



Apple Research Supported by the Ontario Apple Growers - 2007

**John Cline, Associate Professor
University of Guelph,
Simcoe & Vineland Campuses
Tel: 519-426-7127 Ext 331
Jcline@uoguelph.ca**

Research and Technical Support



- 🍏 Debbie Norton, Technician
- 🍏 Research Station Support Staff
- 🍏 Graduate Students - Ali Taheri, two positions available

2007 Experiments (Proposed in April 2007)

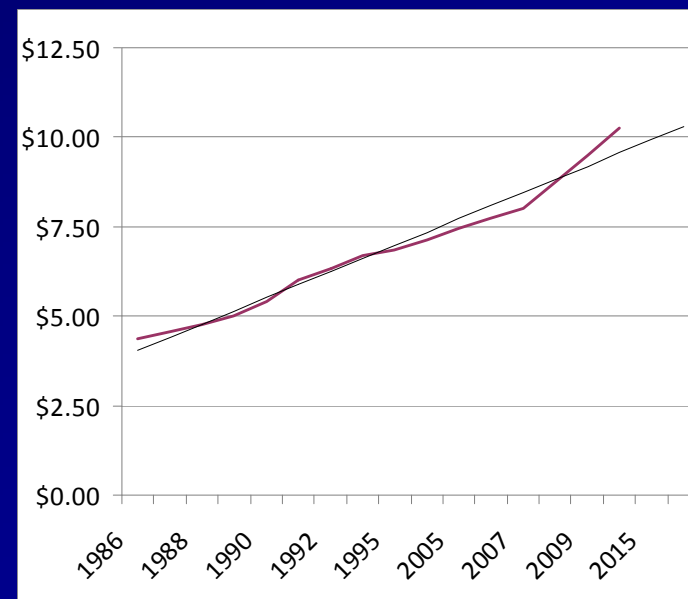
- Establish a super spindle research orchard of Honeycrisp/M.26, Aurora Golden Gala/M.26, Ambrosia/M.9, and Royal Gala/M.9
- Continue Maxcel (6-BA) thinning research, primarily for registration purposes
- Investigate the influence of thinning on mummy fruit formation in Gala and Honeycrisp (Gardner, Celetti)
- Investigate the horticultural benefits of Surround on Gala.
- Continue 1999 and 2002 rootstock experiments

Economics of Thinning

- 🍊 Approximately \$ 500/acre (based on \$10/hr)
- 🍊 Labour intensive practices will be more difficult in the future
- 🍊 Harvest efficiency is directly related to the amount of thinning



Ontario Minimum Wage







6-BA Apple Thinning on Gala (2007)

Table 3. Effect of Maxcel and Carbaryl on yield, fruit number and fruit size on 10-yr-old 'Royal Gala'/Bud.9 apple trees. University of Guelph, Simcoe, Ontario, 2007.

Treatment	Rate (mg/L)	TCSA fall 2007 (cm ²)	Yield (kg.tree ⁻¹)	Yield efficiency (kg.cm ²)	Total number fruit per tree	Mean fruit weight (g)	Crop density (#.cm ⁻²)
Untreated Control		41.2	25.0	0.61	187.5	137.4	4.3
Hand thinned control (every other spur)		43.0	20.7	0.49	131.9	160.3	3.2
Maxcel	75	37.4	23.8	0.65	186.9	137.9	5.3
Maxcel	100	45.4	28.9	0.65	186.8	156.1	4.2
Maxcel + Carbaryl	75,750	41.3	15.9	0.40	94.3	175.6	2.4
Maxcel + Carbaryl	100,750	40.3	14.6	0.45	81.1	188.1	2.5
Exilis	75	46.0	33.0	0.72	229.8	146.6	5.0
Exilis	100	38.6	24.4	0.66	175.9	144.3	4.8
Exilis + Carbaryl	75, 1000	43.9	16.9	0.36	107.4	168.3	2.4
Exilis + Carbaryl	100, 1000	41.3	13.6	0.32	87.9	174.2	2.1
significance ^z		ns	**	*	***	***	**
LSD (P=0.05)		7.74	9.83	0.25	75.42	23.25	1.98
P value		0.4294	0.0012	0.0155	0.0004	<0.0001	0.0030

Effective thinning with Maxcel alone or with Carbaryl



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6-BA Apple Thinning – Ambrosia (2007)

Table 7A. Effect of Maxcel and Carbaryl on yield, fruit number and fruit size on 5-yr-old Ambrosia apple trees. Commercial Orchard, Simcoe, Ontario 2007.

Treatment	Rate (mg/L)	TCSA	Yield		Yield efficiency	Total number fruit per tree	Mean fruit weight		Crop density	
		fall 2006 (cm ²)	(kg.tree ⁻¹)	% of control	(kg.cm ²)		(g)	% of control	(#.cm ⁻²)	% of control
Hand thinned control		23.6	32.4	100	1.4	158	206	100	6.8	100
Maxcell	75	23.4	12.4	38	0.6	59	213	103	2.8	40
Maxcel	100	21.6	14.9	46	0.8	70	212	103	3.5	51
Maxcel + Carbaryl	75,750	22.3	2.0	6	0.1	9	217	105	0.5	7
Maxcel + Carbaryl	100,750	23.2	5.3	16	0.2	22	228	111	1.0	14
Maxcel + Carbaryl (at 10-12mm) followed by 750 mg/L Carbaryl 7 days after first	75,750	22.1	3.2	10	0.2	17	199	97	0.8	11
Significance ^z		ns	***		***	***	ns		***	
SD (P=0.05)		4.20	8.88		0.47	40.3	31.3		2.2	
P value		0.9091	<0.0001		<0.0001	<0.0001	0.4840		<0.0001	

ns, ***, **, *, indicates non significance and statistical significance at P=0.001, P=0.01, and P=0.05, respectively



Determining the Response of Gala and Ambrosia to Benefits Particle Film





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Particle film – Royal Gala (2007)

Table 3. Effect of particle film on tree growth, yield, number of fruit per tree, fruit size and crop density 'Gala' apple trees. University of Guelph, Simcoe, Ontario, 2007.

Treatment	Interval (days)	TCSA fall 2006 (cm ²)	Yield (kg.tree ⁻¹)	Yield efficiency (kg.cm ²)	Total number fruit per tree	Mean fruit weight (g)	Crop density (#.cm ⁻²)	Mean leaf area (g)	Mean leaf dry weight (g)
Unsprayed Control		30.5	7.5	0.26	62.9	174.0	2.2	20.9	0.27
2 sprays full rate (2.5 % w/v)	21	39.9	8.8	0.24	71.1	172.3	1.9	21.0	0.28
3 sprays full rate (2.5 % w/v)	21	34.6	8.1	0.25	67.6	168.1	2.1	21.0	0.29
4 sprays full rate (2.5 % w/v)	21	35.1	8.5	0.26	72.6	162.8	2.2	22.1	0.30
2 sprays full rate (5.0 % w/v)	21	37.1	12.5	0.33	92.9	164.9	2.5	24.1	0.34
3 sprays full rate (5.0 % w/v)	21	32.9	9.7	0.29	78.3	165.6	2.4	22.9	0.31
4 sprays full rate (5.0 % w/v)	21	33.1	12.3	0.39	90.2	174.4	2.9	23.9	0.31
significance ^z		ns	*	*	*	ns	ns	ns	ns
LSD (P=0.05)		7.2	3.52	0.10	19.67	10.34	0.66	4.5	0.05
P value		0.1991	0.0239	0.0375	0.0239	0.1371	0.0869	0.5756	0.1515

^z ns, ***, **, *, indicates non significance and statistical significance at P=0.001, P=0.01, and P=0.05,

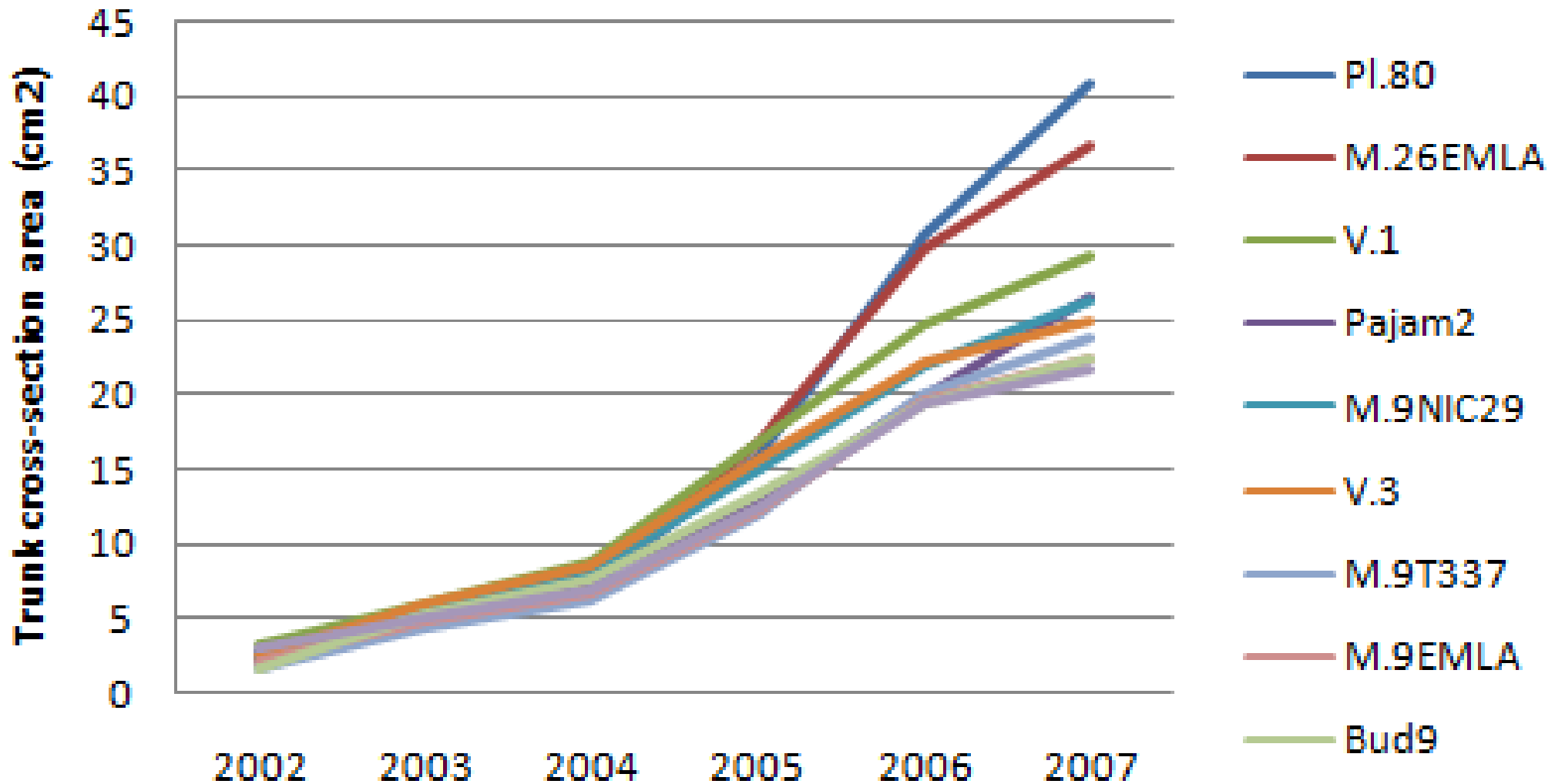
Rootstock Research

Rootstock differences can be subtle but significant

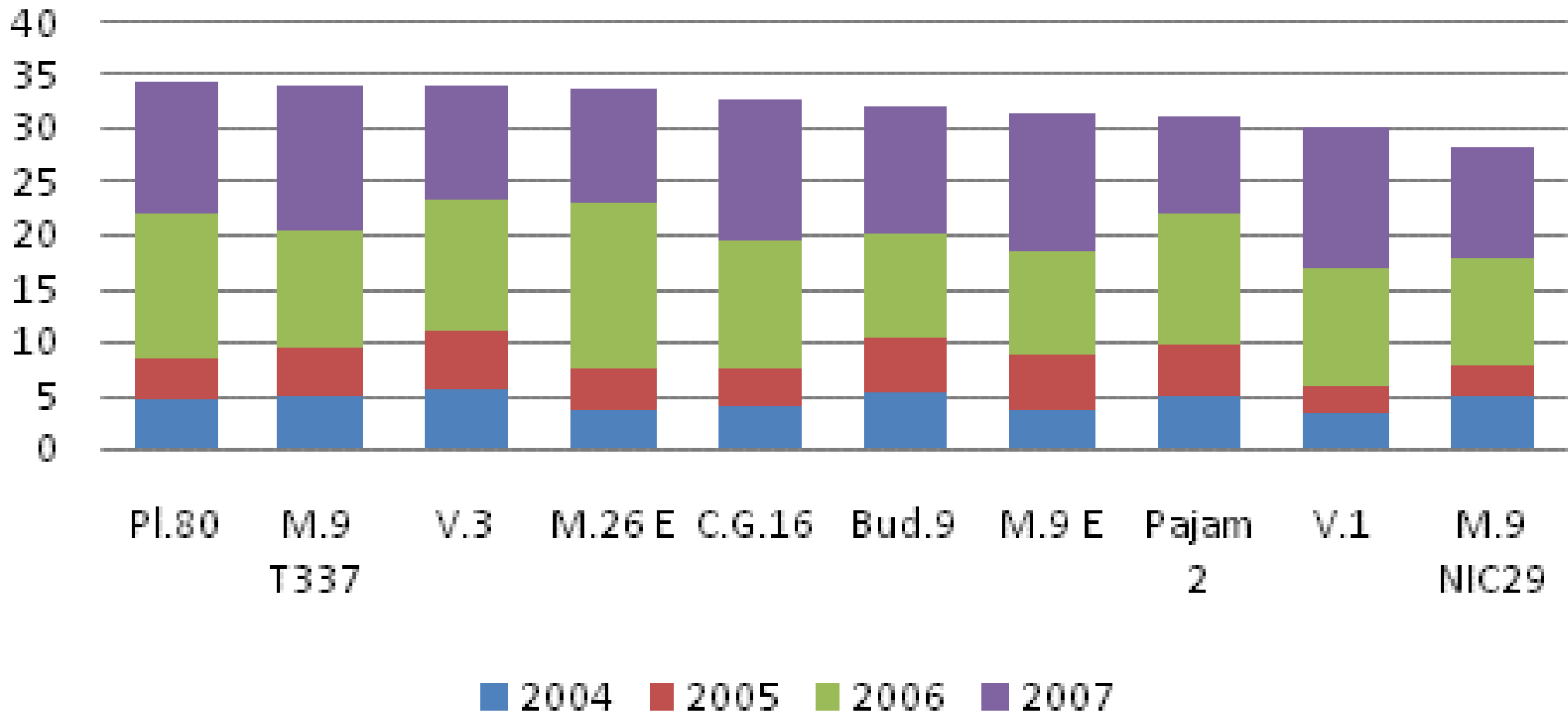


Precocity, productivity, size control, disease resistance, cold hardiness, replant tolerance

Tree Size of Honeycrisp in Relation to Rootstock



Honeycrisp Cumulative Yield (bin/acre) 2.0 x 5.0 m Vertical Axis



Research Challenges and Future

Since tree fruit crops are perennial, and by nature require long-term investment and support

Long-term support today = 3 years

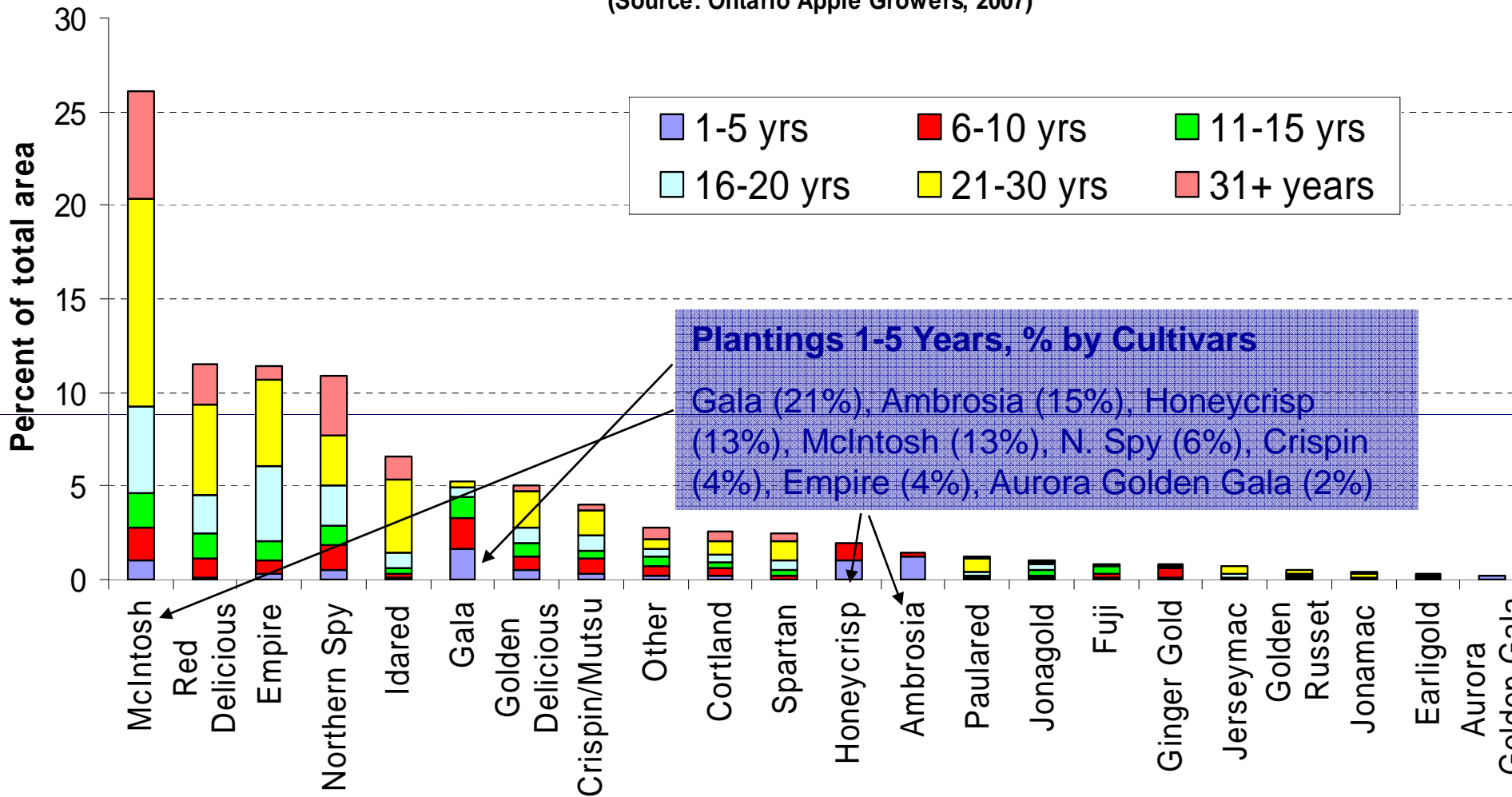
(this is the time it takes to reach fruiting in a new orchard)

Future Research

- Apogee – multi-year and carry-over effects, carry-over effects. Reduction in fruit size
- Irrigation – new technology to conserve water and assist with scheduling
- Thinning – non chemical approaches
- Nutrition – cultivar specific problems such as low Ca in Honeycrisp
- Rootstocks – development of V.5 and V.6
- Other PGRs – Abscisic acid being commercialized
- Horticultural methods to reduce labour costs

Ontario Apple Acreage by Cultivar and Age

(Source: Ontario Apple Growers, 2007)



16, 35, 19% of trees are > 31, 21, 16 years old respectively

30% of trees are less than 16 years old



Orchard Profitability

Cultivar, training system, rootstocks are most critical (fixed at planting)



Crimson Crisp (Coop 39)

- 🍏 The tree is moderately vigorous, grows upright and has good precocity.
- 🍏 It blooms mid to late season. The strengths of 'Crimson Crisp' are its immunity to scab and resistant to leaf rust
- 🍏 Weaknesses include susceptibility to mildew and fire blight



Crimson Crisp (Coop 39)

- Glossy rosy red, close to 100% fruit surface colour, yellow ground colour
- The fruit is quite large: 64–76 mm (2½ -3")
- Flavour: sweet, moderately acid and spicy
- Fruit are not prone to russet.
- Flesh: cream in colour, has an extremely crisp texture
- Matures early October in Simcoe



<http://www.plant.uoguelph.ca/treefruit>

The screenshot shows a Windows Internet Explorer browser window displaying the Pomology website. The browser's address bar shows the URL <http://www.plant.uoguelph.ca/treefruit/>. The website header features the University of Guelph logo and the text "Pomology THE SCIENCE OF GROWING FRUIT". A navigation menu on the left includes links for Home, About Us, Research, Teaching, Public Outreach, Publications, Employment Link, and Contact Us. A "Weather" section is also visible. The main content area has a large image of a white apple blossom and a "Welcome to Our Site" message. A "What's New" sidebar on the right lists recent updates, including "Pomology at the University of Guelph" and "Welcome to our new website!". The footer of the website includes the Environment Canada logo.

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