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Horticultural Highlights

A Whole Foods Plant Based Health Perspective, an Opportunity for Horticulture?

- Urban Horticulture and Green Open Space
- Sustainability of Intensive Vegetable Farming in the Up-Country Region of Sri Lanka

Symposia and Workshops

Horticulture in Europe • *Humulus* • Chestnut • Protea • Woody Ornamentals of the Temperate Zone • New Floricultural Crops • Germplasm of Ornamentals • Virus Diseases of Ornamental Plants • Mineral Nutrition of Fruit Crops • Processing Tomato • Seed, Transplant and Stand Establishment of Horticultural Crops • Vineyard Mechanization and Grape and Wine Quality • CFD Applications in Agriculture • Soilless Culture • Postharvest • Organic Fruit

- Christian ULRICHS, Humboldt University of Berlin, Germany: Recent developments in urban horticulture – facts and fiction.

All keynote speakers highlighted the challenges related to their respective themes and explained how research could solve specific problems.

During the symposium, 60 oral presentations and 362 posters were presented.

The symposium began with welcome addresses delivered by Grégoire Thomas, Director General of AGROCAMPUS OUEST, Christian Pihet, Vice President of the University of Angers, Daniel Loiseau, Vice-President of Angers Loire Métropole, António Monteiro, President of the International Society for Horticultural Science, and Jean-Claude Mauget, Convener of SHE 2012.

The opening session was chaired by António Monteiro, President of ISHS, and included a very stimulating lecture entitled "Horticulture in a crisis environment", delivered by Dr. Tomas Garcia Azcarate, Agricultural Market Economic Advisor, the European Commission.

Ten workshops provided the opportunity for less formal discussions on specific topics such as ecologically intensive horticulture, the impact of climate change on horticultural crops, horticultural potential in Eastern European countries and opportunities for horticultural research and innovation in Horizon 2020. A two-day satellite workshop on horticulture for international development took place in the facilities of AGROCAMPUS OUEST.

Two prizes were awarded during SHE 2012: the ISHS best student presentation was given to Burkard KAUTZ from Germany for his presentation: Impact of salinity and water deficiency on the fluorescence signature of tomato leaves, while the SNHF (Société Nationale d'Horticulture



During a post-symposium professional tour, participants visited Minier Nurseries in Beaufort-en-Vallée near Angers. Here they are walking in the arboretum of the nursery. Photograph by Vegepolys.

de France) best student poster was granted to Alam MEHBOOB from Sweden for his poster: Decontamination of irrigation water comparison of stationary and mobile photocatalytic water treatment.

Seven professional tours were organized for the afternoon of July 4 and the day of July 5. They enabled interested participants to discover the horticultural industry in the area of Angers and to enjoy the beautiful landscapes of Anjou.

Prof. Errol Hewett, ISHS Board member, launched the book *Harvesting the Sun: A Profile of World Horticulture* during the symposium.

The next SHE will be organized and hosted by our Greek colleagues in 2016.

Jean-Claude Mauget

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Section Medicinal and Aromatic Plants Third Int'l *Humulus* Symposium – Commission Plant Genetic Resources – Commission Fruits and Vegetables and Health

The historic city of Zatec (Saaz), Czech Republic, "Town of Hops", was an extremely appropriate location for the 3rd International *Humulus* Symposium, which took place from September 9-14, 2012 (the first and second symposia were held in Corvallis, USA [2004] and Ghent, Belgium [2008], respectively). Over 60 participants from 13 countries covering the entire hop research spectrum and value chain, gathered at the Hop Research Institute Co.

Ltd. Zatec, to learn and share current developments concerning this charismatic plant, *Humulus lupulus* L. The symposium was co-convened by Dr. Josef Patzak, Hop Research Institute Co. Ltd., Czech Republic and A/Prof. Anthony Koutoulis, University of Tasmania, Australia. Dr. Barbara Reed, Vice Chair of the ISHS Commission Plant Genetic Resources, represented the ISHS and was part of the official opening of the symposium.

SCIENTIFIC PROGRAM

The scientific program included 32 oral presentations and 25 posters covering six sections. The first section focused on **Hop Breeding and Molecular Biology**. Invited speaker, Dr. Simon Whittock (Australia), described how various technologies (in vitro polyploid induction, flow cytometry, GC-MS, molecular markers, quantitative genetics) have assisted hop breed-





Participants at the 3rd International *Humulus* Symposium in Zatec, Czech Republic.

ing efforts in Australia to develop new varieties with exciting flavor potential. Dr. Ron Beatson (New Zealand) described the genetic progress made over 50 years of breeding triploid hops for New Zealand growing conditions, with a continued focus on both alpha and aroma hops. Invited speaker, Dr. John Henning (USA), provided a detailed overview of the US Department of Agriculture, Agricultural Research Service (USDA-ARS) hop molecular breeding program, with a particular focus towards genotyping hop accessions and developing genetic maps for quantitative trait loci (QTL) studies. Dr. Emily Buck (New Zealand) described how a number of

QTL for key flavor and aroma components have been identified, illustrating the potential for marker assisted selection in hop. Invited speaker, Dr. Jaroslav Matousek (Czech Republic), provided an extremely interesting update on the gene regulation of the hop lupulin gland metabolome, with specific reference to the role of transcription factors. Research student, Andres Gatica-Arias (Germany), described a genetic engineering approach to over-expressing transcription factors with a view to increasing production of secondary metabolites in hop. Dr. Gennady Karlov (Russia) presented the application of molecular cytogenetics to investi-

gate fundamental aspects of the hop genome.

The second section focused on **Plant Pathology, Virology and Entomology**. Invited speaker, Prof. Teruo Sano (Japan), presented a historical perspective of the origin and diversity of hop stunt viroid as well as current issues. Dr. Sebastjan Radisek (Slovenia) described recent outbreaks of hop stunt disease in Slovenia and how these are currently being managed. Dr. Jernej Jakse (Slovenia) described the use of next generation sequencing as a diagnostic tool for new pathogen discovery in hop. Dr. Stanislav Mandelc (Slovenia) described a comparative proteomic approach to inves-

Co-Convenor Dr. Josef Patzak (Czech Republic) introducing Dr. Barbara Reed, Vice Chair of the ISHS Commission Plant Genetic Resources and ISHS representative, at the official opening of the symposium.

Dr. Karel Krofta (Czech Republic) showing delegates part of the pilot brewing facility at the Hop Research Institute Co. Ltd.



tigate hop plants susceptible and resistant to *Verticillium albo-atrum*. Dr. Florian Weihauch (Germany) described a new biotest for assessing aphid tolerance on different aphid genotypes (in his words: “simple is beautiful”). Dr. Josef Vostrel (Czech Republic) described how organic hops can be protected from two-spotted mite with the assistance of the predatory mite *Typhlodromus pyri*.

The third section focused on **Chemistry and Plant Physiology**. Invited speaker, Dr. Martin Biendl (Germany), described chemical processes for the isolation of prenylflavonoids from hop. Dr. Clinton Dahlberg (USA) described recent efforts in the preparation of the unnatural derivatives of hop. A/Prof. Robert Shellie (Australia) compared and contrasted separation science technologies in hop, namely: high-resolution gas chromatography (GC), ultra-fast GC and comprehensive two-dimensional GC. Invited speaker, Dr. Ana Margarida Fortes (Portugal), described the potential of using organogenic nodule formation in hop as a tool for future biotechnological applications. Dr. Josef Patzak (Czech Republic) compared endogenous phytohormone levels in dwarf and standard hop. Dr. Vit Gloser (Czech Republic) presented work related to the response of hop to drought.

The fourth section focused on **Hop Cultivation and Management**. Invited speaker, Dr. Hiroo Matsui (Japan), described the influence of hop root age on the quality of hop. Dr. Karel Krofta (Czech Republic) presented work on the importance of transpiration in the overall water balance in hop plantations. Invited speaker, Dr. Barbara Reed (USA), provided an update on the cryopreservation and maintenance of hop material in the USDA germplasm collection. Dr. Luca Pretti (Italy) reported on recent hop cultivation trials in four Italian regions. Ing. Josef Jezek



Co-Conveners Dr. Josef Patzak (Czech Republic) (left) and A/Prof. Anthony Koutoulis (Australia) (right) receiving their ISHS medals at the closing ceremony of the symposium.

(Czech Republic) presented recent growth trials of low trellis hop in the Czech Republic. Dr. Ruslan Hofmann (Germany) presented recent findings on energy consumption and quality control during hop kilning.

The fifth section focused on **Hop, Indispensable Raw Material for Brewing**. Invited speaker, Dr. Jessika De Clippeleer (Belgium), presented work on the role of hop versus malt in the origin of staling aldehydes in beer. Prof. Thomas Shellhammer (USA) presented a very interesting talk on understanding the origin of American hop aroma in beer. Dr. Emily Buck (New Zealand) presented a sensory method developed from Dr. Sara Jaeger's group (New Zealand) for screening dried hop cones for specific traits. Dr. Patricia

Aron (USA) presented research on the elucidation and evaluation of hop polyphenol influence on lager beer flavor and flavor stability. Dr. Jan Urban (USA) presented recent research describing, in detail, the molecular structure of humulone and several of its derivatives.

The sixth section focused on **Hop, Beer and Health**. Prof. Herbert Riepl (Germany) presented research on the screening of hop extracts for substances active in neural stem cell differentiation. Dr. Pavel Dostalek (Czech Republic) described the effect of xanthohumol on brewing yeast cells.

SOCIAL ACTIVITIES

During the symposium the local organizing committee ensured that the scientific presentations were complemented by social activities that were of great interest to everyone, including sampling the quality of the end product of their work – beer. Many of these social events were based at the Hop Research Institute, where delegates were able to sample some of the local brews generated at the Institute's pilot brewing facility. Our hosts at the Hop Research Institute were very generous with their time and they opened up the laboratory facilities for inspection. Delegates were also entertained by a choir at a local church in Zatec and enjoyed the excursion to local hop gardens followed by a tour of the Zatec hop museum and finishing with some local Czech beers at the appropriately named Hop and Beer Temple. A highlight of the farewell party was a demonstration of traditional beer brewing. A select group of hop enthusiasts were able to attend the post-symposium tour, which included tours of the Pilsner Urquell brewery and Pilsner Urquell brewery museum in Plzen (Pilsen), the charming town of Karlovy Vary (Carlsbad), the historic city of Praha (Prague) and the large Gothic Karlstejn Castle.

FUTURE PROSPECTS

During the ISHS business meeting, discussions were held regarding the 4th International *Humulus* Symposium and how this fitted in with other international hop meetings. Details of the discussions will be conveyed to the ISHS Executive Committee.

Anthony Koutoulis and Josef Patzak

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Dr. Ron Beatson (New Zealand) inspecting hops (left) and “stirring the pot” (right) during the demonstration of traditional beer brewing.

