

Final report

for

Project no. 1904

Prevention of selected diseases and parasites in organic pig herds – by means of a HACCP based management and surveillance programme (CorePig)

Period covered: (Final: 01.07.2007 – 31.12.2010)

Contract no.	1904	Contract Acronym:	CorePig	
Contract title:	<i>Prevention of selected diseases and parasites in organic pig herds</i> by means of a HACCP based management and surveillance programme			
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Start of Project:	01072007	End of project:	31122010	

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Project Summary, including objectives and outputs

Objectives - From the project application:

The overall objective of the project is to promote animal health and welfare in organic pig herds in Europe. The variation in pig health between organic herds is likely to be caused by different management routines in the herds. To improve animal welfare it is therefore important to investigate the relation between management and parasite/disease occurrence, and based on this, to develop a disease management tool applicable on farm. This will be achieved by carrying out the following three components:

- To conduct an international knowledge synthesis for identifying needs for future research into disease and parasite prevention in organic pig production
- To estimate risk factors for selected diseases and parasites in pigs in European organic herds by conducting an epidemiological survey in European organic pig herds
- To develop and evaluate a HACCP based management and surveillance system for organic pig herds that will enable the organic pig farmer to prevent selected pig diseases and welfare problems by monitoring and controlling the risk factors

The results obtained in this study will benefit animal health and welfare of pigs in organic production systems, as well as the productivity in these herds. Knowledge of risk factors for disease in organic pigs will facilitate efforts to improve animal health in organic pig production, and organic pig producers will benefit from improved animal welfare on-farm by applying an efficient and feasible disease management tool. This will assist in promoting more sustainable farming systems and supporting the rural economy with special relevance to small farmers. The expected improvement in animal welfare in organic pig production is expected to enhance consumer interest in organic pork, and consequently lead to an increased market share of organic meat for the benefit of the economy in organic pig production.

Furthermore, the project aims to identify relevant research needs related to parasite and disease management in organic pig production. This can be applied to target future research to the actual problems experienced in commercial organic production.

Short overview of main results

The project partners comprised about 20 researchers from 9 research institutes in eight countries (DK, DE, SE, UK, CH, IT, AU and FR). The project was rooted in 7 project meetings taking part from August 2007 to April 2010.

In short the project produced the following:

A knowledge synthesis reviewing the structure of organic pig production and current health monitoring systems applied throughout Europe were prepared. Specific chapters reviewing health and welfare problems and associated risk factors, for sows, suckling piglets, weaned piglets and fattening pigs, were included.

An epidemiological survey was carried through in six countries with participation of 104 organic pig herds. This included a description of the situation across and within all countries regarding farm characteristics, housing, nutrition, hygiene, preventive veterinary procedures as well as treatments and productivity, which were found to vary significantly within and especially between countries.

The survey revealed large differences in parasite prevalence and infection intensities within and between countries, but overall *Ascaris suum* (large round worm) was one of the most common intestinal worms.

Four generic HACCP inspired management tools for surveillance and control of parasites, piglet mortality, weaning diarrhoea, and sow farrowing and reproductive problems were produced. Problems were specified and risk factors were identified, based on the knowledge synthesis as well as expert opinion from participants of CorePIG and local advisers. The HACCP inspired management tools were applied in 32 farms. The main conclusions of an evaluation procedure were that the farmers and advisors recognised the potential of the HACCP inspired management tool as a surveillance and control programme. Furthermore, for the majority of farms the risk profiles had improved for the better throughout the application period.

The achieved knowledge has been – and are still - disseminated as project reports, per reviewed scientific papers, national farmer magazines, oral and poster presentations at workshops and conferences and through), distribution of leaflet and booklets as well as for the HACCP inspired management tools as MS Excel tools

1. Main results, conclusions and fulfilment of objectives

1.1 Summary of main results and conclusions

The project partners comprised about 20 researchers from 9 research institutes in eight countries (DK, DE, SE, UK, CH, IT, AU and FR). The project is composed of three work packages:

WP1 'Coordination of the project, dissemination and Knowledge synthesis',

WP2: 'Epidemiological study in organic herds' and

WP3: 'Development and evaluation of a HACCP based surveillance and management system'.

WP1 and WP2 started in 2007, while WP3 that built on the results from WP1 and WP2 started later - in 2008. The UK and CH-partners only participated in WP1 and WP3 while the remaining partners participated in all three WP's.

The project was initiated at the project kick-off meeting in Denmark, August 30-31st 2007, where all project partners met to discuss the planning of the project in detail. Further 6 project meetings were carried out in the project period. The second project meeting was organised in Austria, December 10-11th 2007, the third project meeting in Denmark, February 18-19th 2008, the fourth in France, July 7-9th 2008, the fifth in Italy, December 4.-7th 2008, the sixth in Sweden, June 29-30th 2009 and the final and seventh project meeting took place in Germany, April 7-10th 2010.

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WP1 'Coordination of the project, dissemination and Knowledge synthesis'

1st Period Summer 2007 - Summer 2008:

The WP1 arranged a series of three workshops in 2007-2008 with participation of scientists mostly from the partner institutions, to discuss animal health and welfare problems and related hazards in organic sows, suckling piglets, weaned pigs, and fattening pigs, respectively. Furthermore, herd health monitoring systems in organic pig production was a topic of discussion at these workshops. Based on these activities a draft version of a report reviewing literature regarding health and welfare, and risk factors specific to organic pig production was written - and it was planned that review chapters from this report later would be updated and submitted for publication in an international peer reviewed scientific journal. The report contained general chapters regarding the structure of organic pig production in Europe and current health monitoring systems applied throughout Europe. Further specific chapters reviewing health and welfare problems and

associated risk factors, for sows, suckling piglets, weaned piglets and fattening pigs, were included.

2nd Period Summer 2008- summer 2009:

The knowledge synthesis report on 'health and welfare in organic pigs – problem areas and future research' was revised and updated following feedback from group members on the first draft.

3rd Period Summer 2009 - December 2010:

The knowledge synthesis report was finalised. The final version of the report has been posted on the project website and in Organic Eprints, <http://orgprints.org/18419>, and the individual chapters are at present under preparation for submission as scientific papers to the themed issue of the journal 'Organic Agriculture'. A booklet 'Organic Pig Production in Europe' (reporting extracts from the final report as well as four leaflets on the HACCP based management tools on 'parasites', 'piglet mortality', 'weaning diarrhoea' and 'reproduction and farrowing', respectively have been prepared by the Swiss partner. The booklet is available in English, German, French and Swedish. The four leaflets on the HACCP are available in English and German. These deliverables are uploaded in Organic Eprints and on the COII intranet

The promised National farmer workshop activities as well as inputs to national farmer journal have either been carried out or are still running.

WP2 'Epidemiological study in organic herds'

1st Period Summer 2007 - Summer 2008:

A survey protocol was completed and the data collection session for the epidemiological survey was carried through in six countries during 2008, with participation of 104 organic pig herds (3 where finishing herds only, for what reason they are excluded from some of the analyses) in six partner countries (13-20 herds per country). In connection to the survey, calibration of parasitological laboratories in the partner countries was carried out, resulting in satisfactory performance of all laboratories. Reliability of the clinical parameters employed in the survey was tested during a practical session at one project meeting by analysis of inter-observer repeatability, with satisfactory results for most parameters.

2nd Period Summer 2008- summer 2009:

Data entry and analysis of the data from the epidemiological survey was carried out. This included description of the situation across and within all countries regarding farm characteristics, housing, nutrition, hygiene, preventive veterinary procedures as well as treatments and productivity. Furthermore, regarding mortality and parasites potential risk factors and outcome data were reported. As regards piglet mortality, farmers were for six months periods recording: farrowing date, sow identity, number of live born piglets, number of still born piglets, number of piglets added or taken away during cross fostering, number of piglets present at castration, number of piglets weaned and weaning age. A multiple correspondence analysis and subsequent hierarchical classification in order to identify types of farms based on characteristics related to reproductive performance was carried out. A total of 30 housing, management and animal parameters were used for classification and three types of indoor farms and two types of outdoor farms were identified. The overall findings were that the farm types did not differ regarding reproductive performance, except for the more extensive outdoor type, which had lower performances.

As regards parasites the survey revealed large differences in prevalence and infection intensities within and between countries, but overall *Ascaris suum* (large round worm) was one of the most common intestinal worms. High levels of *Strongyles* eggs were also detected, in France and Sweden additionally faecal cultures were set up to determine which *Strongyles* species were present. These proved to be primarily *Oesophagostomum* spp (nodular worm) but 6 French farms were positive for *Hyostromylus rubidus* (red stomach worm). *Trichuris suis* (whip worm) was also detected but at lower levels. In Italy, 3 herds were also positive for *Metastrongylus* spp (lung worm) though at very low levels. Lastly, the protozoa *Eimeria* spp (coccidia) was also shown to be highly prevalent. However, the clinical relevance of these in sows and finishers is not clear.

3rd Period Summer 2009 - December 2010:

The work package activities have been reported in a work package report 'Epidemiological study concerning the characteristics of organic pig farming in selected European countries'. This additional activity has been uploaded on the project home page and in Organic Eprints, <http://orgprints.org/18428/>. A paper on inter-calibration of a concentration McMaster technique will be submitted to the journal of Veterinary Parasitology in autumn 2011. Further dissemination activities includes presentation of the data at the conference of World association for the Advancement of Veterinary Parasitology as well as a peer reviewed paper on health of organic pigs in Europe including inter-observer-reliability results on animal based clinical measures, which is under preparation for publication in a themed issue of the journal 'Organic Agriculture'. The promised peer review papers regarding risk factors and prevalence of gastro-intestinal parasites and piglet mortality in European organic pig herds respectively are planned to be submitted in the summer 2011 – The latter for the above mentioned themed issue of the journal 'Organic Agriculture'.

WP3 'Development and evaluation of a HACCP based surveillance and management system'*1st Period Summer 2007 - Summer 2008:*

The development of four generic HACCP inspired management tools for surveillance and control of parasites, piglet mortality, weaning diarrhoea, and sow farrowing and reproductive problems was initiated by identifying potential risk factors, based on the literature review carried out in WP1 and expert knowledge provided by all partner countries during the first three workshops.

2nd Period Summer 2008- summer 2009:

The HACCP inspired management tools were further developed. This development included risk factor weightings according to expert opinion from participants of CorePIG and local advisers. The HACCP inspired management tools were applied in France, Germany, Austria and Denmark in 32 farms (May 2009 until January 2010). Based on initial problem identification by farmer interviews and checklist information farm individual HACCP inspired plans including risk profiling and listing of correcting activities were produced.

3rd Period Summer 2009 - December 2010:

The evaluation of the HACCP inspired management tool was initiated in the fourth quarter of 2009. Choice of methodology of the evaluation included the collection of farmer and advisor opinion as well as an analysis of potential change in 'before' and 'after' risk profiling of the individual farms. The Farmer part included a farmer interview on criteria for including/excluding correcting activities. The advisor part of the evaluation was carried out by consulting advisors in the 4 countries on their opinion on the HACCP inspired plans - national 'risk profiles' for 'piglet mortality' were agreed to be used as a model for this part of the evaluation. The main conclusions were that the farmers and advisors recognised the potential of the HACCP inspired management tool as a surveillance and control programme. Furthermore, for the majority of farms the risk profiles had improved at the end of the application period. Feedback from farmers and advisers, as well as issues surfacing during the on-farm trial were integrated in the HACCP inspired tools. The revised versions are presented at national workshops and in national magazines and are available in English, German and Danish. The French partners INRA and IBB funded additionally a further revision of the diarrhoea and fertility tools from national sources. The HACCP inspired tools and their evaluation are described in detail in the work package report 'Development and evaluation of a HACCP based surveillance and management system' which is uploaded in Organic Eprints (<http://orgprints.org/19312/>). The HACCP inspired management tools and their evaluation were and are still presented at national workshops and in national magazines (see list of deliverables).

1.2 Fulfilment of objectives

WP1 'Coordination of the project, dissemination and Knowledge synthesis':

A draft report on the promised knowledge synthesis was prepared in 2008, and individual chapters have subsequently been updated by the co-ordinating authors. The revisions have been incorporated in a final work package report which has been made publically available on the project website in February 2011. In addition to what was promised it has been agreed with the Editor in Chief that the chapters of this report will be submitted for publication as reviews in a themed issue of the international journal 'Organic Agriculture'. Thus, the objective of conducting an international knowledge synthesis by collating all available information on prevalence, risk factors and prevention of disease and parasite infestation in organic pig production was fully achieved. The Report from WP1 is the most comprehensive review of this subject available, and identified significant gaps in existing data on current practices in organic production and in current knowledge on the importance of different risk factors within this production sector.

WP2 'Epidemiological study in organic pig herds':

All activities and analyses planned for WP2 were carried out delayed and during the 2nd project period. The planned papers on risk factors for piglet mortality and parasites in European organic pig herds are under preparation. The following additional activities have been carried out: a project report reporting the results of the epidemiological study, a paper regarding inter-calibration of a concentration McMaster technique between eight European Countries, as well as a paper regarding animal based clinical health parameter and inter-observer reliability.

WP3 'Development and evaluation of a HACCP based surveillance and management system':

The MS excel® HACCP based management tools developed are available in English, German and Danish. The French partners INRA and IBB funded from national sources an adaption to French conditions of the 'weaning diarrhoea' tool and the tool focusing on 'Reproduction and farrowing problems'. These versions are available in French. CRA-SUI will until the end of 2011 translate HACCP tools into Italian and will distribute them in a CD to farmers. Choice of methodology of the evaluation of the HACCP inspired management tools included the collection of farmer and advisor opinion as well as an analysis of potential change in 'before' and 'after' risk profiling of the individual farms. The HACCP inspired tools and their evaluation are described in detail in the work package report 'Development and evaluation of a HACCP based surveillance and management system' which is posted on the homepage.

2. Milestones and Deliverables status

Milestone no:	Description	Planned time	Actual time
1	Project kick-off meeting	July 2007	August 2007
2	Knowledge synthesis workshops	September 2007	July 2008
3	Recording protocols for epidemiological survey developed	September 2007	February 2008
4	Epidemiological survey initiated	October 2007	March 2008
5	A generic draft of a HACCP plan developed	June 2008	December 2008
6	Epidemiological survey finalised	September 2008	November 2008
7	HACCP plan updated with estimated risks from survey	November 2008	August 2010
8	HACCP team established with organic pig farmers	December 2008	April 2009
9	HACCP plans implemented in 32 sow herds	February 2009	March 2010
10	HACCP plan evaluation finalised	December 2009	August 2010
11	Farmer and advisor workshop organised	December 2009	December 2010
12	Final HACCP plans completed	March 2010	February 2011
13	Final report on the project	June 2010	February 2011

Deliverable no:	Description	Planned time	Actual time
1	Report regarding health and welfare in organic pigs – problem areas and future research	February 2008	February 2011
2	Paper regarding prevalence of gastro-intestinal parasites in European organic pig herds	April 2009	August 2011
3	Article in farmer journal on survey results	July 2009	August 2010
4	Farmer and advisor workshops	December 2009	First one November 2008. (see dissemination list).
5	Report on HACCP plans	February 2010	February 2011
6	Article in farmer journal on HACCP plan	March 2010	Still running (see dissemination list).
7	HACCP plan description on the internet	March 2010	February 2011
8	Paper describing the development and evaluation of the HACCP plans	June 2010	July 2011 Available as Work Package Report
Additional activity 1 (1.1-1.5)	Submission of 5 manuscripts based on delivery 1 for publication in themed issue of international peer reviewed journal Organic Agriculture	--	Autumn 2011
Additional activity 2	Work package report 'Epidemiological study concerning the characteristics of organic pig farming in selected European countries'	--	February 2011
Additional activity 3	Submission of manuscript regarding inter-calibration of a concentration McMaster technique between eight European Countries for publication in international peer reviewed journal	--	August 2011
Additional activity 4	Submission of manuscript regarding characteristics of organic pig farms in selected European countries and their possible influence on reproductive performance for publication in themed international peer reviewed journal Organic Agriculture	--	Autumn 2011
Additional activity 5	Health of organic pigs in Europe: description of animal-based parameters and inter – observer reliability for publication in themed international peer reviewed journal Organic Agriculture	--	Autumn 2011

Additional comments (in case of major changes or deviation from the original list)

According to the original plan, the three workshops should all have been held in the autumn 2007, and the knowledge synthesis report printed in February 2008. However, it turned out to be difficult to arrange meetings additional to the project meetings, so it was decided to hold the workshops in conjunction with project meetings instead, thus enabling more participants to attend. This resulted in a 10-months delay compared to the original plan, in carrying through the series of three workshops. Furthermore, according to the original plan, the data collection for the epidemiological survey should have been carried through in autumn 2007 and spring 2008. However, due to a later initiation of the project (July 2007) than originally expected (April 2007) it was impossible to properly develop and calibrate a research protocol for use in early autumn 2007, which would have been appropriate as regards the parasitological data, and it was decided during the project kick-off meeting that the data collection should be carried through in the spring and autumn 2008 instead. All data collection activities and laboratory analyses planned for WP2 were therefore carried out during the 2nd project period.

The case for the project prolongation explained the major changes of the deviation from the original plans and is therefore repeated below:

In the midterm report covering the period up until December 2008 it has been reported that some project activities have been delayed according to the original plan. In the annual plan covering the period January 1st – December 31st 2009 the status of milestones and deliverables are given together with plans for completion of the work. It has not been possible in the period from ultimo December 2008 and up until now to make up for lost time. At the final project meeting in Witzenhausen April 2010 project partners agreed that except for one milestone, which at an earlier stage has been considered not accomplishable, all the remaining promised milestones and deliverables could be accomplished given a project extension.

A no-cost prolongation of the CorePig project until 31 December was therefore applied for and accepted.

In the 3rd project period the project coordination is handed over to Tine Rousing due to illness of the original co-ordinator Marianne Bonde.

3. Work package description and results:

WP 1	Coordination of the project, dissemination and Knowledge synthesis
Responsible partner: no 1 DJF Marianne Bonde	
<p>Description of work (From the project application): Three international workshops will be held with participation of leading experts in diseases and parasites in organic pig production in Europe. Experts from all involved partners will be involved in the workshops. The aim of the workshops is to synthesise current knowledge in the subject area, define appropriate measures of health status which can be used in on-farm monitoring in WP2 and WP3 and identify the further research needs which might be addressed in a FP 7 research project on animal health, welfare and production in organic pig production. Furthermore this WP will be responsible for the coordination of the project, as well as organising and coordinating the dissemination of project results.</p>	
<p>Final report on work carried out and results compared to the original plan/WP aims: A- work carried out and results obtained: The first workshop in WP1 was organised in conjunction with the project kick-off meeting in August 2007, and was attended by 13 scientists from the eight partner countries, and 1 external expert from University of Helsinki, Finland. The main focus of this workshop was to identify health and welfare problems in organic pig production, and further to discuss potential hazards in the housing and management of organic pigs that may lead to poor welfare. It was decided that the report should consist of 6 chapters; 2 general chapters regarding structure of organic pig production in Europe, and health and welfare monitoring systems, respectively; and 4 specific chapters referring to health and welfare problems and risk factors in each of the specified animal age groups: sows, suckling piglets, weaned piglets and fattening pigs, respectively. The second workshop was organised in conjunction with the project meeting in December 2007 and was attended by 16 scientists from the eight partner countries. The chapter editors presented a status report on their work and got input from the partners. Further, potential on-farm health measures to be applied in WP2 were debated, and it was agreed that the clinical examination of sows, suckling piglets and weaned piglets should be carried out according to a protocol based on the work in the EU-project WelfareQuality. The third workshop was organised in conjunction with the project meeting in July 2008, and was attended by 16 scientists from the eight partner countries. The focus was input from WP1 to WP3. During autumn 2008 the chapter editors revised the chapters, and the first draft of the full report was discussed at the project meeting in December 2008. An updated final report was produced in February 2011.</p>	
<p><i>Results/conclusions from the knowledge synthesis (summary from attached project report):</i> Although all organic pig production is governed by <i>Council Regulation (EC) No 1804/1999</i>, the typical housing and husbandry systems vary between countries as a result of differences in national legislation, certification body standards and climatic conditions. Scientific information on health status and risk factors in organic pig production was found to be very scarce. Sows have more behavioural freedom, but may be exposed to greater climatic challenges, parasite infestation and risk of body condition loss. Issues with particular importance for organic production include outdoor access, roughage feeding, later weaning, less sophisticated diets and lack of good health management strategies. It seems that piglet mortality is relatively high in organic farming but with a high variability between farms suggesting that improvement is easily feasible. Issues with particular importance for organic production are (a) control of the microclimate surrounding neonatal piglets, (b) management strategies to decrease the risks of germ and parasite infections, (c) selection of genotypes adapted to organic farming with special emphasis on robustness. Diseases around weaning are multifactorial in nature. In general, not one but several factors are in place, simultaneously imposing stressors at weaning. Trying to disentangle the various factors by a mono-causal approach can much diminish the combined response. The use of antibiotics in herds with organic fattening pigs is lower compared to herds with conventional pigs. Slaughter data indicate that organic pigs have fewer respiratory problems, skin lesions (including abscesses and hernias) and tail wounds compared to conventional pigs. On the other hand white spot livers and joint lesions are more common among organic pigs. The most important health concern among</p>	

organic farmers seems to relate to endo- and ectoparasites. In general there are many different methods, parameters and data to measure and to monitor animal health and welfare. The challenge is for most countries to combine and link different sources in order to make good use of available information. The information gathered in this review formed the basis for the subsequent development of tools for use in a HACCP inspired management and surveillance system for organic pig herds.

Results/conclusions regarding Dissemination activities:

Please find status in section 4 'Publications and dissemination activities'

B- comments on deviations from the original plan:

According to the original plan, the three workshops should all have been held in the autumn 2007, and the knowledge synthesis report printed in February 2008. However, it turned out to be difficult to arrange meetings additional to the project meetings, so it was decided to hold the workshops in conjunction with project meetings instead, thus enabling more participants to attend. This resulted in a 10-months delay compared to the original plan, in carrying through the series of three workshops, as well as a delay in the publication of the first deliverable – the knowledge synthesis report. A draft report on the knowledge synthesis was prepared in 2008, and individual chapters have subsequently been updated by the co-ordinating authors. The revisions have been incorporated in a final work package report which has been made publically available February 2011 on the project home page. It has been agreed with the Editor in Chief that the chapters of this report will be submitted for publication as reviews in a themed issue of the international journal 'Organic Agriculture'. The deviation from the original plan meant that further dissemination plans have been delayed.

WP 2	Epidemiological study in organic pig herds
Responsible partner: Responsible partner: no 2 UKAS Albert Sundrum	
Description of work (From the project application):	
<p>Information on the health status of sows and piglets in organic pig farming is scarce. A current investigation in Germany (BLE-Project 05 OE 019), focusing on the objective to improve overall herd health via the implementation of farm-specific health plans, indicates the need for health improvements in organic farming. In order to set up a disease-specific HACCP-based management and surveillance programme, well-founded and comparable epidemiological data are needed from different countries representing various conditions for organic pig production in Europe.</p> <p>The epidemiological study will be performed in 100 sow herds in 6 European countries (Denmark, Germany, Austria, Sweden, Italy and France) over a time period of 12 months. In order to achieve representative data for each country involved, a distribution of 16-20 sow herds in each country is favoured. Minimum herd size and production type (including fattening / piglet production only), which are representative of national practice will be defined after consultation within the participating countries.</p> <p>The disease levels in these sow herds will be estimated via interviews with the herd owner and interpretation of farm recordings of livestock data collected over a minimum time period and including:</p> <ul style="list-style-type: none"> • medicine usage • pre- and post weaning mortality • culling reasons • vaccination protocols <p>The parasite level in pigs post-weaning will be estimated from parasitological analysis of faecal samples collected from a sample of 3x10 pigs per farm in fixed seasons autumn and spring in all participating herds. These data will be supplemented by on-farm investigation and slaughterhouse data acquisition to better specify animal health status. Also, the researchers will interview the herd owner about the management and potential risk factors for parasites, diseases and mortality.</p> <p>WP1 will define parameters that will be considered in a clinical examination performed on every sow and litter until weaning, as well as parameters for more detailed diagnostics such as blood and</p>	

faecal examinations (using sampling methods and strategies applicable on-farm for herd screening purposes) and slaughterhouse findings. These measures will be used to supply accurate prevalence data for the current and ongoing studies.

A joint epidemiological analysis will be conducted to allow the development of a contemporary and relevant HACCP based surveillance and management system (WP3) that enables a stepwise improvement of animal health of sows and piglets in organic pig production.

Final report on work

A- work carried out and results obtained:

Initial discussion of the research protocol for the survey was carried through at the project meeting in August 2007 and, based on the discussion at this meeting; the WP2 leader presented a revised protocol at the meeting in December 2007. Following discussion at the second workshop in WP1, it was decided to base the clinical examination of animals on protocols developed and evaluated in the EU-project WelfareQuality. In February 2008, a two-day training session was organised in Denmark to familiarise the WP2 project group with the recordings in the survey, and to further discuss the protocol. Eleven project participants were involved in this meeting, which included training on the clinical protocol in two organic pig herds. A further workshop (in France) was focused on inter-observer reliability of clinical parameters. Data collection was carried through in the spring and autumn 2008, followed by data analysis. A final report summarising the results from the epidemiological study was produced in February 2011. This work package report is enclosed with the present final project report and is available on the home page.

Results/conclusions from the analysis of inter-observer reliability of clinical parameters.

For sow parameters pair wise agreement between observers was best (mean PABAK > 0.80) for the lameness, mastitis, metritis, panting, respiratory problems, diarrhoea, solid faeces, tail length and vulva lesions. Agreement on all parameters was more than satisfactory except for skin alterations and dirtiness (mean PABAK < 0.3 and PABAK ranges included negative numbers). Regarding piglet parameters, observer agreement for suckling piglet parameters was very good for lameness, panting, respiratory problems and splay legs (all PABAK \geq 0.93, Po \geq 0.96, W = 1). For dirtiness and diarrhoea PABAK were 0.78 and 0.80, Po were 0.89 and 0.90 and W were 0.13 and 0.22, respectively. For all weaned piglet parameters but dirtiness and presence of runts average PABAK were \geq 0.88. Kendall's W ranged from 0.11 (respiratory problems) to 1.00 (lameness, panting, splay leg). Agreement on dirtiness and presence of runts was not satisfactory (PABAK ranges included 0 and below, average PABAK were 0.20 and 0.60, respectively).

Results/conclusions from the epidemiological study (summary from attached work package project report):

Literature reviews (see also report of WP1) revealed that there is limited information on the health and welfare of sows in organic production systems. Therefore, interviews and on-farm assessments were conducted in a total of 104 organic pig farms in different European countries. The objectives were to gain knowledge about the current farm and management conditions and the health status of organic pigs in Europe and to identify possible risk factors and constraints that could be considered when trying to improve animal health status. The questionnaire comprised a total number of 215 questions, covering housing conditions, management routine and feeding regime as well as preventive, hygienic and therapeutic health measures and available data about the animal health status. Participating countries were: Austria, Denmark, France, Germany, Italy, and Sweden. 66 farms kept at least one age group of pigs outdoors while 35 farms kept their pigs exclusively indoors, for the most part with a concrete outside run. On average, 74.6 (\pm 106.6) sows were housed per farm. Housing conditions on organic pig farms were characterised by a large heterogeneity within and between European countries. The variation was further increased by the fact that some organic farms were dealing simultaneously with different housing systems for pigs of the same life stage. Concerning the portion of bought-in-feedstuffs in relation to the total feed consumed, 52 farms indicated that more than 50 % of the feed ration consisted of home-grown feed. 43 farmers declared that less than 50 % of the feed originated from the farm whereas only 6 farms produced 100 % of their feed themselves. In general, knowledge of the farm manager about the quality of feed ingredients used and the composition of the diets were low. Only few farmers made use of multiple phase-feeding in the different life stages of the pigs. There is reason to suspect that the feeding regimes were suboptimal on some organic pig farms, leaving ample room

for easily feasible improvements. Genotypes used on the maternal and paternal side differed widely between countries. Artificial insemination was carried out on 53.9 ± 38.0 % of the investigated farms. 20 farms favoured natural service while 6 % of the farms used artificial insemination only. With respect to the health management, some farms made comprehensive use of the various options such as quarantine, vaccination or parasite and rodent control, whereas many farmers did not implement preventive measures, including appropriate hygiene and disinfection measures. On the majority of organic farms with indoor housing, the options for disinfection were hindered by the fact that many farms were not able to implement an all-in all-out concept as they did not possess partitioned buildings which could have been cleaned and disinfected separately without the risk to contaminate pigs in the same building. 82 % of the farms received data on pathological findings of fatteners from the abattoir, whereas only 54 farms had abattoir data on sows available. In correspondence with the large variation in the living conditions for pigs, also production data and mortality rates differed widely between organic pig farms. According to the estimation by the farmer concerning the occurrence of selected animal health problems, mortality of suckling piglets and weaners and weaning diarrhoea were named as the most relevant diseases problems. Although dedicated to the same minimum standards, organic pig farming does not provide the same living conditions or a homogenous outcome of animal health parameters. Thus, organic standards do not automatically lead to a high status of animal health but, like all systems, also depends on the quality of management. Differences in management practices, restrictions in the availability of resources (labour time, financial budget etc.), and a lack of feedback and control mechanism within the farm system appears to be a main reason for the substantial variation between farms.

Note - the selected farms do not represent typical national farm situations in all countries, as the agreed inclusion criteria across countries did for example not allow to include farms with finishing pigs only.

Results/conclusions from the epidemiological analyses focusing on piglet mortality and parasites:

It was chosen to focus the data analysis from the epidemiological survey on parasites and piglet mortality, as it turned out, that it was not possible to identify a reliable outcome measure of weaning diarrhoea. Increased knowledge on these aspects is of utmost importance to improve reproductive performance of organic pig farms. The analyses therefore focused on identifying prevalence and identifying risk factors for those conditions, based on information on management, housing, animal health and performance collected in a survey in six EC countries. Analyses regarding the possible influence of management and housing and animal characteristics on piglet production included 82 farms. Due to reduced record quality, 42 of the 82 farms were used for an analysis based on production records. Farms were classified as "indoor" (n = 49) and "outdoor" (n = 33) depending on where sows were kept during the first two weeks after farrowing. Each group of farms was submitted to a multiple correspondence analysis and subsequent hierarchical classification in order to identify types of farms based on characteristics related to reproductive performance. A total of 30 housing, management and animal parameters were used for the classification and three types of indoor farms and two types of outdoor farms were identified. Farm types did not differ regarding reproductive performance, except for the more extensive outdoor type, which had lower performances. Production records showed a detrimental influence of litter size at birth on piglet mortality and that high standard deviation in litter size may exacerbate this problem. A paper on this is under preparation for submission in an international peer reviewed journal.

The parasite data from the epidemiological survey showed that strongyles was the overall most common group of intestinal worms in European organic pigs with prevalence ranging from 11-69% in weaned pigs (approx 12 weeks old), 18-69% in large fatteners and 46-94% in sows. In France and Sweden faecal cultures were examined to determine the species of strongyles which were mostly *Oesophagostomum* spp (nodular worms) but some French farms also had some *Hyostrongylus rubidus* (red stomach worm). The second most common worm species was *Ascaris suum* (large round worm) as 3-53% weaners, 17-74% large fatteners and 2-27% sows were found to be positive for eggs. In addition, *Trichuris suis* were detected in 1-58% of weaners, 6-46% of fatteners and 3-10% of sows. In a few Italian herds a few pigs were also found to harbour *Metastrongylus* spp (lung worms). Overall, *A. suum* and *T. suis* followed similar distribution

patterns in that prevalence increased with age (culminating in fatteners) until immunity sets in eliminating worms and leaving most older animals (i.e. sows) immune. In contrast, the strongyles infections may accumulate over time so that the highest infection levels and prevalence occur in the holder animals. Though infection levels of individual animals were highly variable for all species, the overall high prevalence of parasites demonstrates that strategic parasite control should be integrated in organic farm management. *Coccidia (Eimeria spp)* were highly prevalent in all countries. The highest prevalence was found in fatteners and sows. However, it is generally believed that unless naive animals are exposed to very high infection levels *Eimeria* species are fairly harmless for pigs that are gradually exposed.

Variation within and between countries was very high for the different parasite species but overall, Germany and Austria had fewer parasites compared to Sweden, France, Italy and Denmark. This may in part reflect that in Germany and Austria most pig are indoors with access to only a concrete outdoor run whereas pigs in the other countries at some point during their life have access to pastures. Pastures are believed to be one major risk factor for parasite infections as the parasite eggs cannot be removed once the pastures have been contaminated. Parasites such as *A. suum* and *T. suis* are transmitted through thick shelled eggs that can survive for at least 9 years on pastures, whereas some measure of control can be achieved indoors through good hygiene. In addition, discussions within the consortium seemed to indicate that ant parasitic treatment may also have been used more frequently in Germany and Austria. There are two papers on this under preparation for submission in international peer reviewed journals.

It was attempted to combine the parasitological data and the large amount of data collected through the questionnaire in an attempt to determine the most important risk factors for parasite infections. Unfortunately, the data could not be normalised through transformation for parametric testing. The data were therefore analysed using classification trees but farm management systems proved far too diverse for the test to detect consistent and biologically relevant risk factors. This part of the data analysis was therefore abandoned.

Results/conclusions regarding Dissemination activities:

Please find status in section 4 'Publications and dissemination activities'

B- comments on deviations from the original plan:

In the original plan, the data collection for the survey should have been carried through in autumn 2007 and spring 2008. However, due to a later initiation of the project (July 2007) than originally expected (April 2007) it was impossible to properly develop and calibrate the research protocol for use in early autumn 2007, which would have been appropriate as regards the parasitological data, and it was decided during the project kick-off meeting that the data collection should be carried through in the spring and autumn 2008 instead. All activities and analyses planned for WP2 were carried out during the 2nd project period.

The following additional activities have been carried out: a work package report detailing the results of the epidemiological study and writing of a paper regarding inter-calibration between eight European Countries of a concentration McMaster technique for parasite assessment.

WP3	Development and evaluation of a HACCP based surveillance and management system
Responsible partner: no 1 DJF Marianne Bonde	
Description of work (From the project application): HACCP plans will be developed by experts from at least three European countries, based on literature review as well as the epidemiological results from WP2. The HACCP plan will focus on piglet health and welfare problems, e.g. high pre- or post weaning mortality, or high incidence of parasites or clinical health problems such as weaning diarrhoea.	
The HACCP plans developed in WP3.1 will identify animal health and welfare hazards, risk factors and suggest a list of critical control points and corrective actions.	

This will be carried out in three subtasks each with focus on a specific health and welfare problem on-farm:

- WP3.1.1: HACCP plan for control of parasites (responsible: Allan Roepstorff, LIFE)
- WP3.1.2: HACCP plan for control of piglet mortality and weaning diarrhoea (responsible: Bo Algers, SLU)
- WP3.1.3: HACCP plan for sow reproduction problems (responsible: Barbara Früh, FIBL)
-

In four partner countries (Denmark, Germany, France and Austria) local HACCP teams will be set up consisting of researchers as well as organic farmers. The teams will identify critical levels for the control points suggested in WP3.1 and develop the on-farm monitoring system for groups of 8 organic sow herds in each country.

The HACCP based surveillance programme will thus be implemented and used in 32 sow herds through a 10-month period. During this period, information regarding e.g. parasite infestation, piglet mortality, reproduction, and medicine usage will be collected.

The surveillance system will be evaluated based on time required for the monitoring, number of alarms/corrections, and interviews with the participating farmers regarding their experiences with the system.

Final report on work carried out and results compared to the original plan/WP aims:

A- work carried out and results obtained:

The work in this work package was initiated at the project meeting in July 2008, where the HACCP approach was discussed, and working groups were appointed for the selected welfare problems: Piglet mortality, weaning diarrhoea, parasites, and farrowing/reproduction problems. In the original plan three working groups were anticipated, but the project partners all agreed that piglet mortality and weaning diarrhoea should be addressed separately, and therefore four working groups were appointed.

During autumn 2008 and at the project meeting in December 2008 discussed the identification risk factors and the development of a generic HACCP based management systems for the selected problems. In 2009 local HACCP teams for the four selected problems were established, and the HACCP inspired management systems in terms of control points, critical levels and corrective actions was identified by the project group as well as by local teams. These activities included risk factor weightings according to expert opinion from participants of CorePIG and local advisers.

Hereafter, farm individual HACCP inspired plans were implemented for 6 to 9 months in a total of 32 farms in France, Germany, Austria and Denmark: 8 farms in France, 8 in Austria, 8 in Denmark and 8 in Germany. The farm individual HACCP plans were produced by local HACCP teams and were based on risk profiling developed from initial problem identification produced by individual farmer interviews and checklist information. At the end of the implementation period problem identification and risk profiling on the individual farms were repeated following the same procedure as mentioned above. The implementation activities were initiated in France. Based on the experiences from this implementation and some further project group decisions on software developments as well as an expert opinion follow up on risk factor weightings, some adjustments were made.

Overview of the numbers of farms where tools were applied in the partner countries:

tool topic	applied on N farms				total
	AT	DE	DK	FR^a	
Parasites	2	2	0	3	7
Weaning diarrhoea	2	2	3	4	11
Piglet mortality	2	2	2	5	11
Reproduction and farrowing problems	2	2	3	4	11
N tools applied per farm	1	1	1	2	1 to 2
Total N farms visited	8	8	8	8	32

^a France applied a draft tool at first visits and the draft and project-level tools at second visits

The HACCP inspired tools produced in this project consist of MS Excel tools, which were developed based on a “HAT- Tailbiting tool” (Taylor et al, pers. comm., 2008).

Detail information on the evaluation of the HACCP inspired management tool was initiated in the fourth quarter of 2009 and has been presented in a work package report ‘Development and evaluation of a HACCP based surveillance and management system’ which has been posted on the homepage. The choice of methodology of the evaluation included the collection of farmer and advisor opinion as well as an analysis of potential change in ‘before’ and ‘after’ risk profiling of the individual farms. The Farmer part included a farmer interview on criteria for including/excluding correcting activities. The advisor part of the evaluation was carried out by consulting advisors in the 4 countries on their opinion on the HACCP inspired plans - national 'risk profiles' for 'piglet mortality' were agreed to be used as a model for this part of the evaluation.

As described in the work package report the main conclusions were that the study farmers the potential of the HACCP inspired management tool. The positive and negative list included in the HACCP tools was found to be a good starting point for discussion. The advisors suggested that the tool should be further developed to include only country specific aspects and that solution proposals could benefit from cost-benefit-analyses. Furthermore, as illustrated in Figure 1, 2 and 3 for the majority of farms (16 out of 20) the risk profiles improved after application of the HACCP tool As illustrated in figure 4 the four HACCP tools are listed, with farmers’ responses to questions on who should use the HACCP tool in the future, should interpret the output and implement the action plans after the farmer has completed the HACCP tool. Generally, the farmers thought that the implementation process should be assisted by an adviser.

Feedback from farmers and advisers, as well as issues surfacing during the on-farm trial were integrated in the HACCP inspired tools. The revised versions are available on the home page as well as in ‘drop boxes’

- in English: http://dl.dropbox.com/u/9437274/HACCP-tools_EN.zip
- in German: http://dl.dropbox.com/u/9437274/HACCP-tools_DE.zip
- in French: http://dl.dropbox.com/u/9437274/HACCP-tools_FR.zip.

The Danish versions are available by addressing the Danish partners.

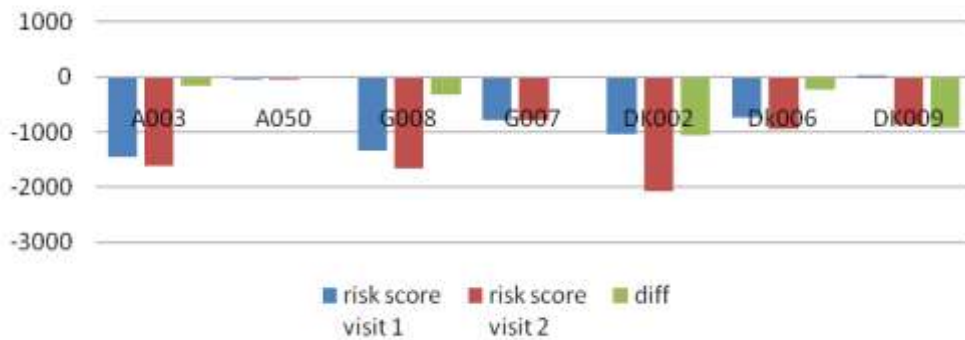
The versions of weaning diarrhoea and reproductive problems were additionally adapted to French conditions and by the French partners INRA and IBB (funded nationally) and are available in French at <http://www.interbiobretagne.asso.fr/elevage-2-45.html#corepig> (http://www.interbiobretagne.asso.fr/upload/File/Recherche/Elevage/Corepig/Corepig_Outil_Diarrhees_PS_1_0.xls, http://www.interbiobretagne.asso.fr/upload/File/Recherche/Elevage/Corepig/Corepig_Outil_Fertilite_1_0.xls).

The HACCP based management systems are presented at national workshops and in national magazines and are available versions in English, German and Danish. The French partners INRA and IBB funded additionally a further revision of the diarrhoea and fertility tools from national sources.

Farrowing and reproduction problems



Weaning diarrhea



Piglet mortality total

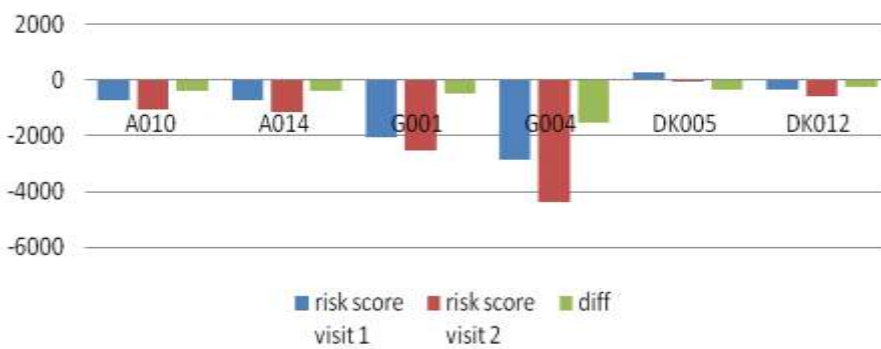


Figure 1+2+3 shows the risk scores on the y-axis and the different farms on the x-axis. The green column shows the difference (Diff) between risk score at the initial farm visit (blue column) and risk score at the final farm visit (red column). If Diff is negative, the farm has improved the management according to the HACCP tool, since a negative difference indicates a reduction in risk.

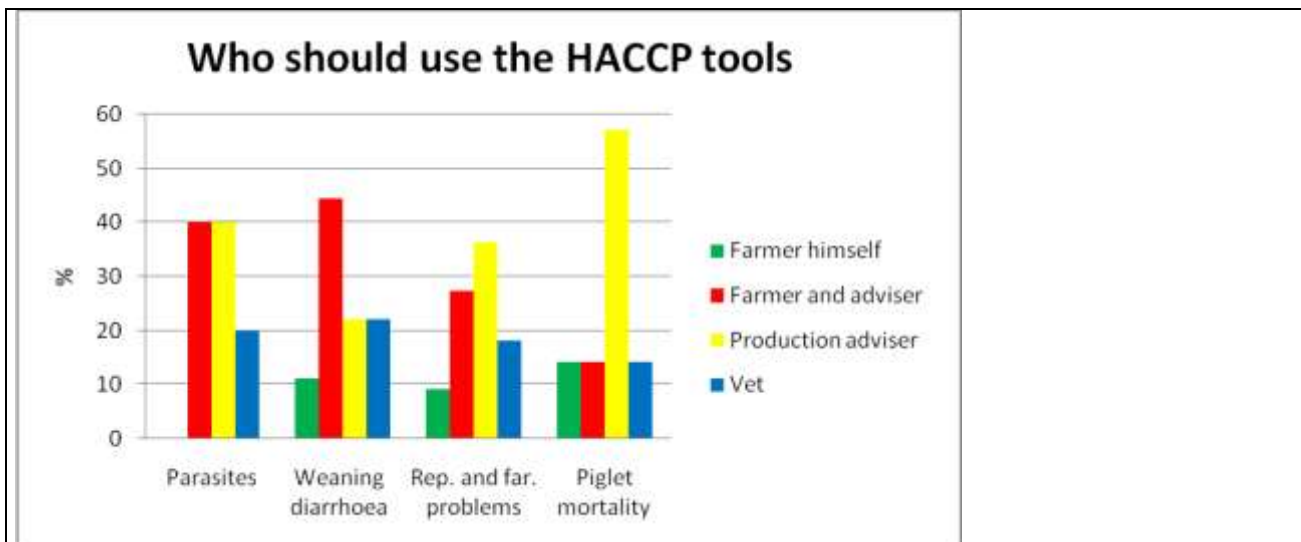


Figure 4 shows in percent on y-axis the farmers' opinion who should use the HACCP tool in the future for the 4 different HACCP inspired management tools.

Results/conclusions regarding Dissemination activities:

Please find status in section 4 'Publications and dissemination activities'

B- comments on deviations from the original plan:

Due to the delay in WP1 and WP2, the WP3 was initiated approximately 7 months later than expected. According to the original plan, the data collection for the epidemiological survey should have been carried through in autumn 2007 and spring 2008. However, due to a later initiation of the project (July 2007) than originally expected (April 2007) it was impossible to properly develop and calibrate the research protocol for use in early autumn 2007, which would have been appropriate as regards the parasitological data. Thus, it was decided during the project kick-off meeting that the data collection should be carried through in the spring and autumn 2008 instead. All data collection activities and laboratory analyses planned for WP2 were carried out during the 2nd project period. Due to the delays in WP2 the generic HACCP inspired management tools were developed based on literature and weightings of risk factors, carried out by experts. Furthermore, as originally planned – due to the mentioned delays - the implementation of the HACCP inspired management tools and the WP2 data collection was not running parallel. Therefore the evaluation did not include clinical output data.

The coordination of the development of the HACCP tools was originally planned to be the task of DJF. However, due to staff changes at DJF, BOKU coordinated the HACCP development and on-farm trials in Austria, Denmark and Germany. DJF coordinated the evaluation of the HACCP tools.

4. Publications and dissemination activities

4.1 List

Project website(s)

Address	Authors: (name + institution acronym)	When was it last updated	Language	Comments
http://corepig.coreportal.org/?page_id=1	Marianne Bonde University of Aarhus, Faculty of Agricultural Sciences, Department of Animal Health and Bioscience (AU-DJF)	February 2011	English	Original home page is no longer existing. Deliverables are either in Organic Eprints or placed in the COII intranet, in both cases with direct links from this report.

Deliverables

Planned / actual date	Title:	Authors: (name + institution)	Where is it available	Language	Comments
Deliverable 1: Report reg. health and welfare in organic pigs – problem areas and future research					
February 2011	Final Work package report 'Knowledge synthesis: Animal health and welfare in organic pig production'	Edwards (NEWC) (Eds.)	http://orgprints.org/18419	English	Autumn 2011: Submission of 5 manuscripts based on Delivery 1 results for publication in themed issue of international peer reviewed journal 'Organic Agriculture'
Deliverable 2: Paper reg prevalence of gastro-intestinal parasites in European organic pig herds					
August 2011	Prevalence of gastro-intestinal parasites in European organic pig herds	Roepstorff (LIFE) et al.		English	In preparation for submission
Deliverable 3: Articles in farmer journal on WP2 survey results					
December 2009	Schweine auf gesunden Klauen.	Leeb (BOKU) et al.	Bioland 12/2009 (p 14-16)	German	
January 2011	Les résultats du programme Corepig.	Ripoche (Biofil)	Biofil. Jan/Feb 2011. (p 11)	French	
March-April 2011	Prévenir la santé des porcs en élevages biologiques : les apports du projet Corepig.	Lubac (IBB)	Alter Agri. March-April 2011	French	
March 2011	Porc Biologique, programme européen Corepig.	Calvar (Chambre d'Agriculture Bretagne)	Atout Porc. March 2011 (p 22-24)	French	

3 June 2011	Værktøjer til sundhedsstyring af søer på friland	Rousing (DJF) et al	http://orgprints.org/19189	Danish	
Deliverable 4: Farmer and advisor workshops / Input to farmer and advisor workshops					
November and December 2008	A series of five presentations (November 23 th , 25 th and December 1 st , 2 nd and 10 th) introducing CorePIG and presenting results from WP1 to Austrian farmers, (joint activity with BioAustria), Austria		BOKU	National	
November 2009	A series of four (November 17 th , 18 th , 24 th and 25 th) presentations to Austrian farmers on the results of WP2, Austria		BOKU	National	
10 March 2010	Workshop: COREPIG: HACCP-based management tool ("risk checklist")- introduction and demonstration of tool; evaluation by advisors, Austria		BOKU	National	
December 2010	National Workshop including a report on the epidemiological study and presentation of the HACCP-based planes , France		IBB	National	
March 2011	Organic farmer and advisor workshop including a report on the epidemiological study and presentation of the HACCP-based planes, France		IBB	National	
18 May 2011	Theme meeting on organic and conventional free ranging of sows, Denmark, Økologisk svineproduktion I Europa: Status på sundhed og velfærd http://orgprints.org/18884		AU-DJF	National	
December 2011	Organic Pig Production course December 2011, Switzerland		FIBL	National	
Spring 2012	International conference of organic pig production, spring 2012, Germany		UKAS	International	
Deliverable 5: Report on HAACP plans					
February 2011	'Organic Pig Production in Europe' (Work package Report on HAACP plans, Deliverable 5)	Frueh (FIBL) et al	Circulated at farmer and advisor workshops, courses etc. http://orgprints.org/19166-19169	English	Available as a technical guide in English, German, French and Swedish, will be translated to Italian until end of 2011
Deliverable 6: Articles in farmer journals on HACCP plan					
May 2011	Værktøjer til sundhedsstyring i frilandsbesætning.	Rousing, Møllegaard Knage-Rasmussen & Bonde. AU-DJF	Intern rapport Nr. 106. Temamøde om økologisk og konventionel frilandsproduktion. (Eds. Sørensen, J.T & Hermansen, J.T), p 26-29, 18. maj 2011, AU, Denmark http://orgprints.org/18883		
January 2011	4 outils de diagnostic pour les porcs	Ripoche (Biofil.)	Biofil. Jan/Feb (p38-39)		
June 2011	Værktøjer til sundhedsstyring af søer på friland	Møllegaard Knage-Rasmussen, Bonde & Rousing, AU-DJF	Landbrugsavisen June 3rd 2011 (p 20)		
August 2011	Von einander lernen - CorePIG	Leeb, Dippel & Winckler	Next issue of BioAustria Journal (4/2011)		

Summer 2011	Landmænds og rådgiveres evalueringer af værktøj til sundhedsstyring af søer på friland	Møllegaard Knage-Rasmussen, & Rousing, AU-DJF	Next issue of ICROFS-NYT
February 2011	HACCP for Parasite Control (leaflet)	Dippel (BOKU/FLI) & Früh (FIBL) et al.	Circulated at farmer and advisor workshops, courses etc. http://orgprints.org/19369,19370
February 2011	HACCP for Piglet Mortality (leaflet)	Dippel (BOKU/FLI) & Früh (FIBL) et al.	Circulated at farmer and advisor workshops, courses etc. http://orgprints.org/19373,19374
February 2011	HACCP for Weaning Diarrhoea (leaflet)	Dippel (BOKU/FLI) & Früh (FIBL) et al.	Circulated at farmer and advisor workshops, courses etc. http://orgprints.org/19367,19368
February 2011	HACCP for Reproduction and Farrowing Problems (leaflet)	Dippel (BOKU/FLI) & Früh (FIBL) et al.	Circulated at farmer and advisor workshops, courses etc. http://orgprints.org/19371,19372
Deliverable 8: Paper describing the development and evaluation of the HACCP plans			
July 2011	'Development and evaluation of a HACCP based surveillance and management system'	Dippel (FLI) and Knage-Rasmussen (AU-Animal Science) (Eds.)	http://orgprints.org/19312/ English Available as Work Package Report

Additional Deliveries - Project reports and Peer reviewed papers (listed in WP order)

Planned/ actual date	Title:	WP	Authors: (name + institution acronym)	Name of Magazine	Comments
2011 planned	Diversity of organic pig production systems in Europe	1 Additional deliverable 1.1	Früh (FIBL) Bochicchio (CRA) Edwards (NEWC) Hegelund (DJF) Leeb (BOKU) Heinonen (Helsinki) Maupertuis (CRAPL) Prunier (INRA) Sundrum (UKAS) Werne (FIBL) Wiberg (SLU)	Organic Agriculture – themed issue	In preparation for submission
2011 planned	Animal health, welfare and production problems in organic pregnant and lactating sows	1 Additional	Edwards (NEWC) Mejer (LIFE)	Organic Agriculture – themed issue	In preparation

Planned/ actual date	Title:	WP	Authors: (name + institution acronym)	Name of Magazine	Comments
		deliverable 1.2	Prunier (INRA) Roepstorff, (LIFE)		for submission
2011 planned	Animal health, welfare and production problems in organic suckling piglets	1 Additional deliverable 1.3	Prunier (INRA) Lubac (IBB) Edwards (NEWC) Mejer (LIFE) Roepstorff (LIFE)	Organic Agriculture – themed issue	In preparation for submission
2011 planned	Animal health, welfare and production problems in organic fattening pigs	1 Additional deliverable 1.4	Lindgren (SLU/JTI) Bochicchio (CRA) Hegelund (DJF) Leeb (BOKU) Mejer (LIFE) Roepstorff, (LIFE) Sundrum (UKAS)	Organic Agriculture – themed issue	In preparation for submission
2011 planned	Methods of monitoring and managing pig health and welfare	1/2 Additional deliverable 1.5	Leeb (BOKU) Bochicchio (CRA) Edwards (NEWC) Früh (FiBL) Knage-Rasmussen (DJF) Prunier (INRA) Sundrum (UKAS) Winckler (BOKU) Wiberg (SLU)	Organic Agriculture – themed issue	In preparation for submission
February 2011	Epidemiological study concerning the characteristics of organic pig farming in selected European countries	2 Additional deliverable 2 http://orgprints.org/18428/	Sundrum (UKAS) (Eds.)		Available as Work Package Report
August 2011	Inter-calibration of a concentration McMaster technique between eight European Countries	2 Additional deliverable 3	Mejer (LIFE) et al.		In preparation
Autumn 2011	Characteristics of organic pig farms in selected European countries and their possible influence on reproductive performance	2 Additional deliverable 4	Prunier (INRA) et al.	Organic Agriculture – themed issue	In preparation for submission
Autumn 2011	Health of organic pigs in Europe: description of animal-based parameters and inter – observer reliability	2 Additional deliverable 5	Dippel (BOKU/FLI) Bochicchio (CRA) Bonde (DJF) Dietze (UKAS) Gunnarsson (SLU) Lindgren (SLU/JTI)	Organic Agriculture themed issue	To be submitted for themed issue

Planned/ actual date	Title:	WP	Authors: (name + institution acronym)	Name of Magazine	Comments
			Prunier (INRA) Sundrum (UKAS) Wiberg (SLU) Winckler (BOKU) Leeb (BOKU)		

Further dissemination activities – Some overlap in the below to the deliverable list may occur

Conference papers and book chapters

Planned/ actual date	Type and Title of contribution:	WP	Book title / Conference:	Partners involved: (partner acronyms)	Type of audience (General public, higher education, researchers, industry, farm sector, advisors etc.)	Size of audience	Countries addressed
2007	System approach to improve animal health.	1	In: Zollitsch, W., C. Winckler, S. Waiblinger, A. Halsberger (eds.), Sustainable food production and ethics. Wageningen Academic Publishers, p. 360-364.	UKAS	Researchers		
2007	Quality production in organic, low-input and conventional pig production.	1	In: Cooper, J., U. Niggli, C. Leifert (eds.). Handbook of Organic Food Safety and Quality. Woodhead Publishing Limited, p. 144-177	UKAS	Researchers		
March 2007	Status quo of animal health of sows and piglets in organic farms.	1	In: Proc. 3rd QLIF Congress, Hohenheim, Germany, March 20-23, 2007, p. 366-369.	UKAS	Researchers, Industry		Europe
March 2007	Obstacles towards a sustainable improvement of animal health	1	In: Proc. 9 th Wissen-schaftstagung Ökologischer Landbau, Hohenheim, Germany, March 20-23, 2007, p. 577-80. http://orgprints.org/9580/	UKAS	Advisors, Industry		Germany Switzerland Austria
February 2008	Management von Absetzferkeln	2	In: Proc. Int. Biolandschweinetagung, 7.2.2008, Löwenstein / Germany	BOKU	Advisers, Farmers, Industry		Austria, Germany, Switzerland
2008	Umsetzung eines Tiergesundheitsplanes auf ökologisch wirtschaftenden Ferkelerzeugerbetrieben in Deutschland	1	Landbauforschung Völkenrode 58/4)	UKAS			
2008	Leitlinien zur Sicherung der Tiergesundheit in der	2	Landbauforschung Völkenrode, Sonderheft 320, 99-120	UKAS			

Planned/ actual date	Type and Title of contribution:	W P	Book title / Conference:	Partners involved: (partner acronyms)	Type of audience (General public, higher education, researchers, industry, farm sector, advisors etc.)	Size of audience	Countries addressed
	Ökologischen Schweineerzeugung						
August 2009	Inter-calibration of a concentration McMaster technique between eight European Countries	2	In: Proc. 22nd conference of the World Association for the Advancement of Veterinary Parasitology, Calgary, Canada, August 8-13, 2009. http://orgprints.org/18410	LIFE	Researchers, Industry		Global
February 2009	Ergebnisse der Einführung eines Tiergesundheitsplanes auf ökologisch wirtschaftenden Ferkelerzeugerbetrieben in Deutschland.	2	In: Proceedings 10. Wissenschafts-tagung Ökologischer Landbau, 11.-13.02. 2009, Zürich, S. 182-185.	UKAS	Researchers		Germany Switzerland Austria
July 2009	Relationship between hygiene management and endoparasite infections in 20 sow herds.	2	In: Proceedings of the XIV ISAH-Congress 2009 (International Society of Animal Hygiene), 19th to 23rd July, Vechta, Germany, p. 561-564.	UKAS	Researchers		Europe
July 2009	Limitations in the use of preventive measures and the need of a system-oriented approach.	2	In: Proceedings of the XIV ISAH-Congress 2009 (International Society of Animal Hygiene), 19th to 23rd July, Vechta, Germany, p. 57-60.	UKAS	Researchers		Europe
2009	Hopp, hopp, hopp im Schweinsgalopp? Klauen und Gliedmaßengesundheit beim Schwein	2	In: Freiland Verband, Reinhard Geßl (Hg.), 16. Freiland-Tagung. Bauernblick und Forschersicht - gemeinsame Strategien für mehr Tiergerechtigkeit, 49-53; ISBN: 978-3-9502061-9-7	BOKU	Farmers, Researchers	150	Austria, Germany, Switzerland
October 2010	A tool to prevent parasites in organic pig herds	1, 2, 3	In: Procidings VII convegno nazionale dell'associazione italiana di zootecnia biologica e biodinamica (ZooBioDi)Milano 23 October 2010 p. 26-31.	CRA -SUI	Researchers		Italy
March 2010	Why observers should train clinical scoring	2	In: SVEPM Organising Committee (Eds.): Proceedings of the 2010 SVEPM Annual Conference, 26.-26.03.2010, Nantes, France http://orgprints.org/18415	INRA, BOKU	Researchers		International
May 2010	Organic pig husbandry systems.	2	In: Proceeding 2nd European Symposium on Porcine Health Management. 26th –	UKAS	Researchers		Europe

Planned/ actual date	Type and Title of contribution:	W P	Book title / Conference:	Partners involved: (partner acronyms)	Type of audience (General public, higher education, researchers, industry, farm sector, advisors etc.)	Size of audience	Countries addressed
			28th May, 2010, Hannover, Germany, p. 25-26.				
July 2010	Diagnostic of post-weaning diarrhoea on the farm level.	2	In: Proceedings of the 21st Int. Pig Veterinary Society (IPVS) Congress, July 18-21, 2010, Vancouver, Canada, p. 759. http://orgprints.org/18581	UKAS	Researchers		International
July 2010	Health status in organic pig herds in Europe.	2	In: Proceedings of the 21st Int. Pig Veterinary Society (IPVS) Congress, July 18-21, 2010, Vancouver, Canada, p. 227. http://orgprints.org/18479	All partners	Researchers		International
July 2010	Endoparasite infections and hygiene management in organic fattening herds.	2	In: Proceedings of the 21st Int. Pig Veterinary Society (IPVS) Congress, July 18-21, 2010, Vancouver, Canada, p. 809. http://orgprints.org/18580	UKAS	Researchers		International
August 2010	Piglet mortality in organic herds	2	In: Proceedings of the 61 st annual meeting of the European Association for Animal Production, Heraklion, Crete Island, Greece http://orgprints.org/18421	INRA + All partners	Researchers		International
December 2010	Prévention de la santé des porcs en élevages biologiques – actes du colloque	1, 2, 3	In: Proceedings of Résultats du programme de recherche Corepig, December 14 2010. Inter Bio Bretagne, Rennes France. http://orgprints.org/18436	IBB, INRA	Farm sector, Advisors, Researcher, Education		France
August 2011	Prevalence of gastro-intestinal parasites in European organic pig herds	2	In: Proc. 23rd conference of the World Association for the Advancement of Veterinary Parasitology, Calgary, Argentina, August 21-25, 2011.	LIFE	Researchers, Industry		Global
Planned 2011	Modellhafte Anwendung und Prüfung von Managementtools zur Förderung von Tiergesundheit und Verbraucherschutz in der ökologischen Schweinehaltung	2	Hoischen-Taubner, S. und Sundrum, A.1 (2010): Wiss. Tagung Ökolog. Landbau, Gießen, Germany	UKAS	Researchers, Advisors		Germany Switzerland Austria
Planned 2011	Hygienemanagement und Endoparasitenbefall auf 17 ökologisch wirtschaftenden Schweinemastbetrieben in Deutschland.	2	Werner, C. und Sundrum, A. (2011): Wiss. Tagung Ökolog. Landbau, Gießen, Germany	UKAS	Researchers, Advisors		Germany Switzerland Austria

Deliverable reports. – Some overlap in the below to the deliverable list may occur

Planned / actual date	(No.) and title	Type: Deliverable, proceedings, internal report, newsletter, web communication	Partners involved: (partner acronyms)	Type of users addressed (General public, higher education, researchers, industry, farm sector, advisors etc.)	Countries addressed
February 2011	'Knowledge synthesis: Animal health and welfare in organic pig production'	Deliverable 1 http://orgprints.org/18419	Edwards (NEWC), Fruh (FIBL), Prunier (INRA), Bonde (DJF), Hegelund (DJF) Lindgren (SLU), Leeb (BOKU)	Higher education Researchers Advisors	All
July 2011	'Development and evaluation of a HACCP based surveillance and management system'	Deliverable 8 http://orgprints.org/19312/	Dippel (FLI) and Knage-Rasmussen (AU-Animal Science) (Eds.)	Higher education Researchers Advisors	All
February 2011	'Epidemiological study concerning the characteristics of organic pig farming in selected European countries'	Additional deliverable 2 http://orgprints.org/18428/	Sundrum (UKAS), Goebel (UKAS), Bochicchio (CRA), Bonde (DJF), Bourgoin (IBB), Cartaud (IBB), Dietze (UKAS), Dippel (BOKU/FLI), Gunnarsson, (SLU), Hegelund (DJF), Leeb (BOKU), Lindgren (SLU), Lubac (IBB), Prunier (INRA), Wiberg (SLU)	Higher education, Researchers, Advisors	All

Popular articles and other dissemination activities (presentations at workshops or meetings, leaflets, posters, press releases, interviews etc.) – **Some overlap in the below to the deliverable list may occur**

Planned / actual date	Title of contribution:	WP	Type of contribution (presentation, leaflet, poster etc.)	Partners involved: (partner acronyms)	Type of audience (General public, industry, farm sector, advisors, policy makers, public authorities, higher education, researchers, etc.)	Language	Countries addressed
October 2007	Zielvorgaben für die Tiergesundheit in der ökologischen Schweinehaltung	1	Workshop	UKAS	Advisors	German	Germany, Switzerland, Austria
Feb. 2008	Biofach, Nürnberg: Zielvorgaben für die Tiergesundheit	1	Workshop	UKAS	Farm sector, Advisors, Higher education, Retailer, Researchers	German	Germany
March 2008	Umsetzungen eines Tiergesundheitsplanes	1	Workshop	Presentation	Farm sector, Advisors, Higher education, Researchers	German	Germany

Planned / actual date	Title of contribution:	WP	Type of contribution (presentation, leaflet, poster etc.)	Partners involved: (partner acronyms)	Type of audience (General public, industry, farm sector, advisors, policy makers, public authorities, higher education, researchers, etc.)	Language	Countries addressed
April 2008	Prävention ausgewählter Erkrankungen und Parasiten in biologischen Schweinebetrieben durch ein HACCP basiertes Management und Überwachungssystem	1	Poster http://orgprints.org/18700	BOKU	Advisors, Farm sector, Policy makers	German	Austria
April 2008	Verbesserung der Schweinegesundheit - wie können Betriebsentwicklungspläne dabei helfen?	2	Presentation	BOKU	Farm sector	German	Austria
May 2008	Økologiske søers sundhedstilstand	2	Magazine article http://orgprints.org/18876	DJF	Industry, Farm sector, Advisors	Danish	Denmark
May 2008	Vorstellung BEP-Bioschwein & COREPIG	1	Presentation	BOKU	Farm sector	German	Austria
June 2008	Presentazione del progetto Europeo di monitoraggio sullo stato di salute e benessere animale dei suini allevati secondo il Reg. CE 2092/91	1	Presentation at meeting	CRA-SUI	General public, Farm sector, Advisors, Public authorities	Italian	Italy
June 2008	Animal health and welfare research in organic pig production in Denmark	1	Presentation	DJF	Researchers	English	Poland
July 2008	Vorstellung BEP-Bioschwein & COREPIG	1	Presentation	BOKU	Farm sector	German	Austria
July 2008	Des chercheurs européens tentent d'améliorer la santé des porcs bio	1	Magazine article	IBB	Farm sector, Advisors	French	France
August 2008	Références en vue sur la santé du porc bio	1	Magazine article	IBB	General public, Farm sector	French	France
September 2008	Vorstellung BEP-Bioschwein & COREPIG	1	Presentation	BOKU	Farm sector	German	Austria
October 2008	Bioschweine - BEP & COREPIG	2	Presentation	BOKU	Higher education	German	Austria
November 2008	Økologiske grise – parasit status 2008	2	Presentation	LIFE	Farm sector, advisors	Danish	Denmark
February 2009	Berater-Tagung in Witzenhausen	2	Workshop	UKAS	Advisors, Higher education, Researchers	German	Germany

Planned / actual date	Title of contribution:	WP	Type of contribution (presentation, leaflet, poster etc.)	Partners involved: (partner acronyms)	Type of audience (General public, industry, farm sector, advisors, policy makers, public authorities, higher education, researchers, etc.)	Language	Countries addressed
May 2009	ISAH, Parasitic burden on organic pig farms	2	Presentation	UKAS	Advisors, Higher education, Researchers	English	Europe
June 2009	Forskning skal vise vej til øget velfærd for øko-grise	1,2,3	Magazine article http://orgprints.org/18875	DJF	Farm sector, Advisors	Danish	Denmark
June 2009	KTBL-workshop: Raufutterfütterung	2	Presentation	UKAS	Advisors, Higher education, Researchers	German	Germany
August 2009	Santé des porcs en élevage Biologique : dernière phase pour le projet européen de recherche Corepig	1, 2, 3	Magazine article	IBB	Farm sector, Advisors	French	France
August 2009	COREPIG Italy Organic pig farming in Italy	1, 2	Presentation	CRA - SUI	Researchers	English	Austria
September 2009	COREPIG Italy Organic pig farming in Italy	1, 2	Presentation	CRA - SUI	Researchers	English	Austria
November 2009	COREPIG: Prevention of selected diseases in organic pig herds by means of a HACCP based management tool	3	Presentation	BOKU	University	English	Austria
December 2009	Inälvparasiter i betesmark och hos grisar i ekologiska besättningar.	2	JTI-report, agriculture pdf online and printed http://orgprints.org/18418	JTI	Farm sector, Advisors, Public authorities	Swedish	Sweden
January 2010	BÖLW-workshop: Proteinfütterung	2	Presentation	UKAS	Advisors, Higher education, Researchers	German	Germany
January 2010	COREPIG: HACCP-based management tool ("risk checklist")	3	Presentation	BOKU, IBB	Advisors	English	France
January 2010	Int. Schweinetagung, Reinfeld	2	Presentation	UKAS	Farm sector, Advisors, Higher education, Researchers	German	Germany, Switzerland, Austria
March 2010	Ökologische Schweinehaltung	2	Workshop	UKAS	Farm sector, advisors, Higher education, Researchers	German	Germany
March 2010	COREPIG: HACCP-based management tool ("risk checklist")	3	Presentation	BOKU, IBB	Researchers	English	France
March 2010	Corepig : Prévention des risques sanitaires en élevage porcins biologiques	1, 2, 3	Presentation and article	IBB	Advisors, Researchers	French	France

Planned actual date /	Title of contribution:	WP	Type of contribution (presentation, leaflet, poster etc.)	Partners involved: (partner acronyms)	Type of audience (General public, industry, farm sector, advisors, policy makers, public authorities, higher education, researchers, etc.)	Language	Countries addressed
May 2010	ESPHM, Hannover	2	Presentation	UKAS	Researchers	English	Europe
May 2010	Parasiter och miljöfaktorer i ekogrisbesättningar	2	Presentation	JTI	Farm sector, Advisors	Swedish	Sweden
June 2010	Prévention de la santé des porcs en élevages biologiques	1, 2, 3	Poster	IBB	Farm sector, Advisors, Researchers	French	France
June 2010	Porcs Bio : naissance et production	2	Poster	IBB	Farm sector, Advisors, Researchers	French	France
October. 2010	Bio-Park workshop: Ökologische Schweinehaltung	2	Presentation	UKAS	Farm sector, Advisors, Higher education,	German	Germany
December 2010	Prévention de la santé des porcs en élevages biologiques	1, 2, 3	National Meeting	IBB, INRA	Farm sector, Advisors, Researcher, Education	French	France
January 2011	GÄA-Wintertagung: Ökologische Schweinehaltung	3	Presentation	UKAS	Farm sector, Advisors, Higher education,	German	Germany
February 2011	Un vrai cochon, mais heureux	1, 2, 3	Magazine article	INRA, IBB	General Public	French	France
February 2011	Tiergesundheit in ökologischer Schweinehaltung	3	Presentation	UKAS	Researchers	German	Germany
February 2011	Int. ökologische Schweinetagung	3	Presentation	UKAS	Farm sector, Advisors, Higher education,	German	Germany, Switzerland, Austria
March-April 2011	Prévenir la santé des porcs en élevages biologiques : les apports du projet Corepig	1, 2, 3	Magazine article	IBB	Farm sector, Advisors, Researcher, Higher education	French	France
March 2011	Thüringer Ökoherz, Wintertagung, Ökologische Schweinehaltung	3	Presentation	UKAS	Farm sector, Advisors, Higher education	German	Germany
March 2011	Wiss. Tagung Ökologischer Landbau	3	Presentation	UKAS	Advisors, Higher education, Researchers	German	Germany, Switzerland, Austria
May 2011	Økologisk svineproduktion i Europa: Status på sundhed og velfærd	2	Presentation http://orgprints.org/18884	DJF	Farm sector, Advisors, Researchers	Danish	Europe
June 2011	Værktøjer til sundhedsstyring af søer på friland	3	Magazine article http://orgprints.org/19189	DJF	Farm sector, Advisors, Researchers	Danish	Europe
Planned 2011	Health management strategies for organic pigs	1, 2, 3	Magazine article	NEWC	Farm sector	English	UK

4.2 Further possible actions for dissemination

- List publications/deliverables arising from your project that Funding Bodies should consider disseminating (e.g. to reach a broader audience)
- Indicate publications/deliverables that could usefully be translated (if this has not been done, and indicate target language)

French adapted and translated HACCP tools (weaning diarrhoea' and 'Reproduction and farrowing problems') are available on the website <http://www.interbiobretagne.asso.fr/elevage-2-45.html>. These could usefully be translated into English.

4.3 Specific questions regarding dissemination and publications

- Is the project website up-to-date?

Yes

- List the categories of end-users/main users of the research results and how they have been addressed/will be addressed by dissemination activities

Farmers and advisors:

- Directly involvement of farmers in HACCP teams.
- Publication of project results in Farmers' magazines.
- Presentations of project results in national farmer and advisor workshops.
- Presentations of project results on project home-page.

Researchers:

- Presentations of project results at research conferences
 - Presentations of project results on project home-page.
 - Presentation of project results in international peer reviewed research journals.
- Impact of the project in relation to main beneficiaries of the project results

National work shops have been well attended. Dissemination through home page and national magazines has potentially many users.