Larvicide Applications with Unmanned Aircraft Systems

Joel Buettner, General Manager; Jake Hartle, Assistant Manager;
Scott Schon, Supervisor; Everardo Ortiz, Vector Control Technician

PLACER MOSQUITO & VECTOR CONTROL DISTRICT

Unmanned Aircraft System

DJI AGRAS MG-1S

Liquid Configuration

- 2.64 gallon tank
- 4 XR11001VS TeeJet Nozzles
- 2 variable speed pumps

Granular Configuration

- 13 L Hopper Volume
- 10kg (22.05 lbs) maxload

Liquid vs Granular

Granular Applications:

- Wider swath
- Taller application heights
- Less concern about drift
- Apply products with residual
- Reduced mixing & loading
- Pretreat applications
- Vegetation Penetration

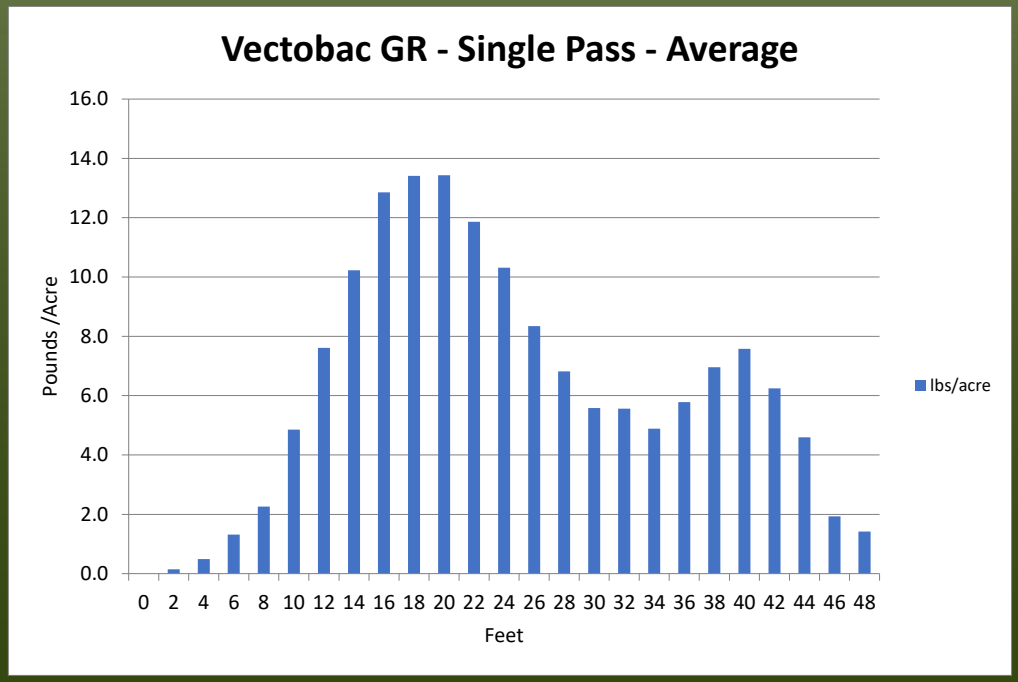
Static Calibration

Determine the output rate of a given material through the granular spreader, while the aircraft remains on the ground

Swath Analysis Trials

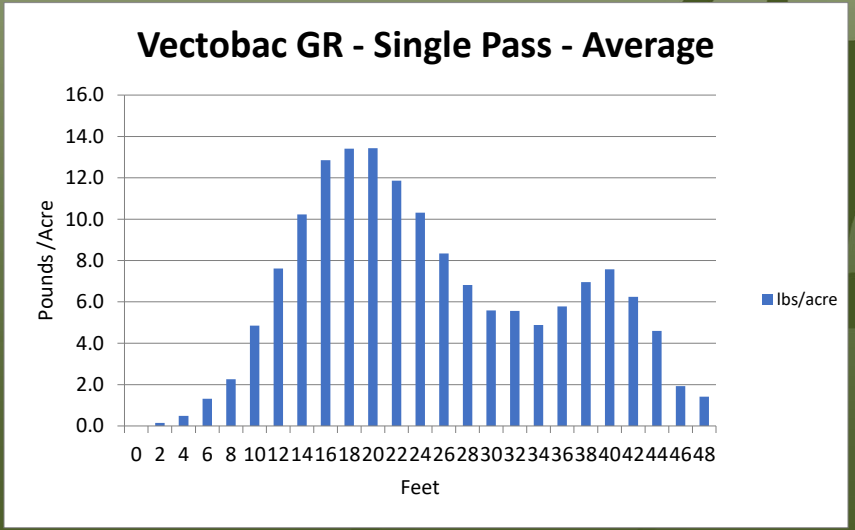
- Use hopper settings (gate opening and RPM) from static calibration to evaluate the swath
- 25 totes, spread 2' from center to capture a 48' sample
- Fly into wind perpendicular to center tote
- Collect material, repeat 3 times

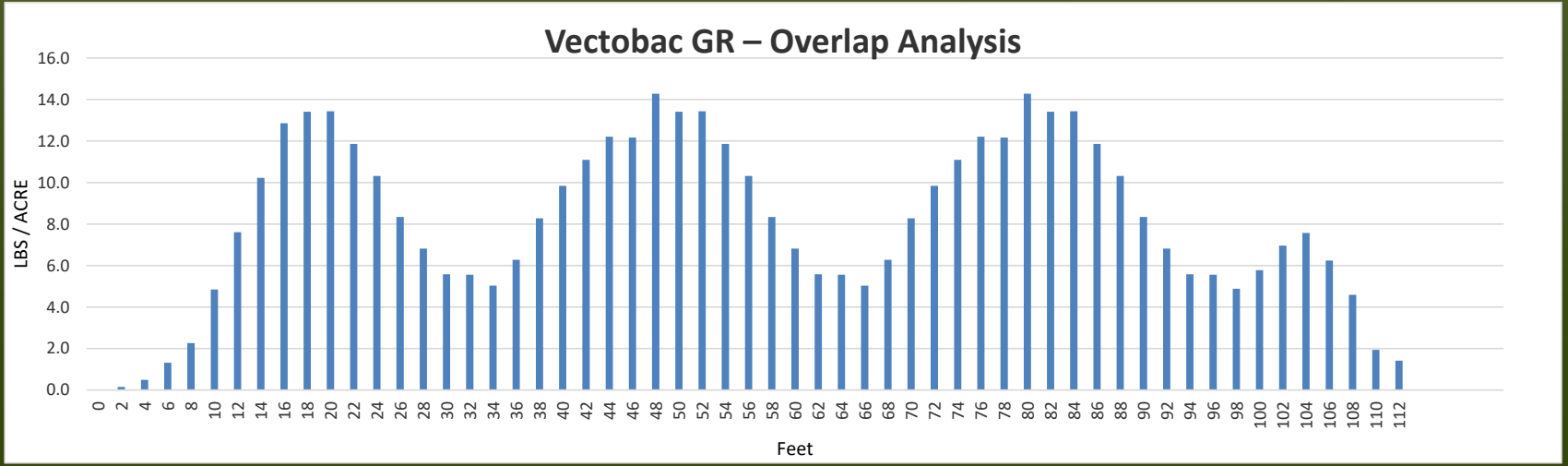
Swath Analysis
Single Pass



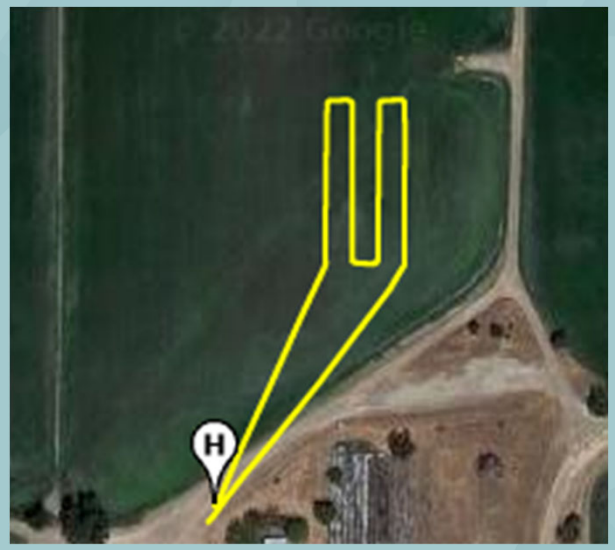
Swath Analysis

Single vs Overlap





Fine Tuning with Mini-Blocks



- At this point we know hopper settings, line spacing, and general flight parameters
- Evaluate target rate by weighing product pre and post 0.5 acre applications
- Fine tune by adjusting aircraft speed

Flight Parameters for the DJI AGRAS-MG1s

Product	Application Rate	Altitude (ft. AGL)	Swath (FT)	Gate Opening (%)	RPM	Speed (mph)	Hopper Capacity
Vectobac G	10lbs/Acre	32	30	100	1200	4.5	12 lbs
Vectobac GR	10lbs/Acre	32	30	80	1200	13.64	19 lbs
Vectomax FG	10lbs/Acre	32	30	80	1200	9.5	15 lbs
Altosid XRG Ultra	10lbs/Acre	32	30	35	1200	15	30 lbs**
Altosid P35	10lbs/Acre	32	30	80	1000	13.77	25 lbs**
Duplex G	10lbs/Acre	32	30	60	1000	11.52	22 lbs
Natular G	10lbs/Acre	32	30	50	1000	7.16	13 lbs

*DJI AGRAS MG-1s maximum altitude for automated flight is 32’

**DJI AGRAS MG-1s hopper max weight 22.05 lbs

Treatments

- Ponds, snow melt pools, flood irrigation, wetlands, organic rice
- 2,300+ acres treated in 2021

Future UAS Operations

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