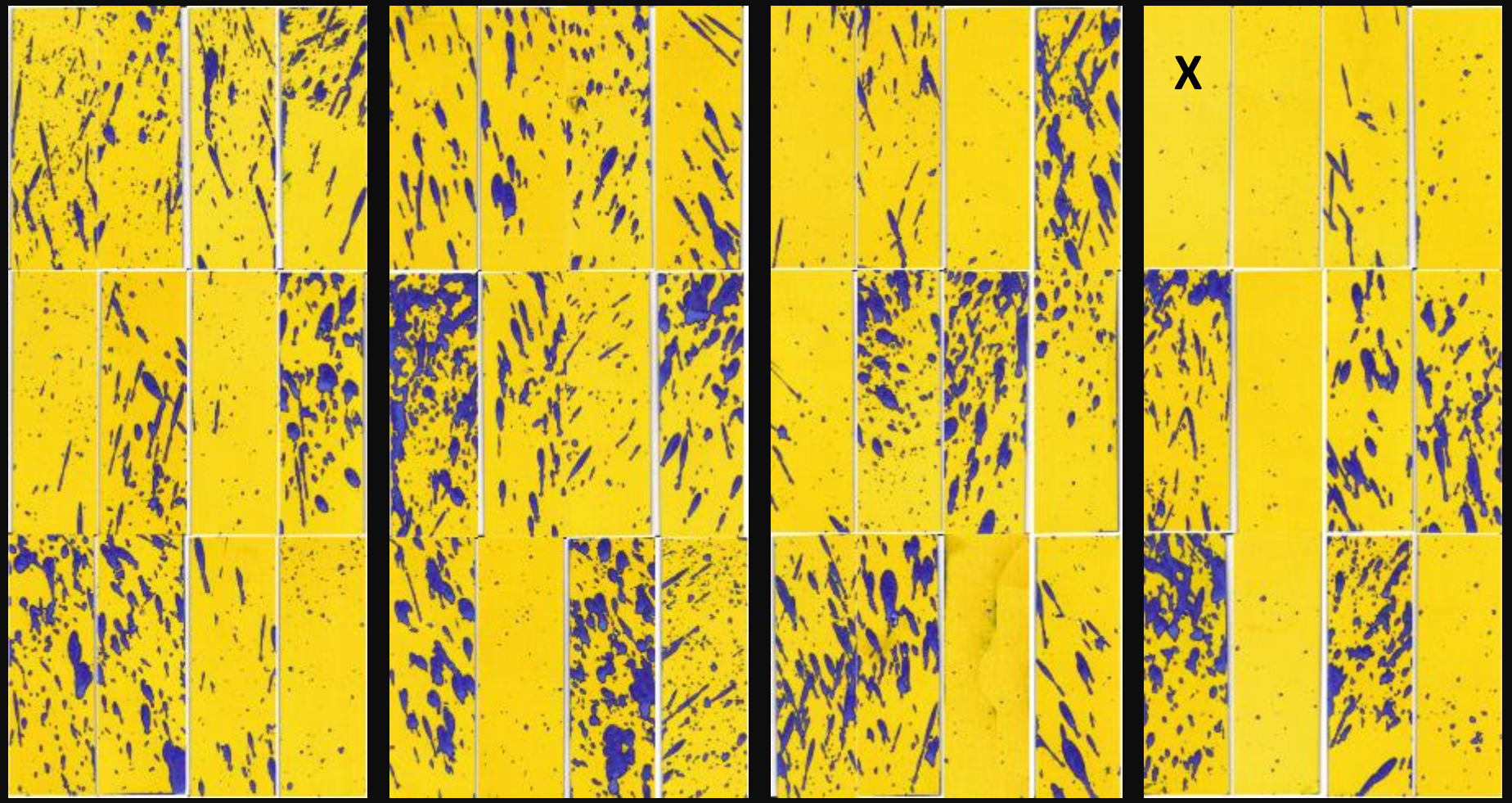
C

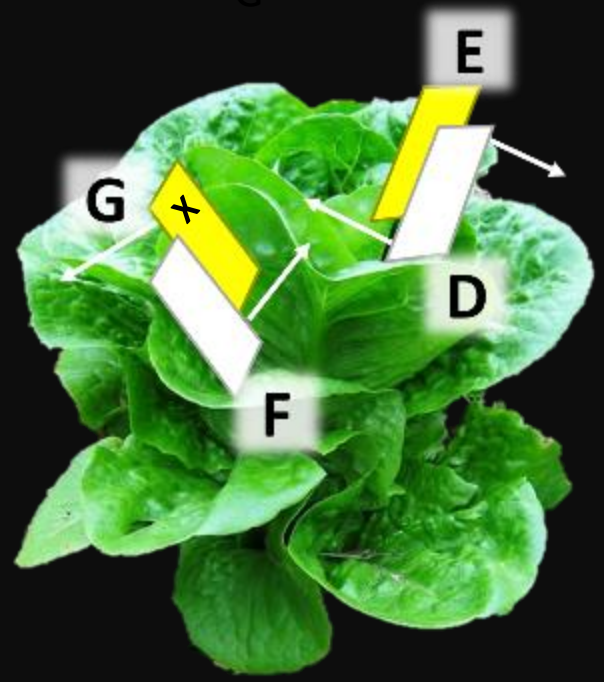


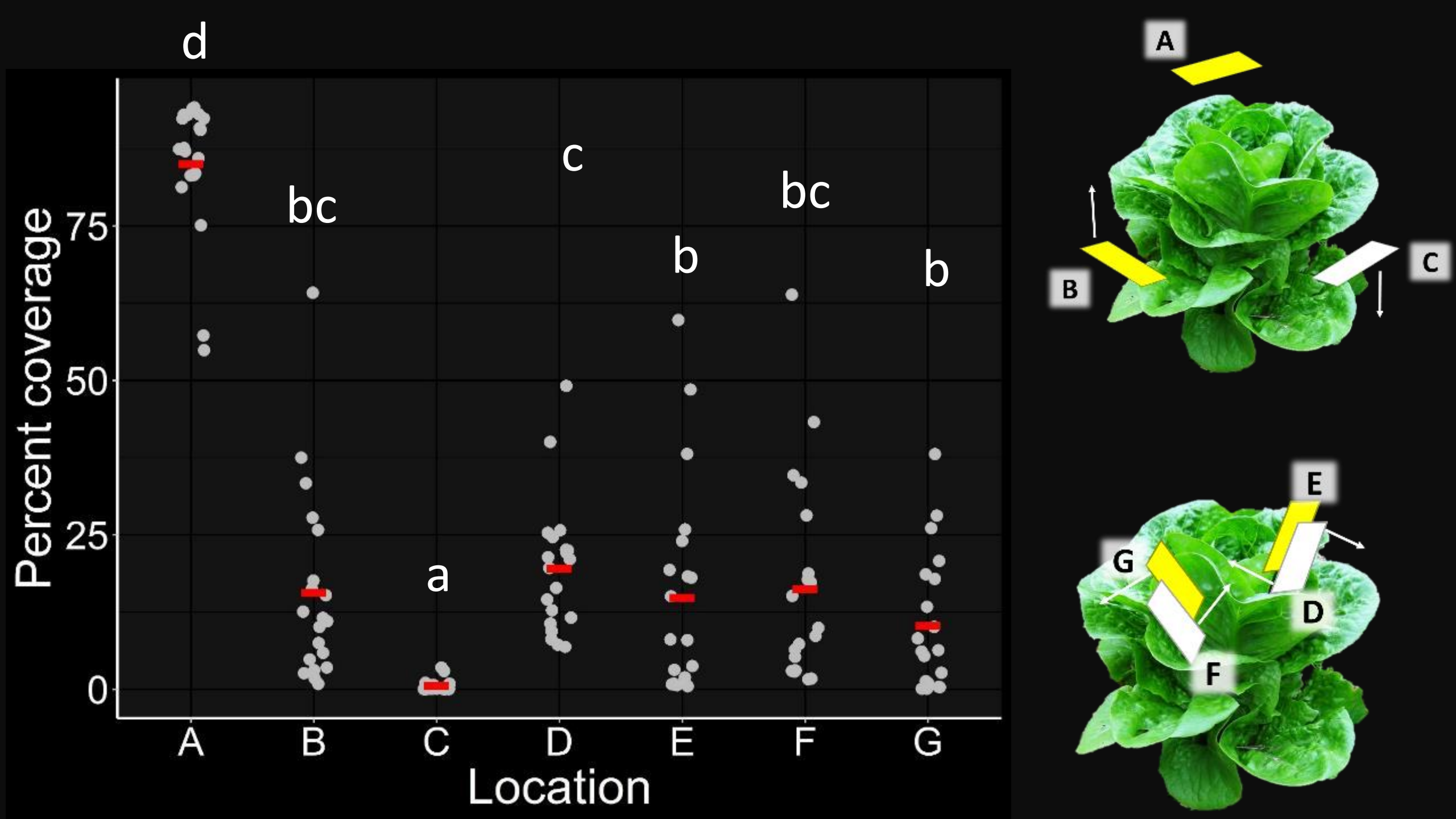


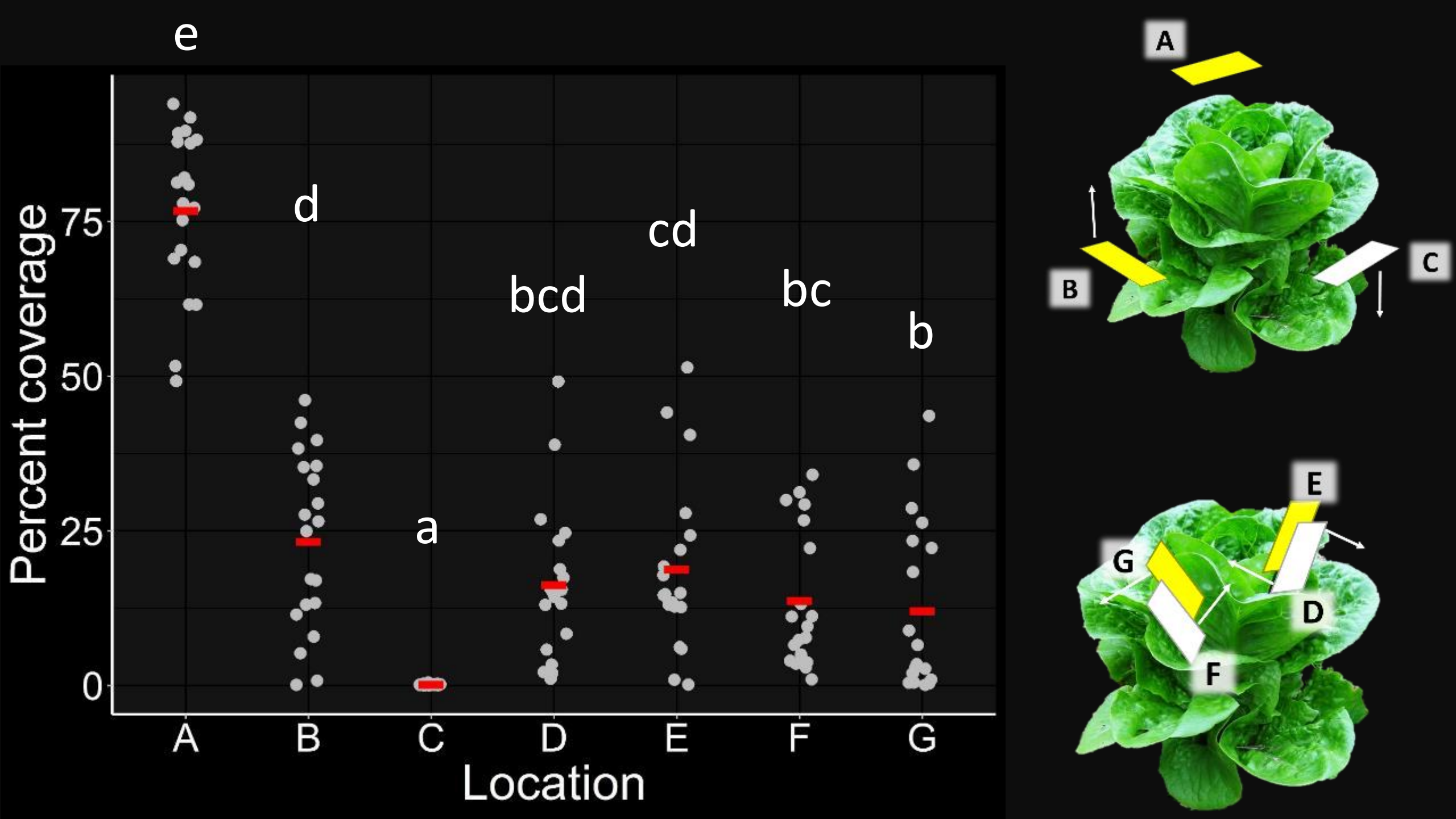
D E F G

D E F G



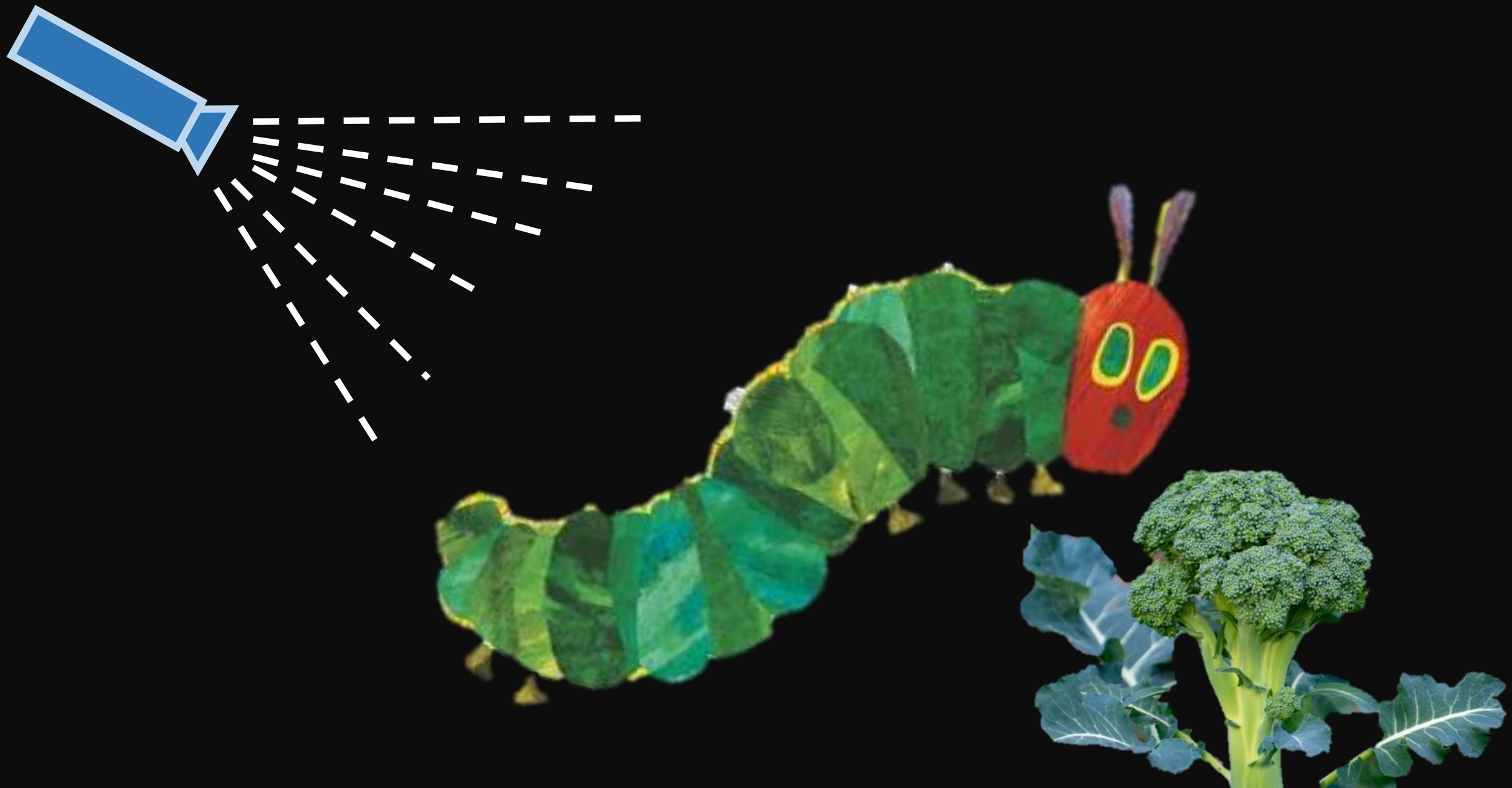



d
bc
c
bc
b
b
a
Percent coverage
0
25
50
75
A
B
C
D
E
F
G
Location
A
B
C
E
G
D
F

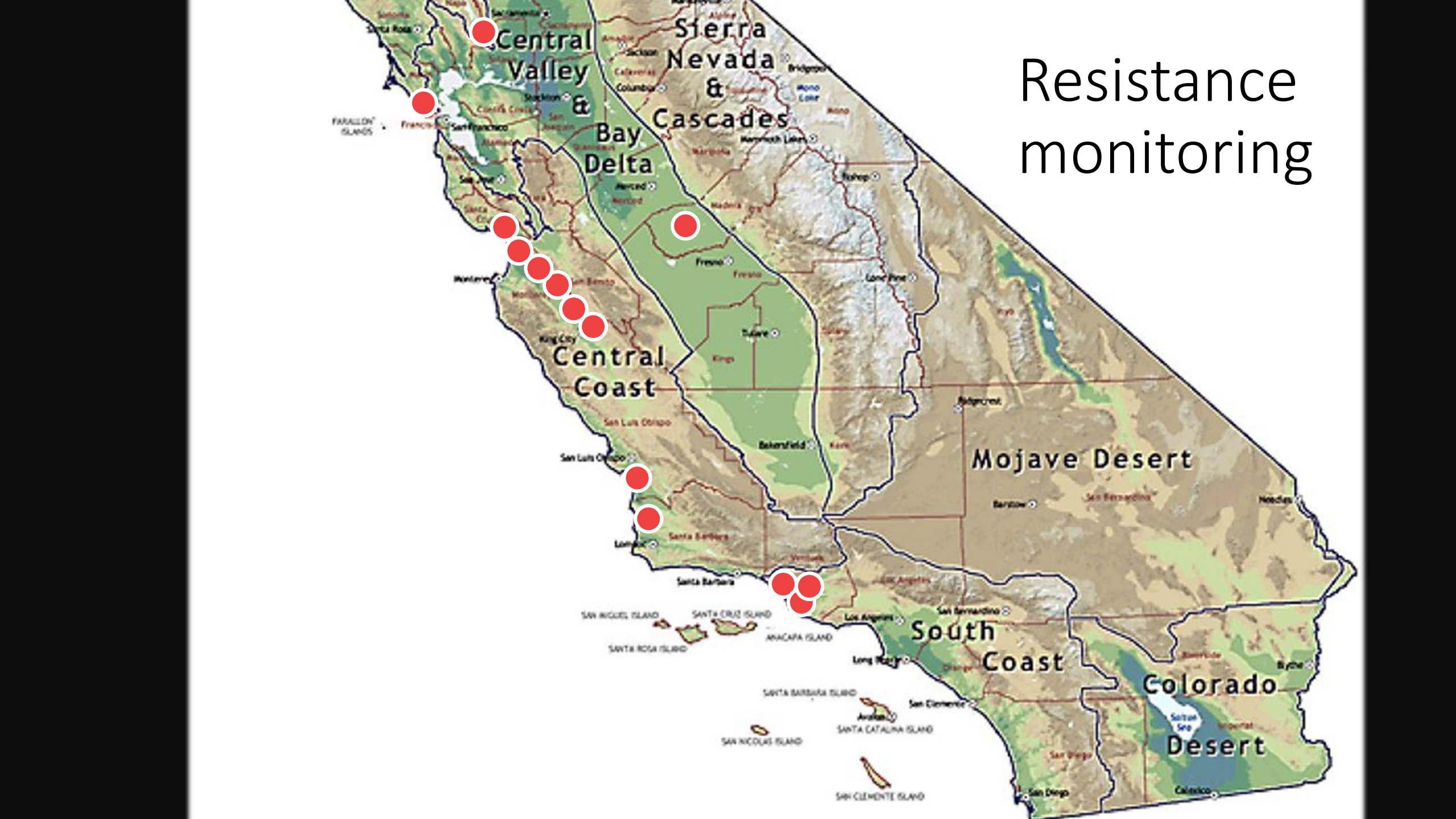

e
d
a
bcd
cd
bc
b
Percent coverage
0
25
50
75
A
B
C
D
E
F
G
Location
A
B
C
E
G
D
F

NOTHING TO SEE HERE...

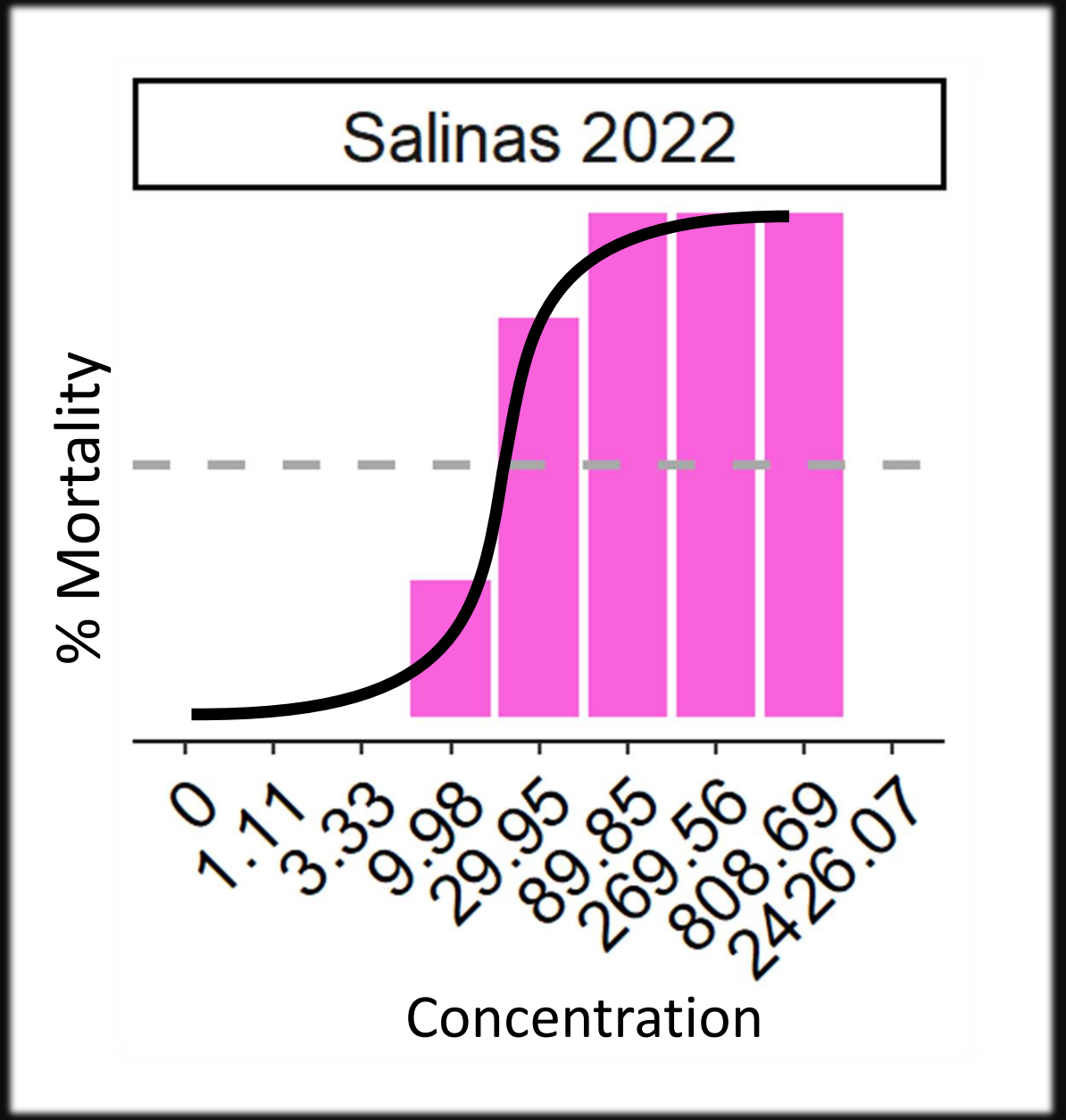
...IN DIAMONDBACK MOTH IPM

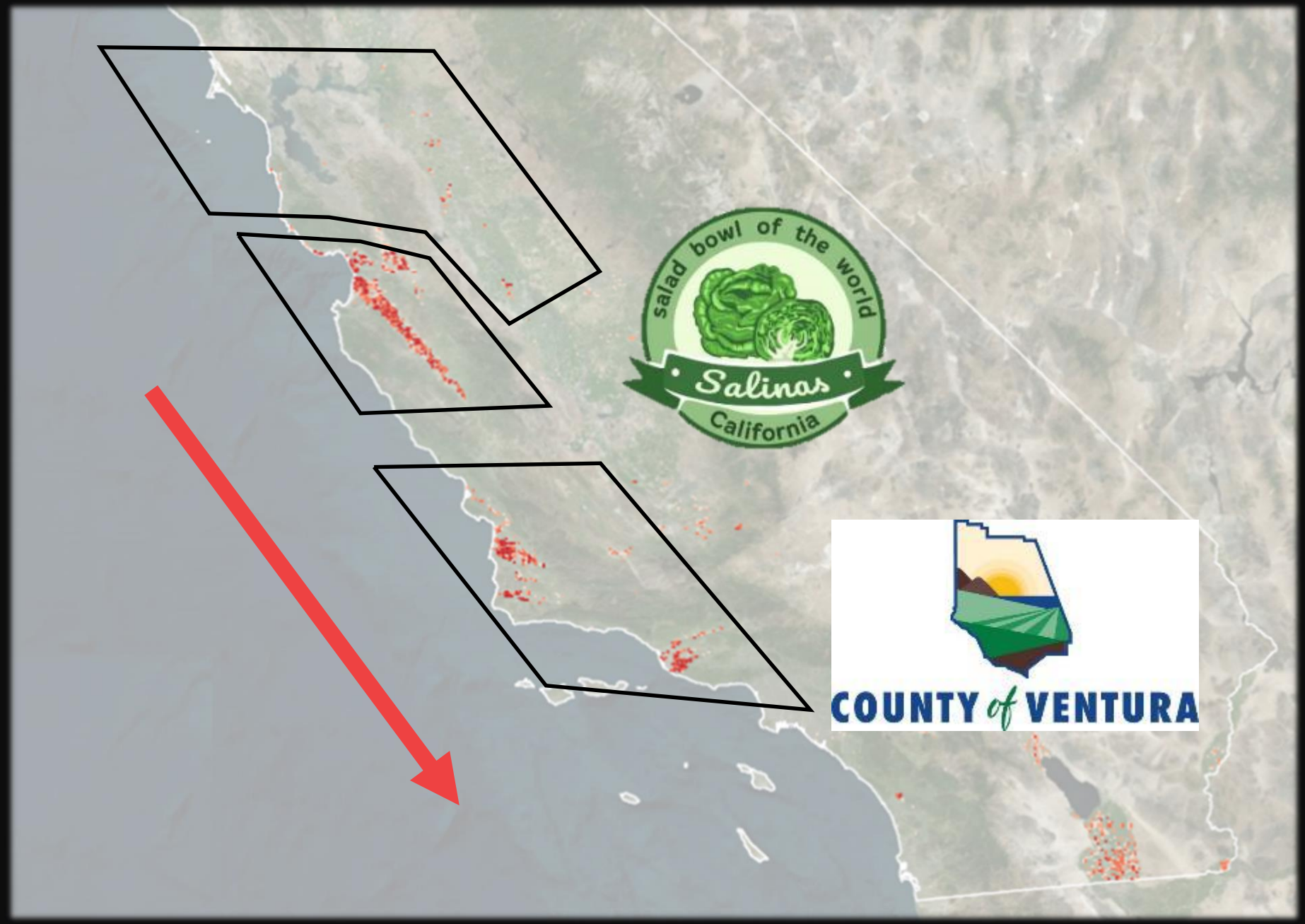



Growers
Pest control advisors


Central Valley & Bay Delta
Sierra Nevada & Cascades
Central Coast
Mojave Desert
South Coast
Colorado Desert
Resistance monitoring

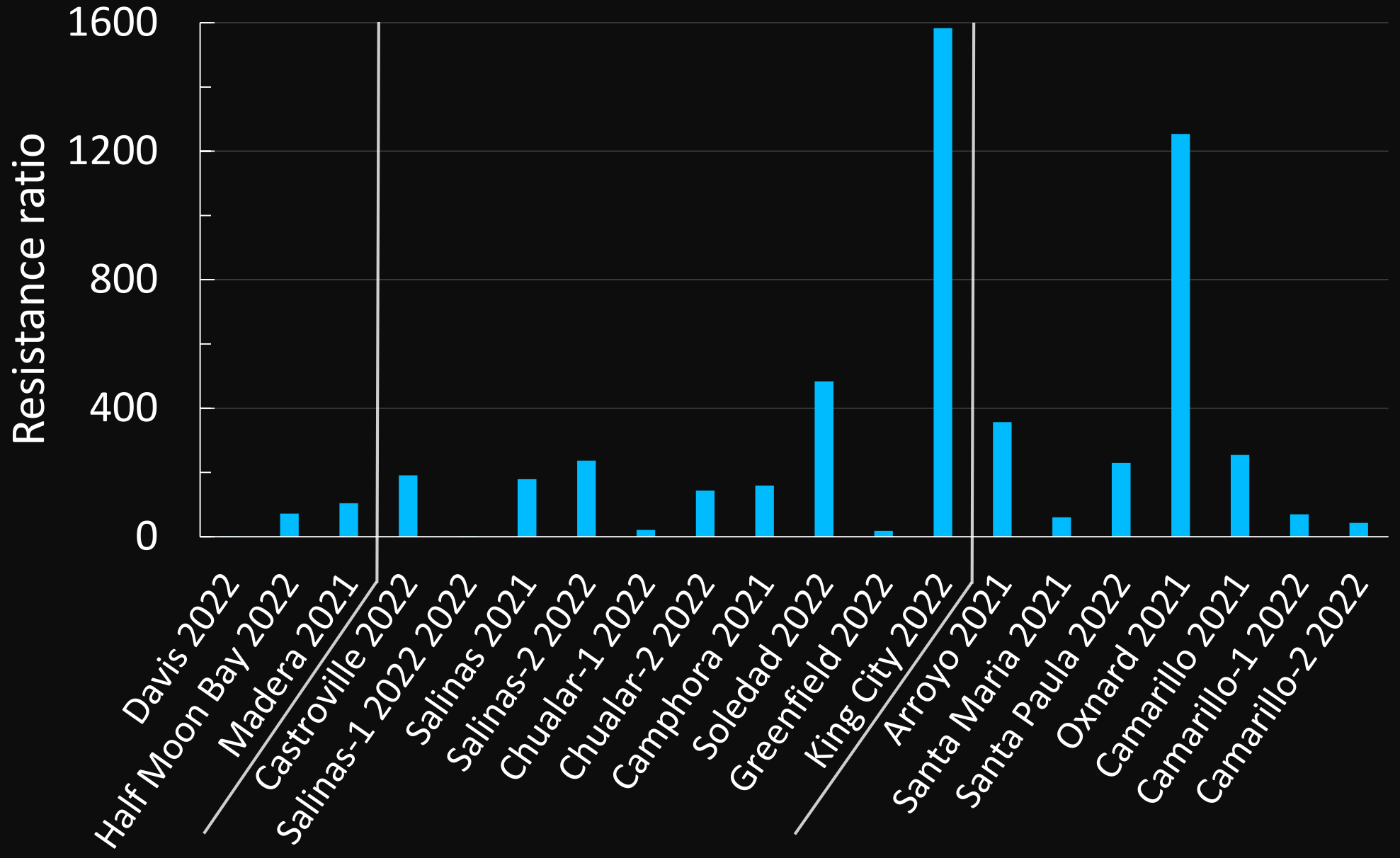
Resistance monitoring – leaf dip assay


Salinas 2022
% Mortality
0
1.11
3.33
9.98
29.95
89.85
269.56
808.69
2426.07
Concentration

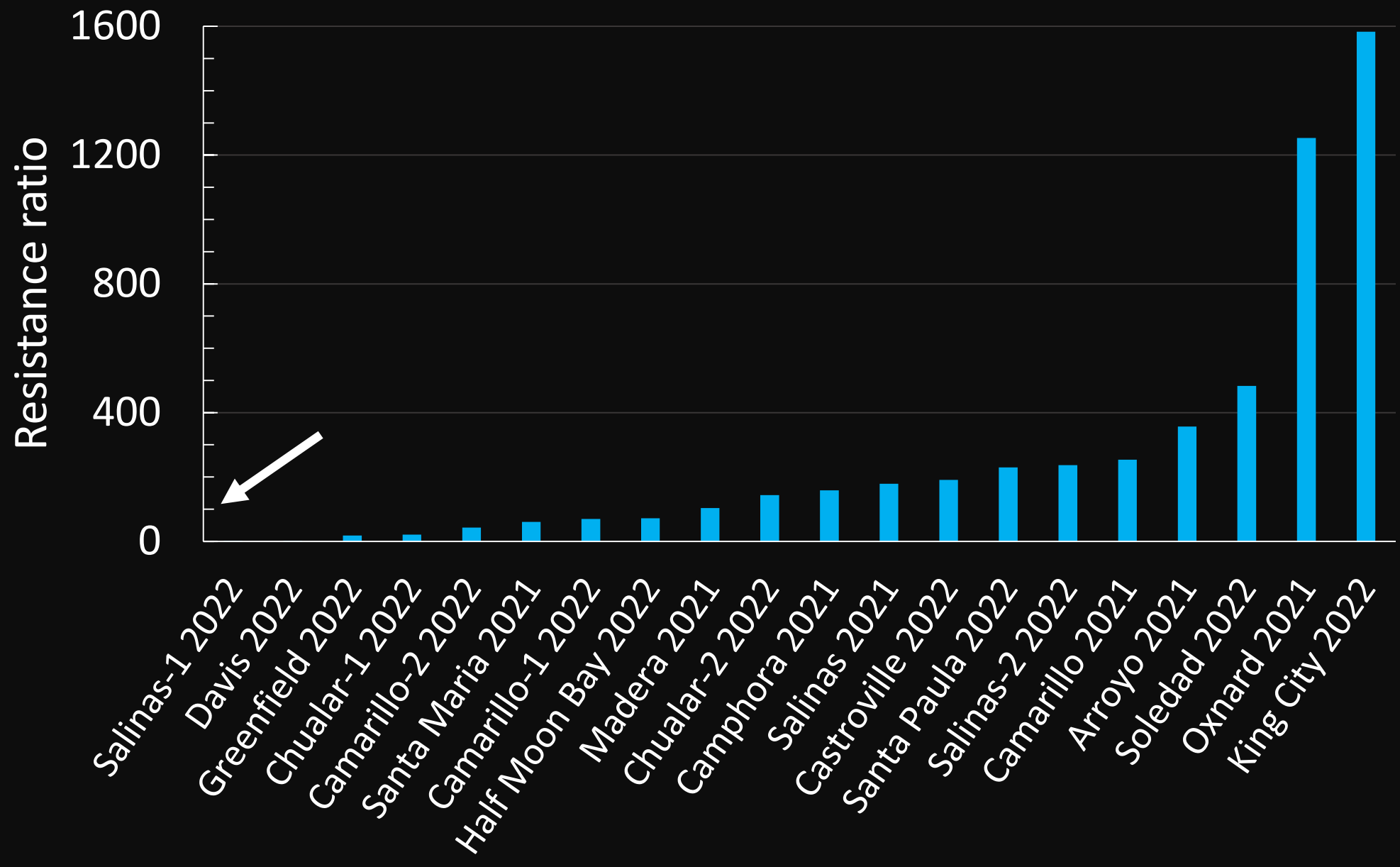


Logo, Heather @unhingedheather

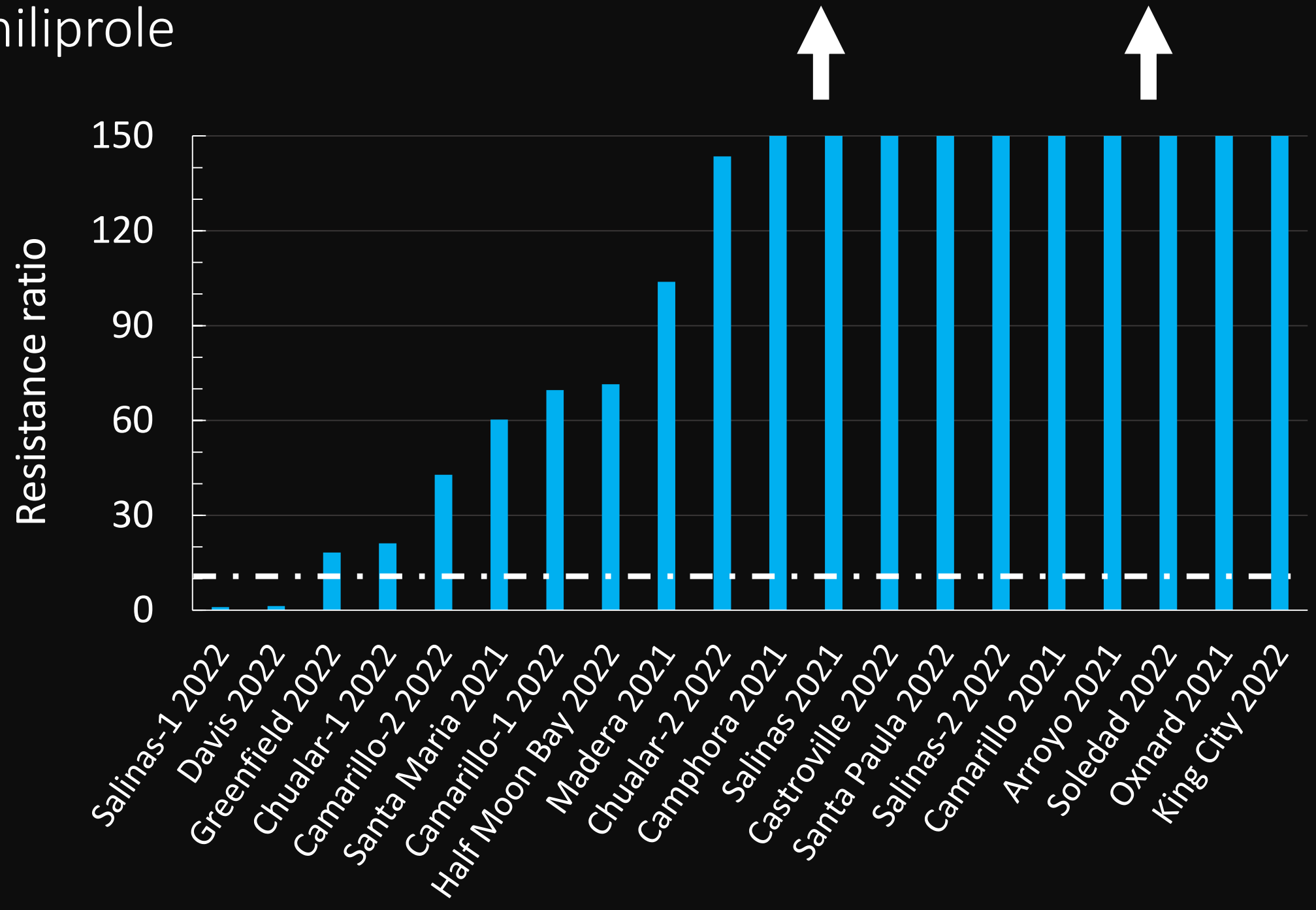
Chlorantraniliprole
Coragen
(diamide)



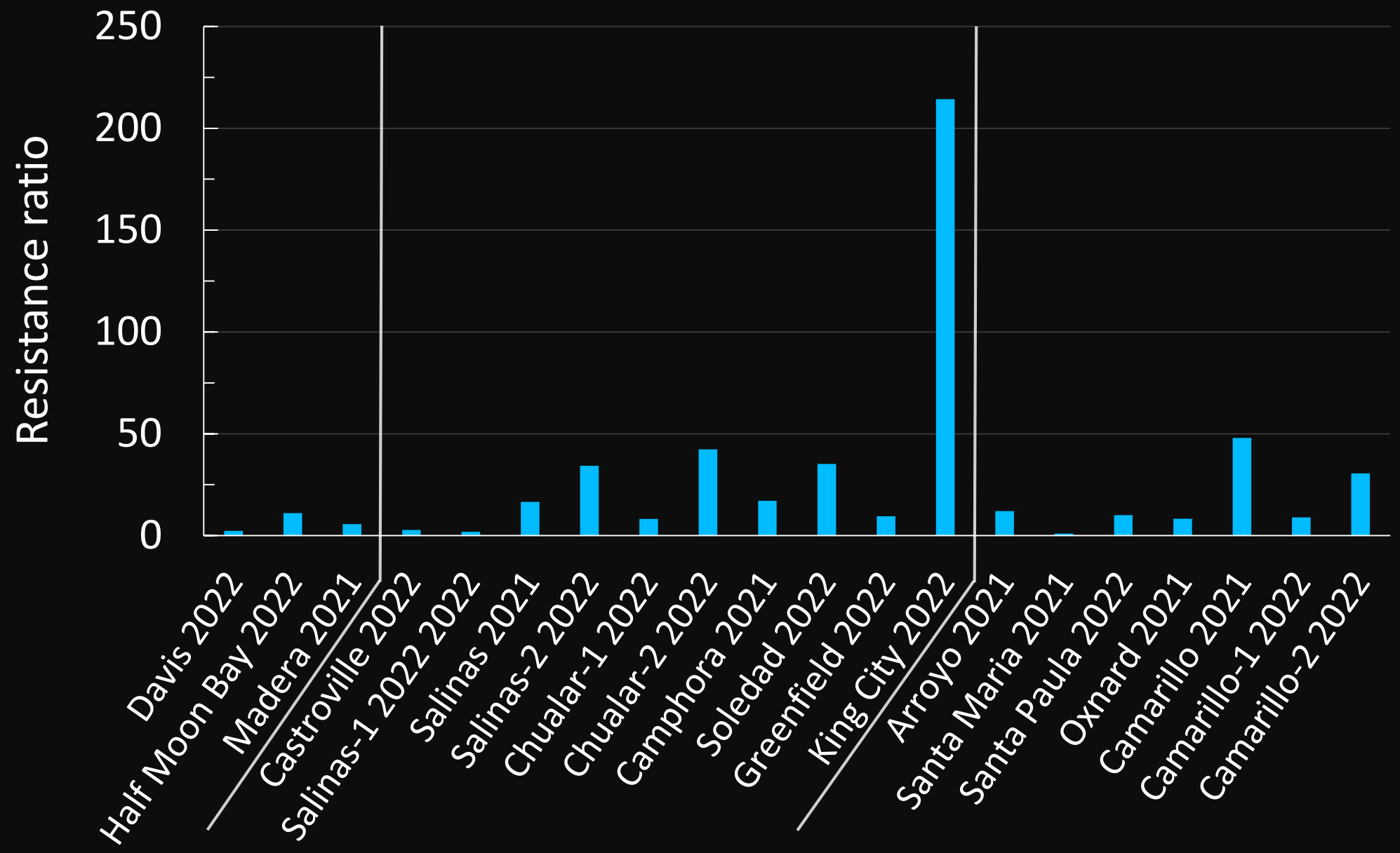
Chlorantraniliprole
Coragen
(diamide)



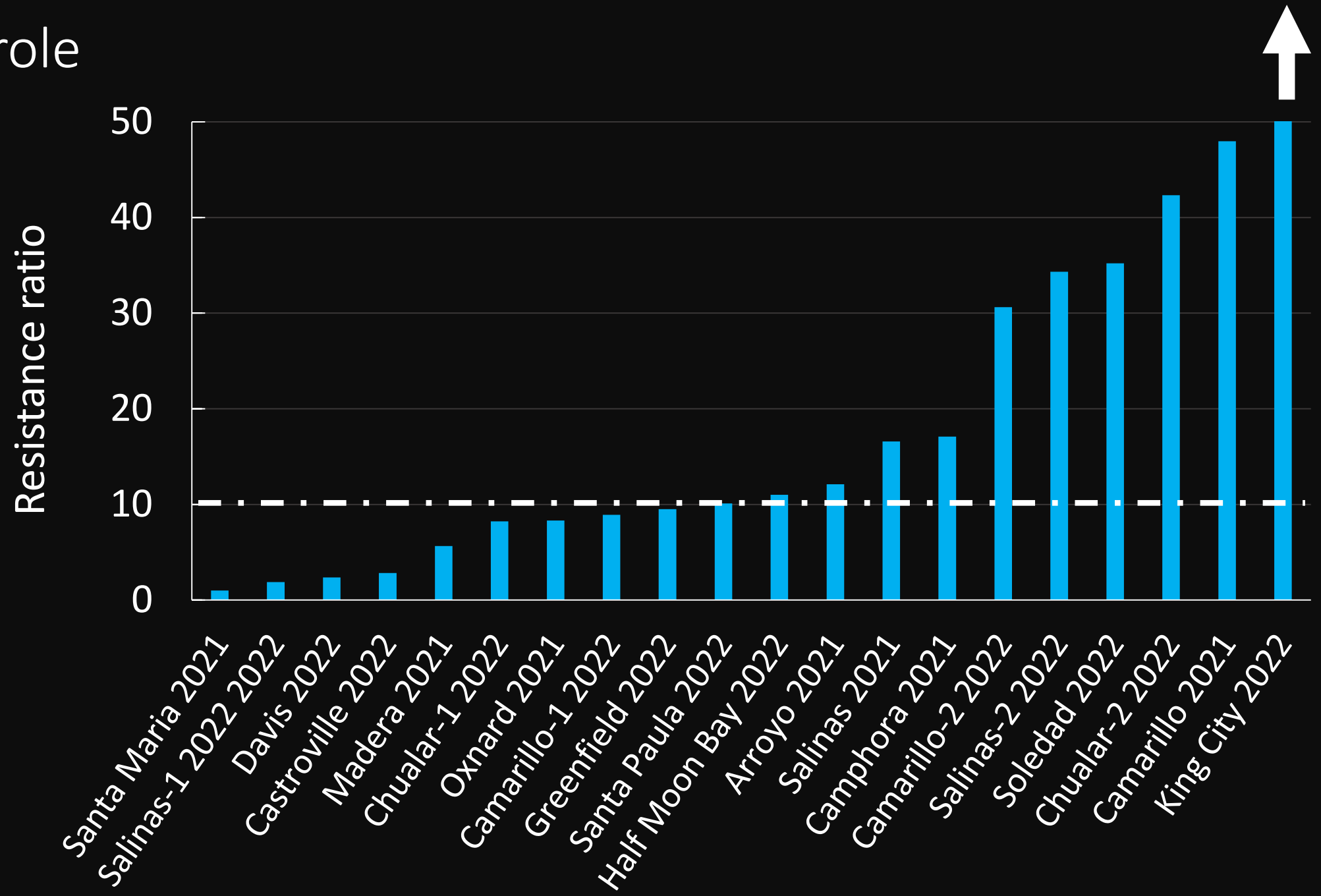
Chlorantraniliprole Coragen (diamide)



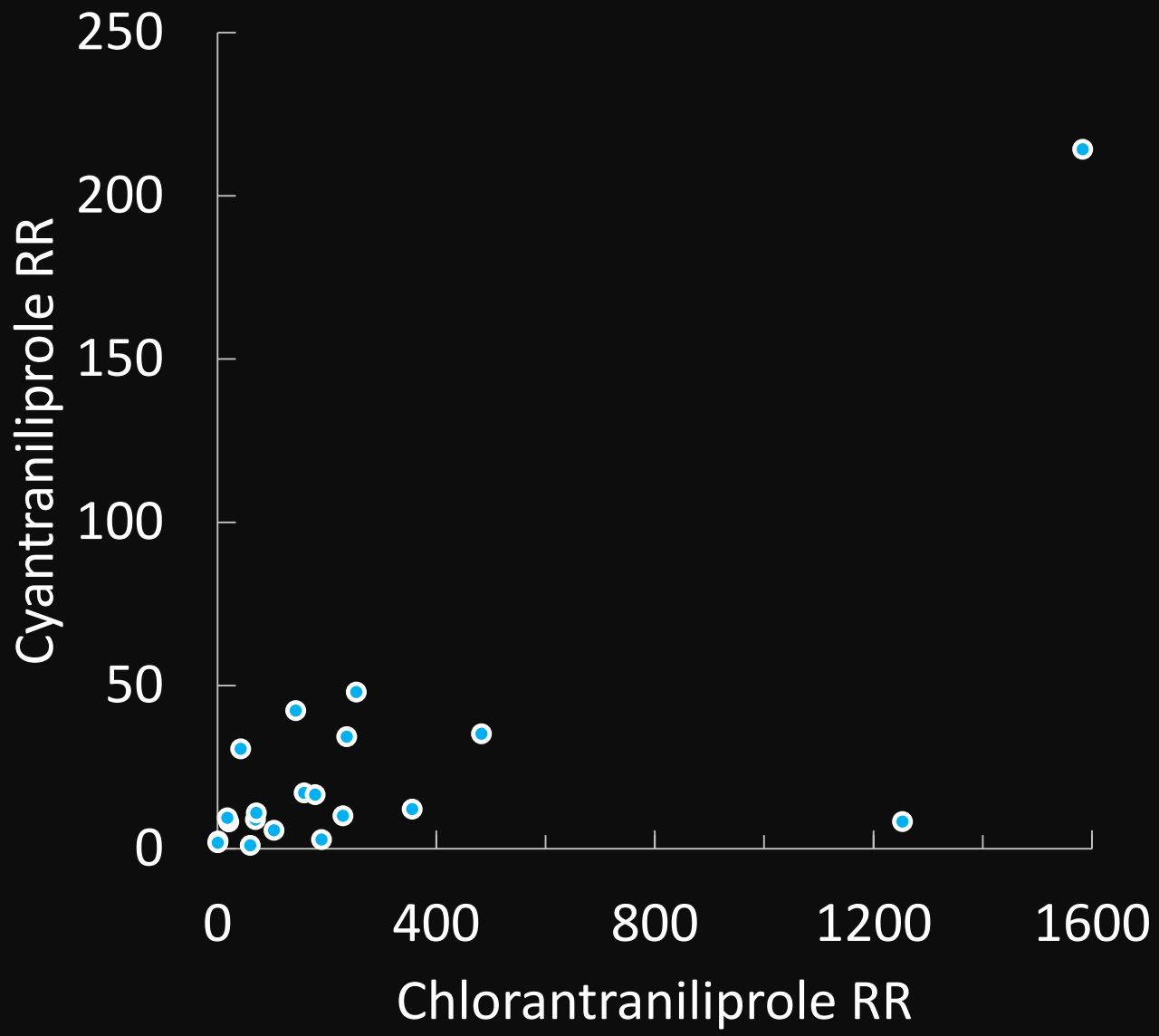
Cyantraniliprole
Exirel
(diamide)

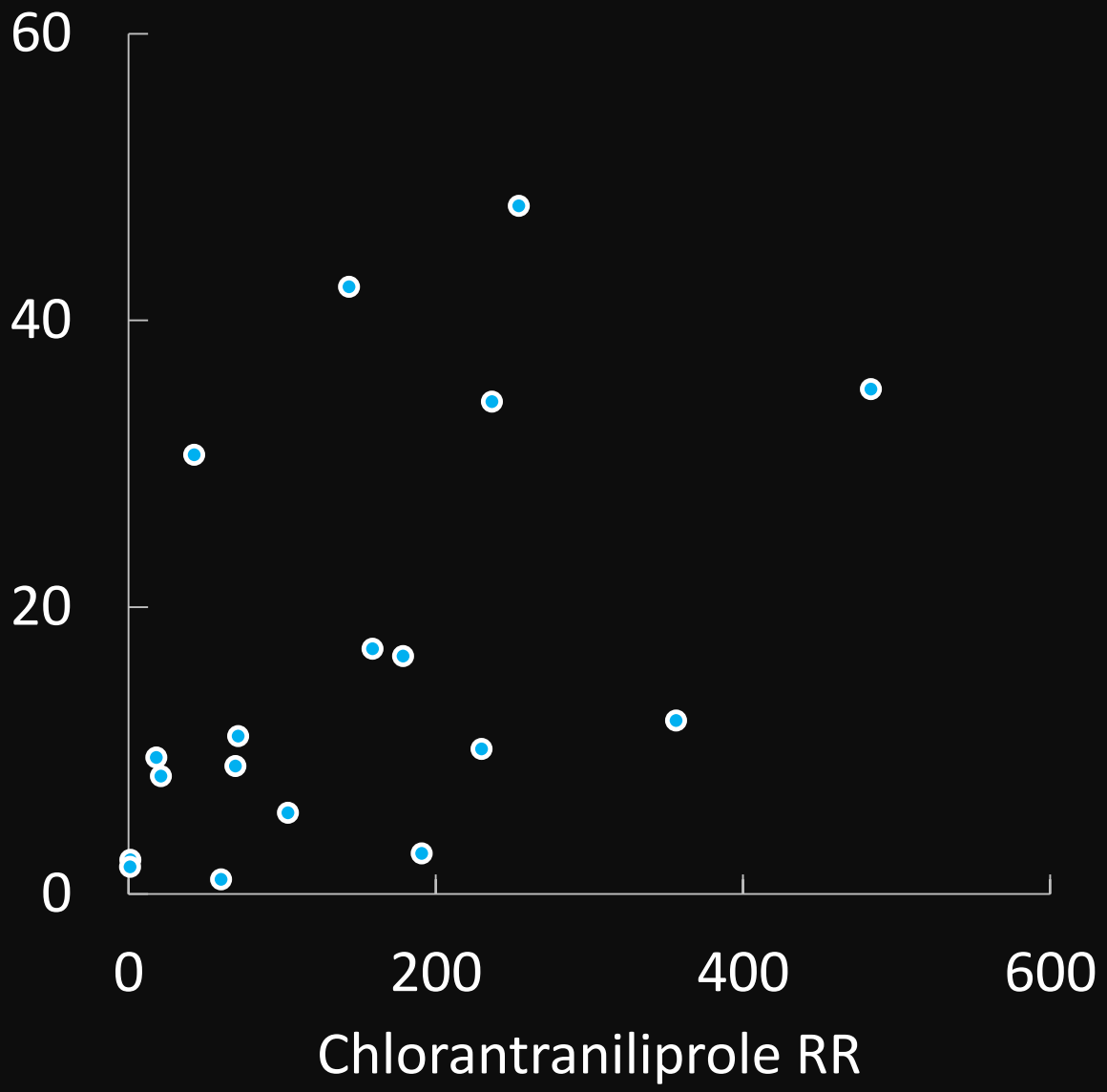


Cyantraniliprole
Exirel
(diamide)

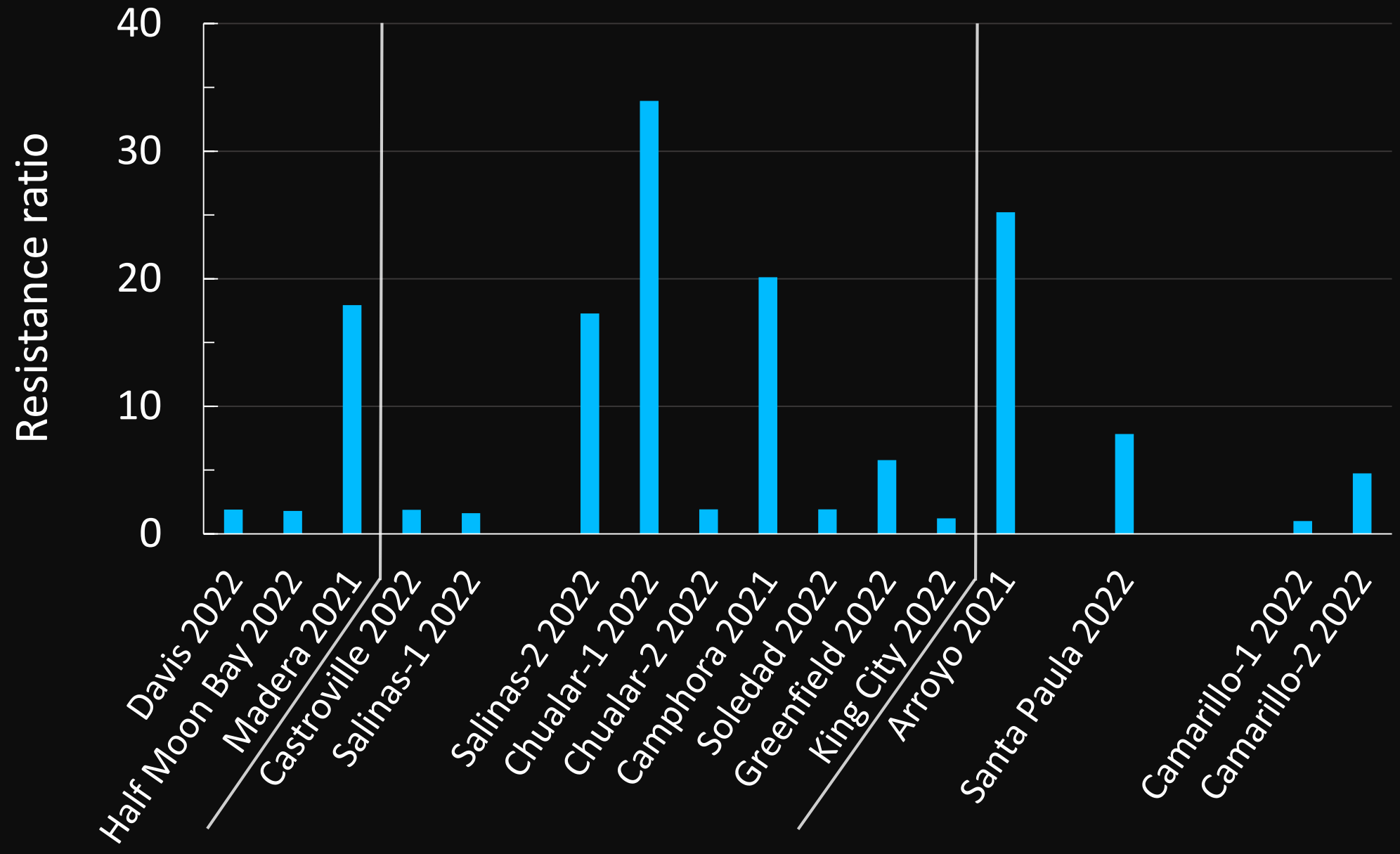


Chlorantraniliprole vs. Cyantranilprole

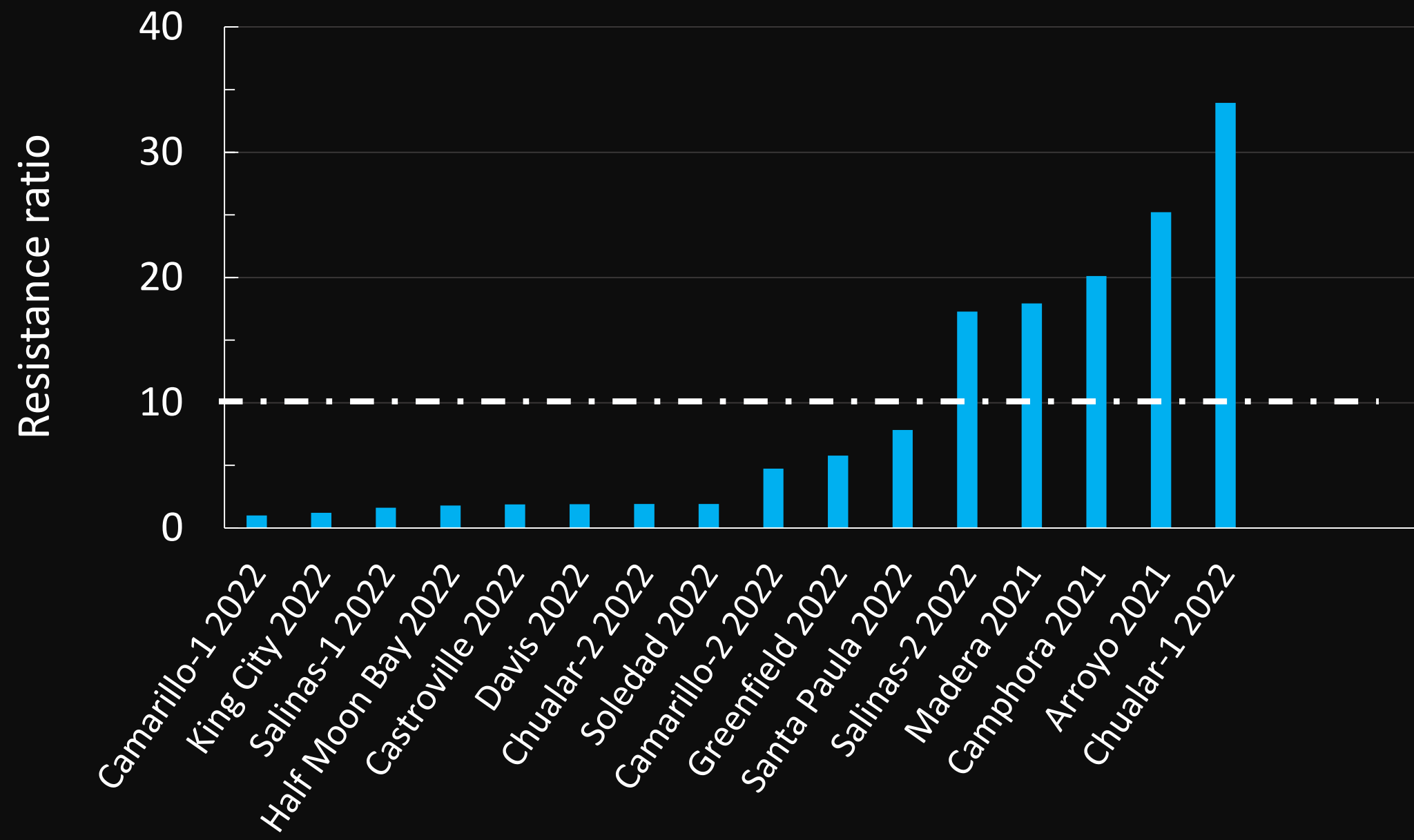




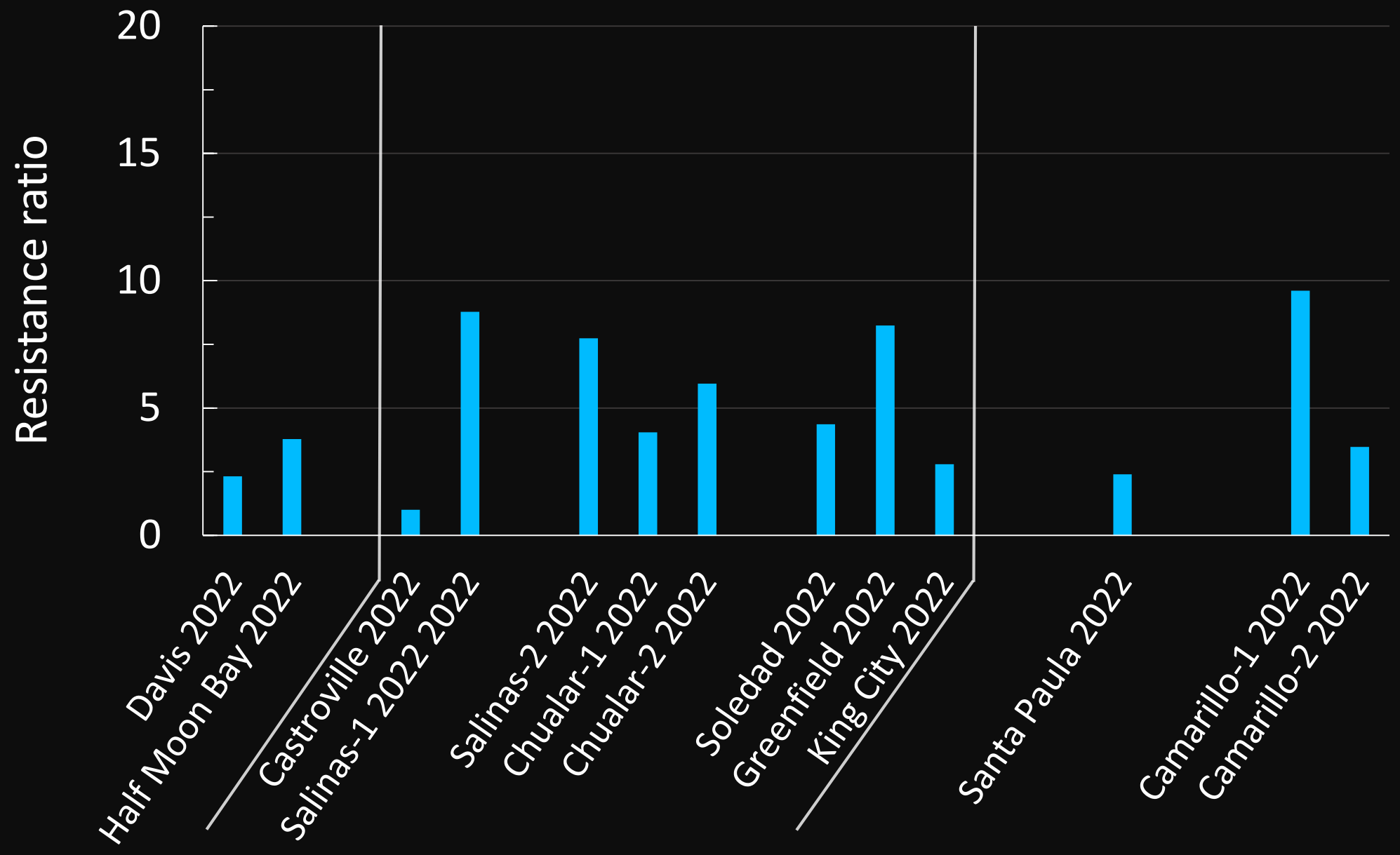
Emamectin benzoate
Proclaim



Emamectin benzoate
Proclaim

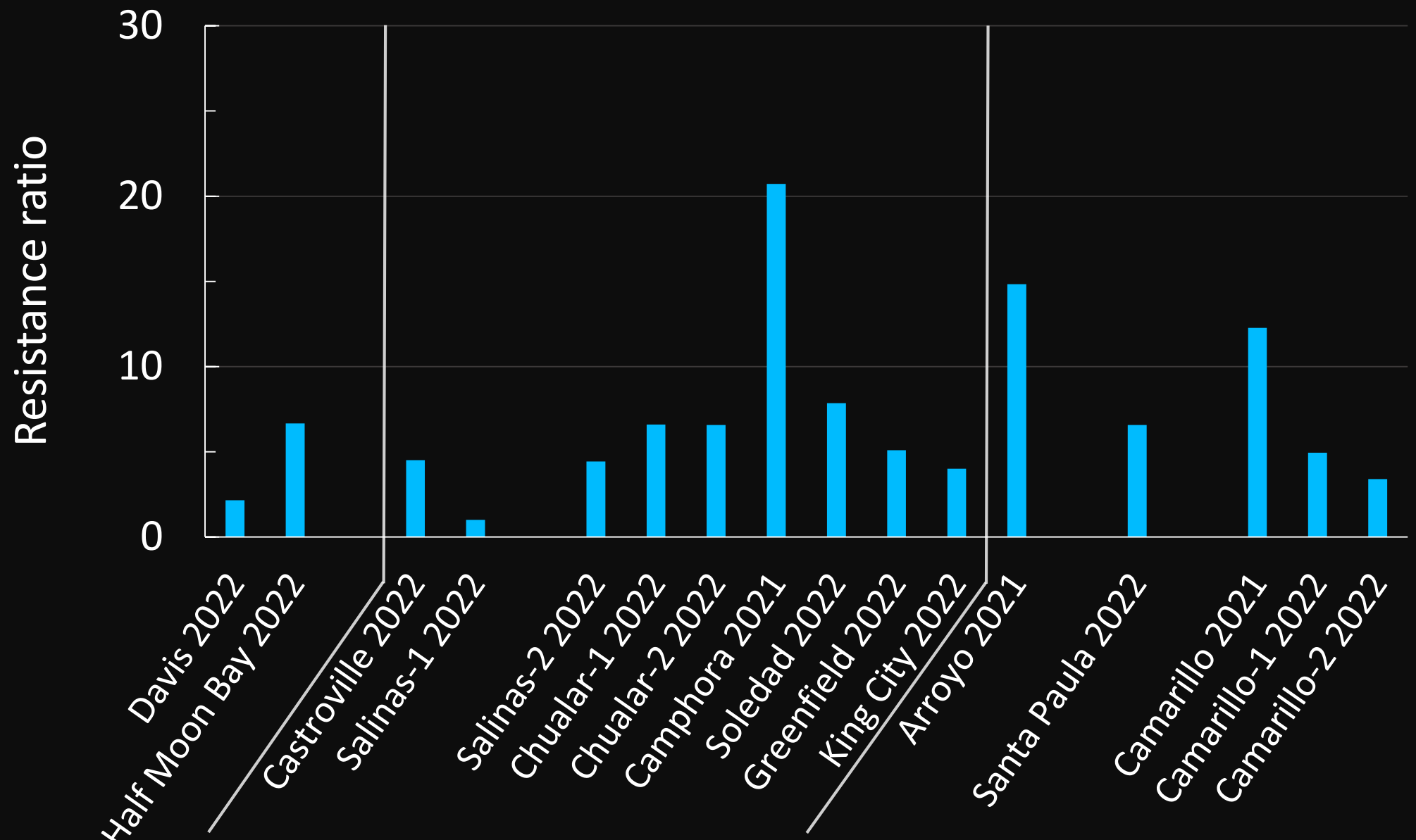


Indoxacarb
Avaunt

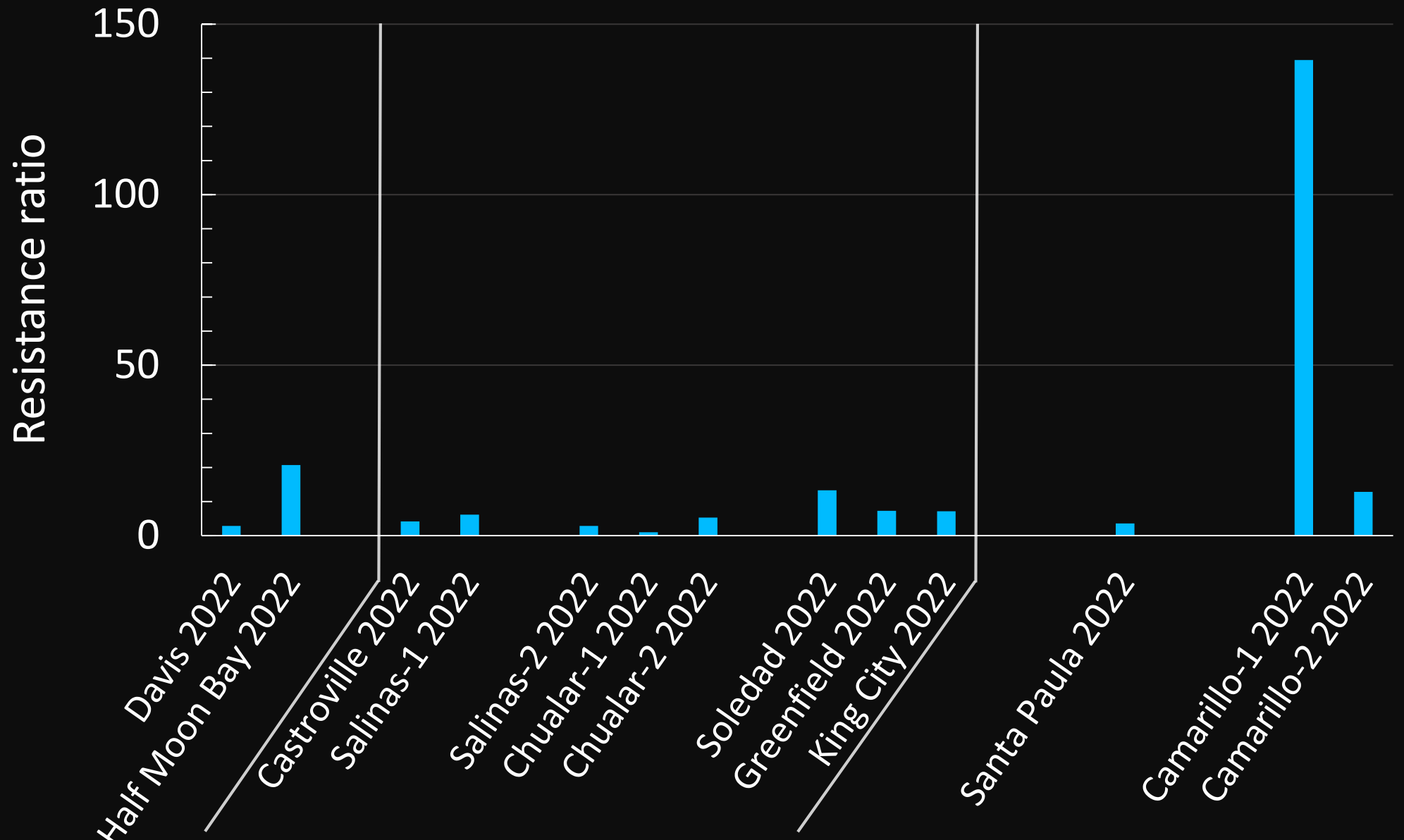


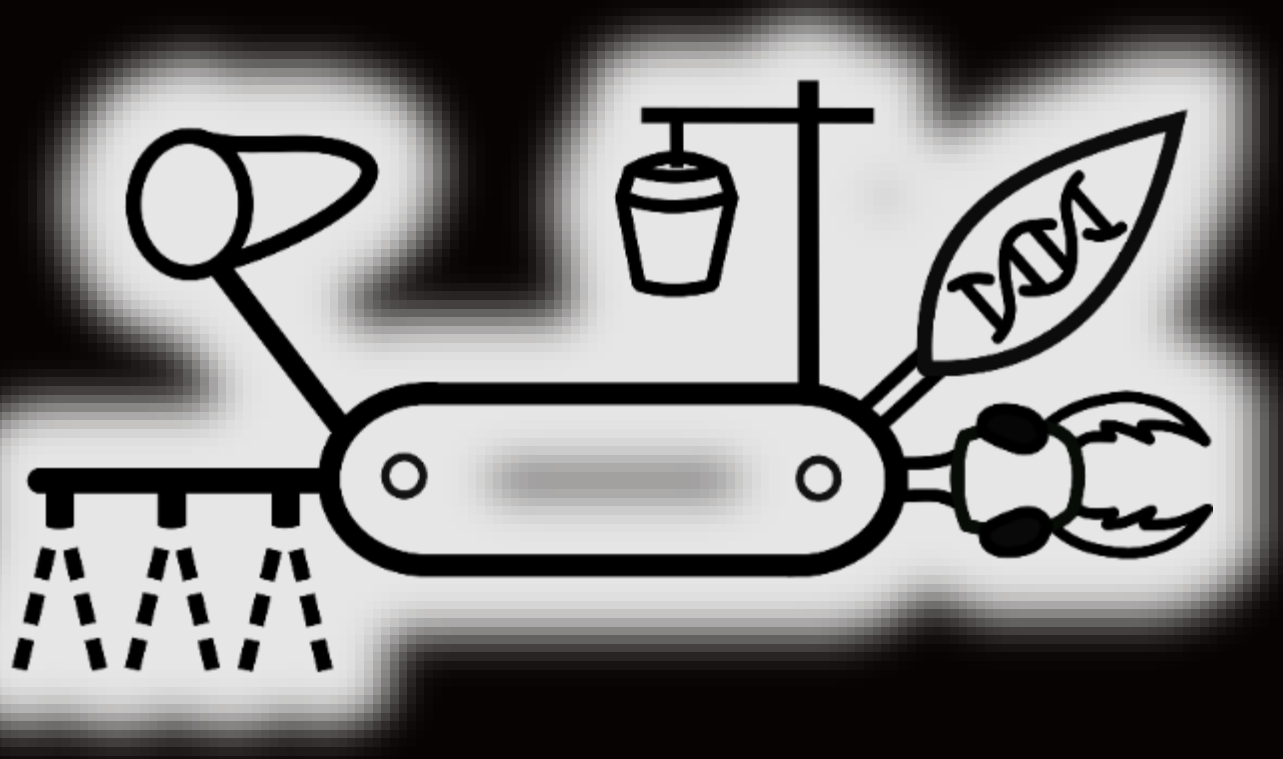
But….LC_{50}'s closer to label rate

Spinetoram Radiant (spinosyn)

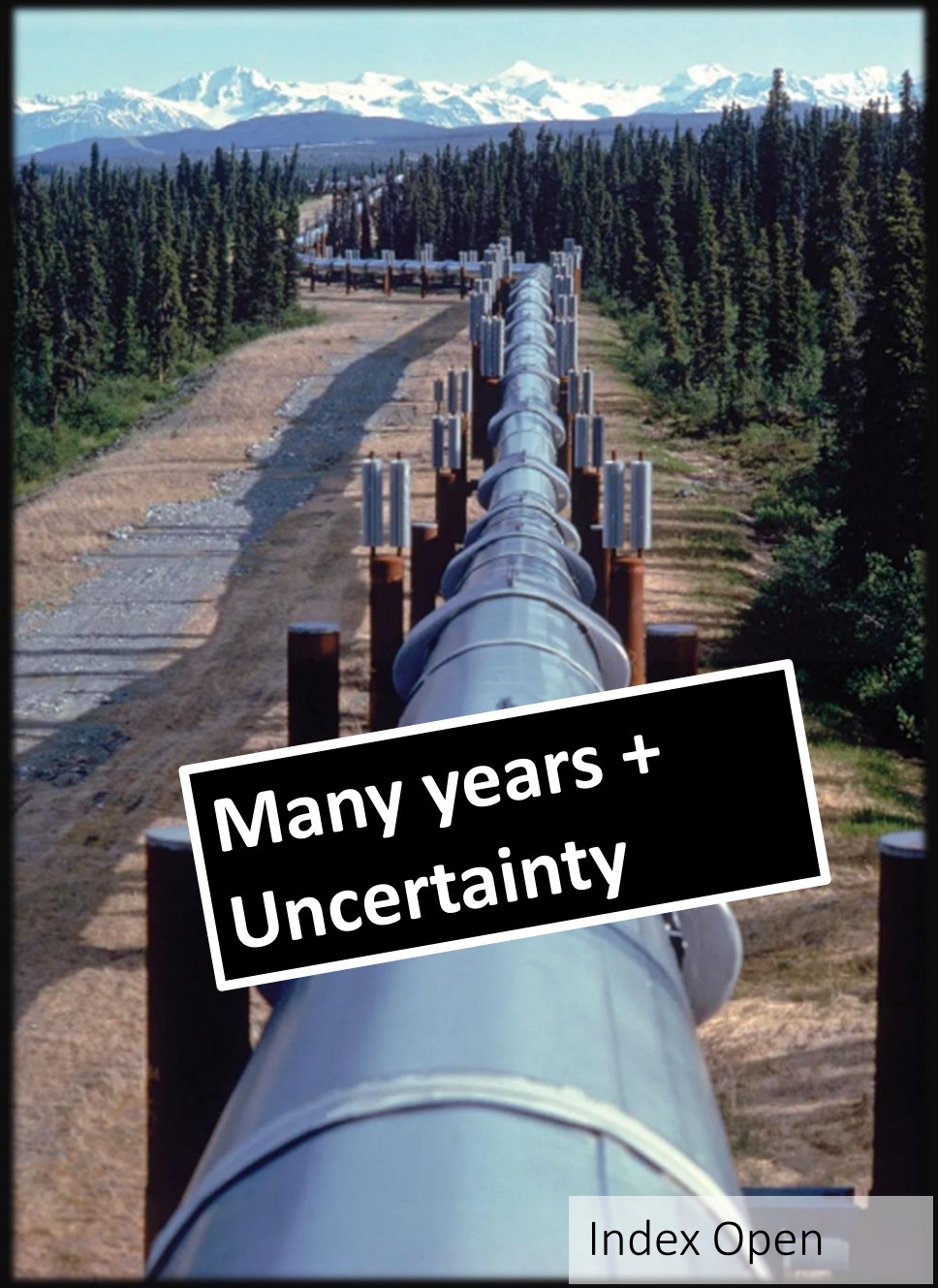


Bacillus thuringensis/ Bt – aizawai
XenTari






3
1
2



Index Open

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- Parabug, Jaclyn and Chandler Bennett
- Grettenberger/Hasegawa lab personnel
- Industry cooperators/FMC
- PCA/grower cooperators

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Questions?