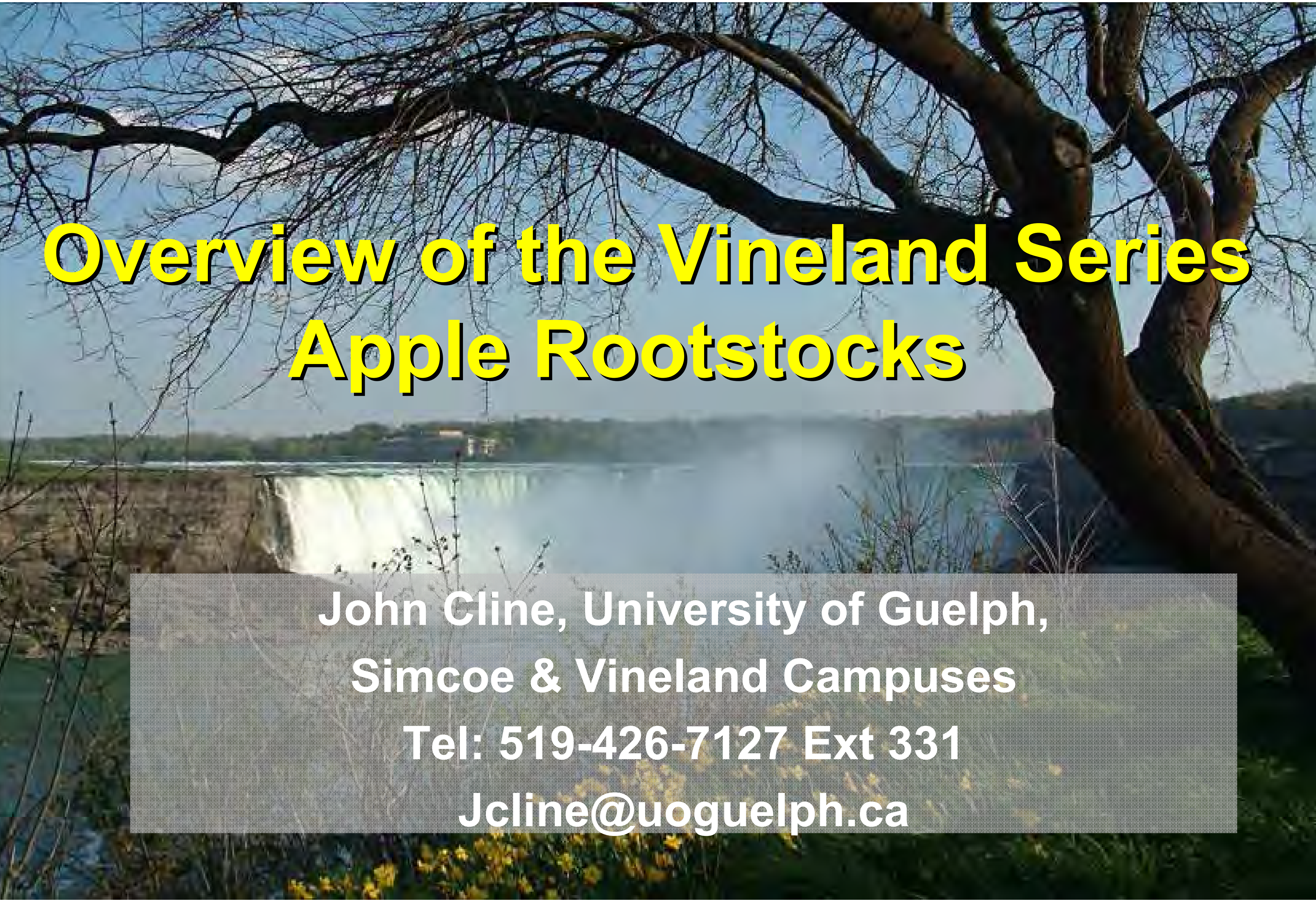

Overview of the Vineland Series Apple Rootstocks

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Presentation Overview

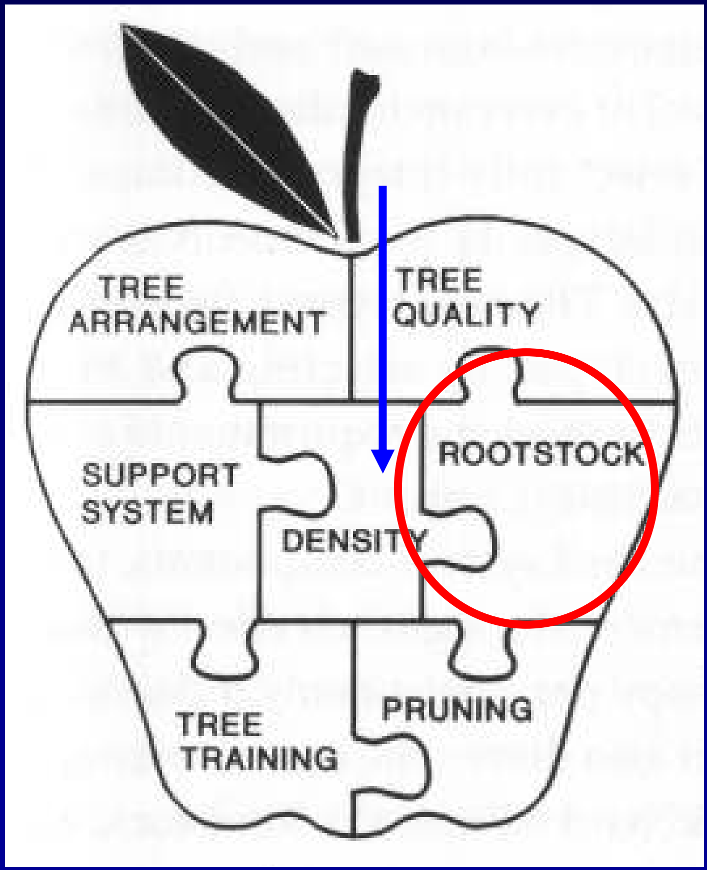
Vineland Series Apple Rootstocks

- Description
- Attributes
- Availability

Rootstock differences can be subtle but significant

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

The Orchard System Puzzle
(Barritt, 1992)



Vineland Rootstocks


FACTSHEET

ORDER NO. 00-007

MARCH 2000

HORTICULTURE

Ontario

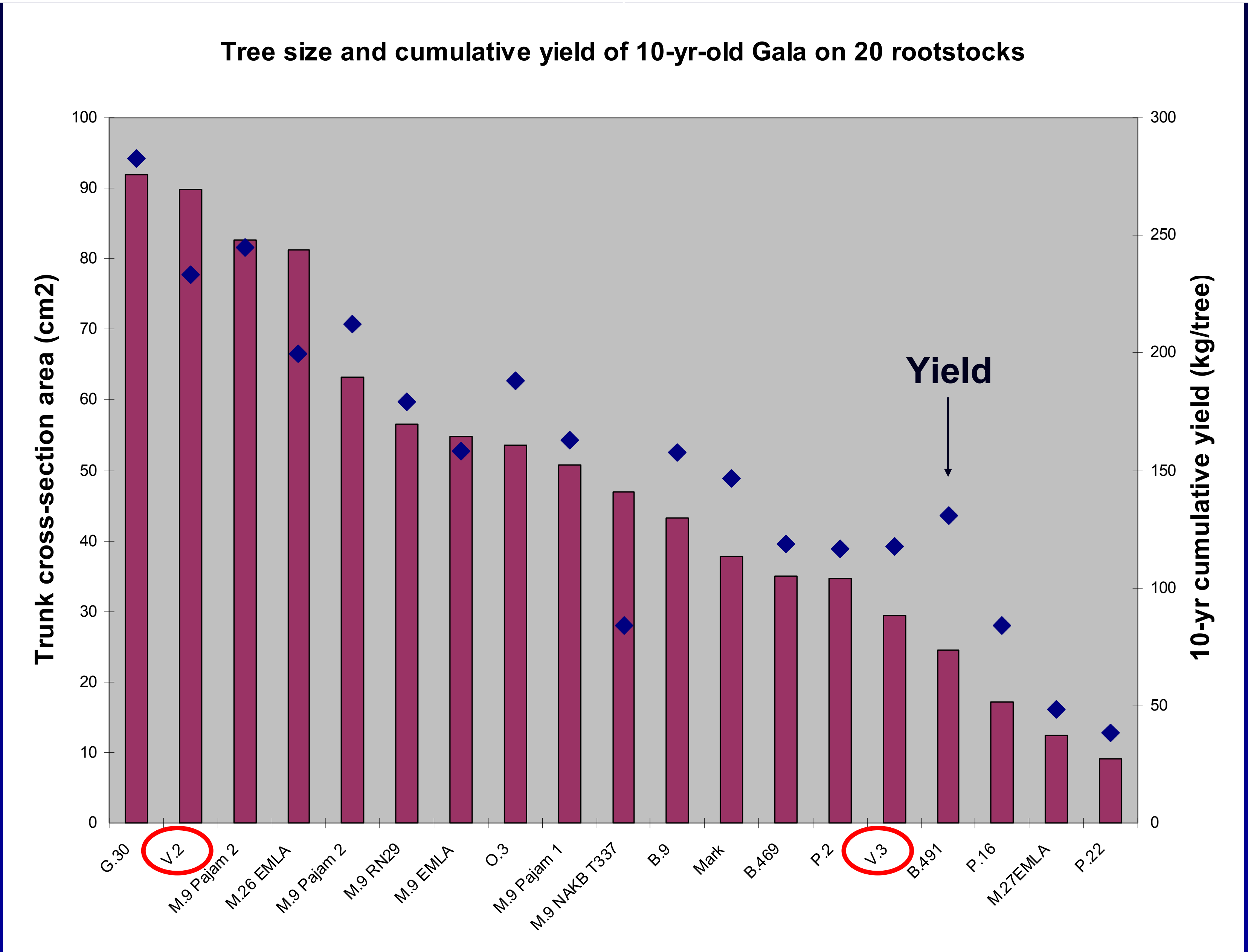
APPLE ROOTSTOCKS

K.B. Wilson

Description

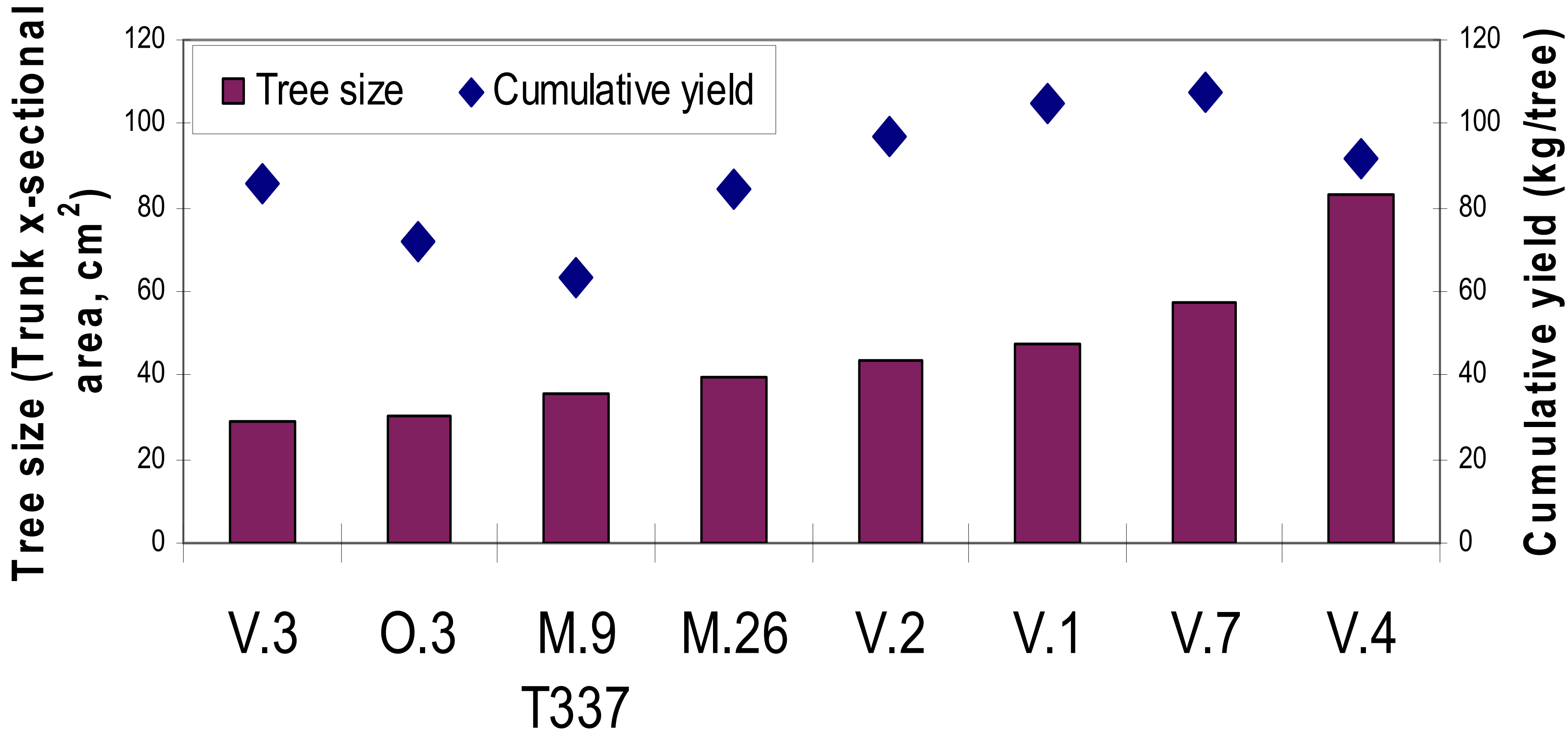
- Developed by Dr. Alec Hutchinson
- ‘Kerr’ applecrab x ‘M.9' rootstock
- Seven rootstocks in the series (‘V.1‘, ‘V.2’-‘V.7')
- Tested in 1980 (Washington, Ohio)
- Tested in 1994-2003 (NC-140)
- Tested in Simcoe 1997, 2002
- Tested in Manitoba and Edmonton (1997-)

Excluded V.5 and V.6



Tree size and cumulative yield of 10-yr-old Gala on 20 rootstocks
Trunk cross-section area (cm2)
10-yr cumulative yield (kg/tree)
Yield
0
10
20
30
40
50
60
70
80
90
100
0
50
100
150
200
250
300
G.30
V.2
M.9 Pajam 2
M.26 EMLA
M.9 Pajam 2
M.9 RN29
M.9 EMLA
O.3
M.9 Pajam 1
M.9 NAKB T337
B.9
Mark
B.469
P.2
V.3
B.491
P.16
M.27EMLA
P.22

Mean tree size and cumulative yield for 10-Yr-old trees on various Vineland rootstocks



Cumulative Yields

Honeycrisp

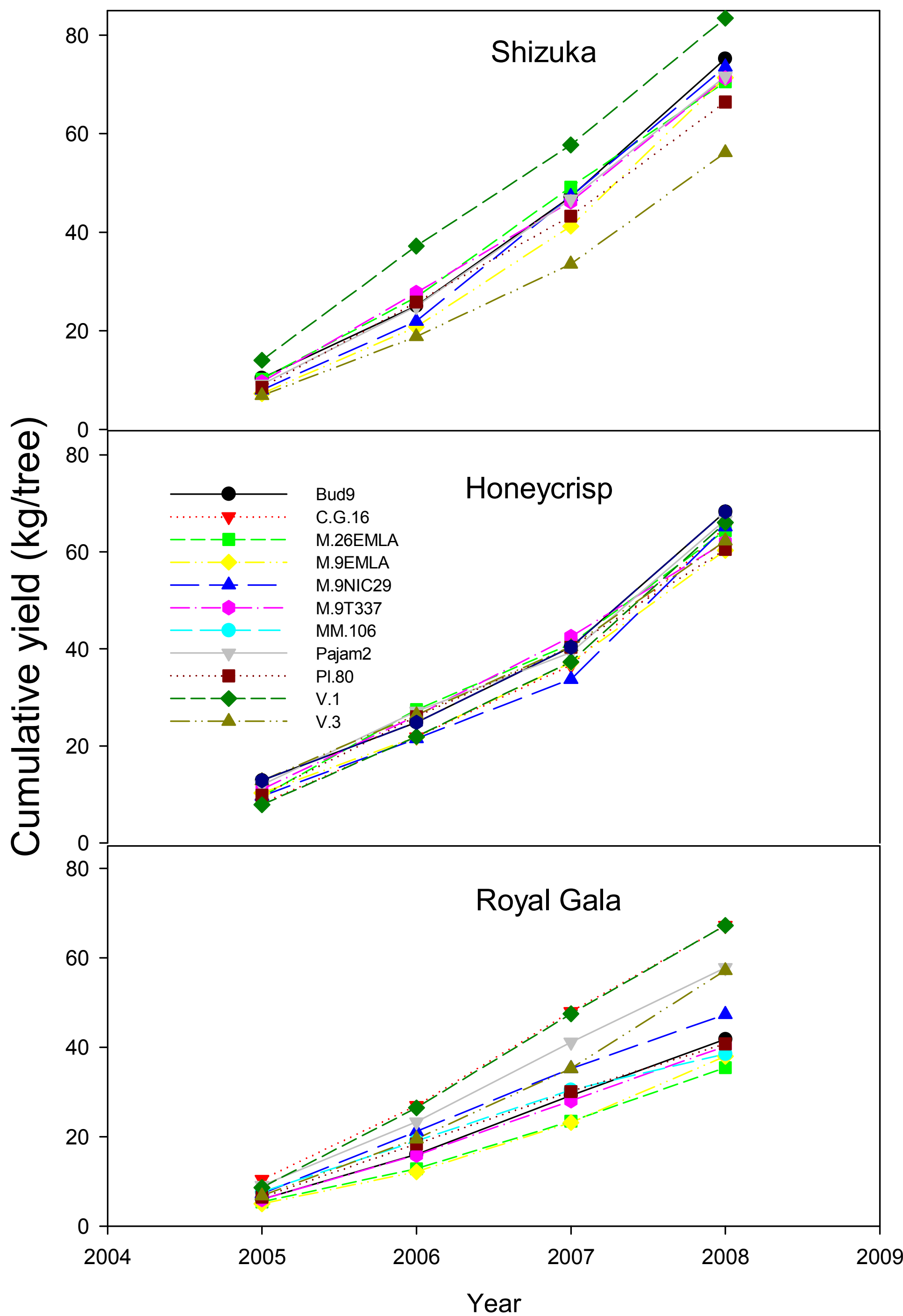
- No statistical difference among roostocks

Royal Gala

- V.1 – 190% of M.26
- V.3 – 161% of M.26
- Bud.9 - 118% of M.26
- M.9E – 107% of M.26
- C.G.16 – 190% of M.26

Shizuka (No statistical difference)

- V.1 – 118% of M.26
- V.3 – 78% of M.26
- Bud.9 - 107% of M.26
- M.9E – 101% of M.26



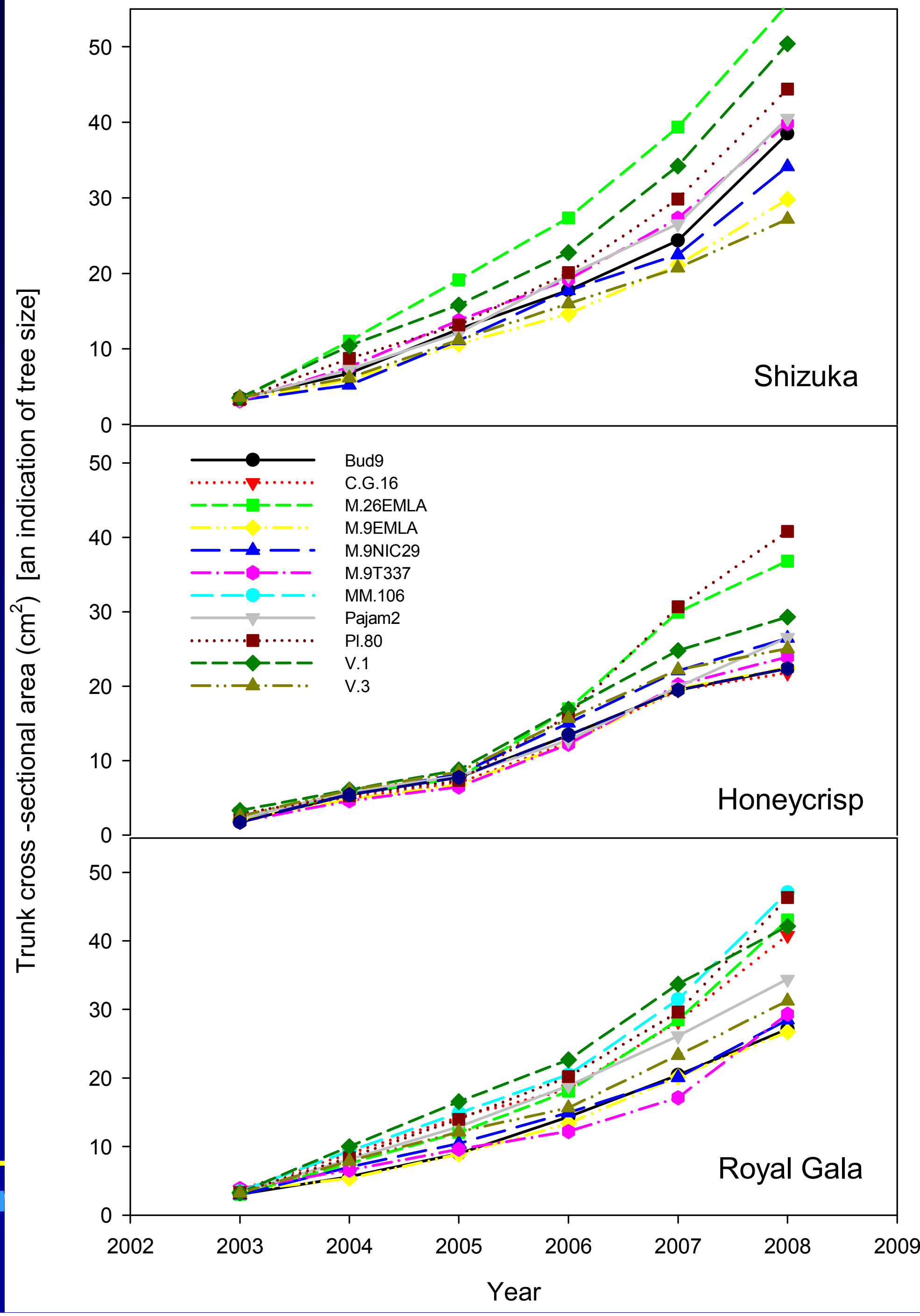
TCSA – 7 Years

Tree Growth

- Honeycrisp < Royal Gala < Shizuka

For Honeycrisp

- V.1 – 81% of M.26
- V.3 – 70% of M.26
- Bud.9 - 62% of M.26
- M.9E – 66% of M.26



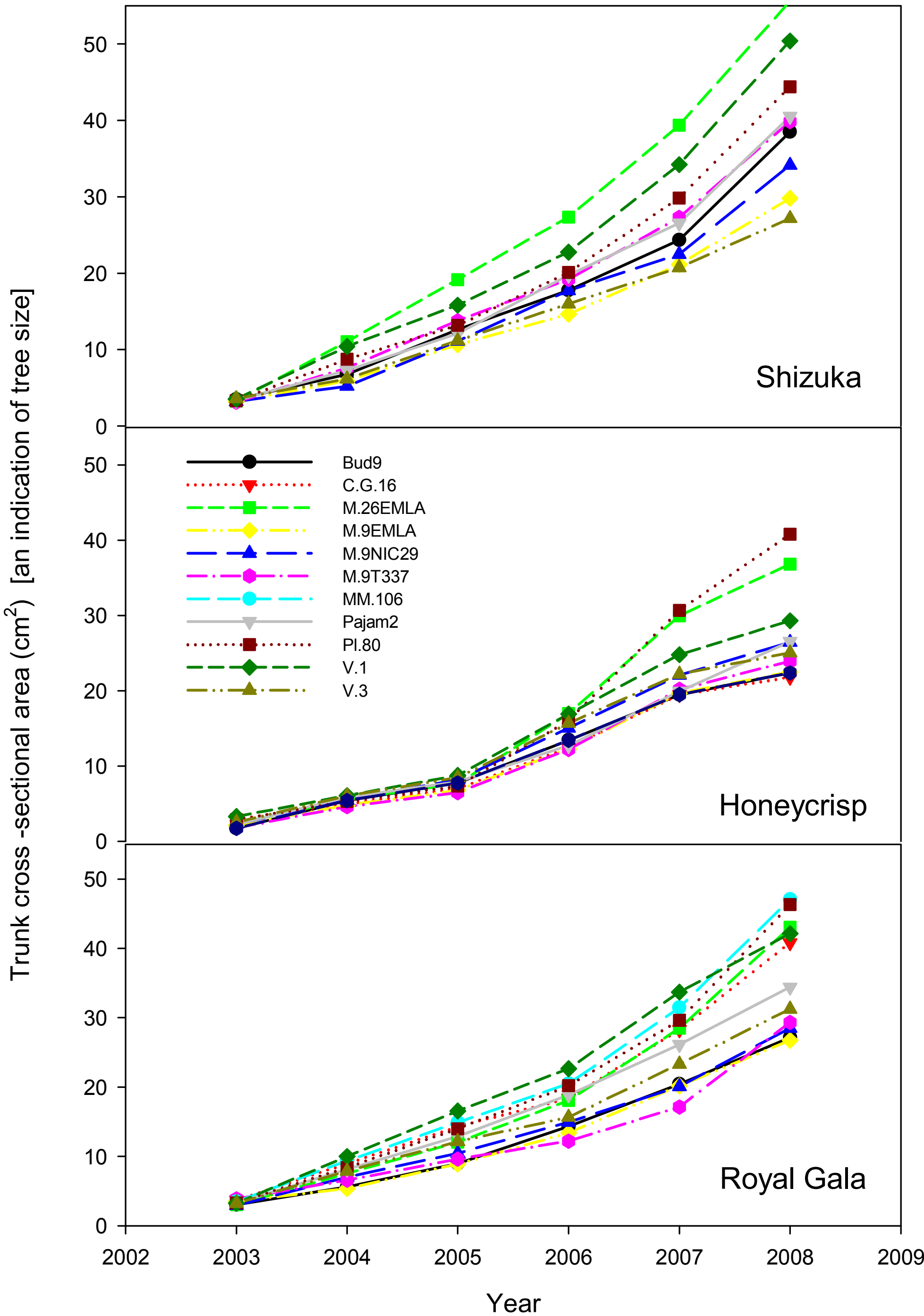
TCSA – 7 Years

For Royal Gala

- V.1 – 98% of M.26
- V.3 – 78% of M.26
- M.9 – 66% of M.26
- Bud.9 – 64% of M.26

For Shizuka

- V.1 – 92% of M.26
- V.3 – 60% of M.26
- M.9 E – 60% of M.26
- Bud.9 - 67% of M.26

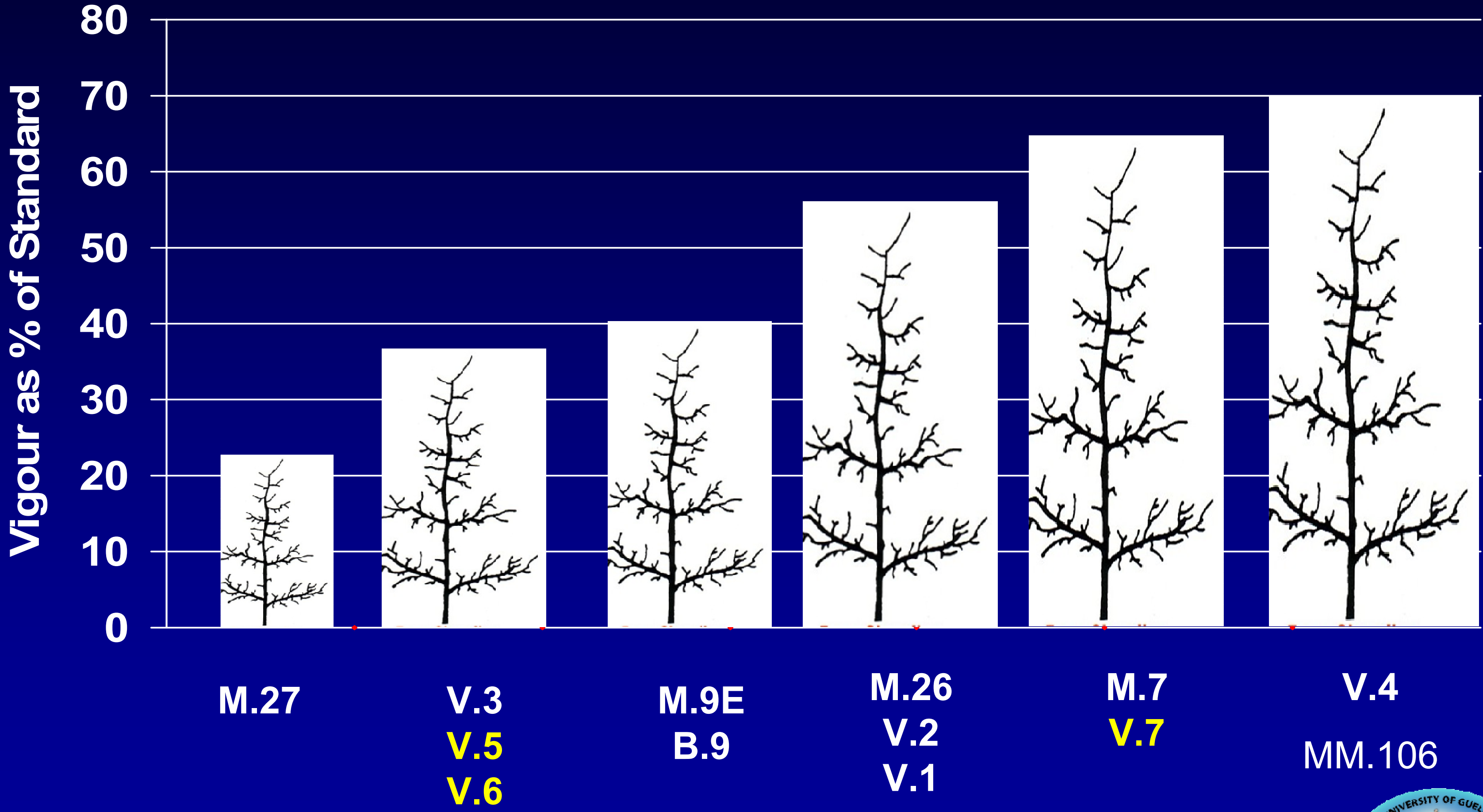


Royal Gala/M.26


Royal Gala/V.3


Royal Gala/V.1

Dwarfing Characteristics of the Vineland Series Apple Rootstocks



Other Attributes

- Cold hardiness
  - Demonstrated in Edmonton planting
- Fireblight resistance
  - Orchard (OHIO) and lab evidence

Cornell University
College of Agriculture and Life Sciences
New York State Agricultural Experiment Station

FOR IMMEDIATE RELEASE
SEPTEMBER 24, 2004
Contact: Linda McCandless, 607-254-5137, email [illegible]

Cornell-developed apple rootstocks survive extreme winter
By Aaron Goldweber

GENEVA, NY: Last winter a "perfect freeze" in New York's Champlain Valley destroyed nearly 25,000 apple trees, resulting in losses projected to be as high as $2.5 million. Out of this devastation comes the encouraging report that two new Cornell-developed rootstocks show strong resistance to unusually harsh conditions.

"The new rootstocks in our trial tolerated this cold snap and survived extremely well compared to those in growers' orchards on standard rootstocks," said Terence Robinson, associate professor in the department of horticultural sciences at the New York State Agricultural Experiment Station (NYSAES) in Geneva, NY. Among five rootstocks showing the most hardiness were Geneva 30 and Geneva 16, which exhibited 96 and 92 percent survivability, respectively.

In commercial orchards, apple varieties are grafted onto rootstocks that help growers control tree size and productivity, and manage pests, diseases, and environmental stress. During a 20-year period from the mid-1970s through the mid-1990s, two Cornell researchers working at the NYSAES, James Cummins and Herb Aldwinckle, developed the apple rootstocks for tolerance to fire blight, a devastating bacterial disease.

"Their survival this past winter demonstrates another important characteristic–extreme cold-hardiness," said Robinson, who specializes in tree fruit systems. He and Kevin Iungerman, extension associate with Cornell Cooperative Extension's Northeast New York Commercial Fruit Program, have a five-acre, 1,200-tree rootstock trial comparing 16 rootstocks at Chazy Orchards in the Champlain Region.

Planted in 2001, trees in the trial were in a unique location to show the effects of the 2003-04 winter, which was one of the harshest of the last 50 years. The stress of bearing the large apple crop of 2003 coupled with mild temperatures in the fall and early winter made the apple trees extremely vulnerable to conditions that followed. A late-December and early-January thaw was followed by rains that saturated the ground and eliminated the snow cover that usually insulates tree roots. In the space of 24 hours, the mercury plunged to extreme sub-zero temperatures and stayed there. The freeze penetrated the soil and damaged root systems, especially those of trees that were three to five years old.

According to a survey taken in June by Iungerman, 24,832 trees were lost coming out of the 2003-04 dormant season. This number is on the rise now that the consequences of summer stress and cropload are showing at harvest. Trees that initially appeared to survive are now seen as lost. The survey showed the freeze killed trees of all ages, but hit younger and more productive trees hardest.

The 25,000 trees lost represent only about five percent of the county's apple trees, but they were predominantly young orchards representing the recent investments by growers and the future production of the area. Growers will have to make considerable new investments to replant the lost orchards.

The economic impact of the loss will not be clear for some time, but Robinson has some numbers that can be used as a starting point. "Each tree that is three- to five-years-old and is killed represents a $50 loss if it was McIntosh and a $100 loss if it was Honeycrisp," he said. "Even working with the assumption that all of the lost trees were McIntosh, the current losses represent $1.23 million. And that doesn't include the cost of replanting." This monetary loss includes the original tree cost and the lost production time while waiting for replacement trees to begin bearing fruit.

To avoid the same level of damage in the future, growers are advised to choose wisely among commercially available rootstocks when replanting.

"Although Geneva 16 and 30 are relatively new, they have been tested in several locations in New York and around the country, so they are ready for use now," said Robinson. "Growers who plant these stocks will have the benefits of using the most highly productive and disease-resistant rootstocks around and will have some insurance against tree death from this type of winter damage."

Growers may not be able to replant these new rootstocks immediately because the rootstocks are at the beginning of commercialization and not yet readily available. Three Canadian rootstocks in the trials also showed strong survival rates. These included Ottawa 3, Vineland 1, and Vineland 3.

"Growers may have to leave their plots open while they wait for commercial stock to become available, but that small amount of time will be a big help in the future of the farm," said Robinson. "This exact type of winter cold snap may not happen for another 50 years, but if another event like 2004 comes, growers will protect themselves from losses by planting the new stocks."

\# # # #

- *"Three Canadian rootstocks in the trials also showed strong survival rates. These included Ottawa 3, Vineland 1, and Vineland 3. "*
- *(Cornell University Press Release, Sept 24 2004)*

Summary of the characteristic and availability of the Vineland Apple Rootstocks

	Commercially Available			Under Test			Will not be commercial-ized
Characterisistic	V.1	V.2	V.3	V.5	V.6	V.7	V.4
Tree Vigor	M.26 size	M.26 Size	M.9E size or slightly smaller	M.9E Size or slightly smaller	M.9E Size or slightly smaller	M.7 Size	MM.106-MM.111 Size
Availability	Cameron Nurseries (cameronnursery.com)	Not commercially available	DNA Gardens, Elnora, Alberta (dnagardens.com)	Not commercially available	Not commercially available	Not commercially available	Not available
Yield Performance	Similar or better than M.26	Similar or better than M.26	Similar to M.9E	NA	NA	Excellent, better than M.26E	Similar to M.26
Yield Efficiency	Similar or better than M.26	Similar or better than M.26	Similar to M.9E	NA	NA	Better than M.26	
Features	Cold Hardy, displays fireblight resistant	Cold Hardy, displays fireblight resistant	Cold Hardy, displays fireblight resistant	NA	NA	Cold Hardy, displays fireblight resistant	Cold Hardy, displays fireblight resistant

NA = not available (rootstock has not been tested)

Availability

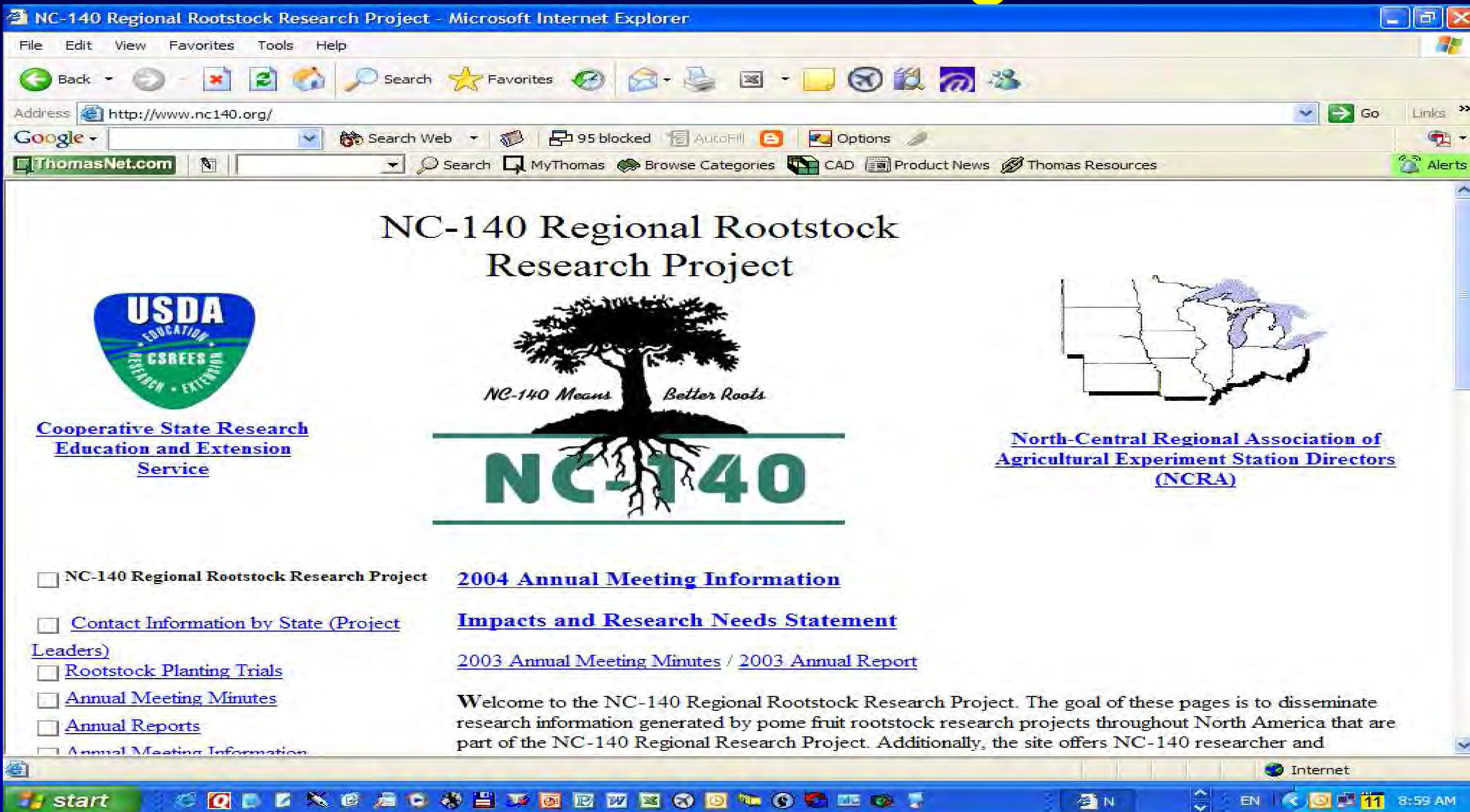
- Commercial development by the University of Guelph and the Ontario Ministry of Agriculture.
- ‘V.1', ‘V.2’ and ‘V.3' have been licensed
- More information is required to determine the suitability of commercializing ‘V.5', ‘V.6', and ‘V.7'.
- ‘V.2’ has been commercially released but has been difficult to propagate in the nursery, therefore it may have limited availability.
- ‘V.4’ will not be commercialized.

Further Information

- Contact the author (John Cline, Univ of Guelph)
- Dr. Stephen Bowley, Business Development Office, University of Guelph (www.uoguelph.ca/research/bdo/)

  Tel: (519) 824-4120 Ext 58704

www.nc140.org



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Address http://www.nc140.org/plantings.html

- Project Publications
- WWW Links
- NC-140 Members Only

Current Plantings

2002 Peach Rootstock Trial (Scott Johnson)

2002 Apple Rootstock Trial (Wes Autio)

2001 Peach Rootstock Trial (Greg Reighard)

1999 Dwarf Apple Rootstock Trial (Wes Autio)

1999 Semi-dwarf Apple Rootstock Trial (Wes Autio)

1998 Cherry Rootstock Trial

- NC-140 Cherry Rootstock Pages
- Preliminary Performance of Hedelfingen Cherry on Ten Rootstocks in the 1998 NC-140 Cherry Rootstock Trial
- Preliminary Performance of Montmorency Cherry on Eleven Rootstocks in the 1998 NC-140 Trial

1998 G.16 Apple Rootstock Trial (Terence Robinson)

1994 Peach Rootstock Trial (Greg Reighard)

1994 Gala Dwarf Apple Rootstock Trial (Rich Marini)

1994 Gala Semi-dwarf Apple Rootstock Trial (Rich Marini)

Internet