

Daniel Neuhoff, Niels Halberg, Thomas Alföldi, William Lockeretz,
Andreas Thommen, Ilse. A. Rasmussen, John Hermansen,
Mette Vaarst, Lorna Lueck, Fabio Caporali, Henning Høgh Jensen,
Paola Migliorini, Helga Willer (Editors)

Cultivating the Future Based on Science

Volume 2

Livestock, Socio-economy and Cross disciplinary Research in Organic Agriculture

Proceedings of the Second Scientific Conference of the
International Society of Organic Agriculture Research
(ISO FAR), held at the 16th IFOAM Organic World Congress in
Cooperation with the International Federation of Organic
Agriculture Movements (IFOAM) and the
Consorzio ModenaBio, 18 - 20 June 2008 in Modena, Italy



The contents of the articles in this volume are the responsibility of the authors. The information contained herein, including any expression of opinion and any projection or forecast, has been obtained from sources believed by the authors to be reliable but is not guaranteed as to accuracy or completeness. The information is supplied without obligation and on the understanding that any person who acts upon it or otherwise changes his/her position in reliance thereon does so entirely at his/her own risk.

Should the publication of corrigenda become necessary, these will be posted at the conference homepage <http://www.isofar.org/Modena2008/>

The 2nd Scientific Conference of the International Society of Organic Agriculture Research (ISO FAR) was held June 18-20, 2008 in Modena Italy, in the frame of the 16th Organic World Congress of the International Federation of Organic Agriculture Movements (IFOAM), organised by Consorzio ModenaBio. The 4th Congress of the European Integrated Project 'Quality Low Input Food' (QLIF) was convened as part of the 2nd ISO FAR Conference (see papers in volume 2 of these proceedings).

Daniel Neuhoﬀ, Niels Halberg, Thomas Alföldi, William Lockeretz, Andreas Thommen, Ilse. A. Rasmussen, John Hermansen, Mette Vaarst, Lorna Lueck, Fabio Caporali, Henning Hogh Jensen, Paola Migliorini, Helga Willer (Editors)

Cultivating the Future Based on Science. Volume 2 - Livestock, Socio-economy and Cross disciplinary Research in Organic Agriculture. Proceedings of the Second Scientific Conference of the International Society of Organic Agriculture Research (ISO FAR), held at the 16th IFOAM Organic World Congress in Cooperation with the International Federation of Organic Agriculture Movements (IFOAM) and the Consorzio ModenaBio, 18 – 20 June 2008 in Modena, Italy.

International Society of Organic Agriculture Research (ISO FAR), DE-Bonn; Institute of Organic Agriculture (IOL), DE-Bonn; Research Institute of Organic Agriculture (FiBL), CH-Frick, Danish Research Centre for Organic Food and Farming (DARCOF), DK-8830 Tjele

ISBN: 978-3-03736-024-8

© 2008, International Society of Organic Agriculture Research (ISO FAR), c/o Institute of Organic Agriculture (IOL), University of Bonn, Katzenburgweg 3, D-53115 Bonn, Germany, Tel. +49 228 735616, Fax +49 228 735617, E-mail info@isofar.org; Internet www.isofar.org and

Research Institute of Organic Agriculture (FiBL), Ackerstrasse, CH-5070 Frick, Tel. +41 62 8657 272, Fax +41 62 8657 273, E-mail info.suisse@fibl.org, Internet <http://www.fibl.org>

Cover: Officina Comunicazione, Modena, Italy

Layout: Anja Schneider, IOL, Bonn, Germany and Helga Willer, FiBL, Frick, Switzerland

Printed by: Artestampa, Modena, Italy

Distribution: Paper copies may be ordered from FiBL (see FiBL shop at <http://www.fibl.org/shop>); FiBL order number 1504. A PDF version can be downloaded free of charge for ISO FAR members via the member area of www.isofar.org.

The abstracts of the papers are available at <http://orgprints.org/view/projects/int-conf-owc-2008-research.html>

Table of contents

Preface	17
Dear Reader	19
Acknowledgements	21
Welfare indicators and welfare promotion of organic animals	23
Assessment of skin damages in dairy cows <i>Smolders, G.</i>	24
Evaluation of Laying Hen Strains for biodynamic Farms <i>Zeltner, E.</i>	28
Risk factors for feather pecking in organic laying hens –starting points for prevention in the housing environment <i>Knierim, U., Staack, M., Gruber, B., Keppler, C., Zaludik, K. & Niebuhr, K.</i>	32
Monitoring the welfare of sheep in conventional and organic farms using an ANI 35 L derived method <i>Napolitano, F., De Rosa, G., Ferrante, V., Barbieri, S. & Braghieri, A.</i>	36
Development of animal health and welfare planning in organic dairy farming in Europe <i>Vaarst, M., Leeb, C., Nicholas, P., Roderick, S., Smolders, G., Walkenhorst, M., Brinkman, J., March, S., Stöger, E., Gratzer, E., Winckler, C., Lund, V., Henriksen, B.I.F., Hansen, B., Neale, M. & Whistance, L.K.</i>	40
Knowledge Transfer in the Animal Health Planning Process: Putting Research into Practice <i>Roderick, S., Ellis, K. & Bassett, A.</i>	44
Effects of different stocking rates with dairy cows on herbage quality and milk production in organic farming <i>Schori, F.</i>	48
Broilers welfare, health and production in organic and conventional systems <i>Ferrante, V., Baroli, D., Lolli, S. & Di Mauro, F.</i>	52
Veterinary treatment in organic husbandry <i>Koopmann, R., Ganter, M. & Link, M.</i>	56
Principles and practicality of organic dairy cattle breeding: different options and implications <i>Nauta, W.J. & Roep, D.</i>	60
Livestock Production Practices of Registered Organic Farmers in Uttarakhand State of India <i>Subrahmanyawari, B. & Chander, M.</i>	64
Handling of animal welfare and disease challenges	69
A Longitudinal Study of Mastitis on an Experimental Farm with Two Herds, One Managed Organically, the other Conventionally <i>Thatcher, A., Petrovski, K., Holmes, C., Dowson, K., Kelly, T. & McLeod, K.</i>	70

Effect of colostrum type on serum gamma globulin concentration, growth and health of goat kids until three months <i>Iepema, G., Eekeren, N. van & Wagenaar, J.P.</i>	74
Control of bovine sub-clinical mastitis by using herbal extract during lactation <i>Giacinti, G., Rosati, R.¹, Borselli, C.¹, Tammaro, A.¹, Ametiste, S.¹ & Ronchi, B.</i>	78
Mastitis incidence and milk quality in organic dairy farms which use suckling systems in calf rearing <i>Wagenaar, J.P.T.M. & Smolders, E.A.A.</i>	82
Dry cow therapy in an organic dairy herd of a milk and a dual purpose breed <i>Barth, K.</i>	86
Incidence of anthelmintic resistance in cattle farms in Northern Germany – first results <i>Keinschmidt, N., Samson-Himmelstjerna, G. von, Demeler, J. & Koopmann, R.</i>	90
Effects of red clover and maize silages on the carriage of gut pathogens in steers <i>Marley, C.L., Scott, M.B., Bakewell, E.L., Leemans, D.K., Sanderson, R. & Davies, D.R.</i>	93
Experiences of Veterinarians Using Acupuncture on Farm Animals <i>Trei, G., Brandt, B. & Hörning, B.</i>	97
Growth performance of broilers fed with different strains of probiotics <i>Tarun, M.</i>	101
Welfare and production of organic sows and piglets	105
Prolonged suckling period in organic piglet production – Effects on some performance and health aspects <i>Bussemas, R. & Weissmann, F.</i>	106
Group suckling in organic sow units <i>Früh, B., Hagmüller, W., Aubel, E., Simantke, C., Schwarz, P. & Baumgartner, J.</i>	110
Development of a mobile organic piggery for outdoor pork production – function, productivity, animal behaviour and environmental risk assessments <i>Salomon, E., Andresen, N., Gustafsson, M., Nyman, M., Ringmar, A. & Tersmeden, M.</i>	114
Effect of additional heating, floor length, straw quantity and piglet nest accessibility on piglet losses in organic farrowing pens <i>Vermeer, H.M. & Houwers, H.W.J.</i>	118
Towards loose housing in Swedish organic dairy production <i>Swensson, C.</i>	122
Excreting behaviour of pigs from organic housing systems in relation to ammonia emission <i>Ivanova-Peneva, S.G., Aarnink, A.J.A. & Verstegen, M.W.A.</i>	126
Profitability of Sow husbandry in organic farming– Performance and construction costs for group housing of lactating sows <i>Lange, K. & Möller, D.</i>	130
Relationships between sow and piglet traits in organic production outdoors and indoors <i>Wallenbeck, A. & Rydhmer, L.</i>	134

Effects of silage or probiotics on performance and gut microbial composition of organic growing-finishing pigs <i>Nagel, P., Domig, K. J., Hagmüller, W., Pfalz, S., Kronsteiner, S., Ortner, B., Sundrum, A. & Zollitsch, W.</i>	138
Prolonged suckling period in organic piglet production – effects on selected immunological parameters <i>Ahrens, F., Pollmüller, T., Sünkel, Y., Bussemas, R., Weissmann, F. & Erhard, M. H.</i>	142
Antimicrobial effect of dietary nitrate in weaning piglets challenged or not with <i>Salmonella enterica</i> serovar typhimurium <i>Modesto, M., D'Aimmo, M.R., Stefanini, I., Mazzoni, M., Bosi, P. & Biavati, B.</i>	146
Organic ruminant feeding	151
How can the organic dairy farmer be self-sufficient with vitamins and minerals? <i>Mogensen, L., Kristensen, T., Sørensen, K. & Jensen, S.K.</i>	152
Production of grain legume crops alternative to soya bean and their use in organic dairy production <i>Martini, A., Migliorini, P., Lorenzini, G., Lotti, C., Rosi Bellière, S., Squilloni, S., Riccio, F., Giorgetti, A. & Casini, M.</i>	156
A discussion of norms for S supply in organic farming based on content in forage and ruminant performance in Norway <i>Hansen, S., & Bakken, A.K.</i>	160
<i>Pisum sativum</i> as alternative protein source in diets for buffalo cows in middle and late stage of lactation <i>Masucci, F., Di Francia, A., De Rosa, G., Romano R., Varricchio M.L. & Grassi, C.</i>	164
Rearing improvement in organic Maremmana beef production: “in vivo” performance and carcass characteristics. <i>Pauselli, M., Mele, M., Morbidini, L., Cozza, F. & Pollicardo, A.</i>	168
Indigenous sheep breeds in organic livestock production in karst areas of Croatia <i>Radin, L., Šimpraga, M., Vojta, A., Marinculić, A.</i>	172
Quality of organically grown protein crops in Norway for livestock concentrates – limited N and S supplementation <i>Henriksen, B.I.F. & Prestløkken, E.</i>	176
Use of grass and red clover silage mixtures for milk production and whole-body N partitioning by dairy cows <i>Moorby, J.M., Ellis, N.M., Fisher, W.J., Davies, D.R. & Scollan, N.D.</i>	180
Effects of mixing red clover and maize silages on milk production and whole-body N partitioning in dairy cows <i>Moorby, J.M., Ellis, N.M., Fisher, W.J., Davies, D.W.R. & Davies, D.R.</i>	184
Animal health, product quality and strategies for organic pork production	189
Strategies for a diversified organic pork production <i>Kongsted, A.G., Claudi-Magnussen, C., Hermansen, J.E. & Andersen, B.H.</i>	190

Influence of amino acid level and production system on performance, health and behaviour in organic growing pigs <i>Høøk Presto, M., Andersson, H.K., Wallgren, P. & Lindberg, J.E.</i>	194
Effects of a feeding strategy to increase intramuscular fat content of pork under the conditions of organic farming <i>Abel, S., Weissensteiner, R., Marien, C., Zollitsch, W., & Sundrum, A.</i>	198
Occurrence of intestinal helminths in two organic pig production systems <i>Lindgren, K., Lindahl, C., Höglund, J. & Roepstorff, A.</i>	202
Multi criteria assessment of livestock systems	207
Organic livestock production - trapped between aroused consumer expectations and limited resources <i>Sundrum, A.</i>	208
Is automatic milking acceptable in organic dairy farming? Quantification of sustainability indicators <i>Oudshoorn, F.W. & de Boer, I.J.M.</i>	212
Environmental Impacts and Economic Differences in grassland based Organic Dairy Farms in Germany – Modelling the Extremes <i>Müller-Lindenlauf, M., Deittert, C & Köpke, U.</i>	216
Impact of the drought on the fodder self-sufficiency of organic and conventional highland dairy farms <i>Boisdon, I. & Capitaine, M.</i>	220
Comparison of Organic and Conventional Beef-Suckler Farms in Germany <i>Hörning, B., Feige, M. & Dollinger, J.</i>	224
Agripolicy: Institutions and implementations	229
Toward Regionalized Models of Organic Food Production and Marketing in the US: The Case of Michigan (USA) <i>Bingen, J., Martinez, L. & Conner, D.</i>	230
Institutions and Policy Development for Organic Agriculture in Western Balkan Countries: a Cross-Country Analysis <i>Hamade, K., Midmore, P., & Pugliese, P.</i>	234
Impact of agricultural liberalisation on the relative importance of price premiums for the profitability of organic farming <i>Sanders, J., Stolze, M. & Lampkin, N.</i>	238
Potential implementation problems of the EU OAP: a failure mode and effects analysis <i>Vairo, D. & Zanoli, R.</i>	242
Public support for organic food and Production, Promotion and Action Plans in Spain <i>González, V. & Moreno, J.L.</i>	246
Development of criteria und procedures for the evaluation of the European Action Plan of Organic Food and Farming <i>Schmid, O. , Lampkin, N. , Jeffreys, I. , Dabbert, S. , Eichert, C. , Michelsen, J. , Zanoli, R. and Vairo, D. , Gonzalez, V.</i>	250

Understanding the organic consumer	255
Understanding the Organic Consumer through Narratives: an International Comparison <i>Midmore, P., Ayres, N., Lund, T.B., Naspetti, S., Zanolli, R. & O'Doherty Jensen, K.</i>	256
Consumers willingness to pay for Fair trade and organic products <i>Sirieux, L. & Tagbata, D.</i>	260
The US Organic Food Shopper <i>Zepeda, L.</i>	264
The EU health claims regulation and its impact on the marketing of organic food <i>Aschemann, J., Maroschek, N. & Hamm, U.</i>	268
Consumers and their impact on food and farming systems in North America and Germany – Examples relating to GMO issues <i>Pick, D.</i>	272
Consumers motivations for buying local and organic products in developing vs developed countries <i>Sirieux, L., Kledal, P. & Santiago de Abreu, L.</i>	276
Influence of Young Children (3-6 years) on Organic Food Consumption in their Families <i>Freyer, B. & Haberkorn, A.</i>	280
Public procurement: constraints and barriers	285
Overcoming constraints and barriers for organic public procurement – Applying the theory of loosely coupled systems to the case of organic conversion in Danish municipalities <i>Mikkelsen, B.E.</i>	286
Juveniles' organic food preferences and how parents deal with them <i>Riefer, A. & Hamm, U.</i>	290
The successful use of organic food products in eating out: A German case study <i>Rueckert-John, J.</i>	294
iPOPY – innovative Public Organic food Procurement for Youth. School meals – and more! <i>Løes, A.K., Nölting, B., Kristensen, N.H., Spigarolo, R., Strassner, C., Roos, G., Mikkola, M. & Mikkelsen, B.E.</i>	298
Economics and strategies on organic farms	303
Do organic livestock farms in Switzerland earn higher work incomes? <i>Lips, M.</i>	304
Gender Effects on Adoption of Organic Weed Management Techniques <i>Lohr, L. & Park, T.A.</i>	308
Financial success of organic farms in Germany <i>Nieberg, H. & Offermann, F.</i>	312
Diversification and specialisation as development strategies in organic farms <i>Zander, K.</i>	316

The Impact of Labor and Hiring Decisions on the Performance of U.S. Organic Farms <i>Lohr, L. & Park, T.A.</i>	320
Factors explaining farmers' behaviours and intentions about agricultural methods of production. Organic vs. conventional comparison <i>Canavari, M., Lombardi, P., & Cantore, N.</i>	324
An integrated approach project for the revaluation of a traditional sourdough bread production chain <i>Piazza, C., Giudici, P., Corbellino, M., Gianinetti, A., Morcia, C. & Terzi, V.</i>	328
The impact of mycorrhizal symbiosis on tomato fruit quality <i>Salvioli, A., Novero M., Lacourt, I. & Bonfante, P.</i>	332
New approaches in consumer research	337
Information Acquisition Behaviour of Fair-Trade Coffee Consumers – a Survey by Means of an Information Display Matrix <i>Aschemann, J. & Hamm, U.</i>	338
Evaluating trust in organic quality marks: a network approach using laddering data <i>Gambelli, D. & Naspetti, S.</i>	342
Identifying the gap between stated and actual buying behaviour on organic products based on consumer panel data <i>Niessen, J. & Hamm, U.</i>	346
Organic Certification and Livelihood	351
Impact of the adoption of participatory guarantee systems (PGS) for organic certification for small farmers in developing countries: the case of Rede Ecovida in Brasil <i>Zanasi, C. & Venturi, P.</i>	352
Participatory Guarantee Systems	
New Approaches to Organic Certification - The Case of Mexico <i>Nelson, E., Gómez Tovar, L., Schwentesius, R & Gómez Cruz, M.</i>	356
The Circular Economy of a Local Organic Food Chain: Xiedao in Beijing <i>Yuexian, L., Høgh-Jensen, H. & Egelyng, H.</i>	360
Organic Agriculture: A New Field of International Development Policy <i>Egelyng, H., Høgh-Jensen, H., Kledal, P.R. & Halberg, N.</i>	364
The institutionalization of Participatory Guarantee Systems (PGS) in Brazil: organic and fair trade initiatives <i>Fonseca, M.F. de A.C., Wilkinson, J., Egelyng, H. & Mascarenhas, G.C.C.</i>	368
Challenges for standards and certification	373
The Differentiation Process in Organic Agriculture (OA) – between Capitalistic Market System and IFOAM Principles <i>Freyer, B.</i>	374
Dropping organic certification - effects on organic farming in Norway <i>Koesling, M., Løes, A.K., Flaten, O. & Lien, G.</i>	378

Analysis of differences between EU Regulation (EEC) 2092/91 in relation to other national and international standards <i>Schmid, O., Huber, B., Ziegler, K., Jespersen, L.M. & Plakolm, G.</i>	382
Organic operators' satisfaction with their certification body – a survey in Germany <i>Zorn, A. & Renner, H.</i>	386
CERTCOST – Economic Analysis of Certification Systems for Organic Food and Farming at EU level <i>Dabbert, S., Lippert, C., Schulz, T. & Zorn, A.</i>	390
IFOAM principles in the light of different ethical concepts <i>Freyer, B.</i>	394
Organic sector relationships	399
Labour Quality Model for Organic Farming Food Chains <i>Gassner, B., Freyer, B. & Leitner, H.</i>	400
Collaborative relationships in the organic wheat supply chain: a case study on three EU Countries <i>Naspetti, S., Paladini, M.E., Bteich, M.R. & Zanolli, R.</i>	404
Strategies to Induce Cooperation from Farmers in an Organic Food Supply Chain: the Case of Bio Market, Inc., Japan <i>Taniguchi, Y.</i>	408
Price Premiums for Organic Food from Australia and China <i>Paull, J.</i>	412
Corporate Social Responsibility and Organic Farming –Experiences in Austria <i>Goessinger, K. & Freyer, B.</i>	416
Factors Affecting Market Outlet Use by U.S. Organic Handlers <i>Oberholtzer, L., Dimitri, C. & Lohr, L.</i>	420
Opportunities for small organic shops despite the rise of organic supermarkets <i>Runge, S., Cornehl, M. & Häring, A.M.</i>	424
The German organic sector from the perspective of social-ecological research on agriculture and nutrition <i>Nölting, B.</i>	428
The Prospects of Organic Agriculture Development in the Chosen Regions of Poland – Podkarpacie and Kurpie. <i>Kucińska, K., Pelc, J., Golba, J. & Popławska, A.</i>	432
Agromere: how to integrate urban agriculture in the development of the Dutch city of Almere? <i>Jansma, J.E., Visser, A.J., de Wolf, P. & Stobbelaar, D.J.</i>	436
The New 'Local': A Global Review of Using Geographical Indications <i>Giovannucci, D.</i>	440
Organic Marketing and organisation in developing countries	445
Shaded Coffee: A way to Increase Sustainability in Brazilian Organic Coffee plantations <i>Moreira, C.F., De Nadai Fernandes, E. & Tagliaferro, F.S.</i>	446

Consumers' Awareness, Demands and Preferences for Organic Vegetables: A Survey Study in Shiraz, Iran <i>Alizadeh, A., Javanmardi, J., Abdollahzadeh, N. & Liaghat, Z.</i>	450
Market Integration Shape Organic Farmers' Organisation <i>Sultan, T., Mursal, A., Salem, S. G., Liu, Y., Oelofse, M., Knudsen M.T., El-Araby, A., Delve, R.J., Yuhui, Q., Hauser, M., Kledal, P., Egelyng, H., Halberg, N. & Høgh-Jensen, H.</i>	454
Accessing the World Market for Organic Food and Beverages from Nigeria <i>Olabiye, T.I., Okusanya, A.O. & Harris, P.J.C</i>	458
Perceived Constraints and Opportunities for Brazilian Smallholders Going Organic: a case of coffee in the state of Minas Gerais <i>Nordlund, E.D. & Egelyng, H.</i>	462
Socio-Economic Effects of Organic Agriculture in Africa <i>Lyons, K. & Burch, D.</i>	466
Cross-disciplinary Studies in Livelihood impacts of Organic Agriculture	471
Agroforestry systems and food security among smallholder farmers of the Brazilian Amazon: A strategy for environmental global crisis <i>Abreu, S. de L. & Watanabe, M.A.</i>	472
Organic agriculture and rural livelihoods in Karnataka, India <i>Lukas, M. & Cahn, M.</i>	476
Impacts of Institutional Arrangements on the Profitability and Profit Efficiency of Organic Rice in Thailand <i>Setboonsarng, S., Leung, P.S. & Cai, J.</i>	480
Organic Agriculture as Livelihood Strategy: A Case Study in a Rural Community of Southern Brazil. <i>Moreno-Peñaranda, R. & Egelyng, H.</i>	484
Profitability of Organic Agriculture in a Transition Economy: the Case of Organic Contract Rice Farming in Lao PDR <i>Setboonsarng, S., Stefan, A., Leung, P.S. & Cai, J.</i>	488
Ancestral Livelihoods in Amazon River Floodplains <i>Madaleno, I.</i>	492
Consumers in a food chain perspective	497
Consumers perceptions of combined "fair trade" and "organic agriculture" labels on food products <i>Daniel, M., Sirieix, L. & Bricas, N.</i>	498
Are Organic Consumers Healthier than Others? <i>Krarup, S., Christensen, T. & Denver, S.²</i>	502
Consumers Values and Motives regarding Organic Food Products in Poland <i>Zakowska-Biemans, S.</i>	506
Exploring close consumer-producer links to maintain and enhance on-farm biodiversity <i>Milestad, R., Björklund, J., Westberg, L., Geber, U. & Ahnström, J.</i>	510

Consumer Appreciation of Carcass Quality of Organic vs Conventional Suckling Lamb Production <i>Palacios, C., Revilla, I., Vivar-Quintana, A.M., Lurueña-Martínez, M.A., & Severiano-Pérez, P.</i>	514
Producers and Consumers Relationship Strategies in the Organic Market in Brazil <i>Darolt, M.R. & Constanty, H.</i>	518
Food for Thought about Environmental Values and Food Demand <i>Henseleit, M.</i>	522
Marketing from multiple perspectives	527
Local food networks and the change of the agrofood system <i>Lamine, C.</i>	528
Direct marketing of beef in organic suckler cattle farms: economic results and impact on breeding system management <i>Veysset, P., Ingrand, S. & Limon, M.</i>	532
Innovations within the organic food sector – basis for novel business relations between agricultural and processing enterprises <i>Gottwald, F.Th. & Boergen, I.</i>	536
Development of organic farming in Central and Eastern European countries <i>Hrabalova, A. & Wollmuthova, P.</i>	540
Construction of prices for organic products enhancing farmers' profiles diversity in the South East of France <i>Lauvie, P. & Bellon, S.</i>	544
Carbon storage and energy use	549
Carbon sequestration in organic and conventional managed soils in the Netherlands <i>Sukkel, W., Geel, W. van & Haan, J.J. de</i>	550
Should organic farmers be rewarded for sequestering C in soil? <i>Cooper, J.M. & Melchett, P.</i>	554
A comparison of energy use in organic and conventional agriculture in Spain <i>Alonso, A.M., González, R., Foraster, L., Guzmán, G.I. & García, R.</i>	558
The Comparative Energy Efficiency of Organic Farming <i>Azeez, G.S.E & Hewlett, K.L.</i>	562
Impact of different Agricultural Systems and Patterns of Consumption on Greenhouse-Gas Emissions in Austria <i>Freyer, B. & Weik, S.</i>	566
Emission of Climate-Relevant Gases in Organic and Conventional Cropping Systems <i>Küstermann, B. & Hülsbergen, K.J.</i>	570
Can Organic Farming Contribute to Carbon Sequestration? A Survey in a Pear Orchard in Emilia-Romagna Region, Italy <i>Ciavatta C., Gioacchini P., & Montecchio D.</i>	574

Energy efficiency of biomass production in managed versus natural temperate forest and grassland ecosystems <i>Callesen, I. & Østergaard, H.</i>	578
Wood Chips from Hedgerows – Biomass Potential for On-Farm Mulching and Bioenergy? <i>Gruber, S. & Claupein, W.</i>	582
Does Organic Farming have Greater Potential to Adapt to Climate Change? <i>Niggli, U., Hepperly, P., Fliessbach, A., and Mäder, P.</i>	586
Biogas in Organic Agriculture	591
Effects of Biogas Digestion of Slurry, Cover Crops and Crop Residues on Nitrogen Cycles and Crop Rotation Productivity of a Mixed Organic Farming System <i>Möller, K., Stinner, W. & Leithold, G.</i>	592
Biogas in stockless organic Farming: Effects of Digestion of Clover/grass, Cover Crops and Crop Residues on Nitrogen Cycles and Crop Rotation Productivity <i>Stinner, W., Möller, K. & Leithold, G.</i>	596
Energy balance of different organic biogas farming systems <i>Helbig, S., Küstermann, B. & Hültsbergen, K.J.</i>	600
Biogas and Organic Farming: Empirical evidence on production structure and economics in Germany <i>Anspach, V. & Möller, D.</i>	604
A New Lease on Life for Marginal Farmland: Convergence of Prairie Restoration with Biofuel Production <i>Borsari, B. & Onwueme, I.</i>	608
Food safety and quality management	613
Effect of cultivar and soil characteristics on nutritional value in organic and conventional wheat <i>Murphy, K., Hoagland, L., Reeves, P. & Jones, S.</i>	614
A multidisciplinary approach to improve the quality of organic wheat-bread chain <i>Abécassis, J., David, C., Fontaine, L., Taupier-Létage, B. & Viaux, P.</i>	618
Organic vs Conventional Suckling Lamb Production: Product Quality and Consumer Acceptance <i>Revilla, I., Vivar-Quintana, A.M., Lurueña-Martínez, M.A., Palacios, C & Severiano-Pérez, P.</i>	622
Animal welfare and food safety: danger, risk and the distribution of responsibility <i>Kijlstra, A. & Bos, A.P.</i>	626
Biodiversity assessment and management	631
Impact of Organic Crop and Livestock Systems on Earthworm Population Dynamics <i>Kotcon, J.B.</i>	632

Eco-Regions: How to link organic farming with territorial development <i>Schermer, M. & Kirchengast, Ch.</i>	636
Effects of landscape agricultural intensification and management on weed species richness in the edges of dryland cereal fields. <i>Romero, A., Chamorro, L., Blanco-Moreno, J. M., Armengot, L., Jose María, L. & Sans, F. X.</i>	640
Comparative analysis of conventional and organic farming systems: Diversity and abundance of farmland birds <i>Neumann, H., Loges, R. & Taube, F.</i>	644
The use of mulch to increase Spider (<i>Arachnidae</i>) numbers; a habitat approach to biological insect control <i>Manns, H.R., Murray, D.L. & Beresford, D.V.</i>	648
Working with biodiversity in OA	653
Enhancing Biodiversity and Multifunctionality of an Organic Farmscape in California's Central Valley <i>Smukler, S.M., Jackson, L.E., Sánchez Moreno, S., Fonte, S.J., Ferris, H., Klonsky, K., O'Geen, A.T., Scow, K.M. & AL Cordova-Kreylos, A.L.</i>	654
Diversity as a key concept for organic agriculture <i>Langer, V. & Frederiksen, P.</i>	658
Testing and scaling-up agroecologically based organic conservation tillage systems for family farmers in southern Brazil <i>Altieri M.A., Lovato P.M., Lana M. & Bittencourt H.</i>	662
Organic farming and biodiversity – how to create a viable farm business including conservation issues <i>Stein-Bachinger, K. & Fuchs, S.</i>	666
Beneficial Invertebrate Activity in Organic and Conventional Vegetable Fields in Eastern England <i>Eyre, M.D., Labanowska-Bury, D., White, R. & Leifert, C.</i>	670
Opportunities and Obstacles in Adoption of Biodiversity-Enhancing Features on California Farms <i>Brodt, S., Klonsky, K., Jackson, L., Brush, S., & Smukler, S.</i>	674
Crop Type and Management Effects on Ground Beetle Species (Coleoptera, Carabidae) Activity in an Extensive Plot Trial <i>Eyre, M.D., Shotton, P.N. & Leifert, C.</i>	678
Spider (Araneae) Species Activity, Crop Type and Management Factors in an Extensive Plot Trial <i>Eyre, M.D., Shotton, P.N. & Leifert, C.</i>	682
Weed species diversity and cover-abundance in organic and conventional winter cereal fields and 15 years ago <i>Kaar, B. & Freyer, B.</i>	686
Invertebrate communities in soils of organic and conventional farming: conversion trial in the Czech Republic <i>Šarapatka, B., Laška, V. & Mikula, J.</i>	690

Multi criteria assessment of experiments	695
A pilot socio-economic analysis of QLIF dairy projects <i>Nicholas, P., Lampkin, N., Leifert, C., Butler, G., Klocke, P. & Wagenaar, J.</i>	696
Sustainability evaluation of long term organic farm systems <i>Vazzana C., Raso E. & Migliorini P.</i>	700
Evaluation of Farm Biodiversity with Indicators in the Context of Sustainability <i>Siebrecht, N. & Hülsbergen, K.J.</i>	704
On the inherent instability of the monoculture <i>Griffon, D. & Torres-Alruiz, M. D.</i>	708
Methods in organic quality research	713
Effect of organic and conventional feed on potential biomarkers of health in a chicken model <i>Huber, M., Van de Vijver, L., De Vries, A., Nierop, D., Adriaansen-Tennekes, R., Parmentier, H., Savelkoul, H., Coulter, L., Verheij, E., Freidig, A., Van der Greef, J. & Hoogenboom, R.</i>	714
The effect of medium term feeding with organic, low input and conventional diet on selected immune parameters in rat <i>Baranska, A., Rembialkowska, E., Lueck, L. & Leifert, C.</i>	718
Potential of X-Ray Spectrometry and Chemometrics to Discriminate Organic from Conventional Grown Agricultural Products <i>Bortoleto, G. G., De Nadai Fernandes, E. A., Tagliaferro, F. S., Ferrari, A. A. & Bueno, M. I. M. S.</i>	722
Authenticity tests of organic products (Golden Delicious and Elstar) applying sensory analysis <i>Ploeger, A., Röger, M. & Weibel, F.</i>	726
Effect of wheat production system components on food preference in rats <i>Lueck, L., Velimirov A., Shiel, R.S., Cooper, J.M. & Leifert, C.</i>	730
Quality of organic feedstuffs grown in Trenthorst (Germany) – evaluated by Near Infrared Reflectance Spectroscopy <i>Aulrich, K. & Böhm, H.</i>	734
Application of standardised biocrystallization on milk and butter samples <i>Kahl, J., Busscher, N., Mergardt, G. & Ploeger, A.</i>	738
Authentication of organic wheat samples from a long-term trial using biocrystallization <i>Kahl, J., Busscher, N., Mergardt, G., Mäder, P., Dubois, D & Ploeger, A.</i>	742
Organic wheat quality from a defined Italian field-trial <i>Kokornaczyk, M., Kahl, J., Roose, M., Busscher, N. & Ploeger, A.</i>	746
Organic beef production by Maremmana breed: qualitative meat characteristics <i>Mele, M., Morbidini, L., Cozza, F., Pauselli, M. & Pollicardo, A.</i>	750
Organic vs. Conventional Field Trials: the Effect on Cauliflower Quality <i>Lo Scalzo R., Iannocciari T., Genna A., Di Cesare L.F., Viscardi D., Ferrari V. & Campanelli G.</i>	754

Health and Safety of organic products 759

- Feed composition and strategies to improve poly-unsaturated fatty acid levels in organic cow milk 760
De Wit, J. & de Vries, A.
- Influence of cropping systems on the potential formation of acrylamide in different cultivars of wheat 764
Stockmann, F., Graeff, S., Weber, A. & Claupein, W.
- Effects of weed management strategies on quality and enteric pathogen contamination of organic lettuce 768
Fischer-Arndt, M. T., Neuhoﬀ, D. & Köpke, U.
- Pilot scale application of ozonated water wash – effect on microbiological and sensory quality parameters of processed iceberg lettuce during shelf-life 772
Särkkä-Tirkkonen, M., Leskinen, M. & Ölmez, H.
- Protein quality and content of nitrite, nitrate and metals in commercial samples of organic and conventional cold meats. 776
Barbieri, G., Macchiavelli, L. & Rivaldi, P.
- Survey of acaricide residues in Italian organic and conventional beeswax 780
Costa, C., Lodesani, M., Serra G. , Colombo R. & Sabatini A.G.
- Occurrence and level of patulin contamination in conventional and organic apple juices marketed in Italy 784
Spadaro, D., Ciavarella, A., Frati, S., Garibaldi, A. & Gullino, M.L.
- Sensory evaluation of processed wheat from a defined field- trial (QualityLowInputFood) 788
Ploeger, A., Röger, M., Lueck, L. & Leifert, C.
- Potential Risk of Acrylamide Formation in Different Cultivars of Amaranth and Quinoa 792
Graeff, S., Stockmann, F., Weber, A. , Berhane, B. , Mbeng, K.J. , Rohitrattana, R. , Salazar, P. , Shoko, P. , Kaul, H.-P. & Claupein, W.

Bioactive compounds of organic plant products 797

- Cultivation and analysis of anthocyanin containing types of potatoes in organic farming regarding cultivability and additional health benefits 798
Hüsing, B., Herrmann, M.E., Hillebrand, S. , Winterhalter, P., Schliephake, U. & Trautz, D.
- The Content of Selected Antioxidant Compounds in Bell Pepper Varieties from Organic and Conventional Cultivation Before and After Freezing Process 802
Hallmann E. & Rembiałkowska E.
- Bioactive compounds in tomatoes: effect of organic vs conventional management in Parma in 2006 806
Nobili, F., Finotti, E., Foddai, M.S., Azzini, E., Garaguso, I., Raguzzini, A. , Tisselli, V., Piazza, C., Durazzo, A. & Maiani, G.
- The antioxidant compounds in rat experimental diets based on plant materials from organic, low-input and conventional agricultural systems 810
Wiśniewska, K., Rembiałkowska, E., Hallmann, E., Rusaczonek, A., Lueck, L. & Leifert, C.

Antioxidant Activity of Vegetables from Different Management Systems <i>Maggio, A., De Pascale, S. & Barbieri, G.</i>	814
The impact of medium term feeding diets from four management systems on body composition and plasma corticosterone concentration in male rats <i>Królikowski, T., Gromadzka-Ostrowska, J., Rembialkowska, E., Lueck, L. & Leifert, C.</i>	818
Influence of fertilisation on furanocoumarins content in two celeriac varieties <i>Schulzová, V., Botek, P., Hajšlová, J., Babička, L., Kouřimská, L. & Václavíková, K.</i>	822
Workshops of the 4th QLIF Congress	827
QLIF Workshop 1: Product quality in organic and low input farming systems <i>Lueck, L., Brandt, K., Seal, C. Rembialkowska, E., Huber, M., Butler, B., Bennett, R., Oughton, L., Nicholas, P., Kretzschmar, U., Sundrum, A. & Leifert, C.</i>	828
QLIF Workshop 2: Safety of foods from organic and low input farming systems <i>Leifert, C., Köpke, U., Bonde, M., Stanley, R., Hamm, U., Wyss, G., Ölmez, H., Benbrook, C., Hajslova, J., Lueck, L., & Cooper, J.</i>	832
QLIF Workshop 3: Performance of Organic and Low Input Crop Production Systems <i>Köpke, U., Cooper, J., Petersen, H.L., van der Burgt, G.J.H.M. & Tamm, L.</i>	836
QLIF Workshop 4: Performance of organic and low input livestock systems: a matter of sound design? <i>Spooler, H., Biavati, B., Borgsteede, B., Davies, D., Klocke, P., Maurer, V., Nagel, P., Nicholas, P., van Krimpen, M., Mejer, H., Modesto, M., Strozzi, G.P., Thamsborg, S.M., Vermeer, H., Wagenaar, J.-P., Zollitsch, W. & Sundrum, A.</i>	840
QLIF Workshop 5: Resource efficiency of organic and low input systems in comparison to intensive agriculture: Extended summary <i>Thorup-Kristensen, K., Brennan, M., Halberg, N., Cooper, J., Lampkin, N. & Niggli, U.</i>	844
Workshop Vision for an Organic Food and Farming Research Agenda	847
A Vision for an Organic Food and Farming Research Agenda 2025 <i>Niggli, U., Slabe, A., Schmid, O., Halberg, N. and Schlüter, M.</i>	848
Workshop on Research carried out in the Sixth Framework Programme on organic and low-input agriculture	853
EU supported organic and low-input agriculture research in the Framework Programmes (FP6 and FP7): scientific support to policies and quality products <i>Tissot, D.</i>	854
Index of Authors	857

Preface

To carry home these heavy two volumes of ISO FAR's 2nd Scientific Conference Proceedings might give rise to the question whether these books represent more mass than class and if they are still topical.

After all the author must wonder whether a contribution in a peer-reviewed proceedings volume is worthwhile when there is the alternative of publishing it in a highly ranked scientific journal with the same effort. Moreover, the editors as well as the numerous referees might have felt desperate at times due to the enormous amount of time and strength they invested to compile about 400 selected papers.

I would like to thank all of you for your effort. It was worthwhile since the reader now obtains a valuable overview of the current state of knowledge and research aims of the scientifically based Organic Agriculture which might be important not only for the scientist but also for all other stakeholders interested in the further development of Organic Agriculture.

I owe gratitude to all who contributed to coping with this laborious task. You have all done a tremendous job in contributing to foreseen successful scientific modules held under ISO FAR's and IFOAM's joined conference/congress umbrella. Our collective hope is that these proceedings will represent a significant milestone on the road towards a better understanding of the potentials and effects capabilities of a scientifically based Organic Agriculture can have.

Prof Dr Ulrich Köpke

President ISO FAR

Dear Reader,

The two volumes of the Proceedings of the Second Scientific Conference of the International Society of Organic Agriculture Research, 'Cultivating the Future Based on Science', represent a considerable part of the worldwide increase in research activities in Organic Agriculture (OA). This observation is in accordance with the overall trend, at least in much of the western world, of increased production and consumption of certified organic products.

In all, 495 four-page papers were submitted to the conference, and all went through a sophisticated review process resulting in 380 papers being selected for presentation at the ISOFAR Conference. Evaluating papers is a difficult task, requiring a sure scientific instinct. It also requires a reasonable judgement of the quality of the language of each paper; since a paper's language is part of what determines its overall quality, even though this gives an unjustified advantage to native speakers of English. Supported by a review form that checked various aspects of the paper's quality, the reviewers tried their best to ensure maximum transparency of the evaluation, which basically reflected the objective of improving the paper's quality.

The first volume deals mainly with various aspects of organic crop production, which traditionally represent the largest share of all papers submitted to conferences on OA. We hope that you will find it interesting to discover the diverse research approaches regarding the management of organic crops. While a tendency to a more problem-oriented approach realized by specialists is evident, as perhaps is to be expected, there is still a strong foundation of papers on traditional agronomy with a systemic approach, which remains a key discipline in OA research. Attentive readers will realize that the diversity of papers also reflects the global differences with respect to an understanding of what OA is.

This second volume gives insights into the increasing research activities on animal husbandry, socio-economics, interdisciplinary research projects, and QLIF workshops, all related to OA. We gratefully acknowledge in particular the increasing interest in organic animal husbandry, which in the past was a poor cousin in OA research. Some topical issues such as global warming and energy supply are discussed in the interdisciplinary sessions.

The scientific committee agreed at the start that cross-disciplinary papers should be given high priority because of the very nature of organic farming and food systems. For many years we have claimed there was a need for a holistic understanding of OA, both because of the interdependencies among sub-systems on the farm (soil-crops-livestock-people) and because of the multiple objectives behind OA (producing wholesome food, conserving soil fertility, maintaining biodiversity, supporting animal welfare, reducing pollution, etc.). However, most often researchers end up meeting and discussing these matters in largely discipline-oriented sessions, even at most organic conferences. Therefore, we wanted to encourage a more cross-disciplinary approach at this ISOFAR event, and we were happy to receive a large number of papers for the cross-disciplinary topics. We hope this tendency will be strengthened in future organic conferences.

Moreover, the great number of papers submitted for the scientific part of the OWC clearly demonstrates the interest in sharing research-based knowledge within the organic sector. To achieve this, it was important to have a section of the OWC where strict methodological approaches are required for participation.

On the other hand, it is a pleasure and an advantage for a scientific conference to be part of a global event that attracts the whole sector and thus allows the researchers to disseminate their findings widely and gain inspiration from other stakeholders in the organic movement.

First and foremost many thanks to all authors who contributed to our joint conference. We also are greatly indebted to the numerous reviewers listed on the next page, who did a first-class job in evaluating hundreds of papers. It was a great pleasure to cooperate with Paola Bonfreschi from the OWC – Organizing Committee, who is the embodiment of reliability and politeness. Last but not least, many thanks to Anja Schneider, of the ISO FAR Head Office, who was mainly in charge of overall communication with the authors and substantially supported the editing of the proceedings.

Managing the review process and editing the proceedings for an international conference is a challenging task in which language difficulties and technical problems may sometimes result in confusion. We kindly ask you to accept our apologies for any problems you may encounter.

We sincerely hope that the Proceedings of the Second Scientific Conference of ISO FAR 'Cultivating the Future Based on Science' will be an important and worthwhile source of information and inspiration for you.

On behalf of the Editors,

Daniel Neuhoff, Niels Halberg, Thomas Alföldi & William Lockeretz

Acknowledgements

Thanks to the following reviewers:

Lucimar S. de Abreu, Brazil; Uygun Aksoy, Turkey; Thomas Alföldi, Switzerland; Hugo Alroe, Denmark; Miguel Altieri, United States of America; Ton Baars, Germany; Saadi Badawy, Egypt; Katja Bahrtdt, Switzerland; Beat Bapst, Switzerland; Paolo Barberi, Italy; Stephane Bellon, France; Marc Benoit, France; Marianne Bonde, Denmark; Jules Bos, The Netherlands; Viv Burnett, Australia; Virgilio Caleca, Italy; Enio Campiglia, Italy; Fabio Caporali, Italy; François Casabianca, France; Edward Cocking, United Kingdom; Tommy Dalgaard, Denmark; Christophe David, France; Ken Davies, United Kingdom; Robert Delve, United Kingdom; Henrik Egelyng, Denmark; Gharieb EL-Bana, Egypt; Thomas van Elsen, Germany; Massimo Fagnano, Italy; Maria Finck, Germany; Andreas Fliessbach, Switzerland; Bernd Freyer, Austria; Jürgen Friedel, Austria; Eric Galandt, United States of America; José Granado, Switzerland; Anna-Maria Häring, Germany; Niels Halberg, Denmark; Ulrich Hamm, Germany; Peter Hanson, United States; Yousr Hashem, Egypt; Lene Hegel, Germany; John Hermansen, Denmark; Brendan Hoare, New Zealand; Beate Huber, Germany; Henning Høgh Jensen, Denmark; Todd Kabbaluk, Canada; Manolis Kabourakis, Greece; Lukas Kilcher, Switzerland; Chris Kjeldsen, Denmark; Preben Klarskov Hansen, Denmark; Peter Klocke, Switzerland; Ulrich Köpke, Germany; James Kotcon, United States of America; Ib Sillebak Kristensen, Denmark; Troels Kristensen, Denmark; Paul Kristiansen, United States of America; Stefan Kühne, Germany; Günter Leithold, Germany; Willie Lockeretz, United States of America; Andreas Lüscher, Switzerland; Paul Mäder, Switzerland; Bud Markhart, United States of America; Andrea Martini, Italy; Veronika Maurer, Switzerland; Jochen Mayer, Switzerland; Marcelo Mele, Italy; Alberto Mengi, Italy; Charles Merfield, Republic of Ireland; Ioannis Metzidakis, Greece; Paola Migliorini, Italy; Heidrun Moschitz, Switzerland; Daniel Neuhoﬀ, Germany; Egon Noe, Denmark; Erich C. Oerke, Germany; Frank Offermann, Germany; Jørgen E. Olesen, Denmark; Susanne Padel, United Kingdom; Hans-Marten Paulsen, Germany; Bruce Pearce, United Kingdom; David Pearson, United Kingdom; Carola Pekrun, Germany; Christopher Penhold, Australia; Christine Picard, Italy; Gabriele Pietsch, Austria; Gerold Rahmann, Germany; Jesper Rasmussen, Denmark; Joachim Raupp, Germany; Angelika Riefer, Germany; Christine Rudmann, Switzerland; Jörn Sanders, Switzerland; Ulrich Schmutz, United Kingdom; Kathrin Seidel, Switzerland; Pentti Seuri, Finland; Anet Spengler, Switzerland; Christin Stark, United Kingdom; Ulrike Steiner-Stenzel, Germany; Hanna Stolz, Switzerland; Matthias Stolze, Switzerland; Wijnand Sukkel, The Netherlands; Albert Sundrum, Germany; Bertil Sylvander, France; Lucius Tamm, Switzerland; John Teasdale, United States of America; Concetta Vazzana, Italy; Els Wynen, Australia; Qiao Yuhui, China; Raffaele Zanolì, Italy; Cesare Zanasi, Italy; Christine Zundel, Switzerland.

