ICROFS news
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Newsletter from the International Centre for Research in Organic Food Systems

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Organic Agriculture: African Experiences in Resilience

NJF seminar, August 21-23, 2013, Denmark.

International Conference on Organic Agriculture Sciences (ICOAS), October 9-13, 2013

SOLID meeting in Greece, May 2013

Calls: International Symposium on Organic Agriculture in the Mediterranean region and products with designation of origin, December 2-4, 2013.

ICROFS
International Centre for Research in Organic Food Systems

CORE Organic II meeting in Amsterdam

Your input to *ICROFS news*

We listen to our readers' response with pleasure, as we are here for you!

Therefore, any response are more than welcome, be it about the format, suggestions to improvements, changes, content or anything you can think of.

Contact us at: LindaS.Sorensen@icrofs.org

CORE Organic II Research Seminar and Governing Board meeting in Amsterdam

The 2nd CORE Organic II Research Seminar took place in Amsterdam at May 15, 2013. It was followed by the 6th meeting of the CORE Organic II Governing Board which was held the following 2 days. At the research seminar, all the current CORE Organic II projects were presented to give an overview of progress, results and activities. The projects were presented on posters as well, and the funding bodies had the opportunities to ask questions and gather detailed info on each project.

Challenges, ideas and dissemination

The afternoon was dedicated to group discussion, and the major themes here were discussions of challenges, ideas and dissemination. The question of dissemination was central, as some researchers found it difficult to find the time for the more popular dissemination, but FiBL and ICROFS will assist in any way possible to facilitate continuous dissemination via a broad span of channels.

The Governing Board meeting started off with reviewing the last ten years with CORE Organic. After this trip down memory lane, the focus was on the future and the role of CORE Organic in the light of Horizon 2020. The new CORE Plus project, in which a call will be published at the end of 2013, was discussed at length and the thematic research areas for the call have now been decided. All in all, the meetings in Amsterdam were very constructive and productive, and both project coordinators and funding bodies are now ready for the work ahead.

Read more about CORE Organic II at: www.coreorganic2.org

Third SOLID general assembly meeting – progress and challenges

The third general assembly meeting within the SOLID project was held in Stavros in Greece in three days in May. It was well attended, and the project progress and activities from the different work packages were presented and discussed, as well as the challenges in the work ahead was addressed.

Day one started with General Assembly; followed by presentations from some of the workpackages and the SOLID Governing Council Meeting.

On day two WP-presentations went on followed by individual discussion sessions and a Stakeholder Meeting. The stakeholder group gave their feedback to each work package, and a few changes in the group were presented.

On day three farm visits were arranged. The SOLID participants visited two dairy goat farms (a semi-extensive traditional system and a semi-intensive one) and a family owned cheese manufacturing unit (which had Guinness World Record for largest goat cheese). Read more about the progress and challenges in the different workpackages at: http://www.solidairy.eu/

Increased production of organic beef products

In theOrganic RDD project SUMMER, scientists at Aarhus University have in the past year attempted to create the right framework for an increase in the production of meat from young organic cattle. The idea is to ensure that the meat is both affordable for consumers, is of good quality and gives the organic farmer a reasonable financial return for his endeavours.

They look at the potential for a production of young organic beef animals where crosses between dairy and beef cattle are used. Both bull calves and heifer calves are used in the experiment. The crossbreds are put on a high-yielding grass-clover pasture. Read more about the ICROFS coordinated SUMMER project at: http://www.icrofs.org/Pages/Research/organicrdd_summer.html

Organic dairy goats in Greece, Photo: Jeppe Juul

Productivity and Growth in Organic Value-chains (ProGrOV)

Networks organization along organic foods value chains in Kenya

The author during a visit to one of the organic farmers in the region

Research results from the ProGrOV project

In this issue - and in forthcoming issues - *ICROFS news* will bring a number of articles with results from the ProGrOV project presented by the MSc students from Uganda, Kenya, Tanzania and Demnark.

The ProGrOV project is about improving productivity and growth in existing organic value-chains in Uganda, Kenya and Tanzania by way of developing agro-ecological methods governance and management of chains, and by capacity development regarding ressearch focussed on organic and interdisciplinary approaches.

Networks organization along organic foods value chains in Kenya; Case: Kales in Nairobi

By Josphat Njenga Gichure, University of Nairobi, Kenya

An MSc student from the DANIDA project ProGrOV has done a survey of certified organic farmers and marketing outlets around Nairobi. The survey was conducted between February and April, 2012 with kales as a case study.

The results show that there was poor and uneven access to information for producers and other weak chain members due to fragmentation of producers and traders and distant markets. The study recommends reorganization of the network structure to facilitate information flow and minimize exploitation of farmers so that all stakeholders benefit from the network structure.

rganic farmer market in the Nairobi region

Kale is among the most preferred green leafy vegetables in Nairobi, reasons being it's nutritious and acts as a source of income to peri-urban traders and farming households. Food supply chains consist of sub- networks in production, distribution and marketing whereby each relationship in the structure has a unique context.

Operations in the networks are based on actors' functional role; interests, goals, rules and power relations define this role. The aim of this study was to describe the network organization of stakeholders along organic products value chains.

Network organization of organic value chains in Kenya

There are two facets of inter-organizational relationships; relationships can be arranged as chains (vertical ties) or as networks (horizontal ties) based on the reason for interdependence. Figure 1 is a generic diagrammatic representation of the organic kales value chain network.

A network has three main elements namely; actors, activities and resources. The level of dependency among actors depends on criticality of the resources in that value chain. Some relations are based on loyalty and trust, while others depend on opportunism. Strong ties share more voluntary, supportive information as they form a solid basis for trust whereas weak ties enhance access to a wider source of resources.

Actors with better position in a network have more control and can collaborate with other network members.

Organic kales supply chains in Kenya

A food supply chain shows the movement of food from the primary production all the way to the ultimate consumer. The products physical flow downstream while information flows is both upstream and downstream.

The organic kales supply chain in Nairobi has several actors; producers, input providers, traders and consumers. Agrochemical shops, sector support groups/ organizations and

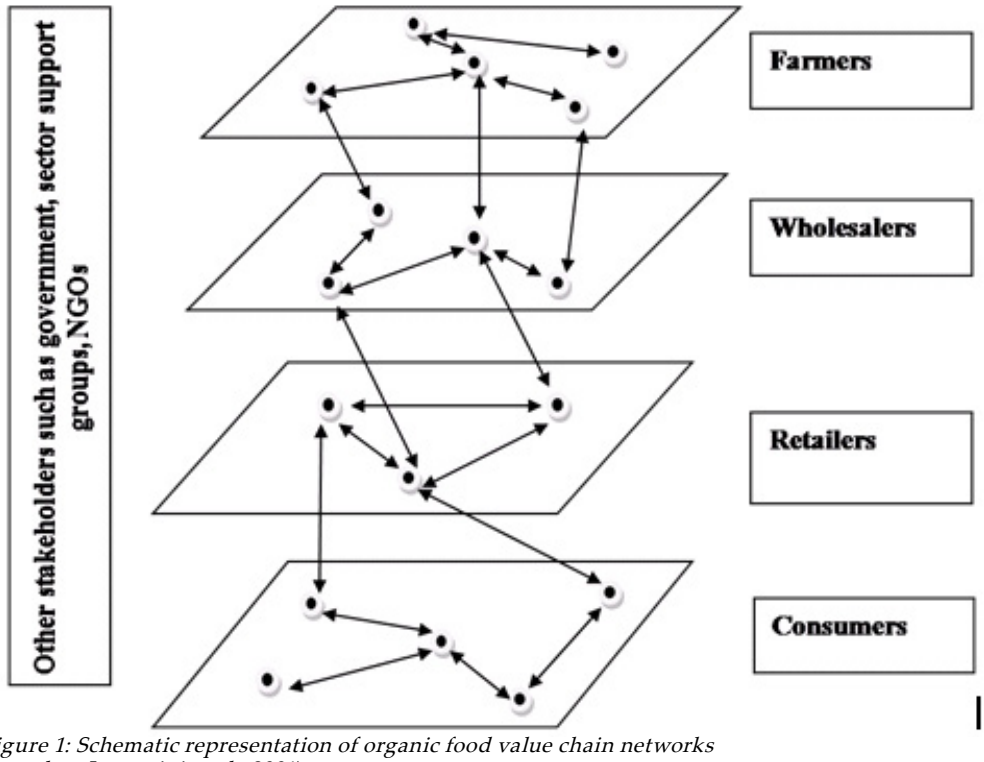


Figure 1: Schematic representation of organic food value chain networks (based on Lazzarini et al., 2001)

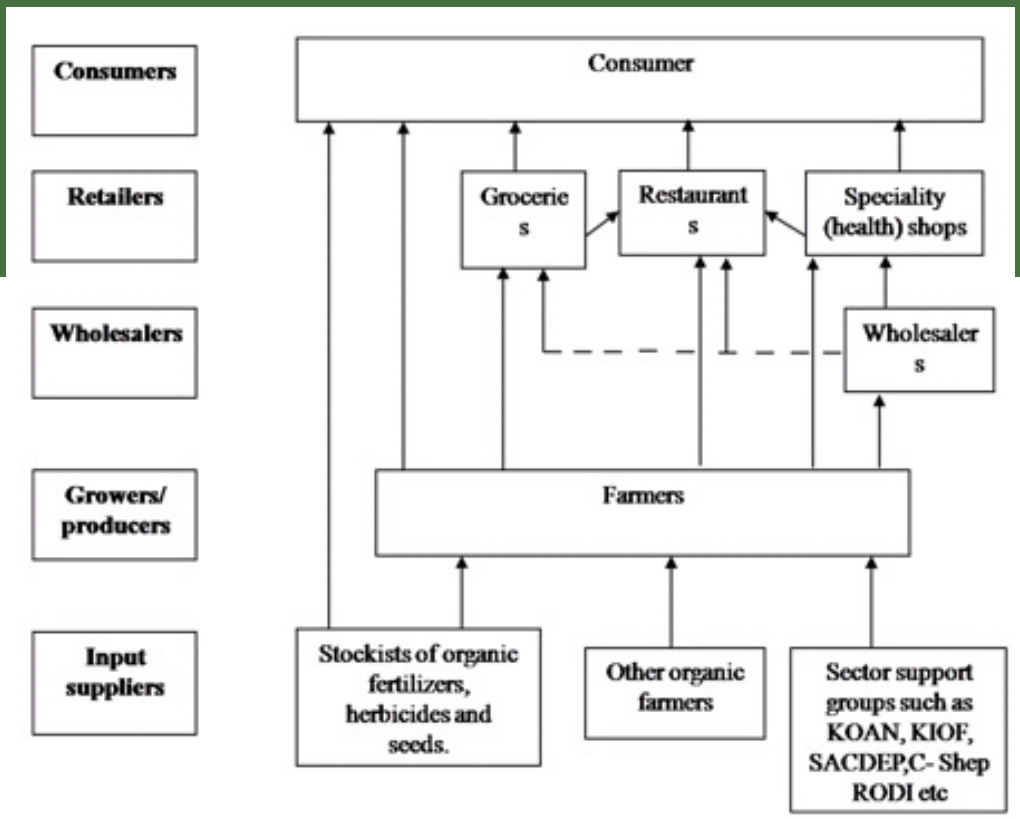


Figure 2: Organic kales supply chain in Nairobi (Source, Author)

social networks (neighbours and other farmers) provide the main primary inputs to farmers. Green groceries, restaurants, specialty shops and wholesalers acted as the main traders (figure 2).

Approximately 79 percent of farmers are organized into farmer groups. About only a third had farm size exceeding an acre. Most of the organic produce was sold directly to consumers either at the farmers market, basket schemes, home deliveries, farm gate sales or through conventional vegetables market.

Approximately 70 percent of the farmers sell organic kales at the organic farmer markets every weekend on Saturday. In Nairobi, there are three farmer markets; in Karen, Hurlingam and Thika. Karen and Hurlingam farmers' markets are within 10 kms from Nairobi's CBD while Thika farmers' market is approximately 40 kms from Nairobi.

Excess produce is sold to retailers (specialty outlets, groceries, restaurants and supermarkets). Almost 50 percent of farmers also sell organic kales through middlemen, about 13 percent use basket schemes, 10 percent sell to wholesales while only 7 percent sell to supermarkets.

Measure of centrality

Measure of centrality in social networks describes actors' positions and integration relative to others in the network. *Degree centrality* measures the ties of an actor in relation to other actors in the network. *Closeness centrality* measures the possibility of interactions with other actors based on a minimum number of intermediaries, that is, the reachability of the actors including indirect ties. *Betweenness centrality* measures an actor's position on the geodesic paths by expressing the number of shortest paths between network actors that pass through a given organization.

Centrality measures of the organic kales value chain

The degree centrality was 67.3 ± 14.5 percent, Network centralization was 42.3 perceent which shows the stakeholders are somehow linked to one another. Closeness centrality was 76.3 ± 8.2% percent which showed that most stakeholders were near the middle of the network structure and required fewer connections to link to everyone in the network. However, network centralization based on closeness centrality measure was about 26.87 percent indicating that although there were many connections among stakeholders, actors were still fairly far from each other. Based on betweenness centrality, centralization was approxi-

Organic farmer market in the Nairobi region

Organic farmer market in the Nairobi region

mately 2.41 percent which was quite low. Although this may encourage creativity, it can reduce exploitation among members. Betweenness centrality shows an actor's importance as a connector between other actors in the network.

The centrality of individual actors varies rather considerably hence the benefits of networking are rather unequally distributed along the value chain. The National Organic Agriculture Movement (KOAN), farmer groups (Ngong Farmers group, Muhuri Road group and Thika Farmers group), large sector support NGOs and the organic certification organization (Encert) were most central. On the other hand, certified retail outlets (Zucchini, Kalimoni, Healthy U and Bridges), government extension officers, the organic farmers' markets and agricultural training institutes were at the network periphery. From this, large sector support NGOs, farmer groups and KOAN were regarded as the most influential and had access to more information in this network.

Despite the fact that farmers are centrally located in the network with a high centralization, most farmers are smallholders making them disadvantaged as they have limited access to information, technology, and other network resources which restricts their ability to network individually. This means they are inadequately organized which is a pointer to insufficient development of the sector. In addition, their central position in the network encourages exploitation by other network actors and hence they can't benefit from the network structure. Furthermore, most farmers are in groups and have limited access to directly interact with other stakeholders.

Reorganization of the network structure is needed

Along organic value chain, there was uneven access to information for producers and other weak chain members due to fragmentation of producers and traders and distant markets. This increase costs associated with access to information. The study recommends reorganization of the network structure to facilitate information flow and minimize exploitation of farmers so that all stakeholders benefit from the network structure. In addition, farmers' groups should provide information such as market information, training on food safety and quality and post-harvest products handling. These will provide farmers with them an opportunity to minimize exploitation. In addition, implementation of group activities during production, marketing and certification should be encouraged.

Joshpat Njenga Gichure has during his studies at University of Nairobi been supervised by Professor Jonathan Nzuma, University of Nairobi, Professor Kostas Karantininis, University of Copenhagen, and Analytical Consultant Paul R. Kledal, Institute of Global Food & Farming Ltd.

Mr. Njenga's fellow students in the ProGrOV project will graduate over the coming 3 years and more results from this will be presented in ICROFS news in the coming issues.

About ProGrOV

The results are from the first graduated MSc student from ProGrOV. The ProGrOV project aims to increase organic agricultural productivity and develop the organic business, improve livelihoods and build capacity for sustainable development in the East African Region. It focuses on increasing productivity and growth in organic value chains through research addressing development of agro-ecological methods, governance and management of organic value-chains, and capacity development using participatory and interdisciplinary approaches.

More information

Read more about ProGrOV: http://www.icrofs.org/Pages/Research/progrov.html

The project is a collaboration between Universities in Uganda, Kenya, Tanzania and Denmark. It is funded by the Danish Ministry of Foreign Affairs and coordinated by ICROFS.

SUMMER chickens "on herbs"

By Sanna Steenfeldt and Klaus Horsted,
Department of Animal Science and Agroecology, Aarhus University

In the organic RDD project 'SUMMER', an experiment with organic broilers with access to a large range area with herbs has been performed. The effect of chicken genotypes with different growth rates and different feeding strategies on the animals' feed intake, growth, welfare, health and meat quality was investigated.

The results so far indicate that it is necessary to use chicken genotypes with lower growth rates for a better welfare, and the focus should be on the individual genotype and its actual nutrient requirements and utilisation of feed from the range area.

Broilertype JA757, the only breed used in the Danish organic broiler production today. Photo: Janne Hansen

Organic chickens are expensive which may explain the low market share. The idea behind the project has been to add further quality parameters to the products in order to justify the higher price. More focus on the use of the range areas by the chickens, high animal welfare and the use of locally produced feeds, including feed items from an attractive range area, have been provided.

Background

According to the current regulations for organic broiler production, it is allowed to have higher daily gain and a significantly younger age at slaughter than was the case after the introduction of organic broiler production in the mid-90s. This often results in leg problems and consequently a lower level of activity among the animals which in turn increases the risk of ulcers and hock burns on the chicken feet. The use of new genotypes with slower growth rates and changed feeding strategies are expected to improve the animal welfare and robustness and to increase the intake of feed items from the range area. Additionally, a different meat quality of the broiler product may be expected.

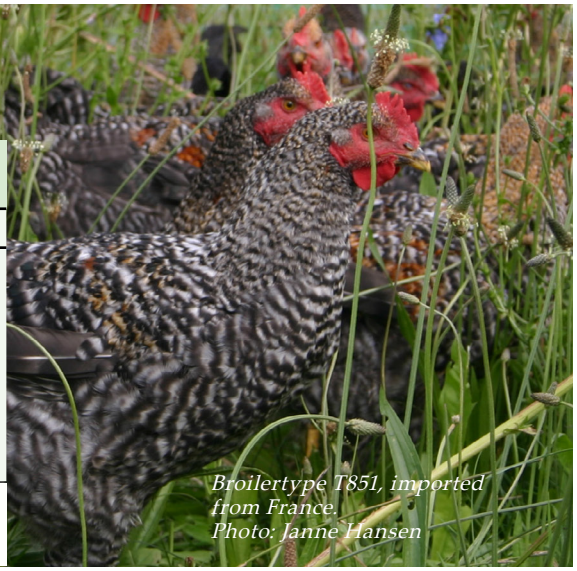
The experiment

Three broiler types with different growth potentials were included in the study, two of which were imported from France (SU51 and T851), while the third (JA757) is the only breed used in the Danish organic broiler production today.

The chickens were raised indoor the first 4 weeks of age and were moved outdoor in mid-June 2012, where they were divided into 18 plots of 500 m2 each. The plots were sown with rye grass and different types of herbs. Forty-two chickens were allocated to each plot / house (app. 12 m2 per chicken). In addition to the 3 genotypes, 2 feeding strategies were included in the study, one of which (HP) is applied in practice, i.e. organic standard feed and whole wheat (separate silos). In the second feeding

Treatment		Weight (g)			Feed consumption (g/chicken/day)		
Genotype	Feed	56	69	84	56	69	84
SU51	HP	1234	1706	2049	125	148	110
SU51	LP	744	919	1367	114	98	72
T851	HP	1603	2175	2681	147	188	161
T851	LP	937	1144	1346	121	115	90
JA757	HP	2643	3585	4282	236	267	241
JA757	LP	1238	1468	1710	135	114	101

Table 1. Chicken weight and feed consumption at 56, 69 and 84 days. Data are an average for female and male chickens. Feed consumption is the sum of compound feed, wheat, oat and limestone.



Broilertype T851, imported from France. Photo: Janne Hansen

Broilertype SU51, imported from France. Photo: Janne Hansen

Herbs etc.	Dry matter	Protein	Methio-nine	Cy-steine
Caraway	16,0	17,7	3,37	1,56
Red clover	16,6	29,6	4,68	2,27
Chicory	11,8	19,2	3,78	1,63
Plantain	11,3	19,5	3,33	1,86
Ryegrass	14,8	21,2	3,99	2,02
Burnet	21,3	18,8	3,42	1,99
Birdsfoot trefoil	17,2	22,2	3,74	2,57
Lucerne	19,9	20,1	3,37	2,49

Table 2. Chemical analyses of herbs from the outdoor area. Protein: g/100 g dry matter, amino acid: g/kg dry matter.

strategy (LP), chickens were offered a feed based on 3 protein crops (peas, rape seeds, lupins) and whole wheat, whole oats and lime stone in separate silos.

Chicken weight and feed consumption

A large effect of the treatments on growth was seen. Feeding with HP + whole wheat resulted in growth rates that were very different between the 3 genotypes, reflecting the different growth potentials (Table 1). JA757 obtained the highest, SU51 the lowest and T851 had a growth that was between the other 2. Feeding LP + whole wheat and whole oats, which was based on a 'choice feeding' strategy, resulted in a generally lower feed consumption for all genotypes and thus an overall lower growth. The differences between genotypes were not nearly as pronounced as with the HP feed strategy.

The proportion of whole wheat in the total feed intake accounted for a much larger percentage in the LP strategy (51-89%) than the HP strategy (8-47%) for all genotypes. Thus, the chickens did not eat very much of the alternative protein feed which may have turned out differently if the chickens had been introduced to this feed already during the first 4 weeks of the rearing period.

Protein content of herbs

Chemical analyses of ryegrass and various herbs from the outdoor area are shown in Table 2, and for most species, the content of protein and methionine are high compared with several of the feed ingredients normally used in compound feed. Particularly red clover had a high content.

Analyses of the content of the chickens' crop also showed that insects, earthworms and snails were part of the feed intake from the range area. Snails had a very high protein (44.8 g/100 g dry weight) and methionine content (6.37 g / kg dry matter).

The analyses show that grasses and herbs on the range area to some extent contribute to the chickens' nutrient supply.

Gait score and welfare

Gait score evaluations were performed on 2/3 of the chickens at 55 and 85 days. A gait score rating indicates the chickens' walking ability characteristics, and the lower score the better. Chickens with relatively fast growth are often hampered in their walking ability, and previous studies suggest that a gait score of around 2 are associated with pain for the chicken. In this study, 'JA757' had considerable problems when fed with normal organic feed (HP), while the other two genotypes did not have any problems when fed this feed (Fig. 1). However, 'JA757' had no problems when given the alternative feed (LP) which was associated with a lower feed intake and hence a low growth rate. Evaluation of plumage condition and foot pads revealed the same tendency so that only 'JA757' on HP feed had remarks. In general, the chickens fed with LP feed showed greater foraging activity on the outdoor area.

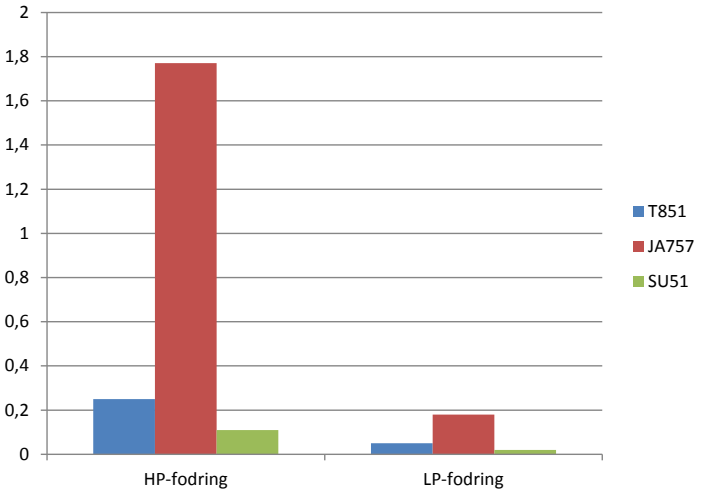


Figure 1. Gait score for the three genotypes for each feeding strategy.

Perspectives

The results so far indicate that chicken genotype and feeding strategy are essential parameters when a high-value chicken production is defined in terms of ethical quality and resource efficiency. Thus, it is necessary to use chicken genotypes with lower growth rate for a better welfare, and the focus should be on the actual nutrient requirement of the breed and the utilisation of feed from the range area. Other factors such as health, meat and eating qualities and the effect of a finisher-feeding strategy are expected to contribute to the overall perspective.

More information

Read more about the Organic RDD project SUMMER at: http://www.icrofs.org/Pages/Research/organic-rdd_summer.html

Organic RDD is financed by the Ministry of Food, Agriculture and Fisheries and coordinated by ICROFS.

Spotless apples under roof

By Marianne G. Berthelsen, Department of Food, Aarhus University

It started as a crazy idea –Is it possible to grow apples without spraying and without getting scabby fruit if you put a roof over the trees? We set out to investigate this in the project 'Fruitgrowth' which aims at optimizing the Danish production of organic apples. The results are very promising and show that a small roof can make a big impact on the occurrence of most of the diseases that attack apples.

Growing apples under roof

After the first year, in the FruitGrowth project, we can conclude that the crazy idea wasn't dumb – and that a small roof can make a big impact on the occurrence of most of the diseases that attack apples.

Cultivars in the experiment

In the experiment the cultivars 'Elshof' and 'Rubens' were grown, both varieties are highly susceptible to apple scab (Venturia Inaequalis), which is the most important disease in apples. Under unsprayed conditions 70 % of the 'Elshof' fruit was discarded due to severe scab attack and only 3 % of the remaining fruit were spotless at the end of storage.

Positive effect of the roof

Contrary, under roof only 0-5 % of the fruit were severely affected by scab and a total of 85 % of fruit were free of scab by the end of storage.

The storage period was three month and the fruits were stored in a standard cold storage at 1 C followed by one week shelf-life at 18 C. For 'Rubens', which is extremely susceptible to scab, the outcome was even more clear. Under roof 75 % of the fruits were without scab lesions while 15 % had to be discarded. Without the roof, 95 % of the fruits were discarded, fruit size was halved and yield only one third of what was achieved under roof.

The occurrence of other diseases was also reduced by the roof, for example sooty blotch which in some years is very frequent under unsprayed conditions, but under roof it was absent.

Fruit were examined for storage diseases and rots were infrequent, whereas 5 % of the fruits developed storage scab, which are tiny black scab lesions. The same amount of storage diseases was found in parts of the experimental field that were intensively sprayed with fungicides allowed for organic production.

Why is the roof effective?

Reduced periods of leaf wetness is the most likely explanation for the success of the roof. Scab spores require prolonged periods of leaf wetness to infect the leaves and fruitlets. At 10 C 28 hours of leaf wetness is required, while 18 hours suffice when the temperature is around 17 C. Field observations clearly showed that the roof could not prevent leaf wetness after steady rain and windy conditions, but drizzle that under normal conditions can maintain leaf wetness was caught by the roofs. After light rain the soil under the roof protected trees

The cultivar Elshof grown under roof

Apple fruit severely attacked by apple scab. Fruits have to be discarded due to the amount of scab on the fruit, but can be used for apple juice production.

was dry.

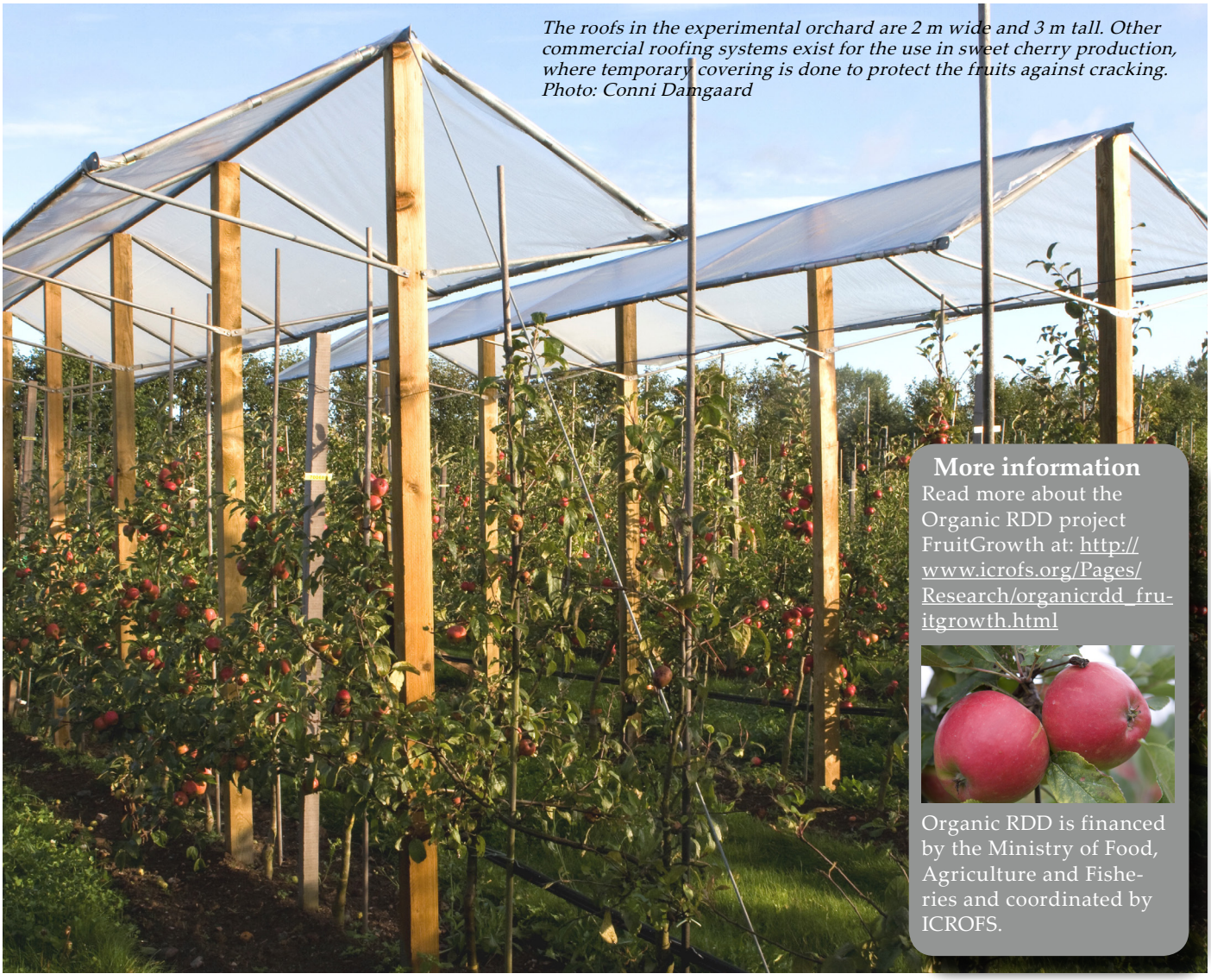
Fruit quality

Fruit quality was also investigated as we expected the roof to have negative consequences due to shading. However, no negative effects on fruit size or coloration could be ascribed to the roofing. Neither was there a reduction in soluble solids, but fruit of both cultivars were slightly firmer at the end of storage when grown under roof.

Perspectives

The first year of this experiment raises a lot of questions, first of all if the promising results can be achieved in the following years and if so, is it economical sound to put up roofs in a commercial production.

We hope to investigate that in the coming years, and the experiment will continue in its present form in the 2013 season.



The roofs in the experimental orchard are 2 m wide and 3 m tall. Other commercial roofing systems exist for the use in sweet cherry production, where temporary covering is done to protect the fruits against cracking. Photo: Conni Damgaard

More information

Read more about the Organic RDD project FruitGrowth at: http://www.icrofs.org/Pages/Research/organicrdd_fruitgrowth.html

Organic RDD is financed by the Ministry of Food, Agriculture and Fisheries and coordinated by ICROFS.

Organic hay fields as a floral resource for bees and other flower-visiting insects

By Beate Strandberg[1], Yoko L. Dupont[1] and Karen Soegaard[2], [1]Aarhus University, Department of Bioscience; [2]Aarhus University, Department of Agroecology

Bees and other flower-visiting insects are experiencing periods of food shortage, particularly in intensively managed agricultural landscapes in Europe.

As part of the Danish project EcoServe we therefore investigate whether increased richness of selected herbaceous species in organic hay fields acts as a floral resource thus enhancing abundance and biodiversity of pollinators.

Honeybee visiting Dandelion

An investigation of the relationship between diversity of bee-plants and pollinators in 20 organic hay meadows of different age revealed a positive correlation; hence, high diversity of pollinators is related to high diversity of bee-plants (Figure 1). Bee-plant diversity was measured as the number of flowering insect-pollinated plants, and pollinator diversity was measured as number of flower-visiting insects. Pollinators encompassed bees (wild bees and honeybees), butterflies and syrphid flies. The hay fields were located in six geographically isolated areas in peninsular Jutland (Denmark), which may be assumed to have independent pollinator faunas. Figure 1 shows that the relationship between bee-plant and pollinator diversity varies among sites (different slopes of the regression lines).

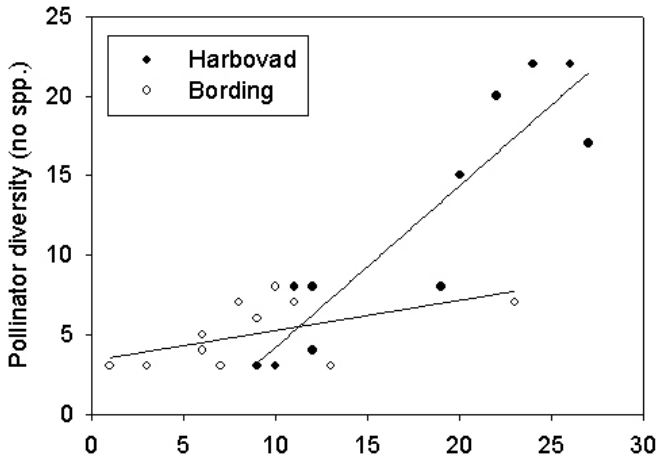
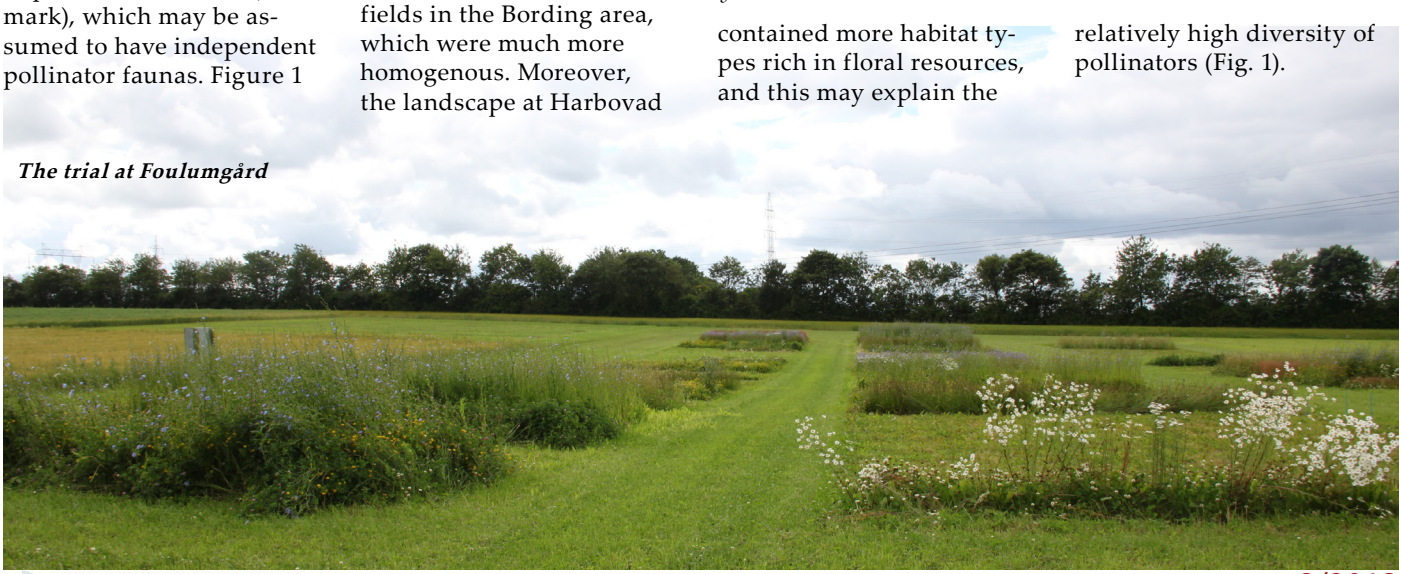


Figure 1. Relationship between number of flowering bee-plants and number of insects visiting flowers in three hay fields in Harbovad and 3 hay fields in Bording, both areas are located in central Jutland (Denmark). The plots are based on data collected on four occasions during the flowering period from late April to late August. The hay fields in both areas are aged 3, c. 10 and >50 years.

Impact of the surrounding landscape

The pollinator fauna at a given site is influenced by habitat type, and hence the potential pollinator fauna and pollinator diversity of a hay field is highly affected by the surrounding landscape. The hay fields in the Harbovad area were embedded in a much more heterogeneous landscape in terms of different types of biotopes (forest, shrub, grassland etc.) than the fields in the Bording area, which were much more homogenous. Moreover, the landscape at Harbovad contained more habitat types rich in floral resources, and this may explain the relatively high diversity of pollinators (Fig. 1).

The trial at Foulumgård



	April	May			June			July			August		
	u	p	m	u	p	m	u	p	m	u	p	m	u
Dandelion													
Cumin													
Ribwort plantain													
Salad burnet													
White clover													
Bird's foot trefoil													
Field scabious													
Common yarrow													
Red clover													
Chicory													
Phacelia													
Chives													
Alfalfa													
Sainfoin													

Figure 2. The flowering period for the herbaceous plants used for experiment at Foulumgård (Denmark). Data are collected in unmowed monoculture plots, i.e. without interspecific competition. Dark grey indicates the main flowering period, light grey indicates periods with fewer flowers.

Increasing floral resources in the landscape – how?

High bee-plant diversity in the abovementioned hay fields may be a consequence of continuous and low intensity hay field management (> 5-10 years of continuous low intensity management). In general, diversity of bee-plants was low in regular hay production fields. Regular hay fields were characterized by short rotations, typically 3-4 years, and frequent cuttings during the summer. Our results suggest that time since last rotation and extensive management, including few cuttings and late first cut (ultimo June-primo July), is a prerequisite for high diversity of bee-plants and pollinators.

In EcoServe, we also investigate whether the addition of bee-plants to grassland mixtures enhances flower availability to pollinators.

At the experimental farm Foulumgård, we are collaborating on an experiment in which flowering patterns and biomass production are tested for a number of herbaceous plants. Among others, the plant species were selected based on their quality as a food resource for pollinators and also to obtain a continuous flowering from April to September in order to avoid periods of food shortage for pollinators.

In the experiment, we tested the effect of different cutting regimes (number and timing of cuttings) on flowering patterns. Furthermore, we tested how flowering is affected by competition when the plant species grow in multi-species mixtures compared to monocultures.

The tested species

The tested species showed continuous flowering without cuttings (Figure 2). However, the majority of the tested plant species did not flower after the first cut (Figure 3), and frequent cuttings (app. 4 weeks between cuttings)

Mining bee Andrena hattorfiana visiting Field scabious

White tailed bumblebee Bombus lucorum visiting Phacelia

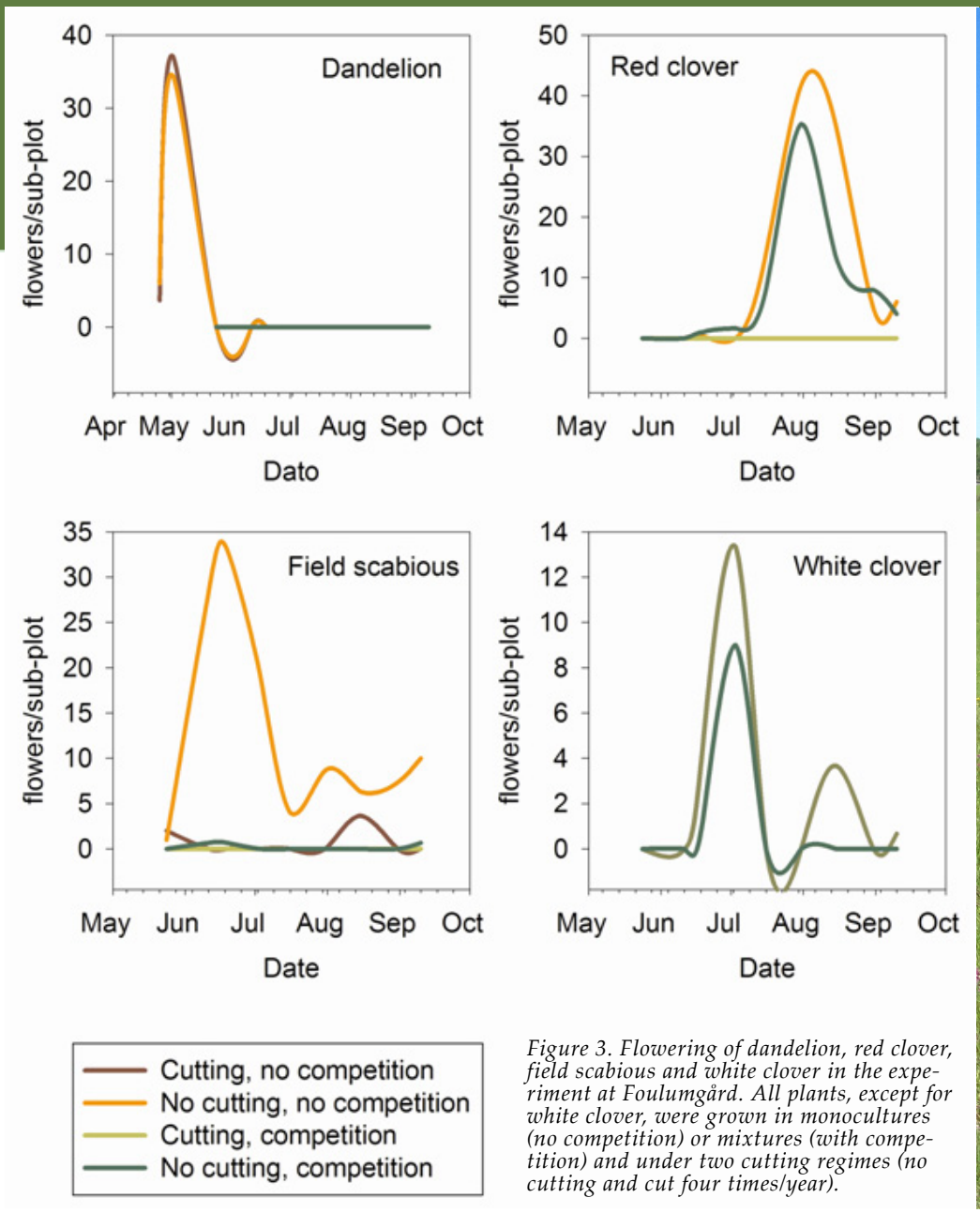


Figure 3. Flowering of dandelion, red clover, field scabious and white clover in the experiment at Foulumgård. All plants, except for white clover, were grown in monocultures (no competition) or mixtures (with competition) and under two cutting regimes (no cutting and cut four times/year).

will result in very limited floral resources. Valuable bee plants, such as phacelia and chicory, do not flower after cutting. Furthermore, phacelia is competitively inferior to other plants and, therefore, cannot be grown in grasslands, but may be sown in e.g. flower strips and field margins, which are not mowed. Species such as field scabious, red clover, bird's foot trefoil, ribwort plantain and cumin set few flowers after cutting. But these species are competitively strong and grow well together with other species in multi-species mixtures.

Dandelion is an example of an early-flowering species in which flowering is completed before the first cutting. Of the tested species, only white clover flowered shortly after cutting, and flowering may even be stimulated by mowing (Figure 3). Traditional grasslands which are frequently mowed will be poor in flowers. Thus, other management strategies are needed to enhance conditions for pollinators. In general, it is important to leave unmowed flower-rich areas in the fields throughout the flowering season to avoid periods of food shortage.

New suggestions

The experiment at Foulumgård showed that several herbaceous species, including red clover, bird's foot trefoil, ribwort plantain and chicory, were competitively strong and flowered well in multi-species mixtures when no cutting occurred. Hence, unmowed margins or "islands" consisting of such mixtures may provide a flower-rich resource for pollinators.

The biomass of these multi-species mixtures harvested at the end of the growing season turned out to be surprisingly high and of the same size as the total biomass of the individual species from four cuttings distributed over the season. Thus, there is potential to exploit the final biomass in bio-production.

More information

Read more about the Organic RDD project EcoServe at: http://www.icrofs.dk/Sider/Forskning/organic-rdd_ecoserve.html

Organic RDD is financed by the Ministry of Food, Agriculture and Fisheries and coordinated by ICROFS.

Larvae for layers

By Lotte Bjerrum[1], Christian Holst Fischer[1] and Steen Nordentoft[2]
1) Danish Technological Institute, Division of Life science;
2) Technical University of Denmark, National Food Institute.

Companies and researchers are in close collaboration developing a container- based system for cultivating fly larvae at organic poultry farms.

In a one week process, manure will be converted to compost and the live larvae will be harvested and used for feeding laying hens. The larvae are expected to have a beneficial effect on the growth performance, intestinal health and on animal behavior in flocks.

Fly larvae on an electronic scales.

In the Organic RDD project "BIOCONVAL" (biological conversion to value), Danish Technological Institute, DTU Food (National Food Institute), Aarhus University and the Knowledge Centre for Agriculture (Poultry) are cooperating with the Danish companies EWH BioProduction and Farmergødning and the Dutch company Dorset Green Machines as well as an organic Danish egg producer.

The aim is to develop and demonstrate an integrated system for cultivating fly larvae (Musca domestica) in poultry manure locally at the farms, and subsequently to use them as dietary supplement for the hens. The fly larva is very nutritious and is a natural food source for poultry. It has an amino acid composition that is similar to fishmeal and is especially rich on the essential amino acids methionine and Cysteine. Among laying hens, the lack of methionine may lower the production and may possibly lead to feather picking and cannibalism, a problem often seen in organic farming.

Feeding live larvae could help overcome these problems, and additionally is hypothesized to increase gut health and animal welfare and behavior.

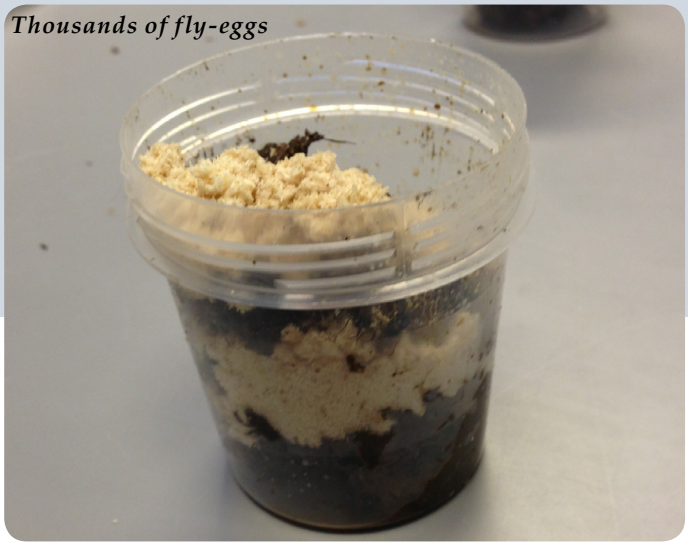
Cultivation in manure

The larvae have an amazing ability to convert fresh manure to compost in very short time. Before they pupate they empty their intestine, allowing clean larvae to be collected and the remaining compost to be used as valuable fertilizer. However, many factors influence the cultivation of high-quality larvae, e.g. the compost temperature, the dosage of fly eggs, humidity in the substrate etc. Therefore, a number of prototype tests have been carried out at Danish Technological Institute in order to optimize the system before it can be used at the chicken farm and supply the hens with fresh larvae.

The solutions have now been implemented in a machine from the Dutch company Dorset Green Machines. The company has already developed equipment for manure treatment and part of this technique has been used in a new container system for larvae cultivation.
The final concept in the BIOCONVAL project will -after a test period -be demonstrated at an organic farm located near Brande.

Dietary and behavioral impact of larvae feeding

Before implementation on the farm an 8 week comprehensive feeding trial will be conducted in May-June at the research stables at AU Foulum. In the study, larval meal as a protein source will be evaluated against fishmeal, and furthermore a group of layers will also receive fresh larvae grown on manure. Here the impact of larvae feeding on growth and gutflora composition will be investigated, as well as behavioral studies including feather picking and cannibalism. In earlier experiments we have observed that chickens are very


Thousands of fly-eggs

The BioConVal consortium consists of:

E.W.H. Bioproduction Aps (www.bioproduction.dk); produce and deliver fly eggs for the project
Dorset Green Machines B.V. (www.dorset.nu); design and production of container for the larvae production
Farmergødning (www.farmergoedning.dk); composting experiments, organic fertilizer expert
Organic egg producer Jan Volmar; on farm trial with larvae feeding of organic layers
Technical University of Denmark, National Food institute (www.food.dtu.dk); laboratory infection models, risk evaluation, feed trial and gutflora studies
Knowledge Centre for Agriculture (www.vfl.dk); design of farm trial, feed formulation, welfare
Aarhus University, Institute for Animal Science- Immunology and microbiology (www.agrisci.au.dk); larvae feed trial, production data
Danish Technological Institute (www.teknologisk.dk); optimization of production and isolation of larvae, project management

interested in searching and eating insects.

Microbiological safety

As the fly larvae are developed in poultry manure, which contains a lot of bacteria, it is also important to ensure that the larvae do not contribute to propagate and transfer infectious matter from the manure to the hens.

In previous studies, the larvae have been heat-treated or made into larvae meal in order to avoid transfer of infections. However, in order to stimulate the hens as much as possible they have to be served to the hens alive and fresh. To ensure that the hens are not exposed to any risk from enteric pathogens as Salmonella or E. coli, researchers from DTU Food (National Food Institute) are investigating how the decomposition of the manure by the larvae influences pathogenic bacteria.

The results of these studies are very promising as the larva increases the natural inactivation of the tested pathogens in the manure and inside the larvae itself.

Against the EU feedstuff legislation

Although organic layers already eats a lot of natural insects in the free range stables, the use of insects for feeding animals are not allowed in the EU. As a reminiscence of the BSE outbreak in the early nineties, strict rules are regulating which sources that may be used for feed and for the moment insects are not among these. There is an increasing demand for lifting this ban on insects, and one of the purposes of this project is to show that fly larvae are safe to use as a feed. It is therefore encouraging that processed fly larvae will be allowed for feeding framed fish in the EU in 2013. We see this as an important step in the right direction.

Perspectives

Larvae bioconversion systems have been proposed as a high quality, efficient and sustainable protein source used as feed or as a direct food source for both animals and humans. Poultry manure is just one of many possible substrates that larvae can convert into high-value protein. Today, large amounts of household and industrial waste are solely used for energy purposes, but protein of higher value could be extracted before the rest is used for energy.

Large scale production of larvae requires however a very high amount of fly-eggs, because the weight of each larvae is small. In order to propagate larvae bioconversion the production of fly-eggs must be automated and made more efficient. This aspect will be further examined in by the project group in the near future.

Organic hens

More information

Read more about the Organic RDD project EcoServe at: http://www.icrofs.dk/Sider/Forskning/organicrdd_biocon-val.html

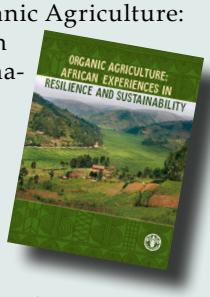
Organic RDD is financed by the Ministry of Food, Agriculture and Fisheries and coordinated by ICROFS.

Publications

Third SOLID News, April 2013
Content of the lastest issue: "Biodiversity – how can we include it in environmental life cycle assessments of products?"; "Which kind of innovation do the supply chain members want ?" ;Presentation of small and medium enterprises in SOLID:
Juvan Luomi – a pioneering organic dairy in Finland
Institute of Organic Training and Advice – Challenges and innovation in dairy farming.

CORE Organic II Newsletter
The ERA-Net CORE Organic II started in 2010 and the first transnational research projects were initiated in 2011. These projects are now ready to communicate their first results, and therefore we are now re-starting the CORE Organic newsletter. You can follow the 13 (soon 14) CORE Organic research projects via the website www.coreorganic2.org, and by subscribing to this newsletter on the website: http://www.coreorganic2.org/Upload/CoreOrganic2/Document/CORE_Organic_News_April13.pdf

Organic Agriculture: African Experiences in Resilience and Sustainability
This publication, Organic Agriculture: African Experiences in Resilience and Sustainability, demonstrates that organic management can benefit people, the economy and ecosystems and that this can be achieved in Africa, where hunger and degradation stubbornly persist, despite decades of development efforts. The work presented in this volume stems from the conference on Mainstreaming Organic Agriculture in the African Development Agenda, held in Lusaka, Zambia, from 2 to 4 May 2012. Read more at: http://www.fao.org/docrep/018/i3294e/i3294e.pdf



Congresses

Njf seminar: "Organic farming systems as a driver for change", August 21-23, 2013, Denmark.
The seminar will be arranged around the following four tracks:
1. Societal and economic viability
2. Transition to renewable resources
3. Nutrient sufficiency and management in farming systems
4. Productivity and sustainable production levels in animal and crop production.
Read more: http://www.njf.nu/site/seminarRedirect.asp?intSeminarID=461&p=1004 4th

International Conference on Organic Agriculture Sciences (ICOAS) 9-13th October 2013; Hungary

The 4th Scientific Conference on Organic Agriculture in Central and Eastern Europe will be held 9-13th October 2013 in Hungary. Previously held in the Czech Republic, ICOAS provides an opportunity for researchers, non-governmental organizations, practitioners and policy makers around the globe to meet and discuss current results of organic agriculture sciences.
From 2013 ICOAS will be a bi-annual event organized every second year in a different Central and Eastern European country with a special emphasis on selected topics of organic agriculture research for each conference.
The theme for ICOAS 2013 is Targeting Global Sustainability – Food Security, Biodiversity and Climate Change.
ICOAS 2013 is hosted by the Hungarian Research Institute of Organic Agriculture (ÖMKi), partner institute of FiBL Switzerland.

Check here for calls for symposia and papers.

Registration for the conference is now open until July 1st.

Calls

International Symposium on Organic Agriculture in the Mediterranean region and products with designation of origin, December 2-4, 2013.
The international conference on organic agriculture in the Mediterranean will be held in Agadir, Morocco. A further important topic of the conference is distinguishing the quality of agricultural products by guarantees of their origin. *Proposals for posters or oral presentations can be submitted until June 30, 2013*. Read more at: http://www.organic-world.net/news-organic-world.html

Meetings

Third SOLID meeting in Greece

SOLID | Sustainable Organic and Low Input Dairying

The third SOLID meeting in SOLID has been held in May. This time, it was held in Thessaloniki, Greece on the 9-11 May 2013. The project progress and activities from the different work packages were presented and discussed, as well as the challenges in the work ahead was addressed.
The SOLID project on Sustainable Organic and Low Input Dairying is an EU FP7 project running from 2011 - 2016. Read more under the section "News from ICROFS" or at www.solidairy.eu.