# KTIF SG Final Report

## 1. KTIF Ref No – KTIF/028/2019

**1.1 Project title:** Pleurisy Reduction in Scottish Pigs to Improve Health, Reduce Waste and Enhance Supply Chain Value

**1.2 Wholesome Pigs (Scotland) Ltd.**

Wholesome Pigs Scotland Ltd was formed in 2003 as a not-for-profit body to deliver an abattoir surveillance system for significant production diseases of pigs. Dr David Strachan from SAC designed the programme and funding was from a mixture of membership fees and contracts from various funders. All significant commercial pig producers in Scotland are members of WPS, enabling it to take a non-competitive approach to improving the health & welfare of the national pig herd.

Wholesome Pigs Scotland is co-located Scottish Pig Producers, the largest pig marketing cooperative in Scotland. Since its formation in 1979, SPP has grown steadily and has over 110 active members in Scotland and Northern Ireland, marketing around 11,000 pigs every week with an annual turnover of around £75m.

## 2. EXECUTIVE SUMMARY

Whilst the overall health of Scottish pigs is improving and compares favourably with most other nations, levels of pleurisy remain stubbornly high. This is a condition of the lungs that ranges in severity and has multiple causes. Veterinary treatment alone is often inadequate to solve the problems and environmental conditions are thought to play a large role in severity.

This project compared the health and environment conditions on six Scottish farms with high incidence of pleurisy with the same measures on low incidence farms. The differences were identified and then interventions designed and tested. Results were circulated to whole Scottish pig industry through written and video material, along with a number of meetings.

## 3. PROJECT DESCRIPTION

The aim was to better understand the environmental, health and management conditions that impact on the incidence and severity of pleurisy and to share experiences to the entire Scottish pig sector

The following steps were carried out:

1) Identify six farms with persistently high pleurisy scores from WPS and six with low scores and monitor their environment, health and production parameters to identify root causes
2) Collate and analyse the project data and produce a series of knowledge transfer material aimed at the relevant aspects of pig house management
3) Apply interventions on the six high scoring farms and relay the results to the Scottish pig sector in a series of costed case studies

## 4. FINANCE

4.1 £47,300 awarded.

A project change request in February 2021 approved moving the Event Venue costs into Publicity because of Covid-19 restrictions.

4.2

| | | Budget | Total Claimed |
|---|---|---|---|
| A) Project Development | Farm recruitment (Andy McGowan - WPSL) | £ 1,100 | £ 1,100.00 |
| | Farm recruitment (Allan Ward - QMS) | £ 3,000 | £ 3,000.00 |
| | Farm recruitment (Jamie Robertson - LMS) | £ 7,200 | £ 7,200.00 |
| | Financial & performance data collation (John Taylor - SPP) | £ 1,300 | £ 1,300.00 |
| | | **£ 12,600** | **£ 12,600.00** |
| | | | |
| B) Project management | Project management & administration (Andy McGowan - WPSL) | £ 3,300 | £ 3,300.00 |
| | Project administration (Peter Duthie - WPSL) | £ 1,300 | £ 1,300.00 |
| | | **£ 4,600** | **£ 4,600.00** |
| | | | |
| D) T&S for speakers/facilitators | Estimated 5000 miles @ 0.45p / mile | £ 2,250 | £ 2,250.00 |
| | | | |
| E) Event venue costs | KE meeting catering | £ 600 | £ - |
| | KE meeting venue hire | £ 600 | £ - |
| | | **£ 1,200** | **£ -** |

| | | | |
|---|---|---|---|
| | | | |
| G) Publicity | KE material printing | £ 900 | £ 1,147.00 |
| | KE material postage | £ 144 | £ 348.00 |
| | Video production | £ 3,000 | £ 3,000.00 |
| | | **£ 4,044** | **£ 4,495.00** |
| | | | |
| H) Other approved external costs | Project Investigator (Jamie Robertson - LMS) | £ 14,400 | £ 14,400.00 |
| | Environmental specialist input (various) | £ 5,000 | £ 5,000.00 |
| | Financial & performance analysis (Iain Lyle - Harbro) | £ 2,200 | £ 2,200.00 |
| | Veterinary specialists (SRUC/SACC) | £ 4,200 | £ 4,052.85 |
| | | **£ 25,800** | **£ 25,652.85** |
| | | | |
| **Project Total** | | **£ 50,494** | **£ 49,597.85** |

4.3 There was a small underspend in KE printing material.

## 5. PROJECT AIMS/OBJECTIVES

5.1 OBJECTIVES

The following steps have been carried out:

1) Investigate six farms with persistently high pleurisy scores from WPS and six with low scores and monitor their environment, health and production parameters to identify root causes. This was expedited to start in early January 2020 to minimise the impact of potential movement restrictions

2) Collate and analyse data from a further 20 farms with high and low levels of pleurisy, which had been collected in previous years but never collated or analysed

3) Collate and analyse the project data. Knowledge transfer material has been produced to step around the restrictions on the normal KT meetings around Scotland due to Covid 19 restrictions. Five short videos have been produced, a two-part programme for discussion meetings on the internet, and a printed document for circulation to the production sector.

4) Apply interventions on the six high scoring farms and relay the results to the Scottish pig sector in a series of costed case studies

## 6. PROJECT OUTCOMES

**6**.1 1) The on-farm investigations were moved to start in early January to keep the monitoring period as tight as possible so that the broad environmental parameters that are influenced by the weather would be broadly similar. Information flows between Wholesome Pigs (Scotland) Ltd, Scottish Pig Producers Ltd and Tulip Ltd allowed quick identification of farms that suited the requirement for pleurisy positive farms with high or low prevalence. The producers approached all kindly accepted the farm visit hygiene protocols that gave the tightest permissible farm visit routine.

A small amount of data collection (airborne particle counts) was not carried out at the end of this phase as routine maintenance and calibration of the equipment was refused by the suppliers due to Covid 19 restrictions.

There were delays in collection of blood samples from pigs at the various processors due to restrictions placed on some staff routinely involved in such work. However, all samples from all farms were finally collected with the co-operation of staff at the mian processor in Brechin. All blood samples were submitted as per protocol to SRUC laboratories in Edinburgh.

2) Collate and analyse the project data. Completion of this phase was delayed by movement restrictions, and was mostly completed by August 2020. Some material was delayed beyond this point. Knowledge transfer material has been produced to step around the restrictions on the normal KT meetings around Scotland due to Covid 19 restrictions. Five short videos have been produced, not three as proposed. A two-part programme was prepared for discussion meetings on the internet, as well as a printed document for circulation to the production sector.

2a) Collate and analyse data from a further 20 farms with high and low levels of pleurisy, which had been collected in previous years but never collated or analysed. The problem of pleurisy on Scottish units had been approached in an earlier project starting in 2013, internally funded. The project was never completed due to lack of funds, but data had been collected from 20 farms and was considered a valuable resource that would contribute significantly to the current project. All the farm and processor data from that initial project has been digitised for comparison to the results from the current project.

3) Apply interventions on the six high scoring farms and relay the results to the Scottish pig sector in a series of costed case studies. All 12 farms were sent an initial short summary after the final visit, providing general comment prior to further analysis. There were understandable delays to further farm access. Four farms agreed further access in September 2020, and interventions were highlighted. Two types of specific interventions were applied and monitoring started. Monitoring continues and will provide a longer term outcome from the project.

### 6.2 Milestones

All objectives were successfully achieved.

Phase 1 - On-Farm Investigation

M1.1: Identify and recruit 12 farms - by end of Jan 2020

M1.2: Complete investigations & analysis - by end of Apr 2020. On-farm investigations were completed by end of March 2020. Samples from the processors were completed by September 2020.

Phase 2 - On-Farm Interventions

M2.1: Undertake interventions to improve environment and health on the six high incidence farms - by end of Aug 2020. These were not started until September 2020, and any infrastructure changes completed by end October 2020. Routine assessments at the processors were carried out in the fourth quarter of 2020 (Q4) but are currently halted for Q1 2021 due to covid sensitivities at Scottish processors. Any measured impact of any interventions on the high pleurisy farms will be delayed until further access to the processors is available.

Phase 3 - Knowledge Transfer

M3.1: Development of written KT material - by end of Jun 2020. This has been significantly delayed but now completed.
M3.1: Four producer meetings held - by end of Sept 2020. As this became unlikely to be completed, permission was obtained to move the resources from the costs of the planned four meetiings to the production of an information booklet on pleurisy that will be sent to producers and farm staff. This will coincide with a series of on-line meetings using further prepared material that will include specific data and analyses from the 12 project farms.

M3.3: Production of three video case studies - by end of Oct 2020. Kind agreement was given for filming on two project farms, and completed in November 2020. The footage has been edited to give KT information on an introductory video and four aspects of management that come out of the study..

## 7. LESSONS LEARNED

7.1 Access to and ability to work directly with the Scottish producers and processors is excellent. There is a high degree of trust required to have an external person or persons enquiring deeply into a private business, acquiring highly specific data, and being allowed to analyse data in whatever manner deemed necessary.

The design of the project was to ask for almost no contribution of time from farm staff or owners, and this is considered to be a significant part of (finally) project completion. Farm staff have very little time for extra tasks, and in a particularly difficult year for everybody this type of approach proved essential for completing studies that involve on-farm studies.

The design of the project included a single element that mostly, but not entirely succeeded. There is a considerable amount of ongoing data collection relevant to individual pig farms, including:

- Processor data; weekly; individual carcase weight, grades and imperfections, dated.

- WPS data from three – monthly specialist visits to collect health data from a selection of individual carcases.
- Agrosoft data; monthly or quarterly farm management data
- eMB – three monthly records of antibiotic use data
- QMS – veterinary observations collated from Quarterly Veterinary Reports, along with other project data

The ability to access data already created and in electronic format is immensely useful for a multidisciplinary subject like the current project. The effort to gather the information has already been invested, and access to the data for further use adds value to that investment. There is substantial value in having access to data that is systematically collected over time, as it can provide confidence in the data that is not necessarily true for highly accurate scientific measurements taken at a single time point or over a short duration. Access to these data streams, subsequent to signed data sharing agreements, was quick and effective in all but one area. The use of data in a productive manner is beneficial to the industry and an area that demonstrates to the producers the value of the raw data collection in the first place. Those that stand in the way of legitimate and agreed data sharing, for whatever reason, are a hindrance to progress.

There is a gap in the currently collected data that could be closed, but only if there was interest from the producers. There is a dearth of information on the grower/finisher phase on nearly all farms. Production data related to the farrowing phase has been generated for two generations of pig farm ownership, is mostly accurate, repetitious, and mostly recorded on to electronic format. The same type of information is almost entirely lacking for the grower- finisher phase, where most of the money is made, or not. The project endeavoured to create information on the growing- finishing phase by extrapolating up from the farrowiing house data and back from the processor data, but was not possible. There would be significant benefit to our understanding and management of not only health issues but also efficiency and financial issues if data was created during the grower – finisher phase.

7.2 The full impact of the project will take time to emerge because a) the timescale of interventions and knowledge transfer has been significantly delayed and b) it will naturally take time for any interventions to have an impact that could be measurable at the processors.

However, two practical interventions carried out on farms in late 2020 have returned positive results, albeit without any confirmed impact on pleurisy severity or prevalence due to the absence of WPS monitoring at the processors due to covid restrictions.

1. Investment in automated sprinkler system in 9 grower and 5 finisher rooms
2. Investment in external baffles on air inlets.

A lack of time and resources is commonly stated across all livestock production systems as basic reasons why appropriate hygiene practice is not delivered. This is an attitude that needs to be fundamentally addressed, and investment in automated sprinkler systems to reduce the manpower time to effectively clean a pen or pens is one step that will be promoted again to the producers.

There is clear data across the 12 project farms, and the previously monitored 20 farms, that temperature and ventilation management leaves a lot of potential for improvement. The evidence is clear that some farm management/systems provide steady thermal conditions that will *not* mostly cause stress on pigs, repeatedly and

under most weather conditions. The link of thermal comfort to ventilation management is direct, and the project has created a series of data based examples of ventilation management that can improve a number of pig output variables. Ventilation management has a direct link to air quality, which is linked to biological pressure on the respiratory tract. It is also linked to energy efficiency, animal behaviour (though air speed), lying behaviour and possibly vice.

## 8. COMMUNICATION & ENGAGEMENT

8.1 The initial communications plan envisaged getting the results out to pig producers and vets through a blend of face-to-face meetings and remote methods. Covid-19 restrictions stopped any meeting happening through the entire project so the focus shifted entirely to remote.

A virtual seminar was held on 17th January with 22 attendees during which Jamie Robertson outlined the initial results and took questions. The intention is to follow these up with two further meetings in April now that the final results, using the videos to get "inside the farm gate".

In the absence of direct meetings, it was decided to expand the written material and so a 24-page booklet was prepared and printed. This will be posted to producers in early-April.

Wider stakeholder groups have been briefed on the project at meetings of the Aberdeen Pig Discussion Group, Wholesome Pigs (Scotland) AGM, Pig Monitor Farm, Scottish Pig Industry Leadership Group and Pig Health & Welfare Group.

The project required the collaboration and support of a number of individuals and companies as well as the engagement of the participating producers and their staff

Andy McGowan & John Taylor, Wholesome Pigs (Scotland) Ltd
Allan Ward, QMS
Jill Thomson, SRUC
Patricia Rojas Bonzi, Tulip Ltd.,
Hedda Weitz, University of Aberdeen
James Nesling, Agrosoft Ltd., UK
Iain Lyle, PigNomics Ltd
Michael Pearce, SRUC
Graeme Mowatt, Cinecosse
David Partridge, Arato Systems

8.2 FAS Engagement
The KE material prepared will be shared with the Farm Advisory Service after the final producer virtual meetings in April 2021.

8.3 EIP-AGRI Engagement
The project has been listed on the EIP-AGRI website and progress reports were posted as required.

## 9. KEY FINDINGS & RECOMMENDATIONS

The fact is that pleurisy is a condition of the membrane of the lungs, and is strongly associated with the pathogenic diseases of the lungs. This may have led to a historic approach that focusses too deeply on the presence of respiratory pathogens. The current study supports the hypotheses that factors under management control may also have a significant impact on the severity of pleurisy.

Factors associated with an increase in the severity and prevalence of pleurisy on farms include:

- Continuous flow facilities compared with All-In, All - Out (AIAO)
- Loss of control of mechanical ventilation systems, with associated impact on thermal comfort, and air temperature variation.
- Effective hygiene of pen facilities.

Losses from pleurisy for the producer are estimated at between £3.88 - £4.13/pig with pleurisy, plus a cost from increased mortality in the grower – finisher phase. Farms with prevalence rates above 10% will have higher losses.

Losses at the processor are 29p/pig with pleurisy, an increase in £0.86/pig in batches with more than 10% prevalence due to lower line speeds when batches are affected, and an annual loss of loss of around 350,000kgs/yr of carcase weight (DW) worth more than £0.5m.

## 10. CONCLUSION

The project successfully demonstrated that the financial losses associated with pleurisy can be mitigated by adjusting farm management, in particular, better hygiene, pig flows and controlling the atmosphere within sheds.

## 11. ANNEXES.

- Pleurisy Brochure sent in hard copy to all commercial producers.