

Cultural Practices & Spray Application Factors that Reduce SWD Damage

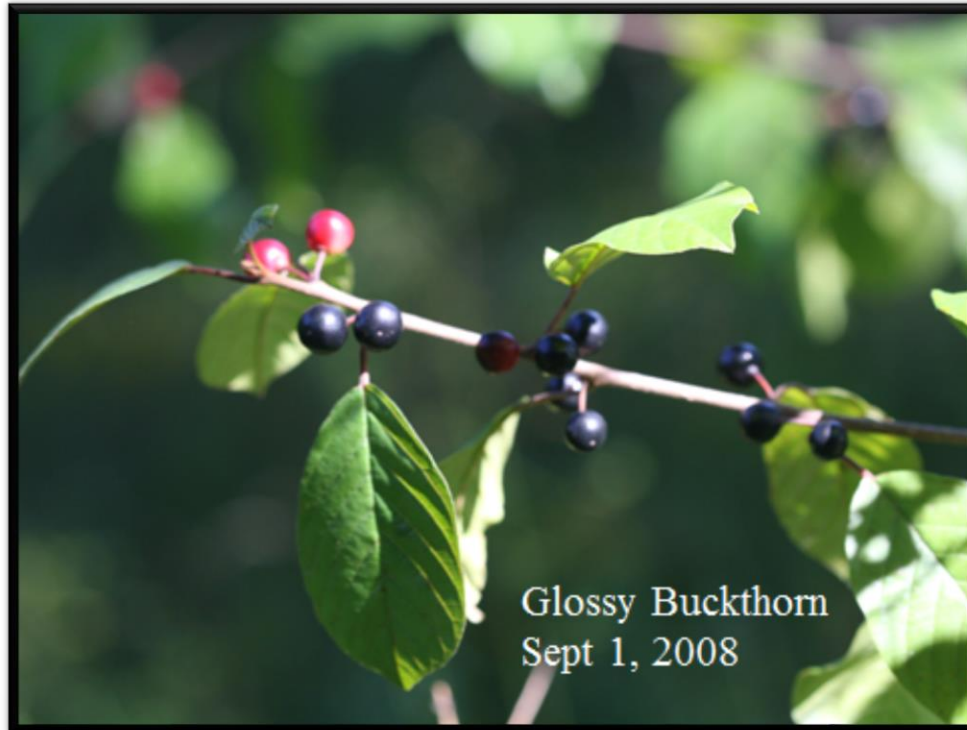
**George Hamilton
Extension Field Specialist
University of New Hampshire
Hillsborough County**

Where is the pest ?

- Wild host plants (e.g. wild brambles, chokecherry, dogwood... almost anything with berries)
- Cull piles
- In the **lower regions of the canopy** because they prefer moderate temperature, shade and humidity

Wild Hosts

Glossy Buckthorn



Wild Hosts

Autumn Olive



Alan Eaton, UNH

Wild Hosts

Kousa Dogwood



Alan Eaton, UNH

Wild Hosts

Pokeweed



Alan Eaton, UNH



Alan Eaton, UNH

Wild Hosts

Porcelainberry



Alan Eaton, UNH

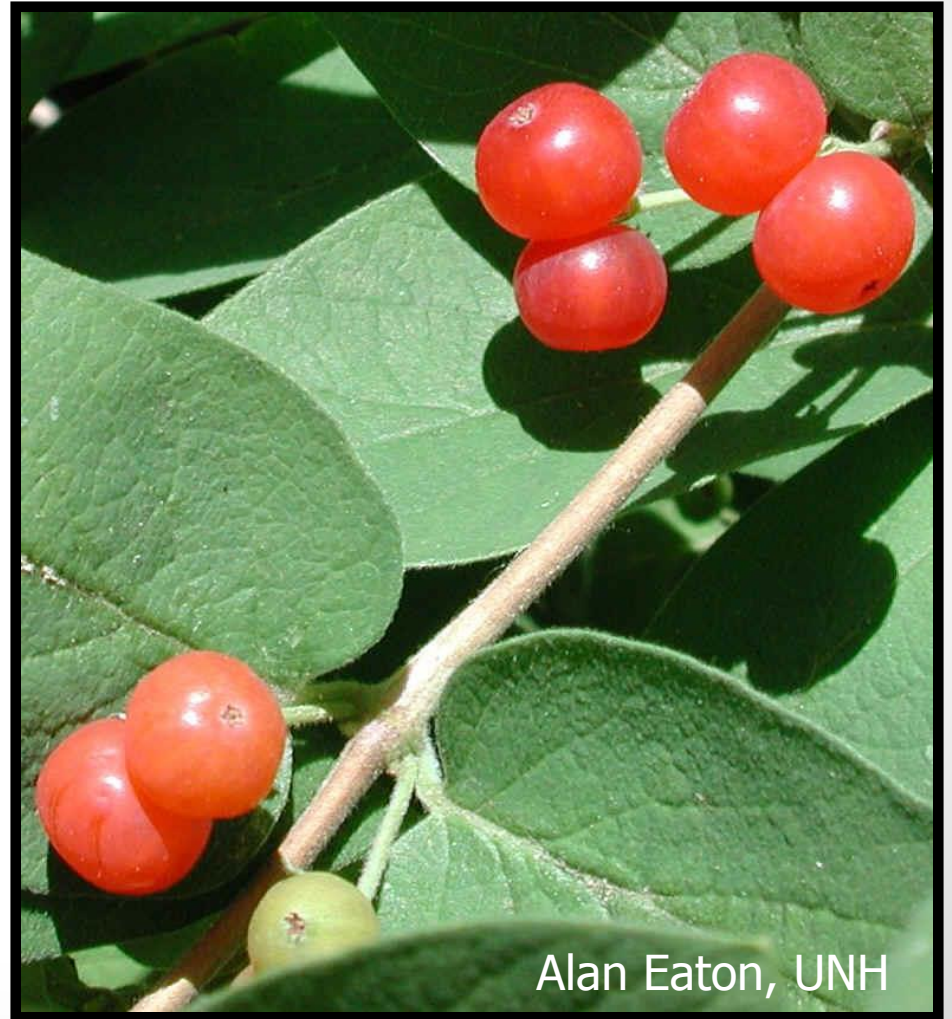
Wild Hosts

? Tartarian Honeysuckle ?

Mixed results in
Northeast states.

Some studies showed
lots of SWD's in the
fruit.

Others...few.



Alan Eaton, UNH

Wild Hosts ? Nightshade ?



Although I've seen SWD's on fruit of deadly nightshade, holding the fruit in a rearing cage produced no SWD's.

Alan Eaton, UNH

Destroying nearby sources

Nearby wild fruit plants might help breed huge numbers of SWD to then attack your crops.

If they fruit BEFORE your crop, eliminating them might help a lot:

Brambles

Inkberry (pokeweed)

Kousa dogwood

Blueberries

Glossy buckthorn

Pruning

SWD adults seem to prefer relatively high humidity, and leaf cover.

Dense canopies are perfect for heavy attack.

By pruning to open up the canopy a bit, you make it less favorable for the adults, and also allow better spray penetration to the interior.

Variety Selection

In general, early-ripening varieties suffer less attack than late varieties.

We have some evidence that suggests some white peaches are especially prone to attack.

In grapes, colored, thin-skinned varieties seem to be attacked more than tougher-skinned or green (“white”) grapes.

We do not have enough experience with plums, currants or cranberries to evaluate varietal differences.

Destroy Damaged Fruit

- If feasible, pick and destroy fruit that appear damaged to reduce the chance of SWD buildup.
- To destroy them, either freeze and then dispose of them, or deeply bury and cover them.
- Simply dumping them does not kill the immatures inside.

Harvest

- Early harvest of fruit can be important in reducing exposure of fruit to the pest. Begin harvest as early as you can and continue to remove fruit as soon as they ripen.
- Scheduling timely harvests and removing over-ripe fruit from fields to minimize host plant resource for SWD to lay eggs into and for larvae to develop on.
- Send pickers through fields with buckets to collect good fruit and another container on a waist belt to collect over-ripe fruit to help remove these resources for SWD reproduction.
- In small fields this can be done by hand, but that may be impractical in large farms. A final cleanup picking to remove the last berries from the bushes may be worthwhile, but this approach has not yet been evaluated.

Netting

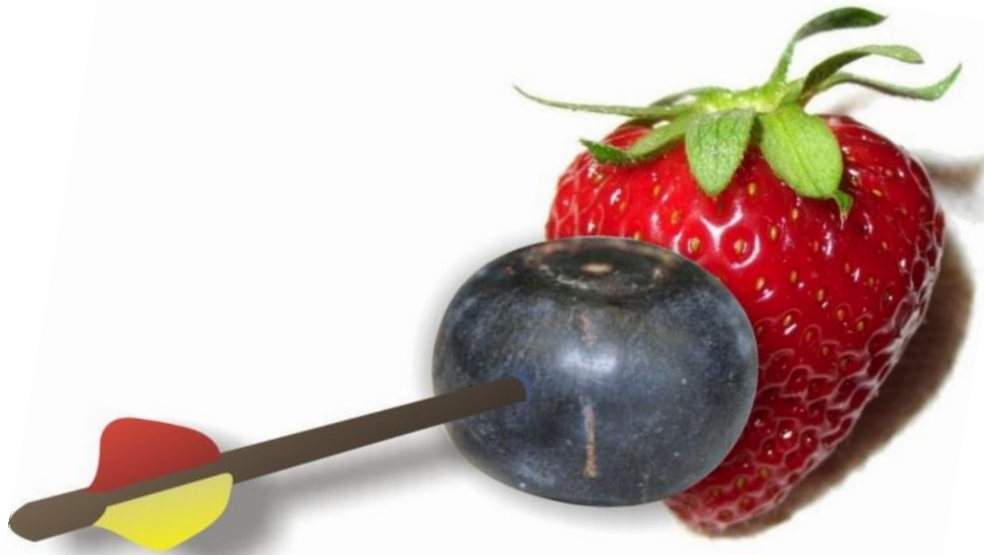
- If you can completely enclose your crop in netting with openings no larger than 0.9mm, SWD adults cannot get inside.
- One problem is setting up a door to allow repeated entry for picking, yet not allow the flies to get in.
- Netting the crop with mesh this fine will increase the temperature and relative humidity inside, and might (?) significantly reduce the amount of sunlight reaching the plants.

Training Raspberries

- Maintain narrow rows
- Trellis raspberry plantings
- Thin both summer and fall raspberry plantings

Hitting the Target

- when spraying berries -



Hitting the Target

- when spraying berries -

First, compare when SWD appears to what the plant growth is at the time?

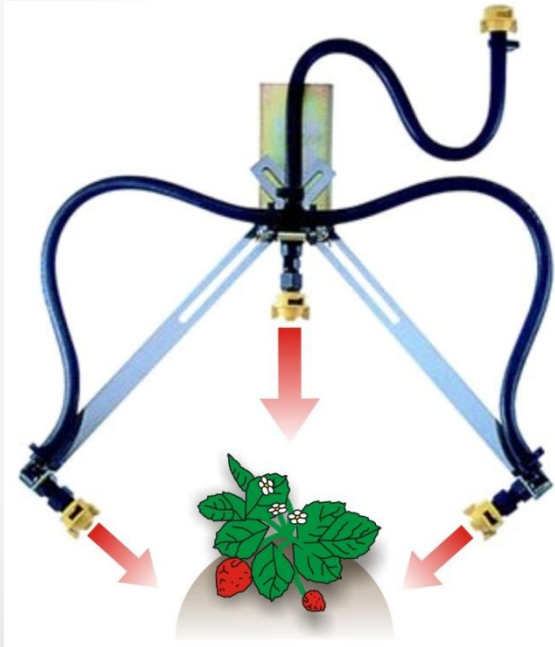
Spray Volume - strawberries

- In 2011, Pam Fisher, from Ontario surveyed strawberry growers about application volumes
- For miticides and insecticides, it ranged from 27 to 80 gallons/acre
- We know it should be more

- Cornell's Laura McDermott and Andrew Landers ran trials a few years ago and found increasing the volume over the season improved foliar coverage
- They increased from 40, to 80 to 106 gallons/acre over the season

Nozzle Location - strawberries

- In Norway and New York, they promote multiple nozzles (3 to 5) on row kits to improve canopy penetration – works well on level ground

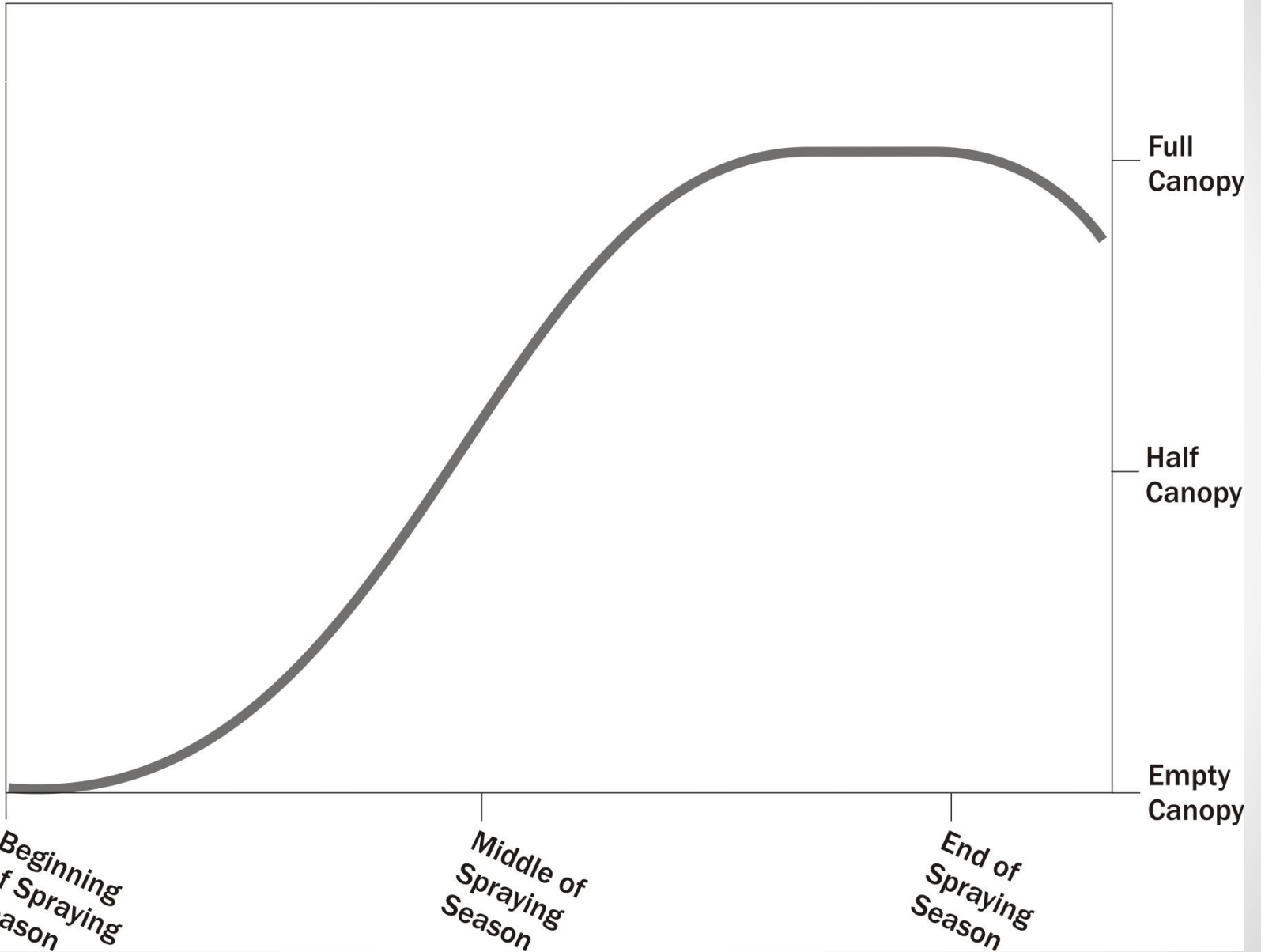


Spray Quality- strawberries

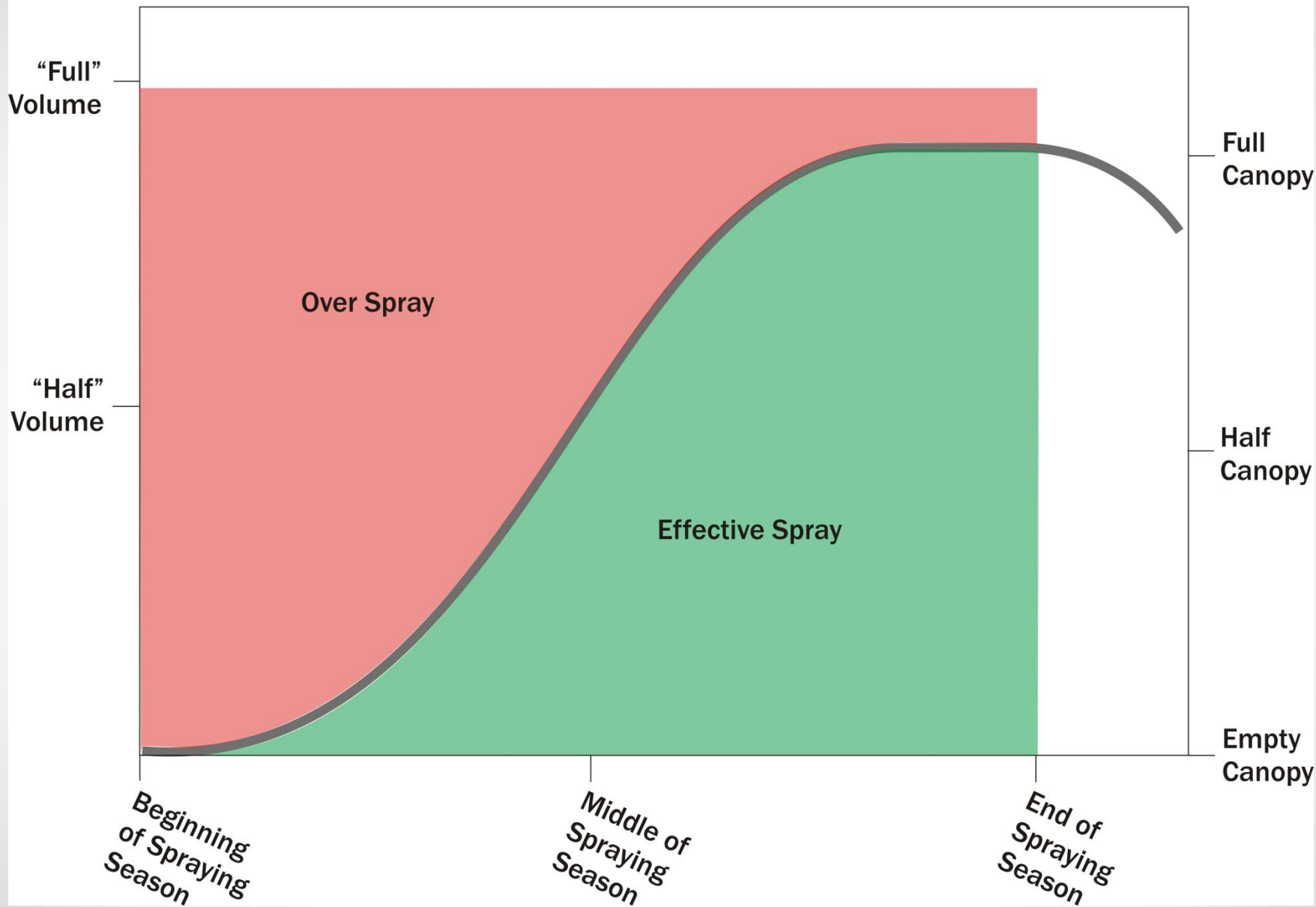
- In New York, they used **02 and 03 flat fans** at 75 psi to improve canopy penetration. That's fine-medium droplet size
- Jason Deveau from Ontario, worked in field tomatoes and found **hollow cones** (fine) did the best job of coverage, but caused a lot of drift without air assist (*again, > 80 gallons/acre helped*)



Canopies Fill and Develop Over the Growing Season



Canopies Fill and Develop Over the Growing Season



“Full”
Volume

“Half”
Volume

Over Spray

Effective Spray

Full
Canopy

Half
Canopy

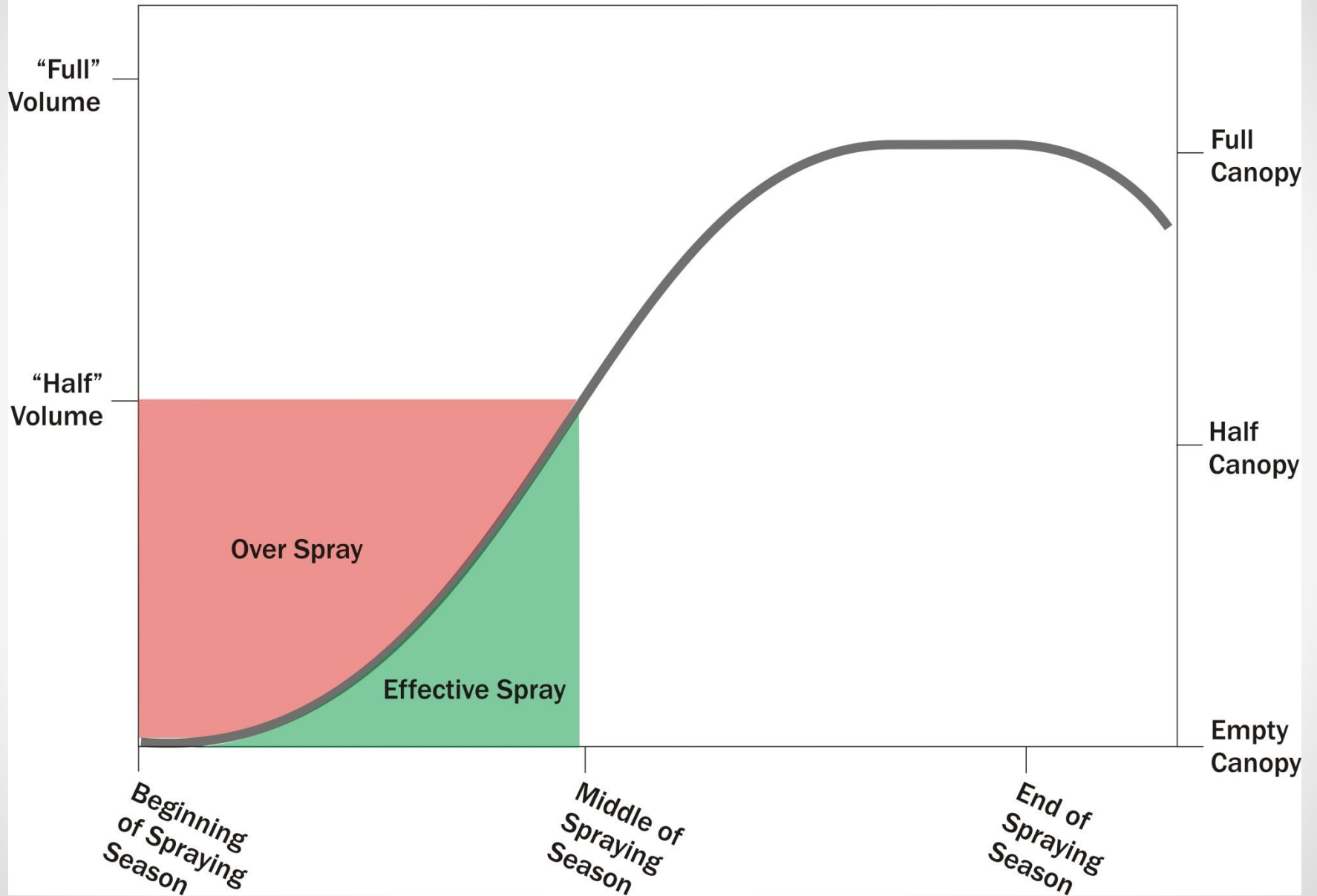
Empty
Canopy

Beginning
of Spraying
Season

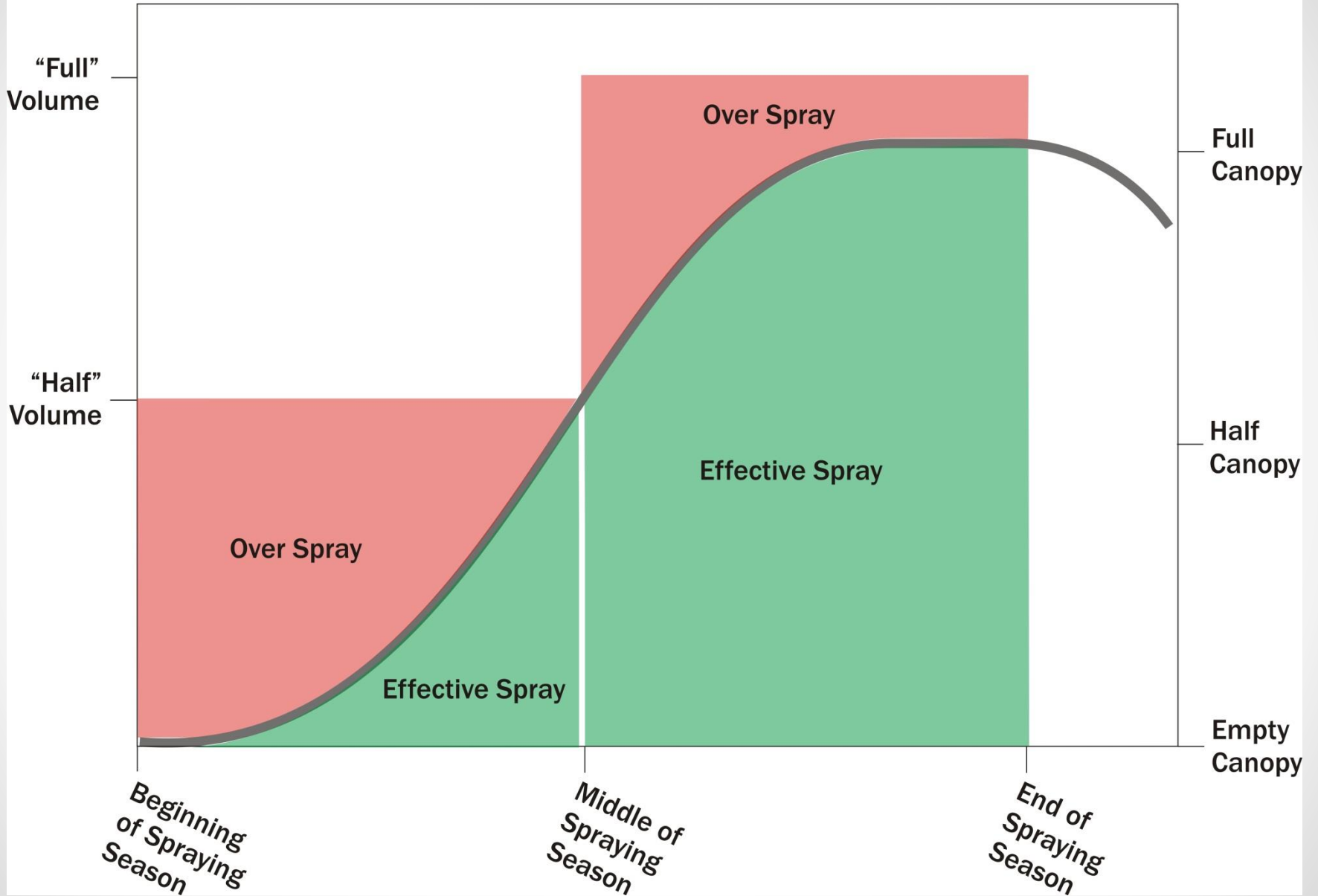
Middle of
Spraying
Season

End of
Spraying
Season

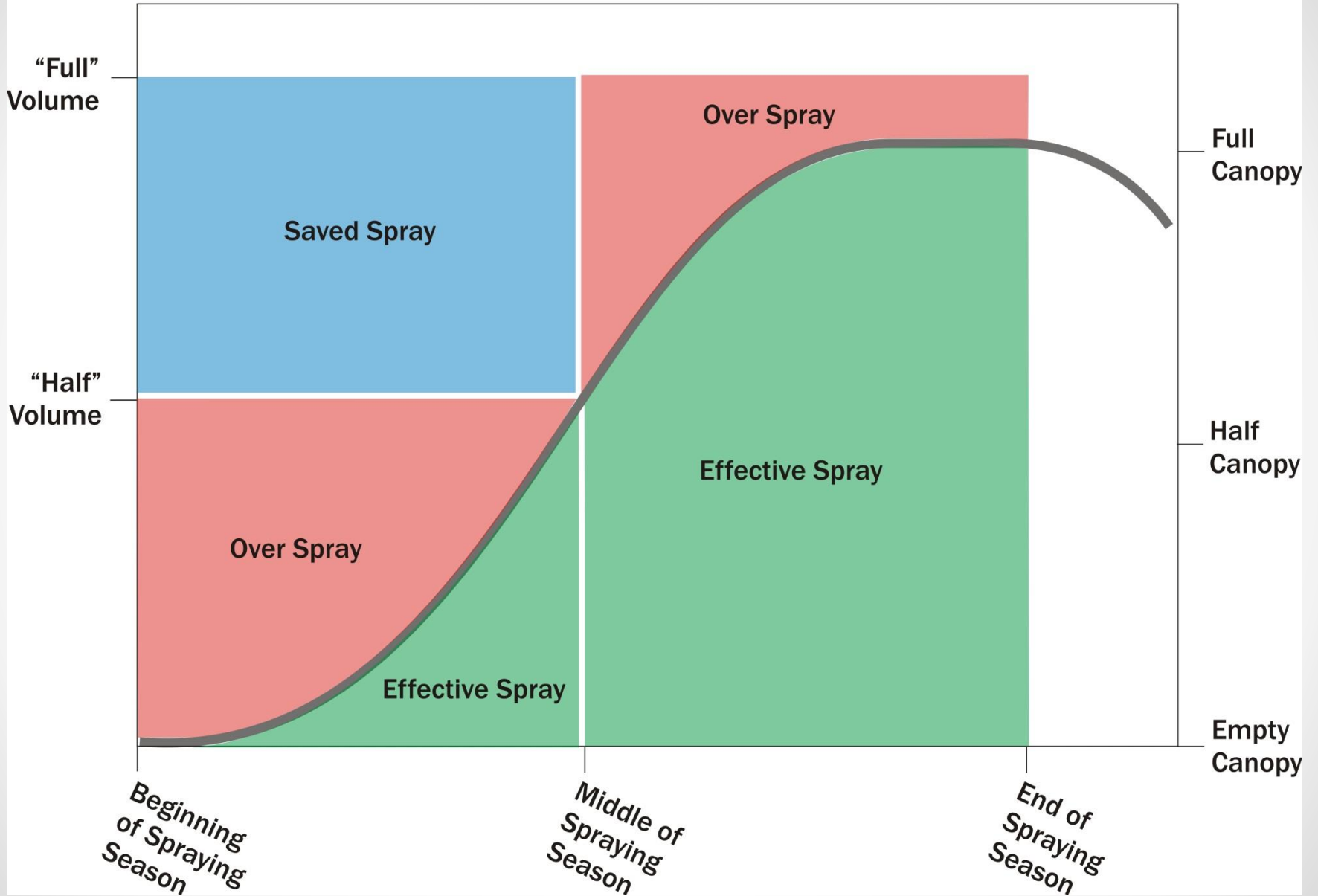
Canopies Fill and Develop Over the Growing Season



Canopies Fill and Develop Over the Growing Season

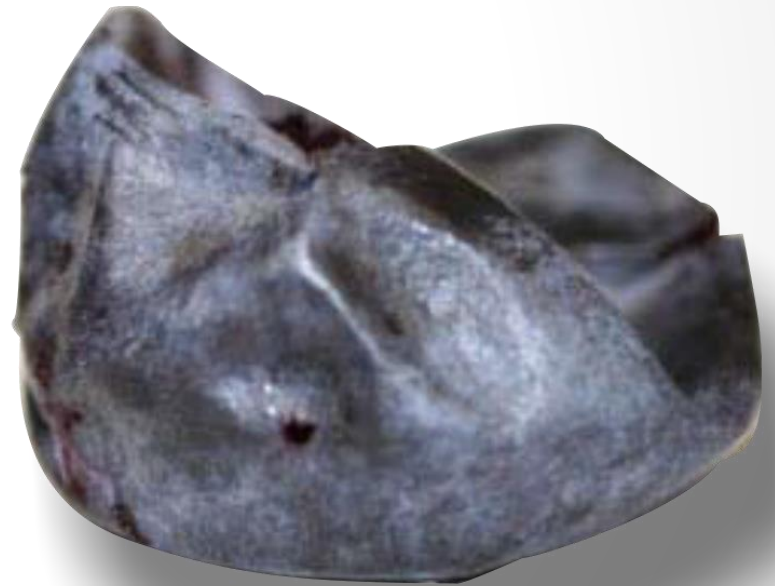


Canopies Fill and Develop Over the Growing Season



SWD Damage – canes and bushes

- You've all seen the damage SWD can wreak on cane fruit and bush berries – it's significant



*Photo Credit: V. Walton,
Oregon State University*

How to spray the lower region

Canopy Development and Spray Deposition in Highbush Blueberry

Gary VanEe,¹
Richard Ledebuhr,²
Eric Hanson,³ Jim Hancock,⁴
and Donald C. Ramsdell⁵

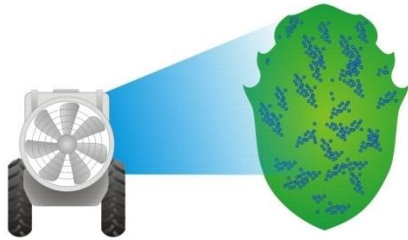
ADDITIONAL INDEX WORDS. captan, sprayer, *Vaccinium corymbosum*, fungicide, insecticide

SUMMARY. Most highbush blueberries (*Vaccinium corymbosum* L.) in Michigan are treated annually with fungicides and insecticides with several types of sprayers. The goal of this study was to determine how sprayer type, pruning severity, and canopy development interact to affect spray deposition patterns. Deposition was measured as the percentage of the surface area of card targets that was covered following applications of black dye. Light measurements indicated that the canopy of blueberry bushes, regardless of pruning treatment, closed by the middle of June, and light levels within the canopy changed little from then until fruit harvest in August. A standard airblast sprayer that pushed spray up and

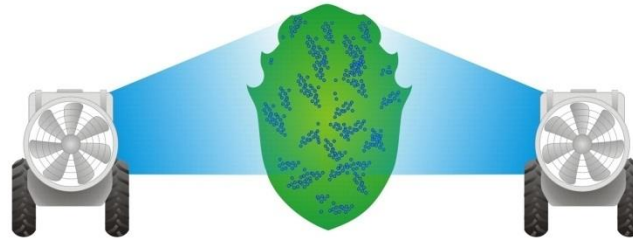
Gary VanEe
Richard Ledebuhr
Eric Hanson
Jim Hancock
Donald C. Ramsdell
(Michigan State)
HortTechnology
April/June 2000
pp. 353-359

Three application methods

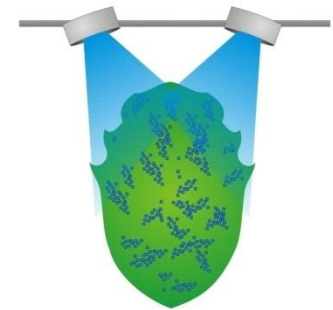
- Compared air blast every row, air blast alternate row and air-assist boom



20 gal/a

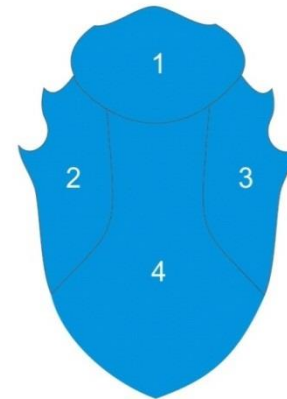


20 gal/a



10 gal/a

- Used water-sensitive paper to compare coverage in four quadrants



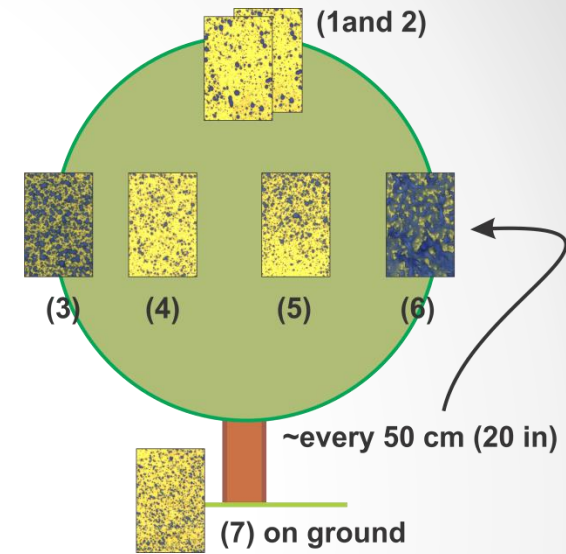
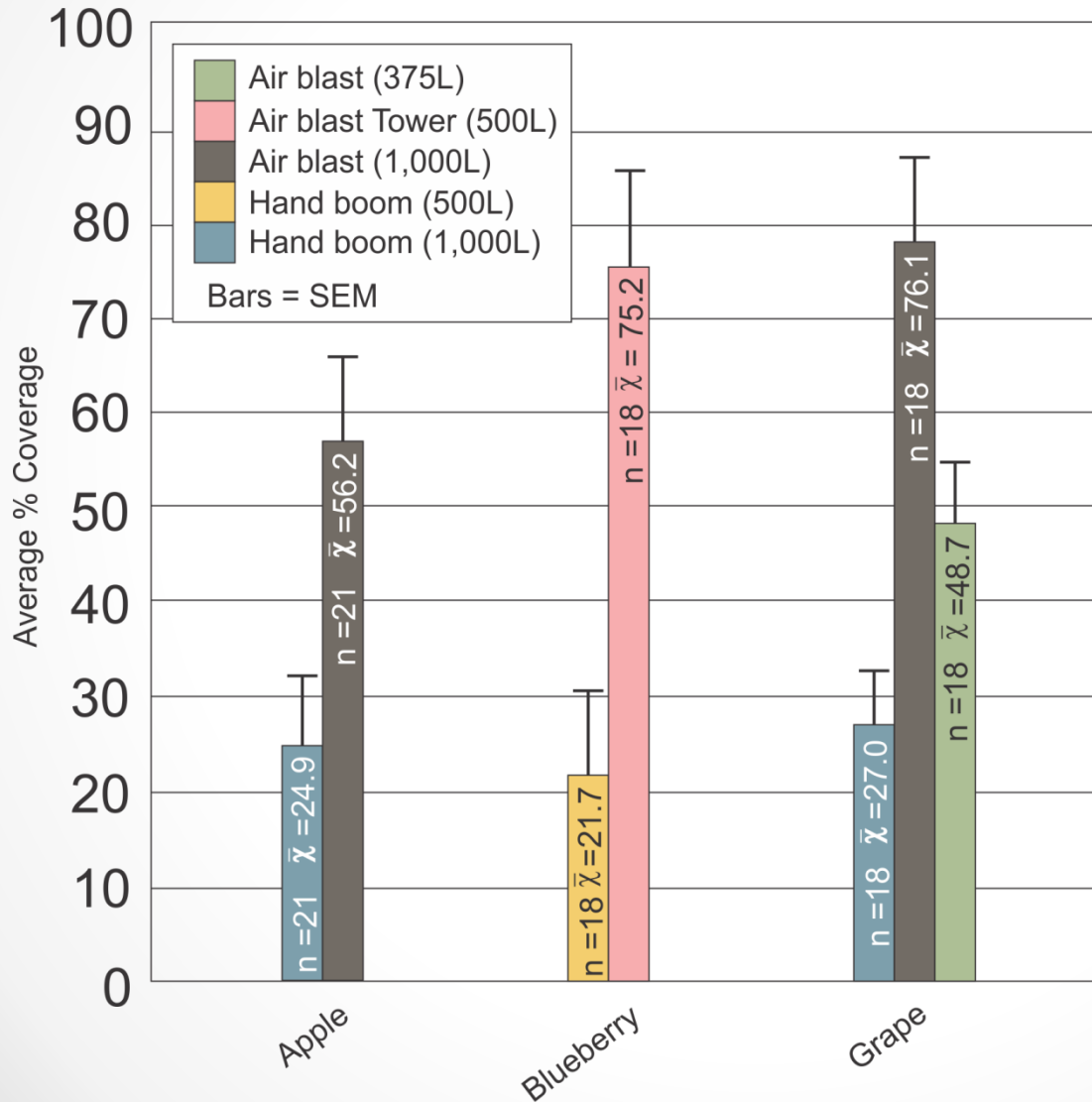
Results

- Don't drive every second row and expect consistent coverage – especially in lower regions
- Prune your canopies to let spray and air penetrate
- Coverage should be confirmed with water-sensitive paper – Especially when using booms with no air-assist or cannons covering multiple rows

Photos: M. Waring, BC Ag.



Volume depends on method and crop



(Jerseys planted 1979, sprayed in late June)

- Use the papers and aim for ~20% coverage and ~85 drops / cm² in hard-to-reach places

Are booms viable options?

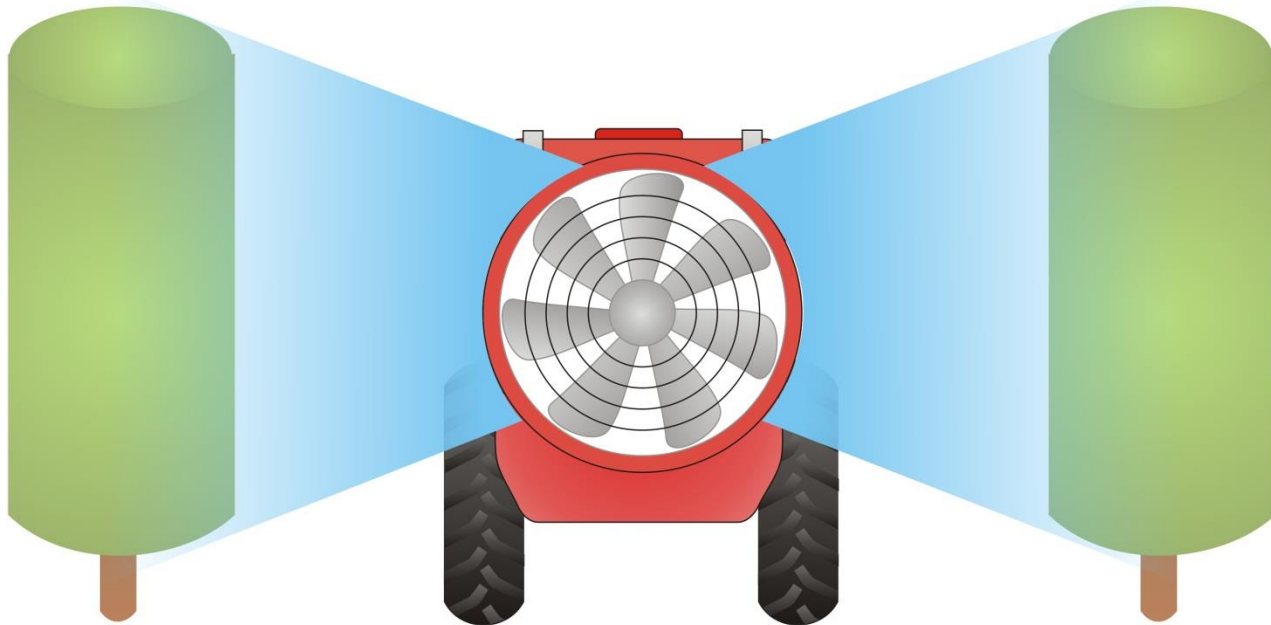


- Boom typically has no air assist
- Boom reduces trample (i.e. knocking berries off)
- Boom covers a lot of area quickly



- Based on VanEe et al. and experience with spray wands, Jason Deveau's guess is that booms may not work
- Aerial application, however, might (Rufus Issacs, Michigan State University, is exploring this)

Know your nozzles



So, this is what you see over your shoulder.

Know your nozzles

Even
Coverage



Banded
Coverage



But when you look closer, it might be this...

Too much air and volume is wasteful

A tractor is shown from behind, moving down a dirt path in a vineyard. It is spraying a very large, dense cloud of white mist or spray that fills the air around it. The mist is so thick that it partially obscures the tractor and the surrounding vines. The scene is set in a lush green vineyard with rows of grapevines on either side of the path. In the background, there are trees and a house with a grey roof.

got drift?



600 L/ha (~ 65 US g/ac)



L+1

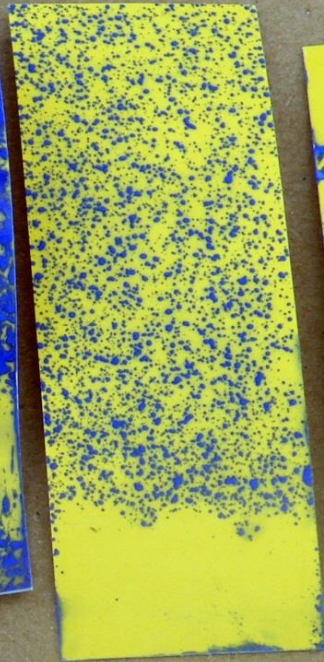


L

↑
SPRAYED



R



R+1



R+2

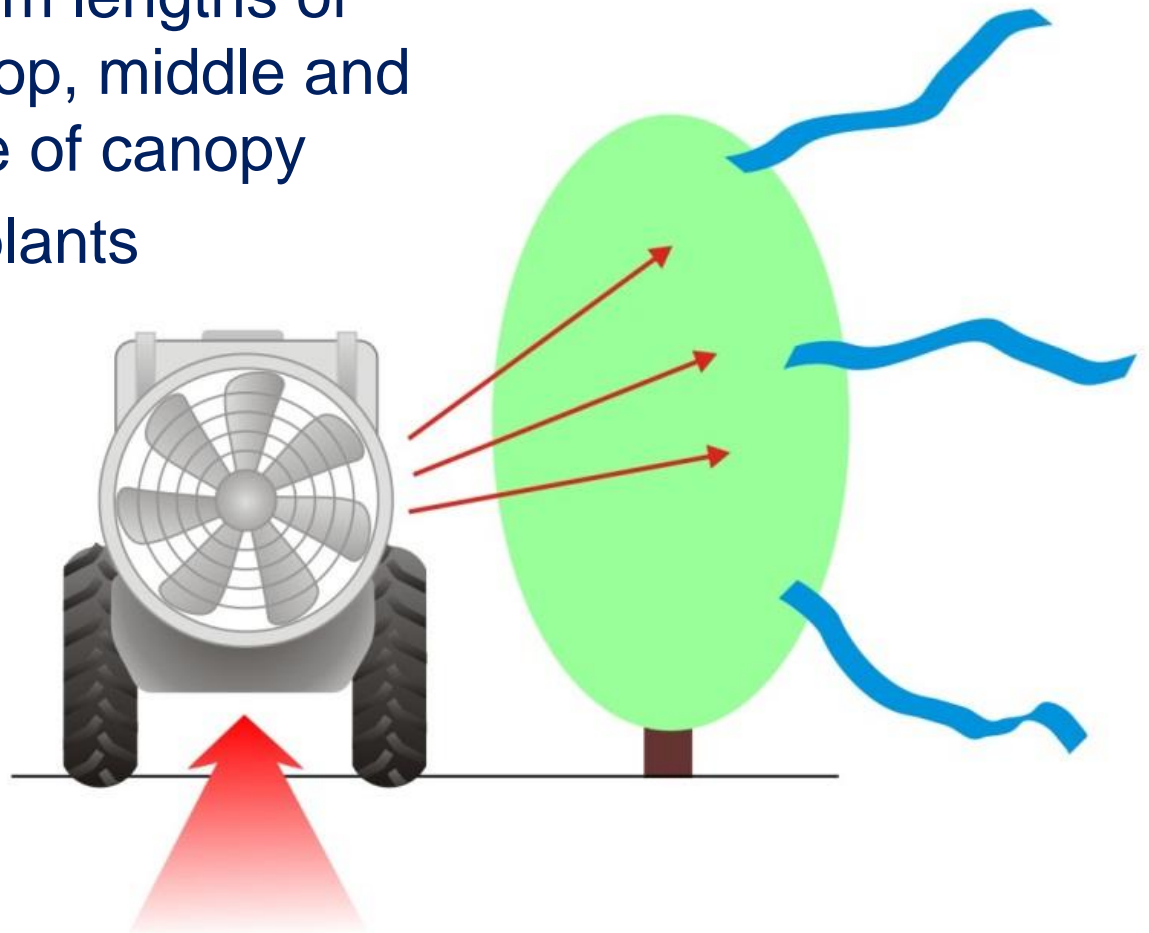
<400 L/ha (~ 42 US g/ac) using Venturi nozzles





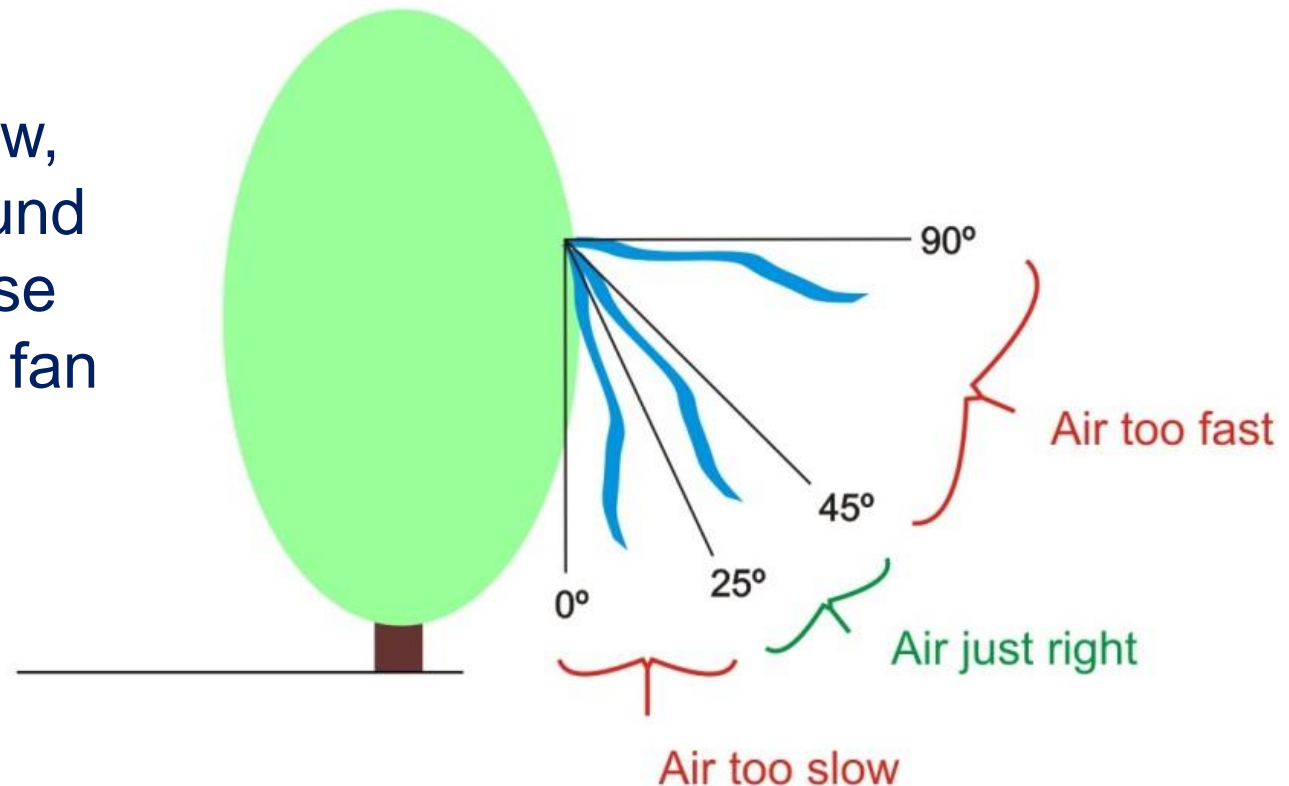
Air settings

- Set deflectors, fan gear, tractor rpm's and ground speed
- Attach three 25 cm lengths of flagging tape at top, middle and bottom of far side of canopy
- Do this to three plants



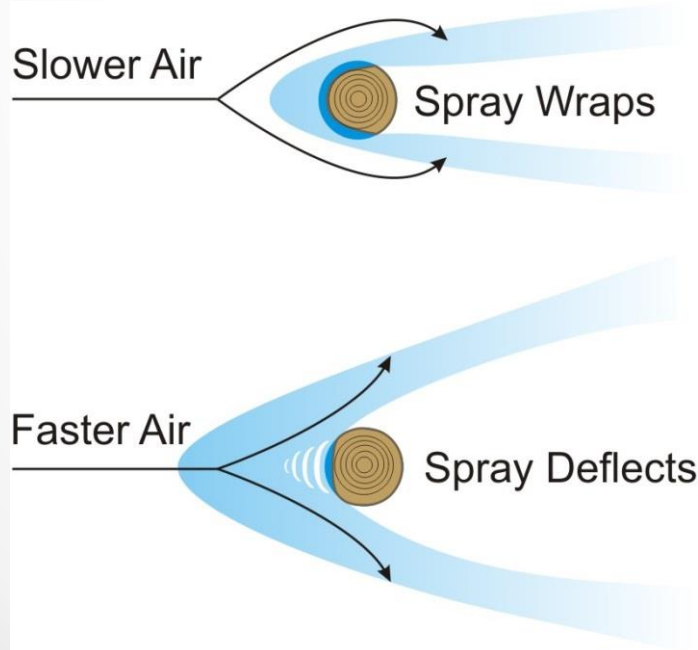
Air settings

- Have a partner observe the tape as the sprayer drives by
- If air is too fast, increase ground speed, reduce rpm's or lower fan gear
- If air is too slow, decrease ground speed, increase rpm's or raise fan gear

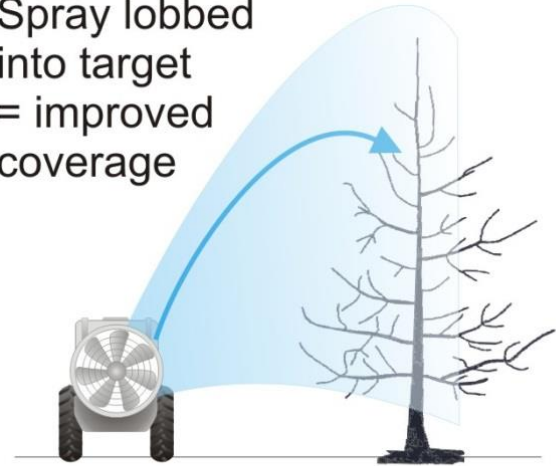


Air speed

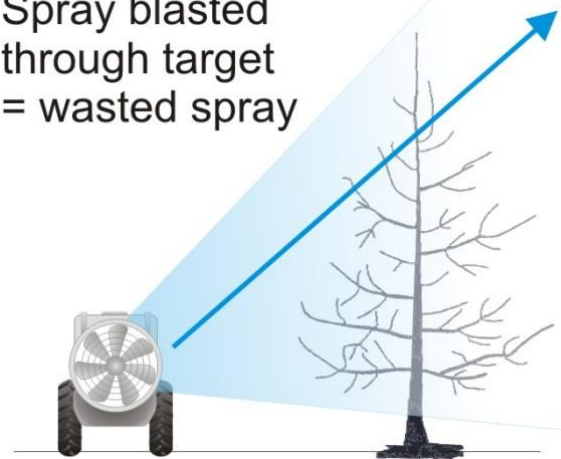
- Who says 540 rpm's is the only way to go? As long as your tractor doesn't lug, and you're using a positive-displacement pump, you can try this



Spray lobbed
into target
= improved
coverage



Spray blasted
through target
= wasted spray



Air direction

- Air carries spray – watch where it goes
- Park in an alley and compare the ribbons to your canopy
- Adjust deflectors to channel air into the canopy
- More than one crop?
Then you may need more than one setting



Use short lengths of bright ribbon. Mind they don't snap or get sucked into the air intake!

The importance of air



The importance of air



Final Thoughts



Go buy water-sensitive paper the moment this presentation is over and **USE IT!**



Buy some flagging tape and check the air flow **BEFORE YOU START SPRAYING!**



Train and Prune your Plants!

Take home



Pruning increases spray penetration and improves coverage – especially when you aim the spray at the trouble spot



Neither overhead boom nor alternate row-middle spraying are recommended for control of SWD in highbush blueberry



Use water-sensitive paper to confirm ~20% coverage. That and ribbons are your guide to travel speed, volume and air settings, which **must change** as the growing season progresses and between significantly different plantings

Check out this on-line course at www.sprayers101.ca



Classroom Course

- Practical tools for efficient and responsible spray applications
- Live instructor and hands on demos
- Fully illustrated handbook of best practices

Online Resource

- Features all handbook content in a searchable, printable format
- Additional resources: videos, fact sheets, articles, apps, and PowerPoint presentations

www.sprayers101.com
www.sprayers101.ca



PERSONALS:

♀ Fruit fly seeks ♂ Fruit fly
for short term relationship.
Enjoys romance, fermentation
and long walks on the peach...



Based on G. Pyör, 2003



THANKS TO!

Dr. Jason S.T. Deveau
Application Technology
Specialist
OMAFRA, Simcoe Station,
Ontario



Dr. Alan T. Eaton
Entomology/IPM Coordinator
UNH Cooperative Extension,
Durham

