

Reconsidering Nursery Spraying Practices

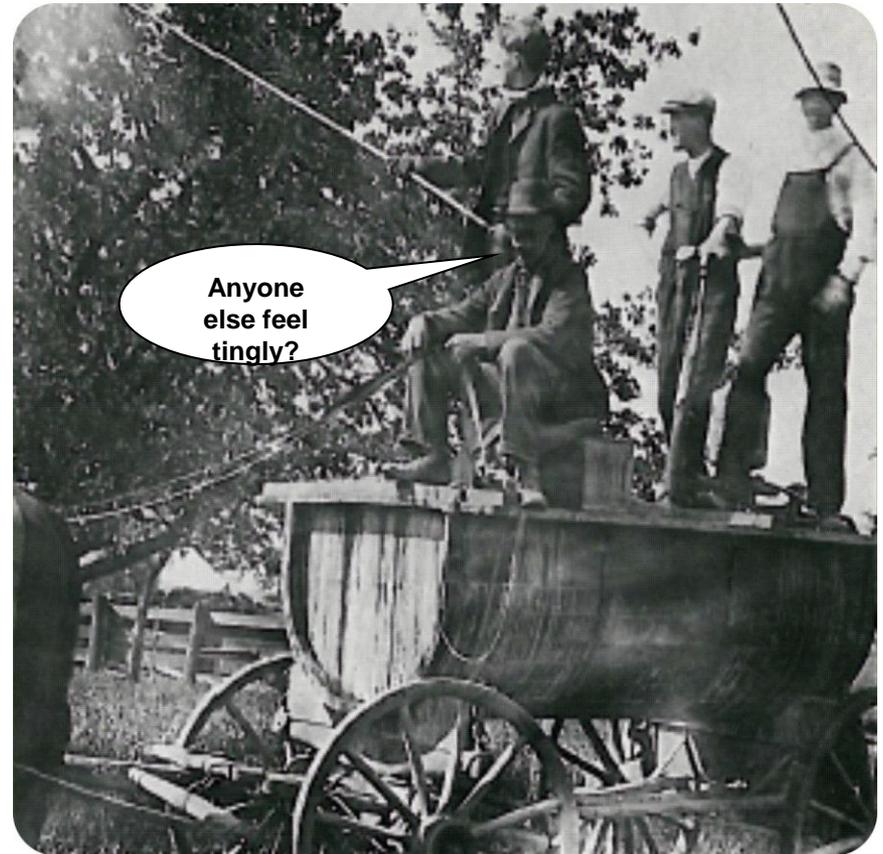
The last three years



Dr. Jason S.T. Deveau
Application Technology Specialist
February, 2012

We've come a long way, baby!

- **Sprayer technology and practices have evolved a great deal in the last 100 years.**
- **We've only just started exploring what can be done to improve spray practices in Ontario's nurseries.**



**An Ontario orchard sprayer (c. 1900)
Work rate: ~1.5 ha/hr and hard on the horses.**



2008-09

- **I was hired, given an empty office and some good wishes.**
- **I started reviewing how Ontario sprays horticultural crops, and how the rest of the world does it. Compared to Europe, we've got some catching up to do.**
- **I started exploring simple, but effective methods for us to get more out of each spray application.**
- **Then I started filling my toolbox with fact sheets, gadgets and an inventory of sprayer parts.**



Fast, cheap and informative (the paper, too).



2009-10

- **I delivered a two-part workshop on how spray droplets behave and what good spray coverage looks like.**
- **We had maybe a dozen nurserymen.**
- **Everyone got some reading materials and a quick refresher.**
- **Then we went outside...**



The first workshop – classroom session.



2009-10



Just look at those encouraging, open-minded faces 😊



2009-10



**We sprayed with the grower's standard setup, then
an optimized setup.**



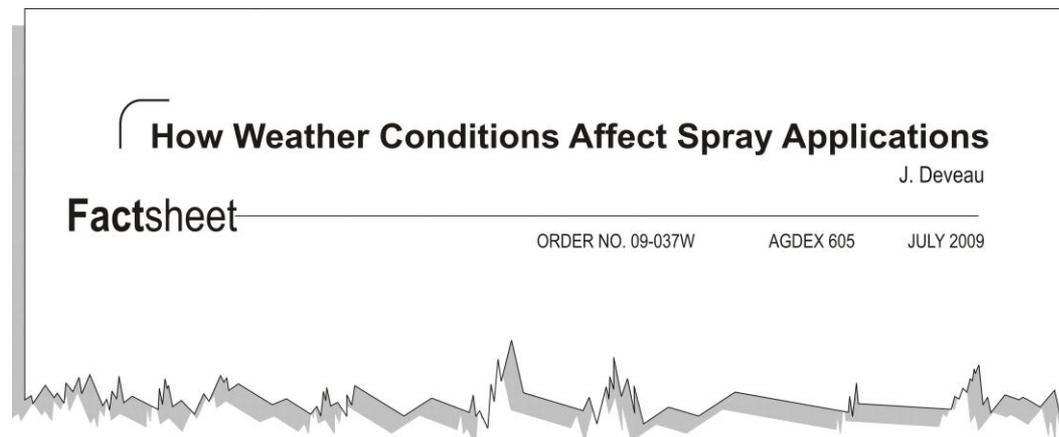
- We discovered a few things during the hands-on portion of the workshop. I suspect many of you are:
- ...using more spray mix than is needed to achieve good coverage – especially early in the season.
- ...trying to spray too many rows with one pass.
- ...wasting a lot of product.
- ... using the same sprayer setup for every crop (maybe changing travel speed or closing nozzles).



The results of sprayer optimization for a container crop.



- I toured some of your operations and we discussed possible changes to your spray programs.
- I was asked to present at the **2010 Short Course** and I delivered a talk full of tips and tricks and asked you to remember three. Did you?
- I handed out a series of new Fact Sheets and articles, but in talking with you afterwards, what you really wanted was **more demonstrations and workshops**.



2011-12

- **So, this year we had another workshop – all hands-on.**
- **Here's what you said on the exit survey:**

What, if anything, will you change in your spray practices as a result of this workshop?

- do more test-strip testing
- possibly turn-off nozzles
- use wettable papers
- do some coverage testing on large plantations (inner row test).
- evaluate coverage and travel speed
- use sensitive papers and do trials
- calibrate more often
- try using twinjets on my watering booms in the greenhouses
- more testing of air flow and spray patterns



2011-12

- During that workshop, 15 of us sprayed whips and learned that turning off the air on an airblast sprayer isn't a good idea. **Droplets need air to disperse and carry into the crop.**
- Then we sprayed cedars and learned that there's a very good reason they are used to filter spray drift.
- That led us to two research trials and we'd like to share them with you:

Improving Cedar Applications



Improving Rose Applications



Improving Cedar Applications

- Could optimized sprayer settings improve control of two-spotted spider mite in cedars?



Improving Cedar Applications

- Through trial and error, we worked to improve coverage with a combination of droplet size, spray distribution, angle of attack and pressure.



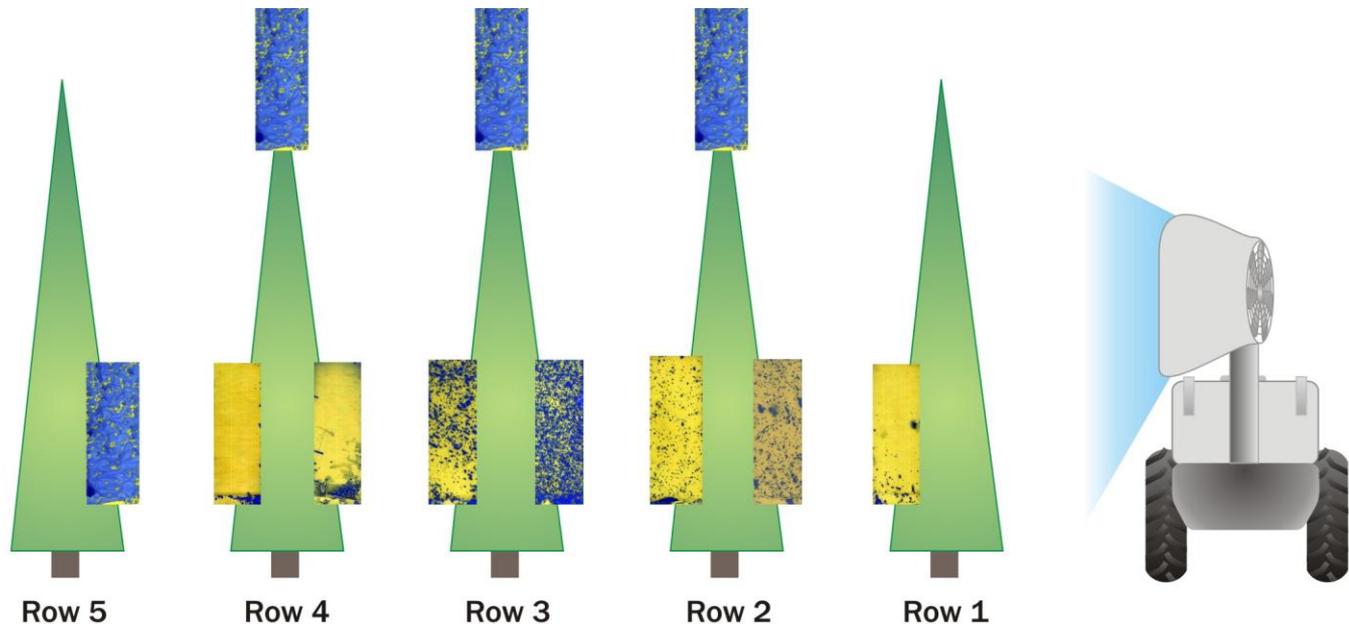
Improving Cedar Applications

- **Water sensitive paper turns from yellow to blue when wetted. Solid blue means run-off and that's too much spray.**



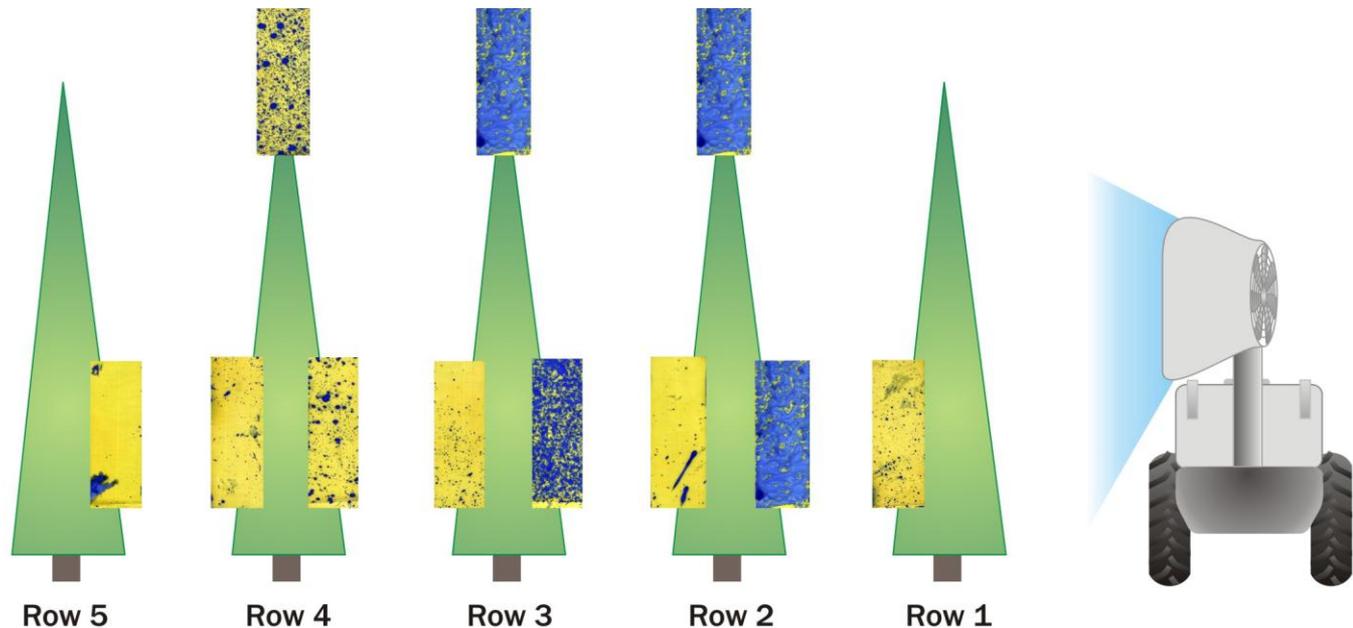
Improving Cedar Applications

- **First, we sprayed from one side.**
- **Here is the coverage achieved with the grower's native sprayer settings for 28 L/min. (7.3 US g/min.)**
- **Note excessive top-coverage, sporadic elsewhere.**



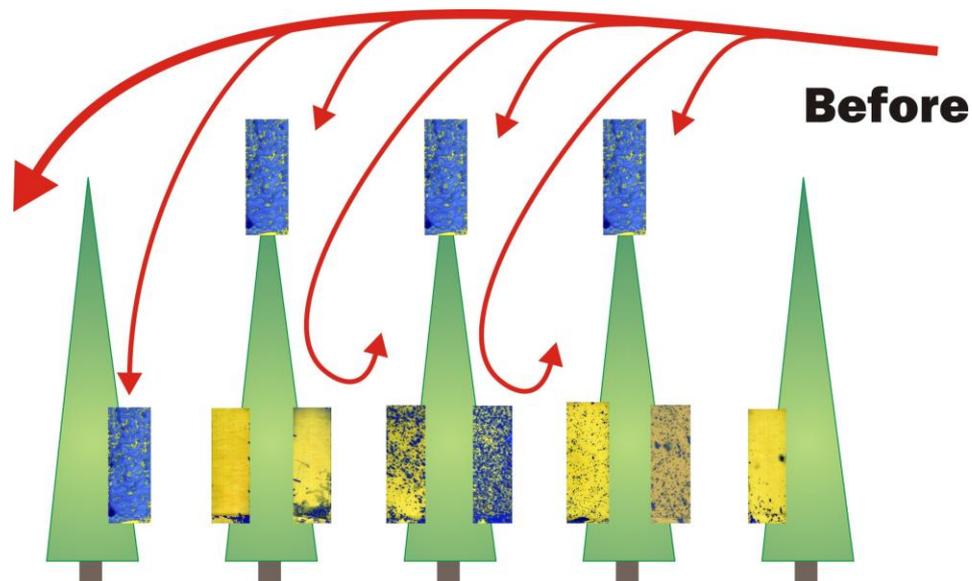
Improving Cedar Applications

- We tried a few setups until we found one we liked.
- We redistributed the spray over the boom at about the same volume of 26 L/min. (7.1 US g/min.)
- Note better spray-side coverage, less over-spray.



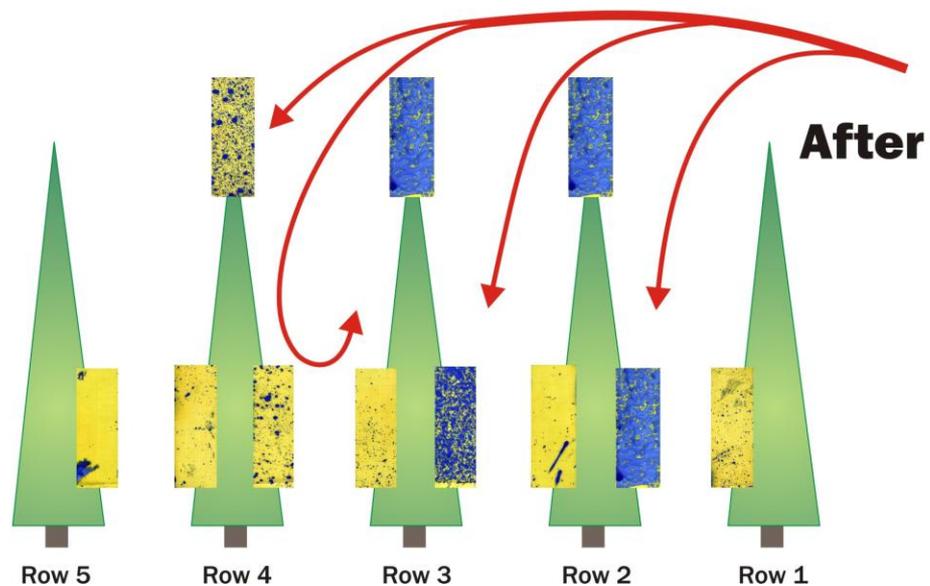
- Here they are for direct comparison.

- Lot's of overshoot before spray adjustment. There was a lot of spray that drifted away, too.

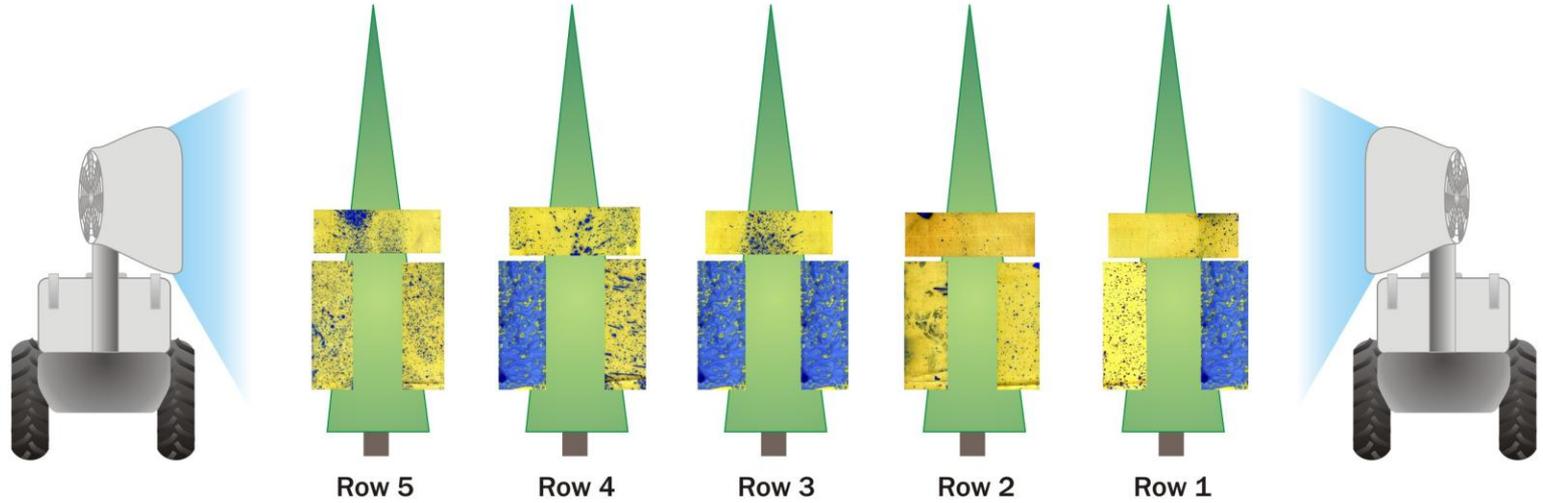


- After adjustment, the spray-side of the crop got consistent coverage, with less overshoot.

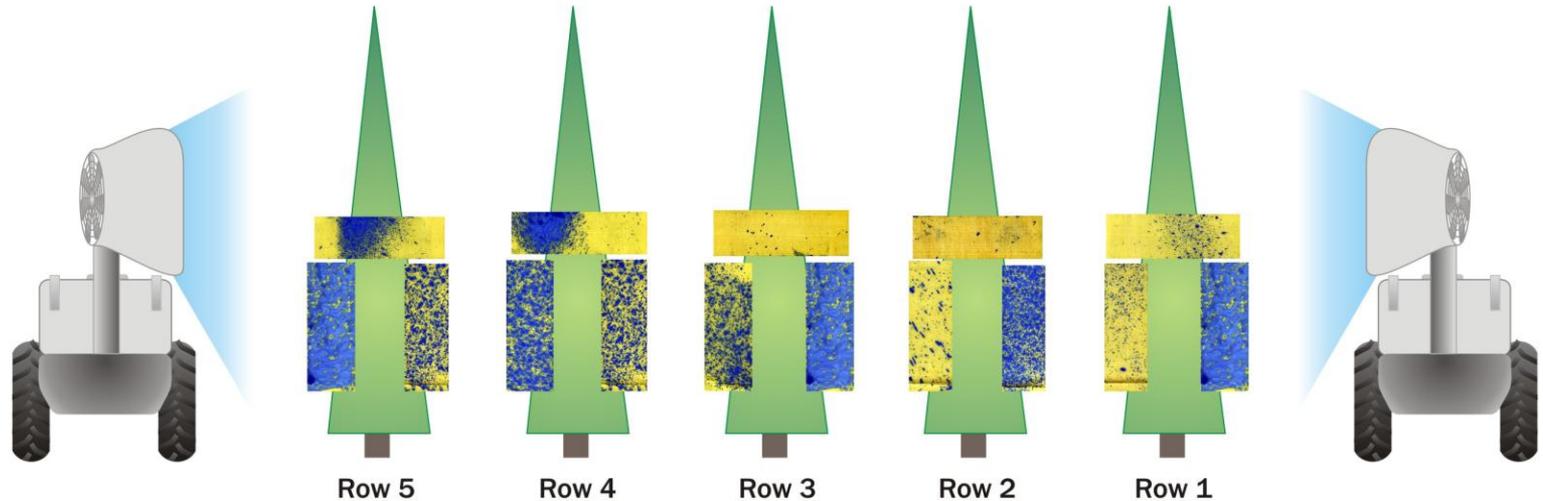
- Remember, we spray from **BOTH SIDES**, so we did that next.



26 L/min. (7.1 US g/min.). This gave good mid-tree coverage.



30 L/min. (7.9 US g/min.). This gave better mid-tree coverage, but used more spray.

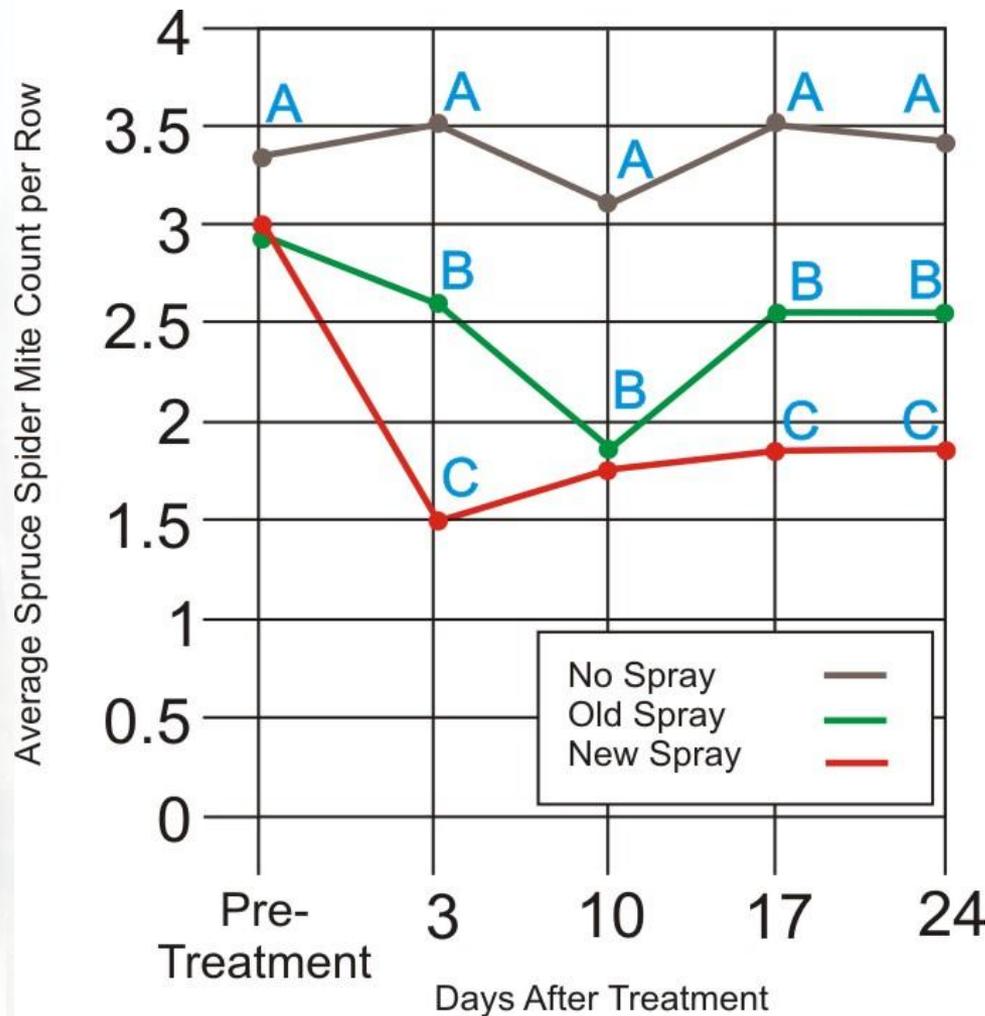


Improving Cedar Applications

- **We went with the 26 L/min. (7.1 US g/min.) set up, even though it gave less coverage, because the grower felt the volume was too high.**
- **One block was sprayed with the grower's typical setup, one block with the optimized setup and one control block.**
- **Mites were counted using a tap-test on each row, roughly every seven days following treatment.**
- **Even though the grower used about the same amount of spray, the re-distribution and improved coverage had a significant result:**



Improving Cedar Applications



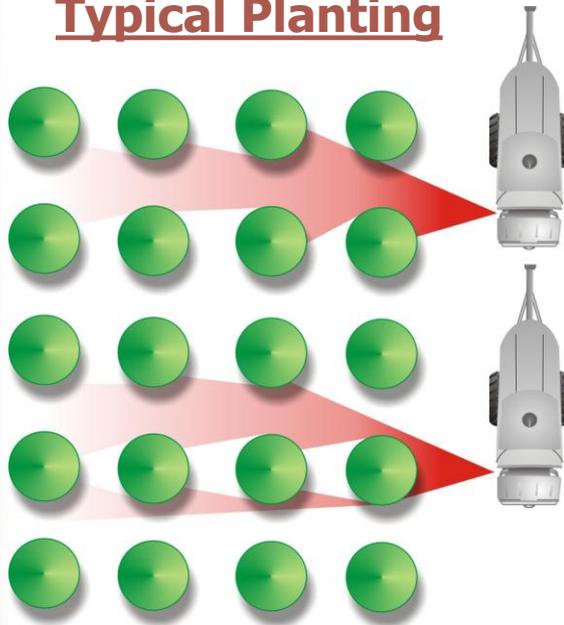
...and this didn't cost anything to accomplish except half a day's time; a one-time investment.



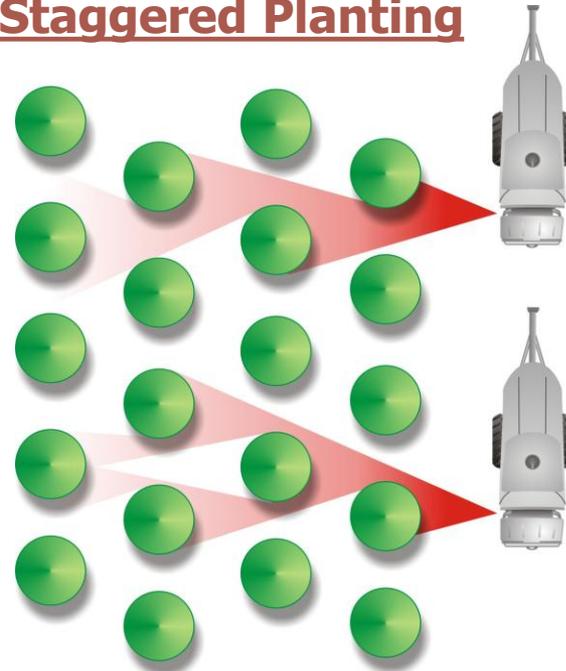
A Proposal

- “What if spray coverage in cedars isn’t just a sprayer issue?” Consider this:

Typical Planting



Staggered Planting



- I think the spray is filtered by the first row, or ends up between the trees. Let’s test this with container trees in 2012. We need a volunteer.



Improving Rose Applications

- **Could optimized sprayer settings improve control of powdery mildew and downy mildew in roses?**



Improving Rose Applications

- **First we sprayed with native settings.**



Improving Rose Applications

- Then, once again, we used water-sensitive paper to determine if we could improve the coverage.



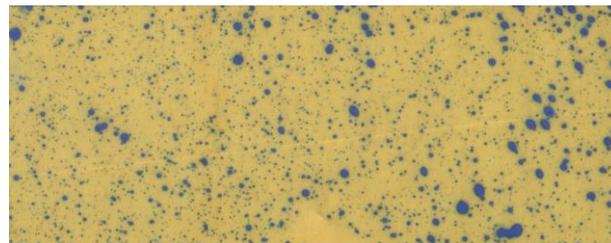
Improving Rose Applications

- **BEFORE:** Hollow cones (D4DC45) on 50 cm centres at 300 psi and 4.8 kph = 841 L/ha



- **Most cards were drenched**

- **AFTER:** Hollow cones (D3DC45) on 50 cm centres at 150 psi and 4.8 kph = 388 L/ha



- **Even distribution of ~85 drops per square centimetre**

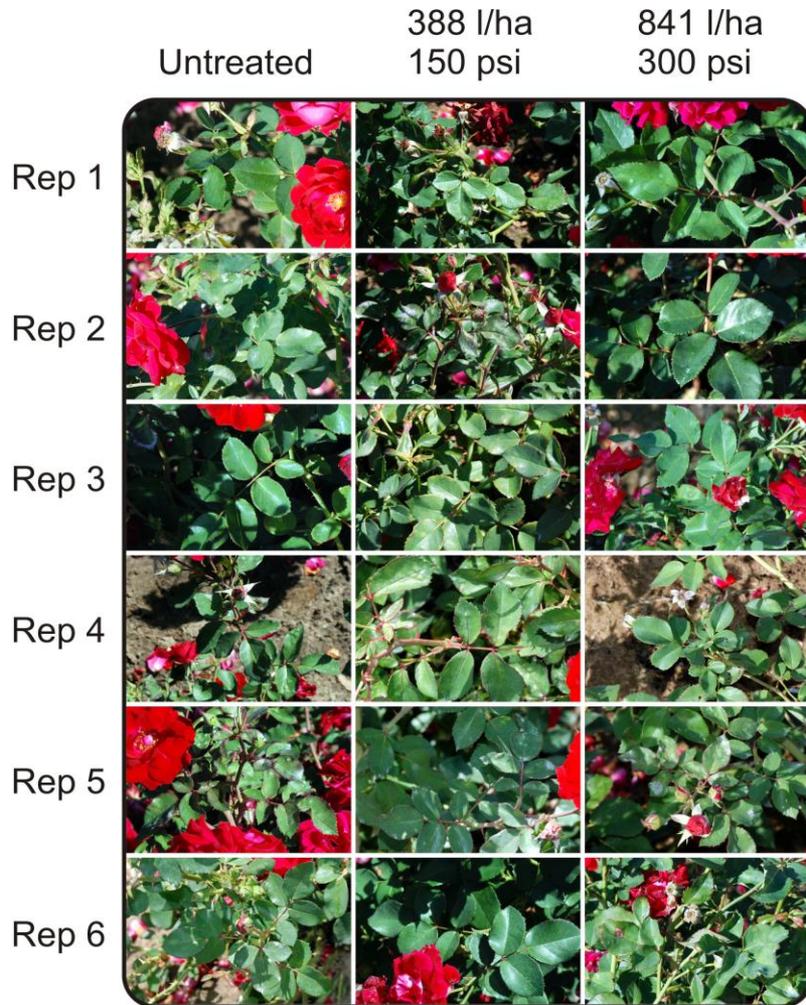


Improving Rose Applications

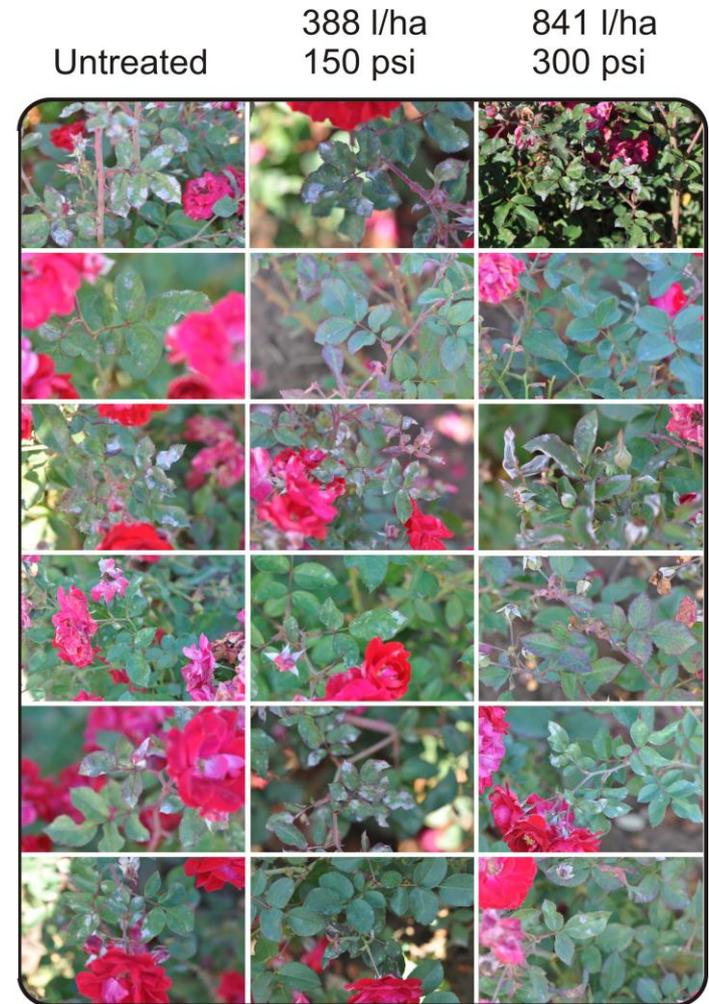
- We marked out three 65 m x 6.5 m blocks in September: an **untreated control**, **841 L/ha** and **388 L/ha**.
- Six rose plants from each treatment were photographed randomly on September 9th.
- One application of **Folpet + Nova** was made on September 19th.
- Six rose plants from each treatment were photographed randomly on September 20th.
- Leaves were digitized and the damaged area on the upper-surface of the leaves was measured as a percent-total-leaf damage.



Improving Rose Applications



September 7 (pre treatment)

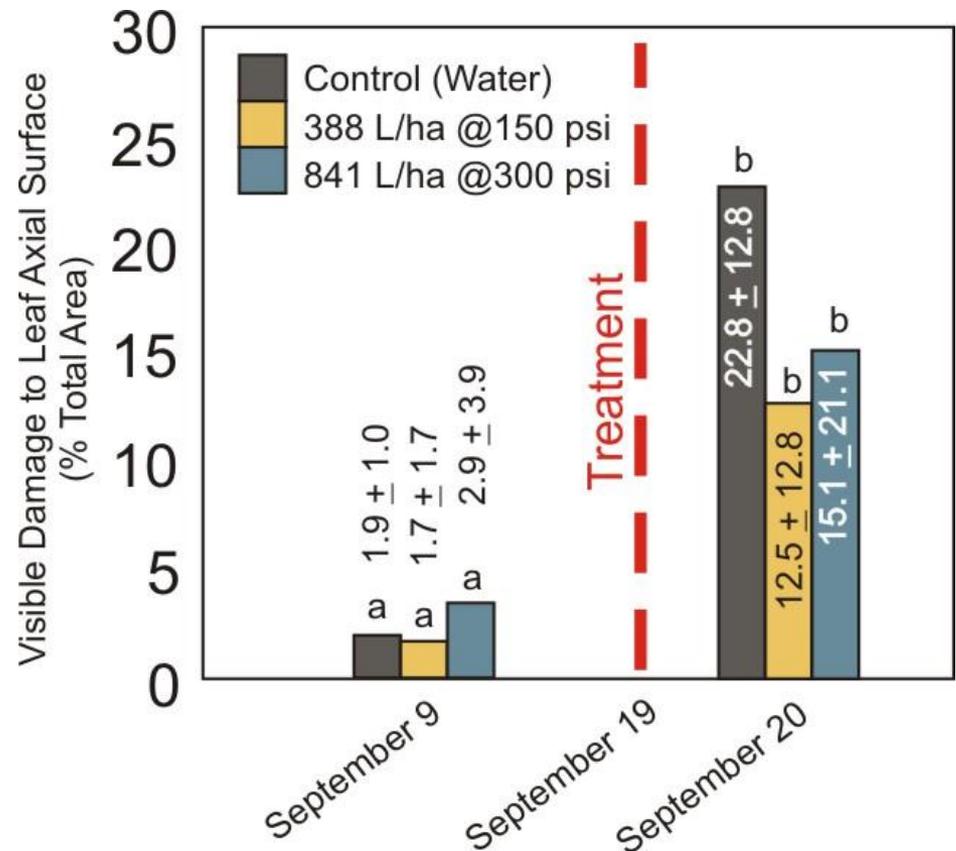


September 20 (post treatment)



Improving Rose Applications

- There was no statistically significant difference in the visible damage between the grower's typical application setup and the optimized setup.
- That means the grower achieved the same level of control with half the spray mix at half the pressure.
- **THIS IS NOT PERMISSION TO BLINDLY CUT YOUR RATES!**
You have to test coverage and efficacy!



2012 Airblast 101 Workshop Series

- **An interactive classroom workshop that includes hands-on demonstrations and dialogue that will provide you with tips on airblast sprayer calibration, maintenance and how to adjust your sprayer to match the crops you spray.**

February 27, 2012 – Brighton

Codrington Community Center: 2992 Highway 30

February 28, 2012 – Simcoe

Best Western Little River Inn: 203 Queensway West

February 29, 2012 – Vineland

OMAFRA Vineland Resource Centre: 4890 Victoria Avenue North

March 1, 2012 – Harrow

Greenhouse and Processing Crops Research Centre:

2585 County Road 20

- **\$20.00 at the door**
- **8 am – 12 pm and lunch is provided**
- **Bring your pressure gauge for testing**
- **Receive a 120 page bound workbook**
- **CCA credits issued**

**Space is limited
so register soon!**

**Call Nancy @
416.622.9771**



Thanks!



**SERIOUSLY
guys, I feel
tingly!**

