Georgia Pecan Management Update

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UGA Horticulture

2012 Pecan Tree Planting Survey

- 146 Respondents
- 102,784 trees
- 89% planted to new acreage
  - Accounts for 3768 acres
- Most of the inter-planting was done in Dougherty, Mitchell, and Lee Counties
- 1778 acres of abandoned orchards brought back in to production
- 277 acres of spaded trees
- Total of 5823 new acres

UGA Recommended Pecan Cultivars

Low Input	Medium Input	High Input	Conditional	Trial
Amling	Caddo	Desirable	Cape Fear	Byrd
McMillan*	Forkert*	Pawnee	Creek	Zinner*
Excel*	Oconee		Kiowa*	Lakota*
Elliott*	Sumner*			Mandan
Kanza*				Morrill

*Type II—Stigma receptive before pollen mature

Effect of Sunlight and Air Movement on Yield---2012

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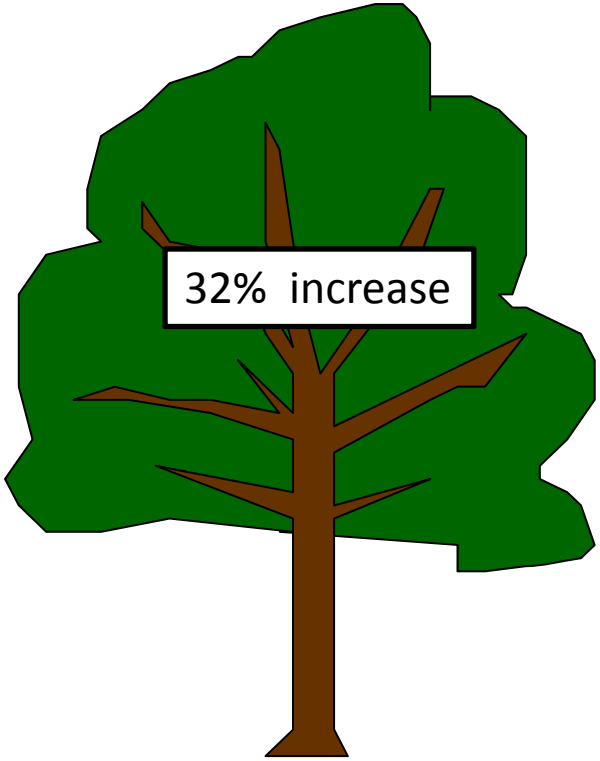

Sunlight=1843 lum/ft^2
Yield=137.4 lbs/Tree

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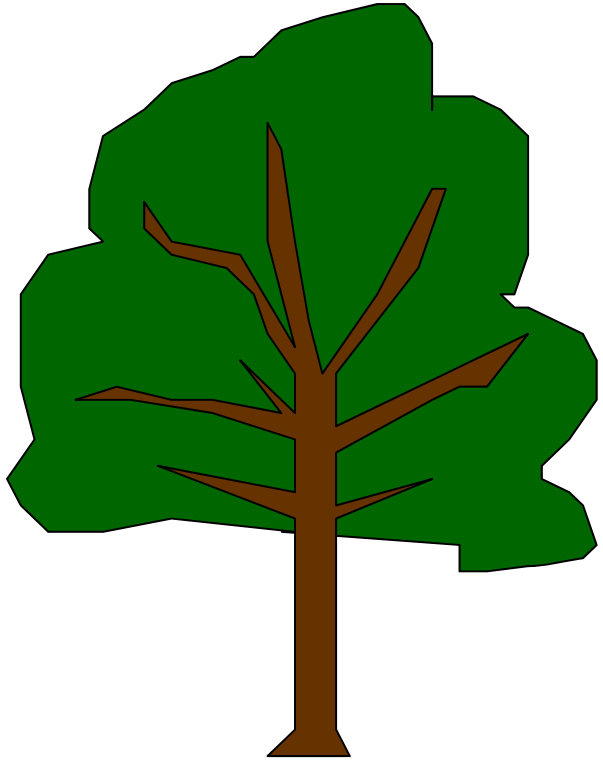

Sunlight=1005 lum/ft^2
Yield=93.6 lbs/Tree

Effect of Sunlight and Air Movement on Yield---2013

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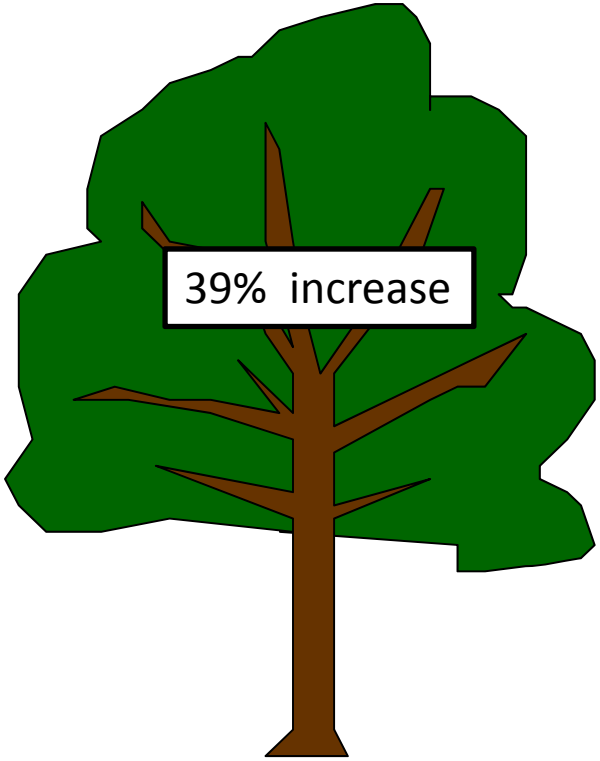

Sunlight=1176 lum/ft^2
Yield=110.6/tree

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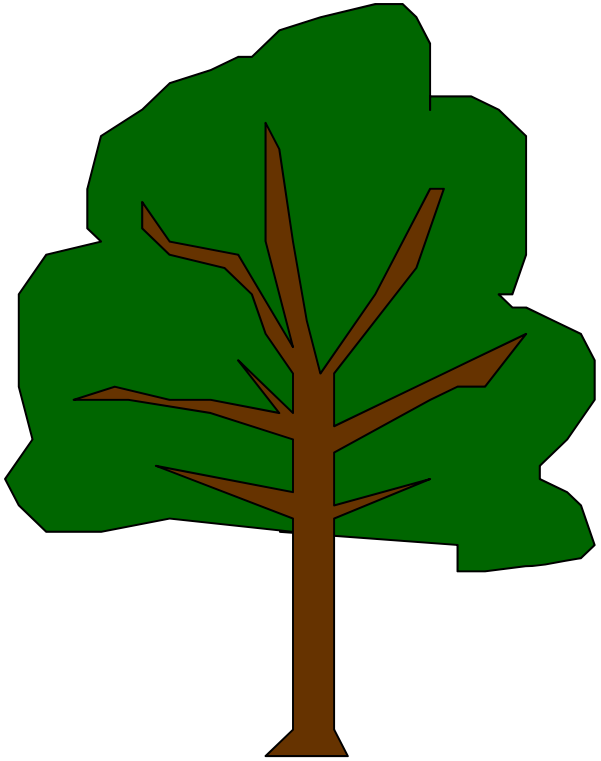


Sunlight=996 lum/ft^2
Yield=68 lbs/tree

Irrigation Schedule Recommendations (gallons per tree)

	New		**Old**	
April	**1800**	**(60 gal/day)**	6750	(225 gal/day)
May	**2880**	**(93 gal/day)**	7905	(255 gal/day)
June	**3600**	**(120 gal/day)**	8550	(285 gal/day)
July	**4500**	**(145 gal/day)**	10,230	(330 gal/day)
August	**11,160**	**(360 gal/day)**	11,160	(360 gal/day)
September	**10,800**	**(360 gal/day)**	10,800	(360 gal/day)
Total	34740		55,395	
Average Per Day	189		303	

The Reduced Irrigation Schedule provides a ***38% Reduction*** in irrigation water use with no significant effect on tree water stress, yield, or quality

Pecans are Perennial Crop
Not an Annual Crop

- Respond differently to inputs
- Orchard soils are not tilled
- Row Crops grow from seed or young plants
  - Birth, Growth, Death in 6-8 months
  - Everything you do to annual crops affects it that year
  - Effects on perennial crops are often delayed and long term

Leaf Tissue Results

	Desired Range	Mean	% Low	% High	Sample Range
Leaf N	2.5-3.3%	2.77%	3	0	2.58-3.09
Leaf P	0.12-0.3%	0.14%	0	0	0.13-0.18
Leaf K[1]	1.1-2.5%	1.26%	45	0	1.04-1.50
Leaf Ca	1.0-1.5%	1.84%	0	48	1.37-2.36
Leaf Mg[2]	0.35-0.6%	0.53%	7	0	0.32-0.66
Leaf S	0.25-0.5%	0.24%	3	0	0.22-0.28
Leaf Fe	50-300ppm	71.7ppm	0	0	50-142
Leaf Zn	50-100ppm	125ppm	7	34	41-292
Leaf B	50-100ppm	84ppm	0	20	50-146
Leaf Cu	6-30ppm	9.8ppm	0	0	6-14
Leaf Mn	100-800ppm	562ppm	0	21	190-1251
Leaf Ni	?	2.5ppm	?	?	1-11

Soil Sample Results

	Desired Range (lbs/A)	Mean (lbs/A)	% Low	% High	Sample Range (lbs/A)
Soil P	30-60	98.3	0	90	48-183
Soil K	100-150	153	0	34	94-361
Soil Ca	400-900	988	3	48	192-2241
Soil Mg	90-100	184	7	90	35-436
Soil S	10-50	26.6	3	0	4-41
Soil Fe	12-25	22.6	3	24	8-76
Soil Zn	15-20	25	28	55	3.9-55.3
Soil B	0.5-1.0	0.99	41	14	0.22-6.0
Soil Cu	0.5-1.5	1.1	14	10	0.2-7.2
Soil Mn	15-40	31.9	28	7	13-45
Soil Ni[1]	?	1.26	N/A	N/A	1-7
pH	6.0-6.5	5.96	41	12	5.3-7.0

How Often Should You Lime the Orchard?

pH	6.0-6.5	5.96	41	12	5.3-7.0

- High N rates can lower pH in upper soil layers (2-3”) in the short term
- Lime applied to surface raises soil pH in upper 2-3” only
- Once soil pH reaches 6-6.5 below surface layer, it tends to remain there for a long time
- There is **NO** research-based evidence for increased yield and growth of mature pecan trees with lime application (Hunter and Hammar, 1947; Johnson and Hagler, 1955; Hagler et al. 1957; Brooks, 1964; Hunter, 1965; Worley et al. 1972)
- Excessive liming can lead to Zn deficiency, mouse ear, and problems with K uptake
- Lime should be applied to mature orchards every 3rd year at most on SE Coastal Plain soils (6.0-6.5); Keep N rates between 75-125 lbs/acre
- Savings: $20/acre

How Often Should You Soil Apply Phosphorous

	Desired Range (lbs/A)	Mean (lbs/A)	% Low	% High	Sample Range (lbs/A)
Soil P	30-60	98.3	0	90	48-183

- P relatively immobile and accumulates on soil surface in non-tilled soils
- 1000 lb/acre pecan crop removes 1.6 lbs P per acre
- Annual turnover
- Yield response to broadcast application of P on mature pecan is extremely rare (Alben and Hammar, 1939; Worley and Harmon, 1964; Sullivan, 1974; Worley, 1974; Sparks 1988; Smith 1991;)
- Rates of >13,000 lbs P/acre only slightly increased nut size
- No benefit to annual maintenance broadcast application of P to pecans in most managed orchards
- Savings: $20.40/acre
- If soil P<30 lbs per acre, broadcast P
- If soil P>30 lbs/acre and leaf P<0.12, band P

How Often Should You Soil Apply Potassium?

Soil K	100-150	153	23	34	94-361

- 1000 lb/acre pecan crop removes 2.3 lbs K per acre
- Annual turnover
  - 70% of total nutrient content of fruit returned to soil in shucks (Sparks, 1975)
- Yield response to broadcast application of K on mature orchards is extremely rare (Hunter and Hammar, 1947; Hunter and Hammar, 1948;Sharpe et al. 1950; Sharpe et al., 1952; Hunter, 1956; Gammon and Sharpe, 1959; Hunter and Hammar, 1961; Worley, 1974; Worley , 1994)
- No real benefit to maintenance broadcast application of K in most mature managed orchards
- Savings: $23.40/acre
- If soil K drops below 100 lbs/acre: broadcast K
- If soil K is >100 lbs/acre and leaf K is less than 1.1: band K
  - Need to keep leaf K at 2:1-2.5:1 ratio with leaf N, but broadcast application will not increase leaf K to 1.25

How Often Should You SOIL-apply Zinc?

Soil Zn	15-20	25	28	55	3.9-55.3

- Most Coastal Plain soils not planted to pecan are very low in Zn
- Most mature orchards have high soil Zn levels
- Zn is immobile in soil
- Broadcast Zinc Sulfate when soil Zn is <15 lbs/acre
- Savings: $25/acre
- Make annual foliar Zn applications

Banding Zn, P, and K

- Band Zn @4-5 **lbs/tree**
- Band K at 8 **lbs/tree**
- Band P at 100-120 **lbs/acre**
- Make applications over drip emmiters or in wet zone of microsprinklers

- Band Zn on opposite side of tree from P and K

Banding is a useful tool when uptake is a problem

What's the Best Way to Fertilize Pecans with Nitrogen?

- Apply 75-125 lbs N
- Inject liquid N
  - 3 applications beginning in April (10 day intervals)
  - 1 application in June
    - 1 application in late August/early September if heavy crop
  - No more than 25 lbs N/acre/injection

- Direct broadcast applications toward herbicide strip
  - Base total acreage applied on width of spread, *not on total size of orchard*
  - Use rate of 75-125 lbs/acre *on treated area only*

- Eliminate late season applications of N with:
  - Poultry Litter Application in Feb/March or
  - Establishment of good clover stand for 3 yrs

Fertigation of Young Trees

1st year trees: 'Cunard' on Orangeburg soil

Treatment	Caliper Growth (mm)	Leaf N
Fertigation (6.16 units N/acre)X4	5.4a	2.63a
10-10-10 (1 lb/tree)	6.5a	2.61a
Granular N (0.36 lbs/tree)X4*	7.6a	2.76a
Control (No N applied)	6.7a	2.63a

Fertilizer N materials;

Fertigation treatments =UAN (28%) (total of 0.84 lbs N per tree)

Granular N treatment=Urea (46%) (total of 0.84 lbs N/tree)

*Last granular application received 0.72 lbs material/tree to reach total of 0.84 lbs N/tree

All fertigation and granular N treatments received P-K through irrigation system in April via 10.5 gal/acre of 1-6-13

Fertilizer Application Dates:

10-10-10: May 9

Fertigation & Granular N: May 9; June 28, July 12; August 6

Fertigation of Young Trees

2nd year trees: 'Cape Fear' on Red Bay soil

Treatment	Caliper Growth (mm)	Leaf N
Fertigation (12.32 units N/acre) X4	17.4ab	2.72ab
Fertigation (6.16 units N/acre) X4	21.1a	2.74a
10-10-10 (1 lb/tree) X3	19.7ab	2.72ab
Granular N (0.36 lbs/tree)X5	14.8b	2.56bc
Control (No N applied)	16.2ab	2.50c

Fertilizer N materials:

Fertigation treatments =UAN (28%)

total of 1.68 lbs N/tree and 0.84 lbs N per tree for high and low rates

Granular N treatment=Urea (46%) (total of 0.84 lbs N/tree)

All fertigation and granular N treatments received P-K through irrigation system in April via 10.5 gal/acre of 1-6-13

Fertilizer Application Dates:

10-10-10: April 23, June 28, July 12

Fertigation : April 23, June 28, July 12, August 6

Granular N: April 23, May 23, June 28, July 12, August 6


Representative scab on Desirable in 2013 at orchard near Ray City, GA
Photo by J. Brock

What did it take to control scab on Desirable in 2013?

4/8	Prophyt---2 qts
4/17	Super Tin 6.4 oz+Elast 25 oz
5/2	Absolute 5 oz+Tebuzol 3 oz
5/8	Absolute 5 oz+Tebuzol 3 oz
5/13	Absolute 5oz+Tebuzol 3oz
5/20	Prophyt—2qt
6/4	Prophyt 2 qts+Super Tin 12.8 oz
6/13	Super Tin 9.6 oz+Elast 38 oz
6/25	Super Tin 9.6 oz+Elast 38 oz
7/2	Quadris Top 11oz+Prophyt 1.5 qts
7/9	Super Tin 9.6 oz+Elast 50oz
7/15	Quadris Top 11oz+Prophyt 1.5 qts
7/23	Super Tin 6.4 oz+Elast 50oz
7/29	Super Tin 12 oz+Topsin 20 oz
8/5	Elast 50 oz+Topsin 20 oz
8/12	Super Tin 12 oz

Cost: $287.90/acre*

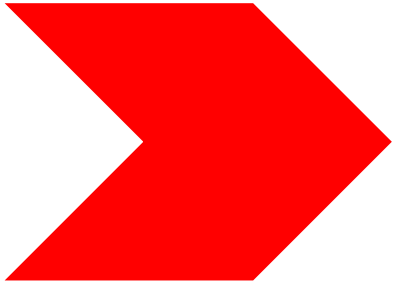
What did it take to control scab on Desirable in 2013?

4/8	Absolute—5oz
4/16	Super Tin 12.8 oz+K-Phite 1qt
4/30	Super Tin 12.8oz+Elast 25 oz
5/14	Super Tin 12.8+ Topsin 20 oz
5/22	Absolute 5oz+Tebuzol 6.4oz+Kphite 1 qt
5/29	Elast 50 oz+Super Tin 6.4 oz
6/5	Elast 50 oz + Super Tin 6.4 oz
6/12	Quadris Top 14 oz+Sulfur 2 qts
6/21	Super Tin 12.8oz+Elast 25 oz
7/1	Quadris Top 14oz+Sulfur 1 qts
7/8	Super Tin 6.4 oz+Elast 50oz
7/15	Super Tin 12.8 oz+Topsin 20 oz+Sulfur 1 qt
7/22	Super Tin 12.8 oz+KPhite 2 qts
7/29	Syllit 50 oz+Bumper 6.4 oz
8/5	Absolute 7.5 oz+Super Tin 6.4 oz +Sulfur 1 qt
8/12	Syllit 50 oz+Super Tin 6.4 oz

Cost: $303.25/acre*

Example:
General Fungicide Spray Schedule

- Spray 1---Absolute+Phosphite
- Spray 2---Enable+Tin
- Spray 3---Enable+Tin
- Spray 4---Absolute
- Spray 5---Absolute+Phosphite
- Spray 6---Elast+Tin
- Spray 7---Elast+tin
- Spray 8---Tin



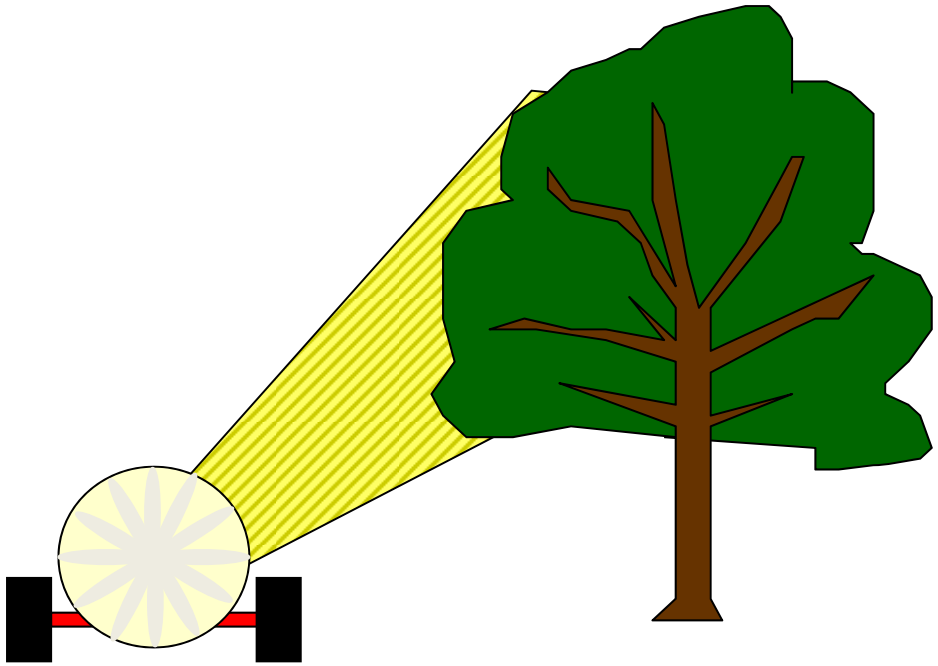
Elast/Tin sprays can be extended for several sprays if pressure warrants additional spraying

If scab pressure is low, use Super Tin alone

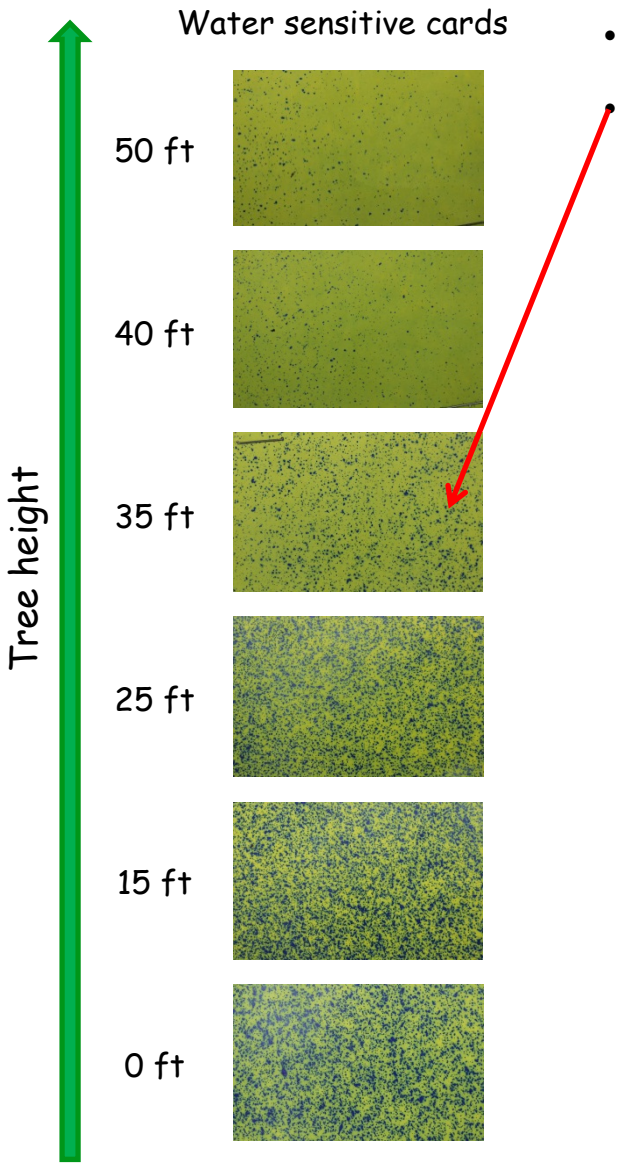
**Use Super Tin alone for the last spray

What made the difference in 2013?

- Air flow
- Sprayer Coverage

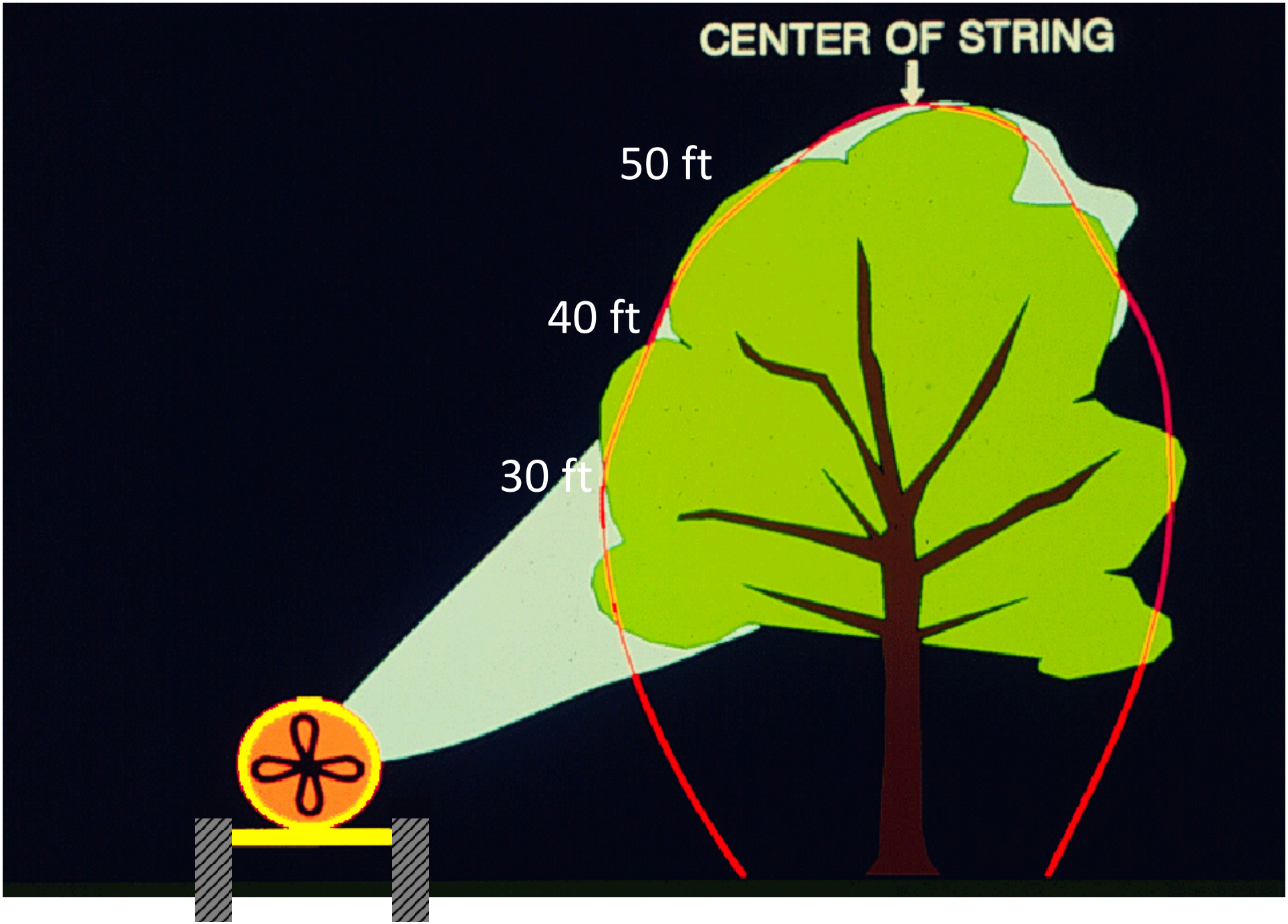


Fungicide spray coverage in mature trees

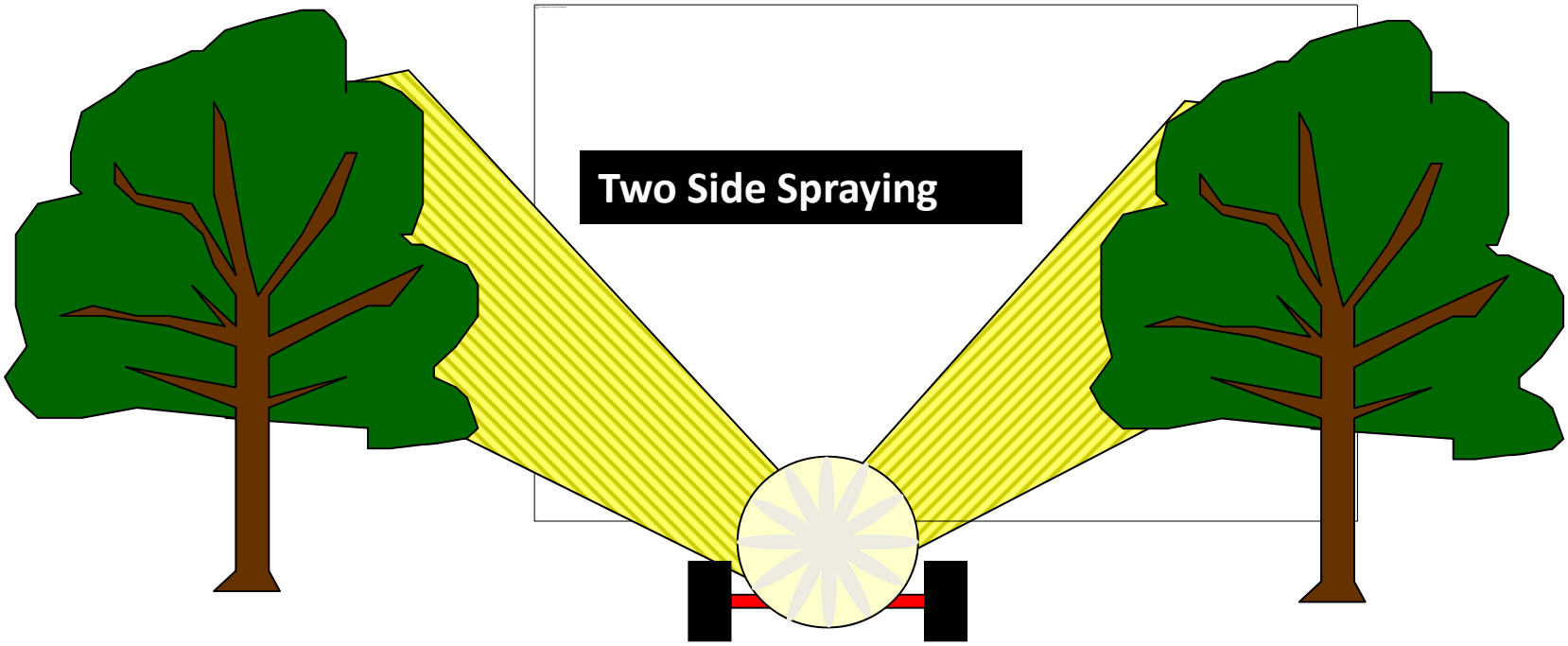


- A decrease in spray coverage with height
- Up to 35 ft, spray coverage appears good

Clive Bock

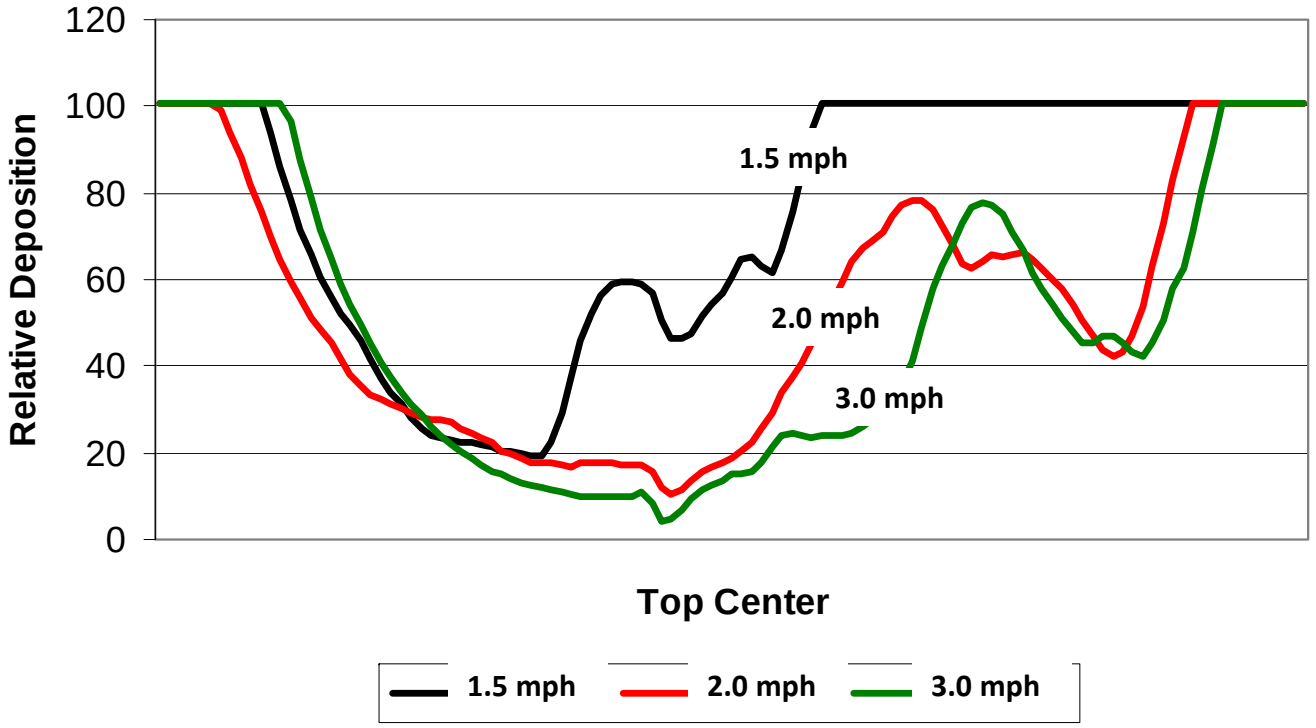

CENTER OF STRING
50 ft
40 ft
30 ft

One Side Spraying


Two Side Spraying

The #1 Thing You Can Do to Improve Scab Control With A Sprayer:
SLOW DOWN!!!!!

- 3.0 to 2.0 mph = 7.8%
- 2.0 to 1.5 mph = 29.8%
- 3.0 to 1.5 mph = 34.9%



New Aphid Products

- Closer (sulfoxaflor) from Dow
- Apta (tolfenpyrad) from Nichino Am.
  - 17-27 oz./A
  - Controls aphids, shuckworm, PNCB, weevils
- Beleaf (flonicamid) from FMC
  - Similar to Fulfill, inhibits feeding of aphids
- Athena (bifenthrin + avermectin) from FMC
  - Insecticide/miticide, not yet labelled in GA