

International Society for Horticultural Science IV *Humulus* Symposium (IHS)

Hop Research Council (HRC)

Joint Program

Tuesday, August 4 Joint Hop Growers of America, Hop Industry Plant Protection Committee, National Clean Plant Network for Hops, Hop Research Council and IV International *Humulus* Symposium

Pan-Industry Welcome

3:00 pm IV *Humulus* Symposium (IHS) Pre-tour arrives at **Hilton Garden Inn**  
3:00-5:30 pm IHS Check-in and late/event Registration and Poster Installation in **Rainier Room Hilton Garden Inn**  
3:30-5:30pm Hop Industry Plant Protection Committee (USHIPPC), registered IHS participants welcome to attend **Syrah Room at Holiday Inn** (3 blocks west from Hilton on Yakima Ave)  
4:45-5:00 pm Entrance Meeting of the IHGC Scientific and Technical Commission and ISHS **Florian Weihrauch** (IHGC) and **Anthony Koutoulis** (ISHS) presiding, Organizers attending, **Rainer Room at Hilton Garden Inn**

Casual Dinner on the Lawn at Bale Breaker Brewery

6:00 pm Board bus to Bale Breaker Brewery at **Hilton Garden Inn Parking Lot**  
*OR (2 boarding times available)*  
6:30 pm Board bus to Bale Breaker Brewery at **Hilton Garden Inn Parking Lot**  
6:15 pm- 9:00 pm ISHS and HRC, HGA, NCPN, and HIPPC Welcome  
6:00-6:45 pm Bale Breaker Brewery/Loftus Ranch Tour, **Smith Family**  
6:45-7:00 pm Welcome to Symposium by Co-conveners,  
**Pattie Aron, Paul Matthews, Fred Stevens**

Wednesday, August 5 - HRC Researcher Reports and Lunch at **Cascade Room, Hilton Garden Inn**

8:00-8:10 am Call to Order, Welcome by HRC President, **Reggie Brulotte**  
8:10-8:30 am **Stephen Kenny**, Washington State University, *Hop Breeding Research*  
8:30-8:50 am **John Henning**, USDA-ARS, *Hop Breeding and Genomics*  
8:50-9:10 am **Mark Nelson**, Washington State University, *Control of Fungal diseases in hop*  
9:10-9:30 am **Rick Boydston**, Washington State University, *Hop tolerance to herbicides*  
9:30-10:00 am **Doug Walsh**, Washington State University, *IPM of Arthropods*  
10:00-10:20 am Break

10:20-10:40 am **Jim Barbour**, University of Idaho, *IPM strategies in Hop*  
10:40-11:00 am **Megan Twomey** (for Dave Gent), U.S. Department of Agriculture, *Overwintering of hop powdery mildew and Susceptibility and Development of Powdery Mildew on Cascade*  
11:00-11:30 am **Ken Eastwell**, Washington State University, *Management of Hop Diseases Caused by Viruses and Virus like agents*  
11:30 am-12 pm **Tom Shellhammer**, Oregon State University, *Identifying brewing qualities which aid hop breeding: Investigating harvest maturity and hop processing and their influence on dry-hop aroma in beer*

12:00 pm Break

**Track 1. ISHS, NCPN, and HGA**

12:00-2:00 pm ISHS late/individual event Registration and Poster Installation in **Rainier Room Hilton Garden Inn**

1:00-2:30 pm Lunch: Introductions and Mixer Lunch, **Cascade Room Hilton Garden Inn**

1:05-1:25 IV *Humulus* Symposium Program Orientation and Welcome  
Organizers: **Pattie Aron, Ron Beatson, Martin Biendl, Paul Matthews, Tom Nielsen, Fred Stevens, Florian Wiehrauch**

Poster Session 1  
(2:00-5:00 pm, presenters are at their posters)

2:00-5:00 pm ISHS Poster Session 1 at **Rainier Room Hilton Garden Inn**

2:30-4:00 pm ISHS Tour of Hops Extract Corporation, (must be registered for Symposium)  
**Board the Bus at Hilton Garden Inn Parking Lot**  
Tour Leaders: **John Paul Maye** and **Harald Schwarz**

4:30-5:00 pm Business Meeting of the IHGC Scientific and Technical Commission and ISHS  
**Florian Weihrauch** (IHGC) and **Anthony Koutoulis** (ISHS) presiding, Organizers attending, **Executive Suite at Hilton Garden Inn**

**Track 2. HRC Members and Potential Members\***

1:30 p.m. Members Meeting\* –**Holiday Inn Syrah Room**

- 1) Call to Order
- 2) Review 2015 Winter Meeting Minutes

- 3) Announce dates and locations for upcoming meetings
    - January 19-22, 2016 - American Hop Convention and Hop Research Council Winter Meeting
    - July/August 2016 – Oregon or Idaho Hop Region?
  - 4) Variety Development /Public Breeding Subcommittee
  - 5) Break at about 3:00 pm
- 3:00-5:00pm                      Members Only                                      Adjourn

\*All HRC Researchers, Members and **Potential Members** are encouraged to attend the first portion of the Members Meeting.

5:00-6:00 pm                      IHS late/individual event Registration at **Rainier Room Hilton Garden Inn**

6:00-8:00 pm                      Dinner: IHS and HRC Researcher Dinner **Cascade Room Hilton Garden Inn**

6:15-6:45 pm                      Hop Science Achievement Recognitions and Awards

Presented by: **Reggie Brulotte and Paul Matthews**

Awardees:

- ❖ **Adrian Forster**
- ❖ **Branka Javornik**
- ❖ **Gene Probasco**
- ❖ **Jim Barbour**
- ❖ **Ken Eastwell**
- ❖ **Steven Kenney**

7:00-8:00 pm    **John McKay**, Bioagricultural Sciences and Pest Management, Colorado State University and New West Genetics, *Evolutionary Genomics in Agriculture: Adaptation to Climate and Applications of Next Generation Sequencing Technologies, Hemp Breeding*

8:00-10:00 pm                      Posters and beer at **Rainier Room**

Thursday, August 6- IHS Hop Quality and Innovation, New Uses in Industry and Health

### Session 1 Quality and Innovation for Brewing

Co-chairs: **Pattie Aron, Tom Nielsen, Val Peacock**

8:00-8:10 am    Introduction to Hop Quality

- 8:10-9:00 am **Thomas Shellhammer**, Oregon State University, USA  
*Hop oil content and the hop aroma intensity of beers dry-hopped with Cascade: does oil content matter?*
- 9:00-9:30 am **Adrian Forster**, Consulting Group, Germany  
*Behavior of Hop Aroma Substances, esp. Linalool during Beer Ageing*
- 9:30-10:00 am **Christina Schmidt**, Hopsteiner - Germany  
*Hop aroma characterization of dry-hopped beers using Headspace-Trap GC-MS*

10:00-10:30 Break

- 10:30-11:00 am **Karel Krofta**, Hop Research Institute Co., Ltd, Zatec, Czech Republic  
*Hop beta acids - from cones to beer*
- 11:00-11:30 am **Alexandr Mikyska**, Research Institute of Brewing and Malting, Prague, Czech Republic  
*Pascalization – alternative way of post-harvest hops processing*

11:30-12:00 Panel on Hop Quality

Moderators: **Tom Nielsen** and **Val Peacock**

Discussion: A range of expert panelists will discuss questions, including: Drying, packaging, cultural practice, farm sanitation, and others important quality issues.

12:00-1:00 pm Lunch: Sensory Evaluation of Beers with Lunch

**Pattie Aron** will lead a comparative pairing of American beers with lunch. Select brewers will comment on the evolution of their beer style.

## Session 2 Cultivation and Management

Co-chairs: **Hiroo Matsui** and **Florian Weihrauch**

- 1:00-1:10 pm Introduction to Cultivation and Management
- 1:10-1:30 pm **Doug Walsh**, Washington State University, USA  
*Pesticide Residues and Biological Materials Present on Hops Grown Under a Variety of Input Regimes and in Beers Brewed Under a Variety of Hopping Regimes*
- 1:30-1:50 pm **Tobias Graf**, Bayerische LFL and Technische Universität München, Germany  
*Irrigation experiments on hop - a new approach for predicting the water balance*
- 1:50-2:10 pm **Maksym Melnychuk**, National Academy of Agrarian Sciences of Ukraine  
*The Biological Effect of Metal Nanoparticles: Influence on Hop (*Humulus lupulus L.*) Plants in vitro*
- 2:10-2:30 pm Break
- 2:30-2:50 pm **Hiroo Matsui**, Suntory Global Innovation Center Ltd., Japan

*The Influence of Various Hop Cultivation Conditions on Hop Quality, Beer Quality and Yield*

2:50-3:10 pm **Ruslan Hofmann**, VLB Berlin e.V., Berlin, Germany

*Initial evaluation of hop picking trials with the innovative "Starpicker" techb*

3:10-3:30 pm Break

Session 3 New Uses in Industry and Health

Co-chairs: **Fred Stevens and Martin Biendl**

3:30-3:40 pm Introduction to New Uses in Industry and Health

3:40-4:10 pm **J. Fred Stevens**, Oregon State University, Corvallis, USA

*Xanthohumol for treatment of metabolic syndrome*

4:10-4:40 pm **Herbert Riepl**, Weihenstephan-Triesdorf University of Applied Sciences

*Flavonoids in Hops Induce Differentiation to Neurons*

4:40-5:05 pm **Corinna Urmann**, Weihenstephan-Triesdorf University of Applied Sciences, Germany

*A new method to enrich differentiation-inducing pyranoflavonoids*

5:05-5:35pm **Dejan Nikolic**, University of Illinois at Chicago, Chicago, USA

*Spent hops for women's health: pre-clinical and clinical investigations*

5:35-5:55 pm **Alison Hamm**, Colorado State University, Fort Collins, USA

*Do hops phytoestrogens prevent microbial dysbiosis associated with estrogen loss?*

5:55-6:15 pm Panel discussion of New Uses in Industry and Health

**Fred Stevens** moderates a discussion with the speakers.

7:00-7:30 Break: Posters and Snacks in **Rainier Room**

7:30-8:30 pm Dinner in **Cascade Room**

7:40-8:15... pm Keynote Lecture at Dinner

**Claus Hellerbrand**, University of Regensburg, Regensburg, Germany

*Beneficial effects of xanthohumol on liver disease*

8:00-10:00 pm Posters and Beer

Friday, August 7- Variety Development, Genomics, Biochemical Genetics and Plant Pathology

Session 4 Variety Development, Biochemical Genetics and Breeding Genomics

8:00-9:00 am Keynote Lecture

**Florence Negre-Zakharov**, Plant Sciences, University of California at Davis, USA, *Postharvest Physiology: Biosynthesis of norisoprenoids in fruit ripening*

Co-chairs: **John Henning**, **Ron Beatson**, **Adreja Cerenak**, and **Anthony Koutoulis**

9:00-9:10 am Introduction to Hop Breeding Genetics

9:10-10:00 am **John Henning**, United States Department of Agriculture – ARS  
*Genomic Studies in Hop: Genome-Wide Association Studies and QTL Mapping for Disease Resistance, Yield and Hop Chemistry*

And **Steven Hill**, Oregon State University, USA  
*Genomics of male hop lines*

10:00-10:20 am **Jeffrey Boutain**, Botanical Research Institute of Texas  
*Nanopore DNA Sequencing a Native North American Hop (*Humulus lupulus* var. *lupuloides*) with Implications for Research on Cannabaceae Collections*

10:20-10:40 am Break

10:40-11:10 am **Ron Beatson**, The New Zealand Institute for Plant & Food Research Limited  
*Polyploid Breeding Strategies for Developing Hop Cultivars in New Zealand*

11:10-11:40 am **Jaroslav Matousek**, Biology Centre, Institute of Plant Molecular Biology, Zatec, Czech Republic  
*The putative regulatory role of transcription factors from HIWRKY family in the last steps of prenylflavonoid and bitter acids biosynthesis in hop*

11:40-12:10 pm **Simon Whittock**, Hop Products Australia and School of Biological Sciences, University of Tasmania  
*Hop flavoromics for distinctive beer*

12:10-12:40 pm **Adreja Cerenak**, Slovenian Institute of Hop Research and Brewing  
*Recent Advances In Slovenian Hop Breeding*

1:00- 2:00 pm Lunch: Sensory evaluation of novel hops, Methods Presentation over Lunch  
**Victor Algazzali**, **Scott Garden** and **Tiffany Pitra** lead an instruction on sensory analysis of novel hops

### Session 5 Plant Pathology, Virology, Entomology

Co-chairs: **Megan Twomey** and **Florian Weihrauch**

2:00-2:10 pm Introduction to Plant Pathology

2:10-2:50pm **Branka Javornik**, University of Ljubljana, Biotechnical Faculty, Slovenia  
*Understanding Verticillium wilt in hop*

2:50-3:20 **Megan Twomey**, Oregon State University, Department of Botany and Plant Pathology, Corvallis, USA

*Overwintering biology and epidemiology of hop powdery mildew*

3:20-3:50 pm **Sierra Wolfenbarger**, Oregon State University, Department of Botany and Plant Pathology, Corvallis, USA

*Adaptation to host resistance by hop powdery mildew*

3:50-4:10 pm Break

3:10-4:40 pm **Florian Weihrauch**, Bavarian State Research Center for Agriculture, Hop Research Center Hüll

*Rosy rustic moth as a hop pest in the Hallertau: History and current situation*

4:40-5:20 pm **Josef Vostrel**, Hop Research Institute, Co., Ltd., Žatec (Saaz), Czech Republic

*Impact of the neozoic ladybird Harmonia axyridis on the coccinellid community in Bohemia*

Poster Session 2 and Sensory Evaluation of Novel Hops

(4:30-6:00 pm, presenters must be at their posters)

5:30-6:15 pm **Before Eating!!** >>>>Sensory Evaluation of Novel Hops in **Rainier Room**

**Victor Algazzali, Scott Garden and Tiffany Pitra** will facilitate sensory evaluations

6:15-7:00 pm Snack Buffet: **Rainier Room** with Posters

7:00-7:40 pm Keynote Speaker: **James Barbour**, University of Idaho, Southwest Idaho Research & Extension Center, Parma, ID

*Prionus californicus pheromone production and potential for its management in hop*

***Please, remove your posters from Rainier Room!***

8 pm: Yakima Bar Crawl: Meet in the Lobby, then, walk to Hop Nation

Saturday, August 8<sup>th</sup>, Hop Chemistry and Physiology, Tours of Ranches and Breeding Programs

Breakfast on own at your convenience

7:00-9:00 am Rainer Room is open with meeting tables

8:30-9:00 am ISHS exit Business Meeting: **Anthony Koutoulis**; next meeting venue, membership, etc.

Session 6 Chemistry and Plant Physiology

Co-chairs: **Martin Biendl** and **Marga Ann Fortes**

9:00-10:00 am Keynote Lecture

**Martin Steinhaus**, German Research Center for Food Chemistry, Leibniz Institute *Molecular sensory science: A powerful tool to unravel the aroma of hops and their influence on beer flavor*

10:00-10:10 am Introduction to Chemistry and Plant Physiology

10:10-10:50 am **Josef Patzak**, Hop Research Institute Co. Ltd., Zatec, Czech Republic  
*Lupulin glands like molecular secretory factories for synthesis and accumulation of secondary metabolites*

10:50-11:10 am Break

11:10-11:30 am **Michael Qian**, Oregon State University, USA

*Aroma compounds in 'Centennial', 'Citra' and 'Nelson Sauvin' hops and their stability in model systems*

11:30-11:50 am **Klaus Kammhuber**, Bavarian State Center for Agriculture, Hop Research Center Huell, Germany

*Analytical and sensorial characterization of the new, Hueller, Special Flavor-Hops*

11:50-12:30 pm **Ray Marsili**, Consultant, Rockford University in Rockford, IL, USA  
*Versatile New Stir Bar Sorptive Extraction Techniques Improve Extraction Recoveries for Important Flavor Chemicals in Beer and Hops*

12:30- 1:30 pm Break

1:30-2:00 pm Box Lunch on Bus: pick up box at **Hilton Garden Inn Lobby** and board bus in parking lot.

2:00-6:30 pm Tour of Yakima Valley Hop Production

2:30-3:00 pm Roy Farms, American Dwarf Hop Association, Moxee

Tour Leader: **Jamie Coggins**

3:00-4:00 pm Perrault Farms, Toppenish

Tour Leader: **Jason Perrault**

4:00-4:30 pm Public Breeding Program, Toppenish

Tour Leader: **Reggie Brulotte**

5:30-6:00 pm Washington State University Experiment Station

Tour Leader: **Mark Nelsen, Ken Eastwell**

6:00-6:30 pm Hopsteiner Breeding Program, Golden Gate Ranches

Tour Leader: **Paul Matthews**

6:30-7:00 pm Golden Gate Ranches harvest facilities

Tour Leader: **Paul Merritt**

6:00-8:00 pm Dinner, Golden Gate Ranches, BBQ

9:00-10:00 pm Return to Yakima Hilton Garden Inn by bus