

# Development of a Low Cost Vertical Patternator

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Funded by: Northeast SARE  
(Sustainable Agricultural Research & Education Program)  
&  
Landey Vineyards

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Why do I have disease and pest problems  
in my vineyard?

A complex problem

# Do you know where your spray is going?

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- Only 55% of the spray hits the target
- 45% hits the ground or becomes airborne

Reichard et al. 1979. Transactions of ASAE. 22:69-74

# How can you tell where your spray is going?

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- Use a patternator  
Cornell patternator  
Dr. Andrew Landers - Cornell  
Material cost 2006 \$489.28



<http://www.nysaes.cornell.edu/ent/faculty/landers/pestapp/PATTERNATOR>

# 2010 SARE Patternator Project

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## Goals

- Develop a more efficient patternator
- Less than \$100 in material costs
- Test ability to quantify spray pattern
- Statistical analysis of patternator's efficiency

# 2010 SARE Patternator Project

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- Modified Cornell patternator  
material cost - \$127.55  
uses window screens
- SARE patternator  
material cost - \$93.44  
uses painted plywood panels
- SARE WITH SCREENS patternator  
material cost - \$115.44  
uses painted plywood panels and screens



Modified  
Cornell  
Patternator



SARE  
Patternator



SARE  
WITH SCREENS  
Patternator















# Testing Patternators

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Berthoud MGP 360 sprayer – torex nozzles

PTO – 440 RPM

Pressure – 70 psi

3 nozzles open – right side

Water with no additives

Spray for one minute



# Statistical Analysis

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- One-way analysis of variance (ANOVA)
- Tukey's hsd test

5% and 1% level of significance

Utilized <http://faculty.vassar.edu/lowry/VassarStats.html>

# Total Output of Sprayer





# Total Output of Sprayer

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## Total output – Berthoud Sapphirex 10 discs

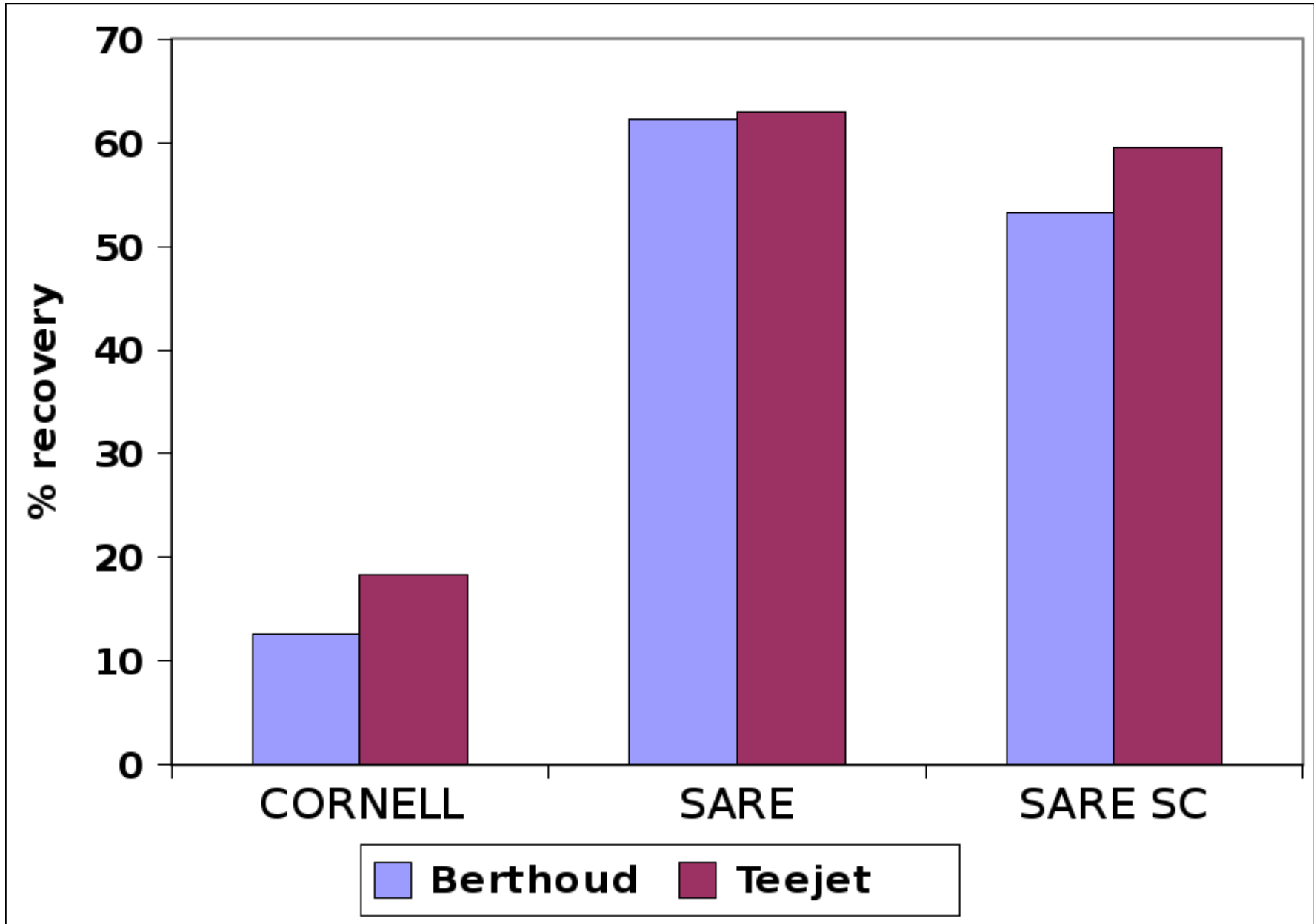
Treatment	Mean (ml)	
top disc	633	
middle disc	633	no statistical significance
bottom disc	655	

## Total output – TeeJet D1.5 discs

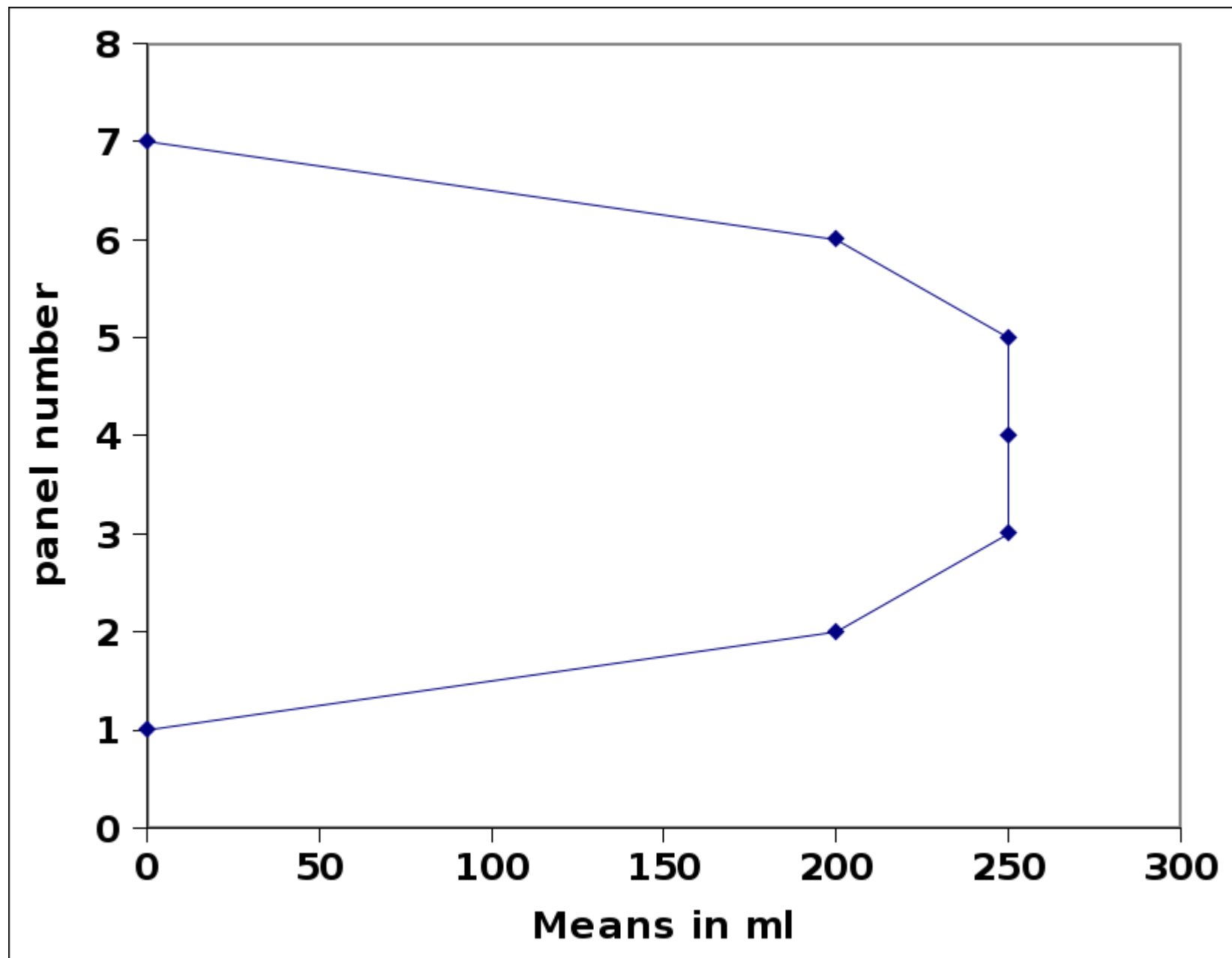
Treatment	Mean (ml)		
top disc	571	a	treatments with different letters are significantly different
middle disc	573	ab	
bottom disc	606	b	

1% level of significance

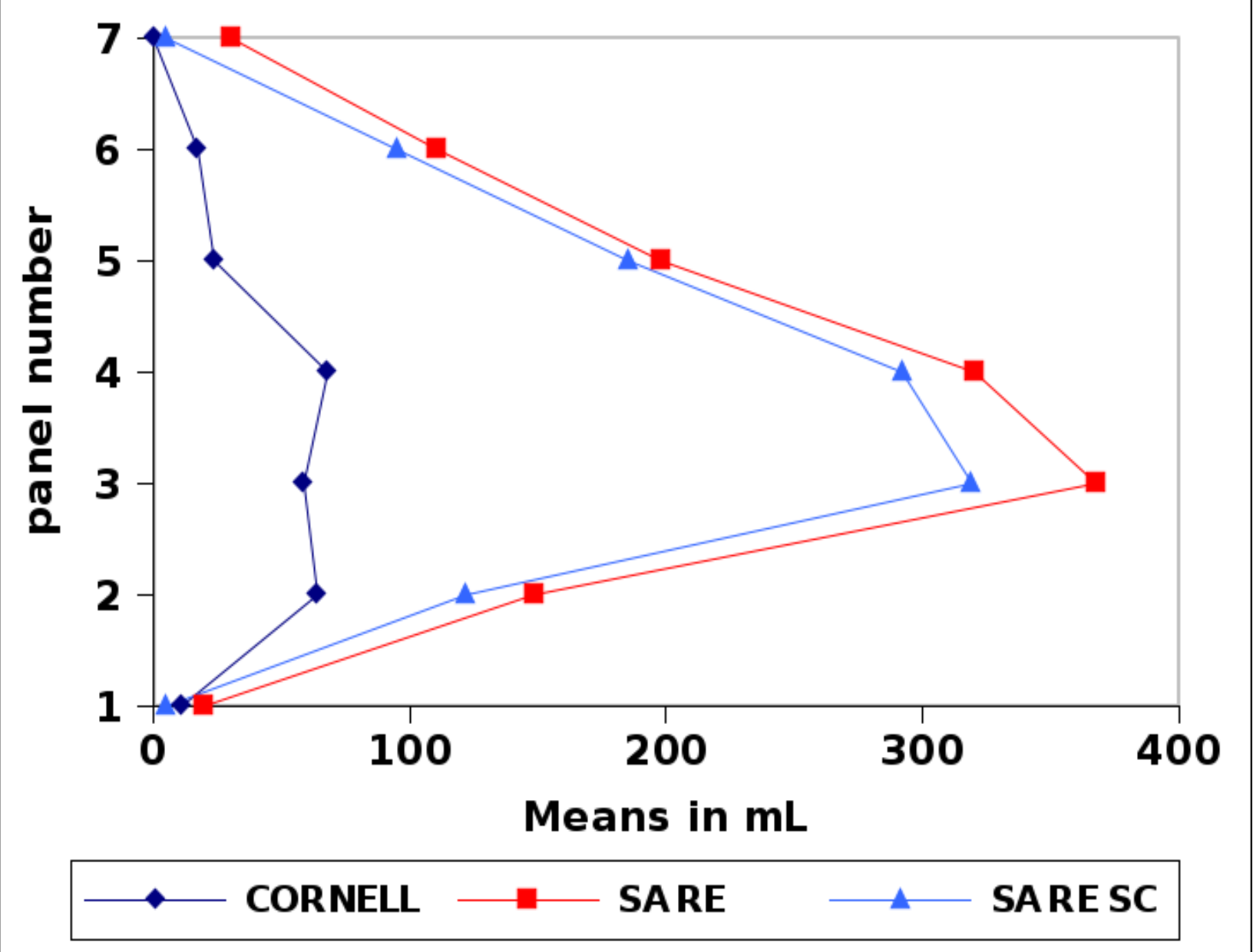
# Percentage of Total Spray Captured



# A Perfect Spray Pattern Chart



# Patternators with Berthoud Sapphirex Discs



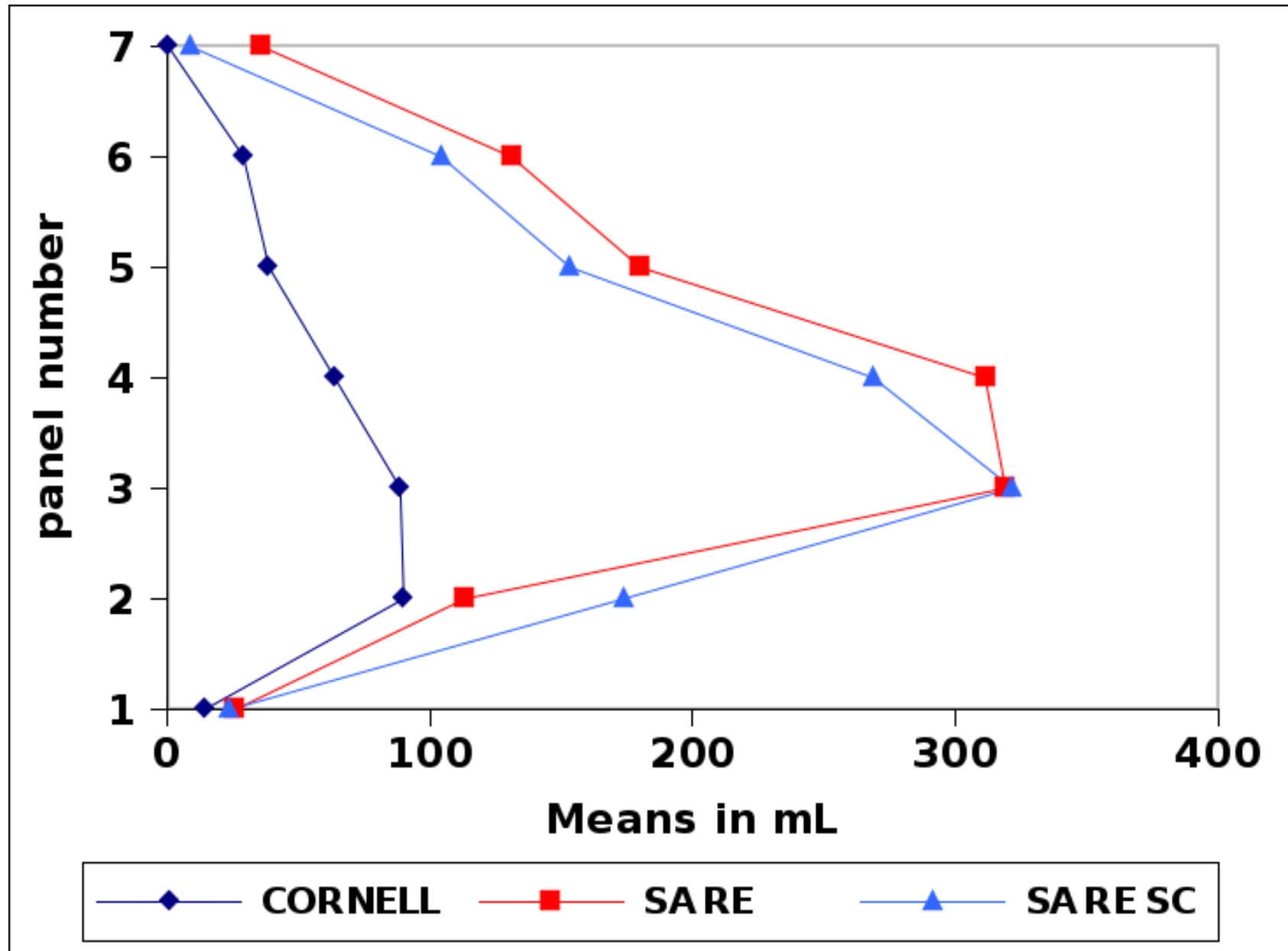
# Patternators with Berthoud Sapphire Discs

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- SARE – significantly more spray versus Cornell
  - 6<sup>th</sup> through 2<sup>nd</sup> panels significant at 1% level\*
  - 7<sup>th</sup> panel significant at 5% level\*
  - 1<sup>st</sup> panel – no significance\*
- SARE with screens – significantly more spray versus Cornell
  - 5<sup>th</sup> through 3<sup>rd</sup> panels significant at 1% level\*
  - 6<sup>th</sup> and 2<sup>nd</sup> panels significant at 5% level\*
  - 7<sup>th</sup> and 1<sup>st</sup> panels – no significance\*
  - no improvement over SARE

\* Tukey's hsd test

# Patternators with TeeJet Discs



# Patternators with TeeJet Discs

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- SARE – significantly more spray versus Cornell
  - 7<sup>th</sup> through 3<sup>rd</sup> panels significant at 1% level \*
  - 1<sup>st</sup> and 2<sup>nd</sup> panels – no significance \*
- SARE with screens – significantly more spray versus Cornell
  - 6<sup>th</sup> through 2<sup>nd</sup> panels significant at 1% level\*
  - 7<sup>th</sup> and 1<sup>st</sup> panels – no significance\*
  - no improvement over SARE

\* Tukey's hsd test

# Conclusion

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- Cornell – 13 to 18% spray recovery
- SARE – 62 to 63% spray recovery
- SARE with screens – 53 to 60% spray recovery
  
- SARE patternators outperformed Cornell
- SARE patternator is recommended over  
SARE with screens

For more information go to [patternator.com](http://patternator.com)