Attendance and presentation at the symposium has been funded by HAL using voluntary contribution, the cherry industry levy and matched funds from the Australian Government.
Plasencia 2013

The symposium was organized by the International Society for Horticultural Science (ISHS) and the Government of Extremadura through the Department of Horticulture of the Research Center La Orden-Valdesequera House, and the Department of Fruits and Vegetables of the Agrifood Technology Research Institute of Extremadura, in collaboration with the University of Extremadura.
TOPICS

1. Breeding, Genetics and Biotechnology
2. Crop Production and Orchard Management
3. Rootstocks and Varieties Evaluation/Propagation
4. Tree Fruit Physiology, Plant Growth, and Floral Biology
5. Pest and Disease Management
6. Postharvest Technology, Fruit Quality, Health Related Issues
Professor Greg Lang (MSU)
Trends and characteristics of current, new and future cherry cultivars

What’s driving breeding programs?
Focus on additional cultivar traits
What traits will become more important in the near future?
Engage physiologists and horticulturalists
Identification of visionary traits
Resistance to cherry leaf spot; very late bloom for frost avoidance adaptation to new harvest systems (upright harvesters require low suckering and moderate tree structure, and sideways harvesters are best with moderate suckering and small flexible stems), resistance to powdery mildew and bacterial canker; low fruit pedicel retention for mechanical harvest; self-fertility, adaptation to low chilling (using interspecific hybrids); resistance to heat-induced fruit doubling; very early ripening; self-fertility, adaptation to low chilling, early ripening, resistance to cherry leaf spot, hybrids with P. canescens and P. tomentose, long on-tree ripening window, precocity and high productivity on vigorous rootstocks, uniform balanced spur formation, good postharvest traits; blush-type fruits (yellow with red blush), novelty fruit types, self-fertility, pest and disease resistance, tree and bud winter hardiness, winter hardiness, compact growth, adaptation to Jerte valley, adaptation to “climate change” (low chilling but high heat for good bud break, but not too early); future targets likely to be resistance to Monilia, Pseudomonas, and black cherry aphid, compact habit, self-fertile, diverse colors, low infection by black cherry aphid, white flesh, low acid, high sugar, adaptation to Beijing climate, self-fertile, tolerance to rain, adaptation to low chill and hot summers, low chilling (<600 hr), early ripening, fruit/leaf balance, good postharvest traits, adaptation to low chilling and high summer heat, early ripening, good postharvest traits, low chilling, long postharvest performance, resistance to bacterial canker
INRA
New breeding programme and new scientific project: ‘Adaptation of sweet cherry to climate change’. Two main targets: phenology-related traits and tolerance to rain-induced fruit cracking
RosBREED
Enabling marker-assisted breeding in Rosaceae

MSU
Amy Iezzoni (PD)
Jim Hancock
Dechun Wang
Cholani Weebadde
Univ. of Arkansas
John Clark

WSU
Cameron Peace
Dorrie Main
Kate Evans
Karina Gallardo
Raymond Jussaume
Vicki McCracken
Nnadozie Oraguzie
Mykel Taylor

Univ. of Minnesota
Jim Luby
Chengyan Yue

Univ. of Arkansas

USDA-ARS
Nahla Bassil
Gennaro Fazio
Chad Finn

Cornell
Susan Brown
Kenong Xu

Clemson
Ksenija Gasic
Gregory Reighard

Texas A&M
Dave Byrne

Univ. of CA-Davis
Tom Gradziel
Carlos Crisosto

Univ. of New Hamp.
Tom Davis

Plant Research Intl.,
Netherlands
Eric van de Weg
Marco Bink

Oregon State Univ.
Alexandra Stone
Professor Koumarov (Bulgaria) – challenges of dwarfing rootstocks
- Tendency to overloading – poor growth – small fruit – stunt trees – dead trees

Pruning
- Promote vigorous growth and restrain cropping
- Severe ("aggressive") pruning

Water regime
- Small and slow water applications
- Small and shallow root system
- Extending irrigation intervals is detrimental

Mineral nutrition
- Small and shallow root system
- Concentration of absorbing roots in the limited volume of soil wetting
ROOT STOCKS & VARIETIES

Professor Greg Lang (MSU)
Evaluation of
• 4 orchard systems (KGB, TSA, SSA, UFO)
• 3 Gisela rootstocks (G3, G5, G6)
• Multiple north American sites
ROOT STOCKS & VARIETIES

Professor Terence Robinson (Cornell)
Interaction of Training System and Rootstock on Yield, Fruit Size, and Crop Value of Three Sweet Cherry Cultivars
ROOT STOCKS & VARIETIES

Large fruit size on dwarfing stocks
- Manage crop load
- Aggressive pruning
- Remove small diameter twigs (<25cm long)
- Remove whole branches
- Additional Nitrogen fertilizer to keep vigour up

High Density Systems
$27-67/additional tree
The permeability concept

- Water balance equals sum of flows through surface (transpiration, surface uptake and uptake along stem/fruit juncture) plus vascular transport
- Numerically largest flow associated with transpiration
- Mechanistic model for surface uptake and transpiration, descriptive model for vascular transport and uptake along stem/fruit juncture
- Data base for cracking thresholds in literature is narrow, data available differ by order of magnitude

Combination of 2 different approaches
Potential for collaboration
Doctor Karen Sagredo (Chile)
Fruit set in Kordia and Regina

- Both experience excess fruit abortion
- Overlapping bloom periods
- Sunburst, Summit and Schneider - Kordia
- Schneider - Regina
- Kordia 30%
- Regina 40%
Dr Angela Berrie (East Malling)
Integrated control of fungal rots

- *Monilinia laxa* was the predominant rot present in orchards
- Botrytis rot was significant rot in store in some years but rarely seen in orchard
- Botrytis important if there is frost damage to flowers
- *M. laxa* main source of inoculum is overwintering mummified fruit

<table>
<thead>
<tr>
<th>Fungal rot</th>
<th>Cherry cultivar / Year sampled</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Stella</td>
<td>Colney</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2002</td>
<td>2003</td>
<td>2002</td>
</tr>
<tr>
<td><em>Monilinia laxa</em></td>
<td></td>
<td>36.4</td>
<td>50.1</td>
<td>36.5</td>
</tr>
<tr>
<td><em>Monilinia fructigena</em></td>
<td></td>
<td>4.2</td>
<td>22.5</td>
<td>2.3</td>
</tr>
<tr>
<td><em>Botrytis cinerea</em></td>
<td></td>
<td>41.7</td>
<td>4.1</td>
<td>28.9</td>
</tr>
<tr>
<td><em>Mucor/Rhizopus spp.</em></td>
<td></td>
<td>8.1</td>
<td>1.9</td>
<td>4.4</td>
</tr>
<tr>
<td><em>Penicillium spp.</em></td>
<td></td>
<td>0.8</td>
<td>5.7</td>
<td>5.0</td>
</tr>
<tr>
<td><em>Cladosporium</em> spp.</td>
<td></td>
<td>0</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td><em>Colletotrichum</em> spp.</td>
<td></td>
<td>1.4</td>
<td>4.2</td>
<td>0</td>
</tr>
<tr>
<td>Other rot</td>
<td></td>
<td>0.6</td>
<td>0</td>
<td>0.4</td>
</tr>
<tr>
<td>Total loss</td>
<td></td>
<td>85.5</td>
<td>80.5</td>
<td>71.1</td>
</tr>
<tr>
<td>Number of orchards sampled</td>
<td></td>
<td>9</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>
### Pests & Diseases

<table>
<thead>
<tr>
<th>Fungicide programme</th>
<th><em>M. laxa</em></th>
<th><em>M. fructigena</em></th>
<th>Botrytis</th>
<th><em>Mucor</em></th>
<th><em>Pencillium</em></th>
<th><em>Cladosporium</em></th>
<th>Total rots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>88.5</td>
<td>1.5</td>
<td>13.1</td>
<td>0.3</td>
<td>0.2</td>
<td>0</td>
<td>98.3</td>
</tr>
<tr>
<td>Signum</td>
<td>50.9</td>
<td>0.8</td>
<td>33.3</td>
<td>0.6</td>
<td>0.2</td>
<td>0.03</td>
<td>82.1</td>
</tr>
<tr>
<td>Indar / Teldor</td>
<td>76.0</td>
<td>2.5</td>
<td>20.5</td>
<td>0.3</td>
<td>1.5</td>
<td>0.4</td>
<td>94.7</td>
</tr>
<tr>
<td>Indar / Teldor pre- harvest</td>
<td>82.5</td>
<td>0.2</td>
<td>15.5</td>
<td>0.08</td>
<td>2.5</td>
<td>0.03</td>
<td>95.4</td>
</tr>
</tbody>
</table>

- New products needed for suppressing sporulation of mummified fruit
- May be difficult to achieve same effect with orchard spray
- Fungicides currently available as orchard sprays limited efficacy especially in reducing fruit rot in storage
POSTHARVEST

Professor Daniel Valero (Spain)
Maintenance of quality attributes by innovative postharvest treatments

• Aloe
  • Reduced loss of firmness, stem pull, stem colour and weight, reduced loss of phenolics and anthocyanins

• MAP with the addition of essential oils was effective on maintaining cherry quality and reducing postharvest losses
• Cherries dipped in solutions containing salicylic acid delayed the postharvest ripening process and enhanced bioactive compounds with antioxidant activity
• Edible coatings based on Aloe vera and Alginate (alone or with essential oils) are promising postharvest tools to increase shelf life of sweet cherries.

• Potential of essential oils to reduce moulds and yeasts post harvest
We have not seen or met a single person who does not like sweet cherries.

In Turkey, Sweet cherry consumption per capita per year is as high as 3.0 kg while in US it is about 1 kg per capita per year.
The 2014 International Horticultural Congress, Brisbane, Australia | 17-22 August, 2014

We will give you a warm welcome to Brisbane, Australia for the 29th International Horticultural Congress August, 2014

Thank You!