

Great Lakes Fruit, Vegetable & Farm Market EXPO

December 9-11, 2008

DeVo Place Convention Center, Grand Rapids, MI



Tree Fruit

Wednesday afternoon 2:00 pm

Where: Ballroom D

Recertification credits: 1 (1C, PRIV OR COMM CORE)

CCA Credits: PM(0.5) CM(1.5)

Moderator: Ed Robinette, Robinette's Cider Mill, Grand Rapids, MI

2:00 p.m. Rainfastness of Insecticides in Apples for Control of Codling Moth

- John Wise, MSU Trevor Nichols Research Station

2:30 p.m. The Tall Spindle Training System for Apple and Pears

- Terence Robinson, Horticultural Sciences Dept., Cornell Univ.

3:10 p.m. Use of Harvista on Apples, Sprayable MCP

- Jim Schupp, Horticulture Dept., Pennsylvania State Univ.

3:40 p.m. New Pear Varieties

- Richard Bell, Research Horticulturist, Appalachian Fruit Research Station, USDA-ARS
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BREEDING NEW PEAR VARIETIES: DEVELOPMENTS FROM THE USDA PEAR BREEDING PROGRAM

Richard L. Bell
USDA, Agricultural Research Service
Appalachian Fruit Research Station
2217 Wiltshire Road
Kearneysville, WV 25430

Telephone: 304-725-3451 Ext. 353

Fax: 304-728-2340

Email: richard.bell@ars.usda.gov

Website: <http://www.ars.usda.gov/naa/afrs>

The USDA pear breeding program has focused on the development of new varieties with high fruit quality and productivity, and enhanced with resistance to fire blight, the major disease problem of pears throughout North America and Europe. Early releases from the program in the 1960's included 'Magness', 'Moonglow', and 'Dawn'. Since 1992, we have released four cultivars, 'Potomac', "Blake's Pride", "Shenandoah", and 'Sunrise'. An application to release of an additional selection, US71655-014, will be made in the near future. A recent additional objective has been the development of varieties with resistance to pear psylla, a major insect pest of pears. Secondary objectives include resistance to *Fabraea* leaf spot, the development of crisp-fleshed pears with European-type flavor, and dwarf growth habit.



Major Objectives

- Excellent fruit quality & long storage life
- Precocious bearing
- Consistent and high yield
- Resistance to fire blight (*Erwinia amylovora*)
- Resistance to pear psylla (*Cacopsylla pyricola*)

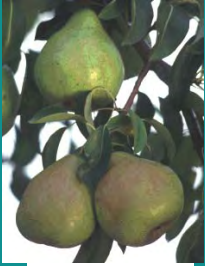
Additional Objectives

- Resistance to *Fabraea* leaf and fruit spot (*Fabraea maculata* or *Entomosporium maculatum*)
- Resistance to pear scab (*Venturia pirina*)
- Dwarf growth habit
- Novel fruit types – interspecific hybrids with Asian species for crisp, ready-to-eat texture

Fire Blight Resistance


- Sources of resistance:
 - Pyrus communis*: ‘Seckel’, ‘Old Home’, ‘Maxine’
 - Pyrus ussuriensis*: Illinois 76, Illinois 65 ‘Ba Li Hsiang’
 - Pyrus pyrifolia*: ‘Kieffer’, NJ 1
 - Pyrus x bretschneideri*: ‘Pai Li’

‘Potomac’ Pear



- Highly resistant to fire blight
- Glossy, light green skin; calyx end russet
- Aromatic, sub-acid flavor
- Harvest 2 weeks after ‘Bartlett’
- Storage life: 2-3 months

‘Blake’s Pride’ Pear



- Flavor and aroma similar to ‘Comice’
- Fruit size equal to ‘Bartlett’
- Fire blight resistant
- Harvest date: 2 weeks after ‘Bartlett’
- Storage Life: 3-4 months
- Moderate vigor; upright-spreading tree habit

'Shenandoah' Pear



- Aromatic, sub-acid to acidic flavor which mellows in storage.
- Large fruit
- Fire blight resistance equal to 'Seckel'
- Harvest 4 to 5 weeks after 'Bartlett'
- Storage life: 5 months

'Sunrise'



- Aromatic, sweet flavor; 14-16% SS; high consumer sensory ratings
- Attractive; frequent blush
- Productive; 2-3 fruit/spur
- Moderately resistant to fire blight
- Matures 2 weeks before 'Bartlett' (Clapp's season)
- Stores for 2-3 months without core breakdown
- Named and released in 2006 by USDA-ARS and The Ohio State University, OARDC
- Certified budwood source: NRSP-5

Table 1. FRUIT DESCRIPTIVE AND SENSORY TRAITS OF 'SUNRISE' AND 'BARTLETT'.

Trait	Cultivar	
	Sunrise	Bartlett
Harvest (days +/- Bartlett)	14	0
Fruit size		
Diameter (mm)	65	66
Length (mm)	87	81
Weight (g)	205	187
Core diameter (mm)	17	22
Flavor (1-9)	7.0	6.4
Aroma (1-3)	1.6	1.8
Texture (1-9)	6.9	6.2
Grit (1-9)	7.0	6.4
Juiciness (1-9)	6.1	6.1
Russet (1-9)	7.3	6.5
Appearance (1-9)	7.8	6.5
Storage life (days)	84	92

TABLE 2. FIRE BLIGHT INFECTION IN 'SUNRISE' AND 'BARTLETT'

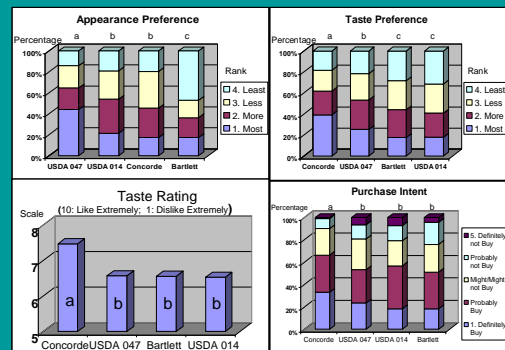
Infection type	No. years	'Sunrise'	'Bartlett'
Natural (USDA score)	10	7.7 a	3.4 b
Artificial	3		
Lesion length (mm)		66 a	311 b
% Lesion length		9 a	81 b



US 71665-014

good sensory scores, long storing, productive
very little superficial scald, no russet

SET 1 Results



COLLABORATORS

Bill Shane
Michigan State University Cooperative Extension
Southwest Michigan Research and Extension Center, Benton Harbor

Jim Nugent & Bill Klein
Michigan State University Cooperative Extension
Northwest Michigan Horticultural Research Station, Traverse City

Robert Andersen, Terence Robinson & Jay Freer
Cornell University
New York State Agricultural Experiment Station, Geneva

Gregory Reighard
Department of Horticulture Clemson University, Clemson

Gary Moulton
Washington State University
Northwestern Washington Research and Extension Center, Mount Vernon

David Sugar
Oregon State University
Southern Oregon Research and Extension Center, Central Point

COLLABORATORS

Rachel B. Elkins
University of California Cooperative Extension, Lakeport

Janet D. Turner & Clark Seavert
Oregon State University Mid-Columbia Agricultural
Research & Extension Center, Hood River

Steve Castagnoli
Oregon State University Cooperative Extension
Mid-Columbia Agricultural Research & Extension Center, Hood River

Elizabeth J. Mitcham
University of California Dept. of Plant Sciences, Davis

William V. Biasi
University of California Dept. of Plant Sciences, Davis

Ann Colonna
Oregon State University Food Innovation Center, Portland

BREEDING FOR HOST PLANT RESISTANCE TO PEAR PSYLLA



Psylla Resistant Pear Germplasm

Pyrus ussuriensis x *Pyrus communis* hybrids



NY 10355



NY 10356



NY 10357

Psylla Resistant Pear Germplasm East European *Pyrus communis*



Batjarka



Erabasma



Jeribasma



Lucele

Modes of Resistance

- Antixenosis
 - Inhibition of oviposition
 - Inhibition of nymphal feeding
- Antibiosis
 - Delayed development
 - Nymphal mortality

Future Directions



Interspecific hybrids with Asian pear species for:

- Novel textures – crisp flesh and European flavor
- High Productivity
- Resistance to psylla, fire blight, *Fabraea*, and pear scab

Future Directions



Dwarf trees for:

- Ease of harvest
- Ease of pruning
- High yield efficiency

Methods:

- Conventional breeding
- Genetic modification of rootstocks and scion cultivars