

PROGRAM SCHEDULE

XXVIth International Horticultural Congress

Toronto, Canada

August 11–17, 2002

SUNDAY August 11

All times are listed and scheduled
based on a 24-hour clock

0900–1830

Registration Desk Open

Metro Toronto Convention Centre,
North Building, Street Level Lobby

1430–1630

Tex Frazier Lecture and Toronto Forum on Biotechnology for Horticultural Crops in the CGIAR

Fairmont Royal York Hotel, Concert Hall

Sponsors: American Society for Horticultural Science; Potato Association of America; International Society for Horticultural Science; The Consultative Group for International Agricultural Research; Seminis Seeds

Conveners: Dr. Richard L. Sawyer Director General Emeritus, International Potato Center; Dr. George Wilson, Vice-Provost, International Activities, North Carolina State Univ.

Welcome and Introduction

Dr. Richard L. Sawyer

The CGIAR System and Horticultural Crops

Dr. Hubert Zandstra, *Director General, International Potato Center, Lima, Peru (CIP)*



Dr. Zandstra has a B.Sc. in Agriculture, McGill Univ.; M.Sc. in Agronomy, McGill Univ.; and a Ph.D. in Agronomy at Cornell Univ.. Previous responsibilities included being Deputy Director General for Research at the International Rice Research Institute (IRRI); Director, Agriculture, Food and Nutrition, IDRC; Associate Director, Crop and Animal Production Systems, IDRC; and Head of Multiple Cropping Dept. and Program leader for the Cropping Systems Program, IRRI. He

has served on many international committees and Boards in his agricultural development work for both developed and developing countries, and has authored many scientific papers. He will provide a general overview of the CGIAR research system, the changes taking place, and attention given to biotechnology with horticultural crops.

Biotechnology with Horticultural Crops in Africa

Dr. Rodomiro Ortiz, *Director of Research and Development, International Institute for Tropical Agriculture, Ibadan, Nigeria (IITA)*



Dr. Ortiz received his undergraduate training at National Agrarian Univ., La Molina, Peru and Ph.D. in Plant Breeding and Genetics, Univ. of Wisconsin, USA. His previous responsibilities include being Director of Genetic Resources and Enhancement Program, ICRISAT, India; Nordic professorship for plant genetic resources, Royal Veterinary and Agricultural Univ., Denmark; blueberry and cranberry cytogeneticist, Rutgers Univ.; and associate geneticist, International Potato Center. Together with many colleagues he has employed conventional, modified, and novel techniques for germplasm enhancement, including bio-techniques that facilitate the genetic manipulation of plant species.

Biotechnology with Horticultural Crops in Latin America

Dr. Joachim Voss, *Director General, Centro Internacional para Agricultura Tropical (CIAT), Cali, Columbia*



Dr. Voss was educated at the Univ. of Toronto (BA); MA, Univ. of Guelph; and PhD Univ. of Toronto in Economic Anthropology. His previous responsibilities included Senior Research Manager IDRC; Director, Sustainable Production Systems Program, IDRC; Senior Scientist, Farming Systems Specialist, CIAT; and Rockefeller Foundation Post Doctoral Fellow in Great Lakes Regional Bean program. He has had many assignments of teaching and research internationally and served on many international committees and Boards.

A Global Approach to Horticultural Problems

Dr. Wanda Collins, *Director, Plant Sciences Institute, USDA-ARS, Beltsville, MD, USA*



Dr. Collins received her PhD degree in Plant Pathology and Genetics from North Carolina State Univ.. Previous responsibilities include Professor, and vegetable breeder NC State Univ.; Environmentally and Socially Sustainable Development Vice Presidency on issues of global agricultural research, World Bank; Deputy Director General of Research, CIP; and Chairperson of the Board of Trustees of the International Plant Genetic Resources Institute and the International Network for the Improvement of Banana and Plantain. She has worked in international agriculture for many years with extensive experience

in Latin America, Asia and Africa. Collins has released many sweet potato varieties in developed and developing countries and authored many articles on science and policy issues in agriculture. She is a Past President of the American Society for Horticultural Science. Dr. Collins will discuss the global approach to potato late blight taken while she was Director of Research at CIP.

Summary and Conclusions

Dr. Ismail Serageldin, *Director, Library of Alexandria;*
Former Vice President of World Bank and Chair of
CGIAR

Closing

Dr. George Wilson

1730–1910

Opening Ceremony

Metro Toronto Convention Centre, Hall A

Musical Interlude

Welcoming Remarks

Congress President

Minister of Agriculture and Food for Canada

Minister of Agriculture and Food for Ontario

Mayor of Toronto

ISHS President

First Announcement of the 2002 World Food Prize Recipient

Ambassador Kenneth Quinn, *President, World Food Prize Foundation*

Overview of the World Food Prize Laureate's Achievements–Video

Introduction of Plenary Lecturer

Dr. Yves Desjardins, *Laval University, Canada*

Plenary Lecture:

Nurturing and Nourishing the World's Poor: Important Roles for Horticulture in Sustainable Development

Dr. Ismail Serageldin, *Director, Library of Alexandria;*
Former Vice President of World Bank and Chair of
CGIAR



Educated at Cairo Univ. and Harvard (PhD, 1972), Dr. Serageldin holds 13 honorary Doctorate degrees from universities on every continent except South America. He is currently Director of the Library of Alexandria and Distinguished Univ. Professor at Wageningen Univ.. Until 2000 he was a Vice President of the World Bank (for Special Programs); Chair of the Consultative Group on International Agricultural Research (CGIAR); Chair of the Consultative Group to

Assist the Poorest (CGAP); Chair of the Global Water Partnership (GWP); and Chair of the World Commission for Water in the 21st Century.

Dr. Serageldin joined the World Bank in 1972 and was Economist in education and human resources (1972-76); Division Chief for Technical Assistance and Special Studies (1977-80), and for Urban Projects in Europe, the Middle East and North Africa (1980-83); Director for Programs in West Africa (1984-87), Country Director for Central and Occidental Africa (1987-89); Technical Director for all Sub-Saharan Africa (1990-92); and Vice-President for Environmentally and Socially Sustainable Development (1993-98). In addition, he was active in promoting NGO-Bank relations, and served as Co-Chairman of the NGO-Bank Committee (1997-99). Prior to joining the World Bank, he worked as a consultant in city and regional planning, and taught at Cairo Univ. and Harvard Univ.

Dr. Serageldin has published over 40 books and monographs (edited or authored) and 200 articles, book chapters, and technical papers on various topics, including: *Nurturing Development* (1995), *Sustainability and the Wealth of Nations* (1996), *Architecture of Empowerment* (1997), *Rural Well-Being: From Vision to Action* (1997, with David Steeds), *The Modernity of Shakespeare* (1998), *Biotechnology and Biosafety* (1999, with Wanda Collins), *Very Special Places* (1999) and *Promethean Science* (2000, with G. Persley).

Responding to the Plenary Lecture

Dr. John Possingham, *ISHS Vice President*

Concluding Remarks

Congress President

ISHS President

Recessional

1910–2130

Welcoming Reception– Streets of Toronto

Metro Toronto Convention Centre, Hall B

1910–2130

Exhibits Open

Metro Toronto Convention Centre, Hall B

MONDAY August 12

0700–1800

Registration Desk Open

**Metro Toronto Convention Centre, North Building,
Street Level Lobby**

0820–1040

Colloquium 1—Applying the Art and Science of Horticulture to Improving Human Life Quality

Metro Toronto Convention Centre, Hall A

Sponsors: ISHS Commission Urban Horticulture; People Plant Council; ASHS Human Issues in Horticulture Working Group; Canadian Society for Horticultural Science; Canadian Horticultural Therapy Association; American Community Gardening Association; American Horticultural Therapy Association; Japanese Society for People Plant Relationships

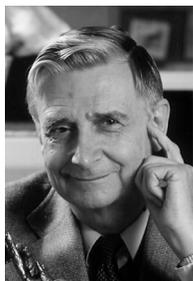
Conveners: Dr. Virginia Lohr, Washington State Univ.; Dr. Paula Diane Relf, Virginia Polytechnical Institute and State Univ., USA

Horticulture is unique within plant biology in that its outcomes are as often described as beautiful and skillful, or as improving human life quality, as they are with objective terms like fruit size, yield or vitamin content. Indeed, the horticultural arts and sciences exist to nourish both the human body and the human spirit. As horticulturists we are fortunate to be working with life forms and refining practices that humans need and innately desire. People want to understand and protect the world's plant genetic resources. They want to explore how plants can be used for food, medicinal, or amenity purposes. It is widely understood that the horticultural arts, whether decorative, therapeutic or applied in science and industry, satisfy physical, emotional and spiritual needs.

Thus, horticultural science and each of its practitioners contributes importantly to improving human life quality and sustaining planet earth. This colloquium explores and addresses the interdependence, the intrinsic bonds, that exist between plants and humans.

For the Love of Life

Prof. Edward Osborne Wilson, Harvard University, USA



The discovery of new life forms has increased dramatically during the past several decades, yet most species of microorganisms and animals remain unknown to science, as well as 10% or more of flowering plants. This rich biodiversity is disappearing fast, for reasons that are now beginning to be understood, and for which a solution must be found as quickly as possible. At the same time we are just beginning to recognize the need that we have for non-human life forms beyond

meeting physical needs such as food and medicine. The biophilia hypothesis maintains that humans are innately attracted to other living organisms in a way that implies that certain kinds of contact with the natural world may be essential for human health. This talk will be a "dispatch from the front" and a look "in my backyard" of global conservation.

The Meaning of the Garden in Human Life

**Julie Moir Messervy, Author and Landscape Designer,
Messervy Associates Landscape Architects, Wellesley,
MA, USA**



Eden . . . Paradise . . . Shalimar . . . Versailles . . . Stourhead . . . Ryoanji . . . Central Park . . . Disneyland . . . The Toronto Music Garden . . . what do these images have in common? They each represent the idea behind someone's "inward garden" that develops from individual associations, memories, character, and dreams to become an "outward garden" upon a particular piece of land. This talk will discuss the meaning behind a host of different "inward gardens" throughout history and show some of my own creations. Featured will be the Toronto Music Garden which was designed in collaboration with eminent cellist Yo-Yo Ma, and whose design is inspired by the First Suite for Unaccompanied Cello by Johann Sebastian Bach.

The Art of Horticulture in Public Spaces

Dr. Katy Mos Warner, President, American Horticultural Society; Former Director of Horticulture and Environmental Initiatives, Disney World, Lake Buena Vista, FL, USA



Gardens in public spaces are symbolic of the culture in which they are found and reflect the values held by the people who make and care for these gardens. From botanic gardens and theme parks to corporate headquarters and simple planters on a town plaza, gardens provide the opportunity for individuals to enjoy the aesthetics of plants. But perhaps more importantly, at the same time, individuals achieve a sense of self and community worth that comes from knowing that the place where you live is valued and cared for. The role of public gardens in building community values and quality of life will be explored.

1000–1830

Exhibits Open

Metro Toronto Convention Centre, Hall B

1040–1100

Break

Metro Toronto Convention Centre, Hall B

Symposia:

Symposia titles, with the names of conveners and sponsors, and location appear in this linear program at the first session only. Thereafter, only the Symposium number and location are listed.

All oral and poster abstracts are associated with a specific symposium and are listed in their entirety by presentation number and in order of presentation in the Abstracts section starting on page 67.

1100–1240

Symposia (Oral Session)

Symposium 1 (S01): Biotechnology of Horticultural Crop Improvement: Achievements, Opportunities and Limitations

Crowne Plaza Hotel, Ballroom A

Conveners: Dr. Freddi Hammerschlag, USDA-ARS, Beltsville, USA; Dr. Praveen Saxena, Univ. of Guelph, Canada

Society Sponsors: ISHS Commission Biotechnology; ISHS Commission Plant Protection; ISHS Commission Plant Genetic Resources; ISHS Section Fruit; ISHS Section Ornamentals; ASHS Plant Biotechnology Working Group

Symposium 3 (S03): Potatoes–Healthy Food for Humanity: International Developments in Breeding, Production, Protection and Utilization

Metro Toronto Convention Centre, 201CD

Convener: Dr. Rickey Yada, Dept. of Food Science, Univ. of Guelph, Canada

Sponsors: Potato Association of America; ISHS Section for Root and Tuber Crops; International Potato Center (CIP); European Association for Potato Research; Asian Potato Association

Symposium 4 (S04): Environmental Stress and Horticultural Crops

Metro Toronto Convention Centre, 202AB

Conveners: Drs. Larry Gusta and Karen Tanino, Univ. of Saskatchewan, Canada; Dr. Michael Wisniewski, USDA-ARS, Appalachian Fruit Research Station, Kearneysville, USA

Sponsors: Canadian Society for Horticultural Science; ISHS Fruit Section - Environmental Physiology and Water Relations in Woody Crops Working Groups; ASHS Environmental Stress Physiology and Water Utilization and Management Working Groups.

Symposium 5 (S05): Viticulture and Oenology: Living With Limitations

Metro Toronto Convention Centre, 202CD

Conveners: Dr. Andrew Reynolds, Brock Univ. Cool Climate Oenology and Viticulture Institute, St. Catharines, Canada

Sponsors: ISHS Viticulture Section; ASHS Viticulture and Small Fruits Working Group

Symposium 6 (S06): The Future for Medicinal and Aromatic Plants

Metro Toronto Convention Centre, 104A

Conveners: Dr. Lyle Craker, Univ. of Massachusetts, USA; Dr. James Simon, Rutgers Univ., USA

Sponsors: ISHS Section Medicinal and Aromatic Plants; International Council on Medicinal and Aromatic Plants; ASHS Working Group on Herbs, Spices and Medicinal Plants; The Nordic Gene Bank (Nordic Council of Ministers)

Symposium 8 (S08): Managing Soil-Borne Pathogens: A Sound Rhizosphere to Improve Productivity in Intensive Horticultural Systems

Metro Toronto Convention Centre, 206C

Conveners: Dr. Lodovica Gullino, Univ. of Torino, Italy; Dr. Alfons Vanachter, DCM Corporation, Belgium; Dr. Andre Levesque, Canada

Sponsors: ISHS Commission Plant Protection; ISHS Orchard Replant, and Soil Borne Pathogens Working Groups; ASHS Root Growth and Rhizosphere Dynamics Working Group; ASHS Plant Propagation Working Group; International Plant Propagators' Society

Symposium 9 (S09): Issues and Advances in Postharvest Horticulture

Metro Toronto Convention Centre, 105

Conveners: Prof. Errol Hewett, Massey Univ., New Zealand; Dr. Robert Prange, AAFC, Kentville, Nova Scotia, Canada

Sponsors: ISHS Commission Postharvest; ASHS Working Group on Postharvest Horticulture

Symposium 10 (S10): Sustainability of Horticultural Systems in the 21st Century–Global Issues, Problem Areas, Systems Design, Stewardship of Resources, Climate Change, Sustainable Cropping Systems, and Ecological Economics

Metro Toronto Convention Centre, 104C

Conveners: Dr. Lukas Bertschinger, Swiss Federal Research Station for Fruit Growing, Viticulture and Horticulture, Wädenswil, Switzerland; Dr. James D. Anderson, USDA-ARS, Beltsville, MD, USA

Sponsors: ISHS Commission Plant Protection; ISHS Commission Root and Tuber Crops; ISHS Working Group on Integrated Fruit Production; ISHS Working Group on Mineral Nutrition of Deciduous Fruit Crops; ASHS Working Groups on Water Utilization and Management, Vegetable Crops Management, Weed Control and Pest Management, and Waste Utilization in Horticulture

Symposium 11 (S11): Asian Plants with Unique Horticulture Potential: Genetic Resources, Cultural Practices and Utilization

Metro Toronto Convention Centre, 205CD

Conveners: Dr. Jung-Myung Lee, Kyung Hee Univ., Korea; Dr. Donglin Zhang, Univ. of Maine, USA

Sponsors: ASHS Working Group on Chinese Horticulture; ASHS Working Group on Tropical Horticultural Crops; Korean Society for Horticultural Science; Japanese Society for Horticultural Science; Chinese and ISHS Working Group on New Vegetable Crops

Symposium 12 (S12): Breeding, Genetics, and Cultivar Development of Tree Fruits and Nuts

Metro Toronto Convention Centre, 203BD

Conveners: Dr. Jules Janick, Purdue Univ., USA; Dr. Silvano Sansavini, Univ. of Bologna, Italy

Sponsors: ISHS Section Fruits and Many Fruit Section Working Groups; ISHS Commission Tropical and Sub-tropical Horticulture; ASHS Working Group on Fruit Breeding; American Pomological Society; EUCARPIA

Symposium 13 (S13): Key Processes in the Growth and Cropping of Deciduous Fruit and Nut Trees

Crowne Plaza Hotel, Ballroom B

Conveners: Dr. Tony Webster, HRI, East Malling, UK; Dr. Stuart Tustin, HortResearch, Havelock North, New Zealand

Sponsors: ISHS Fruit Section and many Fruit Section Working Groups; American Pomological Society; Plant Growth Regulator Society of America; ASHS Working Group on Pomology; ASHS Working Group on Growth Regulators in Fruit and Nut Production; ASHS Working Group on Mineral Nutrition

Symposium 14 (S14): Berry Crop Breeding, Production and Utilization for a New Century

Metro Toronto Convention Centre, 201EF

Conveners: Dr. Peter Hicklenton, AAFC, Kentville, Canada; Dr. John Maas, USDA, Beltsville, USA

Sponsors: ISHS Fruit Section and all Berry Crops Working Groups; ASHS Working Groups on Viticulture and Small Fruits, Fruit Breeding and Pomology; American Pomological Society

Symposium 15 (S15): Horticultural Science in Emerging Economies: Issues and Constraints

Metro Toronto Convention Centre, 103B

Conveners: Dr. George Wilson, North Carolina State Univ., USA; Nico de Groot, Agricultural Economics Research Institute

Sponsors: ISHS Commission Economics and Marketing; ASHS International Division—Working Group on International Topics of Concern to Horticulturists

Symposium 16 (S16): Protected Cultivation 2002: In Search of Structures, Systems, and Plant Materials for Sustainable Greenhouse Production

Metro Toronto Convention Centre, 104D

Conveners: Prof. Mary M. Peet, North Carolina State Univ., USA; Prof. Ayman Abou-Hadid, Ain Shams Univ., Egypt; Dr. Gene Giacomelli, Univ. of Arizona, USA; Dr. A. Gosselin, Laval Univ., Canada

Sponsors: ISHS Commission Protected Cultivation (Working Group on Modeling of Plant Growth, Environment Control and Greenhouse Environments); ISHS Commission Engineering

(Working Group on Greenhouse Environment and Climate Control); ISHS Commission Plant Substrates; ISOSC—Working Group Soilless Culture; ASHS Working Group on Growth Chambers and Controlled Environments

Symposium 17 (S17): Advances in Vegetable Breeding and Crop Physiology

Metro Toronto Convention Centre, 205AB

Conveners: Dr. James McCreight and Dr. Ed Ryder, USDA-ARS, Salinas, USA

Sponsors: ISHS Section Vegetables; ASHS Working Groups on Vegetable Breeding, Vegetable Crops Management, and Seed Research

Symposium 18 (S18): Nursery Crops—Development, Evaluation, Production and Use

Metro Toronto Convention Centre, 206D

Conveners: Dr. Tom Fernandez, Michigan State Univ., USA; Dr. Campbell Davidson, AAFC Research Branch, Morden, Canada

Sponsors: ASHS Working Group on Ornamental/Landscape and Turf; ASHS Working Group on Ornamental Plant Breeding; ASHS Working Group on Nursery Crops; ISHS Section Ornamental Plants

Symposium 19 (S19): Elegant Science in Floriculture

Metro Toronto Convention Centre, 206AB

Conveners: Dr. Theo Blom, Univ. of Guelph, Canada; Dr. Richard Criley, Univ. of Hawaii, USA

Sponsors: ASHS Working Group on Floriculture; ISHS Ornamentals Section (Working Groups on Roses, Protea, and Flowerbulbs)

Symposium 20 (S20): Citrus and Other Subtropical and Tropical Fruit Crops: Issues, Advances and Opportunities

Metro Toronto Convention Centre, 206EF

Conveners: Dr. Gene Albrigo, Univ. of Florida, Lake Alfred, USA; Dr. Victor Galan, ICIA, La Laguna, Tenerife, Spain; Dr. Vince Sousa Machado, Univ. of Guelph, Canada

Sponsors: International Society for Citriculture; ISHS Commission Tropical and Subtropical Horticulture; Interamerican Society for Tropical Horticulture

Symposium 21 (S21): Plant Genetic Resources: The Fabric of Horticulture's Future

Metro Toronto Convention Centre, 104B

Conveners: Philip Forsline, USDA/ARS Plant Genetic Resources Unit, Geneva, USA; Dr. Carlo Fideghelli, Istituto Sperimentale per la Frutticoltura, Rome, Italy

Sponsors: ISHS Commission Plant Genetic Resources; ASHS Working Group on Genetics and Germplasm; IPGRI/CGIAR; Agriculture and AgriFood Canada Expert Committee on Plant and Microbial Genetic Resources; Canadian Agri-Food Research Council (CARC); Potato Association of America; FAO; The Nordic Gene Bank (Nordic Council of Ministers)

Symposium 22 (S22): 4th International Symposium on Taxonomy of Cultivated Plants

Metro Toronto Convention Centre, 103A

Conveners: Piers Trehane, UK; Dr. Steven Clemants, Brooklyn Botanical Garden, USA; Dr. Campbell Davidson

Sponsors: ISHS Commission Nomenclature and Registration; American Association of Botanical Gardens and Arboreta; The Horticultural Taxonomy Group (HORTAX); IUBS Commission Nomenclature of Cultivated Plants; Vaste Keurings Commissie (VKC)

Symposium 23 (S23): Issues and Advances in Seed, Transplant Production, and Stand Establishment Research

Metro Toronto Convention Centre, 201AB

Conveners: Dr. Charles Vavrina, Univ. of Florida, USA; Dr. Jerzy Nowak, Virginia Polytechnical Institute and State Univ., USA; Dr. Silvana Nicola, Univ. of Torino, Italy

Sponsors: ASHS Seedling Establishment Working Group; ISHS Section Vegetables; ISHS Commission Protected Cultivation; ISHS Section Ornamental Plants; ISHS Section Medicinal and Aromatic Plants; ISHS Section Root and Tuber Crops; American Society of Plasmiculture

1240–1340

Lunch Break

Metro Toronto Convention Centre, Hall B

Cash concessions available on the exhibit floor.

1340–1440

Poster Sessions: S01, S03, S04, S05, S06, S08, S09, S10, S11, S12, S13, S14, S15, S16, S17, S18, S19, S20, S21, S22, S23, S25

Metro Toronto Convention Centre, Halls B and C

1340–1440

Special Poster Session:

Symposium 25 (S25): Special Topics in Fruit, Vegetable, and Cross-Commodity Horticulture

Metro Toronto Convention Centre, Halls B and C

1440–1700

Symposia (Oral Session) Continued:

S01–Crowne Plaza Hotel, Ballroom A

S03–Metro Toronto Convention Centre, 201CD

S04–Metro Toronto Convention Centre, 202AB

S05–Metro Toronto Convention Centre, 202CD

S06–Metro Toronto Convention Centre, 104A

S08–Metro Toronto Convention Centre, 206C

S09–Metro Toronto Convention Centre, 105

S10–Metro Toronto Convention Centre, 104C

S11–Metro Toronto Convention Centre, 205CD

S12–Metro Toronto Convention Centre, 203BD

S13–Crowne Plaza Hotel, Ballroom B

S14–Metro Toronto Convention Centre, 201EF

S15–Metro Toronto Convention Centre, 103B

S16–Metro Toronto Convention Centre, 104D

S17–Metro Toronto Convention Centre, 205AB

S18–Metro Toronto Convention Centre, 206D

S19–Metro Toronto Convention Centre, 206AB

S20–Metro Toronto Convention Centre, 206EF

S21–Metro Toronto Convention Centre, 104B

S22–Metro Toronto Convention Centre, 103A

S23–Metro Toronto Convention Centre, 201AB

1700–1800

Break

Metro Toronto Convention Centre, Hall B

1800–2000

Workshops:

Workshop 1 (W01)–Plum Pox/Sharka Virus in North America

Metro Toronto Convention Centre, 104C

Sponsors: ISHS Peach WG, ASHS Fruit Breeding WG, Agriculture and Agri-Food Canada

Convener: Dr. R. Okie, USDA-ARS, Georgia, USA, Dr. Elina Tzoneva and Dr. Neil Miles, Dept. of Plant Agriculture, Univ. of Guelph, Ontario, Canada.

This workshop will call attention to the discovery of Plum Pox in North America and the efforts underway to establish the extent of spread, prevent further spread, and eventually eliminate this pathogen from affected stone-fruit production areas.

Plum Pox Virus: General Biology, Detection, and Molecular Characterization

Dr. Delano James, Centre for Plant Health, Canadian Food Inspection Agency, Sidney, BC, Canada

European Experience with Sharka: History and Current Approaches

Dr. Françoise Dosba, Director, UMR BDPPC, INRA, Montpellier, France

North America Meets Sharka

Dr. Ruth AWelliver, Plant Virologist, Pennsylvania
Dept. of Agriculture, Harrisburg, PA, USA

Certification Activities in Canada and Ontario: Effects on Nursery Practices and Business

Mr. Wayne Roberts, Pest Control and Pesticide Issues,
Ontario Grape & Tender Fruit Producers' Marketing
Board, Vineland Station, ON, Canada

Improvement of Genetic Resistance to PPV

Dr. Ralph Scorza, Research Horticulturist, USDA-ARS
Appalachian Fruit Research Station, Kearneysville,
WV, USA

Workshop 2 (W02)–International Perspectives in Extension: Changes in Delivery Systems

Metro Toronto Convention Centre, 103B

Sponsors: American Society for Horticultural Science (ASHS) Commercial Horticulture Working Group; Potato Association of America–Extension Division; ASHS International Horticultural Consultants Working Group; ASHS Consumer Horticulture and Master Gardeners Working Group; International Society for Horticultural Science (ISHS) Commission on Education

Conveners: Dr. William James Lamont and Dr. Rob Crassweller,
Pennsylvania State Univ., Univ. Park, PA, USA

This workshop will provide an opportunity to exchange information on the function and role of extension and how it has changed over the last ten years. The program will involve extension specialists from around the world discussing and presenting local experiences. Emphasis will be placed on the methods used to deliver information and how success and impacts can be measured.

Introduction and Purpose

Dr. William Lamont, Associate Professor of
Horticulture, Penn State Univ., Univ. Park, PA, USA

Extension Systems in the United States

Dr. Ron Voss, Dept. of Vegetable Crops, Univ. of
California, Davis, CA, USA

Innovations in Extension and Outreach from Africa

Dr. Sieglinde Snapp, Assistant Professor, Dept. of
Horticulture, Michigan State Univ., East Lansing, MI,
USA

Extension Models in South America

Mr. Jorge Arbolea, Uruguay

Conversion to a Private Extension System

Dr. Ian JWarrington, New Zealand

Panel Discussion and Discussion with the Audience

Dr. Rob Crassweller and Previous Speakers

Workshop 3 (W03)–Plant Germplasm Collections: Benefits of Public and Private Partnerships

Metro Toronto Convention Centre, 201CD

Sponsors: ASHS Genetics and Germplasm WG; ASHS Vegetable Breeding WG; ASHS Fruit Breeding WG; ASHS Ornamental Plant Breeding WG; ISHS Commission Plant Genetic Resources

Convener: Dr. John R. Stommel, USDA-ARS Vegetable Laboratory,
Beltsville, MD, USA

This workshop will highlight the benefits of partnerships between the USDA National Plant Germplasm System and other public and private organizations with unique and/or valuable germplasm holdings. Through coordinated efforts these partnerships offer tremendous potential for the conservation of plant germplasm and biodiversity and an opportunity to better define the optimal composition, acquisition and evaluation strategies for germplasm collections. Three speakers, recognized for their leadership in germplasm and conservation activities, will focus on current and future partnership opportunities.

North American Botanic Gardens and Arboreta:**Partners in Conserving Germplasm of Landscape Plants**

Dr. Paul Meyer, Morris Arboretum, Univ. of
Pennsylvania, Philadelphia, PA, USA

Cooperative Enterprises in Fruit, Nut, and Specialty Crop Genetic Resource Conservation

Dr. Kim Hummer, USDA, ARS, National Clonal
Germplasm Repository, Corvallis, OR, USA

Characterization and Conservation of Vegetable Germplasm: An Industry Perspective

Dr. Fred Bliss, Seminis Vegetable Seeds, Woodland, CA,
USA

Workshop 4 (W04)–Integrating Crop Physiology Processes in Horticultural Crops

Crowne Plaza Hotel, Ballroom B

Sponsor: American Society for Horticultural Science (ASHS)
Crop Physiology Working Group

Convener: Dr. Martin Gent, Connecticut Agricultural Experiment
Station, New Haven, CT, USA

The integration within the plant of diverse physiological processes will be discussed as it applies to horticultural crop production.

Discussion Topics:

Integrating photosynthesis from the cell to the canopy,
methods of scaling measurements of gas exchange

Relating the assimilation and transport of carbon with that of
nitrogen

Relating transpiration of water to the uptake and movement
of nutrients

Business Meeting of the ASHS Crop Physiology Working

Group

Dr. Jim Syvertsen, Univ. of Florida, Lake Alfred, FL., USA, presiding

Workshop 5 (W05)–Methods of Studying Root Systems in Horticultural Crops

Metro Toronto Convention Centre, 206C

Sponsor: American Society for Horticultural Science (ASHS) Root Growth and Rhizosphere Dynamics Working Group

Convener: Dr. Brian A. Kahn, Oklahoma State Univ., Stillwater, OK, USA

This workshop will review and discuss the present technology and methods available to study root systems, with emphasis on in situ techniques.

Taking a Poke at a Pig: Characterizing Root Function of Woody Plants

Dr. David M. Eissenstat, Dept. of Horticulture, The Pennsylvania State Univ., Univ. Park, PA, USA

(Relatively) Clean Methods for Analyzing Root Structure and Function

Dr. Jonathan Lynch, Dept. of Horticulture, The Pennsylvania State Univ., Univ. Park, PA, USA

Simplifying Root Studies: Easy Approaches for Vegetables

Dr. Daniel T. Drost, Dept. of Plants, Soils, and Biometeorology, Utah State Univ., Logan, UT, USA

Questions, General Discussion, and Information Sharing

Business Meeting of the ASHS Root Growth and Rhizosphere Dynamics (RHIZ) Working Group

Dr. Brian A. Kahn, Oklahoma State Univ., Stillwater, OK, USA, presiding

Workshop 6 (W06)–Particle Films: A New Paradigm for Modifying Fruit Tree Microclimate, Physiology, Horticultural Characteristics, and Pest and Disease Management

Metro Toronto Convention Centre, 202AB

Sponsors: American Society for Horticultural Science (ASHS) Pomology Working Group; ASHS Growth Regulators in Fruit and Nut Production Working Group

Convener: Dr. Dariusz Swietlik, USDA-ARS, Kearneysville, WV, USA

The purpose of this workshop is to address and explore the effects of particle film technology on tree canopy microclimate and physiology, yield and fruit quality, and arthropod and disease pest management under various environmental conditions. We will also examine how well this technology integrates into existing conventional, IPM, and organic production systems.

Modification of Tree Canopy Microclimate and Physiology with Particle Films

Dr. D. Michael Glenn, USDA-ARS Appalachian Fruit Research Station, Kearneysville, WV, USA

The Effects of Particle Films on Yield and Fruit Quality

Dr. Amnon Erez, Emeritus Scientist, Institute of Horticulture, A.R.O., The Volcani Center, Bet Dagan, Israel

Particle Film Technology: A New, Non-chemical Alternative for Arthropod and Disease Control in Fruit Trees

Dr. Gary Puterka, USDA-ARS, Appalachian Fruit Research Station, Kearneysville, WV, USA

Panel Discussion on the Use of Particle Film Technology in Various Parts of the World

Workshop 7 (W07)–The Influence of Environment and Physiology on Potato Quality

Metro Toronto Convention Centre, 105

Sponsor: Potato Association of America Physiology Section

Convener: Gale Kleinkopf, Univ. of Idaho, Kimberly, ID, USA

The effects of seed age, chemical maturity and blackspot bruise will be addressed in a panel discussion format followed by further discussion where the presenters will be joined by Dr. Warren Coleman, Potato Research Centre, Agriculture and Agri-Food Canada, Fredericton, NB, Canada, and Dr. Rikki Sterrett, Eastern Shore Agriculture Research & Extension Centre, Painter, VA, USA.

Physiological Age of Seed

Rick Knowles, Washington State Univ., Pullman, WA, USA

Chemical Maturity

Dr. Joe Sowokinos, Univ. of Minnesota, East Grand Forks, MN, USA & the USDA Potato Research Worksite

Blackspot Bruise

Bill Belknap, USDA-ARS, Western Regional Centre, USA

General Discussion

Workshop 8 (W08)–Potato Breeding: Where We Are Now, and Where We Are Going

Metro Toronto Convention Centre, 201AB

Sponsor: Potato Association of America (PAA) Breeding and Genetics Section

Convener: Walter De Jong, Dept. of Plant Breeding, Cornell Univ., USA

This workshop will provide a broad overview of potato breeding program goals, recent developments in selection methodology, and a discussion of how potato breeding programs and their many cooperators envision the future of variety development. Participation by international conference participants is especially encouraged. Three or four potato breeders will provide a brief description of their programs. This will serve to provide a foundation for discussion by all attendees. Questions to be discussed include: What is our most promising germplasm, and is it available to others? How has selection methodology changed over the past five years, and how will it change in the future? What market niches are we currently targeting and are we missing any important ones (e.g. varieties for organic markets or for nutraceuticals)? Is plant variety protection changing breeding practice and/or interactions between variety development teams? What is a desirable balance between public and private sector breeding?

Workshop 9 (W09)–ISHS Role in Postharvest R&D for Developing Countries

Metro Toronto Convention Centre, 202CD

Sponsors: International Society for Horticultural Science (ISHS) Commission Postharvest Horticulture; ISHS Committee for Research Cooperation

Convener: Prof. Dr. Wilfried H. Schnitzler

Workshop 10 (W10)–Somaclonal Variation in Micropropagation

Crowne Plaza Hotel, Ballroom A

Sponsors: ISHS Plant Biotechnology Commission, ISHS Quality Management in Micropropagation Working Group

Convener: Dr. Alain Rival, CIRAD, Montpellier, France

This workshop will focus on the molecular determinism of somaclonal variation phenomena occurring during micropropagation processes. It will address the field of DNA markers, genome expression, DNA methylation and proteomics. It will enable an overview of studies under way on epigenetic mechanisms underlying somaclonal variation in higher plants.

Detection of Somaclonal Variants Among Transformed Potato Lines by Computerized Image Analysis

Prof. A. Cassels, National Univ. of Ireland, Cork, Ireland

Molecular Mechanism of Graft Transformation in Red Pepper (*Capsicum annum* L.)

Dr. H. Yutaka, Tokyo Univ., Japan

Cyclamen persicum Mill.: Somatic Embryogenesis and Rapid Analysis of Embryogenetic Callus

Dr. G. Burchi, Inst. Exp. Floriculture, San Remo, Italy

Strategies for the Search of Markers for Clonal Fidelity in Micropropagation

Dr A. Rival, CIRAD, Montpellier, France

Workshop 11 (W11)–Horticulture Student/Faculty Exchange, Canada–United States–Europe

Metro Toronto Convention Centre, 201EF

Sponsor: American Society for Horticultural Science (ASHS) Floriculture Education Working Group

Convener: Dr. Paul Allen Hammer, Purdue Univ., USA

A group of university horticulture departments in Canada, Europe, and the United States have joint grants to support the development of student and faculty exchange programs in horticulture. We are beginning the second year of a three-year grant. This will be an excellent opportunity to discuss these projects with our colleagues at other universities, suggest ways they could become involved, and discuss grant opportunities for student / faculty exchange programs.

Introduction and Presiding

Dr. Rick Shoellhorn, Univ. of Florida, Dept. of Environmental Horticulture, USA

The Canadian — European Project

Dr. Katrine A. Stewart, McGill Univ., Dept. of Plant Science, Canada

Northern Europe

Mr. Arto Vuollet, Hame Polytechnic, Finland

The United States–European Project

Dr. P. Allen Hammer, Purdue Univ., Dept. of Horticulture and Landscape Architecture, USA

Southern Europe

Dr. Ioannis C. Vlahos, Technological Educational Institute (TEI) of Crete, Dept. of Horticulture, Greece

Agreements, Applications, Student Selection

Dr. Hartmut Stuetzel, Univ. of Hanover, Dept. of Horticulture, Germany

Dr. Carol Goodwin, Nova Scotia Agriculture College, Environmental Science, Canada

Dr. Douglas Needham, Oklahoma State Univ., Dept. of Horticulture and Landscape Architecture, USA

Courses, Languages, Transfer Credit

Dr. Caula A. Beyl, Alabama A&M Univ., Dept. of Plant and Soil Sciences, USA

Dr. Arme Skytt Andersen, The Royal Veterinary and Agricultural Univ. (KVL), Dept. of Agricultural Sciences/Section Horticulture, Denmark

Discussion

Dr. H.W.M. Fuchs, Hogeschool DELFT, Dept. of Horticulture, Netherlands

W12–Developments in High Density Sweet Cherry Pruning and Training Systems

Metro Toronto Convention Centre, 203BD

Sponsor: ISHS Orchard and Plantation Systems WG

Convener: Dr. Terence Robinson, Cornell Univ. Dept. of Horticultural Science, New York State Agricultural Experiment Station, Geneva, NY, USA

The workshop will call attention to what is going on around the world that will be of interest to pomologists working with cherries. Note that this Workshop is scheduled to run on Monday and Tuesday evening.

Introduction to Workshop

Dr. Terence Robinson, Chair, ISHS Orchard Systems Working Group

Developments in High Density Cherry Production in:

Germany–Martin Balmer

Hungary–Karoly Hrotko

France–Pierre Eric Lauri

Spain–Juan Negueroles

Discussion

Continued Tuesday evening as Workshop 13 (W13)

Tuesday August 13

0730–1800

Registration Desk Open

Metro Toronto Convention Centre, North Building
Street Level Lobby

0820–1040

Colloquium 2–The Knowledge Business: Changing Processes in Knowledge Acquisition, Management and Transfer

Metro Toronto Convention Centre,
John Bassett Theatre

Sponsors: ISHS Commission Education and Training; ASHS Education and Extension Divisions; Canadian Society for Horticultural Science

Conveners: Prof. Geoff Dixon, Univ. of Strathclyde, UK; Prof. Curt Rom, Univ. of Arkansas, USA

The volume of new knowledge relevant to horticulture continues to expand dramatically. In the laboratory, classroom, and field we become increasingly circumspect about what knowledge to pursue, about what our students or clientele need to know, and about how they should develop experientially. We must also consider the threat of “information overload” and learn how to communicate new knowledge more effectively. While

there are increasingly powerful tools for managing and recovering information, they are as often frustrating as helpful. Although technology has changed significantly, we may question whether human ability to use technology and absorb information has kept pace. Traditional concepts of intelligence may prove inadequate.

Furthermore, as information delivery technology develops, confusion may occur over whether information is new or simply repackaged. Thus, concepts of “scholarship” have become clouded. Both scientists and science administrators are finding it increasingly difficult to explain and fairly assess scholarship across the range of specializations found within horticultural science in this new information era. Each of these issues and concerns is addressed with The Knowledge Business colloquium and related programming throughout the day.

Acquiring, Managing and Applying Knowledge for Environmental Conservation

Professor Sir Ghilleen Prance, Univ. of Reading and McBryde Professor, National Tropical Botanical Garden, Kalaheo, Hawaii, USA



The environment of earth is now largely controlled by Homo sapiens. Since the invention of agriculture this single species has the most profound impact—capable of causing immense devastation or providing for a sustainable future. Substantial detailed knowledge of the interactions between and within the biosphere is demanded if earth is to have a sustainable future. Fortunately, worldwide public attitudes have shifted towards demanding greater environmental care and conservation. As a result the knowledge base describing the biological, physical and chemical environment is expanding rapidly. Knowledge at the macro level is being gathered to understand changing climate and land and sea environments and their impact on the natural distribution and survival of flora and fauna. At the micro level, knowledge of individual ecosystem components is being unraveled, often revealing the fragility of their existence.

Acquiring both macro and micro environmental knowledge requires the collaboration of a wide spectrum of scientific disciplines, and these scientists must then communicate and interact with specialists in the realms of sociology, economics and public policy. This can happen only if the often voluminous data and complex scientific concepts are managed in ways that make them accessible across the specializations involved.

The science of horticulture has its own role to play in gaining the new knowledge and greater understanding needed to achieve environmental conservation. Production horticulture has a pivotal role in developing systems of husbandry that minimize environmental impact. Environmental horticulture helps us understand and demonstrate the links between plants, the environment and conservation. The developing discipline of social horticulture explores the relationships between plants and human health and welfare—a key to achieving both a public understanding of the importance of plants and a desire to safeguard the environment. Horticulturists are well positioned to integrate knowledge from other scientific, social, economic and political disciplines.

This lecture draws on the author’s experiences at the Royal Botanic Gardens, Kew and the Eden Project in Cornwall. It will offer suggestions as to how the science and practice of horticulture can play a more positive role in the quest for environmental conservation.

Knowledge Management for Science-Based Decision Making

Dr. Peter Scott, Director, Program Development, CAB International, Wallingford, UK



Twenty years ago, John Naisbitt in “Megatrends” wisely observed that “we are drowning in information but starved for knowledge.” By 2002, the daily requirement to take decisions on a rational basis requires something more than good organization of the bewildering flow of information. We need much help with converting it to knowledge which can then become the platform for making our own judgements.

Using examples from plant sciences, this lecture will address ways in which we can become better at knowledge management for science-based decision making. It will include some demonstrations of dynamic processes—processes like handling facts to produce information; interpreting information to produce knowledge; using knowledge to support decision making; transferring knowledge in education and training; and storing and disseminating information. Perhaps we can be convinced that we are better placed to avoid drowning in information than John Naisbitt felt, and confident of taking better decisions as a result of our incredibly improved access to information.

Successful Intelligence: From Theory to Dynamic Application to Improved Education

Dr. Robert Sternberg, IBM Professor of Psychology and Education, Yale Univ., USA



Learning and thinking abilities are flexible, dynamic, and modifiable processes, not rigid, static, or fixed with an individual. The theory of successful intelligence characterizes intelligence in a broader way than do conventional theories of intelligence. Conventional theories of intelligence are too narrow and are incomplete in the way intelligence is characterized. The narrow conceptions of intelligence can and do have a pernicious effect on educational institutions

and society. The theory of successful intelligence is supported by empirical research around the world which demonstrates that intelligence has multiple aspects. An understanding of successful intelligence can be applied in education to improve abilities and achievement. A broader conception of intelligence will improve educational outcomes for individuals, schools, and society.

Colloquium 3—Food Safety: Ensuring the Safety of Fresh Produce

Metro Toronto Convention Centre, 105

Sponsors: ISHS Commission Postharvest; ASHS Food Quality & Nutrition Working Group; ASHS Postharvest Workgroup; International Fresh-cut Produce Association

Convener: Dr. Elizabeth Mitcham, Univ. of California, Davis, USA

Moderator: Dr. James Gorny, VP Technology and Regulatory Affairs, International Fresh-cut Produce Association

Historically, horticultural crops were not considered an important source of microorganisms known to cause human

disease. In recent years, however, fruits and vegetables have been linked to outbreaks of *E. coli*, *Salmonella*, and *Listeria* that resulted in human sickness and even death. Have fresh fruits and vegetables become a greater source of pathogenic microorganisms or do advances in detection methods or tracking capability explain the increased number of identified cases? What steps can be taken in the field and after harvest to reduce the incidence of human pathogens on fresh produce? Is “organic” produce safer than conventionally grown produce? Is it possible to eliminate human pathogens that might be present on fresh fruits and vegetables? How do we assure consumers that the benefits of eating fresh produce far outweigh any risks?

Overview of Food Safety Concerns Related to Horticultural Products

Dr. Robert Brackett, Food Safety Director, U.S. Food and Drug Administration Center for Food Safety and Applied Nutrition—Washington, D.C., USA



Food safety has received increasing attention in recent years and among the foods receiving the most scrutiny have been fresh fruits and vegetables. This increased scrutiny has prompted the assessment of food safety risks associated with fresh horticultural products, as well as the means by which such risks might be avoided or minimized. Food safety problems can begin on the farm if

appropriate attention is not paid to environmental contamination, maintenance of equipment, and the use of proper sanitary practices. Likewise, certain handling and processing techniques can increase food safety risks by causing internalization of human pathogens into fresh and vegetable tissues, creation of conditions that favor the growth of pathogenic microorganisms, and allowing opportunity for cross-contamination of produce with pathogenic microorganisms. Food safety problems can also occur as a result of improper handling and storage of fresh produce by retailers and consumers. Consequently, education of such individuals is an important component in minimizing potential food borne outbreaks resulting from consumption of fresh produce.

Pre-harvest Issues Related to Food Safety in Fruits and Vegetables

Dr. Douglas Powell, Dept. of Plant Agriculture, Univ. of Guelph, Guelph, Canada; Founder of The Food Safety Network



Fresh fruits and vegetables are increasingly recognized as vectors for food borne illness. On-farm food safety programs have been developed and implemented for a number of fresh commodities. These HACCP-based systems are designed to reduce the potential of microbial contamination along the entire production and distribution process. This talk will provide an overview of such programs, identify barriers to implementation, and offer a detailed analysis of one such program for

the Ontario Greenhouse Vegetable Growers in Ontario, Canada. Through the use of microbiological testing, on-site visits and producer surveys it was determined that the program has increased grower knowledge, understanding and awareness of microbial risks associated with fresh produce and caused improvements in practices used within the greenhouse and packing sheds.

**Difficulties in Eliminating Pathogenic
Microorganisms on Raw Fruits and Vegetables**

Dr. Larry Beuchat, Center for Food Safety, Univ. of
Georgia, USA



Outbreaks of human gastroenteritis associated with consumption of raw fruits and vegetables contaminated with pathogenic bacteria, parasites, and viruses have occurred with increased frequency in some countries in the past decade. Enhanced epidemiologic and surveillance techniques, together with changes in agronomic, harvesting, distribution, processing, and consumption patterns and practices have undoubtedly contributed to this increase. Infections can be reduced by preventing contamination, controlling growth, or by removing or killing pathogens by washing or treating raw fruits and vegetables with sanitizers. The efficacy of sanitizers, however, is often minimal because pathogens are protected by plants against exposure to the lethal components. The hydrophobic cutin, diverse surface morphology, and abrasions in the epidermis of fruits and vegetables can prevent access of sanitizers to sites where pathogens may be lodged. The challenge is to devise a treatment that will reach pathogens in an active form without compromising sensory quality of raw fruits and vegetables.

Summary and Overview

Dr. James Gorny, International Fresh-cut Produce
Association

1000–1830

Exhibits Open

Metro Toronto Convention Centre, Hall B

1040–1100

Break

Metro Toronto Convention Centre, Hall B

1100–1240

Symposia (Oral Session) Continued:

- S01–Crowne Plaza Hotel, Ballroom A**
- S03–Metro Toronto Convention Centre, 201CD**
- S04–Metro Toronto Convention Centre, 202AB**
- S05–Metro Toronto Convention Centre, 202CD**
- S06–Metro Toronto Convention Centre, 104A**
- S08–Metro Toronto Convention Centre, 206C**
- S09–Metro Toronto Convention Centre, 105**
- S10–Metro Toronto Convention Centre, 104C**
- S11–Metro Toronto Convention Centre, 205CD**
- S12–Metro Toronto Convention Centre, 203BD**

- S13–Crowne Plaza Hotel, Ballroom B**
- S14–Metro Toronto Convention Centre, 201EF**
- S15–Metro Toronto Convention Centre, 103B**
- S16–Metro Toronto Convention Centre, 104D**
- S17–Metro Toronto Convention Centre, 205AB**
- S18–Metro Toronto Convention Centre, 206D**
- S19–Metro Toronto Convention Centre, 206AB**
- S20–Metro Toronto Convention Centre, 206EF**
- S21–Metro Toronto Convention Centre, 104B**
- S22–Metro Toronto Convention Centre, 103A**
- S23–Metro Toronto Convention Centre, 201AB**

1240–1340

Educator’s Luncheon

Fairmont Royal York Hotel, Concert Hall

Ticket required

1240–1340

Lunch Break

Metro Toronto Convention Centre, Hall B
Cash concessions available on the exhibit floor

1300–1340

Symposium 24 (S24):

**The Toronto Knowledge and Scholarship
Forum**

Fairmont Royal York Hotel, Concert Hall

1340–1420

Symposium (Poster Session) S24:

Fairmont Royal York Hotel, Concert Hall

1340–1440

**Poster Sessions Continued: S01; S03, S04, S05,
S06, S08, S09, S10, S11, S12, S13, S14, S15, S16,
S17, S18, S19, S20, S21, S22, S23,**

Metro Toronto Convention Centre, Halls B and C

1420–1740

Symposium (Oral Session) S24:

Fairmont Royal York Hotel, Concert Hall

1440–1700

Symposia (Oral Session) Continued:

- S01–Crowne Plaza Hotel, Ballroom A
- S03–Metro Toronto Convention Centre, 201CD
- S04–Metro Toronto Convention Centre, 202AB
- S05–Metro Toronto Convention Centre, 202CD
- S06–Metro Toronto Convention Centre, 104A
- S08–Metro Toronto Convention Centre, 206C
- S09–Metro Toronto Convention Centre, 105
- S10–Metro Toronto Convention Centre, 104C
- S11–Metro Toronto Convention Centre, 205CD
- S12–Metro Toronto Convention Centre, 203BD
- S13–Crowne Plaza Hotel, Ballroom B
- S14–Metro Toronto Convention Centre, 201EF
- S15–Metro Toronto Convention Centre, 103B
- S16–Metro Toronto Convention Centre, 104D
- S17–Metro Toronto Convention Centre, 205AB
- S18–Metro Toronto Convention Centre, 206D
- S19–Metro Toronto Convention Centre, 206AB
- S20–Metro Toronto Convention Centre, 206EF
- S21–Metro Toronto Convention Centre, 104B
- S22–Metro Toronto Convention Centre, 103A
- S23–Metro Toronto Convention Centre, 201AB

1700–1800

Break

Metro Toronto Convention Centre, 202AB

1800–2000

Symposia (Oral Session) Continued:

S04–Crowne Plaza Hotel, Ballroom A

1800–2000

Concurrent Workshops:

Workshop 13 (W13)–Developments in High Density Sweet Cherry Pruning and Training Systems [continued from Workshop 12 (W12)]

Metro Toronto Convention Centre, 203BD

Sponsor: ISHS Orchard and Plantation Systems WG

Convener: Dr. Terence Robinson, Cornell Univ. Dept. of Horticultural Science, New York State Agricultural Experiment Station, Geneva, NY, USA

The workshop will call attention to what is going on around the world that will be of interest to pomologists working with cherries.

Developments in High Density Cherry Production in:

- USA–Lynn Long
- Canada–Peter Waterman
- Australia–Kym Green

Underlying Principles of Successful High Density Sweet Cherry Production

Greg Lang, Michigan State Univ., East Lansing, MI, USA

Discussion

Workshop 14 (W14)–Prunus Breeders Meeting

Metro Toronto Convention Centre, 206C

Convener: Dr. David H. Byrne, Texas A&M Univ., Dept. of Horticultural Sciences, College Station, TX, USA

A round table discussion on Prunus Breeding.

Workshop 15 (W15)–Production In Retractable Roof Structures

Metro Toronto Convention Centre, 206EF

Convener: Dr. Sven E. Svenson, Oregon State Univ.-NWREC, Aurora, Oregon, USA

This workshop will use short research presentations and theoretical discussions to advance our understanding of the advantages of retractable roof systems for plant production in containers. Some crop-specific research results will be provided, and comparison responses to "traditional" production systems will be discussed.

Introduction to the Workshop

Dr. Sven E. Svenson, Oregon State Univ.-NWREC, Aurora, OR, USA

Growing in Retractable Roofs in the Southwestern United States

Dr. Ursula K. Schuch, Dept. of Plant Sciences, Univ. of Arizona, Tucson, AZ, USA

Container Soil Temperatures and Retractable Roofs

Dr. Hannah M. Mathers, Dept. of Horticulture, Ohio State Univ., Columbus, OH, USA

Growing Conifer Seedlings in Retractable Roofs

Dr. Robert W. Rose, Dept. of Forest Science, Oregon State Univ., Corvallis, Oregon, USA

Growing in Retractable Roofs: Florida and Oregon

Dr. Sven E. Svenson, Oregon State Univ.-NWREC, Aurora, Oregon, USA

Workshop 16 (W16)–Antioxidants in Fruit

Metro Toronto Convention Centre, 105

Sponsor: ASHS Vegetable Breeding WG

Convener: Dr. Preston KAndrews, Washington State Univ., Pullman, WA, USA

This workshop will call attention to and discuss the important role of antioxidants in fruit physiology and human health.

Role of Antioxidants for Protection Against Stresses in Fruit Crops

Preston Andrews, Dept. of Horticulture and Landscape Architecture, Washington State Univ., Pullman, WA, USA

Role of Antioxidants in Postharvest Storage and Quality of Fruit Crops

Dr. Chris Watkins, Cornell Univ., Ithaca, NY, USA

Contributions to Human Health of Antioxidants in Fruit

Dr. Wilhelmina Kalt, Atlantic Food and Horticulture Research Centre, AAFC, Kentville, Nova Scotia, Canada

Workshop 17 (W17)–New Techniques in Plant Low Temperature Stress: Ice Nucleation and Genetic Engineering

Metro Toronto Convention Centre, 202CD

Sponsors: ISHS Commission Tropical and Sub-Tropical Crops, ASHS Environmental Stress WG

Convener: Dr. Jiwan Palta, Univ. of Wisconsin, Madison, WI, USA

Recent techniques for examining ice nucleation and visually observing how plants freeze will be addressed in this workshop. This has particular relevance to tender tissues that are frost-sensitive. Positive and negative aspects of new molecular techniques such as the use of microarrays, marker-assisted selection and proteomics will also be discussed.

Discussion leaders:

Dr. Michael Wisniewski, USDA-ARS, West Virginia, USA

Dr. L.V. Gusta, Univ. of Saskatchewan, Saskatoon, Canada

Workshop 18 (W18)–Breaking Fruit Tree Dormancy with Plant Bioregulators

Crowne Plaza Hotel, Ballroom B

Sponsors: ASHS Plant Growth Regulators in Fruit Production WG; Plant Growth Regulator Society of America; ISHS Plant Bioregulators in Fruit Production WG; ASHS Pomology WG

Conveners: Peter Petracek, Valent BioSciences Corporation, Long Grove, IL, USA; Dr. Stephen Southwick, Dept. of Pomology, Univ. of California, Davis, CA, USA

The purpose of the workshop is to review and discuss recent research on breaking dormancy and the use of plant bioregulating chemicals to fulfill the rest requirements of fruit trees. The general discussion will be on the problem of dormancy and the need for rest breaking agents or other strategies to promote cropping and facilitate production.

Apple and Pear

Dr. Amnon Erez, Institute of Horticulture, A.R.O., The Volcani Center, Bet Dagan, Israel

Stone Fruit

Drs. Stephen Southwick and Kitren Glozer, Univ. of California, Dept. of Pomology, Davis, CA, USA

Grapes

Dr. Nick Dokoozlian, Univ. of California, Kearney Agr. Center, Parlier, CA, USA

Workshop 19 (W19)–Managing Nitrogen and Water for Improved Use Efficiency in Potato Production

Metro Toronto Convention Centre, 103B

Sponsor: PAA Production and Management Section

Convener: Joan Davenport, Washington State Univ., Prosser, WA, USA

Use of soluble chemical fertilizers, particularly to supply the three macro nutrients nitrogen, phosphorus and potassium, has increased potato yields and quality for several decades. However, during the past 10 years, concern continues to increase over the environmental impact of agricultural fertilizers, particularly as non-point sources of water pollution. Currently, nitrogen is a target for improved use efficiencies in potato to reduce groundwater contamination with nitrate-nitrogen. Research efforts are ongoing world wide to study both water and nitrogen management strategies in potato to improve use efficiency and reduce leaching losses. The panelists will briefly present strategies in water and nitrogen use that they see as promising to maintain potato yield and quality while reducing potential adverse environmental impacts. A discussion, with audience participation, will follow on the promises and limitations in improving use nitrogen and water efficiency.

Interaction Between N and Water Use

Anton Haverkort, Wageningen, Netherlands

Soil and Tissue Testing

Dale Westermann, USDA-ARS, Kimberly, ID, USA

Fertilizer Rates and Timing

Wayne Honeycut, USDA-ARS, Univ. of Maine, Orono, ME, USA

Fertilizer Rates and Sources

Carl Rosen, Univ. of Minnesota, St. Paul, MN, USA

Manure Management

Keith Kelling, Univ. of Wisconsin, Madison, WI, USA

Genetics/Variety Improvement

Bernie Zebarth, Agriculture & Agri-Food Canada, Fredericton, NB, Canada

Modeling Potential

Sieglinde Snapp, Michigan State Univ., East Lansing, MI, USA

Precision Agriculture

Joan Davenport, Washington State Univ., Prosser, WA, USA

Workshop 20 (W20)–International Seed Certification: Tools and Technology

Metro Toronto Convention Centre, 201CD

Sponsor: PAA Certification Section

Convener: Denis Kirkham, Plant Health, Plant Products Directorate, Canadian Food Inspection Agency, New Westminster, BC, Canada

New approaches for seed potato certification methodology must be found to meet the increasing pressures of disease occurrence and transmission by pests. Does the long-standing field inspection system serve the industry well? Can new testing technologies assist field inspections and improve accuracy? How will biotechnology change seed potato production and certification? Can post-harvest testing methodologies be standardized or offer greater reliability for seed performance? How will GMO's affect seed potato production and should GMO testing be a regulated part of certification systems?

The United States View

Rob Davidson, Colorado Seed Potato Certification, San Luis Valley Research Centre, Colorado State Univ., Centre, CO, USA

The Canadian View

Cameron Duff, Canadian Seed Potato Certification Program, Plant Health and Production Division, Canadian Food Inspection Agency, Ottawa, ON, Canada

The European View

Speaker to be announced.

Workshop 21 (W21)–Research Networking in Europe: An Innovative Way to Address Production Needs

Metro Toronto Convention Centre, 104C

Sponsor: European Fruit Research Institute Network (EUFRIN)

Convener: Luca Corelli Grappadelli, Univ. of Bologna, Bologna, Italy

The purpose of the workshop is to provide and exchange information on the current European horticultural research environment, where increasing political and economic integration has not been followed by comparable coordination and integration of research activities. Emphasis will be placed on some of the most compelling issues facing researchers and the industry. The program will feature presentations by members of EUFRIN, a voluntary network of fruit research institutes with 10 years experience in coordination of European horticultural research.

Welcome and Introduction

L. Coelli Grappadelli, Dip. Colture Arboree, Univ. of Bologna, Italy

European Fruit Industry

J. Bonany, IRTA, Fundacion Mas Badia, Mas Badia, Spain

European Fruit Research Organizations

W. Muller, Delegate of the Federal Office of Agriculture for International Research, Berne, Switzerland

Overview of Research Activities and Most Relevant Issues related to the following EUFRIN Working Groups:

Fruit Thinning

G. Costa, Dip. Colture Arboree, Univ. of Bologna, Italy

Apple and Pear Variety Testing

Y. Lespinasse, Station d'Amélioration des Espèces Fruitières et Ornamentales (INRA), Beaucaze Cedex, France

Fruit Quality

A. DeJager, Applied Plant Research, Fruit Research Unit, Randwijk, Netherlands

Rootstocks

O. Callesen, Research Centre for Horticulture, Dept. of Horticulture Aarslev, Denmark

Discussion

Workshop 22 (W22)–Knowledge Acquisition, Management and Transfer

Metro Toronto Convention Centre, 201EF

Sponsors: ISHS Commission Biotechnology, ISHS Commission Economics and Management, ISHS Commission Education and Training, ISHS Commission Engineering, ISHS Commission Plant Protection, ISHS Commission Genetic Resources.

Conveners: Prof. Geoff R. Dixon, Dept. of Bioscience and Biotechnology, Univ. of Strathclyde, Glasgow, UK; Dr. Curt Rom, Dept. Horticulture and Forestry, Univ. of Arkansas, Fayetteville, AR, USA; Dr. C.J. Weiser, Oregon State Univ., Corvallis, OR, USA

The purpose of this workshop is to discuss, in an informal and relaxed atmosphere, issues raised by the Knowledge Business Colloquium, Educator's Luncheon address and the Toronto Knowledge and Scholarship Forum and to identify future action by ISHS. Colloquium speakers (**Prof. Ghilleen Prance**, **Dr. Peter Scott** and **Dr. Robert Sternberg**) will be invited to join with the conveners and others as a panel of provocateurs aiming to stimulate debate.

Workshop 23 (W23)–Outreach Programs and Community Food Security

Metro Toronto Convention Centre, 201AB

Sponsors: ASHS Consumer Horticulture and Master Gardeners WG; ASHS Human Issues in Horticulture WG

Convener: Susan Schoneweis, Univ. of Nebraska, Lincoln, NE, USA

This workshop will discuss the role of Horticulture Outreach Programs and Volunteers in addressing local community food issues. There will be a discussion of food security issues followed by the business meeting of the CHMG working group.

Toronto's Urban Farmers: An Overview of Innovative Urban Agriculture and Community Garden Projects in Toronto

Laura Berman, Community Garden Program Coordinator, FoodShare Toronto, Canada

The Use of Television and the Internet to Help Promote and Sustain Local Food Production: The "If Plants Could Talk" Gardening Series for NJN Public Television

Dr. William T. Hlubik, Agricultural and Resource Management Agent, Associate Professor-Rutgers Cooperative Extension of Middlesex County, New Brunswick, NJ, USA

Urban Community Gardens—Sources of Food, Green Space and Community Stability

Jan Zientek, Program Coordinator Rutgers Urban Gardening, Rutgers Cooperative Extension, Newark, NJ, USA

Making Local Connections for Family Farmers in Michigan

Vicki Morrone, Williamston, MI, USA

Farmers Market Vendors Help Feed the Hungry

Kristin Kleeberger, Commercial Horticulture Educator for Waukesha and Milwaukee Counties, Univ. of Wisconsin Cooperative Extension Service, Madison, WI, USA

Tarrant County Food Bank and Inmate Horticulture Program

Dotty Woodson, County Extension Agent-Horticulture, Texas Cooperative Extension, Fort Worth, TX, USA

Workshop 24 (W24)—Orchid Production and Use—A World Wide Perspective

Metro Toronto Convention Centre, 205AB

Sponsors: ASHS Floriculture WG; American Orchid Society

Conveners: Dr. Yin-Tung Wang, Texas A&M Univ., Weslaco, TX, USA; Dr. Robert J. Griesbach, USDA-ARS, Beltsville, MD, USA

There will be three short presentations followed by a moderated panel discussion. This will be a continuation of the previous highly successful ASHS/OAS Symposiums.

Unique Biology of Orchids

Dr. Rob Griesbach, USDA-ARS, Beltsville, MD, USA

International Orchid Production

Nancy Laws, Market Analyst with Fintrac Inc. (presented by **Dr. Yin-Tung Wang**, Texas A&M Univ., USA)

Potting Mixes Used in Commercial Orchid Production

Andy Easton, Director of Education, American Orchid Society

Workshop 25 (W25)—Methyl Bromide Alternatives

Crowne Plaza Hotel, Ballroom A

Sponsor: ASHS Viticulture and Small Fruits WG; ISHS Commission Plant Protection

Convener: Dr. Gina E. Fernandez, North Carolina State Univ., USA

The complete ban on the use of methyl bromide for use in fruit and vegetable production in industrialized countries is set for 2005. Research conducted during the past decade has helped to identify a wide range of viable alternatives for addressing problems and issues such as pest problems, soil type, crop to be planted, and ease of integration into a growers cultural system. However, a single replacement as effective and economical as methyl bromide has not been identified. The objective of this workshop is to provide an overview on what methyl bromide does, and what viable alternatives have been identified to date. Presentations will include information on chemical fumigants that have been identified for use after 2005 in the larger production areas of the USA. Alternative systems that include biological, cultural and genetic alternatives will also be discussed.

Introduction/Overview: What Is Methyl Bromide Doing and Chemical Replacements in Large Production Areas in the United States

Dr. Kirk D. Larson, Univ. of California, Davis, Dept. of Pomology, Davis, CA., USA

Dr. Gina E. Fernandez, North Carolina State Univ., Raleigh NC, USA

Biocontrol Alternatives

Annemiek Schilder, Michigan State Univ., Dept. of Plant Pathology, East Lansing, MI, USA

Frank Louws, North Carolina State Univ., Raleigh, NC, USA

Cultural Alternatives

Dr. Marvin P. Pritts, Cornell State Univ., Dept. of Fruit & Vegetable Science, Ithaca, NY, USA

Dr. Brent Black, USDA ARS Fruit Lab, Beltsville, MD, USA

Genetic Alternatives and Summary

Dr. James F. Hancock, Michigan State Univ., Dept. of Horticulture, East Lansing, MI, USA

Discussion

Workshop 26 (W26)—People-Plant Council Business Meeting

Metro Toronto Convention Centre, 206D

Presiding: Dr. Diane Relf, Virginia Polytechnical Institute and State Univ., Blacksburg, VA, USA

Wednesday August 14

Niagara Excursion

All registered delegates and accompanying persons will spend the day on the Niagara Excursion.

Departs 0700 from Metro Toronto Convention Centre, Front Street Entrance

For further details, see p. 7.

(Social Events section)

Thursday August 15

0730–1800

Registration Desk Open

Metro Toronto Convention Centre,
North Building, Street Level Lobby

0820–1040

Colloquium 4–Plant Genomics: A Revolution in Plant Biology and Horticulture

Metro Toronto Convention Centre, 105

Sponsors: ISHS Commission Biotechnology; ASHS Research Division; Potato Association of America

Convener: Dr. David Wolyn, Dept. of Plant Agriculture, Univ. of Guelph, Guelph, Canada

Genomics analysis in model plants will undoubtedly lead to crop improvement. Common regulators of fundamental plant processes such as disease resistance, stress tolerance and development may be identified and ultimately manipulated to affect phenotype. The recent sequencing of the Arabidopsis and rice genomes were milestones in plant biology. This information, combined with new technologies is facilitating the global analysis of gene expression. In the Arabidopsis community, the "2010 Project" has a goal of identifying the functions of all 25,000 genes by the year 2010 and undoubtedly will benefit all plant scientists.

This colloquium will review the current state and future prospects of plant genomics in the public and private sectors. Analysis of gene expression in functional genomics studies, the progress of the "2010 Project", and the assembly, analysis and interpretation of large databases through bioinformatics will be discussed. This session will be valuable to all scientists interested in the genetic improvement of plants.

Rice, Arabidopsis, and Fungal Genomics in Syngenta Research and Development

Dr. Stephen Goff, Head of Genome Technology, Torrey Mesa Institute, Syngenta Inc., San Diego, CA, USA



Genomics is currently being used at Syngenta to identify targets for various chemicals, to identify new chemical lead compounds, and to improve crops with genes that control commercially important traits. The large amount of Arabidopsis research and the recently sequenced Arabidopsis genome provide a foundation for understanding plant biology and for the identification of useful gene functions. A large number of mutants in Arabidopsis have been generated and extensive gene expression profiles have been collected. These genomics tools and examples of their use will be described.

To develop a similar set of genomics approaches for monocots, the genome of rice was sequenced to over 6-fold coverage by a draft sequencing approach and assembled. The accumulated sequence represents more than 99% of the rice genome, and contains over 99% of the publicly available full-length rice protein sequences. Over 42,000 genes or gene fragments longer than 500 base pairs and 63,000 genes or gene fragments longer than 300 base pairs were predicted using an integrated gene prediction, sequence homology, and protein domain/motif identification strategy. More than 85% of the predicted Arabidopsis genes display significant homology to genes predicted in rice, and approximately one-third appear to be plant-specific. Greater than 98% of the publicly available proteins of maize, wheat, and barley were found with significant homology in the draft sequence assembly and more than 95% of translated cDNAs were found in the rice draft gene predictions. Approximately 40,000 simple-sequence repeats (microsatellites) were identified in the draft genome sequence. Synteny between the rice genome and other cereal genomes was found to be significant, whereas synteny between rice and Arabidopsis is restricted to short regions of the genome carrying 5 to 15% of the genes. No evidence for lateral DNA transfer was found in a comparative analysis of the rice and human genomes. The Syngenta draft sequence of rice provides a solid foundation for completing a high-accuracy sequence, enabling gene identification, facilitating physical and genetic mapping, and serving as a syntenic model for the other major cereal crops: maize, wheat, and barley. Gene expression analysis tools were developed for rice and extended to other cereal crops. The expression of genes under various developmental stages and environmental conditions was studied. Details of the

sequencing and analysis will be presented.

A few fungal species representing a broad range of plant pathogens were sequenced and analyzed. The genes of these fungal species were predicted and comparative genomics was applied to determine fungal-specific genes, genes required for virulence or viability and genes involved in producing particular metabolites. Examples of these studies and their uses in a commercial setting will be described.

Extending the Potential of Gene Expression Profiling in the Post-Genome Era

Dr. Pamela Green, Delaware Biotechnology Institute, Univ. of Delaware, Newark, DE, USA



Gene expression profiling by microarray analysis allows mRNA levels for thousands of genes to be monitored simultaneously. The application of this approach to various problems in plant biology has led to the discovery of gene expression changes and associations among genes that would have been very difficult to detect otherwise. This in turn has led to exciting new hypotheses that can now be tested by other means. As an example, experiments to address the control

of mRNA stability in *Arabidopsis* will be discussed. The development and potential impact of a method for monitoring mRNA stability of thousands of genes simultaneously on microarrays will also be presented.

Challenges in Information Management and Data Access in the Next Ten Years

Dr. Seung Rhee, Director of the Arabidopsis Information Resource (TAIR), Stanford Univ., Palo Alto, CA, USA



Recent advances in biotechnology such as genome sequencing and genome-wide transcript profiling have accelerated the rate of data production. The increasing wealth of data and information challenges the researcher to expand beyond one's domain of expertise into areas of the unknown and unfamiliar. In order to survive in the sea of data, we need to solve the problem of achieving integrated data access. There are several factors that should be considered: First, the semantics and syntax in

which the data are represented should be made explicit and easily accessible. Second, methods of integration or correlation of data should be made explicit. Third, the dynamic quality of data should be addressed. Fourth, high-level data retrieval and analysis tools are needed. In this talk, I will discuss these issues in more detail and describe ways in which different groups, including the Arabidopsis Information Resource are addressing these issues.

0820-1040

Colloquium 5—Horticulture and Human Health: Functional Foods, Plant-Based Medicines, Tools for Environmental Remediation

Metro Toronto Convention Centre,
John Bassett Theatre

Sponsors: ISHS Section Medicinal and Aromatic Plants; International Council of Medicinal and Aromatic Plants; ASHS

Working Group on Herbs, Spices and Medicinal Plants; ASHS Working Group on Food Quality and Nutrition; ASHS Working Group on Human Issues in Horticulture

Convener: Dr. Praveen Saxena, Dept. of Plant Agriculture, Univ. of Guelph, Canada

From time immemorial plants and herbs have been recognized for their miraculous curative powers and numerous therapeutic marvels. About three quarters of the world's population uses plants as their primary source of health care and more than 30% of prescription pharmaceuticals, e.g., morphine, codeine, atropine and digoxin, are derived from green plants. As well, a range of whole plant preparations is now sold as complimentary or "safer" alternative medicines, as herbals, botanicals, and phytopharmaceuticals. The plant based product industry is worth about US\$1 billion annually in Canada and more than 5 times that in the USA. Despite this immense popularity, plant based medicines face a serious credibility problem because of the general lack of scientific evidence regarding safety, quality and efficacy. Also the escalation of consumer demand for plant-based medicines and the expanding world population base has resulted in the indiscriminate harvest of wild species of medicinal plants, placing many of them on the list of endangered species.

Food components believed to improve health, i.e., nutraceuticals and functional foods, are also growing sectors of the natural health product industry. Horticultural plant-based foods and beverages are front and center here, and researchers around the world continue to discover valuable links between food components and improved health.

Plants promote human health in other perhaps more subtle, but equally profound ways. We live in a complex ecosystem in which our lives are constantly influenced by our interactions with plants and they can enhance human health and well being in many ways. One very interesting example of these beneficial effects is the use of plants for remediation of environmental pollutants generated by agricultural, commercial, and many industrial activities.

Indigenous Horticulturists and Human Health: An Ethnobotanical Approach

Dr. Paul Cox, Director, National Tropical Botanical Garden, Kalaheo, Hawaii, USA



Indigenous peoples have been adept at identifying and developing plants with bioactive molecules for use in ritual and in medicine. Some of these plants have been found in the laboratory to contain molecules suitable for drug development, and efforts have been taken to ensure equitable sharing of benefits with indigenous peoples. The recent agreement between the Aids Research Alliance and the people of Samoa, which returns 20% of ARA's net revenues from the

anti-AIDs drug prostratin to the Samoans, is an example of such an arrangement.

Indigenous horticulturalists have also had to learn how to detoxify plants, such as cassava, that are potentially injurious to health. Acute toxicity has often been appropriately dealt with by indigenous peoples, but chronic toxicity, such as is evidenced in the high rates of ALS-PDC among the Chamorro people of Guam, is not always avoided. Such disease isolates become "Rosetta Stones", and if interpreted correctly, can lead to broad advances in the understanding of disease causation. However, they are likely to yield their secrets to western workers only if indigenous perspectives are considered.

Functional Foods: Challenges and Opportunities for Scientists and Consumers

Dr. Joe Mazza, Agriculture and Agri-Food Canada,
Pacific Agri-Food Research Centre, Summerland,
Canada



In Canada, a functional food is defined as being similar in appearance to (or may even be) a conventional food, is consumed as part of a normal diet, and has demonstrated physiological benefits and/or reduces the risk of chronic disease beyond its basic nutritional functions. A nutraceutical is a product isolated or purified from foods but sold in powders, pills, and other medicinal forms not generally associated with food. Like a functional food it has a demonstrated physiological benefit or

provides protection against chronic disease. In the USA, functional food is not a legally defined term or regulatory category, but an industry term meaning health-promoting foods. It can be any food or beverage that imparts a physiological benefit, enhances overall health, helps prevent or treat a disease / condition, or improves physical or mental performance.

Driving forces for the expanding market for functional foods are: a) an increasing recognition by consumers and health care providers of the link between diet and disease; b) demographics (aging population); c) rising health care costs; and d) advances in food and nutrition science. In addition, increased public interest and media coverage of diet-health relationships and an increased acceptance of alternative medicines and treatment modes have created a favourable climate for expansion of functional foods and nutraceuticals. The direct link between diet and health is increasingly recognized by the public at large and consumer awareness of this link is growing. Fifty percent of US citizens believe that with appropriate actions they can prevent cancer; 74% are highly aware of the diet/disease connection; 44% agree that foods can reduce the use of drugs; and 64% agree there is a connection between food and health. This presentation will address factors that are currently driving and constraining functional foods development, the status of the functional foods industry, examples of novel products on the market, and opportunities and challenges faced by the industry, scientists and consumers from North America and globally.

Phytoremediation of Environmental Pollution

Dr. Michael Dixon, Dept. of Plant Agriculture, Univ. of Guelph, Canada



Sustenance of all living organisms including humans depends on soil, water and air. These matrices continue to be contaminated with various forms of pollutants such as hydrocarbons, metals, and excessive fertilizers resulting from human and industrial activities. Plants play an integral part in reducing the environmental impact associated with air, water, and soil pollution. This unique feature of plants to sense, tolerate, and detoxify environmental stresses originates

from their ability to modulate their basic metabolic functions in response to imposed stresses. For the past several years, my research program has examined several aspects of the use of plants in remediation of contaminants, specifically in closed environments such as recirculating nutrient systems in the greenhouse and indoor air. A range of species from both lower and higher plants such as mosses and scented geraniums have

been identified and incorporated in the plant-based remediation technologies. The model systems of biofiltration and rhizofiltration have proven to effectively reduce contaminating volatile organic compounds in the indoor climate and excess salt from hydroponic solutions. The studies to determine the mechanisms of remediation revealed intricate relationships among plant metabolism, nutritional status, and reallocation of resources during stress adaptation. The research on plant and environmental stresses in natural and highly controlled environments has tremendous potential for improved human health through the development of efficient and eco-friendly plant based technologies for the production of food, feed, and functional foods as well as in the space exploration initiatives.

1000–1830

Exhibits Open

Metro Toronto Convention Centre, Hall B

1040–1100

Break

Metro Toronto Convention Centre, Hall B

1100–1240

Symposia (Oral Session):

S02–Toward Ecologically Sound Fertilization Strategies for Field Vegetables Production

Metro Toronto Convention Centre, 103B

Convener: Dr. Nicolas Tremblay, AAFC, St-Jean-sur-Richelieu, Quebec, Canada

Sponsors: ISHS Section for Vegetables—Vegetable Nutrition and Fertilization Working Group; ASHS Vegetable Crops Management and Mineral Nutrition Working Groups

S07–Expanding Roles for Horticulture in Improving Human Well-Being and Life Quality

Crowne Plaza Hotel, Caledon Room

Conveners: Dr. Diane Relf, *Virginia Polytechnical Institute and State Univ., USA*; Dr. Beyoung Hwa Kwack, *Korea*

Sponsors: ISHS Commission Urban Horticulture; ASHS Human Issues in Horticulture Working Group; ASHS Consumer Horticulture and Master Gardeners Working Group; American Horticultural Society; American Horticultural Therapy Association; Canadian Horticultural Therapy Association; American Community Gardening Association; People Plant Council; American Association of Botanical Gardens and Arboreta; Japanese Society for Horticultural Therapy

1100–1240

Symposia (Oral Session) Continued:

S01–Crowne Plaza Hotel, Ballroom A

S03–Metro Toronto Convention Centre, 201CD

S04–Metro Toronto Convention Centre, 202AB
S05–Metro Toronto Convention Centre, 202CD
S06–Metro Toronto Convention Centre, 104A
S08–Metro Toronto Convention Centre, 206C
S09–Metro Toronto Convention Centre, 105
S10–Metro Toronto Convention Centre, 104C
S11–Metro Toronto Convention Centre, 205CD
S12–Metro Toronto Convention Centre, 203BD
S13–Crowne Plaza Hotel, Ballroom B
S14–Metro Toronto Convention Centre, 201EF
S16–Metro Toronto Convention Centre, 104D
S17–Metro Toronto Convention Centre, 205AB
S18–Metro Toronto Convention Centre, 206D
S19–Metro Toronto Convention Centre, 206AB
S20–Metro Toronto Convention Centre, 206EF
S21–Metro Toronto Convention Centre, 104B
S22–Metro Toronto Convention Centre, 103A
S23–Metro Toronto Convention Centre, 201AB

1240–1340

Lunch Break

Metro Toronto Convention Centre, Hall B

Cash concessions available on the exhibit floor.

1340–1440

Poster Sessions: S01, S02, S03, S04, S05, S06, S07, S08, S09, S10, S11, S12, S13, S14, S16, S17, S18, S19, S20, S21, S22, S23

Metro Toronto Convention Centre, Halls B and C

1440–1700

Symposia (Oral Session) Continued:

S01–Crowne Plaza Hotel, Ballroom A
S02–Metro Toronto Convention Centre, 103B
S03–Metro Toronto Convention Centre, 201CD
S04–Metro Toronto Convention Centre, 202AB
S05–Metro Toronto Convention Centre, 202CD
S06–Metro Toronto Convention Centre, 104A
S07–Crowne Plaza Hotel, Caledon Room
S08–Metro Toronto Convention Centre, 206C
S10–Metro Toronto Convention Centre, 104C

S11–Metro Toronto Convention Centre, 205CD
S12–Metro Toronto Convention Centre, 203BD
S13–Crowne Plaza Hotel, Ballroom B
S14–Metro Toronto Convention Centre, 201EF
S16–Metro Toronto Convention Centre, 104D
S17–Metro Toronto Convention Centre, 205AB
S18–Metro Toronto Convention Centre, 206D
S19–Metro Toronto Convention Centre, 206AB
S20–Metro Toronto Convention Centre, 206EF
S21–Metro Toronto Convention Centre, 104B
S22–Metro Toronto Convention Centre, 103A
S23–Metro Toronto Convention Centre, 201AB

1440–1720

Symposia (Oral Session) Continued:

S09–Metro Toronto Convention Centre, 105

1700–1800

Break

Metro Toronto Convention Centre, Hall B

1800–2020

Colloquium 6–Mission to Mars: Challenges and Opportunities for Plant Science

Metro Toronto Convention Centre,
John Bassett Theatre

Sponsors: ISHS Commission Engineering; ISHS Commission Protected Cultivation; ASHS Growth Chambers and Controlled Environments Working Group

Convener: Dr. Gary Stutte, Kennedy Space Center, USA



Why, From a Life Sciences Perspective, This Mission to Mars?

Dr. Chris McKay, Senior Scientist, Space Science Division, Ames Research Center, USA

Mars may have had water and life early in its history which makes it a key target for robotic and human exploration. Extensive human exploration of Mars will of necessity depend on life support systems that rely on agricultural plants. If current concept for re-creating a biosphere on Mars are implemented this would involve widespread use of plants, particularly species from Arctic and alpine environments.

Life and Work in Space

Dr. Robert Thirsk, Astronaut, Canadian Space Agency, Canada



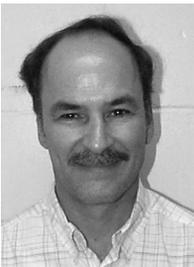
As one of six original Canadian astronauts, Thirsk has accumulated a wealth of experience to bring to this discussion of life and work in space. He has participated in several parabolic flight experiments aboard the NASA KC-135 aircraft, and contributed to a number of space medicine, space station, and shuttle mission planning working groups. Building upon his earlier biomedical engineering research, Thirsk led an international team investigating the effects of weightlessness on the body's venous system, and also designed an experimental "anti-gravity suit," which may help astronauts readapt more easily to life on earth following spaceflight.

In addition, Thirsk has led space education projects designed to foster enthusiasm for science and mathematics among Canadian grade school students. His work with such projects as Tomatosphere and Canolab, which focused on growing tomato and canola plants from space flown seeds, has reached thousands of classrooms across Canada. Today, he continues to participate in the development of curriculum projects, such as Space for Species, a program designed to allow Canadian students to monitor the movements and habitats of various migratory animals.

In June 1996, Thirsk flew as a payload specialist aboard space shuttle mission STS-78, the Life and Microgravity Spacelab (LMS) mission. During this 17-day flight aboard Space Shuttle Columbia, he and his six crewmates performed 43 international experiments devoted to the study of life and materials sciences. The life science experiments investigated changes in plants, animals, and humans under spaceflight conditions, while the materials science experiments examined protein crystallization, fluid physics, and high-temperature solidification of multi-phase materials in a weightless environment.

Horticulture and the Mars Missions

Dr. Raymond Wheeler, Plant Physiologist, NASA Biological Sciences Branch–Kennedy Space Center, USA



When humans venture beyond Earth orbit and on to Mars, horticulture will inevitably follow. Early missions would likely include small-scale plant growing systems to produce fresh vegetables and small fruits to supplement the space traveler's diet. As mission durations increase so will the role of horticulture, where plants will provide an increasing proportion of food, O₂, CO₂ removal, and water purification for a Martian space station. In all cases, innovative horticulture technologies and approaches will be required. This would include the development of energy efficient electric lighting and/or solar collectors, innovative design and management concepts for green-houses and growing systems, capabilities to manage temperature, humidity and atmospheric composition (e.g., O₂, CO₂, ethylene and total pressure), use of techniques to recycle and conserve water and nutrients, and incorporation of novel plant health monitoring concepts. In addition, a successful horticultural effort would require new cultivars that are well suited for the constraints of Martian gardening.

Meeting these needs will be challenging but should also benefit terrestrial horticulture through the inspiration of novel technologies that are energy-efficient and miniaturized, and

through increasing our fundamental understanding of crop physiology.

1800–2000

Concurrent Workshops:

Workshop 27 (W27)—The Potato Industry: Future Issues and Challenges

Metro Toronto Convention Centre, 201CD

Sponsor: PAA Utilization & Marketing Section

Convener: Marcin J. Topolewski, Agricultural Economist, Lamb Weston Inc., Kennewick, WA, USA

Over the last several years the potato industry has gone through several important turns—from the period of growth and stable existence at the beginning of the last decade to a period of low contract returns, over-production and a crisis in farming across North America. Recently we have observed changing trends in potato consumption and production, changing frozen potato trade balances, and lack of acceptance by consumers for GMO crops, including potatoes. During the same period, growers groups have become more vigorous in both their contract bargaining functions and influencing the political system on both domestic policy level and trade issues. Invited speakers will discuss these recent changes and their impacts on the industry with special emphasis on trade, the GMO issue, growers associations and contract bargaining.

The International Potato Industry

Joe Guenther, Univ. of Idaho, Moscow, ID, USA

The Role of Bargaining Associations in Potato Marketing

Dale Latham, Chair, Potato Marketing Association of North America

Ontario Potato Growers Association Speaker

Using GMO Testing and Non-GMO Certification to Reduce Risk and Capture Opportunities in the Global Agr-Food Marketplace

John Fagan, Chairman and Chief Scientific Officer, Genetic ID NA, Inc. Fairfield, IA, USA

Workshop 28 (W28)—Vectors and Alternate Hosts of Plant Virus Diseases

Metro Toronto Convention Centre, 202AB

Sponsor: PAA Plant Protection Section

Convener: Jeff Miller, Univ. of Idaho, Aberdeen, ID, USA

Aphid vectors, and the alternate hosts and transmission of potato viruses will be addressed by the panelists.

Biology of Aphids in Potato Production

Gilles Boiteau, Potato Research Centre, Agriculture and Agri-Food Canada, Fredericton, NB, Canada

Weeds as Alternate Hosts for Potato Viruses

Peter Thomas, ARS-USDA, Washington State Univ. Irrigated Agriculture, Research and Extension Center, Prosser, WA, USA

Thursday August 15

Virus Transmission

Robert Coffin, Crop Specialist, Cavendish Farms,
Summerside, PE, Canada

Discussion

Workshop 29 (W29)—ISHS Publications

Workshop

Metro Toronto Convention Centre, 201AB

Sponsor: ISHS Publications

Convener: Prof. António Monteiro, Inst. Superior de Agronomia,
Tapada da Ajuda, Lisboa, Portugal, ISHS Board, Publications.

This workshop will be an informal discussion about ISHS publications. Prof. Monteiro will make a brief introduction about the ISHS policy on publications and a brief explanation about each of them. Then the floor will be open for questions, comments, etc.

Workshop 30 (W30)—ISHS Postharvest

Commission Business Meeting

Metro Toronto Convention Centre, 202CD

Convener: Prof. Dr. Errol WHewett, Massey, Univ., Auckland, New Zealand

Friday August 16

0730–1800

Registration Desk Open

Metro Toronto Convention Centre,
North Building, Street Level Lobby

0800–1730

Exhibits Open

Metro Toronto Convention Centre, Hall B

0800–0900

**Poster Sessions: S01, S02, S03, S04, S05, S06,
S07, S08, S09, S10, S11, S12, S13, S14, S16, S17,
S18, S19, S20, S21, S22, S23**

Metro Toronto Convention Centre, Halls B and C

0840–1040

Symposia (Oral Session) Continued:

S10–Metro Toronto Convention Centre, 104C

0900–1040

Symposia (Oral Session) Continued:

S01–Crowne Plaza Hotel, Ballroom A

S02–Metro Toronto Convention Centre, 103B

S03–Metro Toronto Convention Centre, 201CD

S04–Metro Toronto Convention Centre, 202AB

S05–Metro Toronto Convention Centre, 202CD

S06–Metro Toronto Convention Centre, 104A

S07–Crowne Plaza Hotel, Caledon Room

S08–Metro Toronto Convention Centre, 206C

S09–Metro Toronto Convention Centre, 105

S11–Metro Toronto Convention Centre, 205CD

S12–Metro Toronto Convention Centre, 203BD

S13–Crowne Plaza Hotel, Ballroom B

S14–Metro Toronto Convention Centre, 201EF

S16–Metro Toronto Convention Centre, 104D

S17–Metro Toronto Convention Centre, 205AB

S18–Metro Toronto Convention Centre, 206D

S19–Metro Toronto Convention Centre, 206AB

S20–Metro Toronto Convention Centre, 206EF

S21–Metro Toronto Convention Centre, 104B

S22–Metro Toronto Convention Centre, 103A

S23–Metro Toronto Convention Centre, 201AB

1040–1100

Break

Metro Toronto Convention Centre, Hall B

1100–1240

ISHS General Assembly

Metro Toronto Convention Centre,
John Bassett Theatre

1240–1400

Lunch Hosted by Exhibitors

Metro Toronto Convention Centre, Halls B and C

1400–1600

Symposia (Oral Session) Continued:

S01–Crowne Plaza Hotel, Ballroom A

S02–Metro Toronto Convention Centre, 103B
S03–Metro Toronto Convention Centre, 201CD
S04–Metro Toronto Convention Centre, 202AB
S05–Metro Toronto Convention Centre, 202CD
S06–Metro Toronto Convention Centre, 104A
S07–Crowne Plaza Hotel, Caledon Room
S08–Metro Toronto Convention Centre, 206C
S09–Metro Toronto Convention Centre, 105
S10–Metro Toronto Convention Centre, 104C
S11–Metro Toronto Convention Centre, 205CD
S12–Metro Toronto Convention Centre, 203BD
S13–Crowne Plaza Hotel, Ballroom B
S14–Metro Toronto Convention Centre, 201EF
S16–Metro Toronto Convention Centre, 104D
S17–Metro Toronto Convention Centre, 205AB
S18–Metro Toronto Convention Centre, 206D
S19–Metro Toronto Convention Centre, 206AB
S20–Metro Toronto Convention Centre, 206EF
S21–Metro Toronto Convention Centre, 104B
S22–Metro Toronto Convention Centre, 103A
S23–Metro Toronto Convention Centre, 201AB

1600–1620

Break

Metro Toronto Convention Centre, Hall B

1620 – 1820

Colloquium 7–Small is Beautiful: The Art and Science of the Miniature

**Metro Toronto Convention Centre,
John Bassett Theatre**

Sponsors: ISHS Section Ornamental Plants; ISHS Commission Urban Horticulture; ASHS Ornamentals, Landscape and Turf Working Group; ASHS Plant Biotechnology Working Group; ASHS Floriculture Working Group; The Canadian and American Horticultural Therapy Association

Conveners: Dr. Paul Read, Univ. of Nebraska; Dr. Jane Seabrook, Agriculture and Agri-Food Canada, Fredericton, Canada

This colloquium seeks to capture the innovative creativity that is embodied in the science and art inherent in horticultural plant endeavors, with special emphasis on those approaches that capitalize on the miniature. The beauty found in mini-bonsai and diminutive landscapes, tiny flowers and tubers produced via micropropagation, and rare insights into shoot apex transition, combine to richly illustrate the exquisite science and art found in horticultural research. The applications of these aspects of horticulture to benefit all of humanity are consistent with the theme of the XXVIth International Horticultural Congress, “Horticulture: Art and Science for Life”.

Indeed, many of the projects featured in this colloquium have evolved from quaint or interesting approaches employed to illustrate physiological, anatomical or morphological principles in the classroom. Ultimately they have become practical and profitable enterprises. Applications for professional horticultural therapists will also be readily apparent.

An Invitation to Explore the World of Miniature Bonsai

Dr. Atsuchi Hasegawa, Kagawa Univ., Japan



Historical records suggest that the protocol for Bonsai (production of dwarf potted trees) was noted for the first time around 700 AD in China. Although it is not clear when Bonsai was first introduced into Japan, we can assume that the upper social class had a deep appreciation for Bonsai in the second half of the 13th century or the first half of the 14th century. Miniature Bonsai is the combination of the power of the plant in natural environments and human craftsmanship. Thus it rests on the originality of artists combined with the laws of Nature for it to be a piece of art.

Traditionally, Japanese people have tried to create beauty by respecting natural objects as much as possible and by subtly adding human craftsmanship. We can say that one of the characteristics of Japanese culture is “condensed culture”, which means Nature is condensed to limits while the natural atmosphere remains. We can then say we feel noble and Bonsai is the concrete creation of such a concept. Miniature Bonsai are so small that we can hold one or two pots in our hand. The height of plants is restricted, up to about 20 centimeters (previously 10-15 centimeters). Because of its small size, the harmony among the size of the pot, its shape, its color and its design (painting) is quite important.

The Art and Craft of Desk-Top Gardening

Dr. Richard Austin, Univ. of Nebraska, USA



What began as a search for a more accessible leisure activity for the physically limited has blossomed into a new gardening technique for everyone – desk-top gardening. Developed for its year-round adaptability, the concept combines the art of bonsai, the convenience of tub planting, the pleasure of model building, and the fun of flower arranging. And, when you add the popularity of miniature furnishings, you have a desk-top garden complete with lawns and shrubs and shade trees – to a tiny scale, of course.

The desk-top garden mirrors its real-size counterpart in several ways. It requires the careful planning and placement of plants to fully exhibit their visual qualities. It allows amenities such as accent boulders (small stones) and cobblestone paths (tiny gravel) to be installed for function as well as form. It can have site furnishings and sculpture (benches, lawn chairs, and even lanterns that really light) for a finishing touch that creates the personal feel of privacy, and it is living and growing. A desk-top garden solves the problem of limited space and allows the fun and pleasure of arranging plants from a seated position. Wheelchair confinement or the restricted use of limbs or hands no longer prevents garden enjoyment. An attractive landscape scene can be designed, planted, and maintained on a convenient sitting position—on a desk top.

It is clear from the research thus far that interest in this new concept is very high with even higher demand to follow. The chance to enjoy a new form of gardening and landscaping is a positive attraction to many, and desk-top gardening brings the hobby in reach of even more people. Within the realm of therapeutic design, the potential is overwhelming.

The Shoot Apex in Transition: Time-Lapse Video Simulation of Floral Morphogenesis in Almond (*Prunus dulcis*) Buds

Dr. Vito S. Polito Dept. of Pomology, Univ. of California, Davis, USA



Almond (*Prunus dulcis*, syn. *P. amygdalus*, *Amygdalus communis*) flowers form in simple buds that contain no leaves and a single terminal flower. The shoot apex of these buds undergo transition from a vegetative state, during which bud scales are produced at the periphery of the apical meristem, to a reproductive state. The transition is characterized by changes in meristem size and morphology. Subsequent to the transition to the reproductive state, a series of bracts are initiated followed by the

sequential initiation and differentiation of the floral organs. The entire shoot apical meristem is ultimately consumed with the initiation of the gynoecium. With the objective of developing a model for the timing of critical events in this developmental sequence, we documented the progress of these events as they occur in three almond cultivars, grown over a range that spans a north-south distance of more than 500 km in the Central Valley of California.

This study generated digital scanning electron micrographs. By combining micrographs of representative stages using video morphing technology, we created a time-lapse simulation of the progress of reproductive transition and organ differentiation at the meristem. The video sequence illustrates changing meristem morphology, organ initiation and differentiation, and the ultimate conversion of the floral meristem to a primordial pistil. The simulation provides a unique, dynamic view of flower development by adding a time dimension to the static scanning electron micrograph.

1830–2200

Gala Dinner and Closing Ceremonies

Metro Toronto Convention Centre, 106/107

Ticket required

Saturday August 17

Post Congress Tours

Depart at Various Times

For details, see p. 8.

(Tours section)