



Sprayer Set-up and Calibration for Efficient and Safe Use of Pesticides

University of Georgia

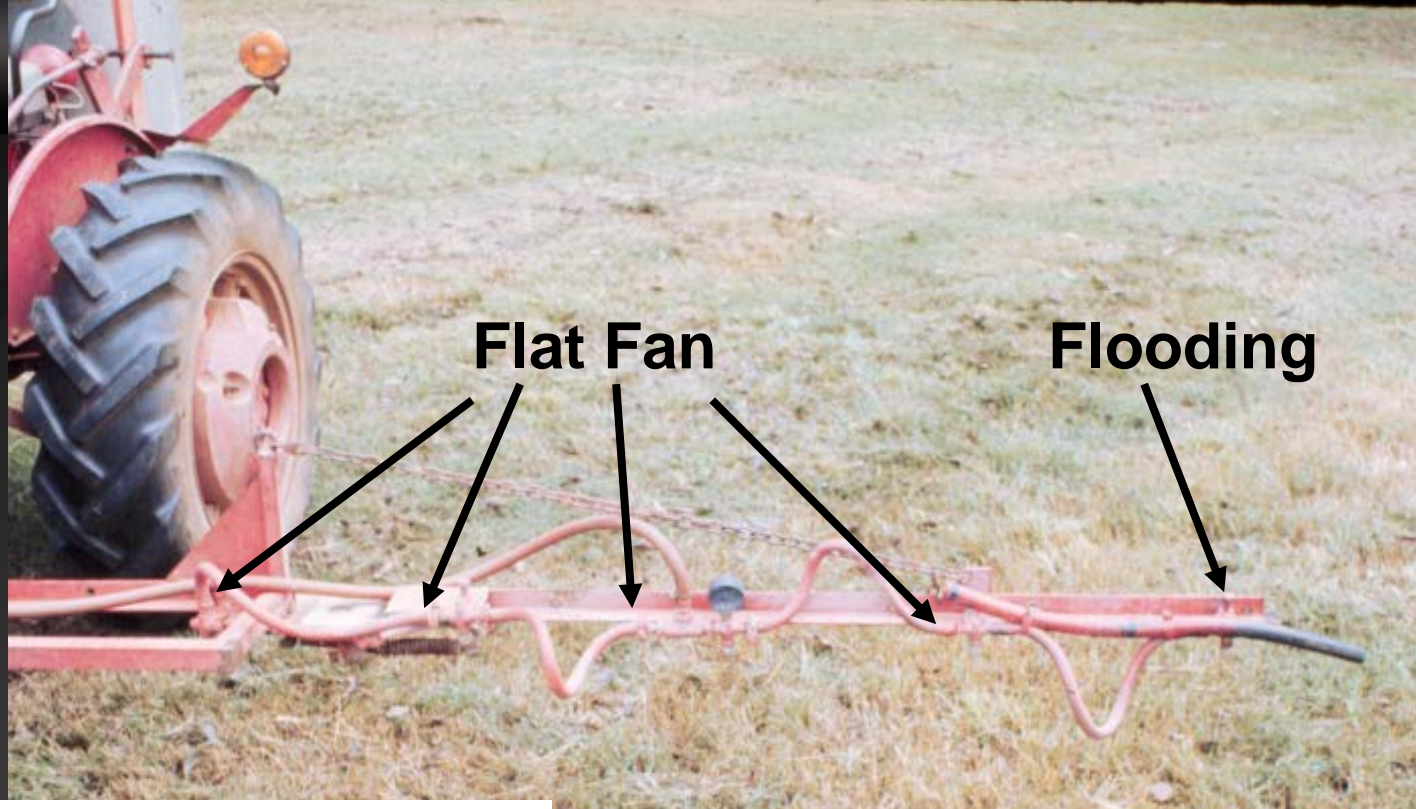


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Herbicide Sprayers



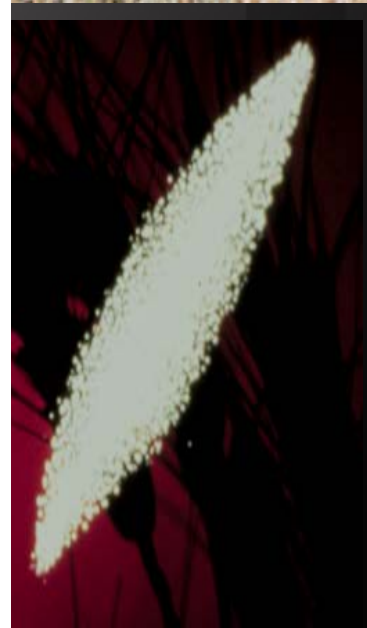
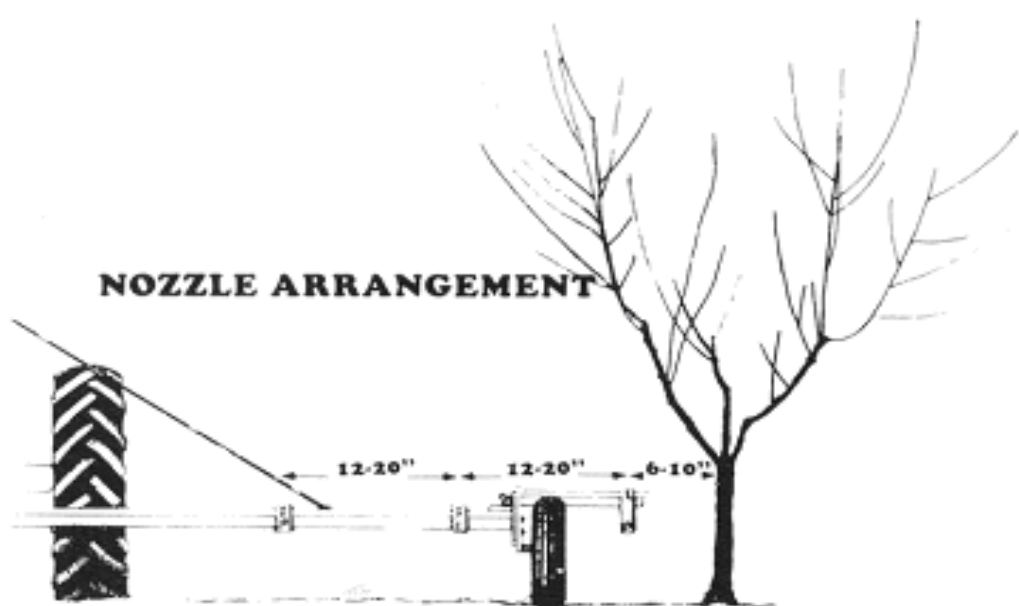


Flat Fan

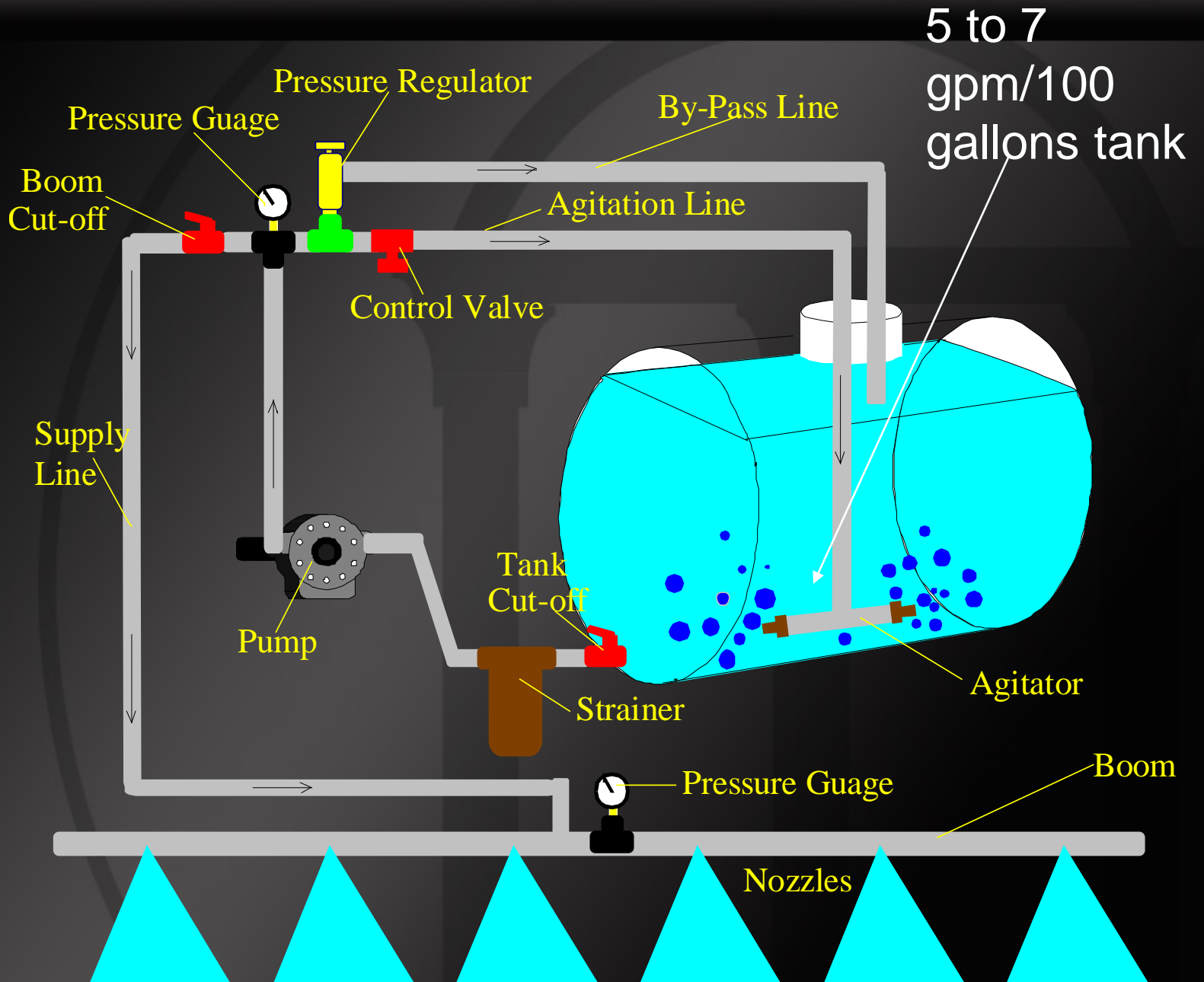
Flooding

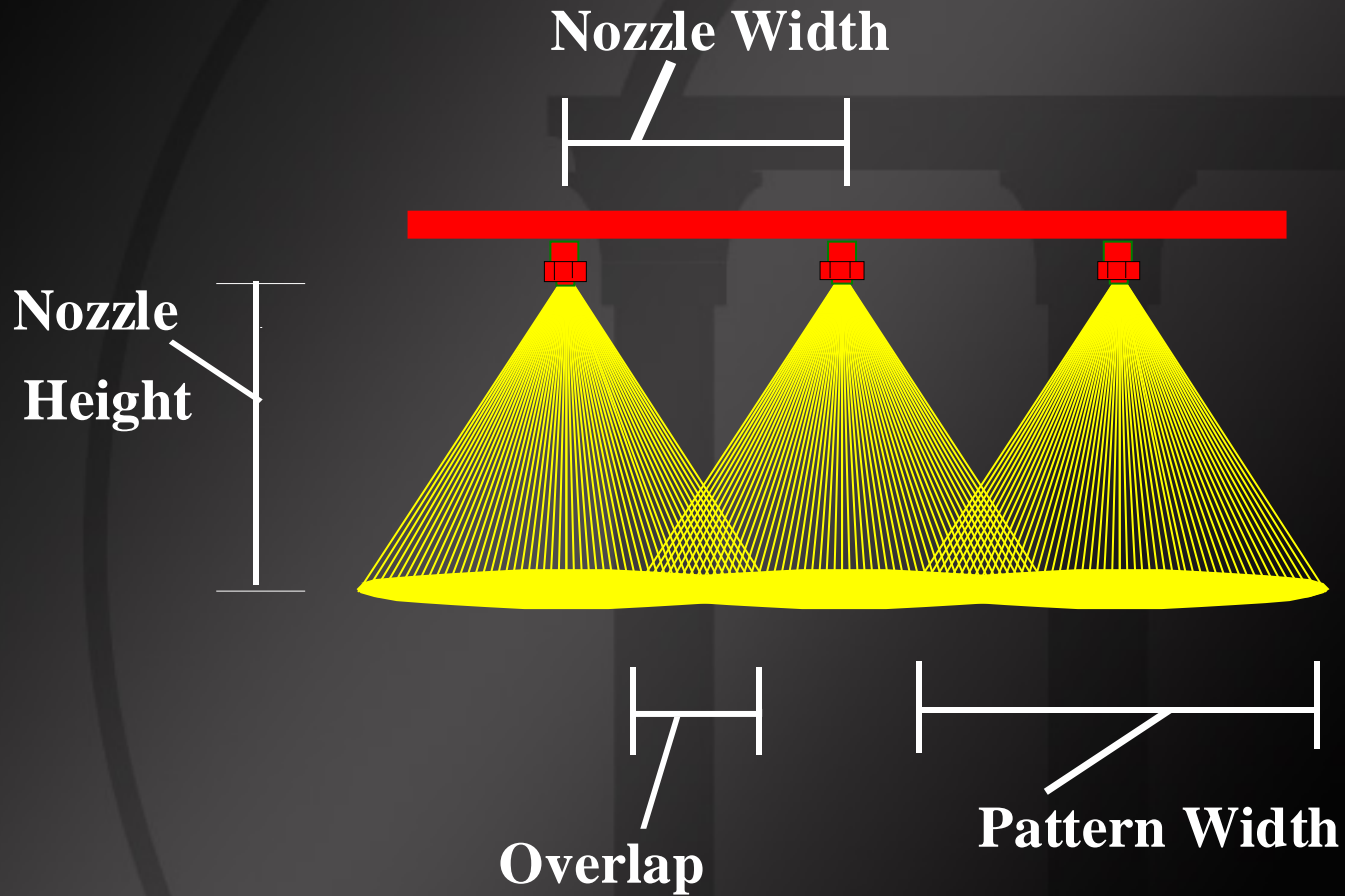
NOZZLE ARRANGEMENT

12-20" 12-20" 6-10"



Fan Type





Overlap Nozzles 40-50 Percent

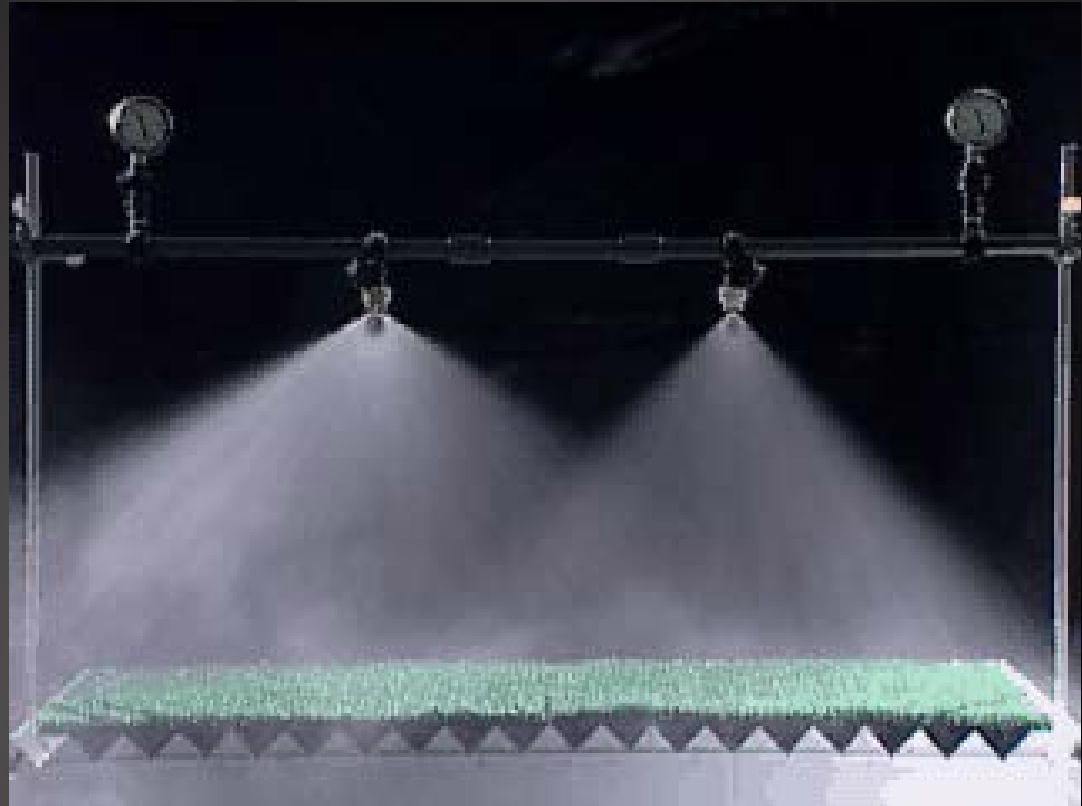


SUGGESTED SPRAY HEIGHT

<u>Angle</u>	<u>Spacing</u>	<u>Height</u>
80	20 inches	15 - 18"
110	30 inches	15 - 18"



EXTENDED RANGE FLAT FAN



110°

80°

8001



8002



8006



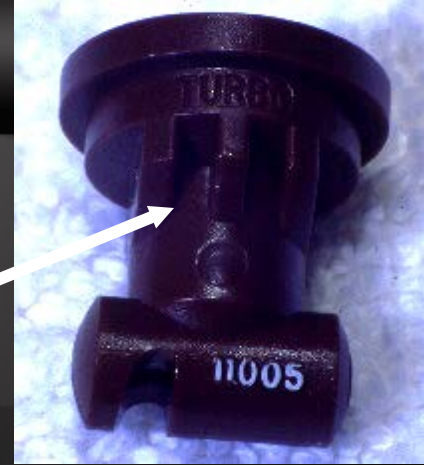


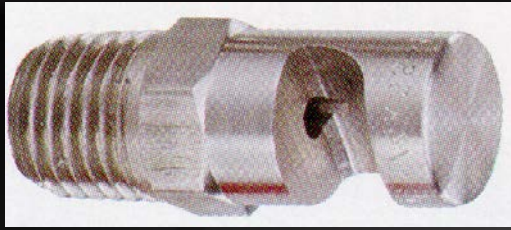
EXTENDED RANGE FLAT FAN



Extended Range

Turbo Teejet





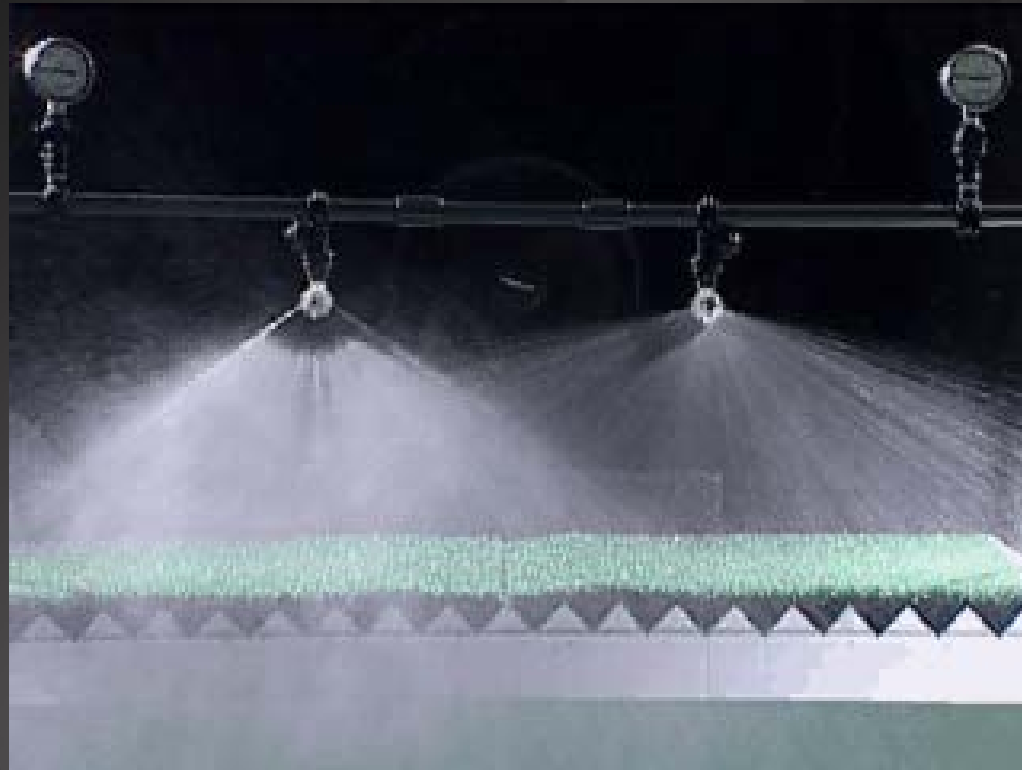
Flood



Turbo Flood



18 psi

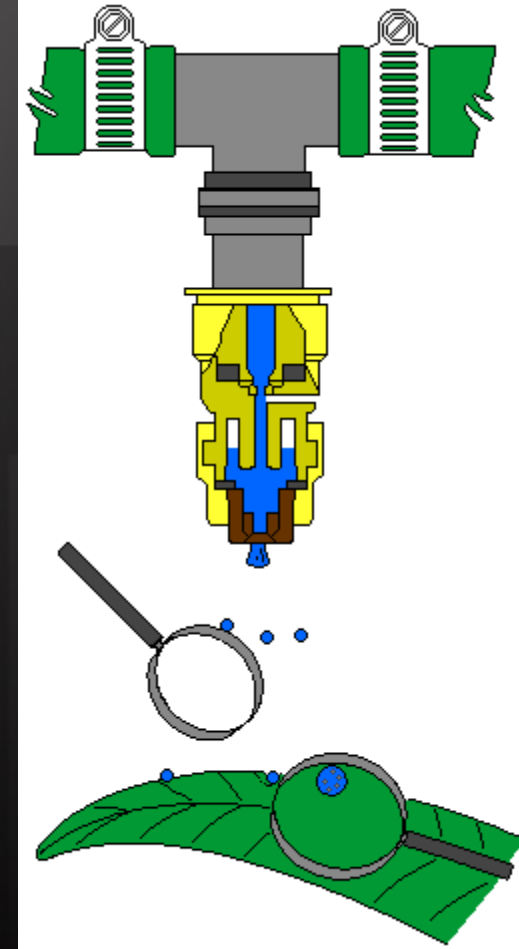




Extended Range

Air Injection

40 psi





Air Injection





Nozzle Type vs. Droplet Size

40 psi and 0.2 gpm

	(Microns)
XR 8002 Flat Fan	177
XR 11002 Flat Fan	153
Flood Fan TK-2	207
Hollow Cone TX-12	178
Turbo Flood Fan TF-2	427
Turbo TeeJet TT11002	271
Drift Guard Fan DG8002	292
Drift Guard Fan DG11002	241
Turbo Drop TD110	610

Womac et. al., 1997



Spray Solution Characteristics

A. Surface Tension

Effects droplet size, not flow

B. Density

Weight/unit volume

↑ density - flow rate decreases

C. Viscosity

Resistance to flow



Nozzle Output Method

- 1) Select appropriate distance**
- 2) Mark it off in the field**
- 3) Set throttle setting and gear**
- 4) Drive the measured distance and time in seconds**
- 5) Operate the sprayer sitting still and collect for time interval**
- 6) Total discharge measured in ounces is GPA applied**



Measure Nozzle Spacing





Calibration Distance

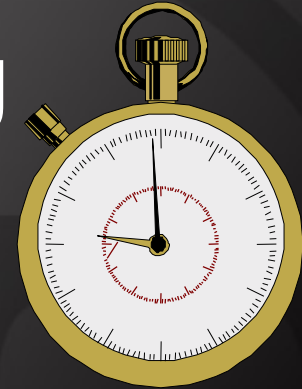
Nozzle Spacing (in)	Calibration Distance (ft)*
10	408
12	340.3
18	227
20	204
24	170
30	136

*Distance = $340 \div \text{Spacing} / 12$



20 inch Nozzle Spacing

204 feet Calibration Distance



Note Time In Seconds



Adjust Pressure



Collect for Distance Time

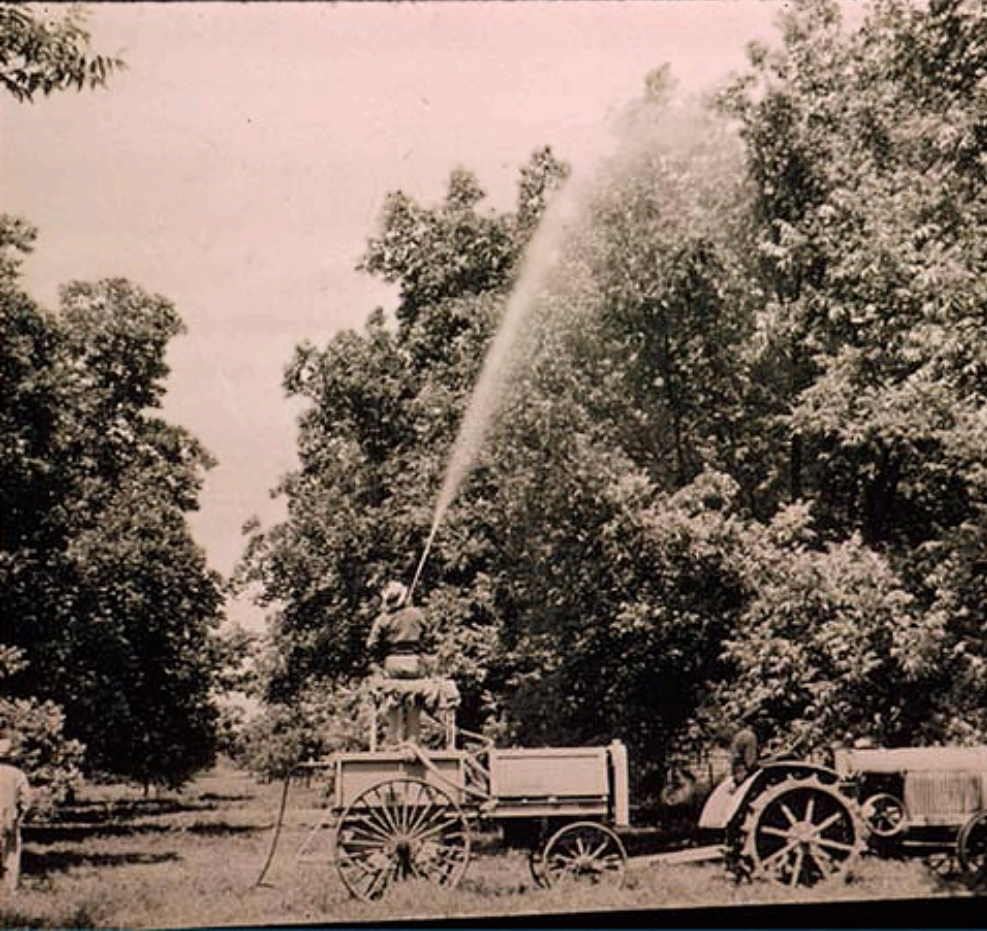


Measure the Amount Collected

**The amount collected
is your GPA rate**



Air Blast Sprayers



Coverage is Essential for Maximum Production







REGULATORY AND ENVIRONMENTAL ISSUES



VOLUME OF DEAD AIR





Pecan Sprayer Clinics



- 🌳 **Check Sprayer Speed**
- 🌳 **Record Nozzle Configuration**
- 🌳 **Check Spray Placement**
- 🌳 **Make Recommendations**



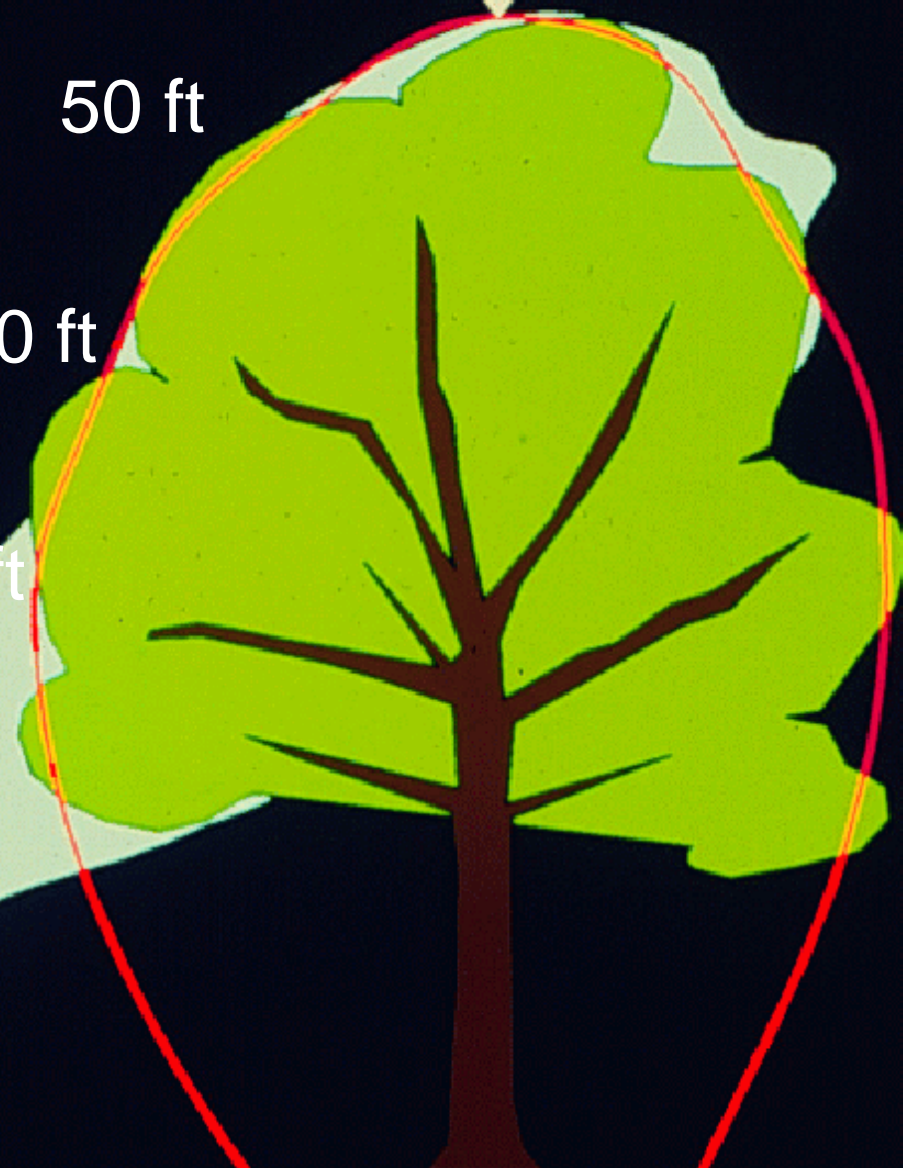
CENTER OF STRING



50 ft

40 ft

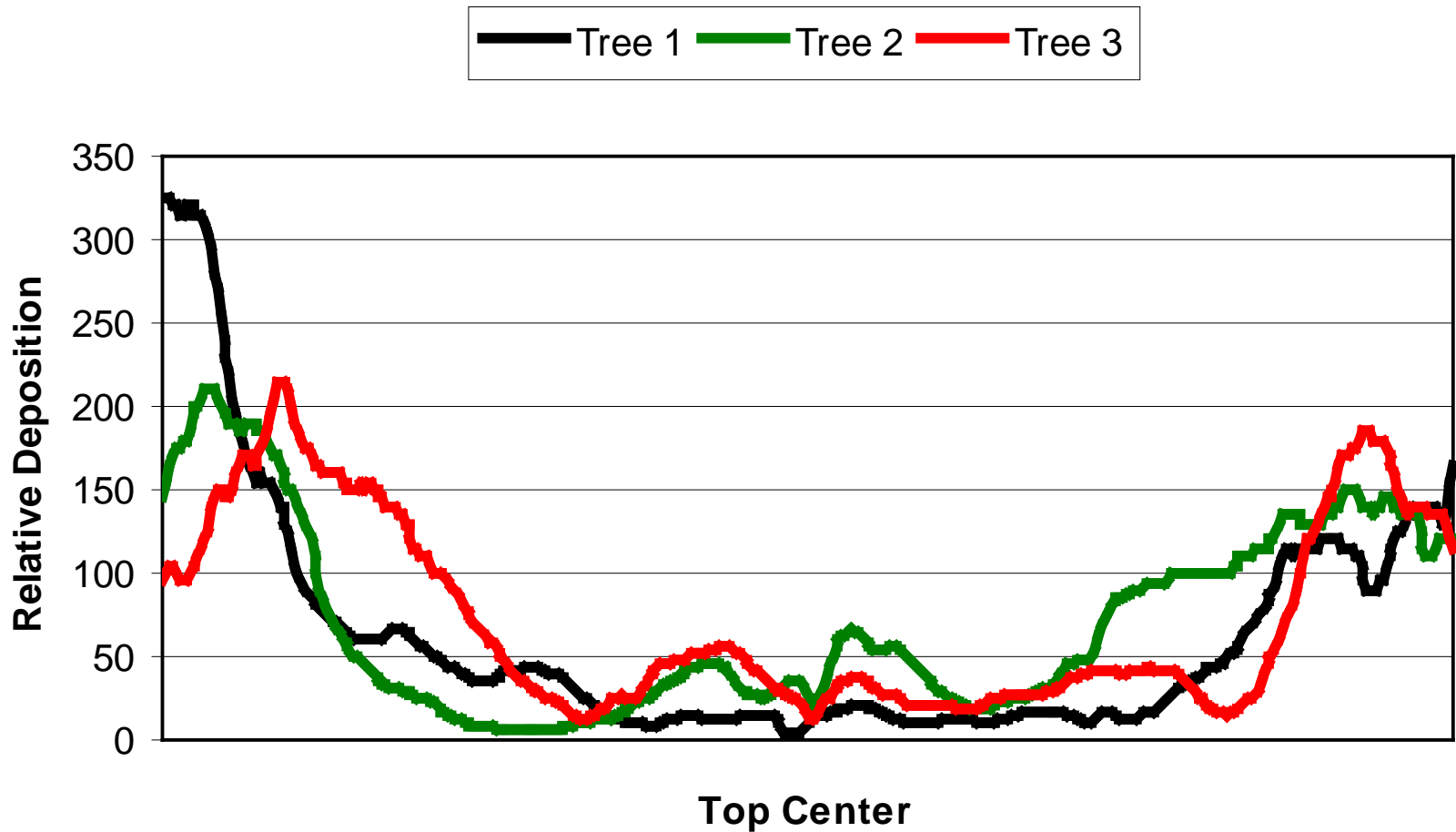
30 ft





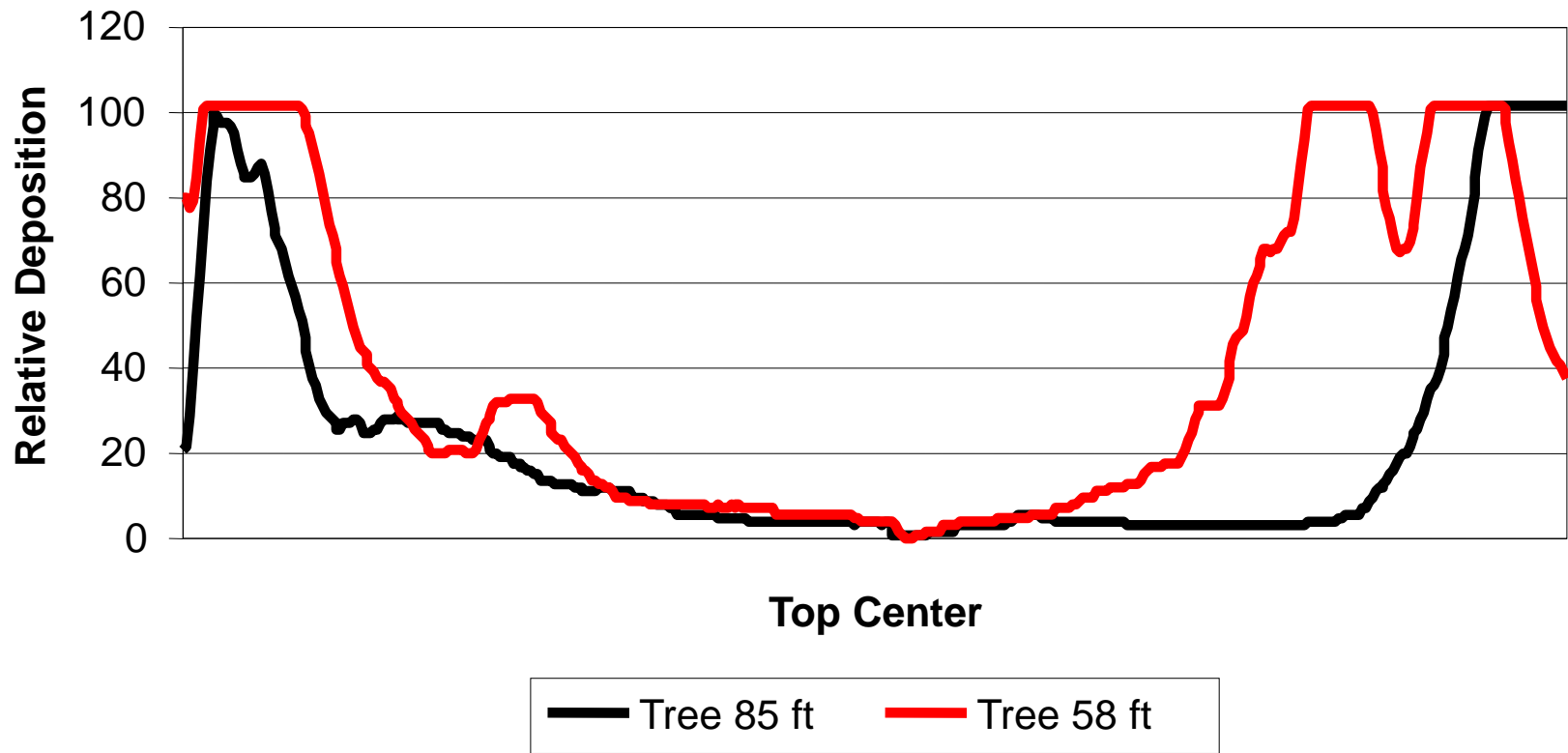
Orchard Air Blast Sprayer Comparison

Pecan Tree Size 54 – 60 ft



Orchard Air Blast Sprayer Comparison

Tree Size, AeroFan – Engine, 2.0 mph





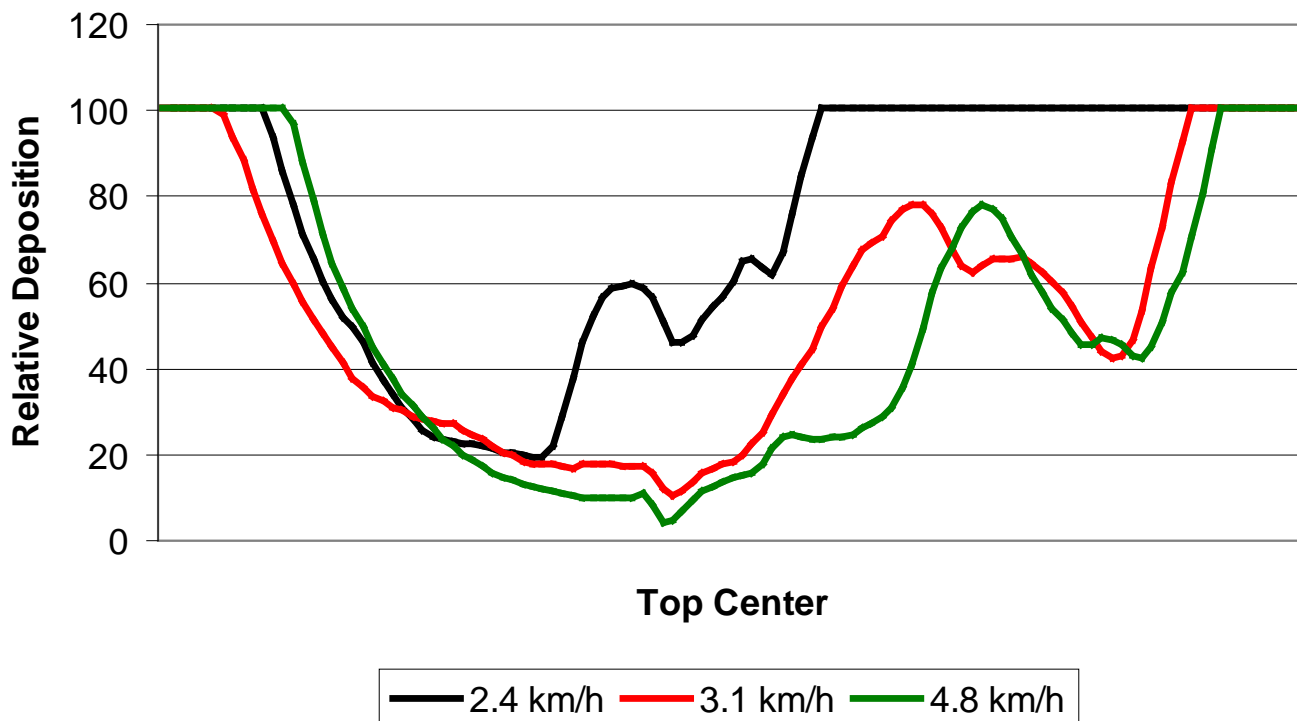
Orchard Air Blast Sprayer Comparison

Speed Spraying, DW – PTO 36" Fan

3.1 to 2.4 km/h = 29.8%
1.9 to 1.5 mph

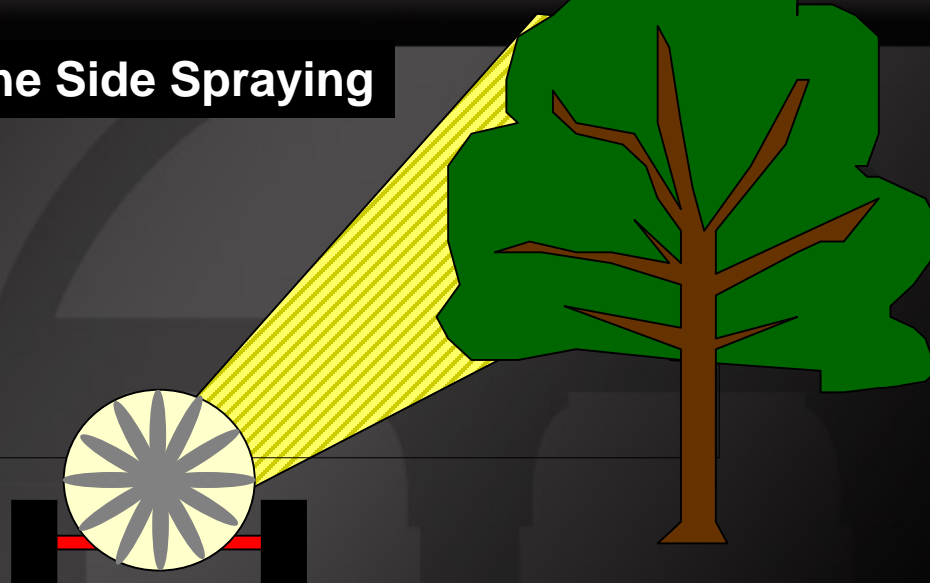
4.8 to 2.4 km/h = 34.9%
3.0 to 1.5 mph

4.8 to 3.1 km/h = 7.8%
3.0 to 1.9 mph

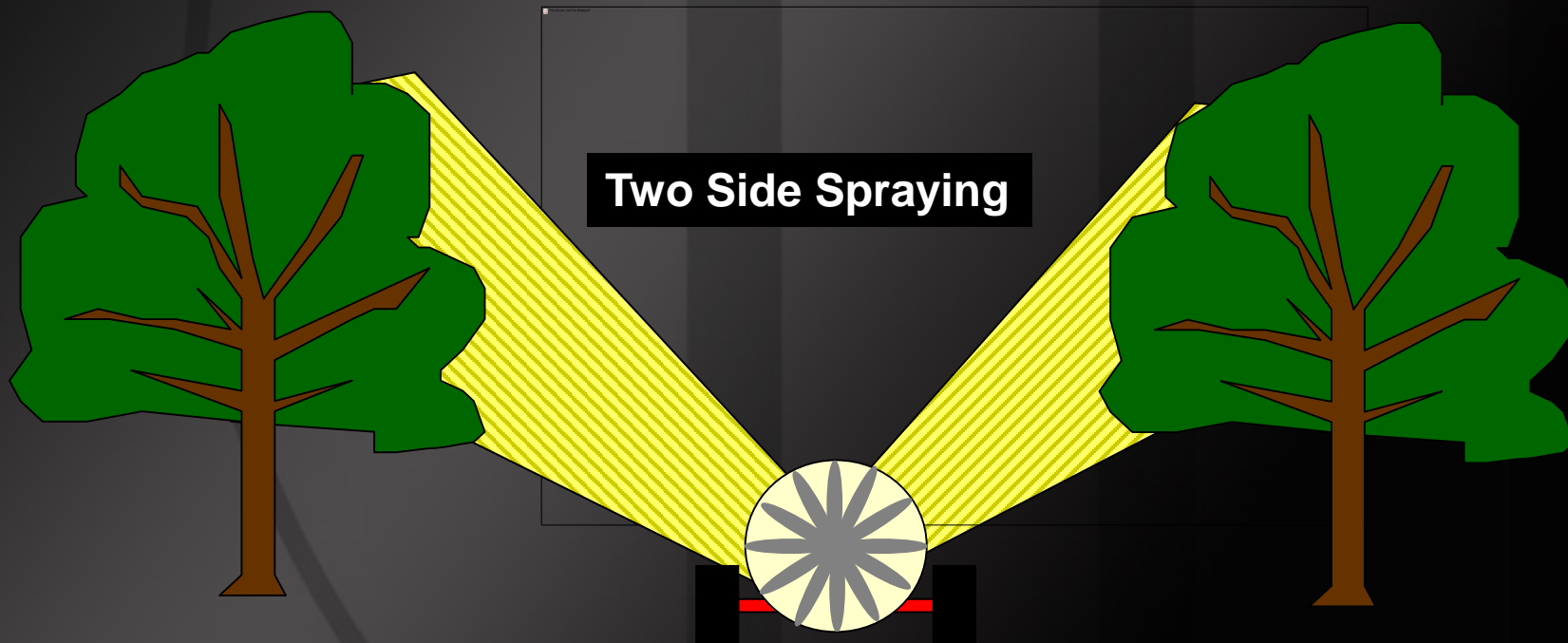




One Side Spraying



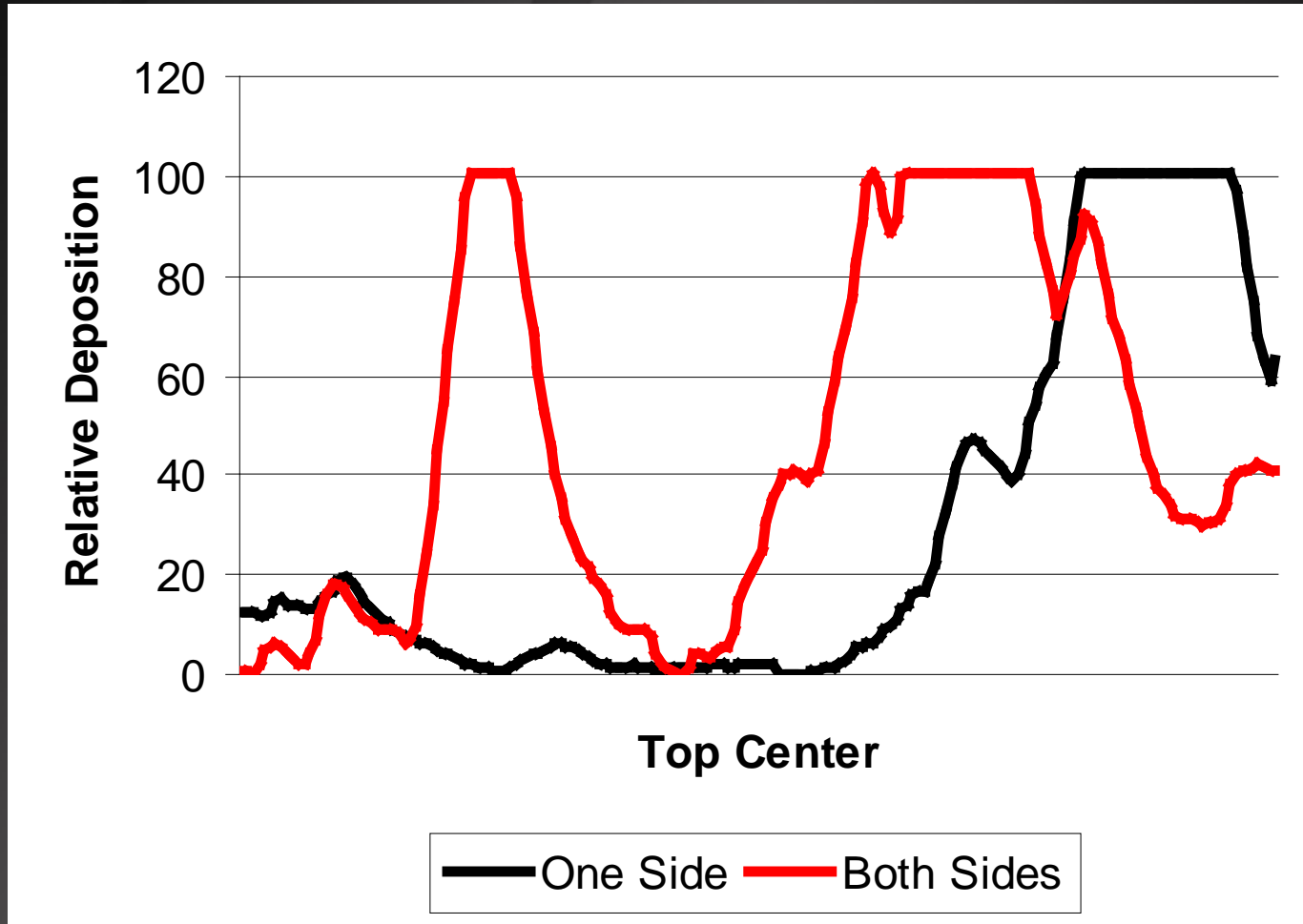
Two Side Spraying





Orchard Air Blast Sprayer Comparison

One vs. Two Side Spraying, DW – PTO 36" Fan, 3.1 km/h

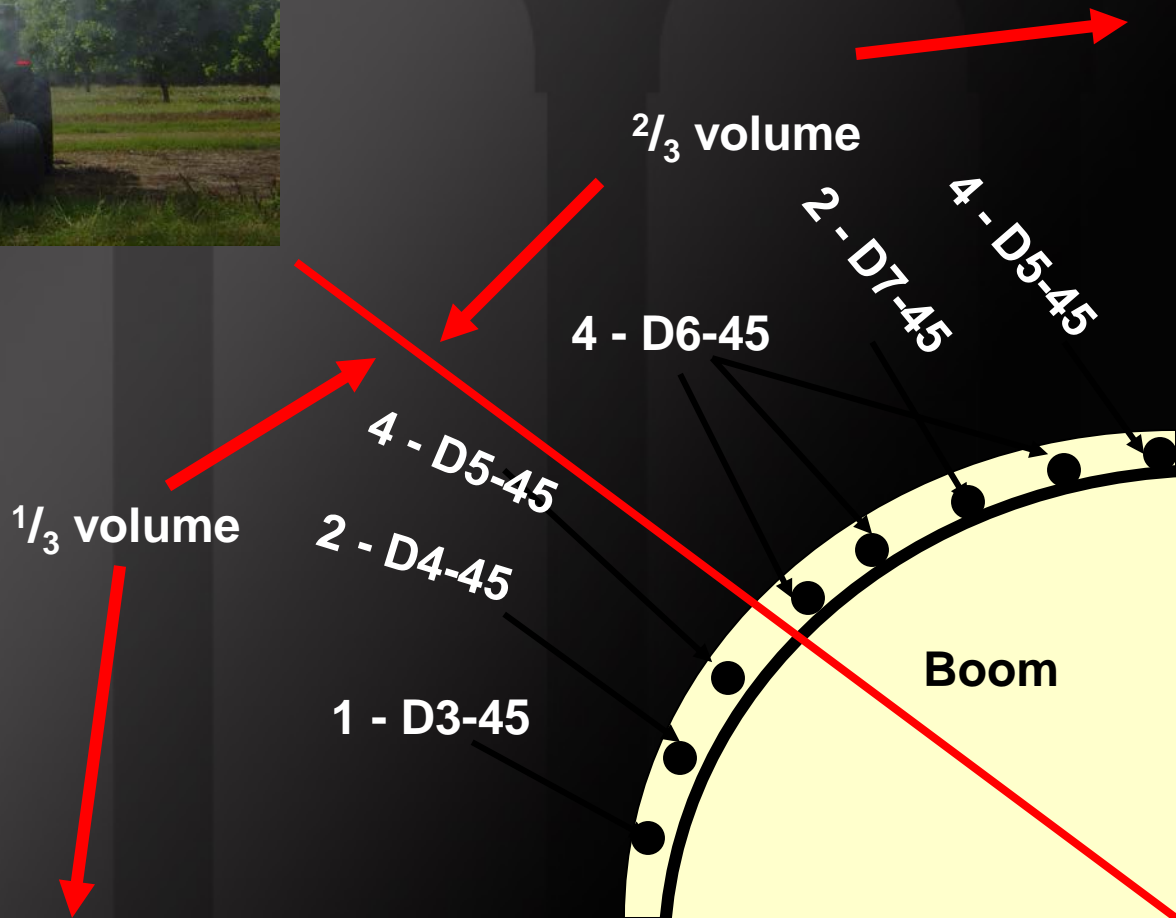




17 nozzles

Flow rate = 16.00 gpm
Top $\frac{2}{3}$ = 10.72 gpm
Bottom $\frac{1}{3}$ = 5.28 gpm

88 gpa
1.5 mph
60 ft spacing



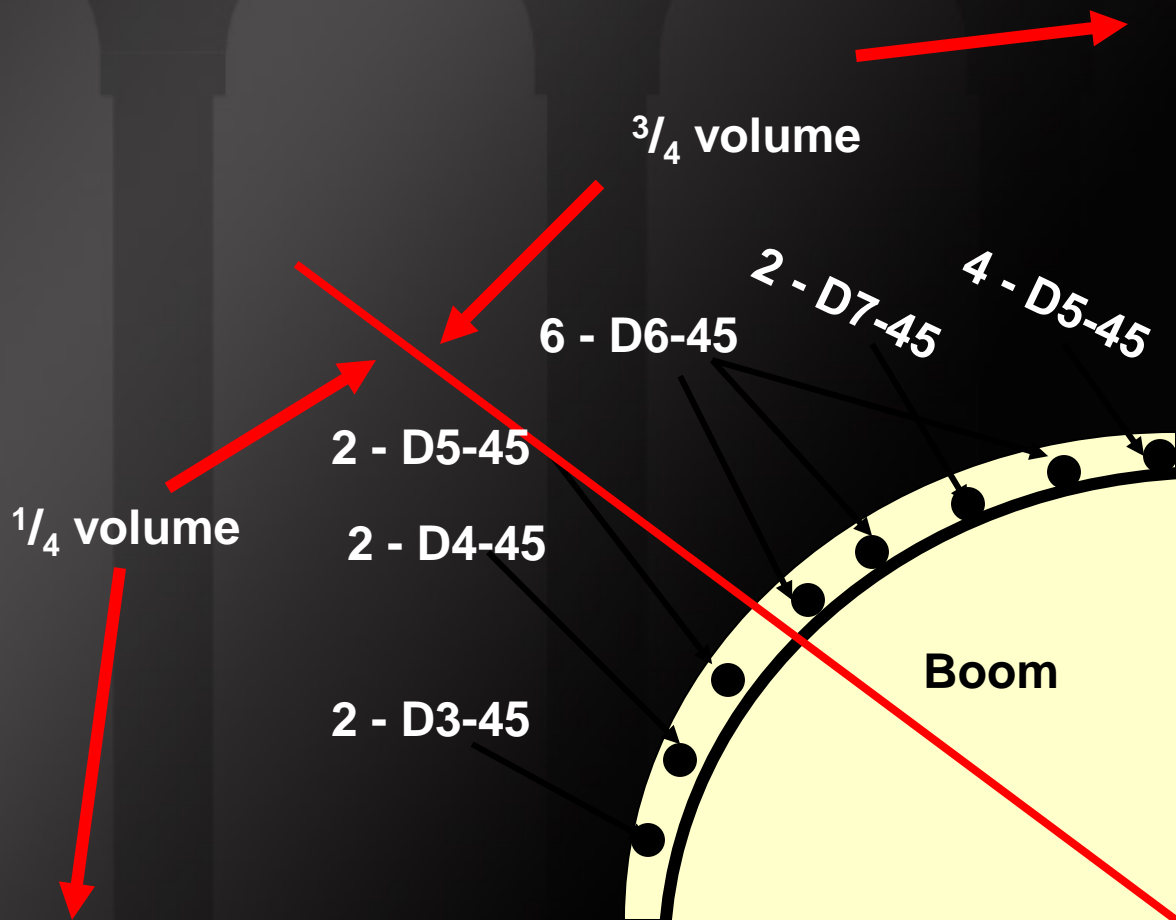


Large Trees

93 gpa
1.5 mph
60 ft spacing

18 nozzles

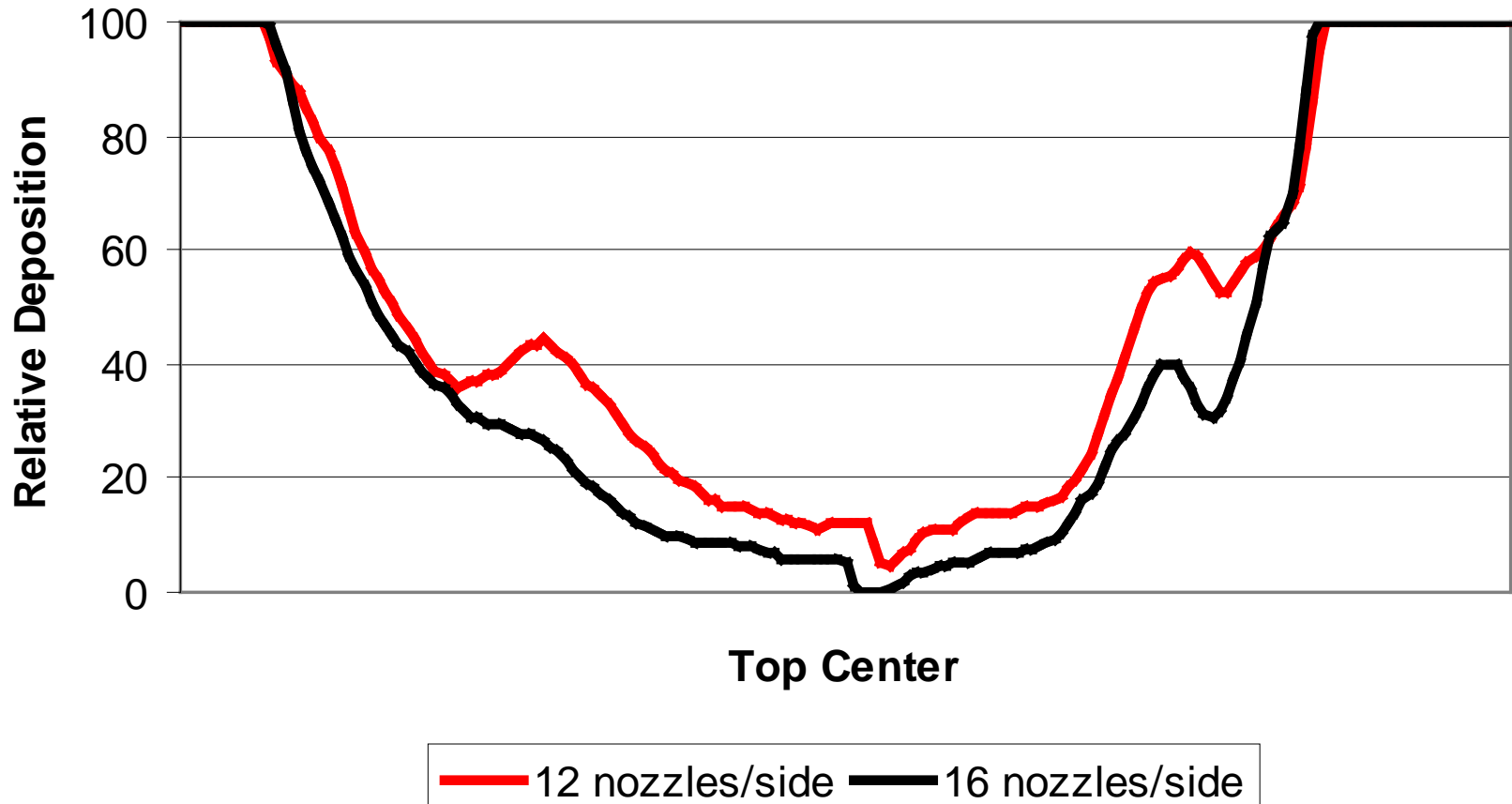
Flow rate = 16.96 gpm
Top $\frac{3}{4}$ = 13.0 gpm
Bottom $\frac{1}{4}$ = 3.96 gpm





Orchard Air Blast Sprayer Comparison

Reduction of Nozzles – 14% increase



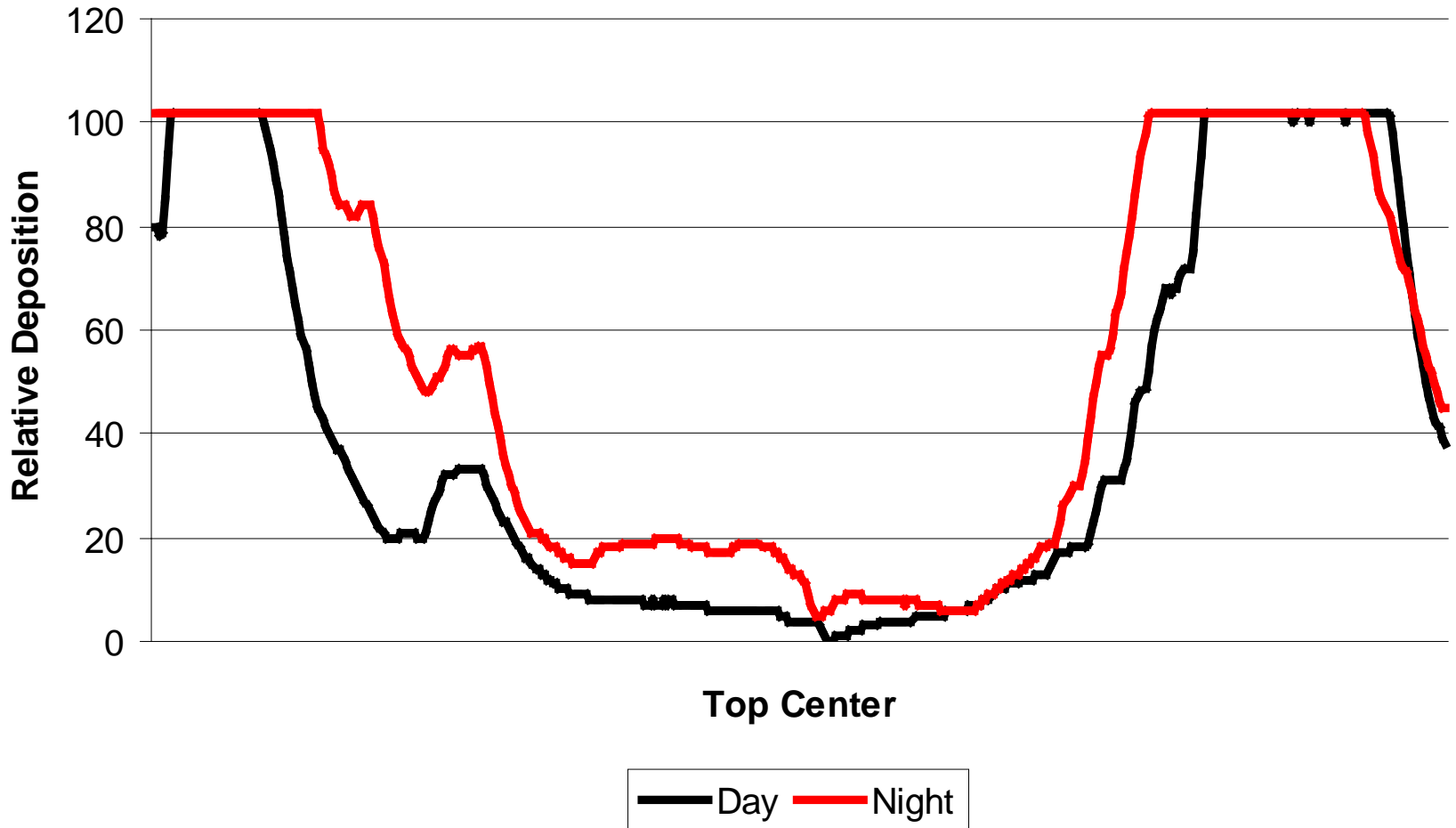
Day and Night Spraying





Orchard Air Blast Sprayer Comparison

Medium Tree, 56 ft, 2 mph – 23% increase





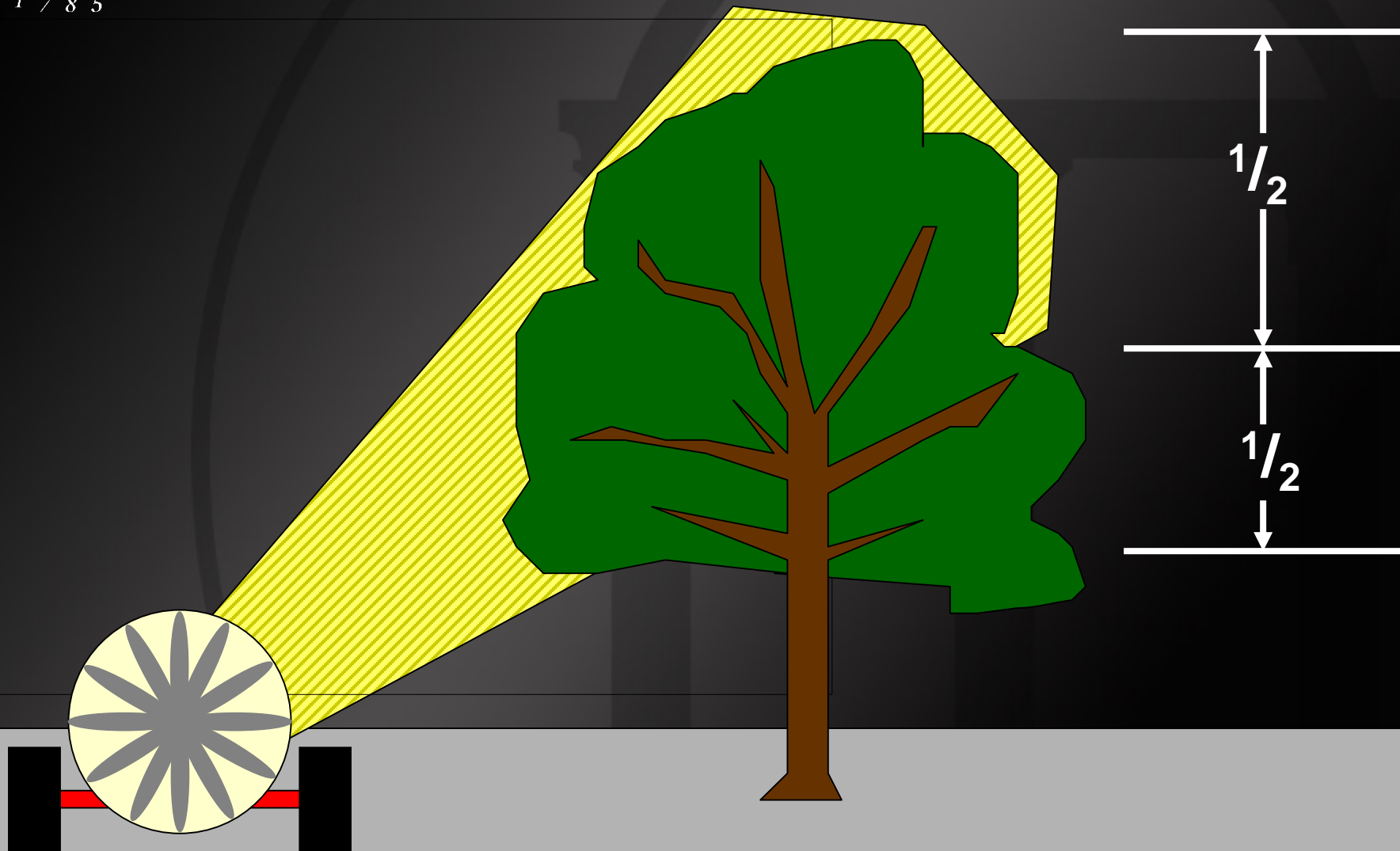
RECOMENDATIONS





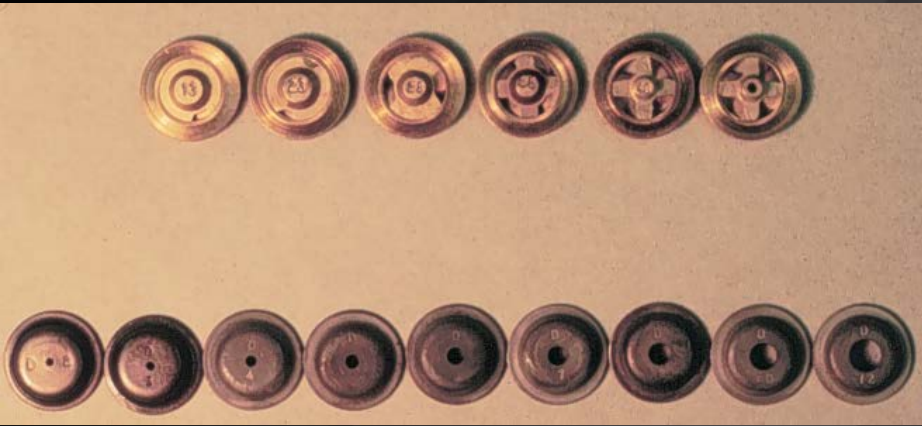
$\frac{2}{3}$ - $\frac{3}{4}$ Spray

Directed Toward Top $\frac{1}{2}$ of Tree





Hollow Cone Nozzles

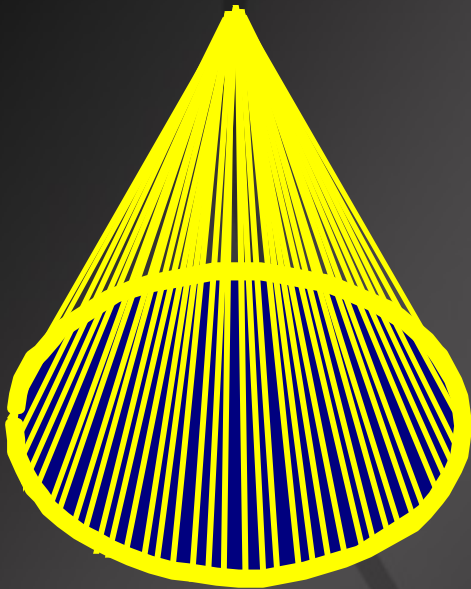


Core

Disc

$\frac{2}{3}$ volume

$\frac{1}{3}$ volume



D6-45

D7-45

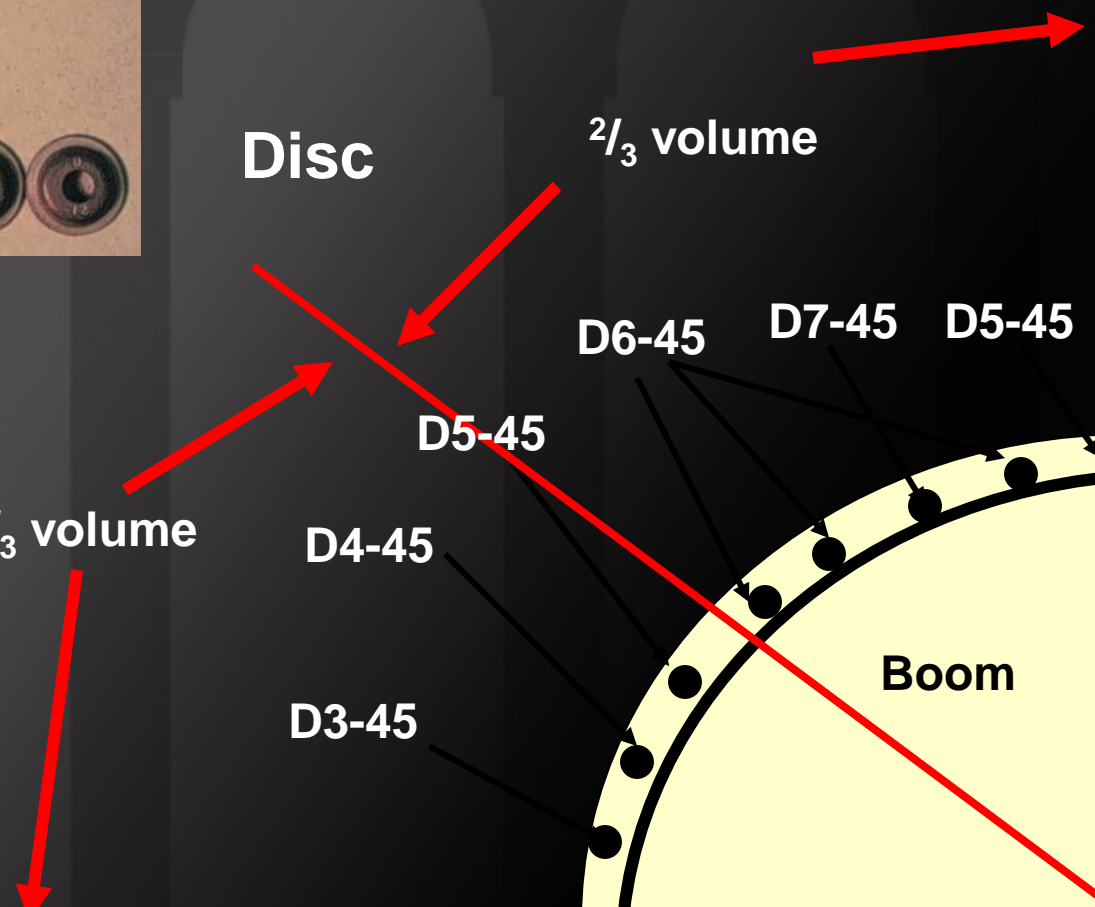
D5-45

D5-45

D4-45

D3-45

Boom





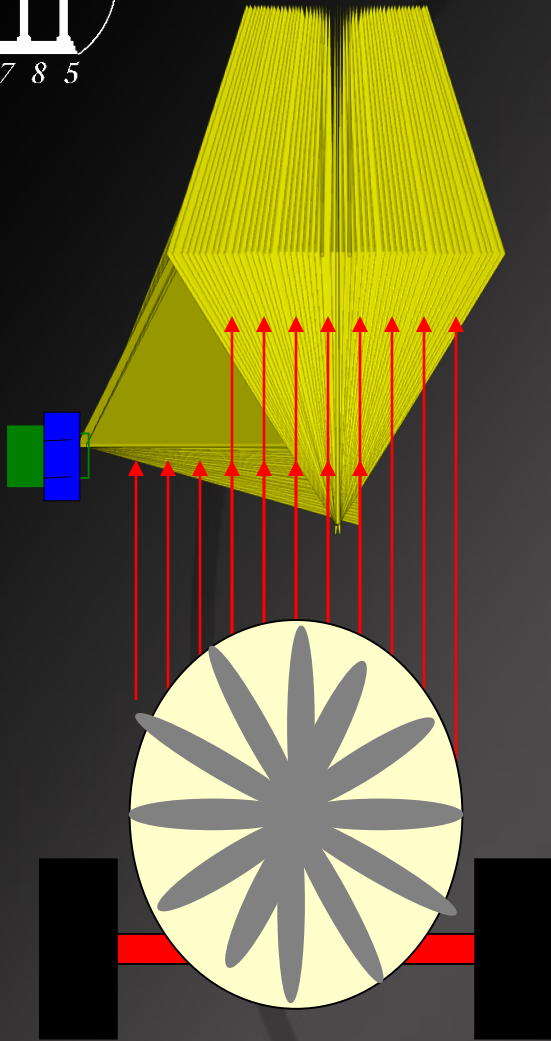
Savage

Nozzle Orientation

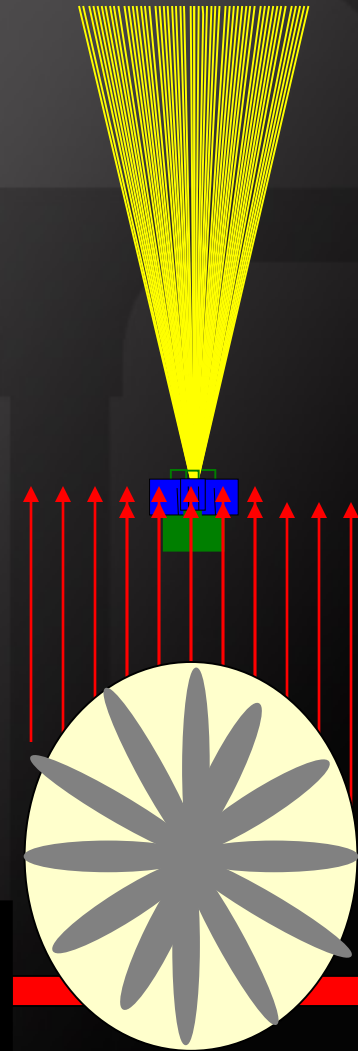


Fine

Coarse



Perpendicular

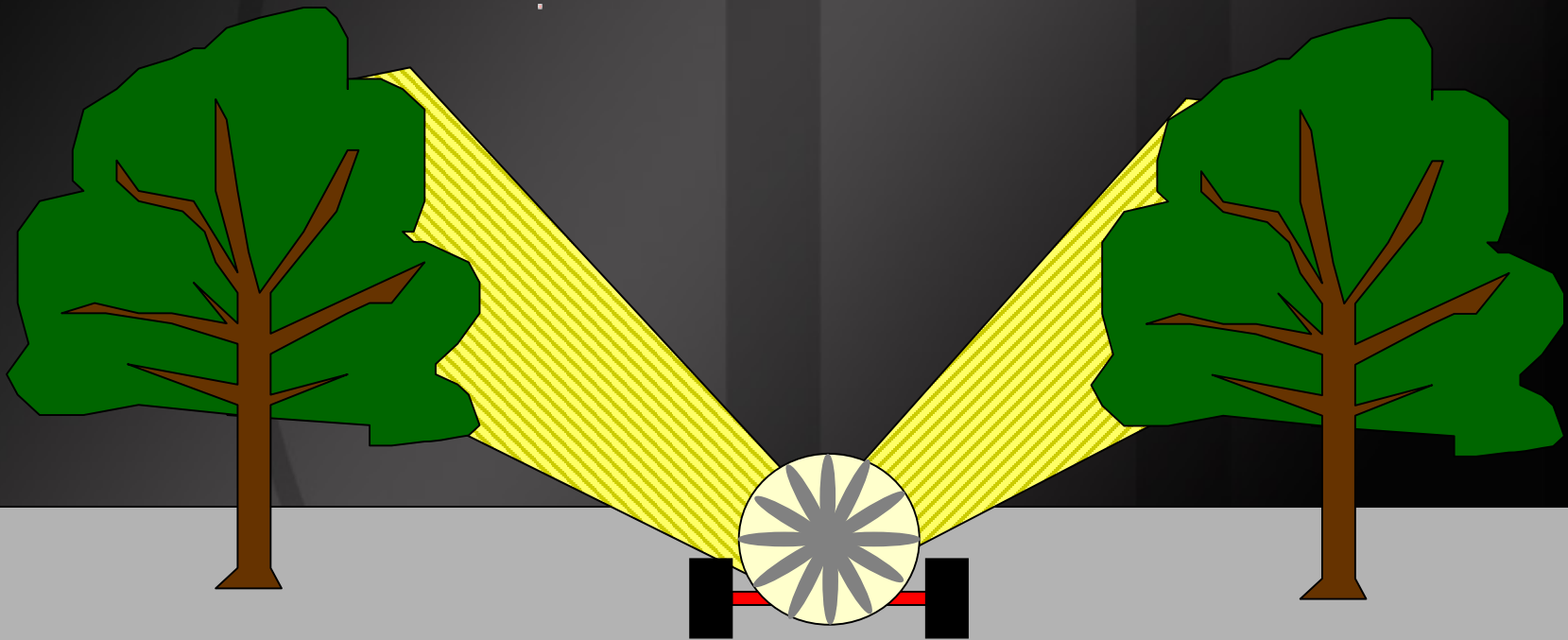


Parallel



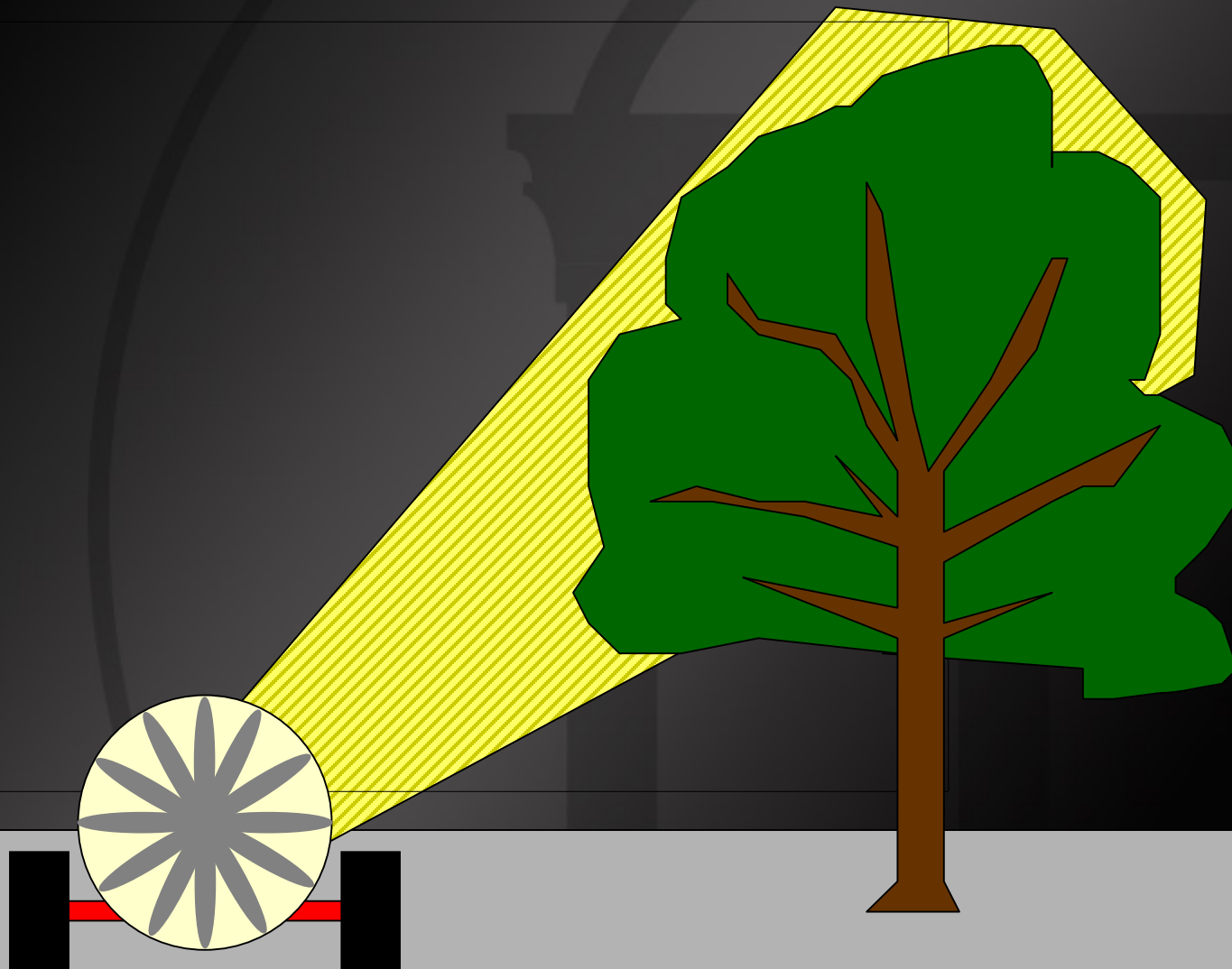
Two Sided Spraying

Up to 80 percent Leaf Canopy





Sprayer Speed Less than 2.5 mph
Higher Performance < 2.0 mph





SPEED

- **Slow enough to displace untreated air with chemical laden air**
- **Large fans deliver more air volume=better coverage**
- **Small fans should be used on small trees(<40 ft)**
- **Slower the speed better the coverage**
- **Slower the speed more GPA /w same nozzles**
- **Same GPA → re-nozzle**



Rate per Acre

TREE SIZE

GPA

Up to 25 ft

25

25 to 50

50 - 75

50 and Up

100 - 125

Questions?

