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International symposium on innovation in integrated and organic horticulture (INNOHORT 2015)

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The remarkable number of participants, the high value of the scientific contributions and the potential influence of the above described events on the international scientific and horticulture industry community was also highlighted in two special issues of Agricell Report by Edwin B. Herman and this confirms the success of the symposium. The 7th edition in

this symposium series will take place in 2017 at the Universidade Federal de Lavras, Brazil.

Details on the symposium can be read also at the website: <http://www.regflor.it/ISHS2015/> and on the Facebook page created for the 6th PEMP. ●

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> International Symposium on Innovation in Integrated and Organic Horticulture (INNOHORT 2015)

Commission Organic Horticulture

#ishs_cmor

INNOHORT Symposium was successfully held in Avignon, on June 8-12, 2015. It was organized jointly by INRA (French National Institute for Agricultural Research) and the Federative Research Structure (FRS) TERSYS (“Development of natural plant products. Quality and Environment”) under the auspices of ISHS. The University of Avignon hosted the 120 participants who came from 20 countries in an historical and convenient working space, and provided delicious French cuisine. Avignon is located in one of the leading European regions for horticultural production, and with the symposium embedded in an academic context, it helped us to rethink together the foundations and orientation of horticultural production.

Aims and scope of the symposium

Tackling challenges related to global changes, environmental issues, and consumer expectations requires new knowledge and progress in biology and ecology. Scientific breakthroughs will not only depend on new disciplinary findings, but also on the integration of different forms of knowledge. More interdisciplinary approaches are required to develop integrative approaches and to bridge several gaps: gaps between technology and ecology, between scientific and lay knowledge (research and practice), between fruits and vegetables (horticulture as a whole), and between integrated and organic systems (or other forms of ecologically-based farming systems).

Innovation was indeed a guiding keyword of the symposium, but its title also reflects the ambition to create bridges between integrated and organic (IN&O, like B&B), both aiming to limit our dependence on external inputs, to promote high standards of produce quality, to support farm financial viability, and to maximize ecosystem services.



> Symposium participants in front of the venue, University of Avignon (new building).

Organization and highlights of the symposium

Overall, 100 oral and poster presentations were offered, with a total of 400 co-authors. Participants were enthusiastic about the mixture of communities and the opportunity to build bridges in the historical city of Avignon. “Take-home” messages, delivered in short oral presentations of posters, enabled participants, including students, to present their results to the larger audience. Parallel workshops gave smaller groups the opportunity to discuss topics in-depth and exchange their viewpoints. A diversity of small workshops was offered, including: “Traditional tomato cultivars in Europe”, “Innovative approaches of crop load regulation in horticultural fruits”, “Ethylene absorbers along the food chain”, the practical use of “DEXIFruit” and “Supporting transitions towards ecological horticulture”. About 50 papers are being reviewed for publication in *Acta Horticulturae*, and we

will also maintain the INNOHORT website (<https://colloque.inra.fr/innohort2015>).

Three invited speakers introduced the diverse topics of “Key concepts related to technological innovation in fruit training systems”, “A conceptual framework for the ecological control of pests in horticulture”, and “New perspectives on the role of phytochemicals in human health”.

Two field trips were conducted midway through the symposium. They facilitated interactions among participants, with scientists in experimental stations and with various stakeholders. The trips allowed participants to move outside to the fields, which is always appreciated.

The symposium was organized around five topics. We briefly present their rationale, conclusions and perspectives.

Topic 1 dealt with the biological dimensions of production, considering quantity and quality, nutritional and organoleptic dimensions.



> Views from field trips in experimental stations and farmers' orchards.

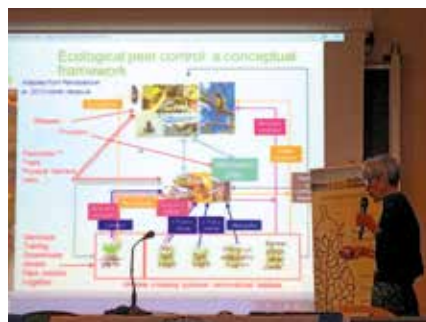
Knowledge domains ranged from genes to the fresh product, and are considered to be an asset in mastering fruit production. Contributions mostly addressed the characterization of genetic variability based on the expression of genes or phenotypical traits. This background is important to master processes, especially when research work is done in situations of integrated or organic production. Specific questions addressed to/by plant breeders and physiologists in such situations should be clarified, beyond resistance to pathogens. The role of modelling as an integrated and predictive tool should also be clarified.

Topic 2 addressed the effects of abiotic and biotic stress on plants and crop performance. The general assumption was that in organic systems a certain level of stress is accepted, which benefits both plant natural defenses and the quality of products (e.g. through concentrations in phytonutrients that are often plant defense compounds). Several presentations dealt with the effect of biotic stress on biological components of the cropping system other than plants themselves. Other presentations were about the prospects for designing cultivars with multiple resistances and tolerances. Global change will entail an increase in the intensity, frequency and duration of stressing events. Therefore, it would be interesting to address the issue of the resilience of cropping systems in relation to their plant and structural complexity (e.g. agroforestry vs. current orchards).

Topic 3 covered crop and quality management, considering cultural and postharvest practices at various organizational levels. Presentations on postharvest technologies were scarce. Many presentations discussed either how one management decision or technique (e.g. compost amendments or fruit thinning) affected the agroecosystem (carbon sequestration or disease management), or how a management system (e.g. organic) affected one part of the whole (such as soil biology or fruit quality). Both perspectives – reductionist or holistic – are important

and complementary. It could be valuable to consider more interactions among a number of management methods, which would contribute to the combined perspective inherent in integrated and organic systems.

Topic 4 addressed the design and evaluation of integrated and organic horticultural cropping systems, with innovative crop management and cropping methods in view. Two sessions highlighted the diversity of assets. Some key practices were identified: cover



> Keynote addresses by F. Lescouret et al. (left), and Y. Desjardins (right).

crops and composting (effects of soil fertility, biocontrol...), crop sequences, choice of cultivars and training systems. We also learned about interesting design experiences, especially in the posters, showing the innovative potential of mixing species in multi-layered systems. Conversely, only a few presentations were given on design approaches (co-design, co-innovation, eco-design). We therefore need cleverness and imagination to gather, integrate and circulate relevant knowledge and know-how to (re)design agro-ecological horticultural systems at various scales, including time dimensions (transitions).

Finally, topic 5 dealt with system performance and evaluation criteria: from field to food (including qualities and standards). Levels of investigation ranged from field to supply chain, but more emphasis is needed on the latter, especially at the international level or in touch with industry. Evaluation

criteria have been extended beyond productivity or production costs, but organizational and institutional issues should also be considered, since they generate transaction costs. Finally, many presentations referred to organic systems, but other initiatives also produced fruit without chemical residues. Acknowledging competitive fields can also support specific development pathways.

Position in a trajectory of ISHS symposia

INNOHORT draws upon previous symposia also conducted under the umbrella of ISHS Commission Organic Horticulture (e.g. Vignola, Italy, 2008, and Leavenworth, USA, 2012, on organic fruits; Avignon, 2013, on Organic Greenhouse Horticulture). These symposia are benchmarks on a pathway we shared and shaped during this week in Avignon and in the fields. The ISHS Organic Fruit Working Group met to discuss future plans, and no consensus was reached. A number of options were proposed, including holding a meeting like INNOHORT, with both vegetables and fruit included, but with a focus on organic, as there is ample activity in that area by itself. Such a meeting could have joint sessions on common topics (e.g. soils, biodiversity) and separate sessions



to discuss more crop-specific topics. Working group members and INNOHORT attendees will be asked for their opinion in the near future to help set the future direction. ●

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