Development of a Low Cost Vertical Patternator

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?

- 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?

- 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

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

- 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


4
5


3


7

Testing Patternators

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

- 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

Total output – Berthoud Saphirex 10 discs

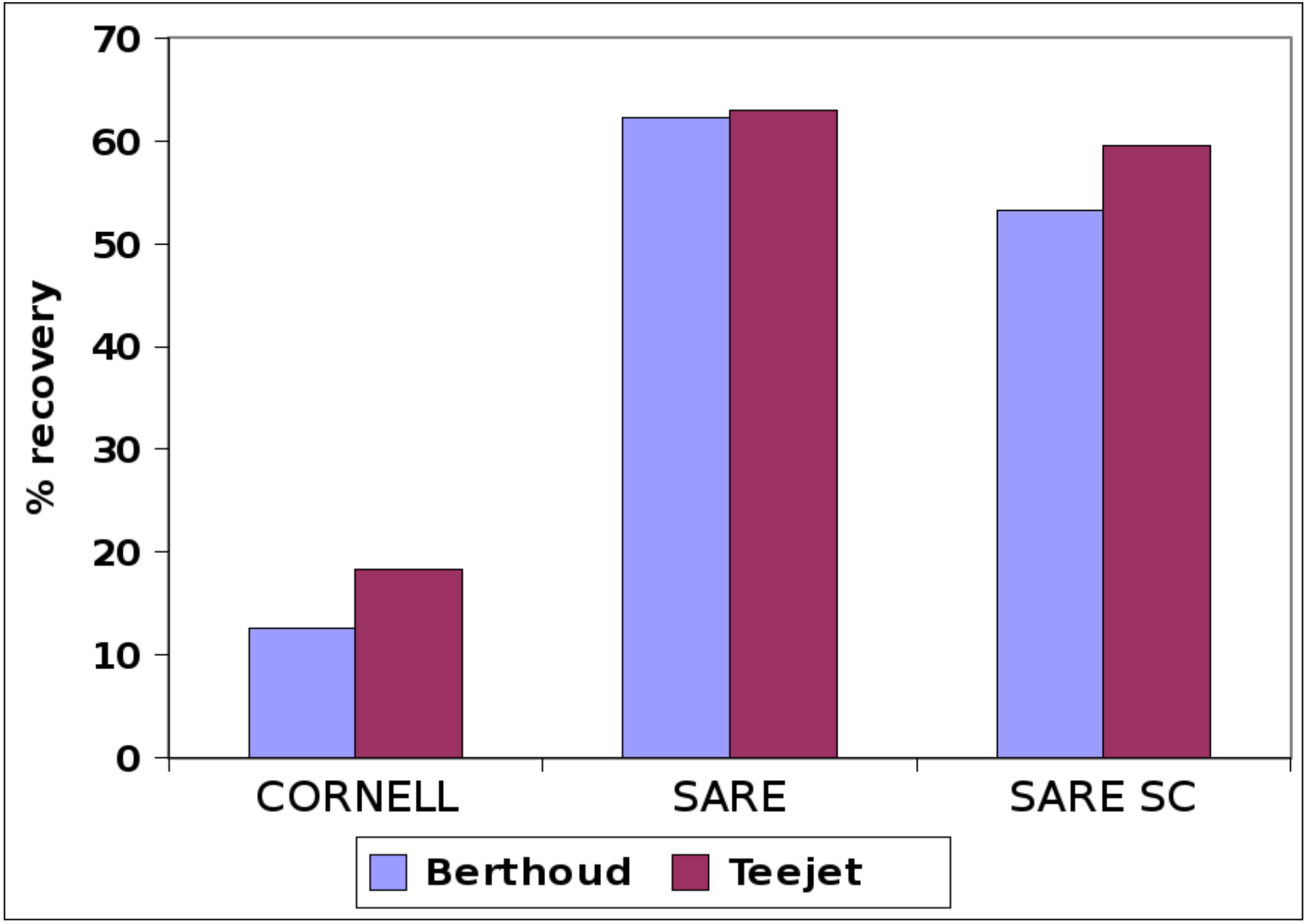
Treatment	Mean (ml)	
top disc	633	
middle disc	633	no statistical significance
bottom disc	655	

Total output – TeeJet D1.5 discs

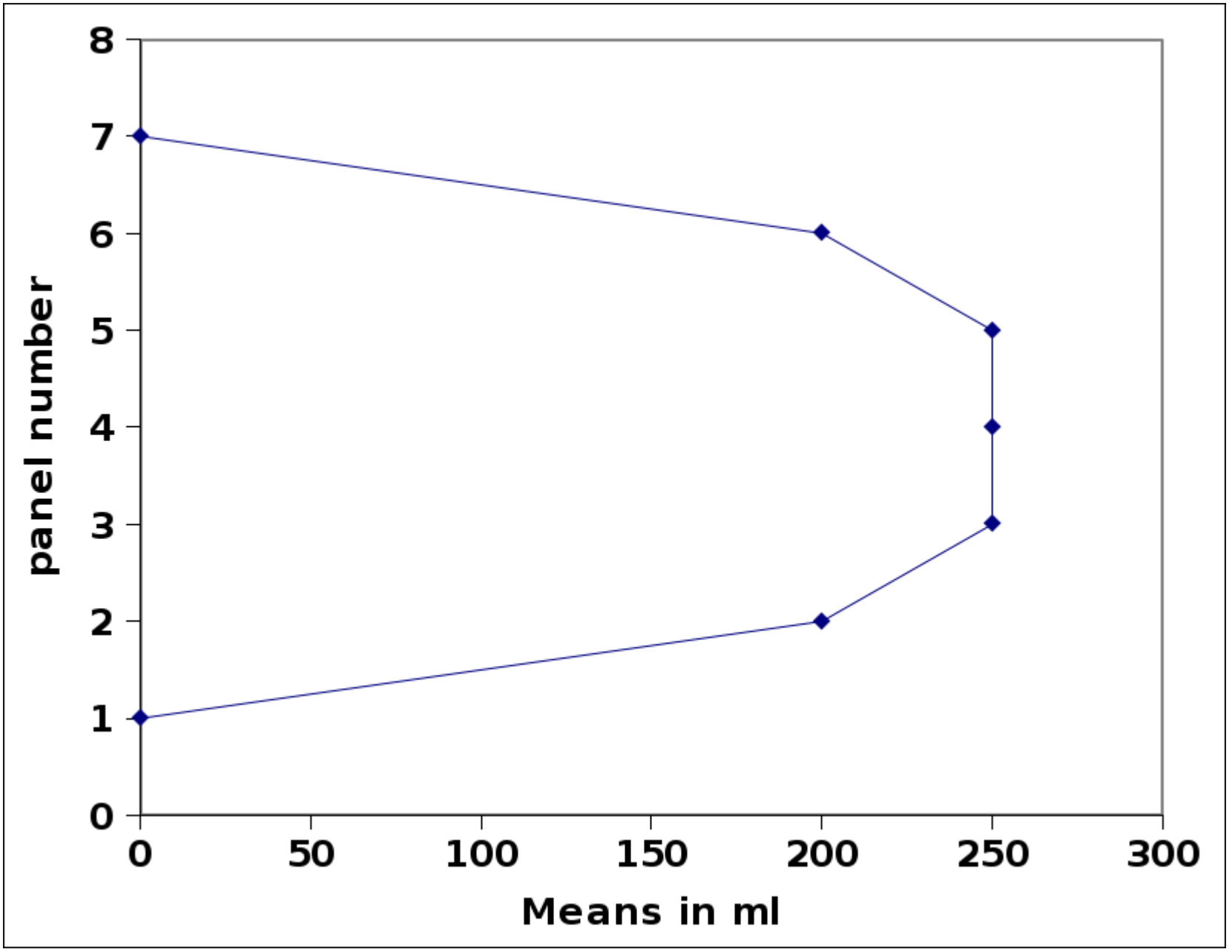
Treatment	Mean (ml)		
top disc	571	a	treatments with different
middle disc	573	ab	letters are significantly
bottom disc	606	b	different

1% level of significance

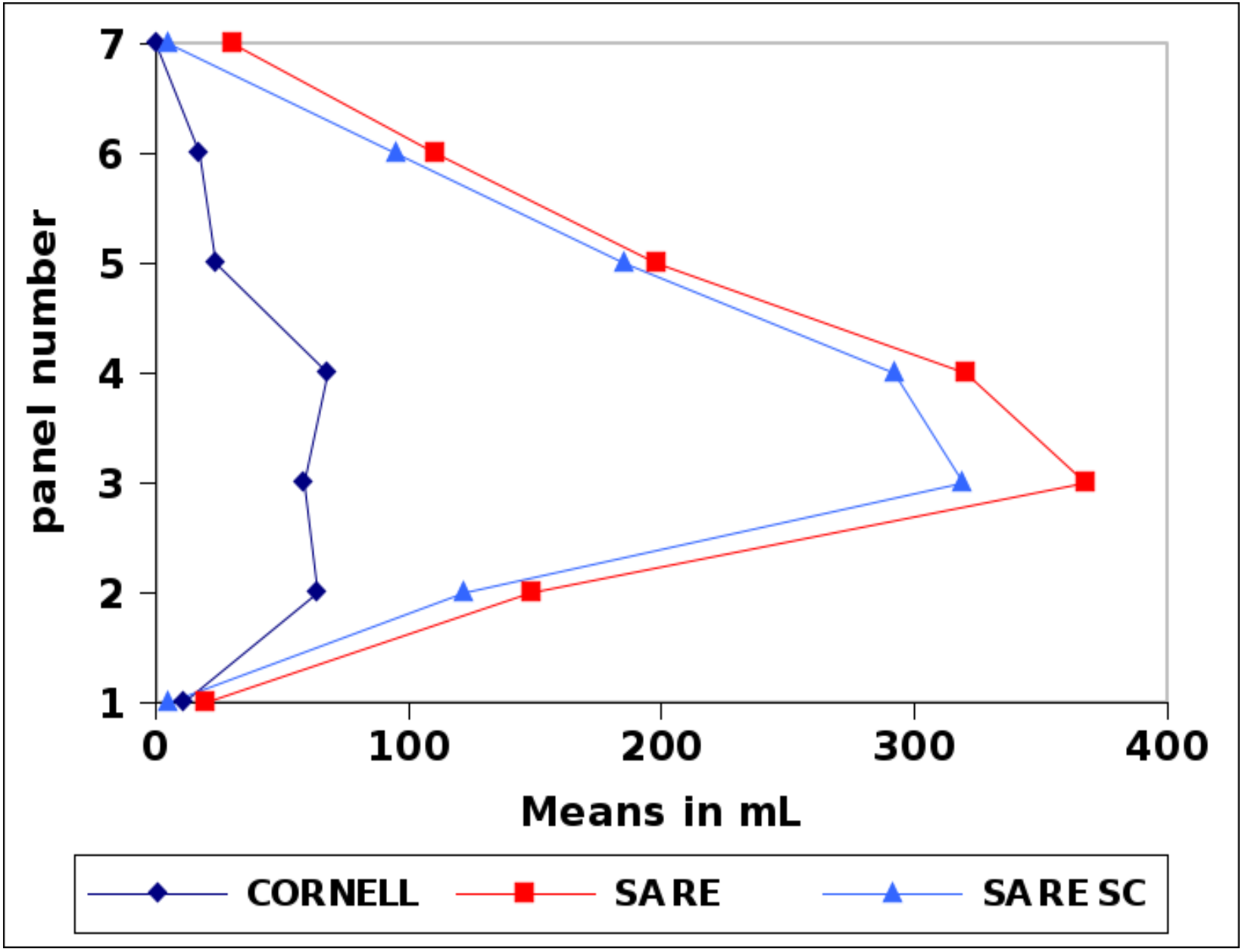
Percentage of Total Spray Captured



A Perfect Spray Pattern Chart



Patternators with Berthoud Saphirex Discs

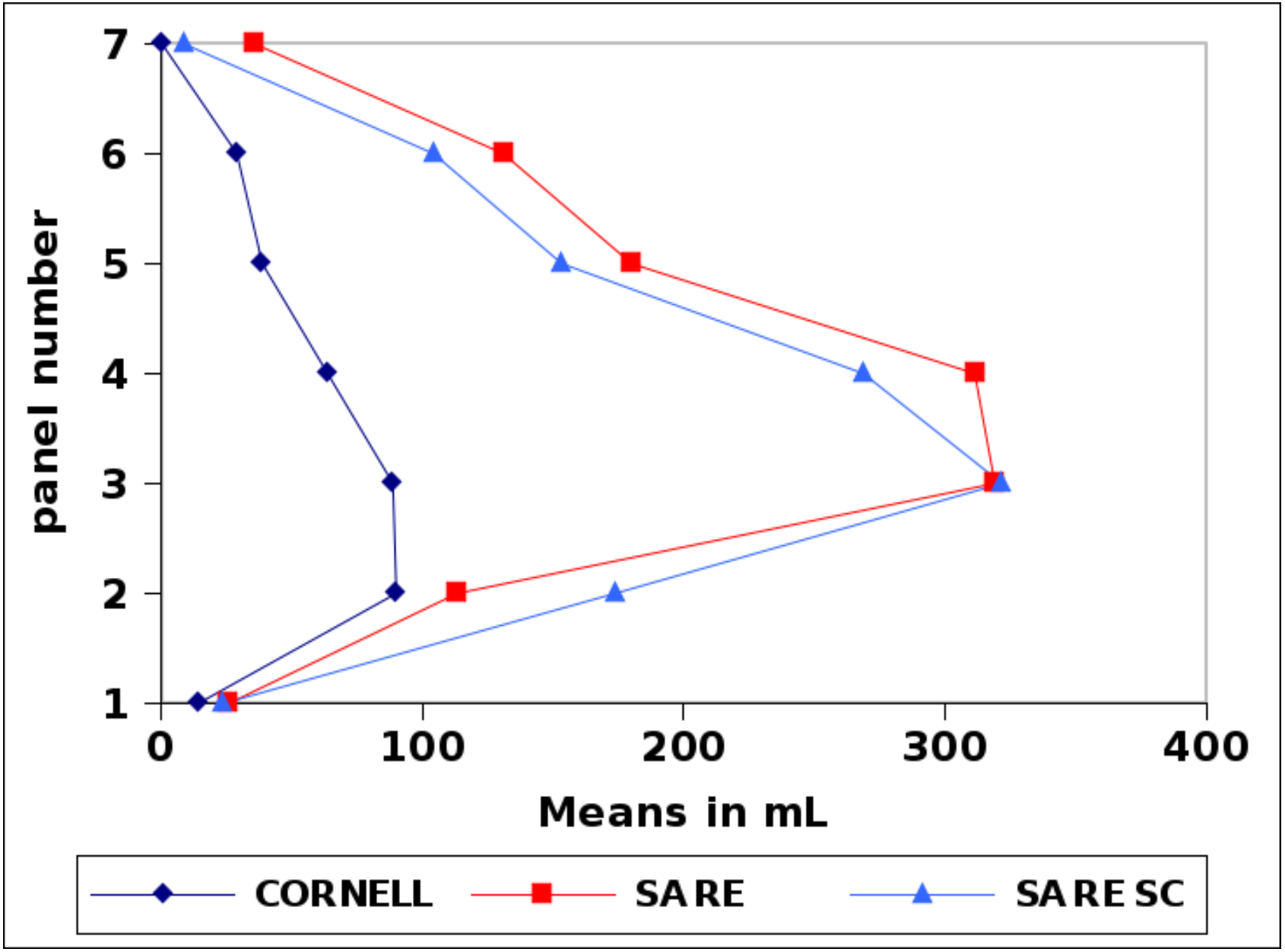


Patternators with Berthoud Saphirex Discs

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

* Tukey's hsd test

Patternators with TeeJet Discs



Patternators with TeeJet Discs

- SARE – significantly more spray versus Cornell

  7^{th} through 3^{rd} panels significant at 1% level *
  1^{st} and 2^{nd} panels – no significance *

- SARE with screens – significantly more spray versus Cornell

  6^{th} through 2^{nd} panels significant at 1% level*
  7^{th} and 1^{st} panels – no significance*
  no improvement over SARE

  * Tukey's hsd test

Conclusion

- 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