

Growing Good Fruit

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Making Your Life a Bit Easier

- Plant Disease Resistant Cultivars
- Use Geneva Rootstock
- Match Scion/Rootstock with soil & tree density
- Fence Deer Out
- Strong Trellis
- Tile if wet
- Plant the right quality trees
- Plant straight rows

Major Insect Pests

- Tarnished Plant Bug
- Rosy Apple Aphid
- Plum Curculio
- Codling Moth
- Oriental Fruit Moth
- Japanese Beetles
- Marmorated Stink Bug
- Next one ??????

Major Diseases

- Apple Scab
- Fire Blight
- Cedar Apple Rust
- Sooty Blotch/Fly Speck
- White/Black/Bitter Rot

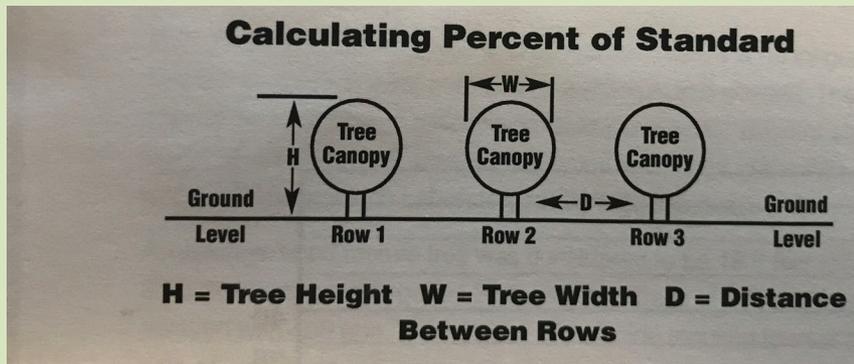
Gearing Up

- Sprayer should be capable of blowing through the trees on each side, fully leafed out
- Tower sprayers help spread spray materials more evenly in tops of trees
 - Especially important for disease control and thinning
- Correct nozzling and good calibration are essential
 - We use 50gpm as a standard for water delivery
 - Calibrate annually
- 4WD tractor is a godsend in gnarly weather
- Invest in a good cab



Tree Row Volume

- A lot of beginning growers get this wrong
- Adjusting the amount of spray material to match the size of the tree canopy
- Generally expressed in gallons/acre dilute equivalent
- Formulas for TRV are readily available
 - Tree height X Canopy diameter X Row length per acre X 0.0007 gallons
- Tied in with gallons water used/acre



IPM 2.0

- Integrated Pest Management using the latest technology and materials to reduce environmental impact
- Use of traps for monitoring pests
- Use of NEWA or on-farm environmental monitors
 - Network for Environment and Weather Applications
- Combining organic and non-organic practices and materials
 - e.g. mating disruption, viruses, targeted conventional materials

Managing Resistance

- Commercial orchards have lost the use of many useful spray materials
 - Sterol Inhibitors, Strobilurins
 - Streptomycin
- Avoiding resistance
 - Spray to kill
 - Enough material, good coverage, proper timing
 - Combining materials with differing modes of action

Stage	Dwarf Orchard						Semi Dwarf Orchard				
	Acres	Rate %	Material	Rate/AC	Amount	Acres	Rate %	Material	Rate/AC	Amount	
Silver Tip	Fire Blight, Scab	20	25%	Champ	3 qt	15	32	50%	Champ	3 qt	48
		20	100%	Spray Oil	1.25 qt	25	32	100%	Spray Oil	1.25 qt	40
Tight Cluster	Scab	12	25%	EBDC	6 lbs	18	32	50%	EBDC	6 lbs	96
Pink	Rosy Aphids	16	25%	Assail	2.5 oz	10	32	50%	Assail	2.5 oz	40
	Tarnished Plant Bug OBLR						32				
Foliar Nutrients	Solubor	12	25%	Solubor	4 lb	12	32	50%	Solubor	4 lb	64
	Urea	12	25%	Urea	6 qt	18	32	50%	Urea	6 qt	96
	Zinc sulfate	12	25%	Zinc sulfate	4 lb	12	32	50%	Zinc sulfate	4 lb	64
Petal Fall	FB						20	100%	Apogee	16 oz	320
	FB						20	100%	Regulaid	1 pint	20
	FB						32	50%	Am Sulfate	48 oz	768
	CM Mating Disrupt	20	100%	Isomate C	300	6000					
	Scab	12	25%	Flint	2.5 oz	8	32	50%	Flint	2.5 oz	40
	Scab	12	25%	Captan	4 lb	12	32	50%	Captan	4 lb	64
	PC, Leaf Hoppers	20	25%	Imidan	3 lb	15	32	50%	Imidan	3 lb	48
First Cover	Scab	12	25%	Rally	8 oz	24	32	50%	Rally	8 oz	128
		12	25%	Captan	3 lb	9	32	50%	Captan	3 lb	48
	Bitter Pit HC	3	25%	CaCl	6 lb	5	5	50%	CaCl	6 lb	15
Second Cover	Scab	12	25%	Rally	8 oz	24	30	50%	Rally	8 oz	120
	Scab	12	25%	Captan	3 lb	9	30	50%	Captan	3 lb	45
	Bitter Pit HC	3	25%	CaCl	6 lb	5	5	50%	CaCl	6 lb	15
	CM Leafhopper, et al	0	25%	Isomate C			30	50%	Assail	6 oz	90
Third Cover	Summer Diseases	12	25%	Captan	3 lb	9	30	50%	Captan	3 lb	45
	Bitter Pit HC	3	25%	CaCl	12 lb	9	5	50%	CaCl	12 lb	30
	Jap Beetle	20	25%	Sevin XLR	2 qt	10	30	50%	Sevin XLR	3 qt	45
Fourth Cover	Summer Diseases	12	25%	Flint	2.5 oz	8	30	50%	Flint	2.5 oz	37.5
	Bitter Pit HC	3	25%	CaCl	12 lb	9	5	50%	CaCl	12 lb	30
	Apple Maggot	20									
Fifth Cover	Summer Diseases	12	25%	Captan	3 lb	9	30	50%	Captan	3 lb	45
	Bitter Pit HC	3	25%	CaCl	12 lb	9	5	50%	CaCl	12 lb	30

Protecting the Good Guys

- Knowing what's out there
 - Good, Bad and Ugly
- Good spray timing
- Targeted Spraying
- Forbs in alleyways to encourage beneficials
- Accepting some damage
- Mating Disruption (>10 acres)

Thinning Apples, Thinning Hair

- Only way to have a chance at producing consistent crops
- Requires a decent understanding of what's happening in your orchard each season
 - Stored carbohydrate use vs. new carb production
 - 10mm fruitlet size is generally most vulnerable
 - Affected by weather – especially 4 days following thinning application
 - Cloudy & warm = most absorption, highest stress
 - Sunny & cold = lowest absorption, lowest stress
- Basic formula for us is NAA & Carbaryl
- Rates & number of applications variety dependent
 - Hard to Thin: Goldens (and GD progeny), Honeycrisp, Gala, Liberty
 - Easy to Thin: Jonagold, Ginger Gold, Ida Red
 - Somewhat Self Thinning: Crimson Crisp
- Start early if 2 applications expected: 4-6mm on Galas, Goldens



Fire Blight Control

- Keep Fire Blight out of your orchard as long as possible
- Act aggressively when FB appears
 - Prune out FB during growing season only if containable amounts
 - No value to sterilize pruners – stay well below visible infection
 - Remove whole trees if severe
 - Dormant prune aggressively
 - Can easily do more harm than good with warm season pruning
 - Use of Apogee to control vigor
- Plant FB resistant cultivars and use FB resistant rootstocks
 - Geneva Rootstocks & Bud 9
- Use copper early, Strep as needed during bloom
 - Benefits of Strep post-bloom doubtful

Groundcover Management

- We currently use herbicide strips under trees and low-growing grass/legume mix in alleyways
 - Perennial rye + red fescue mix, with clover volunteer
 - Fall application + 1 summer application
 - Moving away from Glyphosate, especially in summer
- Struggling to see a way to rid ourselves of herbicides under trees
 - Dwarf trees don't compete well in years 1-3
 - Vole damage makes mowing problematic years 3+
 - Damage to soil structure with 3-4 tillings/season
- No success with wood chip trial

Resources

- Michigan Fruit Management Guide
 - Spray recommendations by stage
 - TRV explained
 - Sprayer Calibration
- Michigan Hort Notes – season updates
 - <https://www.canr.msu.edu>
- Online Materials from Cornell: IPM, tree systems, hard cider info, more
 - <https://fruit.cornell.edu/>
- NEWA
 - <http://newa.cornell.edu/index.php?page=all-weather-data>