Improving management of arthropod pests in strawberry production systems

Christian Nansen, Elvira De Lange, and Emily Bick
UC Davis

Where the pest management story begins….

Better sampling/detection methods for *Lygus*

Use of alfalfa as a trap crop for *Lygus*

Better understanding of how pesticide spray coverage can be optimized

Drone-based releases of predatory mites to control spider mites

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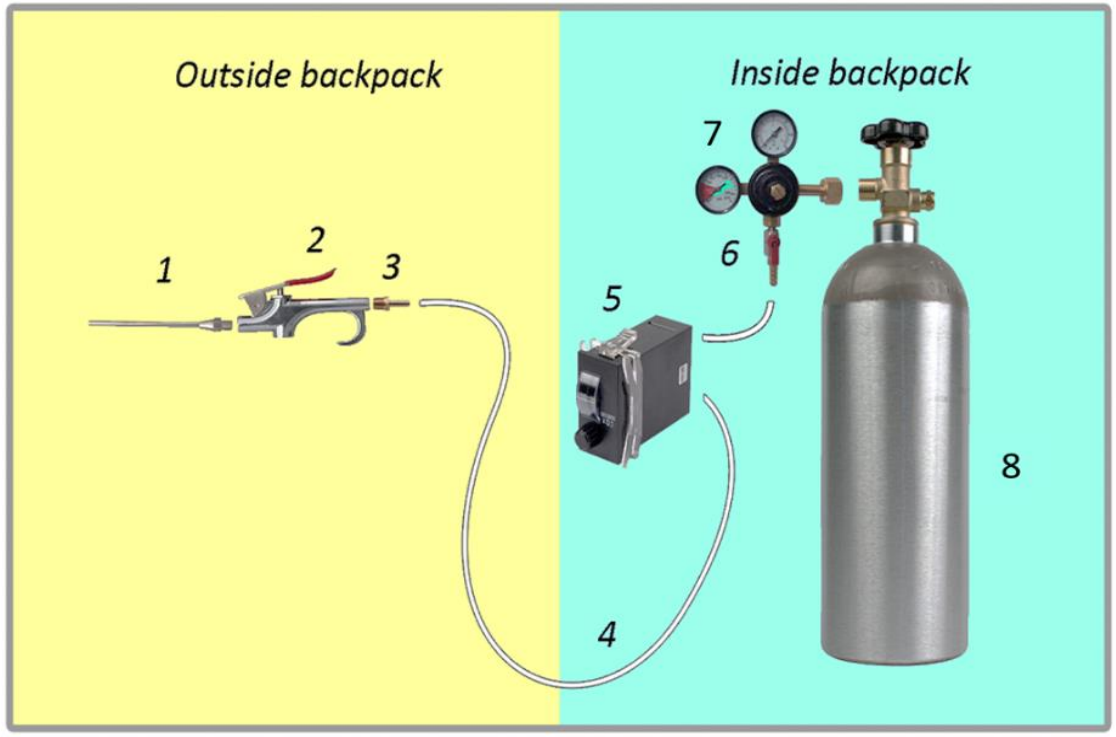
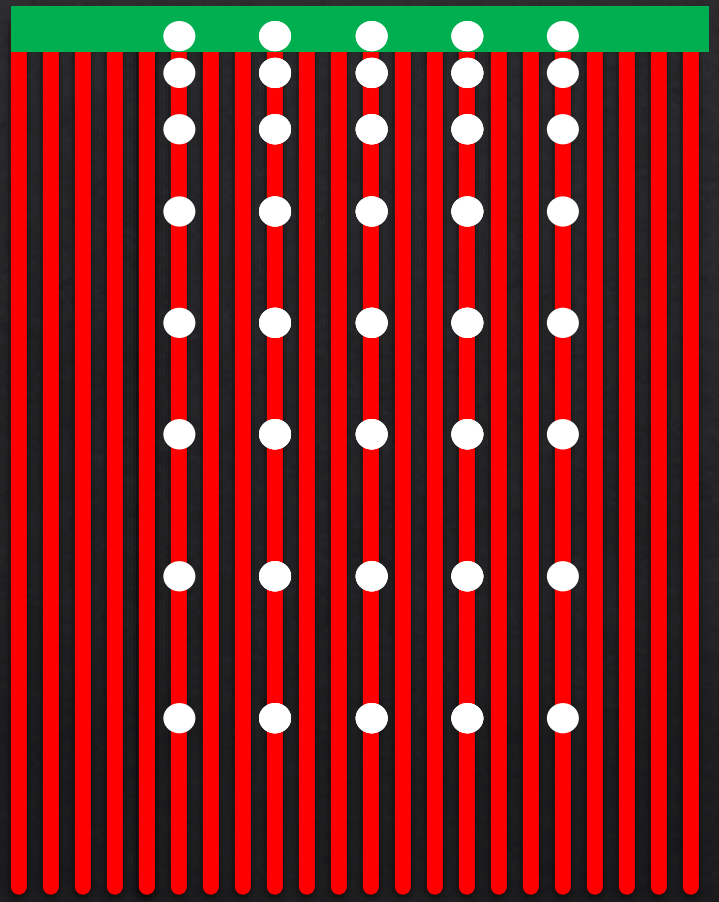


Novel Sampling Device

Use of alfalfa as a trap crop for *Lygus*



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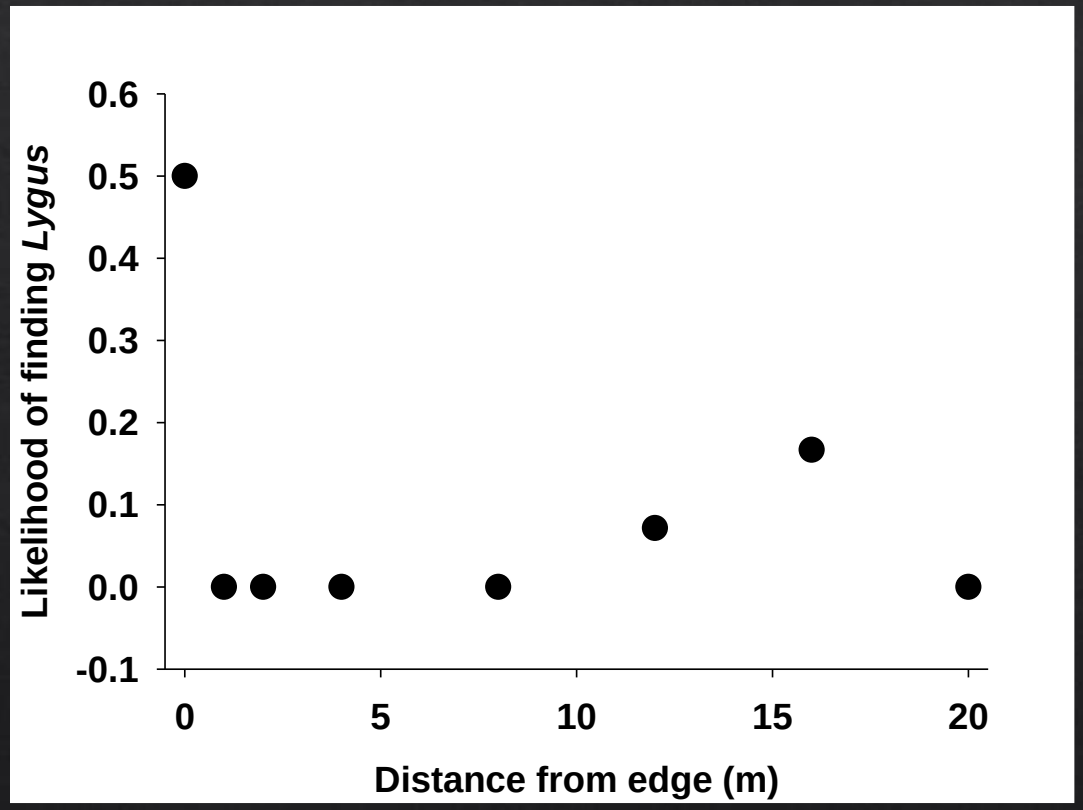
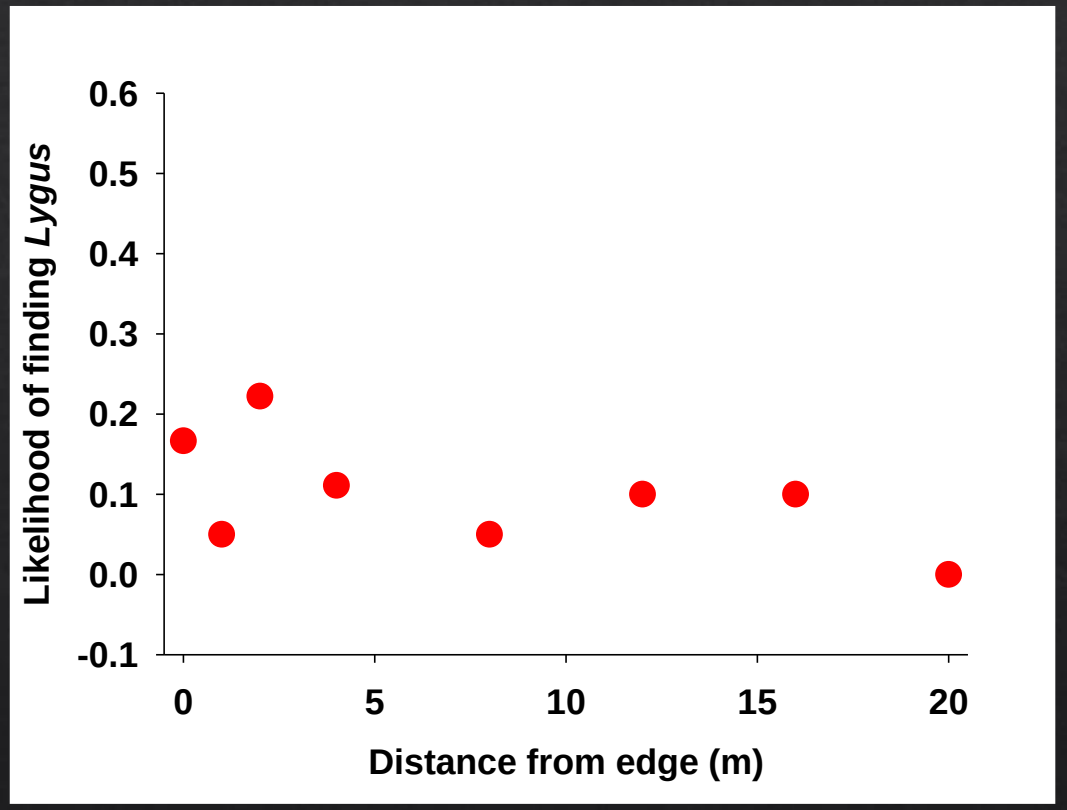
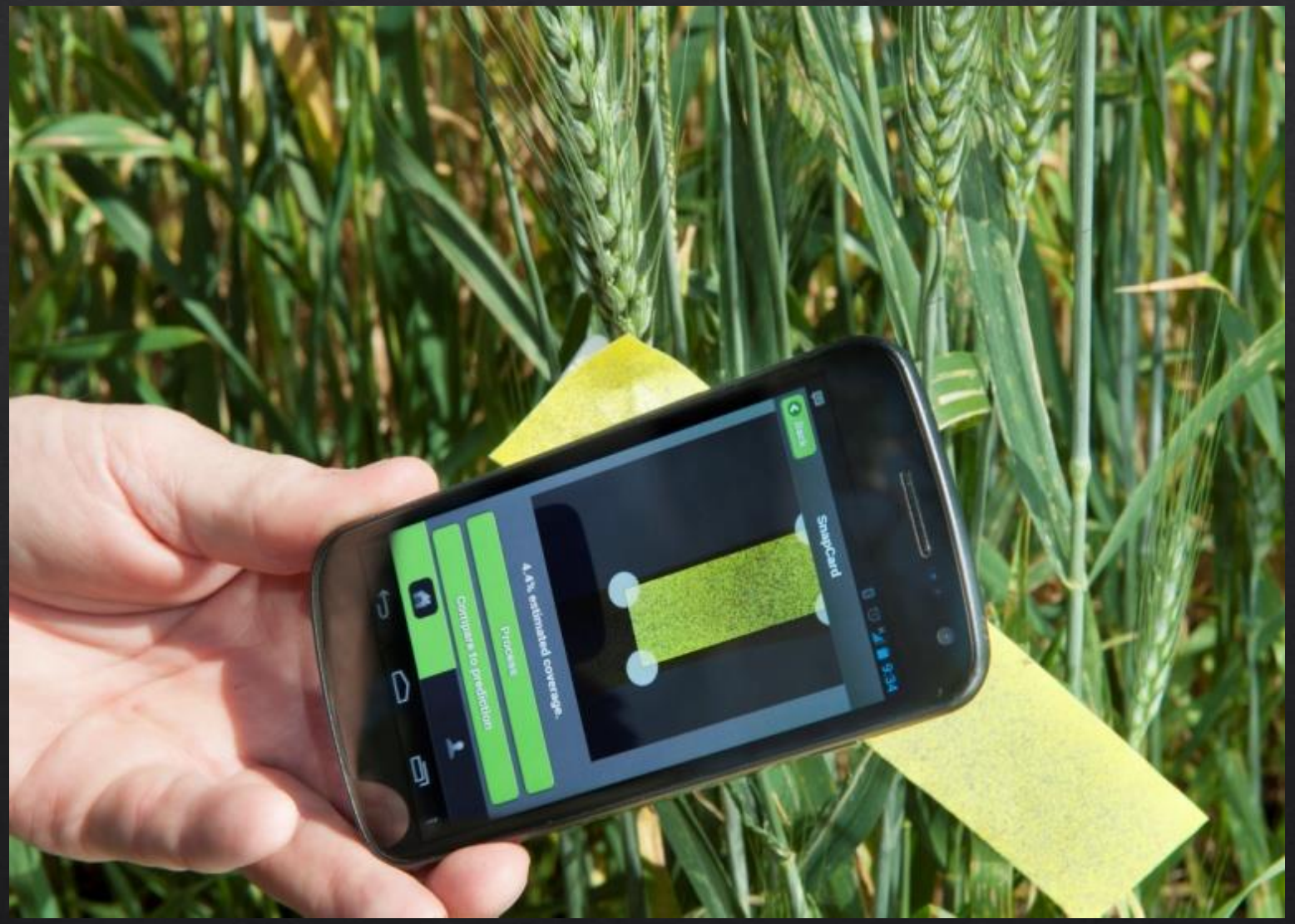




Better understanding of how pesticide spray coverage can be optimized



Better understanding of how pesticide spray coverage can be optimized

Table 2. Spraying conditions from 14 commerc le applications in potato fields

Location	Application	liter/ha	Ht	n	Wind speed	Wind gust	Temp (°C)	RH (%)	Dew point	Spray cover
Pearsall	Air	47	40.6		6.7	10.9	17.6	84.5	14.9	8.5
Pearsall	Air	47	38.1		16.9	25.3	22.3	82.0	19.0	3.8
Edinburg	Air	66	22.9		16.0	22.4	7.6	87.5	5.6	2.5
Edinburg	Air	66	33.0		12.2	18.7	24.0	68.8	27.3	1.8
Edinburg	Air	66	40.6		9.3	14.6	22.1	58.1	13.3	5.9
Edinburg	Air	66	40.6		9.3	15.4	22.7	84.3	19.9	6.0
Edinburg	Air	66	33.0		3.7	7.9	20.0	64.0	13.0	6.8
Edinburg	Air	66	35.6		7.7	11.0	7.1	65.8	4.4	9.3
Olton	Ground	190	25.4		22.3	30.9	25.5	59.7	16.9	67.0
Olton	Ground	190	43.2		16.9	25.0	25.7	54.0	15.6	28.6
Olton	Ground	190	54.6		17.4	25.4	31.9	29.6	11.9	34.4
Olton	Ground	190	63.5		22.5	30.1	26.0	67.7	19.6	22.6
Pearsall	Ground	190	16.5		5.9	10.9	23.5	61.6	14.9	41.9
Pearsall	Ground	190	29.2		10.6	16.2	17.8	63.8	10.6	24.9

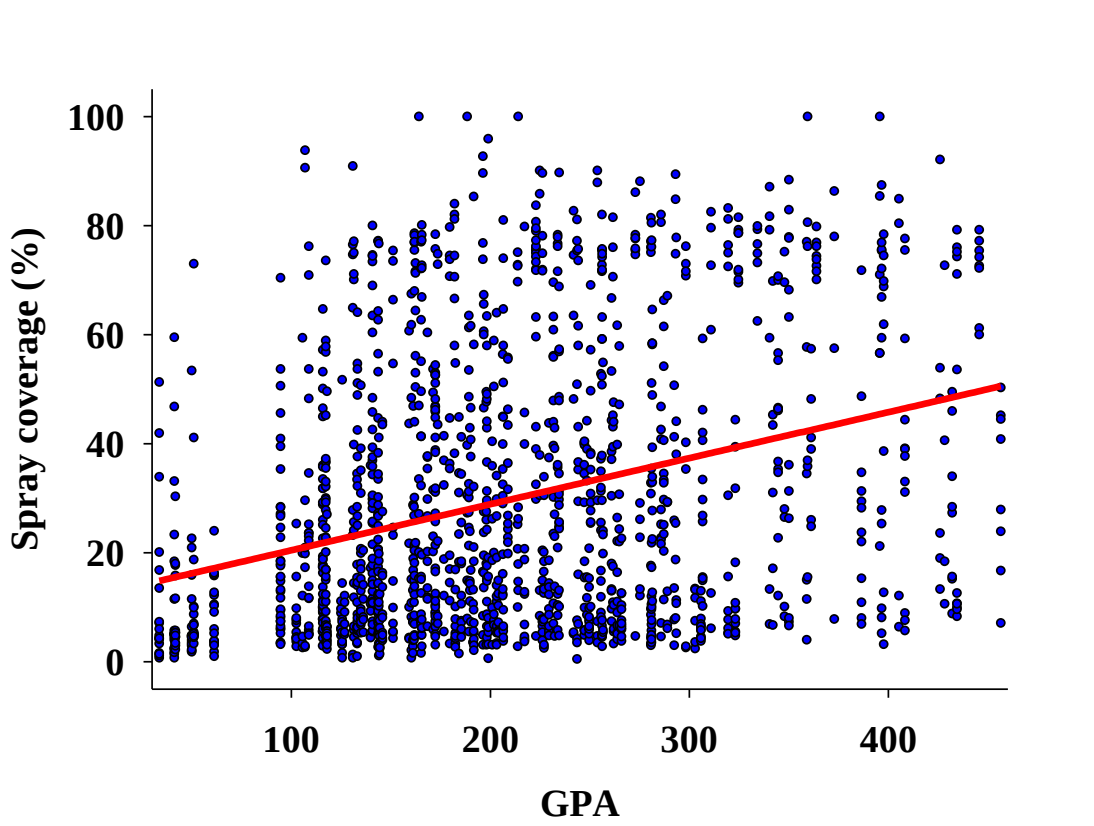
Spray cover: 8.5, 3.8, 2.5, 1.8, 5.9, 6.0, 6.8, 9.3, 67.0, 28.6, 34.4, 22.6, 41.9, 24.9

Applications were either with fixed wing airplane or ground rig; liter/ha, spray volume applied, canopy, portion of the canopy; ht, average plant height (centimeters); radiation, solar radiation (Watts per square meter); wind speed, average wind speed (kilometers).

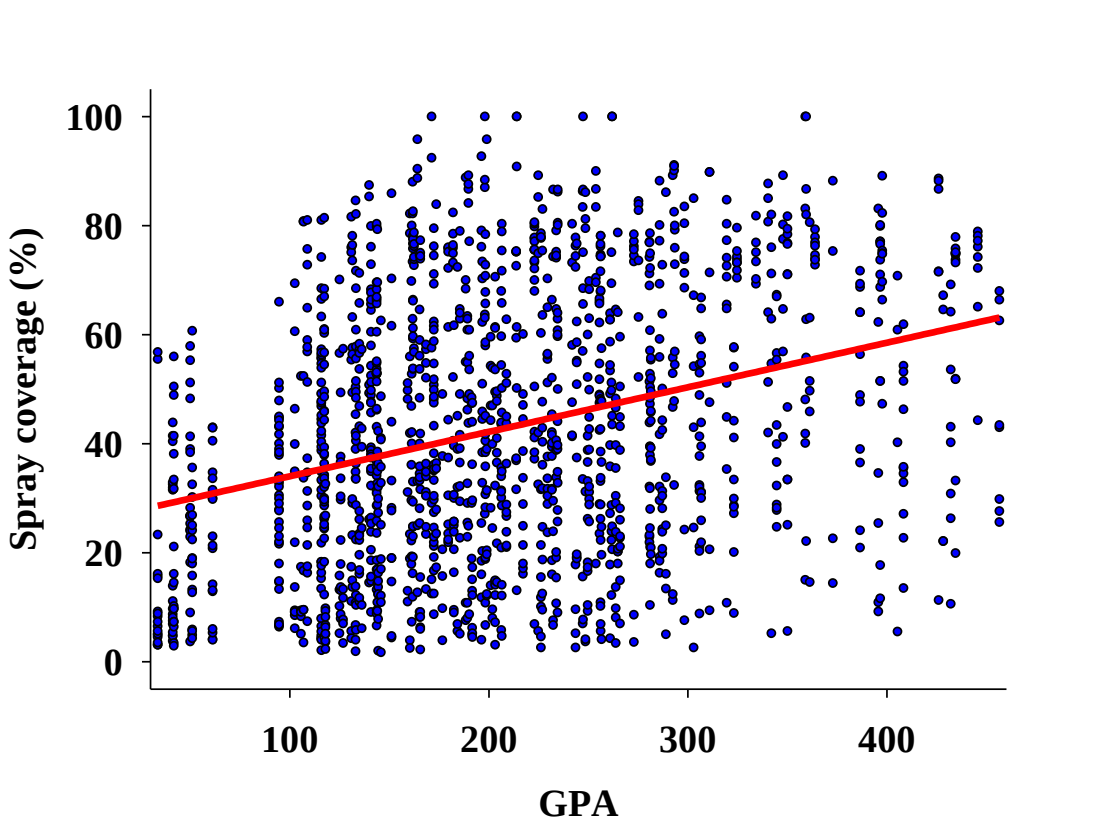
Better understanding of how pesticide spray coverage can be optimized

Nozzle_type	Cards
AI_9502E	240.00
TJ_XR8003-VK	168.00
TJ_60-8004	168.00
D2_w/_DC45	240.00
D3_w/_DC45	276.00
Green_ATR_80	276.00
Lilac_ATR_80	108.00
Orange_ATR_80	72.00
Grand Total	1548.00

Better understanding of how pesticide spray coverage can be optimized



Horizontal position
GPA = 10% of variance



Vertical position
GPA = 8% of variance

Better understanding of how pesticide spray coverage can be optimized

Averaged position
= 37% of variance

Volume sprayed per area (gallons per acre)

Speed of tractor

Crop variety
Canopy density
Canopy structure

Temperature

Relative humidity

Wind

Barometric pressures

Better understanding of how pesticide spray coverage can be optimized

	Spray coverage		
Nozzle_type	Cards	Hori avg	Vert avg
AI_9502E	240.00	27.83	37.68
TJ_XR8003-VK	168.00	36.94	51.49
TJ_60-8004	168.00	40.87	47.14
D2_w/_DC45	240.00	24.07	40.59
D3_w/_DC45	276.00	28.37	44.31
Green_ATR_80	276.00	35.02	48.08
Lilac_ATR_80	108.00	10.77	21.79
Orange_ATR_80	72.00	21.39	43.06
Grand Total	1548.00	29.53	42.81

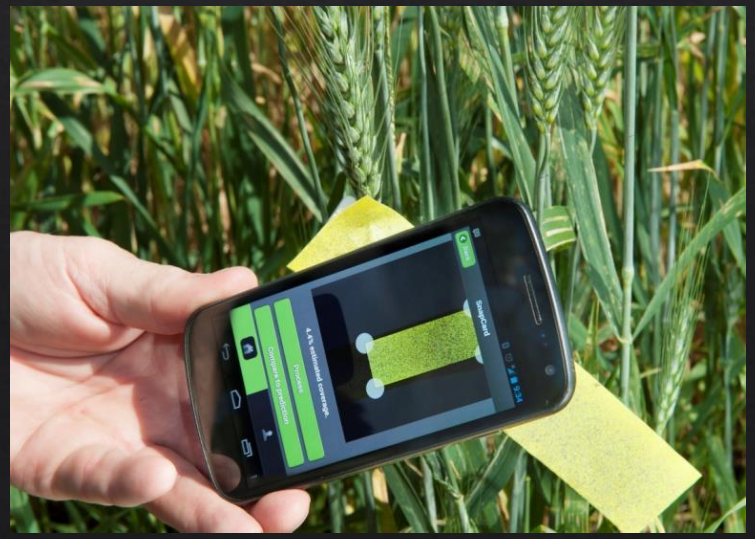
Better understanding of how pesticide spray coverage can be optimized

GPA and spray coverage – more to the story…

Nozzles do not respond the same way

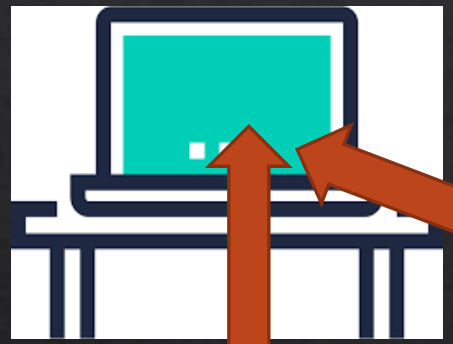
Nozzles are not equally sensitive to spraying conditions

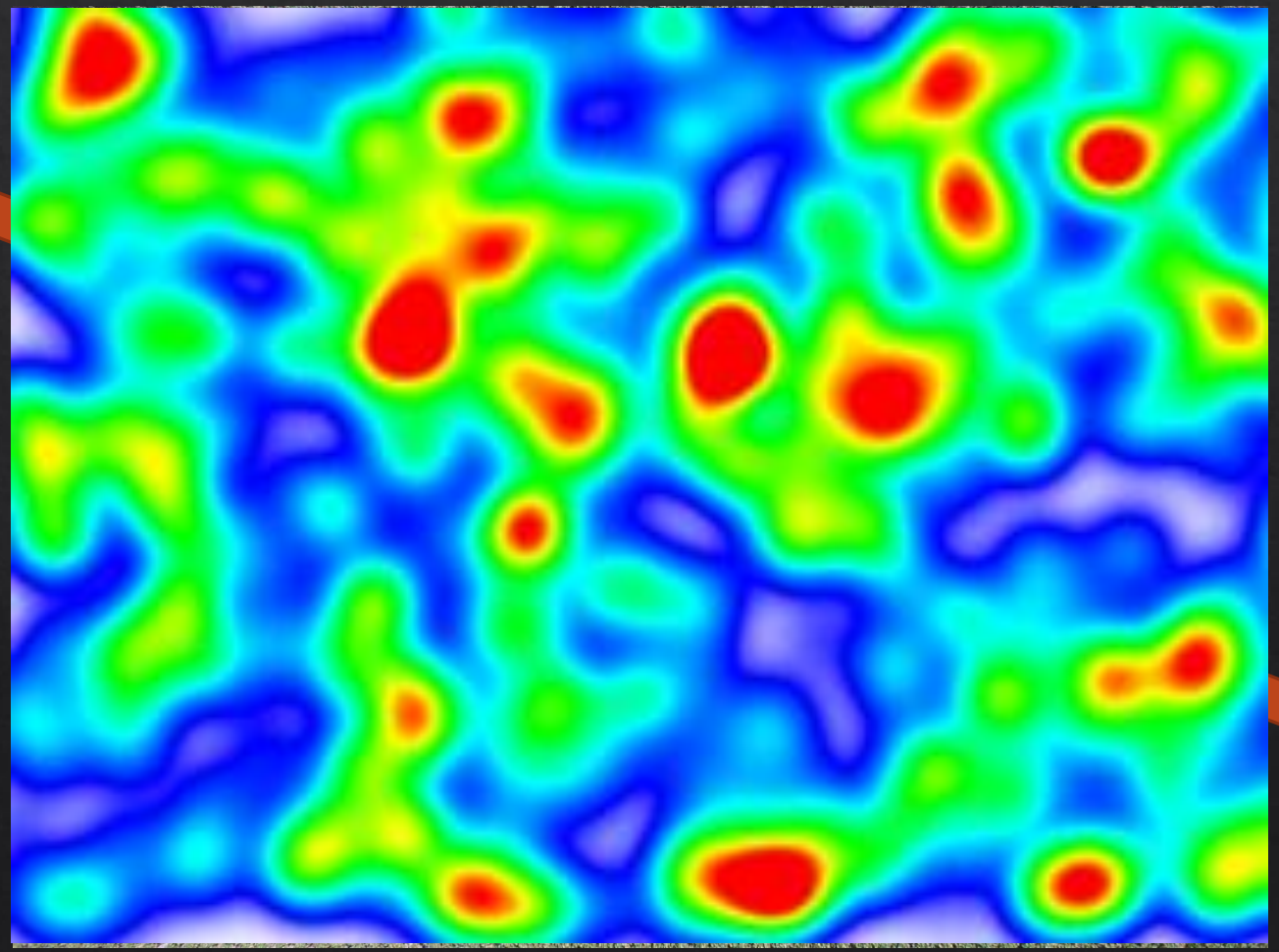
A phone app as a decision support tool

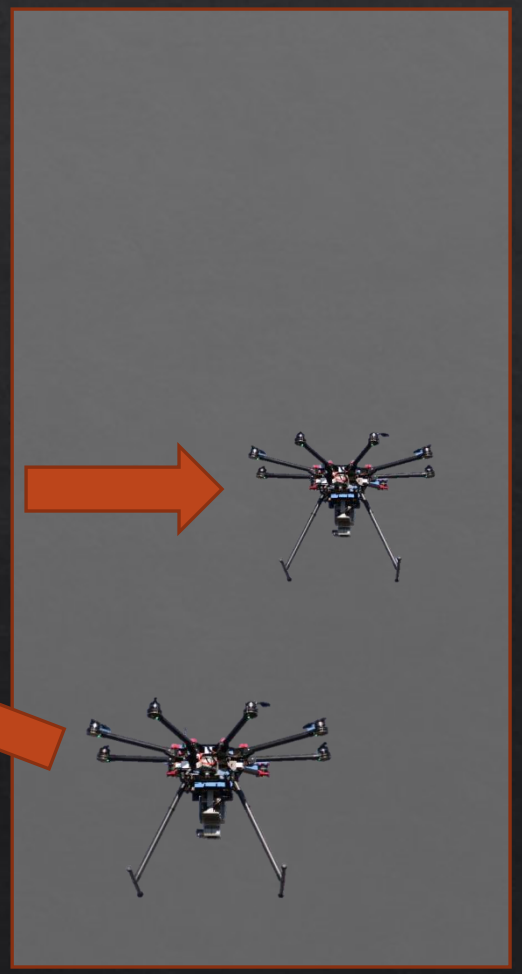


Release and dispersal of natural enemies

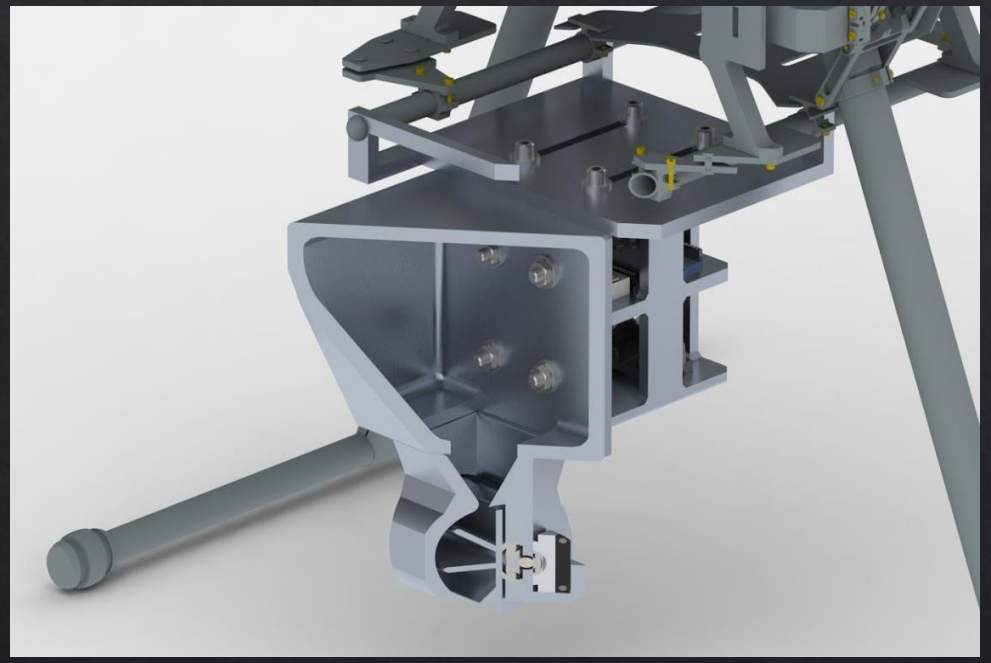
Drone-based releases of predatory mites to control spider mites

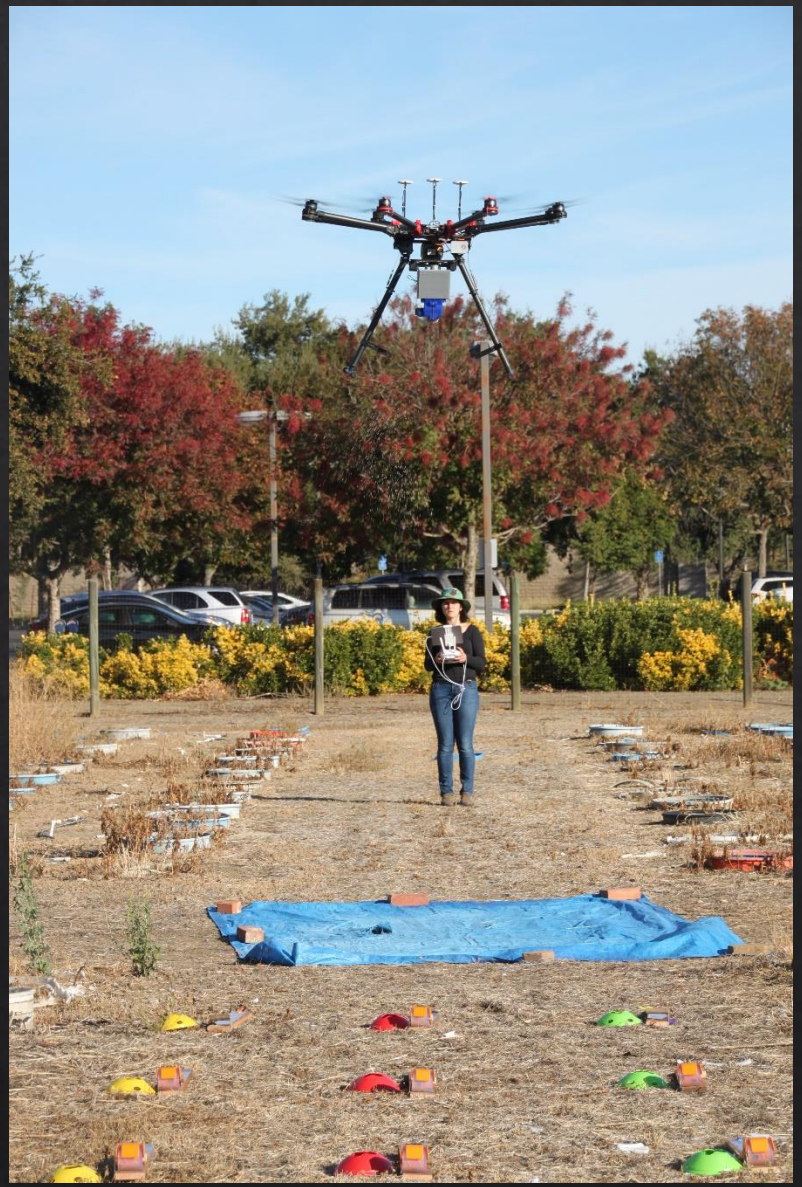






The system components – actuation drone



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The multi-disciplinary team

Thank you!


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