



## **Midterm Status Report 2003 and Application for Continuation in 2004**

For research projects financed by grants from  
The Directorate for Food, Fisheries and Agro Business  
under the Danish Ministry of Food, Agriculture and Fisheries

---

1. Research program

Research in organic farming 2000-2005 (DARCOF II)

---

2. Project title and number

I18 Management in relation to health and food safety in organic pig production  
(MANORPIG)

---

3. Head of project

Jan Tind Sørensen Head of research Unit, Phd.  
Dept. of Animal Health and Welfare  
Danish institute of Agricultural Sciences

---

4. Participating institutes

Danish institute of Agricultural Sciences  
Royal Veterinary and Agricultural University  
Danish Pest Infestation Laboratory

---

5. Other project staff

Allan Roepstorff Ph.D. Senior Research Fellow, Danish Centre for Experimental  
Parasitology. Royal Veterinary and Agricultural University.

Helena Mejer, Phd-student Danish Centre for Experimental Parasitology.  
Royal Veterinary and Agricultural University.

Herwig Leirs Ph.D. Head of Department, Dept. of Mammals. Danish Pest Infestation Laboratory

Jens Lodal, Senior Consultant, Dept. of Mammals.  
Danish Pest Infestation Laboratory

Mette Knorr Lauridsen, Research Assistant, Dept. of Mammals.  
Danish Pest Infestation Laboratory

Marianne Bonde DVM, Ph.D., Scientist. Dept. of Animal Health and Welfare.  
Danish Institute of Agricultural Sciences

---

6. Project period (month, year)

Start of project: May 2001  
End of project: Dec 2004

---

7. Midterm description of the project, its results and progress, and application for continuation in 2004

### **A. Project summary**

Organic pig production is a relatively new production concept with promising possibilities for growth. A major challenge in organic pig production is to maintain and in some areas to improve animal health and food safety without compromising animal welfare. It is assumed that many problems concerning diseases, zoonoses, and animal welfare can be reduced by improved management in organic pig production systems. The purpose with this project is to develop management strategies for controlling diseases, zoonoses and animal welfare problems.

Parasites are a major problem for animal health and welfare in many organic pig production systems. Knowledge relevant for parasite control in organic pig production is scarce. In an experiment in this project the parasite transmission rate in piglets is described and the long-term infectivity of naturally contaminated pastures is measured. Also the effect of ploughing and re-establishing of the grass is examined.

Rodents are assumed to be an important risk factor for diseases and zoonoses in organic pig production systems. Traditional rodent control with application of rodenticides is not desirable in organic pig production. It is therefore necessary to develop organically acceptable and efficient rodent control strategies for organic pig production. Since knowledge on pest supporting factors in Danish out door pig production systems is lacking, a survey identifying these factors will be carried out. The ecology of the pest problem is investigated in organic pig farm cases and strategies for controlling the most important pest problems will be developed.

The development of strategies preventing health and food safety problems needs to acknowledge the complex interaction between diseases/zoonoses, production systems and management, which prevail in organic pig production. It is also important that strategies for controlling diseases and zoonoses do not compromise animal welfare. Hazard-Analysis-Critical-Control-Point (HACCP) is a risk analysis concept, which in recent years have been described for applications at the livestock farm level. A control and management system based on a HACCP concept for on-farm application is developed focussing on selected diseases, zoonoses and animal welfare problems.

Organic pig production is a relatively new production form and most stockmen are inexperienced and need to develop suitable management routines. Operational management routines are described as an integrated part of the HACCP-system. In the development phase experience from researchers, advisors and farmers are elicited in an expert opinion study.

**Table A.1: Work package list (from application)**

<b>WP No</b>	<b>Work package title</b>	<b>Participants</b>	<b>Budget</b>	<b>Start</b>	<b>End</b>	<b>Deliverable, No</b>
1	Non-medical parasite control in piglets	<u>AR</u> , HM	850.000 kr.	May 2001	July 2004	D1-D4
2	Development of a HACCP-system for control of diseases, zoonoses and animal welfare problems	<u>JTS</u> , MB	925.000 kr.	Jan 2002	Sept 2004	D5-D10
3	Development of strategies for pest management	<u>HL</u> , JL, MK	500.000 kr.	June 2001	May 2004	D11-D13
4	Project co-ordination and organisation of an advisory workshop	JTS	225.000 kr	May 2001	Dec 2004	D14

\* Responsible participants are underlined

## **B. Objectives and expected achievements**

Parasites are unavoidable in organic pig production but need to be controlled at an acceptable level. In order to develop non-medical strategies for controlling parasites in organic pig production it is urgent to obtain specific answers to some of the most frequent questions from organic farmers and practising veterinarians: When and to which extent do piglets obtain helminth infections from the environment? How long time should the pastures remain free of pigs before the infectivity is so low that pigs can return? What is the effect of ploughing the pasture? These questions are addressed in WP1.

Risk factors for parasites, diseases, zoonoses and welfare problems can be identified based on existing knowledge. However we need to quantify these risks and further to identify critical control points for on-farm use in order to establish a monitoring system for controlling these risks at farm level. The control system is based on the HACCP concept (Hazard Analysis Critical Control Points). Researchers, advisors and experienced farmers have important knowledge on critical control points, critical control limits, and corrective actions. This knowledge can be elicited in an expert opinion study and by a questionnaire survey. These tasks are carried out in WP2.

Wild rodents such as rats will always be present in organic pig production. However, since rats are assumed to be an important risk factor for diseases and zoonoses, it is necessary to develop efficient rodent control strategies for organic pig production without use of rodenticides. Knowledge on pest supporting factors in Danish out door pig production systems is lacking, and a survey identifying these factors is therefore a necessary part of developing such strategies. This work is carried out in WP3.

Existing knowledge combined with results obtained in WP1 and WP 3 provides a basis for relevant management strategies for organic pig production developed in WP2.

Valuable knowledge relevant for this project will be produced in other national and international projects. To promote efficient communication for the benefit of this project an advisory workshop is organised focussing on diseases, zoonoses and welfare problems in organic pig production and project participants are participating in inter-

national conferences and study tours. This task will be carried out in WP4.

The project is expected to produce:

- Strategies for non-medical parasite control in piglets
- A HACCP-system (critical control points, critical control limits and corrective actions) for selected diseases, welfare problems and zoonoses
- Effective rodent management strategies

## C. Midterm results and progress

### C.1 Description (summary) of main results and conclusions

#### WP1

Six farrowing pastures were contaminated with *Ascaris suum* (round worm), *Trichuris suis* (whip worm) and *Oesophagostomum dentatum* (nodular worm) in the spring 2001. In June the infection level of all pastures was estimated using pasture samples and parasite naïve tracer pigs. In the beginning of July one litter of piglets was born on each pasture. Week 3 after farrowing, 1 piglet from each litter was slaughtered and examined for all 3 parasites. This procedure continued week 5, 7, 9, 11, 13, 15, and 19 or until no piglets were left on a pasture. In addition, blood and faecal samples were also collected. The piglets were weaned at the age of 7 weeks by removing the sow from the pasture. Pasture infection level was followed throughout the experiment by collecting pasture samples and in November tracer pigs were again turned out on the pastures.

Relatively few *Trichuris* eggs reached infectivity during 2001, whereas infective *Ascaris* eggs started to appear in July and then increased steadily in number during late summer to autumn 2001. Infective larvae of *Oesophagostomum* were present from July until October at a low level. There was a high transmission rate of *Ascaris* resulting in high worm burdens and an overall prevalence of 80 %. The highest numbers of small immature worms were found during the first 11 weeks. Thereafter the number seems to have decreased. In contrast, the number of larger established (adult) worms was fairly constant from week 9 to 19. This may indicate that while there was a continuous uptake of infective eggs throughout the experiment, the pigs developed a partial immunity towards the parasite. This partial immunity prevented the establishment of the majority of incoming larvae but allowed the established adult worms to remain in the host. The adult population may have been derived from the eggs that were taken up in the beginning of the transmission period. The adult worms excreted an increasing number of eggs towards the end of the experiment, contaminating the pastures a second time that year. Overall, the results seem to confirm previous findings that neonatal exposure to *Ascaris* may result in higher infection levels compared to situations where exposure to the parasite occurs later in life.

Transmission of *Trichuris* to the piglets was negligible. This is due to the very slow embryonation of these eggs. Normally, the majority of *Trichuris* eggs do not become infective until the second season after contamination. *Oesophagostomum* is transmitted as free-living larvae. The larvae may reach infectivity within as little as 21 days but are sensitive to desiccation. In the present study, survival of the larvae was poor and consequently, overall transmission rate was continuous but very low and worms accumulated very slowly in the pigs. At week 19 the pigs harboured a mean worm

burden of only 442 (min=20, max=1060) worms/pig, of which most were adult and excreting eggs. In all, the results show that if infective parasite stages are present on the pastures, piglets will ingest them very early in life due to their natural foraging behaviour.

The study on long-term infectivity of parasites on contaminated pastures (Task 2) is still ongoing and will be terminated in December 2003 when the last estimation takes place. Measurement of pasture infection level takes place twice yearly, every spring and autumn of 2001, 2002, and 2003 using pasture samples and uptake by tracer pigs. As part of task 3, half the pastures were ploughed first in the winter of 2002 and then again in the winter of 2003. The pastures were re-sown in May after the tracer pigs had been on the pastures.

Approximately one year after the farrowing pastures were contaminated with parasites, only two of the three initial parasites had survived on the pastures. All samples collected in May 2002 and until May 2003 indicate that the pastures were no longer contaminated with *Oesophagostomum*. There was a considerable level of infective *Ascaris* eggs on the pastures and transmission of *Ascaris* by the autumn of 2001. However, by the autumn of 2002 the number of infective *Ascaris* eggs had further increased and the latest results show that *Ascaris* were still present in very high numbers on the pastures in the spring of 2003. This may indicate that heavily *Ascaris* contaminated pastures should not be used for pigs for at least 2 years after the initial year of contamination. Ploughing reduced the number of accessible *Ascaris* eggs in 2002, especially in the spring whereas there seems to be no clear effect in the spring of 2003. The reason may be that the parasite eggs develop slower but survive better deep in the soil than in the surface and that recurrent ploughing brings them up to the surface where they can be picked up by pigs.

The overall pasture infectivity levels for *Trichuris* are much lower than for *Ascaris* but this reflects that initial contamination levels in 2001 were very different. So far the highest transmission level of *Trichuris* took place in November 2002. It seems that ploughing may initially also reduce the transmission level of *Trichuris*. However, it is possible that transmission level on the ploughed pastures may increase again as it did for *Ascaris*. It may however take a little longer for *Trichuris* as its eggs have a higher optimal temperature for embryonation than *Ascaris*. The development time for *Trichuris* eggs may be even more affected than for *Ascaris* deeper down in the soil.

WP2:

Task 4 and 5: An expert panel of 10 Danish and Swedish veterinarians and production advisers with experience in organic pig production has estimated the occurrence of health and welfare problems in organic herds and identified important risk factors. The experts have either completed a series of questionnaires or have participated in our advisory workshop in the spring 2003. According to the experts welfare problems often arise due to insufficient access to water and wallowing facilities, especially as regards the sows. Poor body condition, reproduction problems, and stone chewing were regarded as other common problems for the sows together with leg disorders that might be under-estimated in outdoor herds due to difficulties diagnosing the problem in extensive production systems. Suckling piglets commonly experience welfare problems caused by crushing or trauma inflicted by the dam, and other welfare problems can arise due to insufficient disease treatment and care of weak piglets,

disturbances and trauma from predators and unsuccessful nursings. Diarrhoea is a common health problem in weaned pigs.

Body condition, reproductive problems and leg disorders have been selected as important welfare problems for organic sows based on the expert opinion, while the most common welfare problems for suckling and weaned pigs have been identified as crushing/trauma and diarrhoea, respectively. Poor body condition in sows was regarded as mainly feeding related and competitive feeding systems, restricted access to feed and poor feed quality were important risk factors according to the expert panel. Poor mating management regarding oestrus and pregnancy testing, poor synchronisation of oestrus in sow batches and poor body condition were regarded as important risk factors for reproductive problems in the herd. Other risk factors were defined as infections or improper vaccination strategies. Important risk factors for leg problems in sows were considered to be genetic factors affecting leg strength, diseases in legs and hooves, ground condition in outdoor areas and management in the mating area (trauma caused by increased social activity).

Risk factors for crushing of piglets were related to a) The farrowing hut: design, dimensions and climatic conditions; b) Bedding material: type, amount and quality; c) Environment: disturbance caused by predators or other animals and d) Sow condition: Litter size, milk production, body condition, leg disorders and other diseases. The risk factors suggested for diarrhoea in weaned pigs were related to feed quality and hygiene of outdoor area, indoor pens and wallowing holes.

### WP3

The answers given in the questionnaire survey by 158 farmers have been analysed. The farmers were asked questions about what they considered problems arising from the natural environment. They were also asked to describe how they offered fodder and water, which types of huts they used etc. The surroundings should be described regarding factors that were thought to influence the natural fauna, such as e.g. distance to hedgerows, forests, streams and watercourses.

The results of the survey showed that

- Rats and smaller rodents (mice and voles), foxes and hares were the most frequently occurring mammals in the fields with pigs
- The farmers considered rats and foxes as causing the most important (pest) problems

Occurrence of rats is reported significantly more frequently in organic pig farming than in traditional pig farming in open fields. Factors significantly positively correlated with occurrence of rats and smaller rodents:

- Occurrence of foxes
- Stacks of hay and straw in the fields
- Use of automatic feeding systems
- Use of open water trays

A distance of less than 100 m from pig fields to hedgerows was significantly positively correlated with occurrence of rats. Occurrence of smaller rodents and occurrence of birds of prey were two significantly positively correlated factors. Factors significantly negatively correlated with occurrence of smaller rodents:

- Use of huts with a bottom
- Use of huts made of hard materials

Use of drinking cups was significantly positively correlated with occurrence of rats. Special shelters for the pigs exclusively made of bales of straw did not give a significant positive correlation with occurrence of rodents.

It can be concluded that these results indicate factors that are practicable as preventive measures against rodents. Regarding direct control methods the farmers reported traps, shooting, and cats and dogs as their most frequent non-chemical ways of controlling rodents.

## C.2 Fulfilment of deliverables and milestones

### C.2 Fulfilment of deliverables and milestones

WP1 Non-medical parasite control in piglets	Time schedule according to application	Deviations, if any*
Task		
1. Parasites in piglets on contaminated farrowing pastures	May 2001- Dec. 2001	
2. Long-term infectivity on naturally contaminated pastures	Nov 2001- Mar 2004	
3. Comparison of longterm infectivity of continuous grass and on ploughed/new grass	Nov 2001- Mar 2004	
Deliverables		
D1. International journal paper on neonatal helminth infections	June 30 2002	January 2004
D2. National publication on neonatal helminth infections	Aug 31 2002	June 2003
D3. International journal paper on long-term helminth infectivity of continuous and ploughed pastures	April 2004	
D4 National publication with recommendations for organic farmers on pasture management in non-medical control of helminth infections	Feb 28 2004	
Milestones		
M1 Experiment on helminth infections in piglets on contaminated pastures completed	Dec. 2001	
M2 Experiment on long-term survival of infective helminth stages on continuous and ploughed pastures completed	Dec. 2003	

\* *Deviations are to be further discussed at D*

WP2 Development of a HACCP and a systematic operation programme for control of diseases, zoonoses and animal welfare problems	Time schedule according to application	Deviations, if any*
Task		
4. Development of a protocol for critical control points	Jan – Oct 2002	Jan 02 – Oct 03
5. Development of a HACCP programme	Not scheduled	May 03 – Oct 04
6. Conducting an international questionnaire farm survey targeting organic pig producers	Not scheduled	Dec 03 April 04
7. Evaluation of a CCP protocol as a management tool	Nov 2003- Sep 2004	May – Dec 04
8. Evaluation of a HACCP as a decision support system	Nov 2003 – Dec 2004	May – Dec 04
Deliverables		
D5. An informative publication on health and welfare problems in organic sow herds	Not scheduled	Sept 2003
D6. A report on HACCP principles applied in livestock research and production in Europe	Not scheduled	Aug 2004
D7. A scientific journal paper on risk factors for health and welfare problems in organic sow herds	Not scheduled	Nov 2004
D8. A report on HACCP systems developed for leg problems, weaning diarrhoea, Salmonella and welfare problems on organic pig farms (focus changed slightly from application)	Aug 2004	Dec 2004
D9. A report on how farmers have perceived the applicability of the CCP protocol as a management tool (focus changed slightly from application)	Sep. 2004	Dec 2004
D10. The HACCP system is described for implementation on the Internet	Dec. 2004	Dec 2004
Milestones		
M3. A CCP monitor protocol is available	Nov 2002	Nov 2003
M4. A questionnaire survey focusing on monitoring of health and welfare problems in organic sow herds has been carried out	Not scheduled	May 2004
M5. Prototype HACCP systems developed for leg problems, weaning diarrhoea, Salmonella and crushing of piglets are available	Not scheduled	Aug 2004
M6. An evaluation of the HACCP system as a management tool is completed (former M5)	Oct. 2004.	Oct 2004

WP3 Development of strategies for pest management in selected production systems	Time schedule according to application	Deviations, if any*
Task		
9. Identification of pest-supporting factors	Jun-Nov 2001	
10. Ecology of pest problems	Oct 2001- Mar 2004	
11. Identification of pest control tools	Apr-Jun 2004	
Deliverables		
D11. A list of factors which are known to increase pest problems in open air pig farms to be incorporated in risk analysis and decision support systems	Feb 28 2004	
D12. An annotated list of non-pesticide-based pest control tools for use in outdoor pig systems	May 31 2004	
D13. An international journal paper on the ecology of wild rodents in outdoor pig farm systems	May 31 2004	
Milestones		
M7. Questionnaire results analysed	Nov 2002	Sept 2003
M8. Ecology field work finalised	Jan. 2004	
M9. Potential control techniques listed	Sept 2004	

WP number and title WP4 Project co-ordination and organisation of an international workshop	Time schedule according to application	Deviations, if any*
Task		
12. Organisation of a advisory workshop	Jan-Dec. 2002	4 month delay
13. Co-ordination	May 2001- Dec 2004	
Deliverables		
D14. A workshop report	Jan 2003	May 2003
Milestones		
M10. An advisory workshop	Dec 2002	April 23 2003

## **D. Description of deviations and subsequent adjustments of plans**

D1 will be delayed until Jan 2004 when the manuscript on neonatal helminth infections will be submitted to an international scientific journal. Actual publication will then take place after approximately a year when the journal has processed the manuscript. The delay has been a result of setting up and performing the immunological analysis of serum samples from the pigs.

WP2 (Development of a HACCP and a systematic operation programme for control of diseases, zoonoses and animal welfare problems) is organised in 5 tasks. Two task for developing an on-farm decision support tool (task 4 and 5), one task on application of the tool in organic farms (task 6) and evaluation of the results (task 7 and 8).

The decision support tool was planned to consist of two different tools; a control tool based on a HACCP-concept (task 4) and a systematic operation programme (a SOP) for operational management (task 5). Development of a control and management system based on a HACCP concept consists of seven activities:

1. Conduct a hazard analysis.
2. Determine the critical control points (CCPs).
3. Establish critical limits.
4. Establish monitoring procedures.
5. Establish corrective actions.
6. Establish verification procedures.
7. Establish record-keeping and documentation procedures.

An important part of the HACCP based system is to establish corrective actions to be used when critical limits for critical control points are exceeded. Corrective actions are operational management actions. Developing the HACCP-system it became clear, that a SOP separate from the HACCP-system would be difficult to use in practise. It seems much more efficient to integrate appropriate operational management actions into the HACCP-system. It was therefore decided to change the organisation of the development tasks. A major part of the HACCP-development work is to establish the critical control points. Task 4 was therefore maintained. Task 5 was changed so it includes not only development of corrective actions but also to integrate the work from task 4 and activities 6 and 7 in the HACCP-concept. The focus of the control programme has been changed from focussing only on leg disorders and weaning diarrhoea to a wider range of health and welfare problems in organic sow production. These changes have together with personnel changes delayed the development phase as specified in C2.

The farm study planned as task 6 has turned out to be impossible to carry through. Larger Danish organic pig farmers were contacted in the spring 2003 in order to recruit 6 to 8 farms for task 6. A large proportion of these farms either were considering stopping organic pig production or decreasing production in the near future. Therefore they could not be included in a one-year farm study. Due to economic constraints other farmers had been forced to dismiss staff and they were not able to engage into projects requiring the implementation of additional tasks in the care of the livestock. It was therefore necessary to cancel the farm application activity.

Alternatively a new task 6 is planned. A questionnaire study aimed at organic pig farmers is planned as a basis for evaluation of the CCP protocol and the HACCP system developed in task 4 and 5 as decision support tools. In order to reach a satisfactory number of respondents the study will include organic pig farmers from Denmark as well as other Northern European countries with similar environmental and climatic conditions – Sweden, The Netherlands, Germany and Great Britain. At least 100 organic pig farms are expected to be able to participate in the questionnaire survey. We have got a good contact to research groups in these countries and agreements with national organic pig production organisations will be made during December 2003 to January 2004 in order to secure a successful accomplishment of the international questionnaire study. The results of the questionnaire will enable us to analyse the farmers' perception of the applicability of the CCP protocol as a management tool.

The evaluation of the HACCP programme in task 7 and 8 has to be adjusted to accommodate the changes in task 4, 5 and 6. However the evaluation activities are maintained in two tasks. The prototype HACCP programme will be evaluated as regards practicability, time consumption and potential as a management tool through the questionnaire study targeting organic pig producers.

These changes in WP2 result in some modification of the Milestones. Milestone 3 scheduled to November 2002 will be delayed twelve months due to the delays in task 4. It seems reasonable to include a new Milestone 4 regarding the carrying through of the questionnaire in May 2004 (the new task 6). A new Milestone 5 is added focusing on the availability of a prototype HACCP system in August 2004. The original Milestone 5 is thus renamed Milestone 6. The deliverables originally planned in WP2 were all relying on data collected during the on-farm application, which has been cancelled as mentioned above. A list of new deliverables adjusted to the change in plans is therefore suggested.

- D5: An informative publication on health and welfare problems in organic sow herds Sep 2003.
- D6: A report on HACCP principles applied in livestock research and production in Europe Aug 2004
- D7. A scientific journal paper on risk factors for health and welfare problems in organic sow herds Nov 2004
- D8. A report on HACCP systems developed for leg problems, weaning diarrhoea, Salmonella and welfare problems on organic pig farms Dec 2004
- D9. A report on how farmers have perceived the applicability of the CCP protocol as a management tool Dec 2004 (similar to original D9 delayed 3 months)
- D10. A HACCP system described for implementation on the Internet

## **E. Project publications and other products**

1. Articles in international, scientific journals with review procedures

2. Papers presented at congresses, symposiums, etc.

Roepstorff, A. & Mejer, H. (2001). Strategies for parasite control in organic pigs. Invited presentation at the 5th NAHWOA workshop, November 11-13, 2001, Rødding, Denmark.

Mejer, H., Roepstorff, A. & Eriksen, L. (2002) Epidemiology of helminth infections in pigs born and raised on contaminated pastures. Proceedings of the American Association of Veterinary Parasitologists, 47<sup>th</sup> Annual Meeting, July 13-16, 2002, Nashville, TN, USA, p 51.

Lodal, J., M. Knorr & H. Leirs. (2003) Mammalian pest problems in organic pig farming, preventive measures and control. 4<sup>o</sup> European Vertebrate Pest Management Conference in Parma, Italy, September 9-12, 2003.

3. Reports, articles in agricultural journals, etc.

Mejer, H. & Roepstorff, A. (2003) Non-medical control of parasitic worms in pigs. DARCOFe-news, June 2003.

Mejer, H. & Roepstorff, A. (2003) Ikke-medicinsk kontrol af indvoldsorm i grise. FØJO e-nyt, August 2003.

Lodal, J. (2001) Økologiske frilandsgrise plages af skadedyr. Externt Forum, Ministry of Agriculture, Fisheries and Food, week 35, 2001

Bonde, M. & Sørensen, J.T. (2003) Control of health and welfare problems in organic sow herds. DARCOFe-news, Sept. 2003.

Sørensen, J.T. (ed) 2003. Produktionsstyring med fokus på husdyrsundhed og fødevarerikkerhed i økologiske svinebesætninger. FØJO-rapport (in press)

4. Oral presentations, public meetings, field days, etc.

Mejer, H., Roepstorff, A. & Eriksen, E. Transmission af parasitter i grise som er født og opvokset på friland. Markvandring på KVL's forsøgsgårde, 6 juni 2002.

Roepstorff, A. "Parasitter i lange baner: Parasitter i moderne husdyrproduktion". Foredrag ved KVL's Kandidatkonference 2002, 23 august 2002.

Sørensen, J.T. Health management in organic pig production. Workshop on organic pig production, Horsens, April 24-25 2003.

Mejer, H. Non-medical parasite control in pigs. Workshop on organic pig production, Horsens, April 24-25 2003.

Bonde, M. Development of a HACCP for control of diseases, zoonoses and welfare problems in organic sow herds. Workshop on organic pig production, Horsens, April 24-25 2003.

Lodal, J., Knorr, M. & Leirs, H. Development of strategies for pest management with focus on rodents. Workshop on organic pig production, Horsens, April 24-25 2003.

## **F. Scientific education**

Helena Mejer are conducting the Ph.D. project "Management and alternative crops as means of reducing the parasite loads in organic swine production systems" by July 1, 2001, funded by the DARCOF projects MANORPIG and PROSBIO, as well as co-financed by DARCOF.

## **G. National and international cooperation**

The project group has participated in an international seminar on research in organic pig production organised by DARCOF 24-25 April 2003 in Horsens, Denmark.

The participants from KVL and DIAS are involved in a large international EU-IP project on organic agriculture (acronym: QualityLowInputFood) with activities on organic pig production in 2004-2005.

Collaborative links are made to Dr. Hans Spoolder from Lelystad The Netherlands on health and welfare management in organic pig production.

Scientist Marianne Bonde DIAS is currently organising a study tour to visit selected European research groups working on development of HACCP based systems for on farm use in livestock production. The study tour is planned to take place in January 2004.

## **H. Critical reflection on the project**

In the project application we have chosen to focus on leg disorders, weaning diarrhoea and selected welfare problems. However since planning of the project new information and experience on animal health and welfare problems in organic sow production has emerged. Piglet mortality may be a major health/animal welfare problem, which has been included in task 4 and 5.

The farm study planned as task 6 has been changed to a questionnaire survey on large European organic pig farms. The change was due to difficulties recruiting Danish organic pig farms for a one-year study. Thus the focus of WP2 has become more international. We believe that the change will enhance the research quality of WP2.

During the process of analysing the questionnaire responses and through contact with the organic farmers, it has been possible to identify three groups of farmers regarding their views on pest control. One group uses pesticides if these are allowed in organic farming while a second group does not use pesticides and if they need control pests they prefer traps and other non-chemical methods. A third group denies killing wild animals whether they are pests or not. These different groups have to be born in mind when the issue is how to control pest animals in organic farming.

Rats are often in focus as transmitters of diseases and this is justified by the highly commensal life style of the rats. Last year it was considered also to include smaller rodents in the telemetry studies because very few rats seemed to be present in the study fields. Fortunately, this year a sufficient number of rats are now present in the fields of farm G. The telemetric part of the study will therefore continue with rats.



## 8. Budget

**A. Account for any change in budgets****B. Budget for the whole project (1.000 DKK)**

Total consumption of funds from DARCOF and expected consumption this year and coming years

Year:	Consumption before 2003	Expected consumption 2003	2004	2005	Total
Man-months					
Scientific personnel	17,5	17,5	10,5		45,5
Technical personnel	6	3,5			9,5

Year:	Consumption before 2003	Expected consumption 2003	2004	2005	Total
Salaries					
Scientific personnel	540	558	358		1456
Technical personnel	131	77			208
Other operational costs	247	130	73		450
Equipment					
Others (please specify)					
Direct costs	918	765	431		2114
Indirect costs (20% of direct costs)	155	145	86		386
Total	1073	910	517		2500

### C. Budget for each participating institute (1.000 DKr)

Name of Institute: Danish Institute of Agricultural Science, Dept. of Animal health and welfare

Year:	Con- sumption before 2003	Expected consump- tion 2003	2004	2005	Total
Man-months					
Scientific personnel	5	10,5	6,5		22,0
Technical personnel	1	1	0		2

Year:	Con- sumption before 2003	Ex- pected con- sumption 2003	2004	2005	Total
Salaries					
Scientific personnel	184	360	239		783
Technical personnel	22	22	0		44
Other operational costs	14	70	48		132
Equipment					
Others (please specify)					
Direct costs	220	452	287		959
Indirect costs (20% of direct costs)	44	90	57		191
Total	264	542	344		1150

#### Comments:

Compared to the budget in status report 2002, the budget for 2002 was reduced with 40.000 DKr and the budget for 2003 was increased with 40.000 DKr. This was due to a delay in organising the advisory workshop (task 12). The change in task 6 (from a one-year farm study to an international questionnaire survey) has reduced the need for operational costs and technical man-months (from 2 to 1) and increased the need for scientific personnel man-month (from 19,5 to 22). The major part of the activities in task 6 has been moved from 2003 to 2004. As a consequence the budget for 2003

has been decreased with 138.000 DKr and the budget for 2004 has been increased accordingly.

Name of the Institute: Royal Veterinary and Agricultural University, Danish Centre for Experimental Parasitology

Year:	Consumption before 2003	Expected consumption 2003	2004	2005	Total
Man-months					
Scientific personnel	9	6	3		18
Technical personnel	3	1	0		4

Year:	Consumption before 2003	Expected consumption 2003	2004	2005	Total
Salaries					
Scientific personnel	236	163	84		483
Technical personnel	67	23	0		90
Other operational costs	92	18	25		135
Equipment					
Others (please specify)					
Direct costs	395	204	109		708
Indirect costs (20% of direct costs)	79	41	22		142
Total	474	245	131		850

The budget for 2003 has been reduced with 15,000 Dkr (other operational costs) and the budget for 2004 has correspondingly been increased with 15,000 Dkr. The reason is that the final part of task 2 and 3 of WP1 will be performed so late in December 2003 that the samples from the last slaughters and analysis of serum samples from 2001 to 2003 cannot be carried out until early 2004.

Name of Institute: Danish Pest Infestation Laboratory, Dept of Mammals

Year:	Consumption before 2003	Expected consumption 2003	2004	2005	Total
Man-months					
Scientific personnel	3,5	1	1		5,5
Technical personnel	2,0	1,5	0		3,5

Year:	Consumption before 2003	Expected consumption 2003	2004	2005	Total
Salaries					
Scientific personnel	120	35	35		190
Technical personnel	42	32	0		74
Other operational costs	141	42	0		183
Equipment					
Others (please specify)					
Direct costs	303	109	35		447
Indirect costs (20% of direct costs)	32	14	7		53
Total	335	123	42		500

**Comments:**

---

---

## 9. Signatures and stamps

Name	Institute	Date	Signature
Head of project Jan Tind Sørensen	Danish Institute of Agricultural Sciences		

Appendix I. Detailed budget