



Progress Report 2004 and Application for Continuation in 2005

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

II8 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

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. Danish Institute of Agricultural Sciences

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

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

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: 2001

End of project: 2005

7. Midterm description of the project, its results and progress, and application for continuation in 2005

A. Project summary

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

WP No	Work package title	Participants	Budget	Start	End	Deliverable, No
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 international 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 paddocks 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 paddocks was estimated using paddock samples and parasite naïve tracer pigs. In the beginning of July one litter of piglets was born on each paddock. 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 paddock. In addition, blood and faecal samples were also collected. The piglets were weaned at the age of 7 weeks by removing the sow. Paddock infection level was followed throughout the experiment by collecting paddock 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 a moderate neonatal exposure to infective *Ascaris* eggs may result in higher infection levels compared to situations where exposure to the parasite oc-

curs later in life.

Transmission of *Trichuris* to the piglets was negligible. This was 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 therefore 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 paddocks, piglets will ingest them very early in life due to their natural foraging behaviour.

The study on long-term infectivity of parasites on the contaminated paddocks (Task 2) took place by estimating paddock infection levels every spring and autumn of 2001, 2002, and 2003 using pasture samples and parasite uptake by tracer pigs. As part of task 3, half the paddocks were ploughed first in the winter of 2002 and again in the winter of 2003. The paddocks were re-sown in May after the tracer pigs had been on the paddocks.

Approximately one year after the farrowing paddocks were contaminated with parasites, only two of the three initial parasites had survived on the paddocks. All samples collected from May 2002 indicate that *Oesophagostomum* was no longer present. There was a considerable transmission of *Ascaris* by the end of 2001. However, overall *Ascaris* transmission levels continued to increase until the autumn of 2003 on the paddocks that were not ploughed. This indicates that heavily *Ascaris* contaminated pastures should ideally not be used for pigs for at least 2 to 3 years after the initial year of contamination. Though transmission of *Ascaris* transmission was noticeably reduced in 2002, the results were less clear in 2003 as transmission was reduced in the autumn but not in the spring.

The overall paddock infectivity levels for *Trichuris* were much lower than for *Ascaris* but this may reflect that initial *Trichuris* contamination levels in 2001 were lower. The transmission level of *Trichuris* increased over time indicating that eggs excreted in 2001 continued to develop throughout the 3 year trial. The highest transmission level was registered in November 2003 and, considering the longevity of *Trichuris* eggs, it is expected that the parasite will remain present on the paddocks in the following years. Ploughing reduced the transmission level of *Trichuris* considerably more than *Ascaris* throughout the trial. The reason may be that *Trichuris* eggs have a higher optimal temperature for embryonation than *Ascaris* and therefore do not develop well when ploughed deeper 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, 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.

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. Activities such as mucking out the huts and moving the huts often, keeping fodder in rodent-proof containers, avoiding fodder spillage, and avoiding feeding stations for game animals nearby are reported by the farmers as useful elements in a strategy for reducing rodent problems.

Ecology of rodent pest problems has been studied at two farms on Zealand with regular trapping sessions over a period of two years (2001-2003), capture-recapture studies and telemetric work to investigate rodent movements. The captures yielded a total of 1247 small mammals, belonging to 8 rodent and 2 shrew species. The most commonly trapped animals in the traps were wood mice *Apodemus sylvaticus* and field voles *Microtus agrestis*. The commensal Norway rat *Rattus norvegicus* and house mouse *Mus musculus* constituted 8% resp. 4.6% of the trapped animals. The field data are currently being analysed.

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 submitted	June 30 2002	October 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 submitted	April 2004	December 2004
D4 National publication with recommendations for organic farmers on pasture management in non-medical control of helminth infections	Feb 28 2004	June 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	

WP2 Development of a HACCP and a systematic operation programme for control of diseases, zoonoses and animal welfare problems	Time schedule according to Progress Report 2003	Deviations, if any*
Task		
4. Development of a protocol for critical control points	Jan 02 – Oct 2003	
5. Development of a HACCP programme	May 03 – Oct 04	
6. Conducting an international questionnaire farm survey targeting organic pig producers	May 03- Dec 04	Sep – Nov 04
7. Evaluation of a CCP protocol as a management tool	Nov 2003- Sep 2004	Nov 04 – Mar 05
8. Evaluation of a HACCP as a decision support system	Nov 2003 – Dec 2004	Nov 04 – Mar 05
Deliverables		
D5. An informative publication on health and welfare problems in organic sow herds	Sept 2003	
D6. A report on HACCP principles applied in livestock research and production in Europe	Aug 2004	July 2004 *
D7. A scientific journal paper on risk factors for health and welfare problems in organic sow herds	Nov 2004	April 2005
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)	Dec 2004	April 2005
D9. A report on how farmers have perceived the applicability of the CCP protocol as a management tool (focus changed slightly from application)	Dec. 2004	April 2005
D10. The HACCP system is described for implementation on the Internet	Dec. 2004	April 2005
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	May 2004	Nov 2004

M5. Prototype HACCP systems developed for leg problems, weaning diarrhoea and crushing of piglets are available	August 2004	Jan 2005
M6. An evaluation of the HACCP system as a management tool is completed (former M5)	Oct. 2004.	April 2005

* D6 has been changed to a scientific journal paper on health management in organic sow herds using a HACCP concept

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	Oct. 2003
D12. An annotated list of non-pesticide-based pest control tools for use in outdoor pig systems	May 31 2004	Dec. 2003
D13. An international journal paper on the ecology of wild rodents in outdoor pig farm systems submitted	May 31 2004	March 31 2005
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	April 2003
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

* Deviations are to be further discussed in D

D. Description of deviations and subsequent adjustments of plans

WP1: Submission of D1 and D3 have been delayed due the large amount of data that will result in not 2 but 3 international papers and to the internal refereeing procedure for international papers.

WP2: The international questionnaire farm survey (Task 6) scheduled for the spring 2004 has been delayed 7 months affecting the implementation of tasks 7 and 8 for 4 months. The change to a more international focus in the project has been supported by study trips to several European research groups in the spring 2004, but these trips have caused a delay in accomplishment of the questionnaire study. To get the optimal response rate from the farmers it has been decided to postpone the questionnaire to late autumn 2004 to avoid periods with large amounts of field work on the farms. Therefore also M4 has been delayed for 7 months.

The deliverable D6 has been changed to a scientific journal paper on health management in organic sow herds using a HACCP concept. The topic of this paper is very relevant for the project. Deliverables 7-10 have each been 4 months delayed due to the postponement of tasks 7-8 for 4 months. This results in the delay of M5 and M6 for 5 months.

WP3: The ecological field work (trapping and telemetry data collection) has been finalised and the data are currently being analysed. Progress is slower than expected but the work with D13 will be finalised in the beginning of next year.

E. Project publications and other products

1. Products from Organic Eprints archive

Bonde, Marianne and Sørensen, Jan Tind (September 2003) [Control of health and welfare problems in organic sow herds](http://www.darcof.dk/enews/sep03/haccp.html). Online at <<http://www.darcof.dk/enews/sep03/haccp.html>>. Newsletter from Danish Research centre for Organic Farming (DARCOFenews) September 2003, No. 3

Bonde, Marianne and Sørensen, Jan Tind (22. October 2003) [Kontrol af sundheds- og velfærdsproblemer i økologiske sobesætninger](http://www.foejo.dk/enyt2/enyt/okt03/haccp.html) [Management of health and welfare problems in organic sow herds]. Online at <<http://www.foejo.dk/enyt2/enyt/okt03/haccp.html>>. Nyhedsbrev fra Forskningscenter for Økologisk Jordbrug (FØJO enyt) · Oktober 2003 · nr. 5

Mejer, Helena and Roepstroff, Allan (2003). [Non-medical control of parasitic worms in pigs](http://www.darcof.dk/enews/jun03/parasit.html). Online at <<http://www.darcof.dk/enews/jun03/parasit.html>> Newsletter from Danish Research centre for Organic Farming (DARCOFenews) · June 2003 · No. 2.

Mejer, Helena and Roepstorff, Allan (2003). Ikke-medicinsk kontrol af indvoldsorm i grise. Online at <http://www.foejo.dk/enyt2/enyt/aug03/orm.html>. Nyhedsbrev fra Forskningscenter for Økologisk Jordbrug (FØJO enyt) · August 2003 · nr. 4

Mejer, H. 2004. Pløjning virker mod nogen indvoldsorm (2004). Online at <http://orgprints.org/00003228/>. Økologisk jordbrug 315, 10.

Jens Lodal, Mette Knorr and Herwig Leirs, 2003. Non-poisonous means for reducing rodent pest problems in organic pig farming. Online at <<http://www.darcof.dk/enews/dec03/rodent.html>>. Newsletter from Danish Research centre for Organic Farming (DARCOFenews), December 2003, No. 4.

Jens Lodal, Mette Knorr and Herwig Leirs, 2003. Gode ideer til giftfri muse- og rottebekæmpelse. Online at <<http://www.foejo.dk/enyt2/enyt/okt03/skade.html>>. Nyhedsbrev fra Forskningscenter for Økologisk Jordbrug (FØJO enyt), Oktober 2003, nr. 5

Other products (oral presentations, public meetings, field days, etc.)

Bonde, Marianne. Health management in organic pig production. Oral presentation at Seminar "Rodent control strategies in organic pig and poultry production systems", Wageningen, NL, May 26-28 2004

Bonde, M.K. & Sørensen, J.T., 2004. Velfærds- og sundhedsproblemer i økologisk sohold: forekomst, risikofaktorer og kontrolmuligheder. Workshop: Produktionsstyring med fokus på husdyrsundhed og fødevarerikkerhed i økologiske svinebesætninger. FØJO Intern rapport nr. 54, 7-18.

Leirs, H., 2004. Factors affecting the presence of rodents in outdoor pig farms in Denmark. (In collaboration with J. Lodal and M. Knorr). Seminar "Rodent control strategies in organic pig and poultry production systems" May 26-28 2004, Wageningen, The Netherlands.

Lodal, J., Knorr, M. & Leirs, H., 2004. Strategier til giftfri bekæmpelse af mus og rotter. Workshop: Produktionsstyring med fokus på husdyrsundhed og fødevarerikkerhed i økologiske svinebesætninger. FØJO Intern rapport nr. 54, 27-34.

Lodal, J., 2004. Possible strategies for rodent control in outdoor pig farms. (In collaboration with H. Leirs and M. Knorr). Seminar "Rodent control strategies in organic pig and poultry production systems" May 26-28 2004, Wageningen, The Netherlands.

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.

* 25-75% financed by DARCOF

** 5-25% financed by DARCOF

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.

F. 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 2004-2006.

In February-March 2004 Scientist Marianne Bonde DIAS carried out study tours to visit selected European research groups working on development of HACCP based systems for on farm use in livestock production. The visits included research institutes, universities and associations in the UK, Netherlands and Germany. Further, a Danish network of researchers working with livestock health and welfare research applying HACCP principles has organised a seminar series June – October 2004 discussing HACCP in livestock research.

H. Critical reflection on the project

Before the project was started, it was discussed how best to monitor the survival of parasite eggs and larvae on the contaminated paddocks. Traditionally, there are 2 very different approaches to this problem. One method is to rely on the detection of eggs and larvae in soil and vegetation samples and subsequent visual evaluation of development stage and viability using a microscope. This is relatively easy and a reasonable number of samples can be processed by one person within a few days. However, the method has several shortcomings. Firstly, it is not possible by hand to

collect samples that are truly representative of what a pig would pick up through their normal grazing and especially rooting behaviour. One reason for this is that the eggs and larvae are not uniformly distributed on the paddocks. A further problem is that it is not possible to determine if the eggs are fully infective through visual examination. An egg with a fully developed larva still need time to mature before it is truly infective. It may therefore be preferable to monitor paddock infectivity by examining the worm burdens of tracer pigs that have stayed on the infected paddocks. Though this approach does not yield information on the relative distribution of different development stages and there is a natural variation between pigs, the tracer method gives a truer picture of the actual transmission potential of the paddocks. Unfortunately, the method is expensive in terms of animals and man-hours. Overall, the 2 approaches give different results, that by themselves are incomplete, and it was therefore decided that both approaches were necessary in the present project to ensure maximum level of obtained knowledge.

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. It has been considered also to include smaller rodents in the telemetry studies because very few rats seemed to be present in the study fields at the beginning of the field work. Fortunately, last year a sufficient number of rats were found to be present in the fields of farm G, and, therefore, the telemetric part of the study could be finished as planned 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	Consumption 2003	Expected consumption 2004	Budget 2005	Total
Man-months	23,5	21	9,5	1,5	55,5
Scientific personnel	17,5	17,5	9,5	1,5	46
Technical personnel	6	3,5	0	0	9,5

Year:	Consumption before 2003	Consumption 2003	Expected consumption 2004	Budget 2005	Total
Salaries	671	602	343	56	1672
Scientific personnel	540	531	343	56	1462
Technical personnel	131	71	0	0	210
Other operational costs	247	99	79	16	520
Equipment					
Others (please specify)					
Direct costs	918	701	422	72	2113
Indirect costs (20% of direct costs)	155	132	85	14	386
Total	1073	833	507	86	2500

Comments:

9. Signatures and stamps

Name	Institute	Date	Signature
Head of project			

Appendix I. Detailed budget

B. Budget for each participating department (1.000 DKK)

Name of Institute and department: Danish Institute of Agricultural Sciences, Dept. of Animal Health and Welfare

Year:	Consumption before 2003	Consumption 2003	Expected consumption 2004	Budget 2005	Total
Man-months	6	11,5	5	1,5	24
Scientific personnel	5	10,5	5	1,5	22
Technical personnel	1	1	0	0	2

Year:	Consumption before 2003	Consumption 2003	Expected consumption 2004	Budget 2005	Total
Salaries	206	380	193	56	835
Scientific personnel	184	356	193	56	789
Technical personnel	22	24	0	0	46
Other operational costs	14	42	51	16	123
Equipment					
Others (please specify)					
Direct costs	220	422	244	72	956
Indirect costs (20% of direct costs)	44	84	49	14	191
Total	264	506	293	86	1150

Comments:

Due to the four month delay in WP2 86.000 Dkr from the 2004 budget has been moved to 2005

B. Budget for each participating department (1.000 DKK)

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

Year:	Consumption before 2003	Consumption 2003	Expected consumption 2004	Budget 2005	Total
Man-months	12	7	3,2	0	22,5
Scientific personnel	9	6	3,2	0	18½
Technical personnel	3	1	0	0	4

Year:	Consumption before 2003	Consumption 2003	Expected consumption 2004	Budget 2005	Total
Salaries	303	155	115	0	573
Scientific personnel	236	140	115	0	491
Technical personnel	67	15	0	0	82
Other operational costs	92	15	28	0	135
Equipment	0	0	0	0	0
Others (please specify)	0	0	0	0	0
Direct costs	395	170	143	0	708
Indirect costs (20% of direct costs)	79	34	29	0	142
Total	474	204	172	0	850

Comments: 3,000 DKK has been transferred from other operational costs in 2003 to 2004 and 23,000 DKK has been transferred from scientific personnel in 2003 to 2004. Furthermore, it is requested that a surplus of 8,000 DKK is transferred from technical personnel in 2003 to scientific personnel in 2004 in order to terminate paper publication.

Name of Institute and department:

Danish Pest Infestation Laboratory. Danish Institute of Agricultural Sciences

Year:	Consumption before 2003	Consumption 2003	Expected consumption 2004	Budget 2005	Total
Man-months	5,5	2,5	1	0	9,0
Scientific personnel	3,5	1,0	1	0	5,5
Technical personnel	2,0	1,5	0	0	3,5

Year:	Consumption before 2003	Consumption 2003	Expected consumption 2004	Budget 2005	Total
Salaries	162	67	35	0	264
Scientific personnel	120	35	35	0	190
Technical personnel	42	32	0	0	74
Other operational costs	141	42	0	0	183
Equipment					
Others (please specify)					
Direct costs	303	109	35	0	447
Indirect costs (20% of direct costs)	32	14	7	0	53
Total	335	123	42	0	500

Comments: