Bayerische Landesanstalt für
Landwirtschaft

Report on the 2022 Meeting of the Scientific-Technical Commission in Lugo, Galicia, Spain

Florian Weihrauch
Hop Research Center Hüll

Retrospective: Not so long ago, on a different planet - SC 2013 in Kyiv

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The venue of the 2022 STC Meeting

Venue and date:
‚Hotel Mercure Lugo Centro‘,
Lugo, Galicia, Spain
03-07 July 2022

Organization:
Dr Javier J. Cancela & Team
Dr Florian Weihrauch

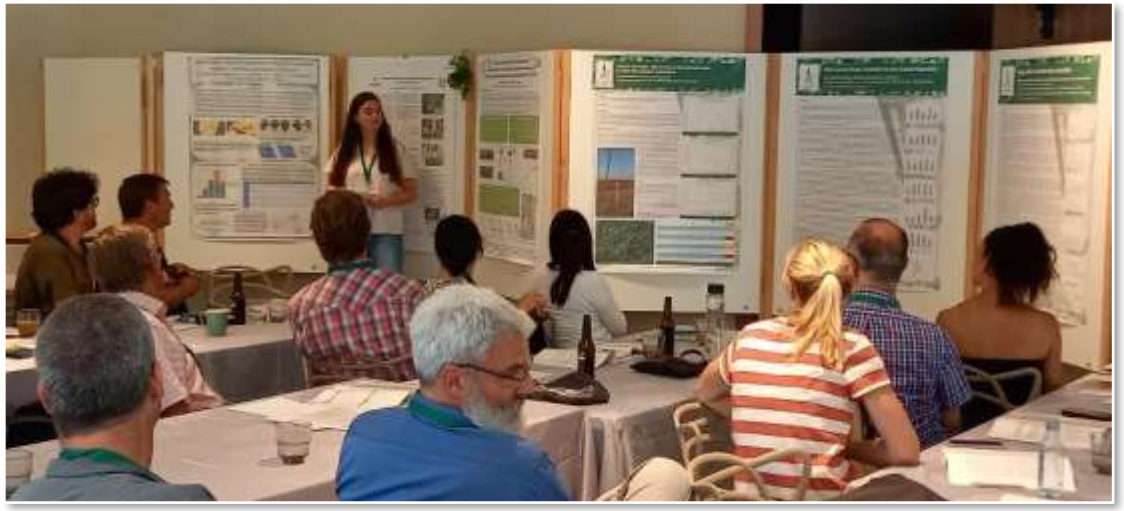
Details of the 2022 STC Meeting

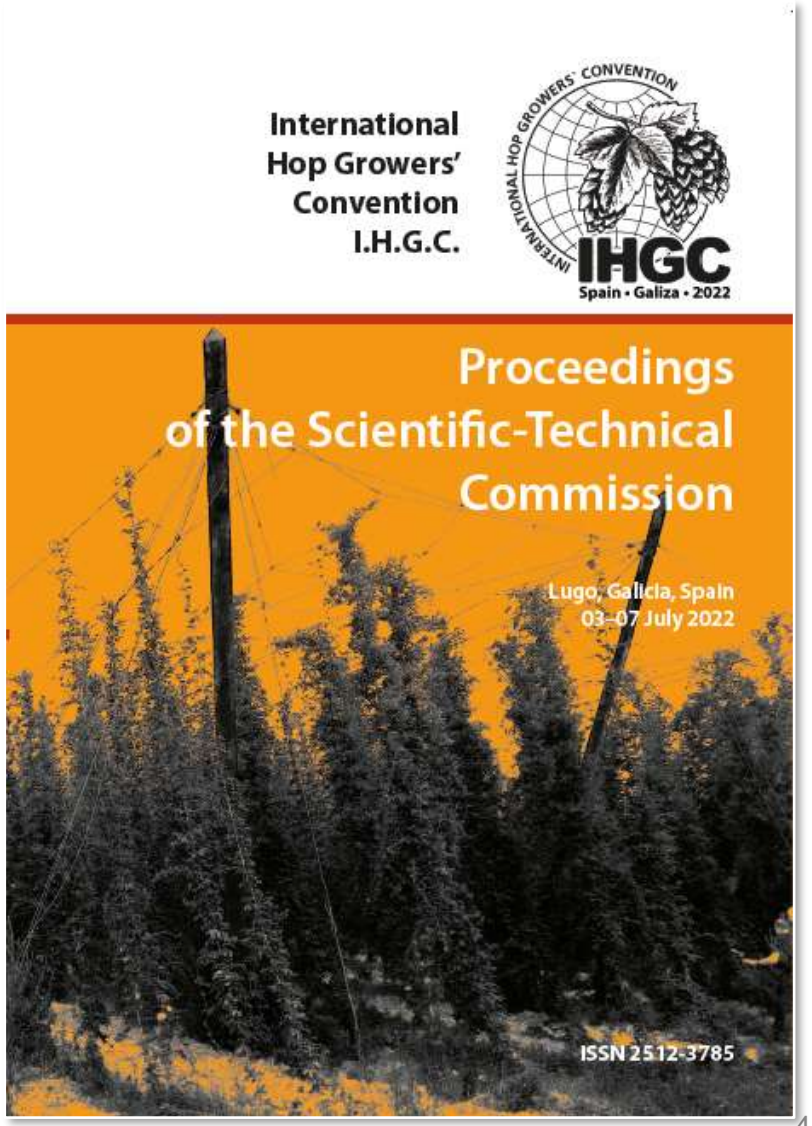
- 55 scientists
- representing 10 hop-growing nations
- giving 31 oral presentations
- in 6 scientific sessions
- showing 10 posters

incl. brief oral introduction, respectively

- published in the Proceedings of the STC on 118 printed pages
- to be published as open access

online version soon:
www.lfl.bayern.de/ipz/hopfen/024299/





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Family photograph of the 2022 STC meeting

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Main discomfort during the 2022 STC meeting

Sonderseite: Coronavirus

Frankfurter Allgemeine
ZEITUNG FAZ.NET

Ukraine Politik Wirtschaft Finanzen Feuilleton Karriere Sport Gesellschaft Stil Rhein-Main Technik Wisse Abo

ANSTURM AUF DEN FLUGHAFEN

Warten auf die Abfertigung und das Gepäck

VON HANS DIETER ERLENBACH · AKTUALISIERT AM 14.06.2022 · 19:11

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UNESCO World Heritage Lugo and Galician hospitality

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Thirty-one highly interesting scientific lectures

HOP CULTIVATION IN GALICIA: HISTORY AND FUTURE

Lugo, 03–07 July 2022

OSU Oregon State

Exploring the use of electric current for weed control in hopyards

Marcelo L Moretti

Assistant Professor

Department of Horticulture
Corvallis, OR, USA

Funding: Hop Research Council

INŠTITUT ZA HMELJARSTVO IN PIVOVARSTVO SLOVENIJE
Slovenian Institute of Hop Research and Brewing

SURVIVAL AND TRANSMISSION OF CITRUS BARK CRACKING VIROID (CBCVd) WITH WATER ON HOP (*HUMULUS LUPULUS* L.)

DOBRAJC MAJA, JAKŠE JERNEJ, RADIŠEK SEBASTJAN

LUGO, 6TH OF JULY 2022

Categorization and quantification of hop aroma

Meeting of the Scientific-Technical Commission, I.H.G.C

Lugo, 07.07.2022

Martin Waldinger, Jana Böttger, David Riewe, Alexander Feiner

Hopsteiner

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Presentation that triggered discussion afterwards

Father of the House of STC 2022

Distinguishing hop varieties as either aroma or bitter hops – is this still relevant?

Adrian Forster, Andreas Gahr, Florian Schüll and Erich Lehmair

Hopfenverwertungsgenossenschaft e.G.; Wolnzach, Germany

References:

[1] Biendl M., Engelhard B., Forster A., Gahr A., Lutz A., Mitter W., Schmidt R. and Schönberger C.: Hops - Their Cultivation, Composition and Usage; Fachverlag Hans Carl, 2014, ISBN: 978-3-418-00823-3

[2] Association of German Hop Growers: The Spirit of Beer; Hops from Germany; Pocket Guide to German Hop Varieties, 2016

[3] Der Barth - Bericht 1971/1972

[4] Forster A. and Schmidt R.: Zur Charakterisierung und Gruppierung von Hopfensorten; Brauwelt 133 (1993), 2036 - 2057

[5] Benitez J.L., Forster A., De Keukeleire D., Moir M., Sharpe F.R., Verhagen L.C., Westwood K.T.: Hops and Hop Products, EBC Manual of Good Practice, EBC and Hans Carl Verlag, 1997

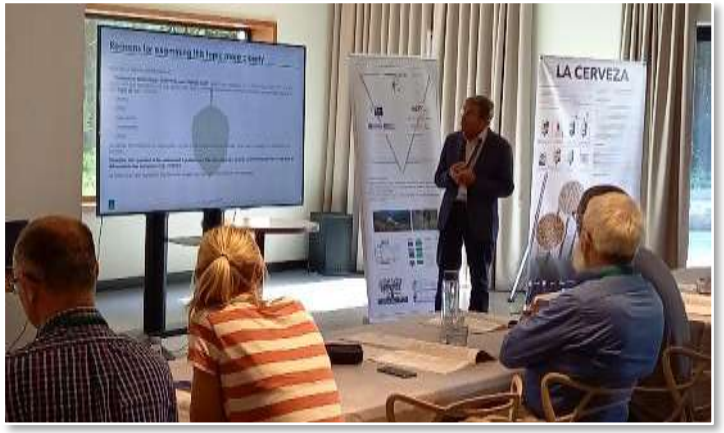
[6] Forster A. and Schüll F.: Warum schießen neue Hopfensorten wie Pilze aus dem Boden? Brauwelt 160 (2020), 131-133

Presentation that triggered much discussion afterwards

Analysis date for the four proposed groups of hops

Effort should be made to expand the criteria for aroma hops, e.g., to include attributes, such as the oxygenated fractions or the esters. At the moment, analysis of the thiols is neither sufficiently reproducible but would be very welcome.

	Unit	Noble, fine aroma	Aroma	Flavor	Bitter
α-acids	%, w/w	< 7	> 6 to 10	< 12	> 12
β : α		< 0.8 to 2.5	> 0.7	> 0.5	Not relevant
cohumulone fractions	%, relative	< 28	< 32	< 35	Not relevant
polyphenols	%, w/w	> 4.0	> 3.5	> 3.0	Not relevant
hop oil	ml/100 g	< 1.2	> 0.6 to 1.5	> 1.0	> 1.5
linalool	mg/100 g	> 3 to 8	> 4 to 12	> 6	Not relevant
oxygenated fraction	mg/100 g				
total esters	mg/100 g				



Options for categorization of hops after discussion:

i. **Four new categories, as proposed**
ii. **No categories at all**
iii. **Remain with two groups as they currently are**
iv. **Develop a point system when to add a hop cv. during brewing, from beginning of the boil to dry hopping**

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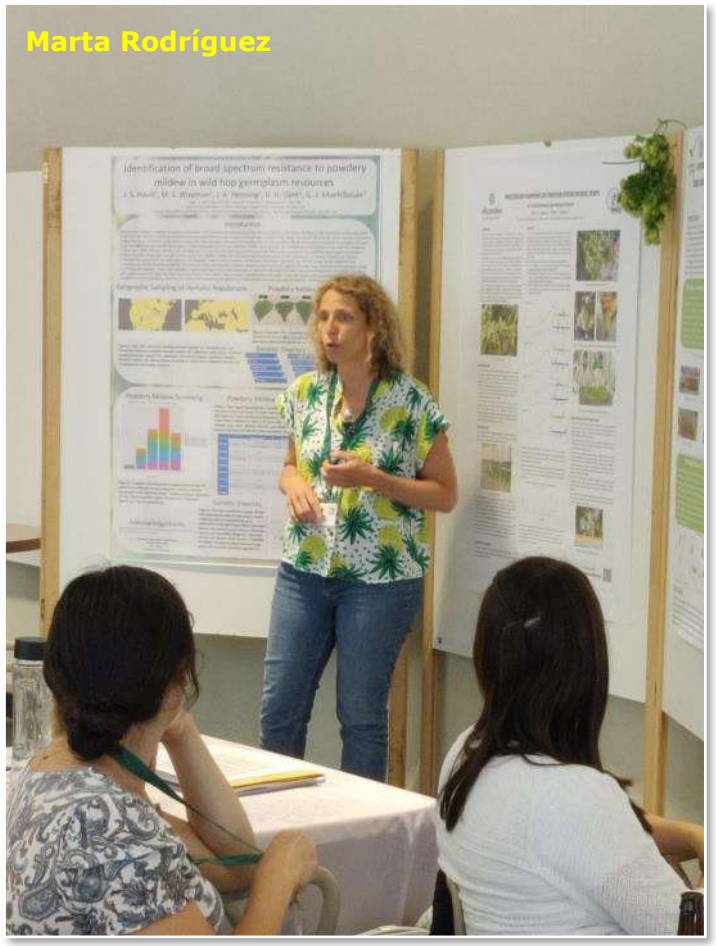
Poster that triggered much discussion afterwards



ekonoke
the vertical horizon

PRECISION FARMING OF INDOOR HYDROPONIC HOPS

A revolutionary growing system

Rojas A., Ramiro J., Sáez A., Equiza J.

Ekonoke's R&D Department, Calle Ceuta 13, San Sebastián de los Reyes, Madrid, Spain

IHGC Spain · Galiza · 2022

ABSTRACT

Hops, one of the key ingredients for the beer industry, is strongly affected by climate change. Extreme climate events are leading to the progressive reduction in quality and yield per hectare in outdoor hops. In order to tackle this, Ekonoke has developed a unique method for indoor hydroponic production of hops, reducing the risks associated to pests, diseases and abiotic stresses.

The research carried out involved 4 varieties of hops and 5 replicas of each. The recirculating irrigation system used has allowed a significant reduction in water use, at least 11 times less than conventional hops, and the controlled indoor growing has allowed for pesticide-free cultivation. So far, the growing cycle has been reduced by 70 days, allowing up to 3 harvests per year and the levels of alpha-acids and essential oils have been higher than in the field in certain cultivars.

Indoor hydroponic hop cultivation has great potential to provide climate resilience to the production of quality hops. Further research will be carried out to increase the efficiency of input use, shorten production cycles, increase cone quality and yield, and improve the initial plant material to achieve these objectives.

Fig 1: Hop flowers

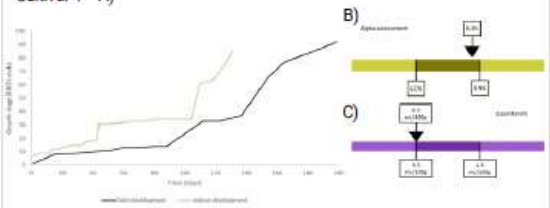
RESULTS

The results obtained are promising in terms of the quality of soft resins, reaching, and even exceeding, the percentage of alpha-acids in some of the varieties studied, both in rhizome and in vitro plants. The amounts of essential oils obtained were close to the levels observed in the field. Myrcene levels were generally higher. However, we observed some variability of the results within cultivars, likely linked to the source of the plant material.

Data obtained from each cultivar is described and presented below:

A) is a comparison of hop growing rates between field and indoor phenological stages (according to BBCH scale);
B) is the average of alpha-acid content in harvested samples of each cultivar, and the darker yellow section represents the alpha-acid range generally obtained in the field; and
C) is the average amount of essential oil content in harvested samples, and the darker purple represents the essential oil range normally obtained in the field.

Cultivar 1 A)



Cultivar 2 A)

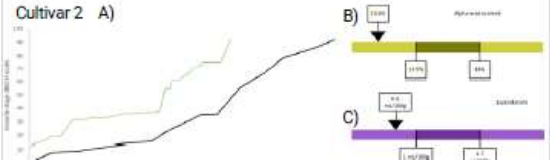


Fig 3: Hop cones (December 2021)

Fig 4 & 5: Hop cone with external lupulin and rachis (December 2021)

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Poster that triggered much discussion afterwards

ekonoke
the vertical horizon

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Thinking big:

Developing a method of controlled indoor hop growing
Pesticide-free and climate-resilient cultivation
Up to three harvests per year possible
Planned erection of a one-hectare hall for growing hydroponic hops
Striving for an annual indoor yield of 36 metric tons per ha
Supported by brewery Estrella Galicia

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Mid-Symposium Tour to Mabegondo and to MEGA

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Mid-Symposium Tour to Mabegondo and to MEGA

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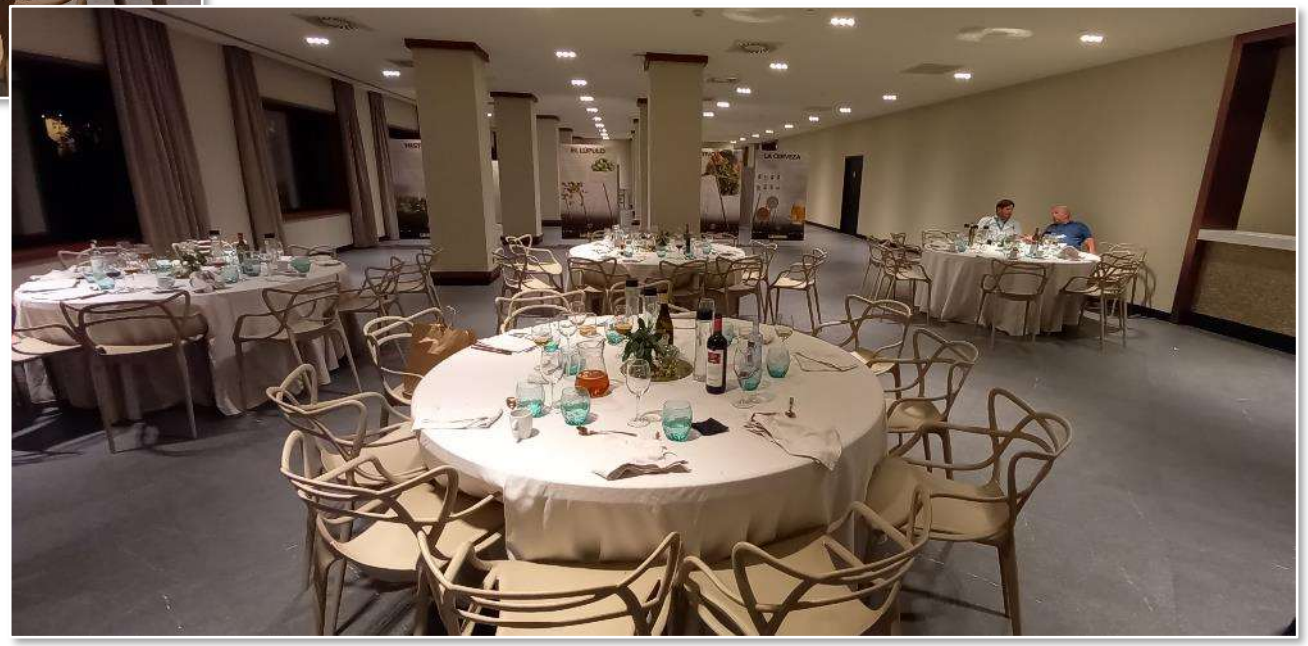
Congress Dinner and Order of the Hop

Congress Dinner: Last one turn out the lights



Some impresssions of happy participants

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Scientific Meetings of the IHGC

Scientific Commission, since 1950:

...
1980 Colmar, FR
1982 Poperinge, BE
1984 Novi Sad, YU
1986 Pécs, HU
...
1995 Strasbourg, FR
1997 Žatec, CZ
1999 Puławy, PL
2001 Canterbury, UK
2003 Dobrna-Žalec, SI
2005 George, SA
2007 Tettnang, DE
2009 León, ES
2011 Lublin, PL
2013 Kiev, UA

Scientific-Technical Commission, since 2017:

2017 St. Stefan am Walde, AT
2019 Bischoffsheim, FR
2022 Lugo, ES
2023 (Venue tbd), SI
2025 Spalt, DE

Thanks for your attention! See you 2023 in Slovenia…

Lucija Luskar