A publication of the International Society for Horticultural Science

Chronica Horticulturae

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ISHS awards bestowed

Horticultural highlights
Global challenges require bold and innovative global solutions

Symposia and workshops
Asian Horticultural Congress • Germplasm of Ornamentals

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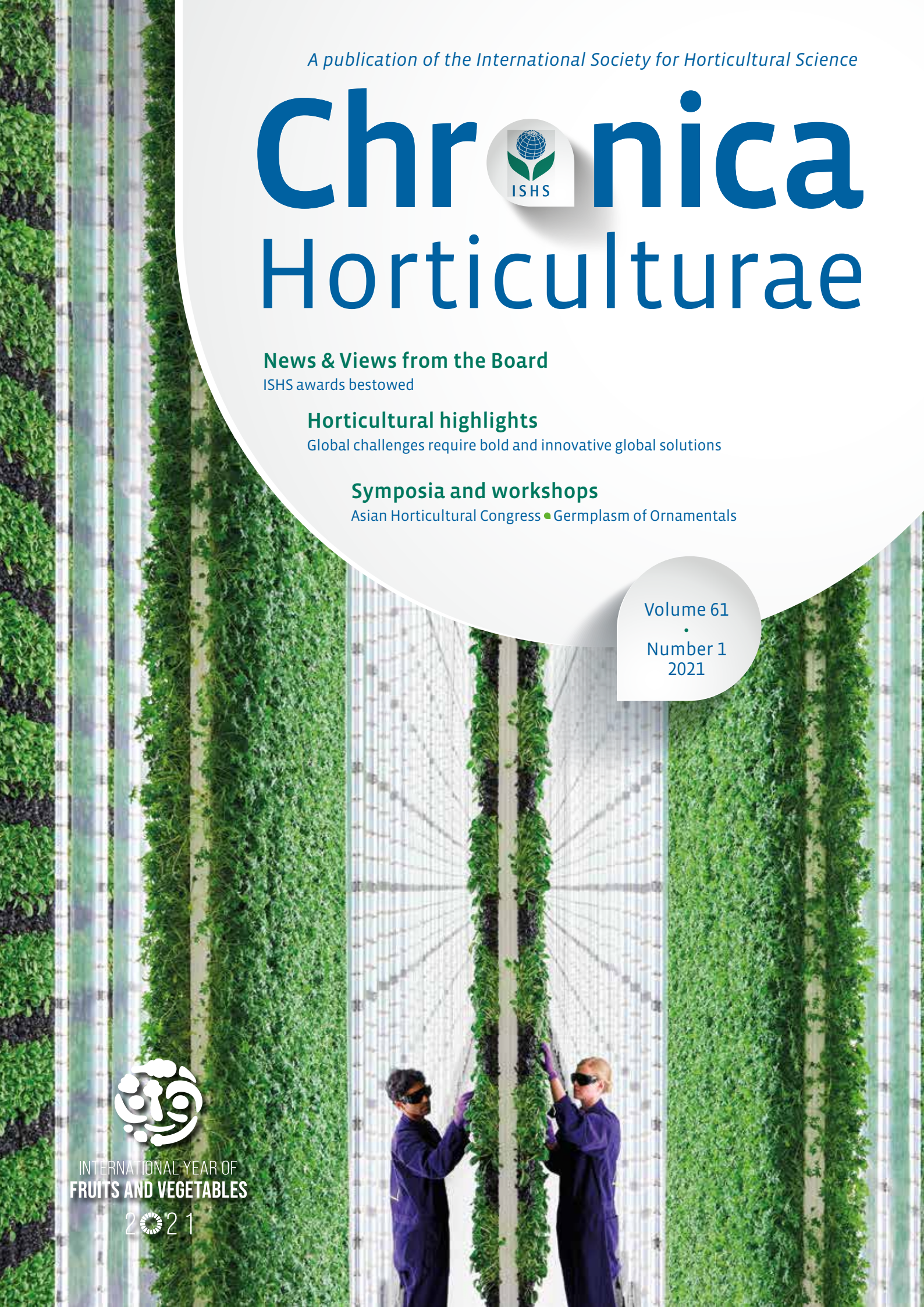

INTERNATIONAL YEAR OF
FRUITS AND VEGETABLES
2021

Chronica Horticulturae

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Editorial office and contact address:
ISHS Secretariat, PO Box 500, B-3001 Leuven 1, Belgium. Phone: (+32)16229427, Fax: (+32)16229450, E-mail: **info@ishs.org**, Web: **www.ishs.org** or **www.actahort.org**.

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A publication of the International Society for Horticultural Science, a society of individuals, organizations, and government agencies devoted to horticultural research, education, industry, and human well-being.

› Contents

Plenty farmers check on leafy greens grown in its South San Francisco Tigris Farm. Photo Credit: Plenty, Unlimited. See article p.16.

› Growing green

Patrícia Duarte de Oliveira Paiva, ISHS Board Member Responsible for Young Minds and Representative of South America

› Patrícia Duarte de Oliveira Paiva

Tistou, the boy with green thumbs, a classical book written by Maurice Druon and published in 1957, was frequently a required text at school for children (and young teens) over many generations. For many children, these classic books were considered to be some of the greatest "loved literature". We may say the same of the movie *Edward Scissorhands* (directed by Tim Burton). In both examples, plants and gardens are the main scenario and actions like planting and taking care of plants are instrumental in making life more meaningful.

Transferring this to our reality... if we ask most people the questions "*Have you ever cultivated any plant*?" or "*Do you know the plants from which your daily food is derived*?" probably the answer may not be so positive as we would expect or hope. Indeed, most people know the names of dinosaurs and other animals, their habits and many other facts regarding their behavior, but they frequently struggle in identifying plant names. This is not their fault. We can do things to turn this knowledge base around.

If horticulture was included in child education, they could "harvest" many benefits, and literally grow greener! Besides learning about plants, which would include cultivation techniques, names, uses and garden design, children could be educated on the nutritional aspects of a healthy diet. In addition, taking care of a garden provides mental health benefits, such as relaxation, because gardening is a calming, stress-free activity.

Horticulture, besides being a great professional and commercial activity, has become a fantastic hobby/activity. Horticulture includes the cultivation of fruits, vegetables, ornamentals, nuts, herbs, spices, flowers of edible, aromatic and medicinal plants, and mushrooms. This field also includes products made from the basic ingredients of some plants (e.g. maple syrup) and products produced from the activities of some animals, such as honey and raw silk (not the fabric), which are considered to be horticultural products (ISHS, 2020). It includes the plants used in beverage production like tea, coffee, wine, and juice and also the ones used as spices, paint, insecticide, resin, gum and for therapeutic purposes, treatment of animal diseases, use of their essential oils and in the cosmetic industry. Horticulture can be divided into Food Horticulture and Ornamental Horticulture (Paiva, 2018). These issues are related to human quality of life and health.

› Horticulture class.

Another term, horticultural therapy, is the engagement of a person in horticultural activities to improve their quality of life and to interact with nature. Horticulture-related activities (HRAs) may involve activities such as horticultural design, flower arrangement, plant cultivation, or flower pressing.

In view of the above, there are many interesting projects throughout the world as well as initiatives involving children's education and horticulture. This matter, horticulture, can be included in the educational curriculum for children and teens or be an important part of biology classes. Young people who have this opportunity and experience can have their interest and inspiration sparked to pursue careers in agriculture/horticulture. A vocational education curriculum contributes to this while creating meaningful connections to self-care, including healthy eating and establishment of well-being.

This kind of action is especially valuable and feasible for low-resource communities. Learning how to cultivate plants and their nutritional importance allows young people to replicate the knowledge they acquired in their homes.

Non-formal initiatives can be combined with formal education, as well as interesting and attractive strategies, such as campaigns, projects, competitions, and training sessions for sharing experiences. Attending classes, children and young teens may be inspired to grow their own gardens and to learn many interesting aspects of agriculture/horticulture.

Further examples include American school activities for children, such as visiting exhibitions, gardens or green areas for specific or extra-curricular activities related to subjects that they are studying. In the project "Fruitfulness" carried out in Brazil, children learn about fruits and vegetables through lectures on food and nutrition. They are taught about their relationship with the environment and they also participate in a fair with fresh products and recipes they prepared and tasted.

Providing literature is another effective strategy. There is a fantastic initiative in the USA which consists of book publication in horticulture or agriculture. Farmers or technicians engaged in agricultural/horticultural careers

› Tasting event of "Fruitfulness" project. Source: Instituto Presbiteriano Gammon.

may share their daily experiences with kids by reading a relevant book to them. This initiative may fascinate and inspire children to learn about and value horticultural/agricultural products.

Furthermore, performing practical activities such as plant growing is always very important. One specific project in a Brazilian school called "Fruit tree" provides students the opportunity to study different aspects of plant growth, like botany and development, and at the end, they may taste their fruits.

However, concerning the importance and great value of horticultural plants, students should be led to discover plants by themselves and learn about the important role of plants in the environment, green spaces, and nutrition. In addition, students should acquire skills on how to grow and take care of plants.

In 2020, Lisbon was proclaimed to be the European Green Capital by the European Commission (https://ec.europa.eu/environment/europeangreencapital/lisbon-is-the-2020-european-green-capital-award-winner/). The city's success is the result of many initiatives and politics in favor of green spaces and nature. It should be highlighted though that a long tradition in gardening education contributed a lot to this achievement. During their educational years, children in Portugal receive lectures on horticultural and gardening techniques, besides having direct contact with nature to learn about botany (Rodrigues, 2019).

Children can learn how plants affect people and the planet when they acquire horticultural knowledge. They discover the seriousness of the threat to environmental issues that we now face. The present community usage of plants must be changed for a safer future. Children develop a better understanding of nature and its great value and role in people's lives.

Children who grow up in rural areas may have different needs and behaviors toward plants. Since they are in constant contact with nature, they already have an opportunity to know how to grow plants, and the effects of the season and weather on their growth and development. These children may be proud to share their experiences, but on the other hand, they may still require in-depth background information to improve their knowledge.

One challenge for children that live in cities, is a new nonclinical term called "nature-deficit disorder" (NDD). This term corresponds to the consequences of the diminishing use of green spaces. This can be a result from the increase of electronic entertainment options, urbanization, and general pressures from school and work (Warber et al., 2015). Green spaces positively affect health by encouraging physical activity, facilitating social cohesion, and reducing stress (de Vries et al., 2013).

The year 2021 has been declared by FAO (Food and Agriculture Organization of the United Nations) as International Year of Fruits and Vegetables, which is "*a unique opportunity to raise awareness on the important role of fruits and vegetables in human nutrition, food security and health and as well in achieving UN Sustainable Development Goals*". This year's main objectives are to raise awareness of the nutrition and health benefits of consumption of fruits and vegetables. This proclamation aims to promote diversified, balanced, and healthy diets and lifestyles through fruit and vegetable consumption. Another important goal is to share best practices on promotion of consumption and sustainability, performing the integration of the smallholders including family farmers into local, regional, and global production, recognizing the contributions of fruits and vegetables to food security, nutrition, livelihoods and incomes.

In conclusion, the development of horticulture-based programs in schools from an early age may provide countless benefits. Performing horticultural activities is fun and pleasant for children of all ages. Educational programs should incorporate concepts of botany, plant behavior and development, environment and food nutrition. The result of these initiatives will be harvested in future adults who will have a solid knowledge of the origin and quality of their food. They will be able to grow garden plants and they will appreciate and respect nature.

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› ISHS awards bestowed

The ISHS takes great pride in presenting the ISHS award recipients for 2020. This past year has been less than routine. With the COVID-19 pandemic restrictions and the cancellation or postponement of symposia, regional congresses, and ISHS administrative meetings, the timing for consideration of the ISHS awards proved difficult. However, committee meetings have taken place virtually and through email. The ISHS Nominations and Awards Committee, in consultation and approval of the ISHS Council, bestow the ISHS Fellow Award on eight distinguished scientists, and the Honorary Membership Award on three exceptional members of the Society.

According to the Society's Rules and Procedures, the ISHS Fellow Award is presented in recognition of a person's outstanding contributions to horticultural science worldwide. The Honorary Membership Award is presented to an ISHS member in recognition of exceptional service to the Society in many capacities throughout their career. The nominations for these awards were presented by individual ISHS members, complete with supporting letters from five members of the Society from at least three different countries. Congratulations to the ISHS award winners for the Class of 2020.

ISHS Fellow Award

Professor Dr. Evelyne Costes

Professor Dr. Evelyne Costes, University of Montpellier II, and Director of Research at the French National Research Institute for Agriculture, Food and Environment (INRAE), is recognized for her significant contributions to horticulture and horticultural research, especially in areas related to horticulture, fruit tree modeling, physiology, and tree architecture and development.

Professor Costes began her career in botany/horticulture as a Ph.D. student of world-renowned botanist Professor Francis Hallé at the University of Montpellier in France. Her first research project was focused on the architecture of litchi trees (*Litchi chinensis*) growing on Reunion Island. She began her professional career in 1988, as a researcher with CIRAD and in 1994, was appointed as a researcher at INRAE in the Genetic and Breeding Department in Montpellier. After completing an Habilitation à Diriger des Recherches (HDR) degree in 2004, at the University of Montpellier II, Dr. Costes was appointed Team Manager of "Architecture and Functions of Fruit Species" (AFEF) at INRAE. In 2006, Dr. Costes was appointed Director of Research at INRAE in the Biology and Genetic Department.

From 2009-2010 she was the Assistant Director of the Joint Research Unit "Plant Development and Breeding," UMR DAP, CIRAD-INRAE-SupAgro. In addition to being a Director of Research, Dr. Costes is also a Board Member of the Joint Research Unit "Genetic Improvement and Adaptation of Mediterranean and Tropical Plants," CIRAD-INRAE-Montpellier SupAgro, in charge of the scientific animation of the "Plants and Population Development and Adaptation" theme since 2011.

Professor Costes teaches courses at the University of Montpellier II related to measuring and analyzing plant architecture as well as fruit tree ecophysiology. She has supervised numerous Master's degree level students and mentored at least twelve Ph.D. students and ten Post-doctoral Fellows. Her research focus has not only been to measure, analyze and model the development of the architecture of fruit trees, but she has also been active in collaborating with geneticists and molecular biologists to understand and identify genes that regulate the development of tree architecture. What is even more impressive is the range of fruit tree species that Dr. Costes has studied. That list covers a wide diversity of species including apple, apricot, peach, almond, pear, fig, olive, litchi, coffee, mango, kiwifruit, and coconut. Her research also encompasses studies of how tree architecture is affected by water stress, cropping, and rootstocks as well as how tree architecture interacts with flowering and fruiting.

Dr. Costes has been an outstandingly active member of ISHS. She has made scientific presentations at more than 40 different ISHS sponsored conferences and symposia and co-authored more than 100 *Acta Horticulturae* papers. She has been a very active member of ISHS Working Group Modelling in Fruit Research and Orchard Management and has attended all of its symposia since 1992.

In 2015, Dr. Costes convened a symposium in Montpellier and she organized workshops related to that Working Group at a couple of ISHS Congresses. She was also the co-convener of the "International Symposium on Understanding Fruit Tree Behaviour in Dynamic Environments" that was organized for the most recent International Horticultural Congress (IHC). Since IHC2018, Dr. Costes was elected by her peers to the position of Chair of ISHS Division Physiology and Plant-Environment Interactions of Horticultural Crops in Field Systems, which is the home of ISHS Working Group Modelling in Fruit Research and Orchard Management. In addition to contributions to the ISHS, Dr. Costes is a regular contributor to Functional-Structural Plant Modeling (FSPM) symposia, EUCARPIA symposia, *Rosaceae* Genomics conferences as well as numerous scientific meetings associated with her work at INRAE. Her outstanding publication record in many highly respected journals indicates that she is not only a participant in these fields, but she is also a respected member of these groups. In summary, Dr. Evelyne Costes' professional career is one of exemplary achievement and sustained contributions to science and the understanding of fruit tree architecture, physiology and horticulture. Her work has provided substantial advances in understanding that lead to improvements in fruit tree management and breeding.

Dr. Chad E. Finn

Dr. Chad Finn was recognized internationally as a leading authority on small fruit crops, especially in the areas of breeding, germplasm, and cultivar performance as well as in production and processing. He conducted research to characterize germplasm resources and improve small fruit crops for nearly 30 years. Dr. Finn worked closely with Dr. Bernadine Strik, Oregon State University horticulturist, in the only government-university cooperative breeding program of its kind. They released or co-released, with colleagues from the USDA-ARS, Agriculture and Agri-Food Canada, Washington State Univer-

sity, and the University of Arkansas, 51 new cultivars, including 21 blackberries, 11 red raspberries, 12 strawberries, and 7 blueberries. Dr. Finn authored or co-authored 475 publications, including 217 peer-reviewed papers, 16 patents/patent applications, 34 book chapters, 38 extension publications, 85 proceeding articles, and over 137 abstracts. He exchanged germplasm with more than 25 breeding programs internationally. Furthermore, he gave over 273 invited presentations (17 as keynote speaker). He obtained, with teams, nearly $24.1 million in competitive grants with over $7.3 million going to his program. The innovativeness and impact of Dr. Finn's research programs have been recognized by the scientific community and small fruit industry and this is demonstrated by his receipt of the following awards: USDA-ARS Technology Transfer award, American Pomological Society's Wilder Medal for outstanding service to horticulture in the broad area of pomology, American Society for Horticultural Science's Outstanding Fruit Cultivar Award for 'Black Diamond' blackberry, and the Federal Laboratory Consortium's Far West Regional Award for "Development of New Berry Varieties" in the category of Outstanding Commercialization Success. In addition, Dr. Finn was elected a Fellow of the American Society for Horticultural Science and honored as a Distinguished Alumnus by Purdue University's Department of Horticulture. He has also received numerous international and domestic requests for information, invitations to discuss his research program, numerous successful grant proposals, and requests to assist in development and evaluation of plant materials from other breeding programs around the world. Dr. Finn was a scientific committee member for four ISHS berry symposia, co-convener for two ISHS berry symposia, and a member of the Expert Committee for Global Crop Conservation Strategy for Strawberry. He consulted on small fruit breeding with more than 100 international scientists and industry representatives from 37 countries. Sadly, the world lost this productive and influential member of the berry research community on 17 December 2019, due to his untimely death. Dr. Finn is bestowed the ISHS Fellow Award posthumously.

Dr. Susan E. Gardiner

Dr. Susan (Sue) Gardiner is recognized internationally, for the impact of her DNA-related research on modern fruit breeding, and for the quality of her systematic and rigorously peer reviewed and published underpinning research. These contributions have been recognized with prestigious awards in both the USA and New Zealand. Dr. Gardiner has developed an integrated high-throughput platform for speedier development of new fruit varieties with targeted characteristics, which is utilized across several species. Her platform flows from marker discovery, through development of high-throughput markers, to automated DNA extraction from seedlings and marker screening. Breeders use this information to make crosses between optimal parents and to select seedlings for observation in the field as well as for sensory evaluation of fruit and for storage tests. The genetic markers associated with various traits can be simply viewed as 'DNA fingerprints' and are of various types according to the stage in the discovery and application process. She was the first New Zealand horticultural scientist to employ genotyping-by-sequencing for marker discovery.

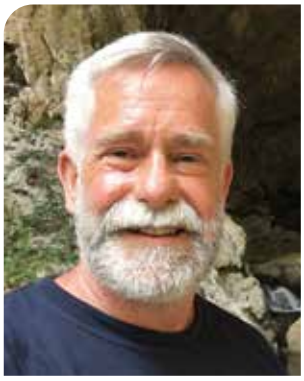
Automation for DNA extraction and marker screening was developed under Dr. Gardiner's leadership and is undertaken by a spinout company from her team, SlipStream Automation Ltd (http://www.slipstream-automation.co.nz/). Her long-term employer, Plant & Food Research, has pre-commercial apple selections that include three selected with genetic markers for red flesh and pyramided scab resistance. Loci in the parental development program include red skin and most recently resistances to apple scab, fire blight, woolly apple aphid, European canker and powdery mildew. Outputs from apple rootstock breeding include 19 Stage 3 elites selected for scion dwarfing, fire blight resistance and pyramided resistances to woolly apple aphid. The use of genetic markers reduces the time from seed to identification of elite selections by 30%, on top of a reduction in the number of seedlings for orchard evaluation to only 7% of the original population. Twelve years annual screening of thousands of seedlings with genetic markers for sex enables kiwifruit breeders to discard non-fruiting male seedlings. Markers in the development pipeline have the capability to screen females for red flesh and resistance to the bacterial disease caused by *Pseudomonas syringae* pv. *actinidiae* (Psa).

In 2017, she was a member of the team that was awarded the Prime Minister's Science Prize for their research into Psa. Sue co-organized the 3rd International Rosaceae Genomics Conference (Napier, 2006), which established New Zealand in the forefront of rosaceous research. She led the International Rosaceae Community (2006-2008), was 'International partner of choice' within the two 5-year USDA-SCRI RosBREED programs (2009 and 2015), was a member of RosBreed Science Advisory panel (2009-2018), was an invited member of the international consortium that sequenced the apple genome (and was awarded a Chinese Academy of Sciences (CAS) Visiting International Professorship (2010)). Sue has remained active scientifically and is currently working with colleagues on a major international project to identify and name *Rhododendron* species, cultivars and hybrids that are in both private and public collections within New Zealand. This involves both taxonomic as well as horticultural considerations and includes identification of taxa that are on the Red List and warrant attention from biodiversity and conservation perspectives. Sue has published over 100 refereed scientific papers, books and book chapters, and 20 papers in conference proceedings.

Dr. Gardiner is regularly invited to deliver lectures on modern technologies for fruit breeding to scientific, industry, and popular audiences. She lectures annually to the Massey University post-graduate plant breeding course. In 2005-2017, she presented 21 invited

lectures in a range of countries including China, Germany, Australia, Switzerland, USA, Italy, and Spain, as well as in New Zealand. In 2012-2017 alone, she presented/co-presented 35 conference papers in France, USA, Italy, Australia, Scotland, and New Zealand. These professional activities, including the publication of scientific papers, editing, the delivery of conference presentations, invited lectures and her roles on scientific panels and committees clearly define her international engagement and status.

Professor Dr. Shawn A. Mehlenbacher



Professor Dr. Shawn Mehlenbacher became the hazelnut breeder at Oregon State University in 1986, shortly after Eastern filbert blight (EFB) arrived in the Willamette Valley. He was promoted to full professor in 1995 and has been the Oregon Hazelnut Industry Endowed Professor since 2000. Professor Mehlenbacher has released 12 hazelnut cultivars, 12 pollinizers, and 3 ornamentals – an astounding feat considering it takes 17 years from cross to release. Due to his releases, the Oregon hazelnut industry, which was stagnant at about 30,000 acres for over twenty years, has now grown to over 80,000 acres. The 2020 harvest is expected to exceed 70,000 tons. Professor Mehlenbacher's work has instigated growth in other countries, essentially creating new international industries. Chilean companies have invested millions of dollars in jumpstarting an industry focused solely on his cultivars.

Professor Shawn Mehlenbacher is recognized as a leading authority on hazelnut breeding, genetics, germplasm, cultivar performance and production. In addition, he has researched the development and use of DNA markers and sequenced the hazelnut genome. He conducted research to understand EFB resistance and sporophytic self-incompatibility. Working with the USDA Repository in Corvallis, he assembled the most diverse germplasm collection for *Corylus* in the world. He has hosted and mentored 14 scientists from throughout the world including Italy, Turkey, France, Chile, and Tunisia. Professor Mehlenbacher has authored 7 book chapters, 107 refereed journal articles, 96 non-refereed articles, and 105 abstracts of oral and poster presentations. The innovativeness and impact of Professor Mehlenbacher's research program has been recognized by the scientific community and his university by multiple awards including: the Briskey Award for Faculty Excellence (2014), the Agricultural Research Foundation, Distinguished Faculty Award (2013), the F.E. Price/ Agricultural Research Foundation Award for Excellence in Research (2009), and the Wilder award by the American Pomological Society (2012) for outstanding service to horticulture in the broad area of pomology, with special consideration to the breeding of meritorious varieties of fruits and nuts.

Professor Mehlenbacher has been an active member of the ISHS since the 1980s. He attended the International Horticultural Congresses in Florence (Italy) and Toronto (Canada). He has attended every ISHS International Congress on Hazelnut since 1992, served on the scientific committee for all of them, and gave invited keynote addresses in 1992 in Alba (Italy), in 2008 in Viterbo (Italy) and in 2017 in Samsun (Turkey). He also hosted the International Congress on Hazelnut in Corvallis in 2000 and will host it again in 2022. Professor Mehlenbacher has represented the ISHS at the congresses several times, presenting information about the organization and recruiting new members. In summary, Professor Shawn Mehlenbacher is a world-renowned geneticist and hazelnut breeder. He is one of a handful of tree fruit breeders who routinely uses marker-assisted selection to hasten release of hazelnut cultivars that are resistant to EFB. For fruit/nut breeders worldwide, his program is the example of an outstanding public program that has used genomics to benefit his stakeholders: hazelnut growers and consumers.

Dr. Gregory L. Reighard

Professor Dr. Gregory (Greg) Reighard was born in Johnstown, Pennsylvania, in the midst of a rural coal mining area. He was the first in his wider family to go to college and attended Pennsylvania State University attaining his B.S. in Forestry in 1977. He completed his M.S. in Biology at the University of Michigan in 1978, and a Ph.D. in Forestry at Michigan State University in 1984. After graduation and working at the University of Florida as a research associate, he applied and interviewed for a tree fruit (pomology) position in the Department of Horticulture at Clemson, where he subsequently spent his entire professional career as a faculty member in the College of Agriculture, Forestry and Life Sciences. In 2017, he served as Interim Chair of the Department of Plant and Environmental Sciences. Dr. Reighard's accomplishments in pomology are impressive, especially as they span the range from applied, field-based work to the fundamentals of molecular biology. His research interests include the study of physiological phenomena of genetically compound fruit trees in terms of effects of rootstocks, interstems and cultural practices on vegetative growth, fruiting, frost protection, nutrition, disease resistance, and cold injury. Additional research has involved developing new rootstocks that are resistant to nematodes, determining how interstems and growth hormones affect root growth and scion phenology, developing flower bud thinning techniques, and finding molecular markers for traits such as nematode resistance and dormancy control for use in applied breeding programs. One of his greatest accomplishments came about through his commitment to the performance evaluation and genetic analysis of rootstocks that could provide tolerance to the disease complex peach tree short life (PTSL). His insight and perseverance, and his collaboration with colleagues at the USDA, resulted in the identification, selection, development and commercialization of the Guardian® peach rootstock, which provided the industry with a rootstock choice that protected trees from PTSL. Today, at least 90% of all commercial peaches newly planted in the southeastern U.S. are planted on Guardian® rootstock. Furthermore, Guardian® rootstock is having a similarly positive impact on peach production in other major stone fruit producing areas around the world, including California, South Africa, and Australia.

Dr. Reighard's program was successful in understanding crop load management, harvest modeling, tree habit, bud dormancy, and structural and comparative genomics, not just in peach, but in other fruit crops such as apple, apricot, pear, and plum. His enthusiasm to evaluate various germplasm for its potential as *Prunus* rootstocks was very fortunate. Working closely with Dr. Bert Abbott, his graduate students and post-doctoral colleagues were some of the first to find genes for nematode resistance in *Prunus* and

the evg mutant that was important in identifying the MAD Box genes that control shoot growth and bud dormancy in peach. In addition, the first sequenced peach genome was from a double haploid tree that he had planted at the university research farm. Although teaching and advising has been a small part of his appointment, he has advised 17 M.S. and Ph.D. students and 120 undergraduates. Dr. Reighard has also hosted 13 postdoctoral, visiting scholars and scientists on sabbatical leave visits from the U.S., China, Turkey, Spain, France, Ukraine, South Africa, and Brazil. Dr. Reighard has an extensive list of over 170 peer-reviewed and nearly 200 additional publications. He has given more than 500 presentations. Greg has been active within the ISHS. He has published over 90 papers in *Acta Horticulturae*, served as an editor or on the editorial board for six symposia, on the scientific committee for seven symposia, and was the convener for one other symposium. In summary, Dr. Greg Reighard's professional career is one of exemplary and sustained dedication to tree-fruit improvement, which has resulted in high-quality scholarship for the discipline of Horticulture, and relevant and impactful deliverables for the industry – domestically and abroad.

Professor Dr. Bernadine C. Strik

Professor Dr. Bernadine Strik has a long and outstanding career working with stakeholders and students in small fruit production. Her work has significant impacts to the industry in Oregon, the Pacific Northwest and the world. Professor Strik has a Ph.D. from the University of Guelph, Ontario, Canada, and has been a faculty member at Oregon State University (OSU), Corvallis, Oregon, since 1987. The primary focus of her assignment at OSU is to conduct statewide and regional extension programs on commercial production of berry crops. She also conducts research on the physiology of berry crops and has been the project leader of the production/physiology program in collaboration with the USDA-ARS.

She has published 127 peer reviewed refereed publications and an additional 37 peer reviewed papers in *Acta Horticulturae* proceedings. She has authored 24 book chapters and 64 extension publications. Professor Strik teaches three courses at OSU, including a course, Physiology and Production of Berry Crops. Her evaluations in all the courses she teaches indicate that she excels in this realm, her scores are often in the high 5's out of a possible 6 points. Those scores are consistently above both the department and university average. She has also trained 22 Ph.D. and M.S. students. In addition, she has mentored 7 undergraduate students for their senior honors projects. She is an accomplished scientist and is deft at designing applied research experiments that result in solid scientific publications and useful information for the growers in the region. She is the world's expert on berry nutrition and has produced a number of seminal and often cited articles on berry nutrition and physiology. Although Professor Strik has an exceptional record in education and research, she is a well-respected Berry Extension Specialist throughout the world. She has made nearly 300 presentations in Oregon, 48 national, and 57 international presentations on berry crop physiology. As the blueberry industry started to grow in the early 2000s in response to the grower needs for blueberry production information, she conducted research on pruning and training impact on yield, planting density, fertilization regimes, trellis systems and more. The outcomes of the applied research are highlighted in field days and grower meetings and the estimated economic impact to growers was nearly $8 million annually.

She has organized and spoken during at least 54 strawberry, blueberry, and cane berry field days and 43 berry workshops since 1992. Recently, she has developed an online course "Blueberry Physiology, Production Systems and Management" for new and experienced growers. There were 106 evaluations for this course and the quality of content received a 4.7/5 and new and experienced growers all stated that they increased their knowledge by 44-66%. Professor Strik's professional international experience has taken her to Europe, Latin America, and Australia, touring small fruit growers and research institutions as an expert advisor and consultant. She has been an active member of the ISHS and has served in elected and invited positions. She served on 10 ISHS/IHC Scientific Committees, chaired the ISHS Section Vine and Berry Fruits (2010-2018), and the ISHS Working Group *Vaccinium* Species and Management (2000-2008). She was co-convener of the IX International *Vaccinium* Symposium in 2008 and was an organizer for the V International Symposium on *Rubus* and *Ribes* in 1989. Since 2018 she has served as one of three selected representatives for the USA on the ISHS Council. She has been an author and served as an Associate Editor or on the Editorial Board for four *Acta Horticulturae* proceedings. Bernadine is well respected by her peers and is genuinely dedicated to berry crops.

Professor Dr. Ryutaro Tao

Professor Dr. Ryutaro Tao has been a professor at Kyoto University since 1988. His present professional responsibilities include not only research, but also educational activities. He teaches courses in horticulture, pomology, and cell biology at the Faculty and the Graduate School of Agriculture, Kyoto University. Professor Tao's research career began with his graduate thesis study on the development of a tissue and cell culture system for persimmon (*Diospyros kaki*) in 1983 at Kyoto University. Since then, he has been working on research projects to utilize tissue and cell culture and transgenic techniques to improve fruit tree species.

Since the 1990s, Professor Tao has been working on the reproductive biology of fruit tree species, such as the S-RNase-based self-incompatibility system in *Prunus*, and floral induction in *Diospyros* and the family *Rosaceae*. He has worked extensively on the sexual system in *Diospyros* and *Actinidia* for the past 10 years. Professor Tao has made several milestone achievements during the 35 years of his research career. One of Professor Tao's major achievements is the development of a wide variety of efficient tissue culture systems for *D. kaki*, including micropropagation, organogenesis, embryogenesis, plant regeneration from protoplasts, somatic hybridization, and *Agrobacterium*-mediated transformation.

Professor Tao made the first field trial of transgenic persimmon with the *BT* gene for insect resistance in the UC Davis experimental orchard, working in collaboration with UC Davis Professor A.M. Dandekar. Thanks to their studies, a wide range of biotechnological techniques can now be utilized for persimmon breeding and propagation.

The most important and well-known achievement of Professor Tao's career is his research

on the S-RNase-based gametophytic self-incompatibility (GSI) system in *Prunus* fruit tree species. Professor Tao conducted 2D-PAGE gel electrophoresis to identify the pistil determinant S-RNase and cloned the gene for *Prunus* S-RNase for the first time. The S-RNase DNA sequence information was utilized to develop PCR-based methods for *S* genotyping, which are now used worldwide to type *S* genotypes of cultivars of self-incompatible *Prunus* species such as almonds, cherries, plums, and apricots. After the identification of the pistil *S*, Professor Tao identified the pollen *S* of *Prunus*.

Based on pollen *S* identification, marker-assisted selection of self-compatible (SC) individuals has been developed and utilized for SC breeding. For his achievements on *Prunus* GSI, Professor Tao was awarded the Japanese Society for Horticultural Science (JSHS) Outstanding Horticulturist Award, which is the most important award of JSHS. For the *Prunus* GSI study, "The discovery of *Prunus*-specific self-incompatibility recognition system and its horticultural applications," he was also awarded the Japan Prize of Agricultural Science from the Association of Japanese Agricultural Scientific Societies. Professor Tao's recent superlative achievements in the reproductive biology of fruit tree species warrant mention. He has clarified a sex determination system in *Diospyros*, a plant genus that includes persimmon. Because this is the first identification of a sex determination mechanism in plant dioecism, the results were published in Science, followed by papers in respected plant science journals such as Plant Cell and Plant Journal. Professor Tao's research has yielded important results that have practical applications in fruit tree species, such as flowering controls in apples, pears, plums, and apricots; ploidy manipulations through unreduced gamete manipulations; and so on. His results are published in over 150 papers in refereed scientific journals and more than 25 review papers and book chapters. Professor Tao's contributions to horticulture are not limited to scientific activities, but include educational activities to mentor students and young researchers. He has served as an advisor to over 50 Japanese and international graduate students, many of whom are now working in horticultural professions, including research. In closing, Professor Dr. Ryutaro Tao's exceptional professional conduct, the care he has taken in mentoring his students, and his humble approach to life are what have enabled him to make such an impact in the world of fruit tree science.

Professor Dr. Christopher B. Watkins

Professor Dr. Christopher (Chris) Watkins has a long and distinguished career in horticultural science, particularly in the area of postharvest physiology. He began his career in the Department of Scientific and Industrial Research (DSIR) in New Zealand in the postharvest group of the Division of Horticulture and Processing. Subsequently, he moved to the USA and progressed to become Professor in the Department of Horticulture at Cornell University and then Director, Cornell Cooperative Extension, and Associate Dean for the College of Agriculture and Life Sciences, and the College of Human Ecology.

Professor Watkins' research has focused primarily on the storage and ripening of fruit from both applied and fundamental aspects. A primary area of that research is the development of knowledge required for the use of 1-methylcyclopropene (1-MCP), an ethylene-binding inhibitor that extends the storage life of apples. This work has been extended to preharvest 1-MCP applications. He also conducts research on new cultivars of importance to New York growers, and on the effects of postharvest techniques on the nutritional quality of fruit. In addition, his research has enhanced the understanding of the underlying mechanisms in fruit responses to storage conditions such as temperature, atmosphere, and 1-MCP, and the interactions of those factors with the development of storage disorders. His current projects focus on the development of physiological disorders of apples such as internal browning, external carbon dioxide injury and superficial scald. Professor Watkins is also responsible for developing and conducting the harvest maturity management, postharvest handling, and storage technology components of a multidisciplinary state-wide fruit extension program. In doing so, he works in cooperation with extension faculty in various departments, with regional fruit specialists, extension educators, storage operators, and marketers.

Professor Watkins is involved in the teaching and supervision of graduate students, having the primary responsibility for 14 Ph.D. and 9 M.S. candidates over the past 27 years. Chris has a very strong record of outputs in his specialized research fields. He has published over 164 peer-reviewed scientific manuscripts, 20 book chapters, 51 papers in conference proceedings, 87 abstracts of papers presented at professional meetings, and over 116 grower articles, newsletters and articles in technical bulletins. Professor Watkins has been widely recognized for his research achievements. In addition, he has been an invited speaker in many countries around the world, including Australia, New Zealand, Belgium, Italy, Greece, Poland, Spain, China, South Korea, Turkey, Canada, and Israel. He has also extensively presented scientific addresses across many states in the USA and within New York State. Professor Watkins has been and continues to be involved in the leadership of scientific publishing. He is currently (2016 to present) Associate Editor, Postharvest Biology and Technology; and was previously Associate Editor, Horticulture Research (2013-2017); Editorial Board member, Postharvest Biology and Technology (1993-2011); Associate Editor, HortScience (Postharvest: temperate fruits) (1999-2004); Editorial Advisory Board, Encyclopedia of Applied Plant Sciences (2013-2016). He has been a referee for 27 scientific journals. Throughout his career, Professor Watkins has been a strong supporter of the ISHS. He is currently Chair of ISHS Division Postharvest and Quality Assurance (2018-2022) and was previously (2014-2018) Chair of ISHS Commission Quality and Postharvest Horticulture. He has published 33 papers in *Acta Horticulturae*.

ISHS Honorary Membership Award

Professor Dr. Peter J. Batt

Professor Dr. Peter Batt has provided exemplary leadership within scientific and publishing activities of the ISHS for the past 20 years. He is currently (2018-2022) serving on the ISHS.

Executive Committee as the Chair of ISHS Division Horticulture for Development and

was previously Chair of ISHS Commission Economics and Management (2014-2018) and Vice-Chair of ISHS Commission Economics and Management (2006-2014). Peter has provided strong leadership of symposia focused on emerging economies and especially in areas relating to education, training and extension. Over the past 16 years, he has been the convener/co-convener of 12 symposia with a further symposium to be held in 2022.
Between 2005 and 2019, he was the editor/co-editor (often the sole editor) of 9 volumes of *Acta Horticulturae*. Over the period from 2000 to 2019, he authored/co-authored 34 papers in *Acta Horticulturae* – nearly two per year. Professor Batt has also contributed strongly to the Congresses held within the ISHS scientific program. He was on the organizing committee for the IHC held in Brisbane, Australia in 2014 (also co-convening and co-editing two symposia/*Acta Horticulturae* volumes) and arranged one symposium within the Congress held in Istanbul, Turkey in 2018. Professor Batt contributes to the two scientific journals published by the ISHS (eJHS and Fruits) by serving as an associate editor on both publications.

Dr. Jill Stanley

Dr. Catherine Jill Stanley (Jill) has been actively involved with the ISHS for at least the past 34 years. She was involved with the ISHS Council as a New Zealand representative, the 2014 International Horticultural Congress (IHC), and then two terms on the ISHS Board, including assignments as Secretary and as Vice President and Scientific Chair of the ISHS Executive Committee. She has participated as a member of the international scientific committees for six symposia.
As Vice President of the IHC in Brisbane in 2014, she played a major role. She coordinated the scientific program for the event. This required her to liaise with the conveners to coordinate four plenary sessions with two speakers each, 40 scientific symposia involving 1209 oral and 1206 poster presentations, 25 workshops, and 3 collaborative medicinal and aromatic plants symposia. Her role required considerable input to manage each of the teams of conveners, to arrange the allocation of rooms with the venue to best meet the anticipated audiences, to coordinate the poster sessions using a new electronic format, and to arrange the timetables to minimize clashes within the overall program. Subsequently, Dr. Stanley oversaw the submission of the *Acta Horticulturae* volumes that were published from the Congress. Aside from her leadership and managerial roles, Dr. Stanley has published 20 papers in *Acta Horticulturae* over the past 34 years. In addition to her contributions to the ISHS, she has also been committed to leadership roles within the horticultural research community in New Zealand. Prior to its merger with the New Zealand Institute of Agricultural Science, she was President of the New Zealand Society for Horticultural Science from 1999-2001 and subsequently a member of the Council of the New Zealand Institute of Agricultural and Horticultural Science (NZIAHS) from 2010-2017 and then its President (2017-2018). Her sustained contributions over three decades to the Council, International Horticultural Congress, ISHS symposia and to the ISHS Board are significant.

Professor Dr. Jens N. Wünsche

Professor Dr. Jens Wünsche, born in 1964, finished his studies of Agriculture in Halle, Germany in 1989 (M.Sc./Dipl.-Ing. Agr.). In 1990, he started his graduate study program at Bonn University, enriched with collaborations and visits to New York State Agricultural Experiment Station, Horticultural Sciences Department at Cornell University. He was a gentle, very open-minded and extremely ambitious young student knowing exactly what he wanted and how to accomplish his goals. At that time, Jens had just been stranded in Bonn after a long Odyssey. On the eve of the Revolutions of 1989, he was one of the numerous bold GDR refugees who had reached the German Embassy in Prague, climbed over the fence and camped in the grounds until – after long negotiations of West German, East German, and Soviet Union authorities – Foreign Minister Genscher, on the evening of 30 September 1989, stepped onto the balcony to announce an agreement on the refugees' voyage to West Germany. This event was an emotional and significant moment in German history.
After a post-doctoral appointment at Nelson Research Centre, HortResearch, Nelson, New Zealand (1993-1996), and a position as scientist at HortResearch (1996-2001), Professor Wünsche obtained his second doctorate degree (Privat-Dozent and Venia legendi) from the Faculty of Agriculture, Bonn University, in 2001. This qualified him to apply for a Full Professor position. After working as liaison scientist at Hawke's Bay Research Centre, HortResearch, New Zealand from 2001 to 2004, Jens was offered and accepted the Professorship and Chair 'Crop Physiology of Specialty Crops' of the Institute of Crop Science at Hohenheim University, Stuttgart, Germany, in October 2004. As fruit crop physiologist, he focused on plant/fruit responses to environmental and crop management triggers. Through his dedicated research, Professor Wünsche gained a thorough understanding of crop physiology and became part of an extensive network of scientific and fruit stakeholder relationships and many emerging market sectors. About 60 high-impact papers give proof of his publication activity. In his numerous professional trips, Jens shared his profound knowledge with colleagues abroad, by giving presentations and lectures on his highly relevant fruit physiology topics. He also actively participated in a research project of excellence provided by the German Science Foundation. His international reputation and expertise as well as his open mind for cooperative research have attracted many top scientists from all over the world to collaborate with him for the benefit of horticulture.
The commitment and dedication of Professor Wünsche to the scientific community is far beyond average. He was Board Member of the Centre for Agriculture in the Tropics and Subtropics at the University of Hohenheim and the Centre of Competence for Fruit Science at Lake Constance. He also served as Vice-President and President of the German Society of Horticultural Sciences (DGG) for 4 years. Despite the high workload and many fold responsibilities, he took over the position as Editor-in-Chief of the European Journal of Horticultural Science (eJHS), which he held until the end of 2020. Due to his competencies and achievements in international horticulture, Professor Wünsche was a privileged candidate to also represent Germany as Council member of the ISHS from 2008-2020.
His involvement and his contributions to the ISHS during the last 30 years are impressive. He was co-convener of the VI International Symposium on Banana at the IHC2010 in

Lisbon and editor/co-editor of three *Acta Horticulturae* volumes. He actively participated and contributed to many ISHS symposia, thereby resulting in the authorship/co-authorship of 27 *Acta Horticulturae* publications. He promoted and completed the transfer and implementation of the German journal "European Journal of Horticultural Science" into the ISHS publication portfolio in 2015 with a very high level of commitment. As member of the ISHS Board (2014-2018), Jens was responsible for the portfolio Innovation, Outreach and Strategy. He introduced and promoted the ISHS Young Minds Award and launched a new initiative to make benefits of ISHS more transparent for young students. The ISHS Summer School on Pre- and Post-harvest Physiology of Temperate Fruit Crops, initiated by Professor Wünsche, took place at Stuttgart-Hohenheim University and Bavendorf Research Station, Lake Constance, in August 2018. He devoted his considerable energy to horticultural research and made many significant contributions to the ISHS. Due to his untimely death, Professor Dr. Jens Wünsche is bestowed this ISHS Honorary Membership Award posthumously.

Announcing a new Editor-in-Chief for eJHS: Professor Dr. Henryk Flachowsky

Beginning January 1, 2021, Professor Dr. Henryk Flachowsky was appointed to serve as Editor-in-Chief (EiC) of the European Journal of Horticultural Science (eJHS), succeeding Professor Dr. Jens Wünsche, who was EiC of this journal from 2007 until the end of 2020. Professor Flachowsky's appointment was confirmed by the ISHS Board.

Professor Dr. Flachowsky has large horticultural shoes to fill considering his predecessor and the long history and reputation of this journal. Generations of horticultural scientists have reported their research results here. In 1929, Julius Springer founded this journal and published it until 1944. Originally, the journal was named "Die Gartenbauwissenschaft." The first editor was Walther Gleisberg, who was Professor at the Saxon State School of Horticulture in Dresden-Pillnitz. A quick glance at the first issue from 1929 is enough to see that the subjects in this journal were just as topical some 90 years ago as they are today. After a pause due to the second world war, a change in publishers, and an editorship that changed several times between different horticultural chairs of German Universities, the journal was internationalized in 2003. Since that time, it has been published in English as the "European Journal of Horticultural Science". In 2014, the journal was entirely renewed to increase its impact and acceptance, and to give the journal a contemporary focus. With the 80th volume printed in 2015, the International Society for Horticultural Science (ISHS) now publishes eJHS in print and online open access. Thus, this journal remains one of the most appropriate avenues to present current research results to the global horticultural science community.

› Professor Henryk Flachowsky is the Head of the Institute for Breeding Research on Fruit Crops of the Julius Kühn-Institut (JKI) – the Federal Research Center for Cultivated Plants at Dresden-Pillnitz, Germany. He is working on the identification and functional characterization of trait associated genes, development and utilization of molecular markers and establishment of new selection strategies. He is in the editorial board of "Plant Cell Tissue and Organ Culture" and "Journal für Kulturpflanzen".

On behalf of the horticultural science community, everyone involved with eJHS, and ISHS, would like to express gratitude to Professor Dr. Jens Wünsche. We are heart-stricken by his untimely death (see Memoriam by Ian Warrington and Georg Noga in this issue). During his time as EiC, Jens modernized the journal to meet with international standards and raised the impact factor.

Our deep appreciation is also directed to Barbara Krause from the University of Stuttgart-Hohenheim, the Editorial Assistance, as well as Jelle Olivier, the ISHS coordinator from Leuven (Belgium), for their continuing support of eJHS. We are especially indebted to Barbara Krause and the team for their great help in the transition period. Professor Dr. Flachowsky looks forward to interacting with all members of the horticultural research community to shape the future of eJHS and to maintain it as a platform for dissemination of horticultural research. We believe that he will do his best to fulfill his responsibility. We will all work hard to ensure that leading scientists recognize the journal for its fast, rigorous, but fair review process, and the respectful communication between authors, reviewers and editors. Our best recognition for our friend Jens is the successful continuation of eJHS.

Spotlight on Honoured ISHS Members

› Ross Ferguson

Position or previous position

Honorary Fellow (formerly Principal Scientist), The New Zealand Institute for Plant and Food Research Limited

ISHS honour

ISHS Fellow

› Staff of "The Barn", Mt Albert Research Centre, Auckland, about 1968. Mentioned in the text are: standing, far left, Ted Bollard, 2nd from left, Ross Ferguson, 4th from left, Rod Bieleski; far right, Ross Beever, 5th from right, Stuart Letham; kneeling (with glasses) Michael Reid. Photograph: Plant & Food Research.

1. Tell us a bit about yourself (hometown, present location, family, hobbies, community involvement).

I live in Auckland, in the north of New Zealand. I was very lucky in that more than 30 years ago I bought a house in Mt Albert, a suburb of Auckland, and only ten minutes' walking distance from work at the Mt Albert Research Centre. As the population of Auckland has increased and as traffic has become much worse, this decision seems more and more sensible. An added advantage is that home is only a few minutes' walk from good bus routes and the commuter train service.

My house is on the northern (warmer) slopes of Mt Albert, a small and, I hope, extinct volcano. There are about 50 small volcanoes in the Auckland urban area, the most recent of which erupted about 600 years ago, so it is very likely more will pop up, about a 10% chance in a lifetime, but usually not in the same place as a previous eruption. Being on the side of a volcano means that my garden has very good light soil, very well-draining but perhaps too light, and it does dry out in summer. My garden is about a tenth of a hectare (quarter of an acre) and mostly in trees, especially Asiatic magnolias. Like most amateur gardeners I have planted too densely and I now need a good and undoubtedly expensive arborist to remove some trees. I have used some of the volcanic rocks to build walls and a rockery bank between the upper level and the lower level, which was formerly a grass tennis court. Unfortunately, it seems that when I want to dig a hole to plant another tree, I usually find a large, immovable lump of basalt just below the surface.

The house is nearly a century old and I bought it from the lady who had it built. It was designed by a reasonably distinguished Arts and Crafts architect and is largely unmodified. I have one room left to restore completely. Like many older houses in Auckland it is wooden, a single storey with an iron roof.

Hobbies: I garden, I cook, I read and listen to music (mainly solo or chamber music), collect antiques (mainly Georgian furniture), collect botanical prints from old florilegia and current botanical artists, and paintings by New Zealand artists from about 1880 to 1950. The problem is that there is so little wall space left. I spent much of the COVID-19 lockdown making an inventory of my paintings and prints.

Most of my community involvement is connected to horticulture. For about ten years I was on the National Executive of the Royal New Zealand Institute of Horticulture, and subsequently have been for about the same length of time on the Executive Committee of the Friends of the Auckland Botanic Gardens. I edit the newsletters of the Auckland Branch of the Institute and of the Friends. The latter is about 36 pages every three months. I do the editing and writing but fortunately I have a very good formatter. The Friends have managed to build up considerable assets, so much of our time involves deciding how usefully to spend money rather than debating on how to raise money.

2. What got you started in a career in horticultural science?

I grew up in small New Zealand towns. I then shifted to Wellington to attend Victoria University to take my first degrees in Botany and Biochemistry. I enjoyed my time in Wellington as I lived in a University Hall of Residence built high on the hills with a commanding view of the whole of Wellington Harbour. During the summer holidays of my second year at university, I won a bursary to take up a holiday job at Fruit Research Division, Department of Scientific and Industrial Research (DSIR), at the Mt Albert Campus in Auckland. This, I found later, was essentially a scheme for luring and recruiting young scientists. The job was a great experience and I must have created a good impression as a year later the then boss of the lab handed me an application form saying, "You sign it, I will fill out the rest." DSIR then had the right to appoint automatically to staff anybody with 1st Class Honours. Subsequently, I always felt a bit of a hypocrite when asked to join panels interviewing job applicants.

After four years at Victoria University, I shifted to Auckland to undertake a Master's and then a doctorate at the University of Auckland, but stationed at Mt Albert. The part of Fruit Research (now included in Plant & Food Research) in which I worked and one of the University Departments, the Department of Microbiology, later Department of Cell Biology, were located in largely prefab buildings. The science undertaken was high quality. Fourteen of us there at the time were or later became Fellows of the Royal Society of New Zealand. Probably the biggest scientific excitement of my first four years was Stuart Letham's isola-

tion and chemical identification of the first natural cytokinin, zeatin, so named because it was isolated from corn kernels (*Zea mays*). His success showed me the importance of really sticking with a project. My thesis studies used *Spriodela oligorrhiza* as a model system, essentially a plant "white mouse".

After I completed my PhD, I was sent, partly funded by DSIR, for two years to the University of East Anglia, Norwich, England, where I worked on control of the enzymes of nitrogen assimilation in yeast, and then at the Albert-Ludwigs Universität at Freiburg-im-Breigau, Germany, for six months on enzyme inactivation in yeast, before returning home. There I was asked to take over a fertiliser trial on the new crop Chinese gooseberry, as it was then usually known – now the kiwifruit. This was to be my crop for the next 40 years.

3. Give a brief overview of your career/ achievements.

When I first started, it seemed that little was known of kiwifruit beyond their Chinese origins. That we now know so much of the biology of kiwifruit, their distribution in the wild, their relatives, and their potential as crop plants is, in part, because of my work. I made an effort to acquire all existing information on kiwifruit and, where necessary, arranged for translations to be made. Thus, for the first time, most of the literature on kiwifruit was collected in one place and could be put into perspective.

A series of about 20 major reviews, including the first-ever comprehensive review of the botany of kiwifruit (*Horticultural Reviews* 6 (1984), 1964), is probably my most important scientific contribution. In 1990, I prepared five chapters in *Kiwifruit: science and management*. In 2007, Professor Huang Hongwen of Wuhan, China and I wrote a 120-page review, also in *Horticultural Reviews*. I then co-authored with Chinese and Italian scientists reviews of the kiwifruit industries of China and Italy, providing information previously available only in Chinese or Italian. In 2016 came another five reviews of various aspects of kiwifruit biology. Together, these reviews cover much of the basic biology of kiwifruit and, I hope, provide an essential foundation for further research.

I have always been impressed by the work of Jules Janick on various aspects of horticultural history. I have done my bit by documenting the domestication of the kiwifruit, from the arrival of the first seed in New Zealand through to the spread of kiwifruit around the world, a classic case study of fruit domestication. Such a detailed record of a new crop's development is unusual. One of my interests in retirement continues to be horticultural history. My two most recent papers, currently in press, deal with published illustrations of New Zealand native plants, 1780-1800, and the paper "mosaicks" of Mary Delany, from roughly the same period. It's good to write on something other than kiwifruit!

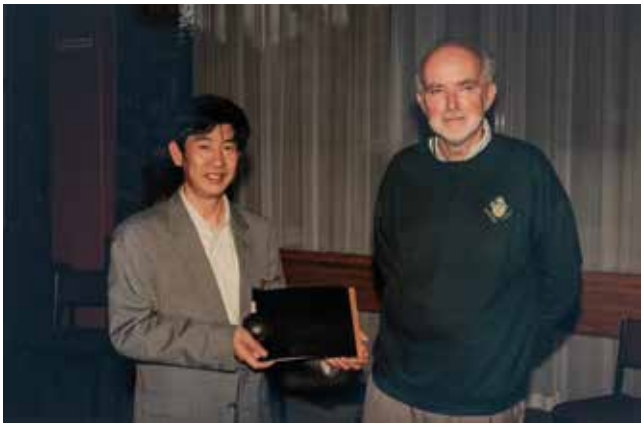
Much of my working life has been spent in reviewing the literature, but I have done some research that could be considered "practical". *Actinidia*, the genus to which kiwifruit belong, poses a special challenge for breeders in that there is considerable variation in ploidy both within and between species. Depending on the species, plants collected from the wild can be diploid, tetraploid, hexaploid or octaploid. This variation in ploidy is an obvious potential barrier to hybridisation and it is important to determine the ploidy of all plants used in crosses. I used flow cytometry to estimate the DNA ploidy of all the plants in Plant & Food Research's *Actinidia* germplasm collections, in total some 3400 genotypes. Then, flow cytometry was used to select desired cytotypes from large populations resulting from in vitro ploidy manipulation or from inter-specific and inter-ploidy crosses. We also applied the techniques to hops.

4. What do you consider to be your greatest achievements?

Without being facetious, I would suggest that my greatest achievement was in being lucky. My first two mentors were Ted Bollard and Rod Bieleski. Both were very good scientists but in very different ways. Ted was able to review the literature and synthesise patterns of knowledge. Rod was a very good experimental scientist but believed strongly in the importance of writing up work. Both had many interests other than simply scientific and fortunately their interests overlapped with mine. We developed strong friendships that continued until their deaths, 50 to 60 years later.

The person I worked with at East Anglia, Tony Sims, was also a brilliant experimental scientist. Working with Tony did, however, involve some challenges. I had been trained as a government scientist to start work at 8 a.m. or earlier; Tony seldom arrived in the lab before midday and then worked late into the night. I would start at my usual time and continue until far too late. It took some time to get that sorted. Student contemporaries became close friends: Mike Reid, Ross Beever and Ian Ferguson. I was also very lucky in the people I worked with later, such as Raffaele Testolin and Mimmo Costa in Italy and Huang Hongwen in China; also more recent colleagues, Mark McNeilage, Russell Lowe, Alan Seal, Paul Datson, Yan Guijun, Mirco Montefiore and Wu Jinhu. Perhaps the most important was Alison Duffy, with whom I worked for about twenty years. She had the incredible ability to look genuinely pleased when I came in to work each morning.

Perhaps my greatest stroke of luck was being asked to work on kiwifruit. When I started it was a very minor, very local crop but as it developed to where it is today, so my opportunities increased. I could easily have been asked to work on crops that have stubbornly insisted on remaining minor crops.



› With Huang Hongwen, then Director of the Wuhan Botanic Gardens, China, on his being appointed an Honorary Fellow of HortResearch, about 2000. Photograph: Plant & Food Research.

› Ted Bollard and former students, 2000. From left, Ian Ferguson, Ted Bollard, Jan Sylvester (née Grigor), Ross Ferguson, Ross Beever.

› From left: Raffaele Testolin, Guglielmo Costa and Ross Ferguson at the IX International Kiwifruit Symposium in Porto, 2017.

5. Did you encounter difficulties along your career path and how did you deal with them or how did you turn them into opportunities?

I guess there were difficulties and disappointments but none that lasted for ever. I was lucky in that for much of my career, scientists in our organisation were left to do what they considered was good for the industry and the country. It probably helped that I was sufficiently realistic, being a born procrastinator, I was never seriously tempted into management.

One minor difficulty was that I worked basically in the same job for 45 years, but the institute changed its name at least seven, possibly more, times – causing confusion both nationally and internationally. Changing your "brand" that often is a clear disadvantage.

6. Tell us about one funny/exciting/interesting experience that happened to you during your career.

I do remember one of my trips to Italy visiting kiwifruit orchard after kiwifruit orchard after kiwifruit orchard, the last only a few miles away from the marvellous mosaics of Ravenna. I had with difficulty to convince my Italian hosts that their understanding that I was interested only in kiwifruit was definitely wrong. There were other, often embarrassing, experiences, but they are probably best forgotten.

The good thing about kiwifruit is that they grow in interesting places: Chile, China, Greece, Italy, Portugal and Spain and, of course, New Zealand. I made my first trip to China in about 1981, when the tallest building in Beijing was probably six storeys and the mode of transport was still largely by bicycle. The changes over the last 40 years have been fascinating.

7. What made you become a member of ISHS and why did you keep the membership? What contribution or role has ISHS played in your career?

I probably joined ISHS out of a sense of duty because it seemed a worthy organisation. I did find the two congresses I attended much too big and confusing for me to take real advantage of them. I have found the small symposia, such as the kiwifruit symposia, much more rewarding. I have attended all the kiwifruit symposia to date and they have certainly helped me to get to know those who are now close colleagues and friends. I was on the organising committee of the symposium held in Rotorua, New Zealand, and that involved a great deal of work, but satisfying. I suspect that there will have to be big changes because of the pandemic. I think we also need to consider alternative methods of publication – the costs of the *Acta* do add significantly to the symposium fees. I understand that this problem is already being considered.

8. What advice would you give to young people interested in a career in horticulture/horticultural science?

I am probably biased because I majored in botany, not horticulture: thus I would stress "know your plant". Then get to know the growers. A good grower can tell you a lot and ask many very relevant questions that may not have occurred to you as a scientist. Talk to other scientists working on your crop: plant physiologists, breeders, pathologists, postharvest specialists, marketers. Even if your work is laboratory-based, be prepared to explain its relevance to growers and to their livelihood. If possible, investigate only some aspects in depth and write papers that tell a story, that don't just present data. Don't publish *and* perish.

9. What are the most interesting new roles or opportunities you see emerging in the future within horticultural science?

I suspect that over the next fifty years the most important work will be in responding to climate change. Either existing cultivars will have to be grown in different regions or different cultivars will have to be grown, cultivars that are adapted to the changing conditions. In New Zealand, studies have already shown that the Bay of Plenty, the centre of the present kiwifruit industry, is becoming too warm for profitable cultivation of some kiwifruit cultivars if dormancy breakers are not used. It can take a long time to develop new cultivars that meet commercial requirements, so we need to start now.

› Celebrating the retirement of Russell Lowe, 2020. From left, Ross Ferguson, Alan Seal, Russell Lowe, Pat Sale. Photograph: Jamie Troughton/Dscribe Media.

Global challenges require bold and innovative global solutions

Sarah Federman and Melanie Yelton

Feeding people responsibly, now and in the future, requires new global attention to, and investment in, innovations in agricultural technologies. These technologies must address the food-energy-and-water nexus. For example, the Food and Agriculture Organization (FAO) estimates that by 2050, food production will need to increase by roughly 70% to meet global demand and require 50% more energy and 30% more fresh water in the face of concurrently decreasing water availability. These projections become especially troubling when put in the context of rapid decreases in land availability. In the U.S. alone, the American Farm Foundation estimates a loss of 3 acres (1.2 ha) of farmland per minute to suburban-urban development. The world is headed towards an unprecedented food and water crisis.

Avoiding such a catastrophe will require interdisciplinary solutions. These complex solutions must draw on both historical and current approaches, such as traditional plant breeding, reduction of global food waste, and controlling the plant environment. But, more than that, forward thinking and out-of-the-box innovation will be key to success.

Indoor agriculture addresses many challenges facing plants, people, and the planet

Indoor agriculture systems, often referred to as indoor growing, represent a nascent and rapidly growing subset of controlled environment agriculture (CEA). These systems have the potential to mitigate many environmental and social challenges at the food-energy-water connection. CEA ranges from simple tunnel systems and advanced greenhouses, to indoor operations. The indoor operations have a smaller footprint than that of agricultural fields and often grow produce on multiple levels or vertically on walls or towers using artificial lighting. Plenty, for example, uses 100% renewable energy in its current farm, reducing the carbon footprint and energy consumption. Indoor growing operations provide potential solutions to many environmental growing issues. They offer a strategy for year-round production in uniformly consistent environments. They can be constructed in extreme environments, and often use substantially less water than field agriculture does.

When indoor agriculture is integrated into multi-storied structures, i.e., vertical farming operations, land-scarcity is addressed by creating vertical growing space. The result is increases in production within smaller areas. From a nutrition standpoint, indoor agriculture can drastically reduce transportation distances when placed proximate to urban populations. In this system, the quantity of production is correlated with longer shelf-life as well as increased nutritional content.

Figure 1. Automated seedling transplant to vertical grow at Plenty's production R&D facility.

Plenty is a global leader in indoor farming production and innovation

Plenty is a high-tech, vertical farming company located in Wyoming and California. The company has attracted over $500M of investment. Plenty farms grow pesticide-free, leafy greens indoors at 200-350× yield of traditional farms, while saving over 1 million gallons (3.8M litres) of water a week compared with equivalent field production. The produce is grown in buildings the size of a big box retail store, saving trees and land.

Indoor vertical farms in companies such as Plenty Inc. can be managed at any location, regardless of weather, climate or season. These vertical farming companies provide year-round, living-wage, high-tech manufacturing jobs, while growing enough fresh produce to supply hundreds of grocery stores per farm.

Plenty R&D outlooks and opportunities

Plenty is a research-driven and technology-forward focused company, committed to expanding the potential of indoor farming. The company's mission statement is to improve the lives of plants, people, and the planet. Plenty's research and development (R&D) process shares similarities to field trials but also follows many technology development principles.

Plenty optimizes production of particular agricultural crops for desired types by manipulating the environment, management, and

Figure 2. A diversity of crops and varieties undergo a rigorous screening process before incorporation into commercial production.

the growing system. Plenty has tested over 900 different fruits and vegetables at our research facility in Laramie, Wyoming. One of the great benefits to indoor farming is that many plant varieties can be tested. Even heritage types that aren't grown by traditional agriculture anymore can be grown in this environment. The fruits and vegetables that provide the best flavor, nutrients and texture can still be grown in an indoor farm. We believe that most crops can be produced indoors under these conditions. To grow a wider range of crops indoors, the most suitable varieties for these environments need to be determined using a screening process. There are thousands of diverse varieties that are presently available to consumers. Growing indoors gives us the opportunity to introduce varieties that consumers haven't yet experienced.

We see a divide between consumer experience and expectations regarding fresh produce. Our research program screens varieties for flavor first as well as for key components of yield and plant performance. The diversity of genetics that is available to our growing system presents an opportunity to deliver many products to our consumers. Our crops have exotic flavors and novel colors. Varieties that are efficient to grow, maintain, and harvest are highlighted. With our protected growing environment, we place extra emphasis on varieties that have flavor, texture, and color over those bred for tolerance of disease or other field stressors.

Plenty Inc. has control of the environment for the plants. This provides the advantage of an accelerated grow rate and facilitates a continuous production for increased yield. Currently, focus is on continually improving and driving flavor and quality. We are now collaborating with Driscoll's to co-develop a berry program, with strawberries as our first indoor-grown crop beyond leafy greens.

While the size of strawberry plants makes them ideal candidates for indoor farming, they require a precise and dynamic environment. The long production cycles, complex interactions between crop development and environment, continuous harvesting, and requirements for propagation pose many challenges when compared to the fast growing, seed-born leafy greens.

We have a thorough understanding of the chemistry and biology underlying strawberry flavor, which means we can optimize for specific profiles with precision in a controlled environment. Our research and development pipeline includes screening, perfecting environmental growing conditions, nutritional profiles, and an intensive focus on lighting optimization. This research will ultimately provide the strategy and farm design to grow a sweet and intensely flavorful strawberry. We think this product will truly differentiate from other offerings in the produce aisle.

Figure 3. Plenty focuses on all sensory aspects of flavor in product development, including flavor, texture, color and smell. This image shows an example of a mix of leafy greens produced by our Wyoming plant.

Plenty – environmentally sustainable and resilient agricultural production

There is definitely growing demand and excitement from customers for pesticide-free, flavor-forward food. Retailers are excited about innovative agriculture that can deliver delicious, fresh food consistently. Our new partnerships with both Albertsons and Driscoll's are a good example of the scale of this momentum.

The need for resilient and sustainable food systems are driving demand for vertically-farmed food. The COVID-19 pandemic and West Coast wildfires uncovered the fragility of traditionally complex and convoluted agricultural supply chains. Grocery store shelves stood empty while crops couldn't make it out of the field. Plenty's process simplifies the food supply chain and supports a consistent supply of nutritious, locally-grown fruits and vegetables. Looking ahead, our approach to resilient, local agriculture supports an insulated supply chain that can consistently and reliably deliver healthy food where it is needed most each day. During the COVID-19 crisis, we have more than doubled the amount of produce we are delivering to customers, non-profits, and food banks filling a gap left by other suppliers.

Climate change is also a large driver in forcing a reevaluation of what is required for resilient food supplies by laying bare unsustainable resource use trajectories. In the U.S., 70% of crop loss in 2019 was due to extreme weather. Rising trends in aridity and unpredictable weather threaten food supplies globally. Indoor farms can grow regardless of season or climate. Once you take seasonality and climate out of the equation, indoor growers have a unique advantage when it comes to providing delicious fresh fruits and vegetables to local markets. Currently, crops grown outdoors need very specific climates to thrive. Bringing them indoors allows us to place a farm just about anywhere and deliver fresh produce locally.

Today, produce that leaves a California field can travel more than 3,000 miles (4800 km) before it reaches a wholesale market on the East Coast. This cross-country trip takes a toll on flavor, shelf-life, nutrition, and con-

tributes substantially to food waste metrics. About 30% of produce traveling cross-country is estimated to be lost due to spoilage and shrinkage. By building indoor farms that can produce continuously next door to the communities and markets we serve, we can get our products onto shelves and onto taste buds promptly after harvest – ensuring the sort of freshness that few consumers have had the opportunity to experience.

Conclusion

Plenty and other companies in the vertical farming sector incorporate the process of growing food in a controlled, and smartly automated environment. This indoor growing system drastically reduces contamination risk to local ecosystems, boosts yield and eliminates many traditional supply chain bottlenecks by selling locally and directly to customers. While there will always be the need for field-grown foods, the vertical farming approach to resilient local agriculture supports the bold and transformative innovation needed to meet future agriculture production demands while promoting responsible environmental stewardship.

› Sarah Federman

› Melanie Yelton

› About the authors

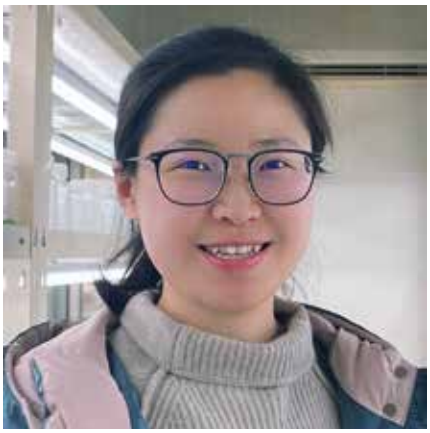
Dr. Sarah Federman is a Research Scientist at Plenty Unlimited Inc. Sarah develops metrics and strategies for monitoring and promoting farm health while ensuring efficient resource use. She received her PhD from Yale University's Department of Ecology and Evolutionary Biology. E-mail: sfederman@plenty.ag

Dr. Melanie Yelton is the Director of Plant Science at Plenty. She holds a PhD in Plant Sciences from the University of California, Davis. Her research focuses on optimizing plant growth through light and illumination. E-mail: myelton@plenty.ag

› ISHS Young Minds Award winner summaries

Below is a selection of research summaries from winners of ISHS Young Minds Awards for best oral and poster presentations at ISHS symposia. To view other exciting research summaries by other winners, please visit www.ishs.org/young-minds-award.

Dissecting the genome-wide evolution and functions of NUDX1 in rose monoterpene biosynthesis



› Yu Han

Yu Han holds a PhD in Agriculture and works as an associate professor at Beijing Forestry University, Beijing, China. The objective of her studies is to analyze the genetic variation molecular basis and regulation mechanism in rose functional aroma components. *Rosa chinensis* is the most popular ornamental plant species worldwide. The flowers of this species have diverse colors and fragrances. Geraniol is an acyclic monoterpene compound with a mild, sweet rose fragrance. In rose, the biosynthesis of geraniol is not catalyzed by geraniol synthase, but the nudix hydrolases 1 (NUDX1). A comparative molecular analysis of synteny between species can elucidate the evolutionary trajectory of genes and genomes. Yu applied a phylogenomic synteny network (synnet) of NUDX genes across 115 *Rosa* and other plant genomes to investigate their origins and evolutionary positions. Combining gene co-expression and other experimental analysis, she predicted the evolutionary trajectory of rose geraniol biosynthesis. Besides geraniol, she also investigated the biosynthesis regulation of other monoterpenes. The acyclic monoterpene ß-ocimene has a regulatory effect that can improve plant resistance. It is an important functional aroma component, but its molecular mechanism of biosynthesis is not yet known. She found that the content of ß-ocimene in the *Rosa* hybrid 'Yellow Island' was extremely low, but in the bud mutant cultivar 'Past Feeling', it was high. At the same time, the expression of *RhNUDX1s*, which are important to the monoterpene biosynthesis, was significantly up-regulated in the petal of 'Past Feeling'. Yu used 'Yellow Island' and 'Past Feeling' as test materials and techniques such as rose callus CRISPR gene editing, rose VIGS gene silencing, and in vitro enzymatic activity verification, to determine the sequence char-

acteristics and gene functions of RhNUDX1s at the DNA, RNA and protein levels. These results will enrich the molecular regulation network of rose monoterpene biosynthesis, and provide references for fragrance molecules to improve rose breeding.

Yu Han won the ISHS Young Minds Award for the best oral presentation at the III International Symposium on Germplasm of Ornamentals in the Republic of Korea in October 2020.

Contact

A.P. Yu Han, National Engineering Research Center for Floriculture, Beijing Forestry University, No.35 Tsinghua East Road, Haidian District, Beijing, China, e-mail: 15201425912@126.com or hanyubjfu@bjfu.edu.cn

Night temperature controlling for flowering in *Chrysanthemum morifolium* under high day temperature condition

› Ah Ram Cho

I'm a PhD student in the Department of Horticulture, Biotechnology and Landscape Architecture at Seoul Women's University, Republic of Korea. I finished my BSc in 2016 and completed my MSc in 2018 at Seoul Women's University. My dissertation research project is focused on growth and flowering of orchid plants in response to elevated CO_2.

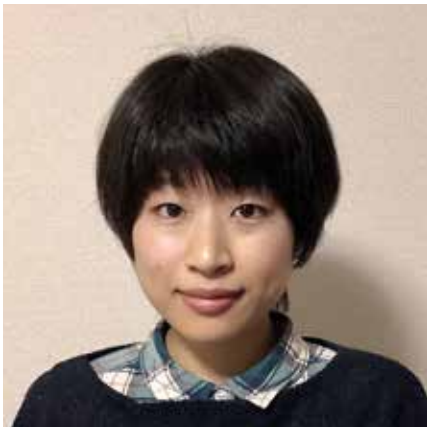
My objective was to study carbon reduction by controlling night temperature (NT) to save cooling expense during high daytime temperature (DT). I selected *Chrysanthemum morifolium* as the plant to be studied. This *Chrysanthemum* is a widely used ornamental for cut flowers or containerized plants. This ornamental is produced year-round throughout the world. Because the number of extreme summer temperature events has increased markedly, cooling systems are required for chrysanthemum cultivation during the summer season. Two cultivars of *Chrysanthemum morifolium*, 'Swifty Rosso' and 'Swifty Yellow', were grown in a plant growth chamber with NT of 20, 23, 26, and 29°C and DT of 35°C with 8 h photoperiod. As a result, the flowering quality (i.e., flower and ray floret size) was increased in the plants grown at NT of 20 and 23°C compared to those of 26 and 29°C, regardless of the cultivar. Time to flowering was fastened in the plants grown at NT of 20 and 23°C in 'Swifty Rosso' and 20°C in 'Swifty Yellow', among the NT treatments with increasing flower production. High NT induced the flower abnormality of chrysanthemums. The percentage of abnormal flowers reached 100% in plants grown at NT of 26 and 29°C at 60 and 80 days after treatment (DAT), respectively, in 'Swifty Rosso'. In 'Swifty Yellow', plants grown at NT of 26°C also reached 100% abnormality at 85 DAT and those of 29°C had not bloomed until 119 DAT. The highest A_{CO2} was found in the plants grown at NT of 20°C until 50 DAT in C. 'Swifty Rosso' and 23°C at 20 DAT in 'Swifty Yellow'. These results indicate that decreased flowering quality (i.e., flowering delay, emergence of abnormal flowers, and decreasing photosynthesis) of chrysanthemum under high DT can be resolved by NT control. NT under high DT should be controlled below 23°C to produce high-quality containerized plants of *Chrysanthemum morifolium* 'Swifty Rosso' and 'Swifty Yellow'.

Ah Ram Cho won the ISHS Young Minds Award for the best poster at the III International Symposium on Germplasm of Ornamentals in the Republic of Korea in October 2020.

Contact

Ah Ram Cho, Department of Horticulture, Biotechnology and Landscape Architecture, Seoul Women's University, 01797 Seoul, Republic of Korea, e-mail: ar092@swu.ac.kr

A candidate mechanism controlling floral repression in hardly flowering cabbage mutant



› Yu Kinoshita

Yu Kinoshita is a PhD student in the Graduate School of Agriculture at Kyoto University, Japan. She has studied a "hardly" flowering cabbage mutant under the supervision of Professor Munetaka Hosokawa. This cabbage mutant was found among the open-pollinated line 'T15' in an open field by Professor Susumu Yazawa 42 years ago and was named as 'nfc' (non-flowering cabbage). 'nfc' hardly flowers in the spring season even after plenty of low-temperature periods. Therefore, 'nfc' has been continually propagated vegetatively by cuttings.

Yu's research focuses on measuring the flowering characteristics of 'nfc' in detail and determining the mechanism. In the first experiment, throughout a 3-year cultivation period, 'T15' plants flowered, while the flowering ratios of 'nfc' propagated by cuttings at the 1st, 2nd, and 3rd year were 0, 32 and 4%, respectively. Additionally, even if 'nfc' plants flower, they do not flower in the same way as 'T15' in terms of flowering date and number of flowering shoots. Moreover, the terminal buds of 'nfc' flowering plants continued to grow vegetatively, even when their lateral shoots flowered. In the second experiment, the expression level of the floral promoter gene *BoFT* greatly increased in 'T15' after vernalization, while in 'nfc' it slightly increased. Therefore, floral repression in 'nfc' was caused by low expression of *BoFT*.

In the third experiment, when Yu grafted 'nfc' onto bolting radish rootstocks according to Motoki et al. (2019), 27% of 'nfc' scions flowered. Since FLOWERING LOCUS T (FT) protein is considered to be a major transmissible signal involved in floral induction by grafting, this result supported the results of experiment 2. Additionally, the flowering

characteristics of 'nfc' self-pollinated progenies were similar to 'nfc'. Therefore, the hardly flowering trait is inheritable and 'nfc' is homozygous for the causal genes related to the hardly flowering trait.
Yu Kinoshita won the ISHS Young Minds Award for the best oral presentation at the III Asian Horticultural Congress (AHC2020) in Thailand in December 2020.

› Contact

Yu Kinoshita, Lab. of Vegetable & Ornamental Horticulture, Kyoto University, Kitashirakawa-Oiwake cho, Sakyo-ku, Kyoto 606-8502, Japan, e-mail: kinoshita.yu.87c@st.kyoto-u.ac.jp

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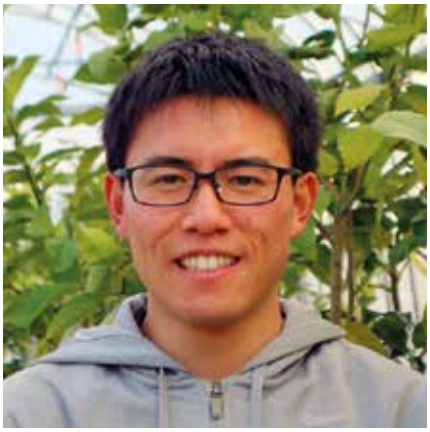
Post-zygotic arrest of embryo development induces seedless fruits in kabosu (*Citrus sphaerocarpa* hort. ex Tanaka)



› Katsuhisa Futagami

Katsuhisa Futagami is an MS student in the Graduate School of Bioresource and Bioenvironmental Sciences at Kyushu University, Fukuoka, Japan. He has been studying the theme during undergraduate and postgraduate courses in Kyushu University, under the supervision of Professor Yukio Ozaki and Assistant Professor Yuki Mizunoe. He attended the III Asian Horticultural Congress with the research entitled "Post-zygotic arrest of embryo development induces seedless fruits in kabosu (*Citrus sphaerocarpa* hort. ex. Tanaka)". Kabosu is one of polyembryonic and flavorful acid citruses, and its juice is used as an alternative to table vinegar in Japan. Seedless kabosu 'Sobo-No-Kaori' and 'Kami-No-Kawa' were established from bud mutations of seeded 'Oita No.1' and commercially highly evaluated. The fruits are, however, commonly smaller than those of 'Oita No.1' and occasionally contain several seeds. New superior seedless kabosu cultivars are, therefore, required. In the current study, the factor of the seedlessness in kabosu was determined by investigating the fertility of male and female gametes, and self-incompatibility for the basis of the breeding of seedless kabosu cultivars. Plant materials of 'Oita-No.1', 'Sobo-No-Kaori' and 'Kami-No-Kawa' were provided from Oita Prefectural Agriculture, Forestry and Fisheries Research Center, Oita, Japan. High pollen germination rate was revealed in 'Oita No.1', and moderate values enough for pollination were observed in 'Sobo-No-Kaori' and 'Kami-No-Kawa'. One hundred or more pollen tubes elongated and reached to lower styles of seedless cultivars eight days after self- and cross-pollination with 'Oita No.1'. These results showed that both seedless cultivars are male fertile and self-/cross-compatible before fertilization. The number of perfect seeds, and the number of embryos in perfect seeds per fruit in seedless cultivars were lower than those in 'Oita No.1' regardless of pollen parents. On the other hand, seedless cultivars produced many imperfect seeds containing undeveloped embryos as compared with 'Oita No.1'. These results indicated that seedless cultivars show imperfect embryo development. Seedlessness in kabosu is primarily caused by female sterility resulting in arrested embryo development after fertilization. The new findings of this study will inform the breeding of novel seedless cultivars in citrus.
Katsuhisa Futagami won the ISHS Young Minds Award for the best poster at the III Asian Horticultural Congress (AHC2020) in Thailand in December 2020.

›Contact

Katsuhisa Futagami, Graduate School of Bioresource and Bioenvironmental Sciences, Kyushu University, 422, West 5, 744 Motooka, Nishiku, Fukuoka City 819-0395, Japan, e-mail: futagami.katsuhisa.100@s.kyushu-u.ac.jp

Fruit and vegetables promoted through a collective publication by FAO and CIRAD

Rémi Kahane, Bruno Telemans, Makiko Taguchi and Fen Beed

The book "FRUIT AND VEGETABLES: Opportunities and challenges for small-scale sustainable farming" is soon to be launched! The purpose of this article is not to duplicate its content; rather to explain its genesis and the long-term collective efforts over three years to come to an exceptional deliverable.

Brief (hi)story of the book

In mid-2017, when FAO's Plant Production and Protection Division contacted CIRAD to share the authorship of this book, the idea was to build on the experience of CIRAD and partner network including ISHS, inherited from the past Global Horticulture Initiative (Lumpkin, 2007). The purpose was to integrate different visions of horticulture, including testimonies from the members of the FAO-led discussion group Sustainable Crop Production Intensification (SCPI) of horticulture crop-based system on the one hand, and the research- and innovation-oriented views of scientists on the other hand. In the meantime, the UN declared 2021 the "International Year for Fruits and Vegetables", and from late 2019, it was therefore decided that the book should contribute directly to the promotion of the International Year of Fruits and Vegetables (IYFV), by focusing on the sustainable production systems of fruit and vegetable crops.

› The appealing diversity of fruit and vegetables are examples from the first chapter.

Early drafts of various chapters were delivered by contributing authors, among which figured colleagues from CIRAD and FAO, Lisa Kitinoja from The Postharvest Education Foundation, Marie-Jo Amiot-Carlin from INRAE, and Andreas Ebert, expert in vegetable genetic resources. Thirteen case studies were integrated into specific chapters on production, postharvest and policy. In order to homogenize the various contributions, a professional writer, Gordon Ramsay, re-crafted the document to ensure the style was

› The school garden as pedagogic and educative support is illustrated in the fourth chapter.

consistent and this was further reviewed by FAO and CIRAD with inputs of a large number of international experts. The process was completed with professional editing by WRENmedia.

The layout of the book was supervised by CIRAD, who contracted Delphine Bonnet, as experienced graphic manager, and Cyril Girard, a talented nature artist, for the original illustration of the book (some extracted for this article). This team completed the English, French and Spanish versions (early 2021) and is proceeding with Arabic, Chinese and Russian versions. While the official launch will be coordinated as a key event of IYFV, the publication will be presented at the All Africa Horticultural Congress (AAHC 2021), an ISHS-continental event coordinated from Dakar, Senegal in March 2021 (Kamara, 2020). FAO was kindly invited to hold a side-event during the congress in order to specifically celebrate the IYFV and to present the key messages embedded in this book. The congress format will be an in-person, virtual hybrid with bilingual presentations, in English and in French (www.aahc2020.org).

Target audience of the book

Originally meant as an inspiring guide in line with the FAO series "Save and Grow" (FAO, 2011) targeting policy makers, the FRUIT AND VEGETABLES book is now dedicated to the widest readership. The amount of up-to-date and referenced information along the five chapters also makes it a reference for students and all actors involved in agriculture, professionals and civil society alike. Decision makers and opinion leaders are particularly targeted, with the intention of promoting the multiple benefits of fruit and vegetables, and the need for dedicated production practices, organizations and policies to ensure the sustainability of small-scale farming and stability of ensuing value chains. The publication is a real page turner, also thanks to the inclusion of the travel-appealing illustrations. To complement, this book matches perfectly with the official publication of the IYFV (FAO, 2020). Small-scale farming is dominant

› The edible leafy greens of Brèdes of chayote (*Sechium edulis*).

in most low or middle income countries, and their challenges and opportunities are highlighted through the fruit and vegetable crops.

A collective call for more

More visibility to fruit and vegetables

For too long fruit and vegetable crops have been considered as luxury foods, due to the strong share of exports from the tropics and subtropics to the industrialized country markets. This resulted in ignoring the domestic markets, indigenous species, local varieties, and the associated knowledge for production, storage, processing and marketing. Giving fruit and vegetables more exposure is a way to highlight the nutritional, socio-economic, and environmental risks and benefits for producers and consumers in most countries.

More research support on fruit and vegetables, and on the neglected and underutilized crops especially

CIRAD, FAO and research members of ISHS recognize the need for significantly more funding and innovation in fruit and vegetables and many promising areas are presented in this book. In particular, it could be influential and timely during the international discussions toward "One-CGIAR".

More attention to the complexity of the food systems

Although this book focuses on fruit and vegetable production, as it considers sustainable small-scale farming, most of these farming units produce them in combination with various crops and livestock. The specificities of fruit and vegetables are highlighted in the book – huge diversity of species and cropping systems, perishability and high value of the fresh produce – in order to illustrate on a broad scale the positive impacts of transformed managements of agrobiodiversity such as agroforestry, water resources, soil fertility and human knowledge. Fruit and vegetables are at the core of the transformation of food systems, a global issue to be raised and debated during the 2021 UN Food System Summit (https://www.un.org/en/food-systems-summit).

This book calls for an integrated approach to fruit and vegetables that combines health issues (safety risks and nutrition benefits) with agricultural sustainability (socio-economic and environmental criteria) and education potential for employment and resilience. Now more than ever, fruit and vegetables demand our attention.

Acknowledgement

All images are the excellent, original drawings by Cyril Girard (http://www.editions-mediterraneus.fr/).

"The views expressed in this publication are those of the author(s) and do not necessarily reflect the views or policies of the Food and Agriculture Organization of the United Nations."

› A lovely single orange fruit waiting to be tasted.

› Purple onion with its cross-section showing many layers.

› A cross section of grapefruit showing juice sacs and immature seeds.

› Rémi Kahane

› Bruno Telemans

› Makiko Taguchi

› Fen Beed

› About the authors

Rémi Kahane has been in charge of horticultural research for development at CIRAD in Montpellier, since 2002. He was an onion breeder for a farmers' cooperative in France for 15 years. He is vice-president of IHC2022, Chair of the International Committee. E-mail: remi.kahane@cirad.fr

Bruno Telemans has served as project officer and technical advisor to a variety of horticultural development projects in Western and Central Africa, for over 20 years. Presently he is in charge of perennial and horticultural crops with the Plant Production and Protection Division of Food and Agriculture Organization of the United Nations (FAO). E-mail: bruno.telemans@fao.org

Makiko Taguchi is an Agricultural Officer working in the Plant Production and Protection Division of FAO. While her main focus is on cereal production systems, her work ranges from diversified production systems to city region food systems. E-mail: makiko.taguchi@fao.org

Fen Beed is Senior Agricultural Officer and Team Leader for Rural, Urban, Crop and Mechanization Systems, Plant Production and Protection Division of FAO. E-mail: fenton.beed@fao.org

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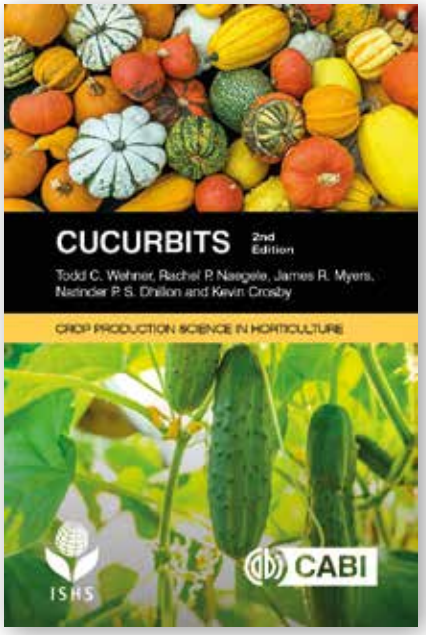
New Books
Websites

› New books, websites

Book reviews

The books listed below are non-ISHS-publications. For ISHS publications covering these or other subjects, visit the ISHS website www.ishs.org or the *Acta Horticulturae* website www.actahort.org



Wehner, T.C., Naegele, R.P., Myers, J.R., Dhillon, N.P.S., and Crosby, K. (2020). Cucurbits, 2nd edn (Wallingford, Oxfordshire, UK; Boston, MA, USA: CABI), pp.280. ISBN 9781786392916 (paperback). €50.00 / £45.00 / $60.00.

A 25% discount will be received by entering the code "CCISHS25" when ordering through https://www.cabi.org/bookshop/book/9781786392916/

The *Cucurbitaceae* is a genetically diverse group of plants and one of the most important and large groups of vegetables growing worldwide, including cucumber, squash, gourd, pumpkin, melon, and watermelon. The second edition of the book Cucurbits provides comprehensive and general information related to the production of the species belonging to this group of plants. With this, the authors give the reader a general awareness of cucurbit crop production and it is a jumping-off point for those researchers who have an interest in any of these species.

The division of this book into chapters is accurate. Advances in production, breeding, and evolution are treated individually for each of the species in eleven chapters. The book delivers new information about evolution, diversity, and distribution of these species; explores the new genetic resources for characteristics of agronomic interest and the breeding and cultural methods used to improve their quality and production facing both biotic and abiotic stresses; describes the cultural requirements for optimal production; provides a large number of diseases, viruses and pests affecting optimal development; and introduces two new and relevant topics, which are the importance of their consumption in human health, and the influence of abiotic factors (e.g., drought, heat, salinity) on their development. Botanical aspects, taxonomy, origin and nomenclature of major and minor crops in this family are also deeply described.

The authors of the book have remarkable experience in cucurbits and the different topics herein considered, which is a guarantee of its presentation. It could be considered as a guide to cucurbits, being highly illustrated and written in an accessible style, which makes this book suitable for a wide variety of readers interested in the cucurbit family.

Reviewed by Maria Luisa Gomez-Guillamon, IHSM La Mayora, UMA-CSIC, Malaga, Spain

III Asian Horticultural Congress (AHC2020)

Due to the global COVID-19 pandemic, the III Asian Horticultural Congress (AHC2020) was convened in the form of a hybrid congress during 15-17 December 2020, in Bangkok, Thailand, under the theme "Asian Horticulture for a Sustainable World". It was jointly hosted by the Horticultural Science Society of Thailand (HSST), the International Society for Horticultural Science (ISHS), the Department of Agriculture (DOA), the Department of Agricultural Extension (DOAE) and Kasetsart University (KU) with the support from National Research Council of Thailand (NRCT), Agricultural Research Development Agency (Public Organization) (ARDA), and Thailand Convention and Exhibition Bureau (TCEB). The Congress provided a platform for researchers, professors, students, government agencies, associations, growers, entrepreneurs and other professionals with an interest in horticulture to share recent research and development findings and innovation in various fields of horticulture as well as creating technical and business cooperation networks among Asian horticulturists and relevant parties.

Of the total 378 participants from 17 countries of Asia, Oceania, South Africa, Europe, and North America, 104 persons were on-line participants (from Australia, Bangladesh, China, Italy, Japan, Indonesia, Israel, Malaysia, New Zealand, Russia, Singapore, South Africa, South Korea, Taiwan, Vietnam, and USA), whereas 266 participants were in-person attendees. Eight representatives from the Embassies in Bangkok, namely Bangladesh, Indonesia, the Netherlands, the Philippines and Taiwan, were also at the opening ceremony.

› Virtual presentations of representatives at the opening ceremony, keynote and invited speakers. From left to right: Top row: Mr. Rapibhat Chandarasrivongs, Deputy Permanent Secretary of Ministry of Agriculture and Cooperatives, Thailand; Dr. Ananta Dalodom, President of HSST; Prof. Dr. Yüksel Tüzel, President of ISHS; Mr. Somchai Charnnarongkul, Thailand. Center row: Dr. Toyoki Kozai, Japan; Dr. Matthew R. Willmann, USA; Prof. Dr. Junping Gao, China; Prof. Dr. Fure-Chyi Chen, Taiwan. Bottom row: Mr. Nirmala Friyanti Devy, Indonesia; Dr. Shabtai Cohen, Israel; Prof. Dr. Bhimanagouda Patil, USA; and Mr. Sam Lee, Thailand.

A two-day scientific program was divided into seven sessions (breeding and biotechnology, physiology and production, nutrition and production, postharvest technology, agricultural extension and agribusiness, processing, and engineering). Various technical issues on recent research and development in horticultural science were presented and shared through the congress. There were five keynote speakers: Mr. Somchai Charnnarongkul, Senator, Thailand; Dr. Matthew R. Willmann, Cornell University, USA; Prof. Dr. Fure-Chyi Chen, National Pintung University of Science and Technology, Taiwan; Prof.

› Opening ceremony with organizers, supporters and embassy representatives.

› In-person participants of the congress.

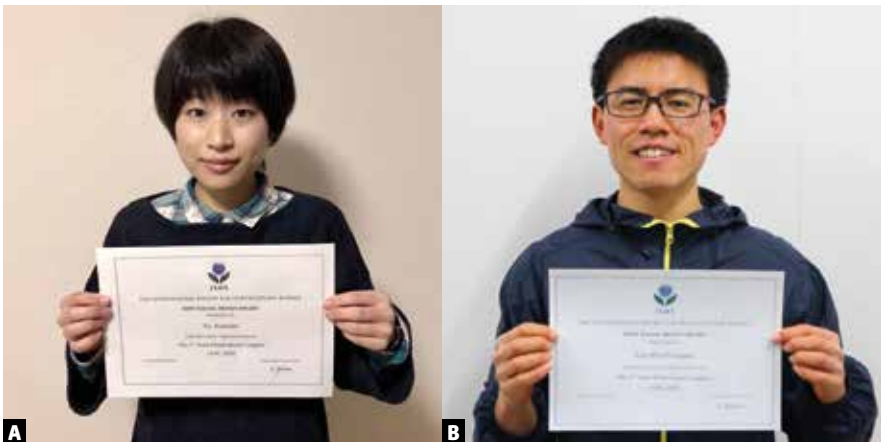
Dr. Junping Gao, China Agricultural University, China; and Dr. Toyoki Kozai, Japan Plant Factory Association, Japan. There were nine invited speakers, three of whom were from overseas: Dr. Shabtai Cohen, Hebrew University of Jerusalem, Israel; Prof. Dr. Bhimanagouda Patil, Texas A&M University, USA; and Mrs. Nirmala Friyanti Devy, Indonesia Citrus and Subtropical Fruit Research Institute, Indonesia; and six from Thailand: Dr. Jutarat Pattanatorn, Siammakro; Mr. Thanapong Vairungroj, PTT Gas Separation Plants; Dr. Metinee Srivatanakul, GAP Net; Dr. Pakakrong Kwankhao, Chao Phya Abhaibhubejhr Hospital; Dr. Ariya Sarikaphuti, Mae Fah Laung University; and Mr. Sam Lee, Britech (Thailand). There were 53 oral and 79 poster presentations. Both oral and poster presentations were mainly on breeding and biotechnology, physiology, and nutrition and production, respectively.

Safety cultural practices and development into innovative products of medicinal herbs will bring more interesting issues for future research. Modern technologies such as using plant growth regulators and light emitting diode (LED) growth system will be useful and contribute to quality and quantity improvement of horticultural crops. New postharvest technology and processing will provide the opportunity to increase product quality and income of producers.

Besides, two optional professional excursions were arranged for on-site participants to visit horticultural planting areas and related industries. Route A to Ratchaburi province (western part of Thailand) was focused on four visits to the aromatic coconut farm of Mr. Bovorn Salasawat and NC Coconut Co., Ltd., where various processed products were made from coconut; Thai Orchids Co., Ltd., which was one of the leading orchid exporters; and Udom Garden, where leafy ornamental and pot plants were grown. For Route B to Chonburi and Rayong provinces (eastern part of Thailand) two visits were set out starting with a visit to Kubota Farm, Ban Bueng, Chonburi Province, the first educational and experiential farm in Southeast Asia where modern agricultural innovations were practiced. This was followed by a visit to HRH Princess Maha Chakri Sirindhorn Herb Garden, PTT Rayong, the first garden for medicinal herbs in Thailand, which was established by the state-owned PTT Public Company Limited, Thailand's oil and gas company with the main objective to conserve and develop knowledge of herbs for future generations.

The AHC2020 Scientific Committee selected the best oral and poster presentations for the ISHS Young Minds awards. The awardees were Yu Kinoshita from Kyoto University,

› Visit to A. GAP aromatic coconut farm, Ratchaburi; B. Udom Garden, Ratchaburi; C. Kubota Farm, Ban Bueng, Chonburi.



› Winners of the ISHS Young Minds Awards: A. Yu Kinoshita (best oral presentation), B. Katsuhisa Futagami (best poster).

Japan, for the best oral presentation entitled "A candidate mechanism controlling floral repression in hardly flowering cabbage mutant" and Katsuhisa Futagami from Kyushu University, Japan, for the best poster entitled "Post-zygotic arrest of embryo development induces seedless fruits in kabosu (*Citrus sphaerocarpa* hort. ex Tanaka)".

The proceedings of AHC2020, totaling 84 manuscripts, will be published as a volume of *Acta Horticulturae* soon after scientific review by the editorial board.

Since the AHC2016 in Chengdu, the People's Republic of China, scientific studies in horticultural science were conducted for novel findings and innovation. Each of the scientists present agreed on the recent technical progress. We look forward to reports of further applicable research and innovations to be presented in the next AHC2023 in August 2023, Tokyo, Japan, under the theme "Heritage and Innovation for Future Asian Horticulture."

Peyanoot Naka, Sunisa Boonyapatipark and Nipat Sukhvibul

› Contact

Peyanoot Naka, Sunisa Boonyapatipark and Nipat Sukhvibul, Horticultural Science Society of Thailand, Chatuchak, Bangkok 10900, Thailand, e-mail: peyanoot2@gmail.com, sueboonya@hotmail.com and sukhvibuln@hotmail.com

› III International Symposium on Germplasm of Ornamentals

Division Plant Genetic Resources and Biotechnology #ishs_dbio
Division Ornamental Plants #ishs_dorn

› On-site participants in the front and online participants on the screen.

The III International Symposium on Germplasm of Ornamentals (ISGO2020, https://www.ishs.org/symposium/693), the first ISHS symposium of 2020, was successfully held during October 25-28, 2020, at Gyeongwonjae Ambassador Incheon, Incheon, Republic of Korea. This meeting followed two preceding symposia held in Beijing, China, in 2012, and in Atlanta, USA, in 2016. The ISGO2020 was convened by Professor Byoung Ryong Jeong, Gyeongsang National University. This meeting had a hybrid format combining on-site and online presentations with the support of the Korean Society for Horticultural Science (KSHS), Korean Society for Floricultural Science, Korea National Arboretum, Korean Federation of Science and Technology Societies, Gyeongsang National University, Incheon Convention Bureau, and the World Flower Company.

The organizing committee made the decision to keep the dates of the symposium as originally scheduled despite the COVID-19 pandemic. The hybrid symposium presented some issues. One was the potential and unexpected technical issues of utilizing modern technologies such as video streaming, and other necessary technical services; the second was to consider participants from different time zones; and the third was how to adjust the registration fees.

The symposium was attended by 207 ISHS members or researchers from seven countries: Korea (128 participants from universities and research organizations), China, USA, Japan, Indonesia, India, and Portugal. A total of 79 participants from overseas gave 26 oral presentations. The poster presentations were made in e-poster sessions by posting 126 submitted posters in a pdf file plus a 5 minute-voice recording.

› Questions and discussion of an invited talk of Professor Donglin Zhang, University of Georgia, chaired by Professor Ki Sun Kim, Seoul National University.

The oral, invited, and keynote talks were broadcasted via live streaming on Youtube and Dacast for Chinese participants in addition to pre-recorded files ready to back up in case of technical issues. Off-site participants had access to these presentations in addition to real time participation for questions and discussion via online chatting or email.

Topics covered were divided into four sessions: new ornamental plants and breeding, ornamental exploration and utilization, germplasm resources and conservation, and applications of modern technology. Keynote talks were given by Professor Jongsuk Lee (Korea National Arboretum, Korea) – "Hostas in Korea"; Professor Todd West (North Dakota State University, USA) – "Ornamental woody plant breeding, selection and evaluations for cold climate conditions"; and Professor Qi-Xiang Zhang (Beijing Forestry University, China) – "Analysis of characteristic aroma components of *Prunus mume* based on genomics and cold resistance breeding".

The invited speakers talked about interesting topics such as "Modern technique greatly enhanced woody ornamental plant breeding" (Professor Donglin Zhang, University of Georgia, USA); "Growth and flowering characteristics of Korean native *Veronica*" (Professor Cheon Young Song, Korea National College of Agriculture and Fisheries, Korea); "Creating your own path: inducing novel traits using mutagenesis" (Professor Ryan Contreras, Oregon State University, USA); "Japanese azalea germplasm: the living horticulture properties" (Professor Nobuo Kobayashi, Shimane University, Japan); "Development of droplet-vitrification procedure for the cryopreservation of *Asteraceae* family germplasm" (Professor Haeng-Hoon Kim, Sunchon National University, Korea); and "The project 'Commercialization of native wild flowers' in Korea National Arboretum" (Dr. Sang Yong Kim, Korea National Arboretum, Korea).

Two ISHS Young Minds Awards were presented and the winners were Yu Han from Beijing Forestry University, China, for the best oral presentation entitled "Dissecting the genome-wide evolution of NUDX1 in geraniol biosynthesis of *Rosa chinensis*" and Ah Ram Cho from Seoul Women's University, Korea, for the best poster entitled "Night temperature controlling for flowering in *Chrysanthemum morifolium* under high day temperature condition".

› Professor Byoung Ryong Jeong delivering a welcome message during the opening session which was also broadcasted via the internet for remote participants from seven countries.

› The ISHS Young Minds Awards presented by the Convener Professor Byoung Ryong Jeong to Yu Han (online participation and shown on the screen), Beijing Forestry University, China, for the best oral presentation and to Ah Ram Cho, Seoul Women's University, Korea, for the best poster.

Some highlights and new developments in ornamental germplasm presented included the use of modern technique to enhance ornamental plant breeding, induction of novel traits using mutagenesis, development of droplet-vitrification procedure for cryopreservation, and search and new utilization of wild ornamental plant resources. Although we were unable to proceed with the technical tours due to COVID-19 restrictions, the initial tour had been designed to showcase ornamental plants of the Republic of Korea at the best time of the year for observation. Korea is a peninsula that possesses unique plant resources and diversity due to dynamic climatic changes throughout the year and the Demilitarized Zone (DMZ) is a unique biodiversity spot.

The symposium proceedings, an e-*Acta Horticulturae* volume 1291 containing 35 papers, edited by Professors Wan Soon Kim (University of Korea, Korea), Seung Youn Lee (Andong National University, Korea) and Yong Ha Rhie (Pai Chai University, Korea), was published on time at the beginning of the symposium and distributed by email.

This symposium was truly a great and rare opportunity to reignite our desire to come together again to share knowledge and contribute to basic and applied research results on germplasm of ornamental plants. I truly hope that the ISGO2020 showed many horticulturists out there that there are still ways to revive the scientific desire to quench our thirst for horticultural science in this "new normal" era. Stay safe and healthy, horticulturists!

Byoung Ryong Jeong

› Contact

Prof. Byoung Ryong Jeong, Symposium Convener & President of KSHS, Department of Horticulture, Gyeongsang National University, 501 Jinju-daero, Jinju, Gyeongnam 52828, Republic of Korea, e-mail: brjeong@gnu.ac.kr

› Team of broadcasting and support staff.

From the Secretariat

› In memoriam

Prof. Dr. Jens Wünsche (1964-2021)

Professor Dr. Jens Norbert Wünsche passed away, after a long illness, on 27 January 2021. He had been a member of the ISHS for over 30 years, serving on both the Board and Council and was Editor-in-Chief of the European Journal of Horticultural Science (eJHS) from 2007-2020.

Professor Dr. Wünsche was born in 1964, and completed his studies in agriculture in Halle, Germany, in 1989 (MSc/Dipl.-Ing. Agr.). In 1990, he started his graduate study program at Bonn University, enriched with collaboration and visits to the New York State Agricultural Experiment Station, Horticultural Sciences Department at Cornell University.

Jens was a gentle, very open-minded, and extremely ambitious young student knowing exactly what he wanted and how to accomplish his goals. However, his life at that time was tumultuous. He had become stranded in Bonn as a consequence of the uprising against the Soviet occupation and division of Germany after WWII. Jens was one of the numerous bold GDR refugees who had reached the German Embassy in Prague, climbed over the fence and camped in the embassy grounds. After long negotiations between West German, East German, and Soviet Union authorities, Foreign Minister Genscher, on the evening of 30 September 1989, announced agreement for the refugees to pass into West Germany. This event was an emotional and significant moment in German history and in Jens' life.

After a post-doctoral appointment at HortResearch's Nelson Research Centre in New Zealand (1993-1996), he was then appointed as scientist (1996-2001) where he worked primarily on the physiological aspects of apple fruit growth and development. Jens obtained his second doctorate degree (Privat-Dozent and Venia legendi) from the Faculty of Agriculture, Bonn University, in 2001. This qualified him to apply for a Full Professor position. After working as liaison scientist at HortResearch's Hawke's Bay Research Centre (2001-2004), Jens was offered and accepted the Professorship and Chair 'Crop Physiology of Specialty Crops' of the Institute of Crop Science at Hohenheim University, Stuttgart, Germany, in October 2004. As a fruit crop physiologist, he focused on the basis of plant/fruit responses to environmental and crop management factors. This included studies into flower bud development, flower and fruit abscission processes, and the integration of hormones, carbohydrates and molecular mechanisms in the control of plant development. Through his dedicated research, Prof. Wünsche gained a thorough understanding of crop physiology and became part of an extensive international network of scientific and fruit stakeholder relationships, including those in emerging market sectors.

Jens authored/co-authored over 80 scientific papers in his short career. In addition to those published in horticultural science journals, he also had papers in journals specializing in plant physiology, brewing science, water management, viticulture, plant pathology and biotechnology. He supervised over 50 Masters and PhD students.

In his numerous professional trips, Jens shared his profound knowledge with colleagues abroad, especially in the USA, Chile, Thailand, Vietnam, New Zealand, and Italy, giving presentations and lectures on highly relevant topics in fruit physiology. He also actively participated in a research project of excellence provided by the German Science Foundation (SFB564 The Uplands Program: Sustainable land use and rural development in mountainous regions of Southeast Asia, 2000-2012) which had a major focus on Vietnam. Professor Dr. Wünsche also stimulated international research in numerous other cooperative programs and shared his ideas on sustainable horticulture in many valuable and constructive discussions. His international reputation and expertise, as well as his open mind for cooperative research, attracted many top international scientists to collaborate with him for the benefit of horticulture.

The commitment and dedication of Professor Dr. Wünsche to the wider scientific community was outstanding. Jens was a Board Member of the Centre for Agriculture in the Tropics and Subtropics at the University of Hohenheim and the Centre of Competence for Fruit Science at Lake Constance. He also served in the Board of the German Society of Horticultural Sciences (DGG) as Vice-President (2014), President (2015) and Past President (2016). He represented Germany as an ISHS Council member from 2008 until 2020.

His involvement and his contributions to the ISHS as an active member during the past 30 years are impressive, being co-convener of a symposium at IHC2010 in Lisbon, and editor/co-editor of three *Acta Horticulturae* volumes. He actively participated in and contributed to many ISHS symposia and authored/co-authored 27 *Acta Horticulturae* papers. As a member of the ISHS Board (2014-2018), Jens was responsible for the Innovation, Outreach and Strategy portfolio. He introduced and promoted the ISHS Young Minds Award and investigated ways to make the benefits of ISHS more accessible to young students. The first ISHS Summer School on Pre- and Postharvest Physiology of Temperate Fruit Crops was initiated by Jens and took place at the Stuttgart-Hohenheim University and Bavendorf Research Station, Lake Constance, in August 2018. This very successful course offered a unique chance for 25 graduate students from all over the world to meet with and learn from international experts in their fields. ISHS also benefitted from specific tailor-made partnerships with industry, such as that with Bayer Crop Sciences, due to the personal contacts he had developed.

Despite his high workload and many responsibilities, Jens assumed the position as Editor-in-Chief of the European Journal of Horticultural Science in 2007, a position which he held until just before his death. Jens saw the potential to transform this regional scientific journal into a truly international publication. He also realized that wider promotion and a greater submission rate would contribute to increasing the journal's impact factor. Together with Jozef Van Assche, former Executive Director of the ISHS, he promoted and completed the

effective transfer of the journal into the ISHS publication portfolio in 2015. The journal has indeed expanded in size and in the diversity of submissions since that time, together with a corresponding increase in the impact factor (currently 1.182).

Most recently, Jens had been the co-convener of SHE2021 – the IV International Symposium on Horticulture in Europe, for which he lobbied strongly, and which had been in the planning phase for the past eight years. This was a passion for Jens as he was determined that the best of European horticultural science would be celebrated as fully and as professionally as possible and that the symposium would be held at his home university. Although his health was progressively failing over much of the planning time, his commitment and enthusiasm for this symposium were steadfast.

Professor Dr. Wünsche was undoubtably a very distinguished, highly dedicated, and enthusiastic scientist. He devoted his energy to horticultural research and made many significant contributions to the ISHS. He will be remembered for his enthusiasm for life, his dedication to horticultural science, his interest in the lives of his colleagues, and his leadership.

The International Society for Horticultural Science has recognized Jens through the award of Honorary Membership.

Our sympathies are extended to his beloved wife, Judith, and his three daughters, Helene (13 yr), Charlotte (11 yr) and Henriette (9 yr).

Emeritus Professors Ian Warrington and Georg Noga

› New ISHS members

ISHS is pleased to welcome the following new members:

New Individual Members

Australia: Constancio Asis, Mr. Andrew Horsfield, Mr. Matthew Napolitano, Mr. Cameron Stone, Jennifer Symmons, Phil Thomas, Mr. Muhammad Asad Ullah, Mr. Lorin Young; **Belgium:** Prof. Dr. Ann Cuypers, Dr. Soraya França, Prof. Dr. Monica Höfte, Ms. Julie Moelants, Ms. Ingeborg Pecqueur, Ms. Steffi Pot, Dr. Serge Remy; **Brazil:** Dr. Sandro Bonow, Mr. Mário Borba; **Canada:** Mr. Benido Claude D Belem, Virginia Burt, Mr. Ryan Chester, Ms. Andréane Gravel, Darwin Kowalchuk, Amélie Lachapelle, Mike Manion, Prof. Samuel Pinna, Dr. Poonam Singh, Ms. Bianca van der Stoel; **Chile:** Prof. Dr. Carlos Figueroa, Ms. Judith Villafaña; **China:** Beilu Du, Ms. Yanwen Gu, Assoc. Prof. Changfei Guan, Mr. Li Jerry, Irfan Ali Sabir, Dr. Jian Sun, Ms. Wanxia Sun, Dr. Yuanyuan Xu; **Chinese Taipei:** Ms. Yu Hsin Tung; **Cyprus:** Mr. Omiros Antoniou, Mr. Pelopidas Antoniou, Ms. Filio Athinodorou, Ms. Klaudia Georgia Fasko, Antonios Tzionis; **Denmark:** Ms. Mai Fruervang, Dr. Thayna Mendanha; **Egypt:** Mr. Mohamed Ashraf; **Finland:** Ms. Akiliina Olkkola; **France:** Aline Potier; **Germany:** Maximilian Herzig, Mr. Michael Lichter; **Ghana:** Lydia Baffour-Awuah; **Greece:** Mr. Nikolaos Polyzos, Dr. Athanasios Tsafouros, Georges Tsitos; **Honduras:** Sheng-Yu Hou; **Hong Kong:** Assist. Prof. Yat Fan Siu; **Iceland:** Harpa Lind Kristjánsdóttir; **India:** Mr. Dinesh kumar Mittal, Ms. Reshma Ranjanan; **Indonesia,** Surya Diantina, Ms. Nailatun Nikmah, Prof. Dr. Endang Semiarti, Ms. Aditya Nur Subchan, Prof. Dr. Sudarsono Sudarsono, Ms. Mega Wegadara, Lailia Zubaidah; **Iran:** Assist. Prof. Raheleh Ebrahimi; **Ireland:** Mr. James Fitzpatrick; **Israel:** Mr. Ali Alkiesh, Mr. Israel BenTzur, Mr. Meir Geller, Mr. Ariel Kitron, Nir Rubin; **Italy:** Dr. Fenton Beed, Dr. Roberta Bulgari, Mr. Emanuele Durante, Dr. Stefania Mang, Dr. Melissa Venturi, Andreas Wenter; **Japan:** Prof. Dr. Fusayo Asano, Assist. Prof. Mami Miyake, Dr. Minh Ngoc Nguyen, Mr. Naoki Sakaguchi, Assist. Prof. Seitaro Toda, Ms. Lingran Xiao; **Korea (Republic of):** Aejin Hwang, Ms. Sung-Mi Jung, Kyoung-Hee Kim, Dr. Park Kongyoung; **Latvia:** Dr. Daina Feldmane; **Malaysia:** Prof. Dr. Fadzilah Adibah Abdul Majid, Sin Hoong Tan; **Mauritius:** Mario Chiodi; **Mexico:** Mr. Anthony Oscar Romero, Prof. Augusto Trejo-Gonzalez; **Netherlands:** Mr. Mustafa Agbaria, Mr. Tommaso Barbagli, Mr. Roderick Bouman, Dr. Marthe Derkzen, Mr. Rob d'Hont, Ms. Marina Gomez-Caro, Vincent Mochel, Dr. Mohammadreza Nematollahi, Nina Oud, Dr. Marta Streminska, Dr. Ningyi Zhang, Yifei Zhao; **Nigeria:** Ms. Olaide Williams; **Norway:** Nina Elisabeth Boe, Mr. Naseer Muhammad; **Philippines:** Mr. Dominique Neutens; **Poland:** Dr. Lukasz Zadka; **Portugal:** Ms. Sílvia Afonso, Ms. Marisa Sofia Coelho Lourenco; **Qatar:** Mr. Victor Martinez; **Romania:** Silvia Nicolae, Mr. Valentin Oprea, Raluca Laura Poenaru; **Russian Federation:** Dr. Julia Burmenko; **Serbia:** Ivana Glicic, Mr. Velimir Mitrovic, Prof. Dr. Ninoslav Nikicevic; **Singapore,** Dr. Tiara Herman, Ms. Lee Lee; **South Africa:** Mr. Dian Craven; **Spain:** Barrie Berg, Mr. Pablo Calviño, Dr. Mercedes Garcia, Dr. Alfonso Guevara Gazquez, Ignasi Iglesias, Eva Moré, Mr. Eugenio Roldan; **Sweden:** Assoc. Prof. Paul Becher, Mr. Robin Eskilsson; **Thailand:** Ms. Rattiya Darapan, Malaiporn Wongkaew; **United Kingdom:** Dr. Claudia Carvalho, Mr. Edward Collins, Mr. Tomasz Frackowiak, Ms. Livia Kalossaka, Dr. Lucas Shuttleworth, Dr. Jason Sumner-Kalkun; **United States of America:** Roberto Alvarado, Conner Austin, Dr. Janet Broome, Nicole Capozziello, Pamela Catlin, Lesley Fleming, Dr. Terrence Frett, Ms. Shacarah Gagnon-Kvale, Sunny Green, Eric Gustavson, Mr. Piers Hanbury, Faryn Hart, Janet Hartin, Dr. Lawrence He, Dr. John Henning, Dr. Antoinette Hollis, Susan Hunter, Mr. Boonkong Kasouaher, Ms. Heather Kelejian, Ms. Jeanette Koncikowski, Andrew Larson, Judson LeCompte, Bella McGowan, Maureen McGuire, Mr. Michael McLeon, Zach Miller, Assoc. Prof. Brandy-Joe Milliron, Megan Mitchell, Dr. Savithri Nambeesan, Sarah O'Neill, Robin Peters, Denise Pieratos, Hannah Pilkey, Ms. Liz Robertson, Taylor Robinson, Ms. Katie Ryzhikov, Mr. Daniel Schavey, Brian Schulker, Dr. Nataliya Shcherbatyuk, Paul Stiekema, Dr. John Tamkin, Mr. Sean Tarr, Sally Todd, Assoc. Prof. Danielle Treadwell, Anais Tuepker, Ms. Jaclyn Nicole Uy, Ms. Rebekah Waller, Rebecca Wiepz, Timothy Wood, Kelli Woodson, Anne Yasalonis, Silvia Yoshimizu-Yee, Dr. Robert Zavodny

› Calendar of ISHS events

For updates and more information go to www.ishs.org › calendar of events. For a comprehensive list of meetings in each Division or Working Group use the "science" option from the website navigation menu. To claim reduced registration for ISHS members, your personal membership number is required when registering - ensure your ISHS membership is current before registering. When in doubt sign in to your membership account and check/renew your membership status first: www.actahort.org or www.ishs.org

Year 2021

- May 1-5, 2021, Rimini (Italy): **IX International Strawberry Symposium.** Info: Prof. Dr. Bruno Mezzetti, Dip.Sci. Agrarie, Alimentari ed Ambientali, Università Politecnica delle Marche, Via Brecce Bianche, Ancona 60100, Italy. Phone: (39)0712204933, Fax: (39)0712204856, E-mail: b.mezzetti@univpm.it or Prof. Dr. Maurizio Battino, Dept of Clinical Sciences, Sect Biochemistry, Università Politecnica delle Marche, Via Ranieri, 65 - 60100 Ancona, Italy. E-mail: m.a.battino@univpm.it or Dr. Gianluca Baruzzi, Council for Agric. Research & Economics, via La Canapona, 1 bis, Magliano, 47100 Forlì, Italy. Phone: (39) 543 89566, Fax: (39) 543 89077, E-mail: gianluca.baruzzi@crea.gov.it Web: https://www.iss2021.com/
- May 31 - June 2, 2021, Malmö (Sweden): **IX International Symposium on Light in Horticulture.** Info: Assist. Prof. Most Tahera Naznin, Department of Biosystems and Technology, Swedish University of Agricultural Sciences, Box 103, 23053 Alnarp, Sweden. Phone: (46)40415019, E-mail: naznin.most.tahera@slu.se or Dr. Maria Karlsson, Växtskyddsvägen 3, skne, Hunnestorpsvägen 29, skne, 23053 BstadAlnarp, Sweden. Phone: (46)40-415370, E-mail: maria.e.karlsson@slu.se or Assoc. Prof. Sammar Khalil, Department of biosystem and technology, Box 103, 23053 Alnarp, Sweden. E-mail: sammar.khalil@slu.se E-mail symposium: ISHSLight2020@slu.se Web: https://www.ishslight2020.se/
- June 28-30, 2021, Tel Aviv [virtual symposium] (Israel): **IX International Symposium on Mineral Nutrition of Fruit Crops.** Info: Dr. Uri Yermiyahu, Gilat Research Center, Soil and Water, Mobile Post Negev 85280, Israel. Phone: (972)89928649, Fax: (972)79926485, E-mail: uri4@agri.gov.il or Dr. Arnon Dag, Plant Sciences, Gilat Research Center, Agricultural Research Organization, (The Volcani Center), Mobile Post Negev, 85280, Israel. Phone: (972)506220155, Fax: (972)89926485, E-mail: arnondag@agri.gov.il Web: https://www.ortra.com/events/mnutrition2020
- July 12-14, 2021, Bangkok (Thailand): **IX International Scientific and Practical Conference on Biotechnology as an Instrument for Plant Biodiversity Conservation (physiological, biochemical, embryological, genetic and legal aspects).** Info: Dr. Kanchit Thammasiri, Department of Plant Science, Faculty of Science, Mahidol University, Rama VI Road, Phyathai, Bangkok 10400, Thailand. Phone: (66)89-132-7015, Fax: (66)2-354-7172, E-mail: kanchitthammasiri@gmail.com E-mail symposium: biotech2020thailand@gmail.com Web: http://plantscience.sc.mahidol.ac.th/biotech2020
- July 26-30, 2021, Wenatchee, WA (United States of America): **XII International Symposium on Integrating Canopy, Rootstock and Environmental Physiology in Orchard Systems.** Info: Prof. Stefano Musacchi, Washington State University, TFREC, 1100 N. Western Ave., Wenatchee, WA 98801-1230, United States of America. Phone: (1)509-663-8181, Fax: (1)509-662-8714, E-mail: stefano.musacchi@wsu.edu E-mail symposium: info@2020orchardsystems.com Web: https://2021orchardsystems.com/

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- July 27-28, 2021, Bogor, West Java (Indonesia): **II International Symposium on Tropical and Subtropical Ornamentals.** Info: Dr. Syarifah Iis Aisyah, Dept.of Agronomy and Horticulture, IPB, Jl. Meranti, Kampus IPB Darmaga, 16680 West Java Bogor, Indonesia. Phone: (62)2518629353, E-mail: syarifahiis@yahoo.com or Dr. Dewi Sukma, Department of Agronomy and Horticulture, Bogor Agricultural University, Jl. Meranti Kampus IPB Dramaga, 16680 Bogor, Indonesia. Phone: (62)-251-8629353, Fax: (62)-251-8629353, E-mail: dsukma70@yahoo.com E-mail symposium: tso2020indonesia@gmail.com Web: http://tso2020.ipb.ac.id
- August 15-18, 2021, Leuven (Belgium): **XIII International Controlled and Modified Atmosphere Research Conference - CaMa2021.** Info: Prof. Bart Nicolai, Flanders Centre for, Postharvest Technology, W. De Croylaan 42, 3001 Heverlee, Belgium. Phone: (32)16322375, Fax: (32)16322955, E-mail: bart.nicolai@biw.kuleuven.be or Dr. Maarten Hertog, BIOSYST-MeBioS, K.U. Leuven, de Croylaan 42 - bus 2428, B-3001 Heverlee, Belgium. Phone: (32)16322376, Fax: (32)16322955, E-mail: maarten.hertog@kuleuven.be Web: https://cama2020.org/
- August 18-22, 2021, Uvero Alto, La Altagracia (Dominican Republic): **X International Pineapple Symposium.** Info: Mr. Joelin Santos, AsoproPimopla, C/ Altagracia 100, Monte Plata, Dominican Republic. Phone: (829)745-0318, E-mail: j.santos@asopropimopla.org E-mail symposium: xpineapple2020@gmail.com Web: http://www.cedaf.org.do/eventos/xpineapple2020/
- August 22-27, 2021, Ghent (Belgium): **II International Symposium on Growing Media, Soilless Cultivation, and Compost Utilization in Horticulture.** Info: Dr. Bart Vandecasteele, ILVO, Plant Sciences Unit, B. Van Gansberghelaan 109, 9820 Merelbeke, Belgium. Phone: (32)92722699, E-mail: bart.vandecasteele@ilvo.vlaanderen.be E-mail symposium: info@growingmedia2021.comWeb:https://www.growingmedia2021.com/
- August 28 - September 2, 2021, Halifax, Nova Scotia and Charlottetown, Prince Edward Island (Canada): **XII International Vaccinium Symposium.** Info: Prof. Dr. David Percival, Dalhousie University, Department of Plant, Food, and Environmental Sciences, PO Box 550, Truro, NS B2N 5E3, Canada. Phone: (1)9028937852, Fax: (1)9028931404, E-mail: david.percival@dal.ca Web: http://www.Dal.ca/ivs

NEW

- September 5-8, 2021, Baoding, Hebei (China): **V International Jujube Symposium.** Info: Prof. Dr. Mengjun Liu, Research Center of Chinese Jujube, Agricultural University of Hebei, Baoding, Hebei, 71001, China. Phone: (86)312754342, Fax: (86)3127521251, E-mail: lmj1234567@aliyun.com Web: http://jujube.nssoft.net/
- September 14-17, 2021, Zlatibor (Serbia): **XII International Symposium on Plum and Prune Genetics, Breeding and Pomology.** Info: Dr. Darko Jevremovic, Kralja Petra I 9, 32000 Cacak, Serbia. Phone: (381)32321375, Fax: (381)32321391, E-mail: darkoj@ftn.kg.ac.rs E-mail symposium: plum2020@institut-cacak.org Web: https://www.plum2020.com
- September 20-25, 2021, Almeria (Spain): **VI International Symposium on Papaya.** Info: Prof. Dr. Julian Cuevas González, University of Almería, La Cañada de S. Urbano s/n, 04120 Almería, Spain. Phone: (34)950015559, Fax: (34)950015939, E-mail: jcuevas@ual.es E-mail symposium: papaya2021@ual.es Web: http://www2.ual.es/VI-simposium-on-papaya/

- September 20-24, 2021, Riva del Garda, Trento (Italy): **XIV International Symposium on Plant Bioregulators in Fruit Production.** Info: Dr. Fabrizio Costa, Via Mach 1, 38010 San Michele all'Adige, Trento, Italy. Phone: (39)0461615563, E-mail: fabrizio.costa@fmach.it Web: https://eventi.fmach.it/ISHS-2021
- September 20-26, 2021, Nara (Japan): **VII International Symposium on Persimmon.** Info: Prof. Dr. Keizo Yonemori, Faculty of Agriculture, Ryukoku University, 1-5 Yokotani, Seta Oe-cho, Otsu 520-2194, Siga, Japan. Phone: (81)775995695, Fax: (81)775995608, E-mail: keizo@agr.ryukoku.ac.jp or Prof. Dr. Satoshi Taira, Lab. of Pomology, Fac. of Agr., Yamagata University, Tsuruoka, Yamagata 997-8555, Japan. Phone: (81)235-282829, Fax: (81)235-282832, E-mail: staira@tds1.tr.yamagata-u.ac.jp E-mail symposium: 2020persimmon@gmail.com Web: http://kaki2020.jshs.jp
- September 24-26, 2021, Ohrid (North Macedonia): **VIII South-Eastern Europe Symposium on Vegetables and Potatoes.** Info: Prof. Dr. Gordana Popsimonova, Debarca 16, 1000 Skopje, North Macedonia. Phone: (389)70255878, E-mail: gpopsimonova@yahoo.com or Skender Kaciu, Univ. of Prishtina-Faculty of Agri., and Veterinary, Boulevar B.Clinton bb, 10000 Prishtina, Kosovo. E-mail: skenderkaciu@yahoo.com E-mail symposium: contact@ishs8.org Web: https://ishs8.org/
- September 27-30, 2021, Yalova (Turkey): **X International Symposium on Kiwifruit.** Info: Assoc. Prof. Arif Atak, Horticultural Central Research Institute, Department of Viticulture&Kiwifruit, 77102 Yalova, Turkey. Phone: (90)2268142520, Fax: (90)2268141146, E-mail: atakarif@gmail.com E-mail symposium: secretariat@kiwifruit2021.org Web: http://www.kiwifruit2021.org
- October 4-6, 2021, Bari (Italy): **I International Symposium on Plant Propagation, Nursery Organization and Management for the Production of Certified Fruit Trees.** Info: Prof. Salvatore Camposeo, Università di Bari, Dipt. di Scienze Agro-Ambientali e Territor, Via Amendola 165/a, 70126 Bari, Italy. Phone: (39)0805442982, Fax: (39)0805442982, E-mail: salvatore.camposeo@uniba.it or Prof. Dr. Tiziano Caruso, Department of Agricultural & Forest Science, University of Palermo, Viale delle Scienze, Edificio 4 ingresso H, 90128 Palermo, Italy. Phone: (39) 09123861207, E-mail: tiziano.caruso@unipa.it or Prof. Vito Nicola Savino, University of Bari - Microbiologia Applic., Dip. Protezione delle Piante, Via Amendola 165a, 70126 Bari, Italy. Phone: (39)0805443069, Fax: (39)0805443608, E-mail: viton.savino@gmail.com E-mail symposium: info@certfruit2020.org Web: http://www.certfruit2020.org
- October 6-9, 2021, Toluca (Mexico): **V International Conference on Postharvest and Quality Management of Horticultural Products of Interest for Tropical Regions**. Info: Prof. Dr. Omar Franco Mora, Laboratory of Horticulture, Faculty of Agriculture, Universidad Autónoma del Estado de México, Toluca, México, 50140, Mexico. E-mail: franco_omar@hotmail.com E-mail symposium: convener@pqmhp2021.com Web: https://pqmhp2021.com/
- October 19-22, 2021, Nanjing (China): **V International Symposium on Biotechnology and Molecular Breeding in Horticultural Species**. Info: Jun Wu, Nanjing Agricultural University, College of Horticulture, Nanjing, Jiangsu, 210095, China. E-mail: wujun@njau.edu.cn or Prof. Dr. Shaoling Zhang, Nanjing Agricultural University, 1 Weigang, 210095 Nanjing, China. E-mail: nnzsl@njau.edu.cn Web: http://www.bmbh2020.org
- October 29-30, 2021, Kansas City, MO (United States of America): **XV International People Plant Symposium and II International Symposium on Horticultural Therapies**. Info: Dr. Candice Shoemaker, 2021 Throckmorton, Department of Hort, Forestry, Rec Res, Kansas State University, Manhattan, KS 66506, United States of America. Phone: (1)7855321431, Fax: (1)7855326849, E-mail: cshoemak@ksu.edu Web: http://ipps2020.org/

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- October 31 - November 5, 2021, Stellenbosch (South Africa): **XI International Symposium on Grapevine Physiology and Biotechnology.** Info: Melané Vivier, Institute for Wine Biotechnology, Department of Viticulture and Oenology, Private Bag x1, Matieland, 7602, South Africa. Phone: (27)218083773, Fax: (27)218083771, E-mail: mav@sun.ac.za or Johan Burger, Stellenbosch University, Department of Genetics, Private Bag X1, Matieland, 7002 Stellenbosch, South Africa. E-mail: jtb@sun.ac.za Web: http://www.isgpb2020.com
- November 8-12, 2021, Montpellier (France): **I International Symposium on Reproductive Biology of Fruit Tree Species**. Info: Dr. Evelyne Costes, INRA UMR AGAP, 2, place Viala, 34060 Montpellier Cedex 1, France. Phone: (33)499612787, Fax: (33)499612616, E-mail: evelyne.costes@inrae.fr or Prof. Dr. Henryk Flachowsky, Pillnitzer Platz 3a, 01326 Dresden, Germany. E-mail: henryk.flachowsky@julius-kuehn.de Web: https://symposium.inrae.fr/reproductive-biologyfruittree/
- December 1-3, 2021, Bangkok (Thailand): **V Asia Symposium on Quality Management in Postharvest Systems.** Info: Prof. Dr. Varit Srilaong, Posth.Tech., School of Biores.&Technology, King Mongkut's Univ. of Technol.Thonburi, 126 Pracha-Uthid Road, Bangmod, Thungkru, Bangkok 10140, Thailand. E-mail: varit.sri@kmutt.ac.th E-mail symposium: asqp2021@kmutt.ac.th Web: http://www.asiapostharvest2021.kmutt.ac.th/
- December 14-17, 2021, Giarre, Catania (Italy): **VIII International Conference on Landscape and Urban Horticulture**. Info: Prof. Daniela Romano, Universitá de Catania, Dip. DOFATA, Via Valdisavoia 5, 95123 Catania, Italy. Phone: (39)095234306, Fax: (39)095234329, E-mail: dromano@unict.it or Dr. Francesca Bretzel, CNR, IRET Istituto di Ricerca sugli Ecosist, Via G. Moruzzi 1, Pisa 56124, Italy. Phone: (39)0506212485, Fax: (39)0506212473, E-mail: francesca.bretzel@cnr.it or Dr. Stefania Toscano, Via Valdisavoia 5, 95123 Catania(CT), Italy. Phone: (39)0954783303, E-mail: stefania.toscano@unict.it E-mail symposium: info@luh2021.it Web: https://www.luh2021.it/
- December 14-17, 2021, Catania (Italy): **III International Organic Fruit Symposium and I International Organic Vegetable Symposium**. Info: Prof. Dr. Ferdinando Branca, Di3A, Università di Catania, Via Valdisavoia 5, 95123 Catania, Italy. Phone: (39)095234307, Fax: (39)095234329, E-mail: fbranca@unict.it or Dr. Alberto Continella, University of Catania, Via Valdisavoia 5, Catania, Italy. Phone: (39)095-234455, Fax: (39)095-234406, E-mail: acontine@unict.it or Dr. Alessandro Tribulato, via Valdisavoia, 5, 95123 Catania, Italy. Phone: (39) 095 234328, Fax: (39) 095 234329, E-mail: atribula@unict.it E-mail symposium: info@orghort2020.it Web: https://www.orghort2020.it/

Year 2022

- February 7-10, 2022, Bangalore (India): **International Symposium on Tropical and Subtropical Viticulture**. Info: Prof. Dr. Dilipraj Patil, Associate director of Research, MHREC, University of Horticultural Sciences, Udyanagiri, Bagalkot, 587104, India. E-mail: adrebagalkot@uhsbagalkot.edu.in or Dr. Girigowda Manjunatha, Officer In-charge, Bio-control laboratories, Directorate of Horticulture, University of Horticultural sciences, Bagal, Karnataka, 570020, India. Phone: (91)9916219697, E-mail: gmanjunath2007@gmail.com Web: http://iststvbagalkot2020.com/
- February 14-18, 2022, Stellenbosch (South Africa): **V International Symposium on Pomegranate and Minor Mediterranean Fruits**. Info: Prof. Dr. Olaniyi Fawole, Department of Botany and Plant Biotech, University of Johannesburg, Auckland Park Campus, South Africa. E-mail: olaniyi@sun.ac.za Web: https://ishsstellenbosch.org/stellenbosch/

- March 6-10, 2022, San Juan (Argentina): **XVI International Symposium on Processing Tomato - XIV World Processing Tomato Congress.** Info: Dr. Luca Sandei, SSICA, Tomato Department, Viale f.Tanara 31/a, 43121 Parma (PR), Italy. Phone: (39) 0521795257, Fax: (39) 0521771829, E-mail: luca.sandei@ssica.it or Dr. Cosme A. Argerich, Instit. Nac. de Tecnol. Agro., C.C. Nro. 8, La Consulta, 5567 Mendoza, Argentina. Phone: (54)2622470304, Fax: (54)2622470753, E-mail: argerich.cosme@inta.gob.ar E-mail symposium: symposium@worldtomatocongress.com Web: http://www.worldtomatocongress.com
- March 13-18, 2022, Brena Baja (La Palma) & La Laguna (Tenerife) (Spain): **XIV International Protea Research Symposium.** Info: Prof. Dr. Juan Alberto Rodríguez Pérez, Àrea de Producción Vegetal, Universidad de La Laguna, Calle Dinamarca 29, 38300 La Orotava, Tenerife, Spain. Phone: (34)666695267, E-mail: jarodrip@ull.es Web: https://proteas2020.asocan.net
- March 25-28, 2022, Guangzhou (China): **IV International Orchid Symposium.** Info: Prof. Dr. Genfa Zhu, Enviromental Horticulture Research Inst., Guangdong Academy of Agricultural Sciences, No. 1 East Jinying Street 1, Wushan Road, Tianhe district, 510640 Guangzhou, China. E-mail: genfazhu@163.com

NEW
- March 28-31, 2022, João Pessoa, Paraíba (Brazil): **X International Congress on Cactus Pear and Cochineal.** Info: Mr. Mário Borba, 1571 Rio Grande do Sul Avenue, 58030021 João Pessoa-Paraíba, Brazil. E-mail: presidente@faepapb.com.br E-mail symposium: cactuscongress2022@faepapb.com.br Web: http://www.cactuscongress2022.com
- April 18-21, 2022, Murcia (Spain): **III International Symposium on Beverage Crops.** Info: Rocio Gil Muñoz, Avda Ntra Sra de la Asunción N24, 30520 Jumilla, Spain. E-mail: mariar.gil2@carm.es or Prof. Dr. Encarna Gómez-Plaza, Universidad de Murcia, Fac. Veterinaria, Dep. Tecnología Alimentos, Campus Espinardo, 30071 Murcia Murcia, Spain. Phone: (34) 868887323, E-mail: encarna.gomez@um.es or Prof. Dr. Cristina Garcia-Viguera, Phytochemistry and Healthy Foods Lab, Dept Food Science Technoloy CEBAS-CSIC, Campus Espinardo 25, Espinardo, 30100 Murcia, Spain. Phone: (34) 968396200, Fax: (32)9686213, E-mail: cgviguera@cebas.csic.es Web: https://www.bevcrops21.es/
- May 23-26, 2022, Pula (Croatia): **VIII International Symposium on Edible Alliums.** Info: Smiljana Goreta Ban, Institute of Agriculture and Tourism, Department of Agriculture and Nutrition, Karla Huguesa 8, 52440 Porec, Croatia. E-mail: smilja@iptpo.hr

NEW
- May 29 - June 2, 2022, Limassol/Lemesos (Cyprus): **VI International Symposium on Postharvest Pathology: Innovation and Advanced Technologies for Managing Postharvest Pathogens.** Info: Assist. Prof. Nikolaos Tzortzakis, Dept. Agricultural Sciences, Biotechnology, Food Science, Cyprus University of Technology, 3036, Lemesos, Cyprus. Phone: (35)7 25002280, Fax: (35)7 25002838, E-mail: nikolaos.tzortzakis@cut.ac.cy Web: http://web.cut.ac.cy/postharvestpathology2021/
- May 30 - June 3, 2022, Naoussa (Greece): **X International Peach Symposium.** Info: Prof. George Manganaris, Anexartisias 57, PAREAS Building, P.O. Box 50329, 3603 Lemesos, Cyprus. Phone: (357)25002307, Fax: (357)25002804, E-mail: george.manganaris@cut.ac.cy or Dr. Athanassios Molassiotis, Pomology lab, Faculty of Agriculture, AUTH, 54 124 Thessaloniki, Greece. Phone: (30)2310 998882, Fax: (30)2310 998882, E-mail: amolasio@agro.auth.gr Web: https://www.fruitsciences.eu/peach2021
- June 12-15, 2022, Cordoba (Spain): **XV International Asparagus Symposium.** Info: Juan Gil, Plaza de la oca, 1, 2-1, Córdoba, Spain. E-mail: juan.gil@uco.es Web: https://www.ias2022.com/
- June 19-24, 2022, Davis, CA (United States of America): **VIII International Symposium on Almonds and Pistachios.** Info: Dr. Louise Ferguson, 2037 Wickson Hall, Plant Sciences Department Mail Stop II, UC Davis 1 Shields Ave. Davis CA 95616, United States of America. Phone: (1) 559 737 3061, Fax: (1) 530 752 8502, E-mail: lferguson@ucdavis.edu or Dr. Thomas M. Gradziel, Department of Pomology, University of California, 1 Shields Avenue, Davis, CA 95616-8683, United States of America. E-mail: tmgradziel@ucdavis.edu or Bruce Lampinen, Dept of Plant Sciences, University of California, 1 Shields Avenue, Davis, CA 95616, United States of America. E-mail: bdlampinen@ucdavis.edu Web: https://ucanr.edu/sites/Almond_Pistachio_2021/
- August 14-20, 2022, Angers (France): **XXXI International Horticultural Congress: IHC2022.** Info: Dr. François Laurens, INRA, Centre d'Angers, 49071 Beaucouzé, France. Phone: (33)2 41 22 56 00, Fax: (33)2 41 22 57 55, E-mail: francois.laurens@inrae.fr E-mail symposium: info@ihc2022.org Web: https://www.ihc2022.org/

NEW
- September 5-9, 2022, Corvallis, OR (United States of America): **X International Congress on Hazelnut.** Info: Prof. Shawn A. Mehlenbacher, Department of Horticulture, 4017 ALS Bldg., Oregon State University, Corvallis, OR 97331-7304, United States of America. Phone: (1)5417375467, Fax: (1)5417373479, E-mail: mehlenbs@hort.oregonstate.edu Web: https://hazelnut2021.org/

Year 2023

- January 22-26, 2023, Stellenbosch (South Africa): **XIV International Pear Symposium.** Info: Dr. Elke Crouch, University of Stellenbosch, Horticulture, Consumer Sciences Building, Private Bag X1, 7602 Matieland, South Africa. Phone: (27)218084763, Fax: (27)218082121, E-mail: elke@sun.ac.za or Prof. Karen I. Theron, Department of Horticulture, University of Stellenbosch, Private Bag X1, Matieland 7602, South Africa. Phone: (27)218084762, Fax: (27)218082121, E-mail: kit@sun.ac.za
- March 10-14, 2023, Athens (Greece): **I International Symposium on Protected Cultivation, Nettings and Screens for Mild Climates.** Info: Dr. Dimitrios Savvas, Agricultural University of Athens, Laboratory of Vegetable Production, Iera Odos 75, 11855 Athens, Greece. Phone: (30)2105294510, Fax: (30)2105294504, E-mail: dsavvas@aua.gr or Assoc. Prof. Thomas Bartzanas, Agricultural University of Athens, Laboratory of Farm Structures, Iera Odos 75, 11855, Athens, Greece. Phone: (30)2105294045, Fax: (30)2105294045, E-mail: t.bartzanas@aua.gr

NEW
- May 23-26, 2023, Brasília, DF (Brazil): **VII International Symposium on Tomato Diseases.** Info: Prof. Eduardo Mizubuti, Departamento de Fitopatologia, Universidade Federal de Viçosa, 36570-900 Viçosa-MG, Brazil. Phone: (55) 31 3899 1090, E-mail: mizubuti@ufv.br or Dr. Alice Kazuko Inoue-Nagata, Embrapa Vegetables Km 09,BR060, 70275970 Brasilia-DF, Brazil. Phone: (55)6133859053, E-mail: alice.nagata@embrapa.br or Prof. Dr. Nadson Pontes, BR 153, km 633. CP 92, Zona Rural, 75650-000 Morrinhos-GO, Brazil. Phone: (55)64-34137900, E-mail: nadson.pontes@ifgoiano.edu.br

NEW
- June 6-8, 2023, Almeria (Spain): **X International Symposium on Soil and Substrate Disinfestation.** Info: Dr. Miguel de Cara, IFAPA-Centro La Mojonera, Camino San Nicolás, 1, 04745. La Mojonera, Almería, Spain. Phone: (34)671532026, Fax: (34)950558055, E-mail: franciscom.cara@juntadeandalucia.es

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1304	IX International Peach Symposium	87
1303	XIII International Pear Symposium	125
1302	II International Symposium on Vegetable Grafting	76
1301	XIII International Asparagus Symposium	67
1300	XI International Workshop on Sap Flow	63
1299	XXX International Horticultural Congress IHC2018: VII International Symposium on Tropical and Subtropical Fruits, Avocado, II International Symposium on Jackfruit and Other Moraceae and II International Symposium on Date Palm	108
1298	I International Symposium on Botanical Gardens and Landscapes	145
1297	XXX International Horticultural Congress IHC2018: V International Symposium on Plant Genetic Resources and International Symposium on Applied Functional Molecular Biology	150
1296	International Symposium on Advanced Technologies and Management for Innovative Greenhouses: GreenSys2019	254
1295	EUFRIN Fruit Thinning Working Group Symposium	39
1294	VI International Symposium on Cucurbits	74
1293	VI International Symposium on Lychee, Longan and Other Sapindaceae Fruits	76
1292	XXX International Horticultural Congress IHC2018: International Symposium on Fruit and Vegetables for Processing, International Symposium on Quality and Safety of Horticultural Products and VII International Symposium on Human Health Effects of Fruits and	99
1291	III International Symposium on Germplasm of Ornamentals	81
1290	XVII International Symposium on Apricot Breeding and Culture	68
1289	IV Balkan Symposium on Fruit Growing	74
1288	IX International Symposium on New Ornamental Crops	64
1287	XXX International Horticultural Congress IHC2018: International Symposium on Medicinal and Aromatic Plants, Culinary Herbs and Edible Fungi, IV International Jujube Symposium and VI International Symposium on Saffron Biology and Technology	98
1286	XXX International Horticultural Congress IHC2018: II International Symposium on Organic Horticulture for Wellbeing of the Environment and Population	75
1285	XXX International Horticultural Congress IHC2018: II International Symposium on Micropropagation and In Vitro Techniques	67
1284	X International Symposium on Artichoke, Cardoon and Their Wild Relatives	71
1283	XXVI International Eucarpia Symposium Section Ornamentals: Editing Novelty	68
1282	XXX International Horticultural Congress IHC2018: II International Symposium on Plant Breeding in Horticulture	101
1281	XXX International Horticultural Congress IHC2018: International Symposium on Cultivars, Rootstocks and Management Systems of Deciduous Fruit and Fruit Tree Behaviour in Dynamic Environments	147
1280	XXX International Horticultural Congress IHC2018: International Symposium on Nuts and Mediterranean Climate Fruits, Carob and X International Symposium on Temperate Fruits in the Tropics and Subtropics	66
1279	XXX International Horticultural Congress IHC2018: VII Conference on Landscape and Urban Horticulture, IV Conference on Turfgrass Management and Science for Sports Fields and II Symposium on Mechanization, Precision Horticulture, and Robotics	72
1278	IV International Conference on Postharvest and Quality Management of Horticultural Products of Interest for Tropical Regions	74
1277	XII International Rubus and Ribes Symposium: Innovative Rubus and Ribes Production for High Quality Berries in Changing Environments	116
1276	XXX International Horticultural Congress IHC2018: International Symposium on Viticulture: Primary Production and Processing	75
1275	XXX International Horticultural Congress IHC2018: International Symposium on Strategies and Technologies to Maintain Quality and Reduce Postharvest Losses	101
1274	II International Symposium on Beverage Crops	63
1273	XXX International Horticultural Congress IHC2018: II International Symposium on Soilless Culture and VIII International Symposium on Seed, Transplant and Stand Establishment of Horticultural Crops	109
1272	XXX International Horticultural Congress IHC2018: XI International Symposium on Banana: ISHS-ProMusa Symposium onGrowing and Marketing Banana under Subtropical Conditions	61
1271	XXX International Horticultural Congress IHC2018: III International Symposium on Innovation and New Technologies in Protected Cultivation	105
1270	IX International Symposium on Soil and Substrate Disinfestation	82
1269	XXX International Horticultural Congress IHC2018: II International Symposium on Innovative Plant Protection in Horticulture	77
1268	XI International Symposium on Protected Cultivation in Mild Winter Climates and I International Symposium on Nettings and Screens in Horticulture	89
1267	International Symposium on Survey of Uses of Plant Genetic Resources to the Benefit of Local Populations	81
1266	International Symposium on Growing Media, Soilless Cultivation, and Compost Utilization in Horticulture	103
1265	XXX International Horticultural Congress IHC2018: III International Berry Fruit Symposium	78
1264	II International Symposium on Carrot and Other Apiaceae	75
1263	XXX International Horticultural Congress IHC2018: International Symposium on Ornamental Horticulture and XI International Symposium on Postharvest Quality of Ornamental Plants	115
1262	III International Orchid Symposium	73
1261	I International Apple Symposium	76
1260	XI International Symposium on Plum and Prune Genetics, Breeding and Pomology	77
1259	III International Symposium on Horticultural Crop Wild Relatives	61

For an updated list of all titles (in print, USB-drive or e-Acta Horticulturae format) logon to www.actahort.org

› *Chronica Horticulturae* author information

Chronica Horticulturae is the quarterly publication of the International Society for Horticultural Science (ISHS) and is received by all members of the Society and numerous libraries throughout the world. Members and non-members are urged to contribute articles for consideration. However, it needs to be understood that *Chronica* is not to be construed as a scientific journal that publishes original research. Research articles appropriate for eJHS, Fruits or *Acta Horticulturae* are usually inappropriate for *Chronica*. We seek horticultural articles of interest to a broad audience composed of ISHS members and the horticultural, scientific, and academic communities.

Chronica Horticulturae is currently made up of as many as nine sections as follows:

News & Views from the Board. This section is usually confined to editorials from Board Members as well as general announcements of the Society.

Issues. Articles of a broad focus that often involve controversial topics related to horticulture, including broad social issues and economic development, are appropriate for this section. These articles are intended to stimulate discussion. Often, guest writers are invited to contribute articles.

Spotlight on Honoured ISHS Members. ISHS Fellows and Honorary Members complete an interview on how they started and progressed in their careers, what affected their decisions and attitudes and how their involvement with the ISHS assisted them. In addition, they are invited to comment on how they see the future of horticultural science for young people. Articles in this section are by invitation only.

Horticultural Science Focus. This section is intended for in-depth articles on a topic of horticulture that is generally, but not always, scientific in nature. Many articles are mini-reviews and will provide up-to-date information on current topics of interest to the horticultural community. We encourage these articles to be illustrated.

Horticultural Science News. Shorter articles about current topics including horticultural commodities and disciplines are welcome.

History. This section includes articles on the history of horticulture, horticultural crops, and the ISHS.

The World of Horticulture. Articles in this section highlight horticultural industries and research institutions of particular countries or geographic regions throughout the world. Illustration with figures and tables is extremely helpful and highly advised. This section also includes book reviews that are requested by the Editor. Members who wish to recommend a book review should arrange for a copy of the book to reach the Secretariat.

Symposia and Workshops. Meetings under the auspices of ISHS are summarized, usually by a participant of the meeting. These articles are arranged by the symposium organizers.

News from the ISHS Secretariat. This section contains information on membership, memorials of deceased ISHS members, and a calendar of ISHS events. Brief memorials (up to 500 words) should be sent to the Secretariat.

Authors who wish to submit articles for publication in *Chronica* should contact ISHS headquarters and their request will be transmitted to the Editor. Authors should be aware that most articles should have a broad international focus. Thus, articles of strictly local interest are generally unsuited to *Chronica*. Illustrated articles are usually 1500 to 5000 words long. There are no page charges for *Chronica Horticulturae*. Photographs submitted should be of high resolution (≥ 300 pixels per inch). Send articles or ideas for articles to:

Kim Hummer, Editor, **hummerk@oregonstate.edu**
Kelly Van Dijck, Associate Editor, **kelly.vandijck@ishs.org**

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