

Report from project II8 Management in relation to health and food safety in organic pig production, concerning deliverables D7 and D9

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Health and welfare problems in European organic sow herds.

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Abstract

52 organic pig producers from Denmark, UK, the Netherlands, and Sweden completed a postal questionnaire concerning health and welfare problems in organic sow herds. 23 % of the farmers stated that they frequently observed leg problems in their sows. Hoof injury was the most frequently observed leg problem, but leg or hoof disorders were the culling reason in only a few cases. 55 % of the farmers perceived they had a problem with piglet mortality, 17 % of the herds reported a piglet mortality of more than 20 %. The most common cause of death was crushing of piglets by the sow. In addition to that, piglets that were weak at birth and shortage of milk in the sow caused piglet mortality in many herds. 21 % of the farmers were concerned with weaning diarrhoea; it seemed mainly a Danish and Dutch problem. Respiratory diseases were perceived as a problem by 44 % of the farmers, especially from the Netherlands. Arthritis was perceived as a problem by 26 % of the farmers, while endoparasites were concerning 21 % of the farmers. Diarrhoea was the major cause of death in Danish weaned pigs. In the Netherlands they were more likely to die from respiratory diseases. The English farmers reported that mortality in weaned pigs caused by insufficient feed intake was a bigger problem than infectious diseases. In general the farmers appreciated improvements of the production facilities as the method most likely to improve animal health in the herd, but also optimisation in the care of the animals were likely to improve herd health. Breeding programmes focusing on disease resistance and better surveillance of the production, using for example a CCP management tool were alternative options. In spite of the CCP management tool not being the farmers' first choice of control method, 50 % of the farmers would be interested in applying such a tool in their herd. If the tool were of use in marketing organic pigs, it would be an extra incentive.

Introduction

Organic pig production is a small-scale system, and various production systems co-exist. Yet the knowledge of animal health and welfare in existing systems is scarce (Thamsborg et al., 2004).

In a survey among Danish and Swedish farm advisers (veterinary practitioners and farm husbandry advisers) carried out in task 4 in this project, health and welfare problems in organic sows, suckling piglets and weaned pigs were identified. The problems that were judged as being most important for the three groups of animals, respectively, were: leg problems in sows, piglet mortality, and weaning diarrhoea (Bonde & Sørensen, 2003). The farm advisers suggested and ranked a list of potential risk factors for these problems (Bonde & Sørensen, 2004).

The risk analysis concept, Hazard Analysis Critical Control Points (HACCP) integrates epidemiological risk assessment and qualitative control procedures. Intervention is directed towards the risk factors rather than focusing on the problem. Improved management in the individual herd may reduce problems and in order to ensure a high level of animal health and product safety it is necessary to be able to monitor and assess any risk factors present in the herd. This is relevant, especially for organic producers as the organic guidelines encourage control of disease and welfare problems by means of prophylactic measures.

The farmers' perception of the problems, however, are important when developing a herd health management tool. A problem in relation to organic pig production is that there are so few organic pig producers that it is difficult to do a survey with a satisfactory number of farms. Therefore we have chosen to include organic pig producers from several countries. Apart from Denmark, organic pig producers from Sweden, UK, the Netherlands and Germany were invited to participate in the survey. These countries have been chosen as they have an industrialised pig production. Further, they are geographically close and do have comparable production systems.

In this study we have gathered information on the prevalence of health and welfare problems on-farm. Further the occurrence of different risk factors in the herds has been investigated.

Materials and methods

The investigation is based on a questionnaire with 51 questions concerning disease patterns and Salmonella infection in the herds in 2004 as well as production system and management in the mating section, pregnant sows, lactating sows and suckling piglets, and weaned pigs, respectively. Further, the farmers were asked to rank different potential methods to control animal diseases in the herd. The questionnaire is included as Appendix.

The questionnaire was forwarded to organic pig farmers in Denmark, UK, The Netherlands, Sweden and Germany, and for this purpose it has been translated from Danish to English, Dutch, Swedish and German.

The Danish questionnaire was posted to 20 of the largest organic sow herds in Denmark. Most of these had participated in other organic pig projects at DIAS in the last couple of years. 11 farmers (55 %) completed the questionnaire. The English version was posted to 13 herds that were supplying pork to one organic pork marketing company, and 6 farmers (46 %) completed the questionnaire. The Dutch version was posted to 72 herds on a list from the Dutch organic certification programme SKAL. 24 farmers (33 %) completed the questionnaire, while 5 farmers replied that they did not have a sow herd. The Swedish version was posted to 22 herds with more than 10 sows, according to the producer list obtained from the Swedish organic certification system KRAV. 11 farmers (50 %) completed the questionnaire. We could not get access to any producer lists from Germany, in stead the German questionnaires were forwarded to a group of German organic pig husbandry advisers, in contact with 21 organic sow herds. However, the consultants have failed to supply any questionnaires from Germany, and therefore the results reported are based on the questionnaires returned from Denmark, UK, Sweden and the Netherlands.

Results

Participating farms

52 organic pig producers from Denmark, UK, the Netherlands, or Sweden completed the questionnaire. In general the pig producers had several years experience in organic farming, only 4 farmers had converted to organic production within the last year, and 50 % of the farms had been organic for 5 years or more. The farmers were also experienced in sow husbandry; 81 % of the farms had housed a sow herd for 10 years or more.

Table 1. Information about the farms participating in the survey

	No of herds	Av. herd size, sows	Av. organic experience	% integrated herds*	Predominant system			Av. age at wean.
					Dry sows	Lactating sows/piglets	Weaned pigs	
DK	11	144	> 5 years	82 %	Pasture		Indoor with outdoor access	52
UK	6	52	> 2 years	83 %	Pasture			54
NL	24	94	> 2 years	71 %	Indoor with outdoor access	Indoor with (58%) or without (42%) outdoor access	Indoor with (63%) or without (37%) outdoor access	41

S	11	37	> 5 years	55 %	Pasture and/or indoor with outdoor access	52
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* herds with sows as well as fattening pigs, finishing at least 50 % of the pigs produced in the sow herd

The herd sizes varied from 10 to 400 sows with an average of 88 sows. 33 % of the herds had 100 sows or more. As illustrated in Table 1 the Danish herds tended to be larger than especially the Swedish and English herds. 71 % of the herds were integrated, finishing most of their slaughter pigs themselves. The predominant system for dry and lactating sows in Denmark, UK and Sweden was pasture, while most of the Dutch sows were housed indoor with outdoor access. The weaned pigs were housed indoor with outdoor access in Denmark, the Netherlands and to some extent in Sweden. In UK the weaned pigs were on pasture. The average age at weaning was lower in the Netherlands (41 days) than in the other countries (52-54 days).

Leg disorders in sows

48 of the 52 farmers answered the question regarding the occurrence of lameness in their sows as illustrated in Table 2. 23 % of the farmers stated that they frequently observed leg problems in their sows. The Dutch and Swedish farmers seemed more concerned with lameness in their sows compared to the English and Danish farmers. Most farmers reported the same occurrence of leg problems compared to previous years or even a decreasing tendency. In general, hoof injury was the most frequently observed leg problem in the sows. Leg or hoof disorders were culling reason in only a few cases.

Table 2. The farmers' perception of leg problems in sows in 2004

	No.	No problem	Infrequent problem	Common problem	Serious problem
DK	11	2	8	1	0
UK	5	1	4	0	0
NL	22	3	12	7	0
S	10	5	2	3	0
Total	48	11 (23 %)	26 (54 %)	11 (23 %)	0 (0 %)

Piglet mortality

All farmers quantified the piglet mortality in their herd (Table 4), while only 44 of the 52 farmers stated how they perceived the problem (Table 3). In general 55 % of the farmers perceived they had a problem with piglet mortality, and 17 % of the herds, mostly Dutch, reported a piglet mortality of more than 20 %. The most common cause of death was crushing of piglets by the sow. In addition to that, piglets that were weak at birth and shortage of milk in the sow caused piglet mortality in many herds.

Table 3. The farmers' perception of the piglet mortality problem in their herd in 2004

	No.	No problem	Small problem	Common problem	Serious problem
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DK	11	1	2	8	0
UK	5	3	2	0	0
NL	19	2	4	10	3
S	9	5	1	3	0
Total	44	11 (25 %)	9 (20 %)	21 (48 %)	3 (7 %)

Table 4. Piglet mortality in the suckling period, litters born in 2004

	No	Piglets died in the suckling period				% caused by crushing
		< 5 %	5-20 %	21-35%	36-50%	
DK	11	2	8	1	0	30-80 %
UK	6	1	5	0	0	20-98 %
NL	24	1	16	6	1	10-90 %
S	11	1	9	1	0	50-100 %
Total	52	5 (10 %)	38 (73 %)	8 (15 %)	1 (2 %)	Average 60 %

Only a few farmers perceived scours in suckling piglets as being more than a small problem.

Weaning diarrhoea

50 farmers quantified the prevalence of weaning diarrhoea at batch level (Table 6), while 48 of the 52 farmers stated how they perceived the problem (Table 5). In general 21 % of the farmers were concerned with weaning diarrhoea in 2004, but it seemed to be mainly a Danish and Dutch problem. 10 % of the herds observed weaning diarrhoea in more than 25 % of their batches of weaned piglets (Table 6).

Table 5. The farmers' perception of weaning diarrhoea

	No.	No problem	Small problem	Common problem	Serious problem
DK	11	2	5	3	1
UK	5	3	2	0	0
NL	22	9	7	4	2
S	10	7	3	0	0
Total	48	21 (44 %)	17 (35 %)	7 (15 %)	3 (6 %)

Table 6. Estimated prevalence of weaning diarrhoea at batch level in 2004

	No	Weaning diarrhoea, in % of pig batches			
		<10 %	11-25 %	26-50 %	>50 %
DK	10	5	3	1	1
UK	6	4	2	0	0
NL	23	15	5	2	1
S	11	10	1	0	0
Total	50	34 (68 %)	11 (22 %)	3 (6 %)	2 (4 %)

Apart from weaning diarrhoea the farmers were asked about the importance of other disorders in weaned pigs, such as respiratory diseases, arthritis and endoparasites. Respiratory diseases were causing most concern, perceived as a problem by 44 % of the farmers, especially from the Netherlands. Arthritis was perceived as a problem by 26 % of the farmers, while endoparasites were concerning 21 % of the farmers. Table 7 summarises the important causes of death in weaned pigs during the first 4 weeks after weaning, reported by 45 of the 52 farmers. Diarrhoea seemed to be the major cause of death in

Danish weaned pigs, while the Dutch weaned pigs were more likely to die from respiratory diseases. The English farmers reported that mortality in weaned pigs caused by insufficient feed intake was a bigger problem than infectious diseases.

Table 7. Important causes of death in weaned piglets (more than 10 % of the deaths in the herd)

	No.	Diarrhoea	Arthritis	Insufficient feed intake	Respiratory diseases	Other reasons
DK	10	8	2	2	2	5
UK	3	2	1	3	0	1
NL	24	13	12	12	19	12
S	8	4	3	2	3	6
Total	45	27 (60 %)	18 (40 %)	19 (42 %)	24 (53 %)	24 (53 %)

CCP as a management tool:

The farmers were asked to score each of the health control options listed in Table 8 on a scale from 1 to 7, with 1 being the best and 7 the least successful control method. In table 8 the methods are ranked based on their average scoring. The methods labelled '1' were thus receiving the best average scores from the farmers.

Table 8. Ranking of herd health control methods according to farmers' opinion

	Production facilities	Care of the animals	Surveillance of the production	Health advisory plan	Efficient disease treatment	Robust pig breeds	Breeding for disease resistance
DK	3	1	2	5	7	6	4
UK	1	2	4	7	6	5	3
NL	2	1	5	6	7	4	3
S	1	5	3	4	6	7	2
Total	1	2	4	7	6	5	3

In general the farmers appreciated improvements of the production facilities as the method most likely to improve animal health in the herd, but also optimisation in the care of the animals were likely to improve herd health in the farmers' opinion. Breeding programmes focusing on disease resistance and better and more focused surveillance of the production, as for example a CCP management tool were alternative options. The effect of health advisory plans, better disease treatment and more robust pig breeds in improving herd health were less promising according to the farmers.

In spite of the CCP management tool not being the farmers' first choice of control method, 50 % of the farmers would be interested in applying such a tool in their herd (Table 9). If the tool were of use in marketing organic pigs, it would be an extra incentive.

Table 9. Farmers' interest in applying a CCP management tool in the herd

	No.	Use of CCP as a management tool			
		Yes	Possibly	No	Undecided
DK	11	5	1	1	4
UK	6	2	0	4	0
NL	23	9	4	5	5
S	10	3	1	3	3
Total	50	19 (38 %)	6 (12 %)	13 (26 %)	12 (24 %)

Discussion

Leg problems in sows were not a major problem to the farmers, especially in the UK and Denmark, where the sows were on pasture. The Swedish and Dutch farmers more frequently observed lame sows in their herds. This might be due to the difference in housing system, as Dutch and to some extent Swedish sows are housed indoor. Indoor housing perhaps leads to more injuries. On the other hand, indoors or in smaller herds like the Swedish, monitoring of individual animals are easier; housing on pasture may lead to an under-estimation of the problem caused by difficulties in the surveillance of animals. Preventative measures such as hoof trimming were seldom in the sow herds - 90 % of the farmers never trimmed hooves.

Piglet mortality was generally a problem, especially caused by crushing of piglets by the sow. The Danish and Dutch farmers seemed more troubled by dead piglets than the Swedish and English farmers. In general the Danish and Dutch herds were more likely to use barley straw, whereas the Swedish and English farmers used wheat straw. Further the Dutch sows and piglets were housed indoor, while lactating sows in the other countries were on pasture.

The farmers in the different countries differed in their opinion on health problems in weaned pigs. In the UK weaned pigs were on pasture and infectious diseases were less of a problem than in Denmark and the Netherlands, where weaned pigs were housed indoors. The indoor system applied in Denmark and the Netherlands might increase the risk of diarrhoea. Aspects of hygiene, feeding and the age at weaning might also be partly responsible for the difference between the countries. Respiratory diseases were a problem in many Dutch farms, contrary to the other countries.

The CCP management tool was not the preferred health control method for the farmers. They may have difficulties judging the potential of the tool, as it has not yet been tested on-farm. The Danish and Dutch farmers seemed more interested in using the tool in their herds. The CCP management tool may be more suited to larger herds and the Danish and Dutch herds were generally bigger than the English and Swedish herds. The price the farmers were willing to pay for the tool and advise varied among the 40 % of the farmers, who had indicated a price limit. None of the Swedish farmers would pay more than 1-2

Euro per sow, and none of the Dutch farmers would pay more than 4,50 Euro per sow, while some of the Danish farmers would be willing to pay more than 4,50 Euro per sow.

References:

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APPENDIX

Questionnaire re. animal health and welfare in organic sow herds

Farm information:

1. When was your farm converted to organic production?

Before 1990: ___ 1990-1995: ___ 1996-1999: ___ 2000-2002: ___ 2003-2004: ___

2. When did you take over the property?

Before 1990: ___ 1990-1995: ___ 1996-1999: ___ 2000-2002: ___ 2003-2004: ___

3. For how long has a sow herd been kept at the property?

Before 1990: ___ 1990-1995: ___ 1996-1999: ___ 2000-2002: ___ 2003-2004: ___

4. How many people have been occupied in the sow herd in 2004?

0-1/2 person's work in one year ___ 1/2-1 person's work in one year ___
1-2 person's work in one year ___ >2 person's work in one year ___

Animals in the herd in 2004:

5. Number of sows: _____

6. Purchase of animals in 2004, approximate number:

- Breeding animals (sows, gilts, boars): _____
- Pigs for fattening: _____

7. Sale of produced pigs in 2004 (Please allocate a total of 100 % between the animals mentioned below):

- At weaning _____ % of the pigs
 - At 20-30 kg _____ % of the pigs
 - Finishers _____ % of the pigs, average slaughter weight: _____ kg
 - Other: _____ % of the pigs
-

Production system and management in mating section:

8. How much time do the sows spend in the mating section:

- 1-7 days
 8-28 days
 > 28 days

9. Grouping:

- Individual pens
 Well-established groups (no substitution of sows)
 Sows are introduced and removed continuously:

Group size: 2-10 11-20 >20

10. Gilts/ young sows:

- Kept separate from older sows during mating and first pregnancy
- Kept separately during mating but mixed with older sows during pregnancy
- Mixed with older sows during mating and pregnancy

11. System: Outdoor (pasture) with huts

- Indoor deep litter pens with outdoor run
 Indoor pens with outdoor run
 Indoor pens without outdoor access
 Other system

12. If access to outdoor area: What is the surface material/layer:

Grass Soil Deep litter Concrete floor Slatted floor Other

Remarks:

Production system and management of pregnant sows:

13. Grouping:

- Individual pens
 Well-established groups (no substitution of sows)
 Sows are introduced and removed continuously

Group size: 2-10 11-20 20-50 >50

14. System: Outdoor (pasture) with huts

- Indoor deep litter pens with outdoor run
 Indoor pens with outdoor run
 Indoor pens without outdoor access

___ Other system

15. If access to outdoor area: What is the surface material/layer:

Grass ___ Soil ___ Deep litter ___ Concrete floor ___ Slatted floor ___ Other ___

16. Appearance of outdoor area	Often	Parts of the year	seldom
Wet, muddy or manure covered surface <ul style="list-style-type: none">• Most of the area• Feeding and drinking area, passageways			
Rough or stony ground <ul style="list-style-type: none">• Most of the area• Some parts of the area			

Remarks:

Production system and management of lactating sows

17. How many days before farrowing are the sows introduced to the farrowing pens:

0-2 days ___ 3-6 days ___ >6 days ___

18. Grouping:

- ___ Individual pens
___ Well-established groups (no substitution of sows)
___ Sows are introduced and removed continuously

Group size: 2-10 ___ 11-20 ___ >20

19. System:

- ___ Outdoor (pasture) with huts
___ Indoor deep litter pens with outdoor run
___ Indoor pens with outdoor run
___ Indoor pens without outdoor access
___ Other system

20. If outdoor huts:

- Individual huts ___ Huts shared between several sows ___
Crescent-shaped: ___ A-shaped (peaked roof): ___
Insulated: ___ Not insulated: ___

21. Rails or other equipment in the farrowing pen/hut to protect the piglets:

Yes ___ No ___

22. Bedding material in the farrowing pen/hut:

Chopped straw ___ Long straw ___

Wheat ___ Rape seed ___ Barley ___ Rye ___ Other _____

23. If access to outdoor area: What is the surface material/layer:

Grass ___ Soil ___ Deep litter ___ Concrete floor ___ Slatted floor ___ Other ___

24. Appearance of outdoor area	Often	Parts of the year	seldom
Wet, muddy or manure covered surface <ul style="list-style-type: none"> • Most of the area • Feeding and drinking area, passageways 			
Rough or stony ground <ul style="list-style-type: none"> • Most of the area • Some parts of the area 			

25. Wild animals close to sows and piglets (contact)	often	frequently	Parts of the year	seldom	never
Foxes					
Wild birds					

Remarks:

Production system and management of weaned pigs (15-25 kg) - if you sell all pigs at weaning, please continue to question 36

26. Age at weaning: ___ days

27. System: ___ Outdoor (pasture) with huts
 ___ Indoor deep litter pens with outdoor run
 ___ Indoor pens with outdoor run
 ___ Indoor pens without outdoor access
 ___ Other system

28. If access to outdoor area: What is the surface material/layer:

Grass ___ Soil ___ Deep litter ___ Concrete floor ___ Slatted floor ___ Other ___

29. Wallowing

- ___ Sprinkling system
- ___ Wallowing hole: Stationary ___ Moved once a month ___

Moved before introducing a new group of pigs to the area ___

30. Water supply:

- Pond ___ Water trough ___ Water bowl ___ Nipple drinker ___

31. Rodents and wild birds	Rats	Mice species	Birds
Occurring near the pigs			
Possible contact to pigs			
Possible contact to feed			
Rodent management strategy	Rodenticide (poison) ___ Dog/cat ___ Traps ___ Other ___ Nothing ___		

32. Grouping of weaned piglets (first 4 weeks after weaning) in pen/paddock:

- ___ Intact litter
- ___ No changes in groups in the first 4 weeks after weaning
- ___ Piglets are removed or added to the group time and again

Group size for weaned piglets: <20 ___ 21-50 ___ >50 ___

33. Cleaning of facilities between groups of piglets:

- ___ New paddock
- ___ Removal of manure and wet litter
- ___ Wash of pen
- ___ Wash and disinfection of pen
- ___ Other
- ___ No cleaning between groups of piglets

34. Cleaning regime	Daily	2-3x/week	Weekly	1-2 x/month
Provision of bedding material				
Scraping of floor				

35. Feed for weaned piglets	
Protein content in weaner feed	_____ %
Protein source	Rape seed ___ Peas ___ Lupin ___ Other _____ Dairy (waste) products ___ Fish products ___
Type of feed	Ready mixed ___ Home mixed feed ___
	Dry feed ___ Liquid feed ___
	Preground feed ___ Pelleted feed ___

Remarks:

Health problems:

36. Which are the main health problems in the sows in your herd?

Health problem	Serious problem	Common problem	Small/infrequent problem	Not a problem
Lameness - leg and hoof disorders				
Reproductive disorders				
Udder diseases				
M.M.A. (mastitis metritis agalactia)				
Other:				

Remarks:

37. Which are the main health problems in the piglets in your herd?

Health problem	Serious problem	Common problem	Small/infrequent problem	Not a problem
Piglet mortality				
Scours in suckling piglets				
Weaning diarrhoea				
Respiratory diseases				
Arthritis				
Endoparasites				
Other:				

Remarks:

Leg and hoof disorders in sows:

38. With respect to your sows, what is your estimate regarding the occurrence of leg disorders in your herd in 2004?

	None	1-2 sows	< 10 % of the sows	10-30 % of the sows	> 30 % of the sows
Hoof abscesses, arthritis etc. needing medical care					
Injuries to hooves					
Recordings of arthritis from the sow abattoir					
Culling or euthanasia of sows because of leg or hoof disorders					
Culling of gilts owing to poor legs					

39. What is your impression of the occurrence of leg disorders in the sows in 2004 compared to the previous years?

- Increasing
- The same
- Declining

40. Do you vaccinate your sows and gilts against swine erysipelas?

Systematically Occasionally Rarely Never

41. Hoof trimming of the sows:

Never Occasionally At least once a year

Remarks

Piglet mortality:

42. With respect to your litters of piglets, what is your estimate regarding the piglet mortality (in the suckling period) in 2004?

0-5 % die	5-20 % die (1-2 piglets per litter)	20-35 % die (2-4 piglets per litter)	35-50 % die (4-5 piglets per litter)	More than 50 % die (>5 piglets per litter)

43. What is your impression of the piglet mortality in 2004 compared to the previous years?

- Increasing
- The same
- Declining

44. What is your average number of liveborn pigs per litter in 2004:

< 9 pigs 9-10 pigs 10-11 pigs 11-12 pigs >12 pigs

45. In your opinion what are the causes of piglet mortality in your herd (Please allocate a total of 100 % between the possible causes mentioned below)

Causal factor	% of dead piglets
Crushed by the sow	
Killed by predators or wild birds	
Cold	
Shortage of milk	
Weak at birth	
Diarrhoea (scours)	
Other causes:	

Remarks:

Weaning diarrhoea:

All pigs sold at weaning (Please continue to question 50)

46. With respect to your pigs in 2004, what is your estimate regarding the occurrence of diarrhoea during the first 2 weeks after weaning?

	< 10 %	11-25 %	26-50 %	51-75 %	76-100 %
% of pig batches					

47. What is your impression of the occurrence of weaning diarrhoea in 2004 compared to the previous years?

- Increasing
- The same
- Declining

48. In your opinion what are the primary causes of pig mortality during the first 4 weeks after weaning in your herd (Please allocate a total of 100 % between the possible causes mentioned below)

Causal factor	% of dead pigs
Diarrhoea	
Arthritis	
Insufficient feed intake	
Respiratory diseases	
Other:	

49. Which measures do you apply to control weaning diarrhoea (you may indicate one or more options):

- Antibiotic treatment
- Alternative treatment (eg. herbs, homoeopathic medicine)
- Vaccination or serum treatment
- Feeding strategy
- Isolation of sick animals in a separate pen or paddock
- Other:
- No intervention

Remarks:

Salmonella:

50. Has your herd been diagnosed with Salmonella in 2004?

- Salmonella antibodies in meat juice or blood
- Salmonella cultured from animals, feed or bedding
- Salmonella cultured from sick animals
- No

51. Do you take precautions against Salmonella when buying animals or feed?

	Yes	No
Choose suppliers of animals and feed that are certified free from salmonella		
Test of purchased animals		
Test of purchased feed		

Remarks:

Monitoring and management systems

Many factors may influence occurrence of leg disorders, piglet mortality, weaning diarrhoea or Salmonella infection rate in a sow herd. Therefore, several strategies can be applied in order to control the problems.

Efforts may be aimed at:

- *Improvement of the production system*
- *Improvement in the surveillance and care of the animals*
- *Achievement of more robust animals*

52. Which methods have the greatest potential to control animal diseases in your herd – please rank the methods from 1 to 7 with 1 labelling the best method and 7 labelling the least successful method.

- ___ Improvements of the production facilities
- ___ Optimization in the care of the animals
- ___ Better and more focused surveillance of the production
- ___ Health advisory plans
- ___ Improvements in the treatment of disease
- ___ Choice of more robust pig breeds or hybrids in the production
- ___ Breeding for a higher resistance against diseases

We are currently in the process of developing a system to ease the daily surveillance of pigs for leg disorders, piglet mortality, weaning diarrhoea and Salmonella. This system will identify the main causes of the problems in the individual herd and focus on the control of these factors in order to prevent health problems.

53. Would you be interested in applying such a tool in your herd:

- ___ Yes – it might be applicable as a management tool
- ___ Yes – if it leads to increased payment for my pigs
- ___ No
- ___ Undecided

54. If you are interested in such a tool ('Yes' in Question 53) how much would you be willing to pay for advise and reports to apply the system in your herd?

- ___ < £ 1,0 per sow
- ___ £ 1,0 – 2,0 per sow
- ___ £ 2,0- 4,5 per sow
- ___ > £ 4,5 per sow
- ___ Undecided

Remarks

Thank you for your assistance in completing this questionnaire