California Strawberry Commission Update Fall 2018

Dan Legard – VP Research and Education

Topics

- Sprayer Calibration Program Update
- Strawberry Center Automation Program Update
  - Spray Rig Optimization
  - Lygus Vacuum Improvement

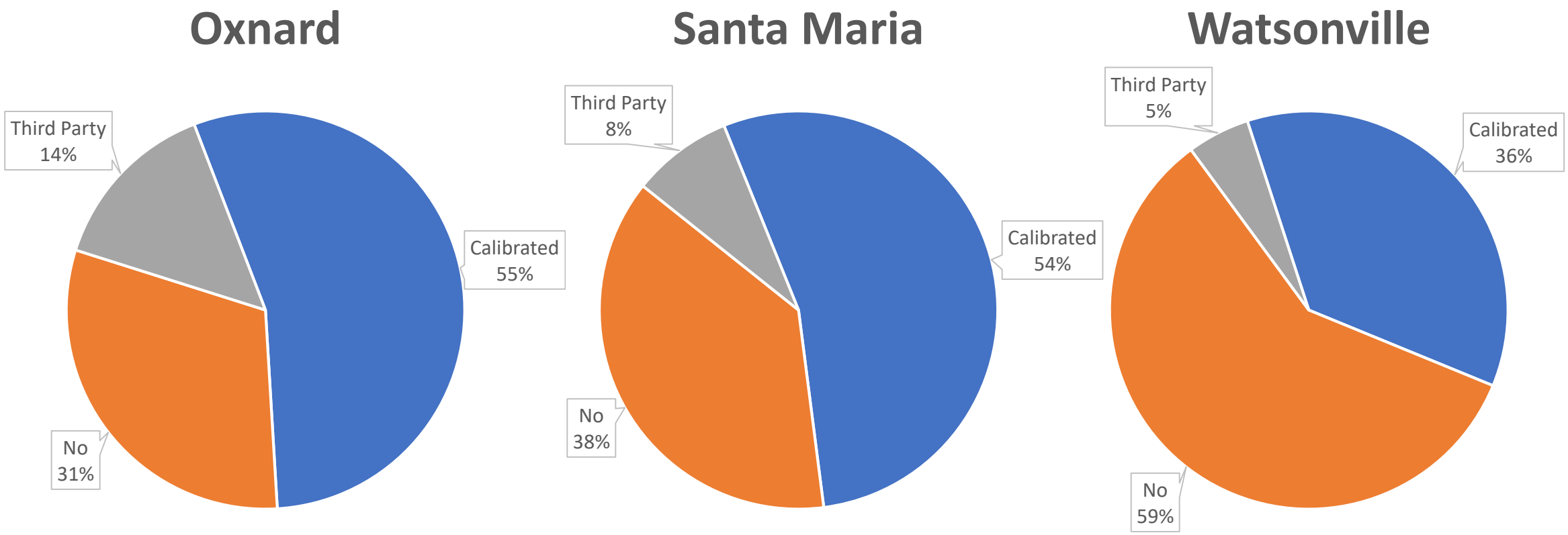
Sprayer Calibration and Maintenance

Sprayer Calibration Program

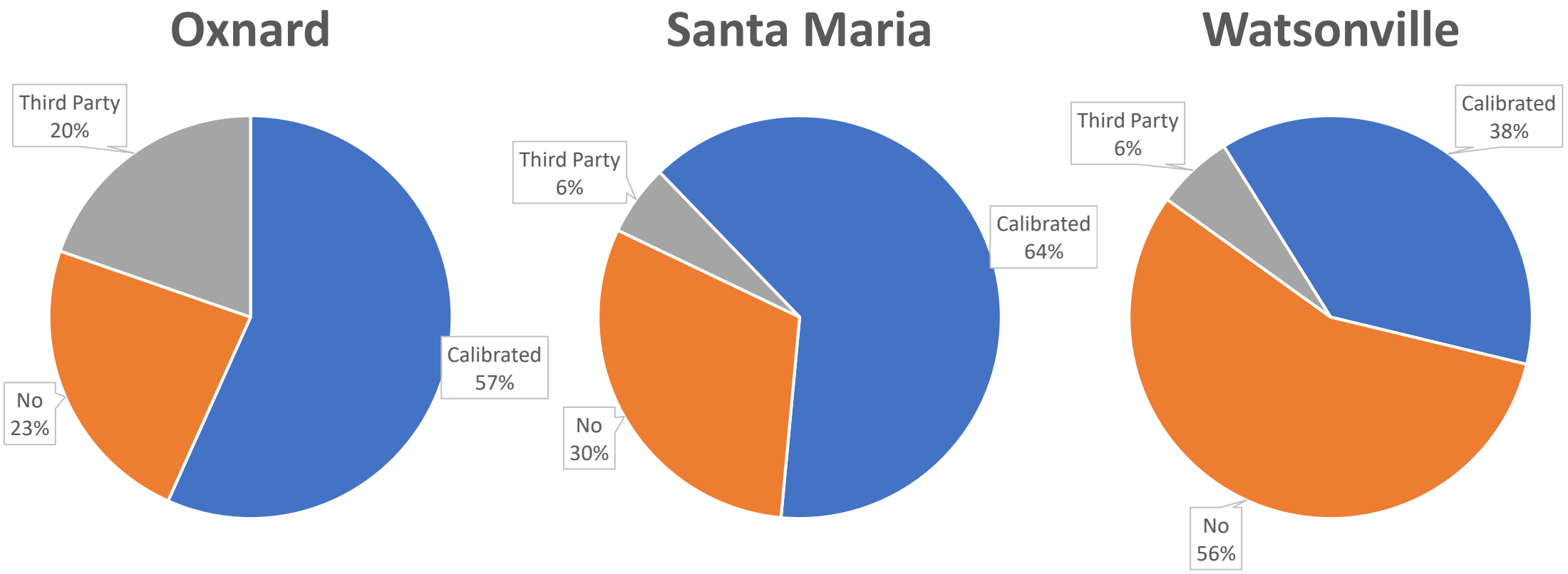
- Changed program from large group trainings to on-farm training and calibration for individual growers.
- Goal is to get 90% of the industry's sprayer's calibrated
- Develop tools to enable growers to calibrate and maintain sprayer's themselves
  - Develop a strawberry specific calibration APP (BASF)
  - Create training videos showing calibration and maintenance procedures (YouTube)
  - Worksheets and reminder stickers for use in field

Current Status of On Farm Calibration

Ranches Calibrated in Each District



Acres Covered by Calibrated Sprayers

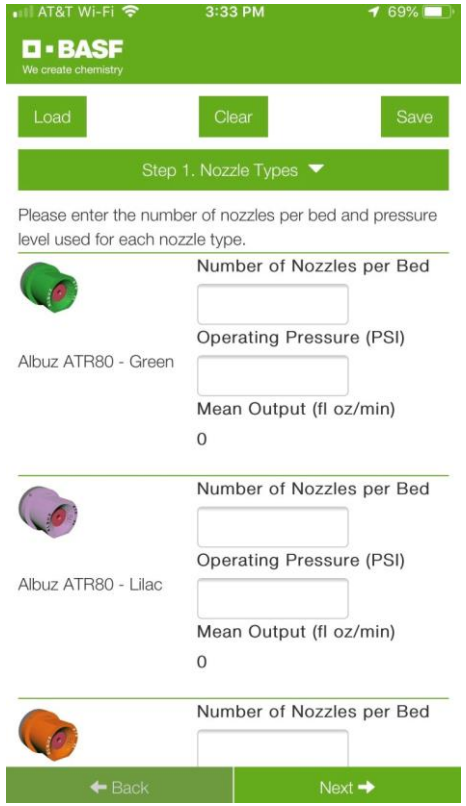


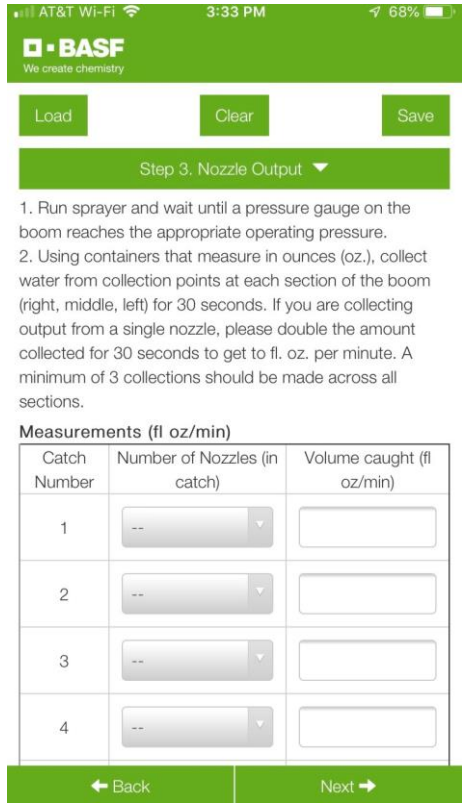
Tools Development for Calibration Program

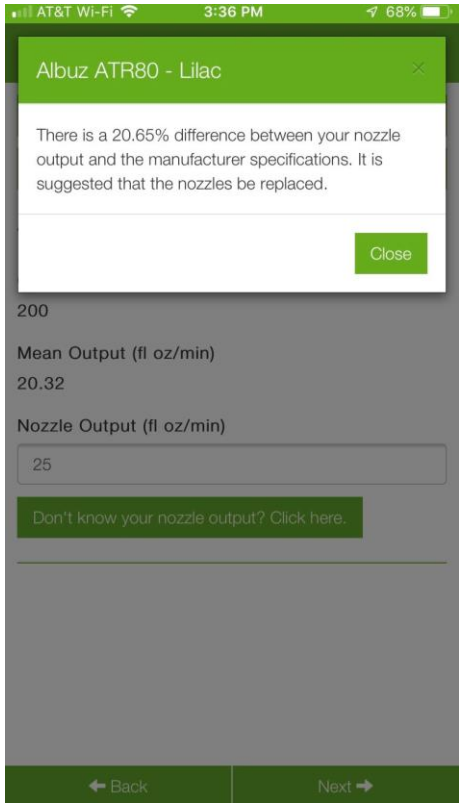
Sprayer Calibration App

BASF QuickCalc App

- Collaboration with BASF
- English/Spanish
- Specific for strawberry industry in CA
- Walks through SOP for calibration
- Tells when to replace nozzles
- GPA results

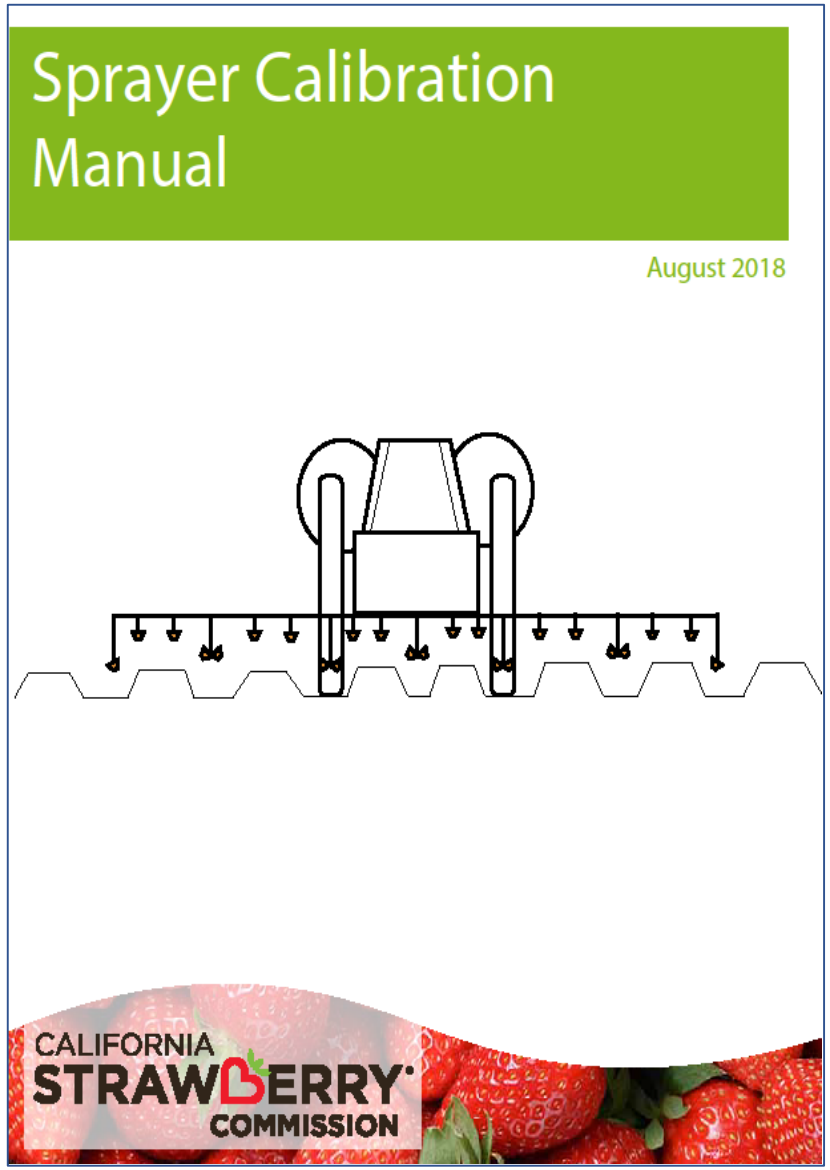






Sample Montage of Explainer Video

Manual



Sticker

Automation Program: Spray Rig Optimization

Dr. John Lin

Caleb Fin

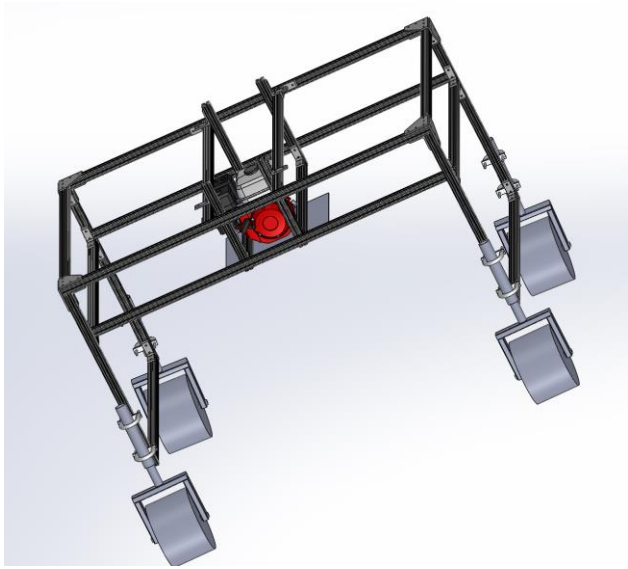
Cal Poly Strawberry Center Automation Program

Sprayer Optimization Objectives

- Reduce Drift and Improve Stabilization:
  - Drifting particles – smaller particles susceptible to being taken by winds
    - Particles should be in the canopy or on the ground but not in the air
  - Boom stabilization – reducing variation in boom height across field.
    - Consistency in spray across beds and field
- Evaluate in grower fields with spray card trials

Test Rig Design

- Gas Engine Powered
- Pressure Compensated
- 2 Spray Booms
- 20 nozzles
- Pulled by tractor
- Balloon wheels to dampen vibrations



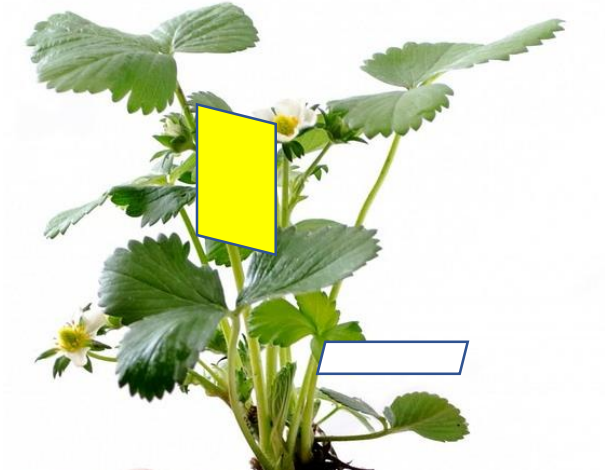
Spray Rig vs Grower Standard 8/30/2018

CP	vs	GS
		xxxxxxxxx
250	**psi**	
133	**GPA**	133
16	**# Nozzles**	18
XR Teejet 11001VS	**Nozzle**	
Flat Fan	**Type**	Flat Fan
2	**# Booms**	1
8	**Nozzles/Boom**	18
45° inwards (booms toward each other)	**Boom Angle**	NA
inwards	**Boom Direction**	NA
0" (at top of canopy)	**Boom Height**	~7" above canopy
	Tractor Speed	3.4mph

Spray Card Trials

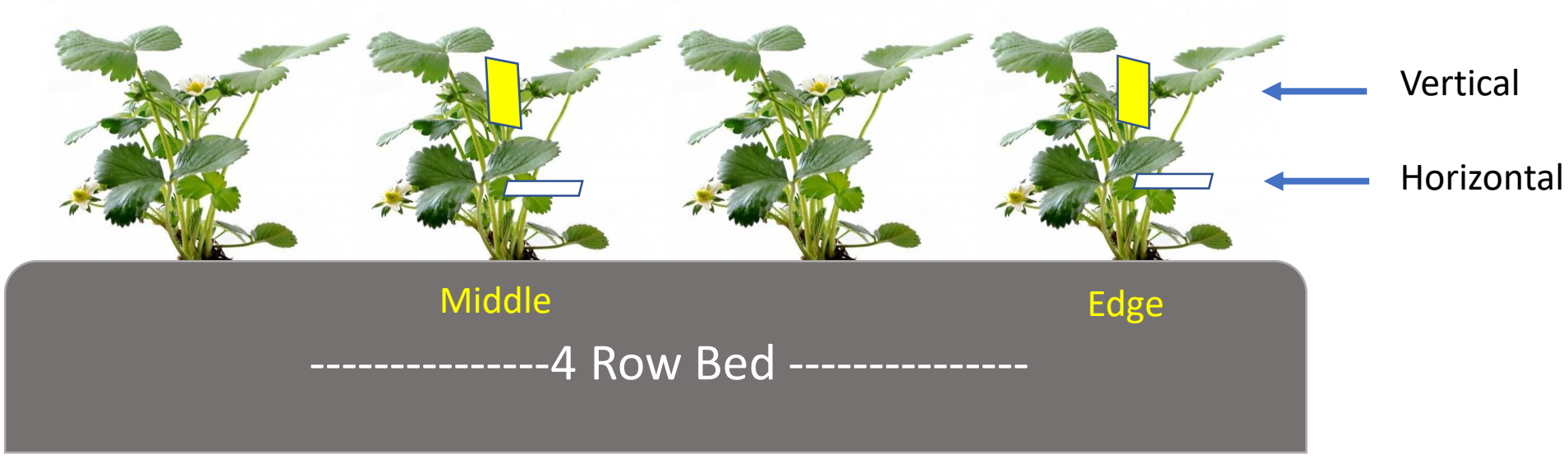
- Cards determine canopy coverage
- Water sensitive cards
- Sensitive side placed away from approaching boom, challenging the sprayer

Vertical and Horizontal Cards



Mid Card Placement

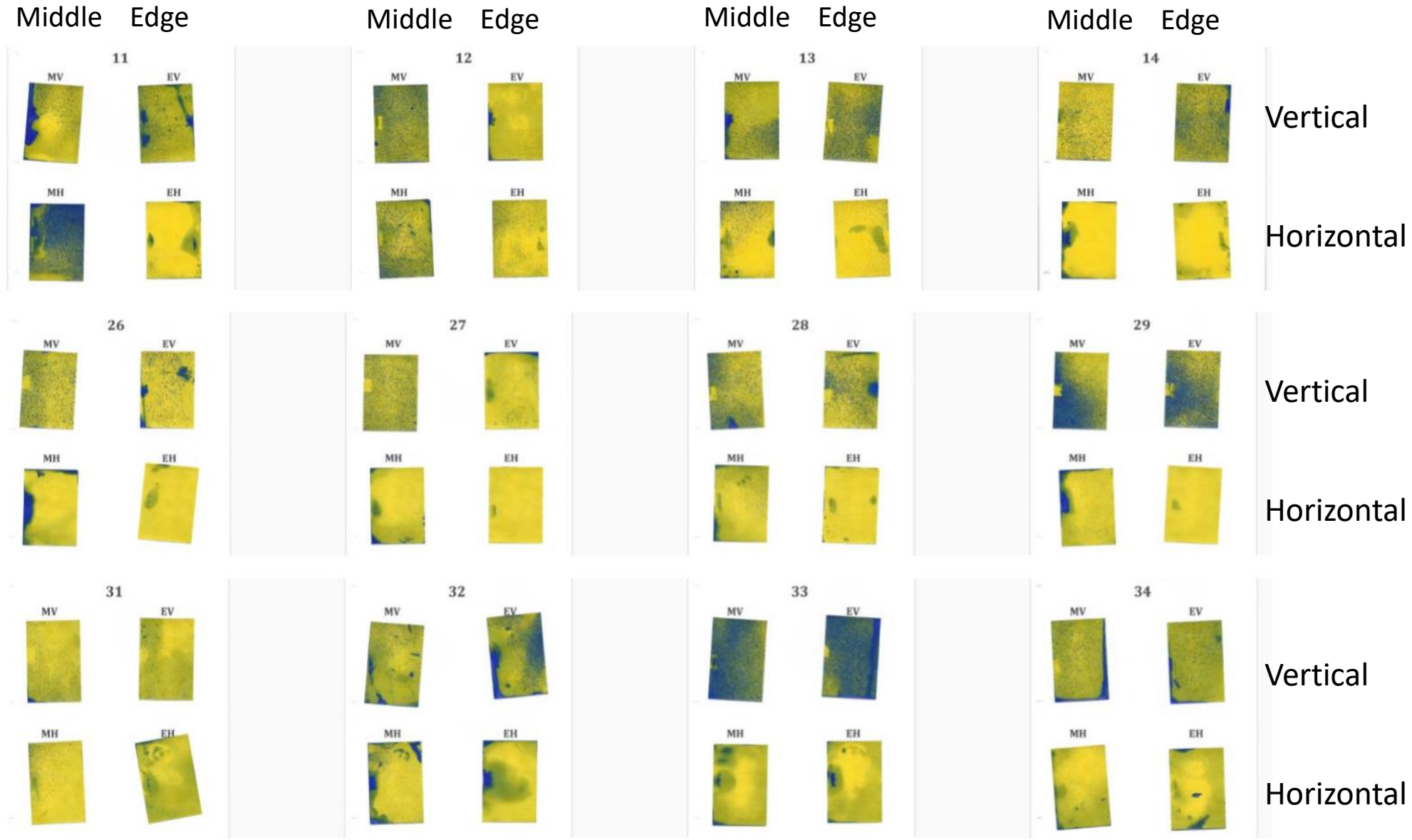
Edge Card Placement



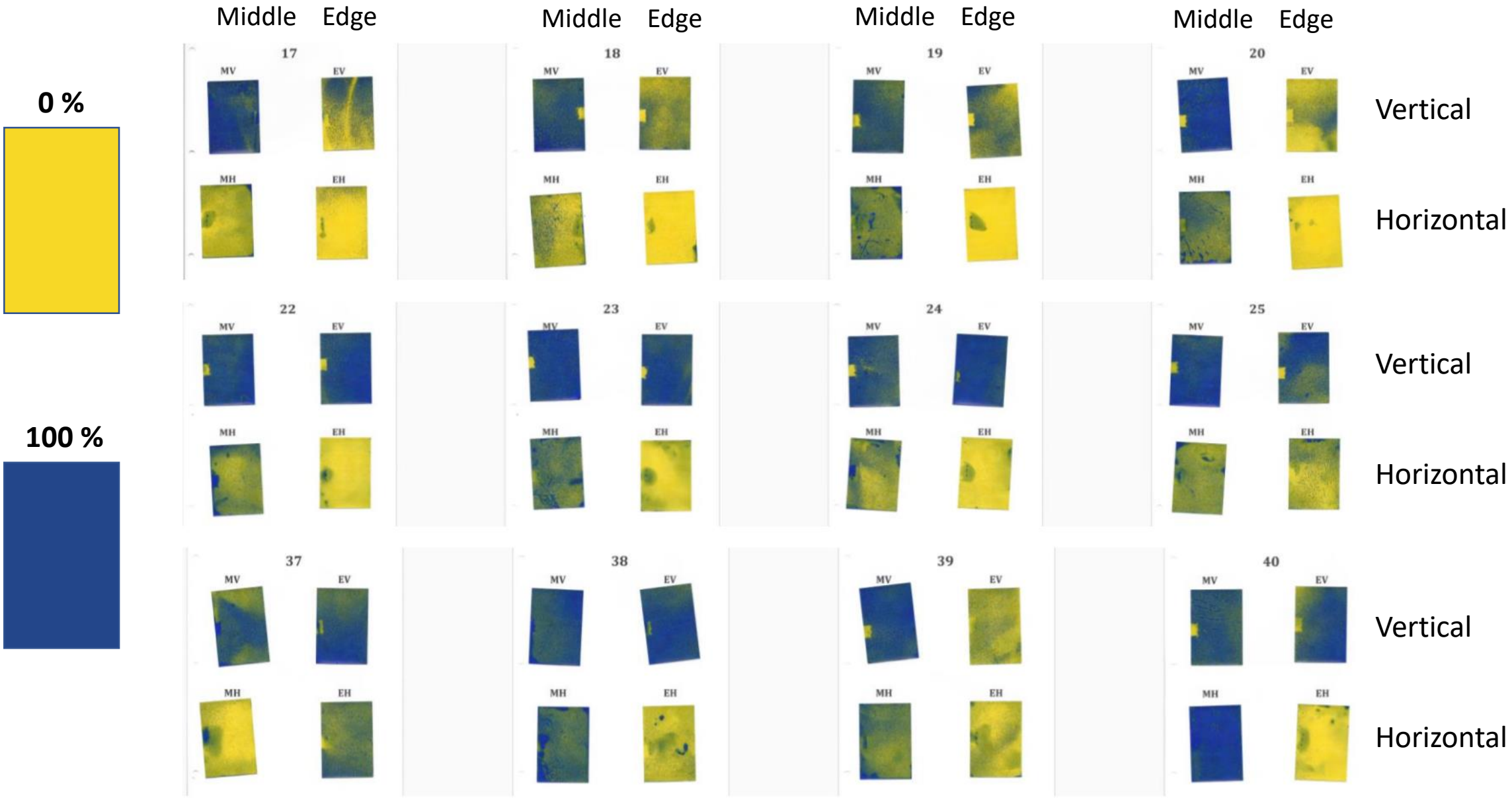
Grower Standard Sprayer (8/30/2018)

0 %

100 %



Strawberry Center Test Rig (8/30/2018)



Timeline

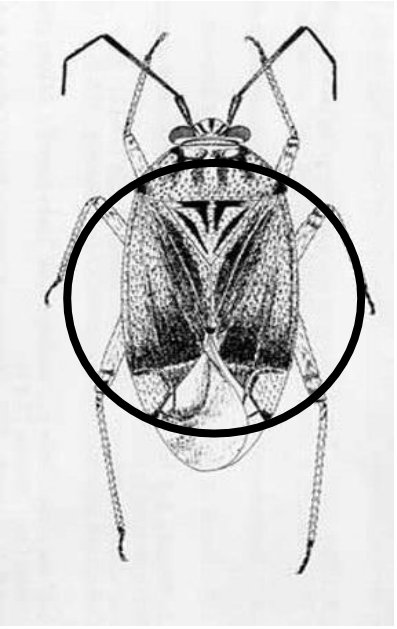
- Field tests of new designs will continue into next year
- Develop full size prototype for field testing in fall 2019

Automation Program: Lygus Vacuum Opt.

Lygus Vacuum Theory

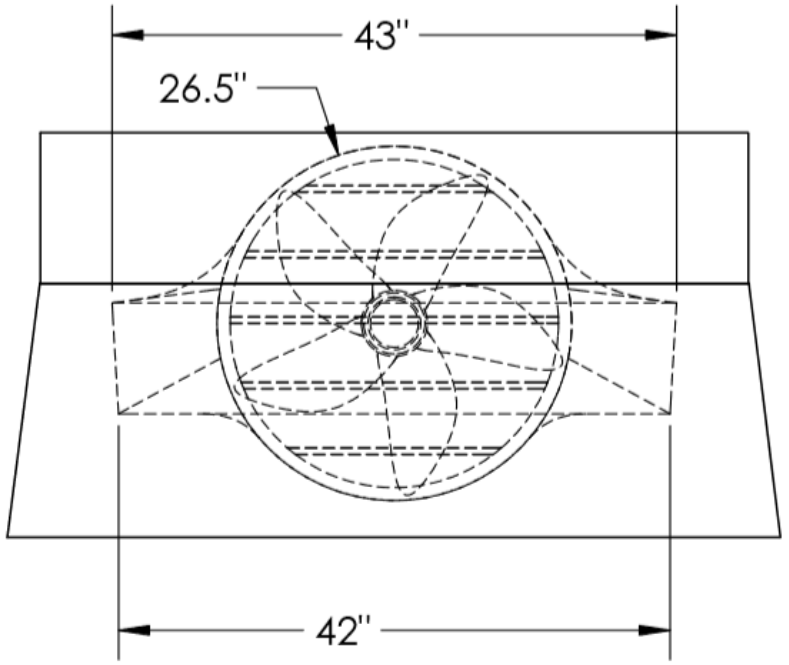
$$V_t^2 = \frac{2m\,g}{C_d \rho_a A}$$

- Assume lygus bug to be a sphere
- Determined terminal velocity of spherical lygus bug

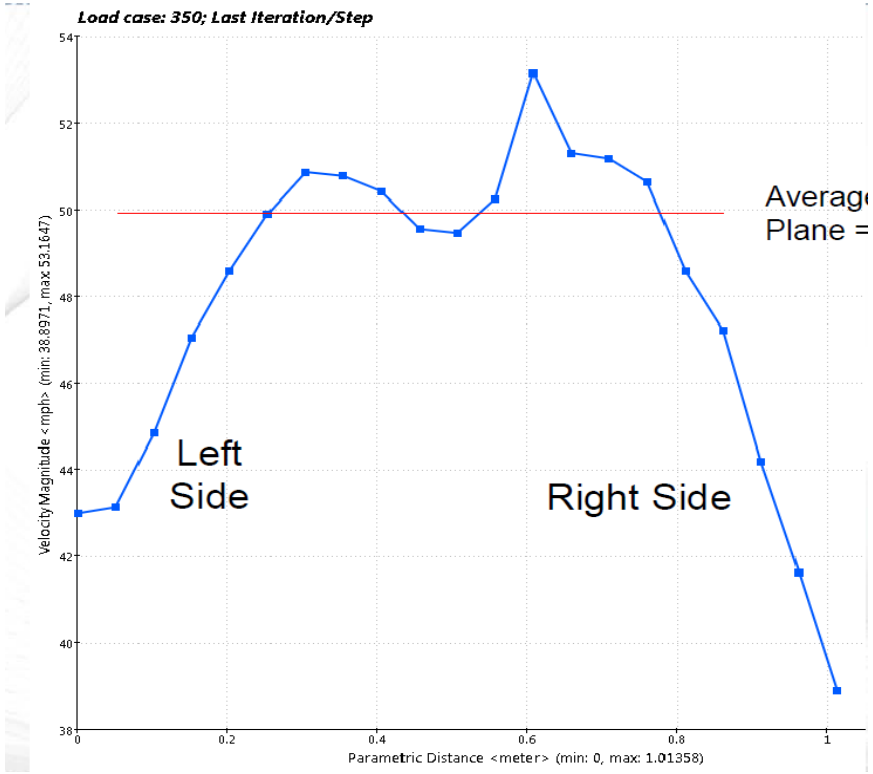


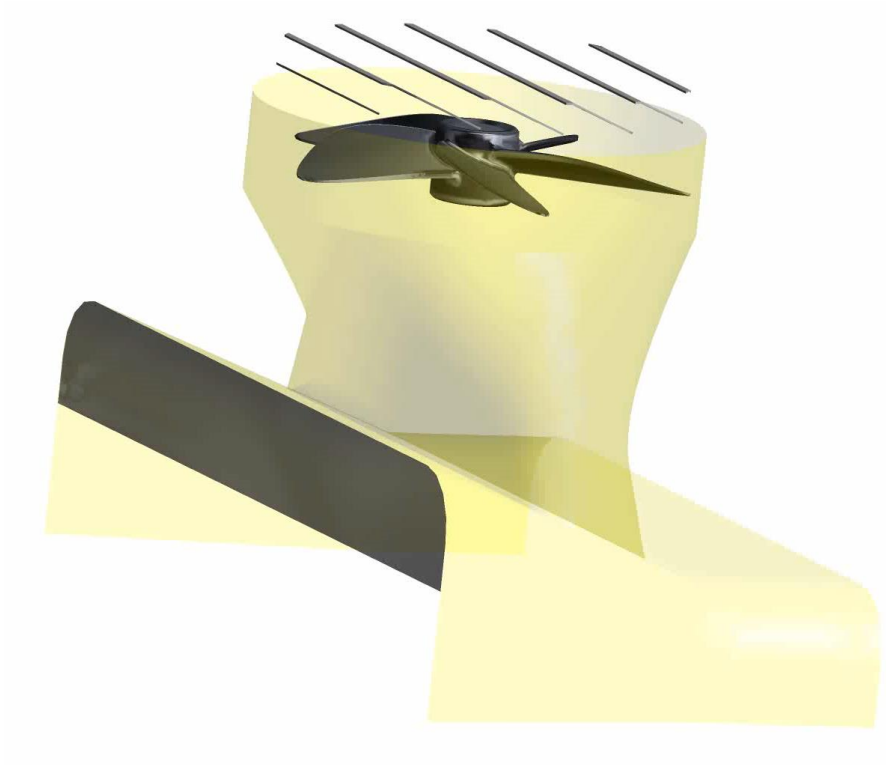
Conventional C&N Vacuum Dimensions

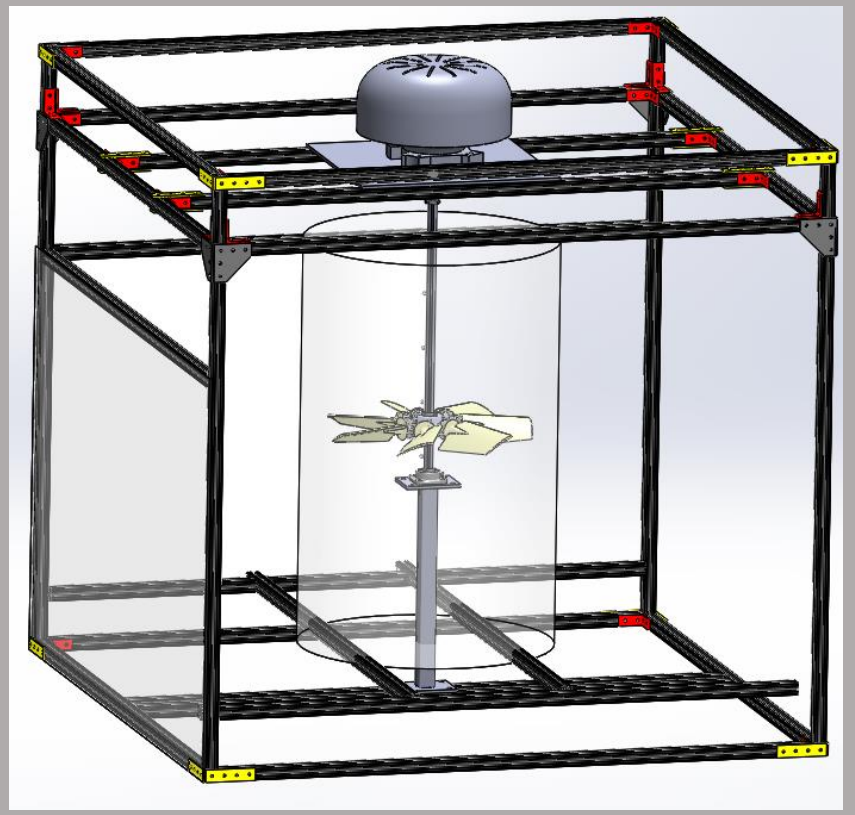
- Fan diameter smaller than the inlet size



Conventional C&N Vacuum Velocity

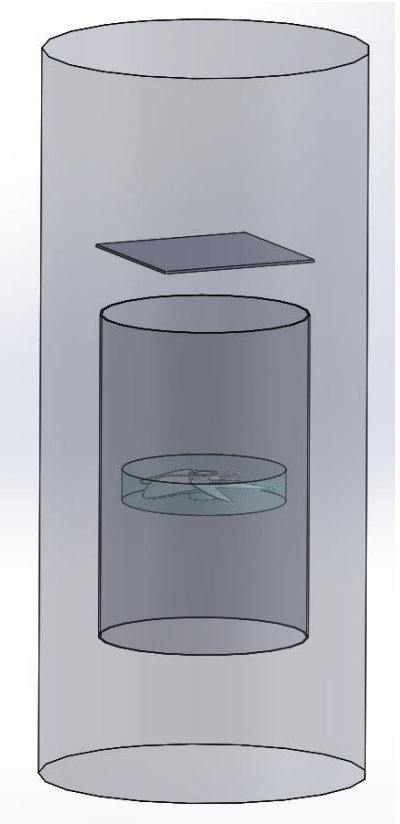




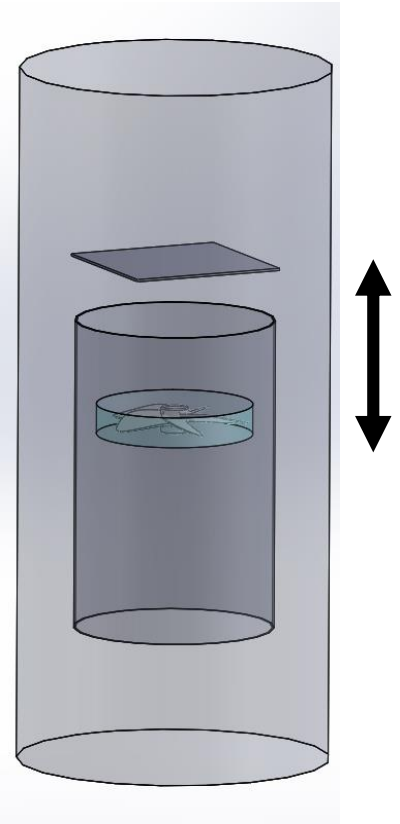


Lygus Vacuum Design

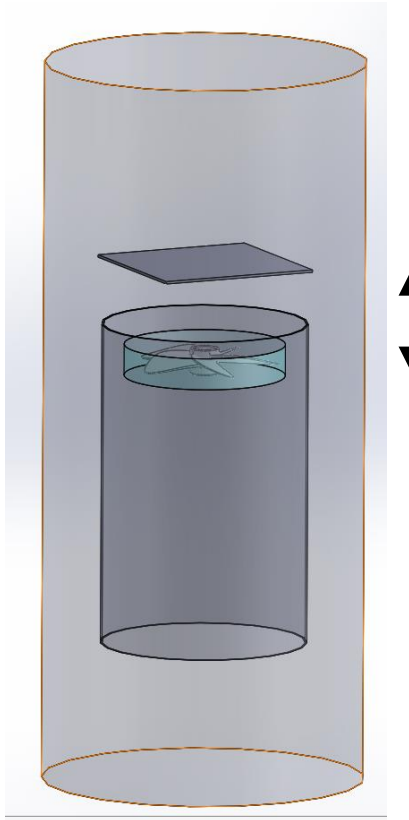
Details



1.0



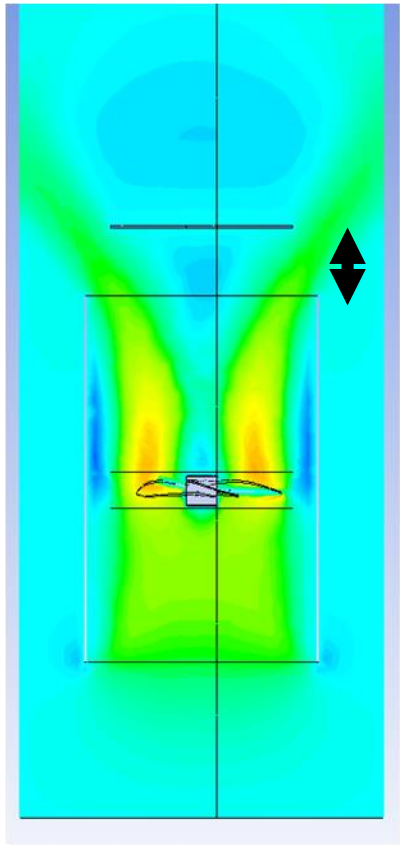
1.1



1.2

Parameter 1

- Fan location in tube
- Fan distance from tube varied from 32 inches to 12 inches



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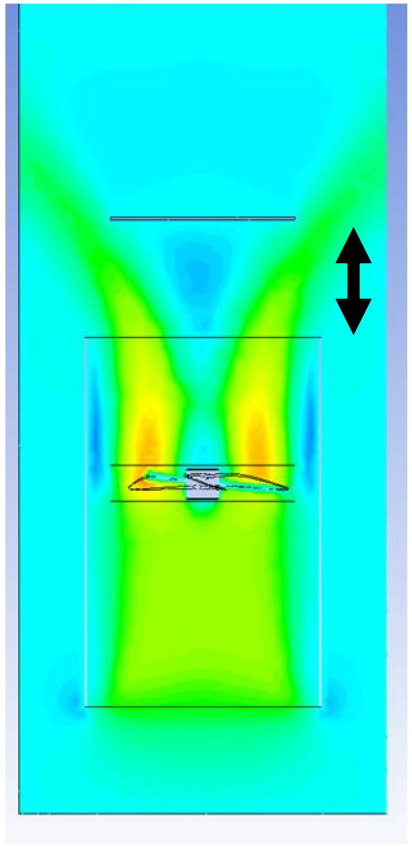

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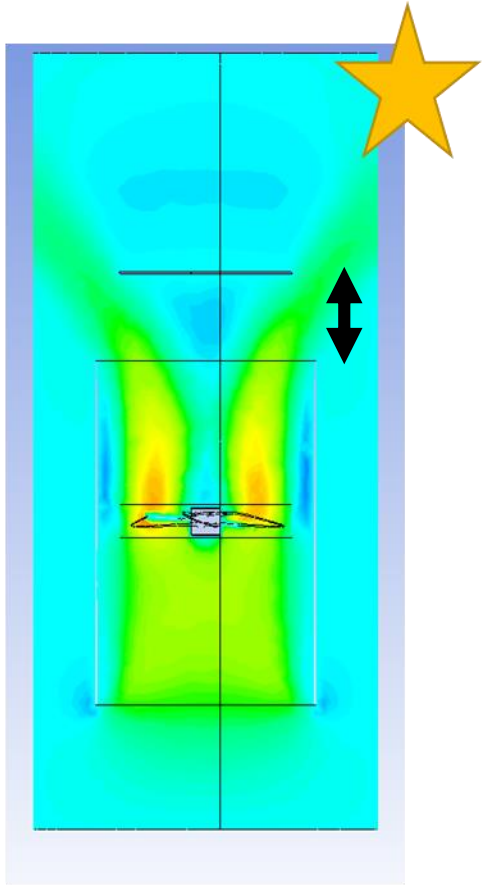

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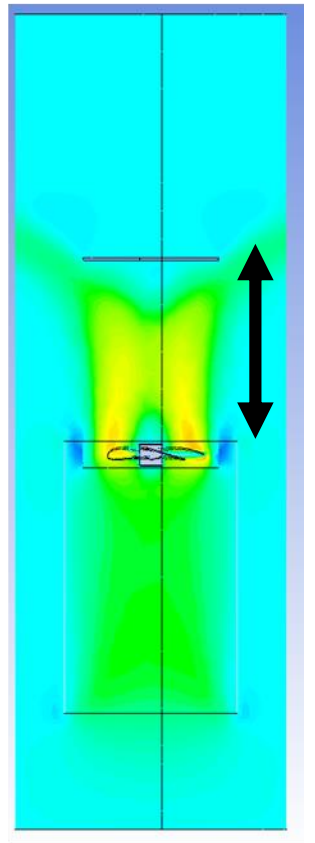
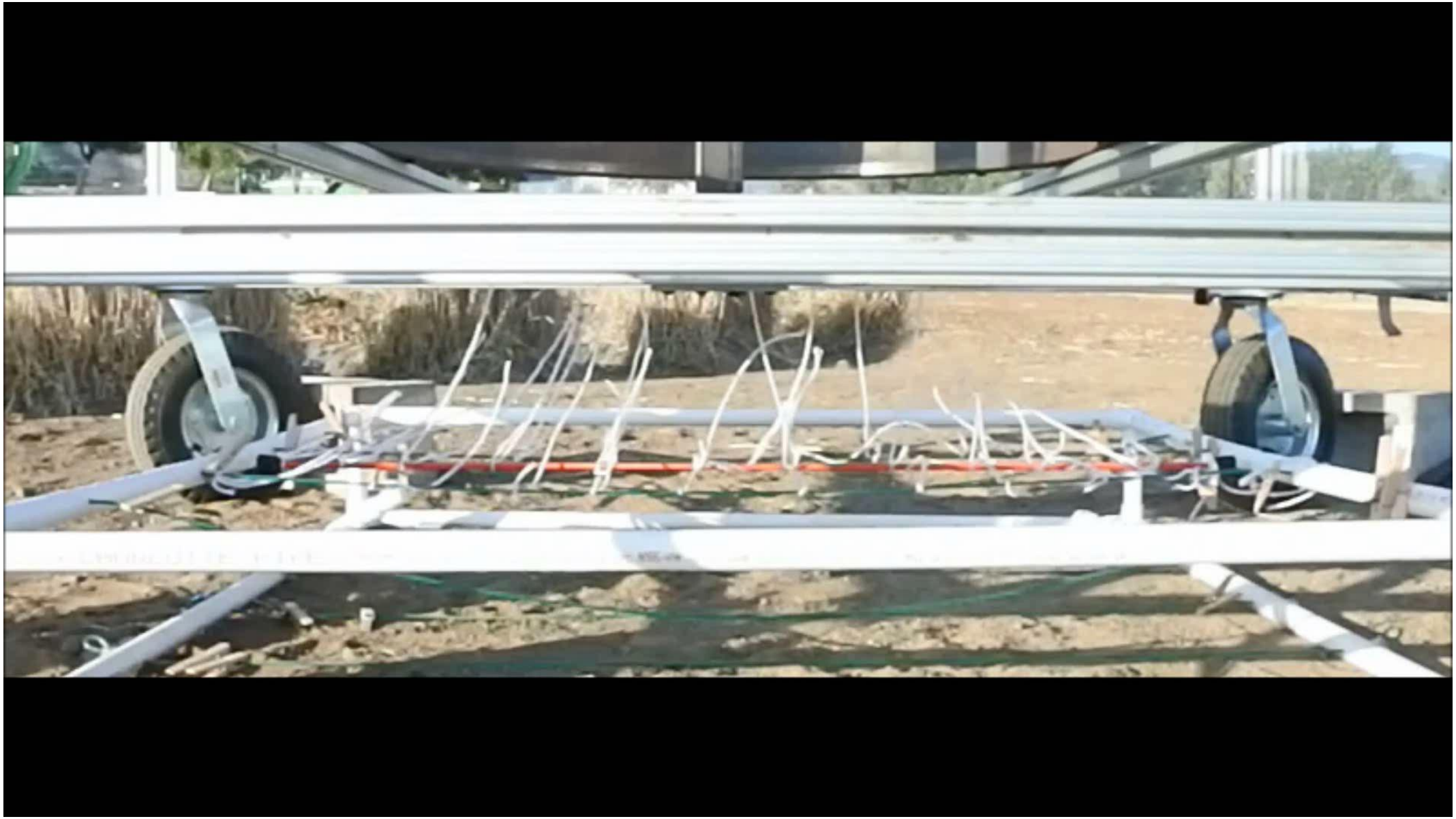


2.3

Parameter 2

- Tube distance between ground and plate
- Fan to plate distance held constant

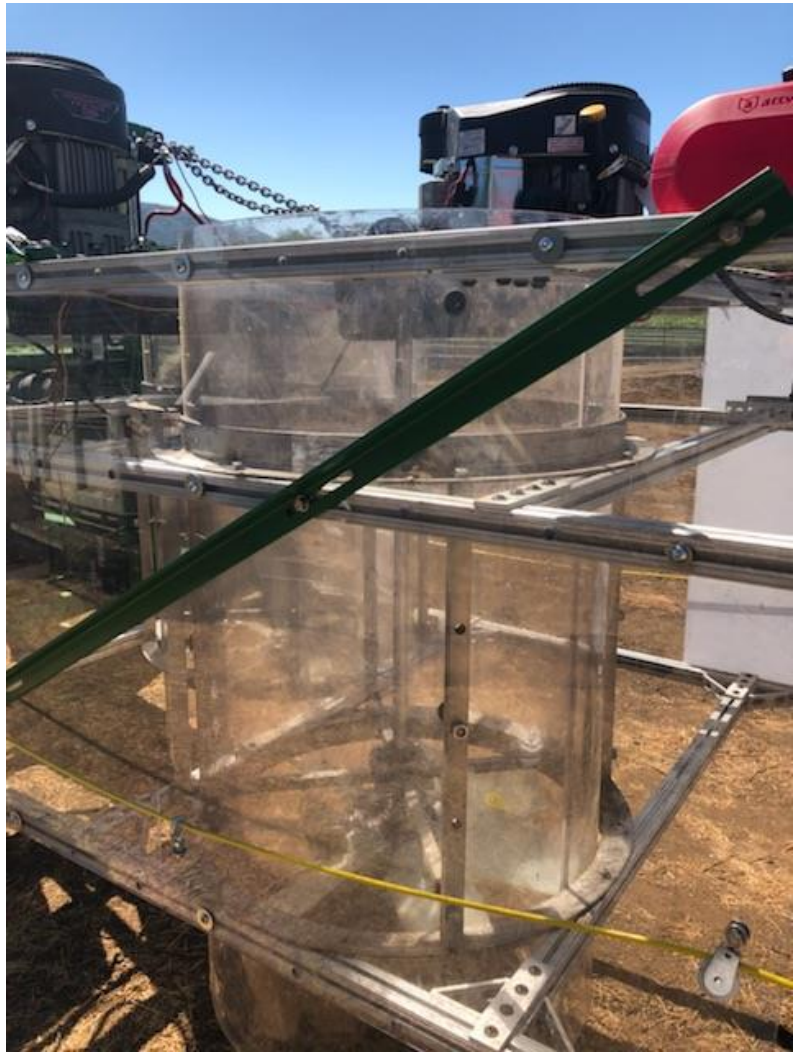


Lygus Vacuum Design 2

Fan One

Fan Two

Lygus Vacuum Design 2



Lygus Vacuum Design 2

Timeline

- Are testing protype in grower fields this fall
- Build full size commercial prototype for testing by fall 2019
- Goal is to double to performance of the current lygus vacuum