



Nordic Association  
of Agricultural  
Scientists

## NJF Conference 495

### **ORGANICS**

**for tomorrow's food systems**

**June 19–21, 2017 Mikkeli, Finland**

**NJF 4th Organic Conference,**

### SUMMARY OF THE CONFERENCE

The first meeting of the Scientific Committee took place on the 16<sup>th</sup> and 17<sup>th</sup> of February in 2016, in Mikkeli, Finland. It was a result from the previous discussions initiated by Professor Pirjo Siiskonen.

During the first discussions transdisciplinarity was considered important and four different tracks were established to cover different areas of organic research: Track 1: Tuning up sustainable organic production, Track 2: Organic food, human health and wellbeing, Track 3: Organics in our society, Track 4: Organics – the next step.

From the very start it was agreed that the scientific research is needed in all these four areas in order to develop organics and to bring scientific evidence for consumers and other stakeholders. Interaction under the topics of the tracks was found important for future development.

The aim of the conference was established to share and discuss recent research outcomes within organic food and farming and its societal interactions. Dialogue and cooperation between stakeholders was regarded necessary for implementation of the research.

*How did we manage to realize the aim ?*

The conference gathered around 80 participants. In addition to four keynote papers and presentations 45 different abstracts were received, which lead to 38 oral presentations, 9 posters and 8 additional posters. Seven different country posters from Denmark, Estonia, Finland, Latvia, Lithuania, Norway and Sweden were presented as well. Generally the received abstracts covered the different tracks and their descriptions well. Track 1: Tuning up sustainable organic production was the most popular with 19 abstracts. In track 2: Organic

food, human health and wellbeing there are 9 abstracts, for track 3: Organics in our societies 10 abstracts were obtained, and in track 4: Organics – the next step there were 7 abstracts. In the scientific program the tracks were further divided to different sessions according to their contents.

The four high level keynote speakers gave unforgettable contribution to the conference: Professors John P. Reganold, Lotta Rydhmer, Carola Strassner and Gerold Rahmann.

We all learned from each other and from the research work that has been or will be carried out.



## **Summary - keynote speakers**

### **Organic agriculture in the 21<sup>st</sup> century – part of food security**

*Professor John P. Reganold has shaped his career by his interest in agriculture and the environment. He has over 30 years of experience in researching the effects on organic, integrated, and conventional farming systems with focus on*

*productivity, financial performance, environmental quality, and social wellbeing.*

Different farming systems can be compared using four key sustainability indicators: productivity, environmental impact, economic viability, and social wellbeing. In the light of these aspects, organic farming systems seem to balance multiple sustainability goals better than their conventional counterparts.

- In addition, striving towards all four sustainability goals encourages farmers and researchers to innovate, Reganold states.

The policymakers should create an enabling environment for these innovations. This allows organic and other innovative farming systems to move towards truly sustainable production systems. The consequences for food and ecosystem security are huge, and the task is not easy.

- Organic agriculture can contribute a larger share in feeding the world. However, one farming system alone will not safely feed the planet, Reganold points out.

Based on present evidence, although organic farming systems produce lower yield than conventional ones, they are more profitable and environmentally friendly, and deliver equal or more nutritious foods with less to no pesticide residues.

According to Reganold, a blend of organic and other innovative farming systems will be needed for future global food and ecosystem safety. Moreover, further actions are needed, from reducing food waste to changing consumption patterns.

- All this requires policy instruments to facilitate the development and implementation of sustainable farming systems, Reganold emphasizes.

### **Tuning up sustainable organic animal production**

*Professor Lotta Rydhmer is an expert on animal breeding and genetics. In NJF-conference, she highlighted different perspectives and choices to make when tuning up organic animal production for more sustainable solutions.*

An engine can be tuned up to run most efficiently. However, organic animal production is not one single engine to handle. When targeting for a more sustainable production, there is a need to consider various sustainability aspects with many goal conflicts.

- The first step is to admit the existing conflicts. All of them cannot be solved scientifically, they need some political decisions, Rydhmer emphasizes.

Researchers can highlight these conflicts and provide scientific bases for political decisions. For instance, how to get high profit in a short-term economic perspective and simultaneously reach high animal welfare. In an evaluation of 15 different pig production systems in Europe, production systems with higher pig welfare had worse farmers' economy in general.

Furthermore, there is a conflict between efficiency and climate impacts. In the Nordic countries, a high proportion of the consumed cattle meat is a "by-product" of milk production. A breeding resulting cows with high milk production leads to less cows and thus less meat. If we still want to consume the same amount of cattle meat, we have to increase the number of beef cows. In general, animal production with beef cattle has a larger climate impact than with dairy cattle.

- Dual-purpose breeds have a key role in organic production, and this example illustrates well the importance of studying the whole production system, Rydhmer states.

The organic production is sometimes discussed as one homogenous system. However, there is a huge diversity among producers, from small farms to bigger units. Different production systems have different challenges, and the farmers need different advisory support. For scientists, this means that different studies and research results are needed to improve the production systems.

- Regardless of differences between organic and conventional production systems, we should strive for continuous improvement and sustainability assessment practices, Rydhmer says.

As for the future, there are two alternative paths to follow according to Rydhmer. When thinking of merely marketing aspects, "tuning up" could mean more exclusive rules for organic production in order to maintain a large difference between organic and conventional production.

Seeing organic production as a way to sustainable development on a larger scale, these complicated rules may limit the number of organic farms. Hence, "tuning up" could be adapting the rules for organic production according to new scientific results, not letting the precautionary principle lead to dead ends.

- The choice between these future roads for organic production ought to be discussed within the organic movement, keeping the organic principles in mind, Rydhmer ends.

## **Do organic food systems produce healthy diets?**

*Professor Carola Strassner specializes in food systems sustainability, with the emphasis on the whole system approach to sustainability. Her recent research interests are institutional catering, school meals and the organic food system.*

Organic food consumption patterns seem to be close to both recommended healthy dietary patterns as well as sustainable diet patterns.

- European studies show that people who prefer organic food also follow overall healthier diets. This means that they eat more fruits and vegetables, more whole grains and less meat, Strassner states.

In France and Germany, national nutrition surveys include organic consumption data in the analysis. For example, in Germany there was a positive relationship between healthy dietary patterns, nutrition knowledge and a healthy lifestyle.

The association between dietary patterns and food choices really seems of great importance. However, these patterns must be seen as part of a whole. On the one hand, health is the product of the pattern of foods eaten over a longer period of time and other factors – on the other hand, diet is one of many health determinants.

Hence, the search for evidence of better health outcomes needs to be considered from the dietary level to the social practice level. A future field of study can be found from school meal systems and other institutional catering setting such as hospitals.

- Studies show that a school with a healthy-food policy favors organic food in meal choices. Hence, an organic school policy can promote healthy eating in general, Strassner emphasizes.

### **Going towards Organic 3.0**

*Professor Dr. Gerold Rahmann's scientific focus has been on low input farming system development. At the moment professor Rahmann is president of the board of the International Society of Organic Agriculture Research (ISOFAR).*

Organic 3.0, the next phase of organic development, is about bringing organic into the mainstream with the task of participating in solving the global challenges. These challenges, such as supplying enough healthy food, protecting the environment and changing the consuming habits have been discussed among the organic sector. The ongoing discussions, however, do not have enough practical visions for research.

- What has to be done that organic sector is ready to contribute to tackle the future challenges, Rahmann asks.

Rahmann sees that there are two time dimensions in this work. Firstly, the next 35 years until 2050, when there will be approximately 9 billion people and 1 ha agricultural farm land per capita. Secondly, the time from 2050 up to 2100, with estimated 11 billion people and only 0,7 ha agricultural land per capita.

- The challenges are the same for every farming system. Our limited resources need to be intensified, more productive and efficient, Rahmann states.

Hence, the food production must be more and more sustainable in general. All farming systems can learn from each other in this job. Both organic and conventional systems have to train and trigger their farming systems on the track of better practices.

The future questions, some of the highly vast, some of them highly detailed, must be solved together with the support of research.

- Organic sector can take the leadership for future innovations to design clear pathways to be more sustainable, Rahmann suggests.

## Summary - the tracks

**Track 1 - Tuning up sustainable organic production** - tackled the main problems of organic production: 1. Weeds, 2. Nutrient deficiencies and balances, 3. Pests, pathogens and diseases and 4. Low yields (as a result of the former). Different solutions to the main problems were suggested. For weeds, an expert database was formed to classify the most common weeds according to their growth habit severity (Hofmeijer et al.). For the suppression of weeds, winter cover crops were found rather efficient (Madsen et al.), while spring sown cover crops were less effective, due to better initial growth of the weed seed bank (Salonen and Zarina). However, new species for cover crops are constantly being found and introduced (Toom et al.). The best results in reducing weed biomasses seem, however, to be achieved with different fallows and their technical treatment with machinery such as Kwick-up (Lötjönen). In addition to usage for weed suppression, cover crops were found to improve nutrient availability and nutrient balances of soils and also to reduce nutrient leaching (Toom et al., Talgre et al.). Planting trees on pastures for cattle to urinate at would be an innovative method to reduce nutrient leaching from pastures (Andersen et al.). For nutrient balances on general, new calculation method was suggested in order to take into account also imported/exported biomasses and their imported/exported nutrients (Seuri). For soil improvement, microbial interactions can help (Hakalehto et al.), although it is not always clear what makes a "good field" good and how could the "bad fields" be improved, if we don't know what makes "a good field" (Mattila et al.). A right variety could improve the yield, when other things are kept optimal, although there may be trade-offs between yield quantity and quality (Hakala, Zute et al., Hiltunen et al., Zarina and Alekse). Diversity of crop rotations and intercropping could help to balance and improve soil nutrient status and could lead to better yielding capacity, although here, too, right choice of varieties is crucial (Himanen et al., Lepse and Jansone). Innovative solutions to control pests of strawberry (Wibe) and pathogens of onions

(Kivijärvi et al.) were presented. New ways to thin and/or fertigate apple trees to control the quality, size and yield of apples were presented (Koort and Vangdal). In Track 4 a new website, OK-Net ([farmknowledge.org](http://farmknowledge.org)) was introduced. Here you can find suggestions for solutions of most of the problems in organic production.

## **Track 2 - Organic food, human health and wellbeing**

As a conclusion the research among organic food, human health and wellbeing has to follow the recent up-to-date modern technology including placebo-controlled, double-blind, randomized cross-over clinical trials as far it is possible. This is important in scientific and consumer point of view and when delivering the research results for medical doctors and other health professionals. The healthy lifestyle as a whole including organic diet has to be surveyed taking into consideration different social aspects of the consumers (Strassner). In future the focus of the research has to be directed to long term over generation harmful effects of the pesticides using the best suitable methodology available (Tahvonen).

Several bioactive components can be found from organic food: from milk, oats, barley, wild berries and organic honey. Organic cow milk production volume and dry matter intake are affected by the feed like blue lupin (Puhakka et al.). Also high concentrations of phytoestrogen equol (Adler and Steinshamn) associated in prevention of osteoporosis and breast cancer, is induced by high proportions of red clover in feed. Other important bioactive organic milk components include exosomes, which are specific information packages for a calf (Tupasela et al.). Organic raw milk components, especially from the whey and from the colostrum, may have importance in allergy prevention. In order to avoid hazards caused by bacterial pathogens the bioactive components have to be isolated or fractionated from the raw milk (Kneifel). Bioactive polyphenols can be found from organic oats and barley (antioxidant and scavenging activity) (Sturite et al.), wild berries, other natural products like stem bark and organic honeys. Wild berries, other natural products and organic honeys have huge alternative potential to antibiotics against bacterial infections in humans and in animals and when fighting against antimicrobial resistance (Toivanen et al., Obey et al.). Organic certification of forests will bring many other health and wellbeing collection products for customer use, like herbs, mushrooms (e.g. chaga mushroom), sap and resin (Partanen).

**Track 3 - Organics in our society** - was oriented to analytical and multidisciplinary approaches to the development of organic food chain: 1) perceptions of organic farmers and organic farming; 2) development of organic food and farming and 3) organic food supply chains.

The first session highlighted perceptions of beginners in organic farming and their role in the development of the movement, making visible the divisive and cohesive relations. Also the interaction between the society and organic

farmers and the opinions towards the organic farmers were discussed. During the second session participants discussed the organic development in the selected EU countries and the governmental goals and their reachability in Finland. The last session analyzed some aspects of the organic products in the market, collaboration of the stake holders, access to products, new products and new regional ideas, such as cultivation of summer truffles in Juva. Track 3 was supplemented by country posters (Denmark, Estonia, Finland, Latvia, Lithuania, Norway and Sweden) with key information about the development of the organic producers, processors and situation in the market, main research institutions and governmental activities.

The track discussions dealt with the needs of research on activities and initiatives by organic food chain players for further developments on the sector as well as the need for objective information to both consumers and stake holders to ease making more sustainable decisions and choices.

#### **Track 4 - Organics – the next step**

Organic food and farming had a successful role to date in sparring the mainstream food systems to become more sustainable. Currently, the population is rapidly growing and the planetary boundaries are in several cases transgressed. Inequity and social unrest set unprecedented, interrelated challenges to the sustainability of food systems today and in the future. A radical change in global food systems is needed to meet the challenges. Is Organics able to make the leap to show the way forward again? This track focuses on research with systems approach, contributing to the development of tomorrows' food systems.

The track comprised presentations on pathways towards climate-smart agriculture, Organic 3.0 in Sweden, and how to disseminate knowledge to and among farmers. All involved farmers, advisers and other stakeholders in stakeholder dialogue to make sure the views and needs of farmers were taken account of. In the same manner, farmers were involved in a study about barriers towards transition towards nutrient recycling and renewable energy. A case study of an agroecological symbiosis – a farm working together with other enterprises such as biogas production, bakery, other farms – was presented. In addition, a study of greenhouse gas emissions from organic farms in Latvia and work on organic farming in Russia was presented.

Finally, the last keynote speaker Gerold Rahman, gave an inspiring talk about how organic agriculture can help to prevent hunger, reduce farm land degradation and losses in biodiversity, mitigate climate change, support income and jobs and supply healthy and enough food. However, he also challenged some of the existing ideas about organic agriculture, if these challenges are to be solved globally and long term end encouraged organic to



learn from conventional, as well as the other way around up to good organic farming practice.

## **The Scientific Committee**

Chair: Carina Tikkanen-Kaukanen, *the University of Helsinki*, Secretary: Jaakko Nuutila, *the Natural Resources Institute Finland*

- *The Natural Resources Institute Finland:*

Kaija Hakala, Raija Tahvonen and Jyrki Aakkula (Helena Kahiluoto)

- *The University of Helsinki:*

Elias Hakalehto, Merja Lähdesmäki and Minna Mikkola

*The Latvia University of Agriculture:*

Dzidra Kreismane

- *The Estonian University of Life Sciences:*

Anne Luik and Elen Peetsmann

- *ICROFS-International Center for Research in Organic Food Systems, Denmark:*

Ilse Rasmussen

- *The Lithuanian Institute of Agrarian Economics:*

Virgilijus Skulskis

- *EPOK– the Centre for Organic Food and Farming (SLU), Sweden:* Karin Ullvén

and Maria Wivstad

- *NORSØK– The Norwegian Centre for Organic*

*Agriculture:* Atle Wibe, Anita Land

## **Organizing Committee**

Chair: Sari Iivonen, Director, *Natural Resources Institute Finland/Pirjo Siiskonen* Director, *Natural Resources Institute Finland* (until

31.12.2016)/Secretary: Jaakko Nuutila, *the Natural Resources Institute Finland*

- *The Mikkeli University Consortium:* Sirpa Taskinen, Ulla Jurvanen, Matti Malinen

- *The Natural Resources Institute Finland:* Harri Huhta

- *The University of Helsinki, Finland:* Sirpa Piskonen

## **ORGANIZERS**

The conference was coordinated by Finnish Organic Research Institute, which is an expert network operating under the University of Helsinki and Natural Resources Institute Finland (Luke).

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