Pig Development Department

Pig Farmers' Conference, 2013

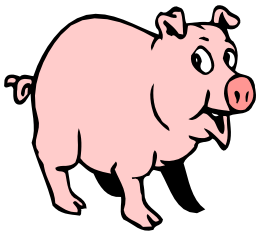
Conference Proceedings

Cavan Crystal Hotel, 22nd October, 2013
Horse & Jockey Hotel, 23rd October, 2013

Teagasc
Agriculture and Food Development Authority

Pig Farmers' Conference 2013

Conference Proceedings



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Teagasc/IFA Pig Joint Programme

Ciarán Carroll, Head, Teagasc Pig Development Department

In recent weeks the pig sector received a significant boost with the official launch of the Teagasc/IFA Pig Joint Programme. The focus of the programme is to improve profitability, increase sow productivity and grow the national sow herd, while operating to the highest standards of pig welfare and producing quality pig meat while adopting best practice to protect the environment. This programme will further improve Teagasc services to the Pig Sector. Teagasc had requested funding assistance from Irish pig farmers, and they are providing this through a new levy (via an addition to the existing statutory Bord Bia levy). The purpose of the Joint Programme is to support pig producers by providing research, advice and education across a range of issues of importance to the sector. Under the programme producers will contribute 10 cent per pig towards Teagasc Pig Research, Knowledge Transfer and Education/Training. This money will help fund staff (Research, Advisory & Technical) to carry out a Teagasc/IFA agreed Joint Programme focused on a number of issues.

How will the Joint Programme Operate?

A Joint Programme Operational Committee has been set up, comprising key Teagasc/IFA personnel. They are developing a programme of research, advice and education and will have overall responsibility for the implementation and delivery of the programme. They will hold regular (monthly) meetings to discuss programme content and progress, set and review monthly targets, decide on reports to be circulated, etc. They will provide reports to the Teagasc Pig Stakeholder Group. Producers can submit their suggestions and comments for the Joint Programme through their advisors or their IFA representatives.

What can pig producers expect from the Joint Programme?

The levy will help fund staff (2 Research, 2 Advisory & 1 Technical). Two new Advisors took up their posts recently (Amy Quinn at Moorepark and Shane Brady at Balllyhaise) while Dr. Keelin O'Driscoll has also commenced a Research post. A Pig Nutrition Researcher will be appointed soon. The Joint Programme will include Research, Advice & Training on such areas as those listed below.

Research

- *Nutrition & feeding:* to establish the most cost effective diet formulations and sequence of diets, and investigate the use of alternative ingredients in pig diets.
- *Pig Health and Welfare*: as a pre-cursor to the Joint Programme Teagasc Pig Development Department prepared a set of blueprints for the guidance of producers in selecting and designing loose housing systems. New research will focus on best management practices for loose housed sows. Work will also be carried out on issues relating to pig health such as carcass condemnations and lameness. A new project has started on maximising annual output per sow by increasing the number of viable piglets born alive and minimising pre-weaning piglet mortality.
- *Food safety*: projects will focus on feed as a risk factor for salmonella transmission and also on salmonella control measures at farm level.
- *Environment issues of importance include:* minimising the volume of manure produced through reductions in water use at farm level.
- *Dissemination Days*: Technology (End of project) Reports will be published and presented at Research Dissemination

days. An example of this is the Lameness research dissemination day held recently at Moorepark.

New Pig Research & Food Test Centre

To emphasise Teagasc's commitment to the Irish pig sector we have allocated funding (almost €3 million) to construct a modern state of the art research facility incorporating a Food Test facility. This will enable Teagasc to conduct pig research as an essential component of an integrated pig research, knowledge transfer and training programme and to facilitate research on pigs connected to the evaluation of the health benefits of functional foods. The pig research unit will provide facilities for conducting research on various aspects of pig production including those listed above. No comparable facility exists in Ireland and it will be one of few new facilities in Europe.

Advisory/Knowledge Transfer

- *Herd Performance Monitoring:* the Teagasc PigSys Analysis Programme has been upgraded. It provides clients and their advisor with up to date detailed information on the technical and financial performance of the herd and helps form the basis for the advisory service delivered to clients. The data from all participating herds is amalgamated annually to provide national information of the technical performance, costs of production and margins in the sector. This national database is the source of benchmarking. It is also the source of the information used to compare costs of production in Ireland with the main pig producing countries in the EU via the InterPig group. Herds participating in PigSys have been shown to perform significantly better than non-participating herds. The upgraded system will enable Teagasc to provide

more frequent and timely updates on herd performance, particularly to identify trends and problems in the sector and to allow for more effective benchmarking as producers strive to improve technical performance and improve competitiveness.

- Producers will receive an annual farm visit (upon request) to prepare /review an Annual Business Plan.
- Discussion Groups, workshops, newsletters and the annual Teagasc Pig Farmers' Conference

Education/Training

- Producers may register participants on the FETAC pig course, conducted jointly by the Pig Development Department and Clonakilty and Ballyhaise Agricultural Colleges to ensure pig farm operatives are trained to the highest standards of animal husbandry and management.
- Website information: there will be a dedicated Joint Programme location on the Teagasc pig website which will provide all Joint Programme-related information & updates

ECO-FCE – A whole-systems approach to optimising feed efficiency and reducing the ecological footprint of monogastrics

Dr. Stefan Buzoianu & Dr. Peadar Lawlor, Teagasc, Moorepark

Project information

A new project titled "A whole systems approach to optimising feed efficiency and reducing the ecological footprint of monogastrics" or in short "ECO-FCE" was launched last February in Belfast. ECO-FCE is funded by the European Union Seventh Framework Programme (FP7 2007/2013) under grant agreement No. 311794.

As feed represents approximately 70% of the cost of producing a pig, feed conversion efficiency is one of the key determinants of unit profitability. Through a better understanding of the interactions between animal genetics, gut structure and function, the microbial population of the gut and the attributes of feed, ECO-FCE will propose strategies to improve feed efficiency whilst also reducing the output of pollutants from the animal (GHG emissions, N, P etc).

The project is co-coordinated by Queen's University Belfast and the Agri-Food and Biosciences Institute (AFBI) Hillsborough. It brings together an international consortium of 17 partners from across Europe and the U.S. to be awarded €6M research funding over a 4-year period, which will focus on one common objective: to provide the European pig industry with innovative strategies to feed the growing global population in an efficient and ecologically-friendly manner. The Teagasc Pig Production Department will play a central role in the project, leading one of the seven project work packages while actively participating in all others. Another Irish organisation Hermitage Genetics will also play an important role in the project.

Work programme and objectives

The core scientific work of ECO-FCE is divided into a number of interactive sub-projects:

Development of an ECO-FCE warehouse: Existing research into factors to improve feed conversion efficiency (FCE) and reduce the ecological footprint of pigs is plentiful, but perhaps under-utilised. ECO-FCE will compile this information into one, easy-to-use "electronic warehouse". This will be available for use by the pig

industry to predict the effect of management and feeding practices on FCE and environmental pollutants.

Novel feeding strategies: ECO-FCE will substantially advance animal nutrition and feed science in pigs. Precision feeding of pigs will be a key area of research. The use of a range of feed additives will also be investigated to determine their effectiveness in improving FCE and reducing ammonia emissions and nitrogen and phosphorus excretion.

Gut manipulation: Using cutting edge technologies, ECO-FCE will identify characteristics of gut structure and microbial populations in the gut which promote "good" and "poor" FCE in pigs. Using this knowledge, strategies to manipulate the gut to promote a "beneficial" gut micro-biome in compromised animals, will then be tested.

Development of indicators for nutrient partitioning: ECO-FCE will identify genetic indicators that are: (1) diagnostic for the utilisation and partitioning of nutrients, (2) indicative of the animal's reactivity to nutritional and management interventions to improve FCE, and (3) informative regarding the genetic potential of the animal

Tool development and validation: Industry tools that will be developed include the ECO-FCE "hub" (developed from the ECO-FCE "warehouse") which will allow end-users to extract information specific to their personal query, an ecological calculator and genomic models.

Expected benefits for pig producers

Better feed conversion efficiency

All the strategies examined in the project will aim to improve FCE. As feed represents ~70% of the cost of producing a pig an improvement in feed conversion efficiency will have a major influence on unit profitability. For example, an improvement in feed conversion efficiency of 0.1 units between weaning and slaughter at ~104 kg could save up to €3.30 /pig or up to ~€40,000 /year for a 500 sow unit.

Better health

One of the aims of the project is to manipulate the gut to promote a "beneficial" gut micro-biome. A better intestinal microbial profile should improve overall pig health. Healthier pigs can divert energy to growth that would otherwise be used for maintenance of the immune system. For example, diarrhoea in pigs can deteriorate feed conversion efficiency by up to 0.3 units thereby greatly increasing feed cost. An improvement in feed conversion efficiency of 0.3 units could lead to a reduction in feed costs of ~ €120,000 on a 500 sow unit.

***Reduced output of pollutants (*GHG emissions, N, P etc)**

A more efficient feed converter by definition will require less feed to achieve a target weight. For this reason less manure, green house gasses, N, P etc will be excreted in the lifetime of the animal. In fact one of the most effective means of reducing the polluting potential of a pig is to improve its feed conversion efficiency. All of this is not only good for the environment but will also reduce the manure handling costs associated with pig production.

Decision management tools

A tool (ECO-FCE "hub") will allow producers and other personnel to extract information specific to their personal query. An ecological calculator will also be developed as part of the project

Contact

Further project details can be found at www.ecofce.eu

Anyone interested in knowing more or following the progress of ECO-FCE can also register as a stakeholder through the website and receive regular updates.

Development of ante and post mortem meat inspection of pigs as a welfare diagnostic tool (PIGWELFIND) Research update

Dr. Dayane Teixeira and Dr. Laura Boyle
Teagasc, Moorepark

Background

Suboptimal housing, management and stockmanship are associated with poor welfare in pigs and are reflected in disease, abnormal behaviour, injury, poor longevity and reduced productivity. Pig producers are caught in a dilemma which is driven by poor profit margins and the demand for cheap food on one side and the demand for high standards of animal welfare, environmental protection and food safety on the other. However, while maintaining high standards of animal welfare undoubtedly costs money there are also serious financial costs associated with poor welfare. This concept is central to our current research which aims to determine the financial costs associated with pig welfare problems on farm. Furthermore, this research aims to validate indicators of pig health and welfare measured on the carcass at meat inspection (MI) as a diagnostic tool for use by the producer and his/her private veterinary practitioner (PVP). Currently in Ireland ante and post mortem meat inspection (MI) of pigs has the primary objective of protecting consumer health. However, valuable information on pig health and welfare could be gleaned from MI records and potentially contribute to reduced carcass losses due to condemnation and trimming as well as to improvements in pig health and welfare on-farm. Automated on-line recording systems for carcass and visceral pathologies as well as welfare lesions such as tail injuries are already in use in several countries including Northern Ireland.

Our studies related to this subject started in 2010 when data from over 36000 slaughter pigs were collected from six factories in Ireland and Northern Ireland (see 2010 Teagasc Pig Conference Proceedings). In summary, this study provided preliminary herd-level data on tail-biting (scored according to severity on a 5-point scale (Figure 1)) and carcass condemnation prevalence, associations and resulting financial losses. Over 99% of inspected pigs were tail-docked, while 58.1% and 1.03% had detectable and severe tail lesions, respectively. Many differences were detected in the prevalence and reasons for carcase condemnations (CC) between abattoirs and judiciaries (Republic and Northern Ireland) which reflected variation in the criteria and methods of data capture used in MI in different abattoirs.

Figure 1. Tail-lesion scoring system (Scores 0-4, left to right)

A 2nd study was conducted in April 2012 based in one factory in Ireland which looked at a wider range of welfare lesions and their relationship with CC. In addition to the severity of tail biting lesions, the prevalence and carcass condemnation/trimming implications of loin bruising (associated with excessive mounting behaviour) and hind-limb bursitis were also investigated. In summary, 3422 pigs were studied over a seven day period and, overall, 72.6% of pigs had detectable tail lesions, whilst 16.0% and 44.0% were affected by severe loin-bruising and hind limb bursitis, respectively. Abscesses were the main cause of CC and tail lesion severity was a significant risk factor for CC. The other welfare lesions measured were not related to CC (see 2012 Teagasc Pig Conference Proceedings).

Subsequently an in-depth economic analysis of the losses associated with tail biting was completed. Losses associated with CC and trimmings were calculated using the current average of Irish value for pig meat (€1.70/kg). The losses associated with the 85 carcass condemnations in the study population amounted to over 1800kg with a value of more than €3200. This equates to €0.94 per study pig and increases to €1.10 per study pig if costs associated with the c. 330 kg of trimmings are included (Table 1).

Table 1. Weight (kg) and associated financial cost (€) of carcass condemnations and trimmings

No. carcasses affected		Weight (kg)		Cost [3] (€)	
		Total	Per pig	Total	Per pig
Carcass condemnations					
Entire[1]	14	977.62	0.28	1661.95	0.48
Partial	71	911.53	0.27	1549.60	0.45
Total	85	1889.15	0.55	3211.55	0.94
Carcass trimmings					
Total	113	329.84	0.1	560.73	0.16
Cumulative CC and trimmings					
Total [2]	194	2218.99	0.65	3772.29	1.10

[1] estimated using the average weight of entirely condemned carcasses in NI factories as recorded in the 2010 study which was presented at the 2010 Teagasc Pig Conference (69.83 kg)
[2] NB 4 carcasses were both trimmed and condemned
[3] using current Irish pigmeat prices/kg (€1.70/kg as on 2/10/13)

A negative relationship was also detected between tail lesion severity and carcass weight such that as the tail lesion severity score increased carcass weights were significantly reduced. There was an estimated 1181.7kg reduction in carcass weight associated with tail lesions scored greater than 1 (Table 2). This equates to €2.45 per study pig with a tail lesion score ≥2 or to €0.59 per pig in the final study population. When added to costs associated with carcass condemnations and trimmings, the estimated cost per study pig was €1.69.

Table 2. Carcass weights (kg±S.E.) and associated financial losses (€) associated with carcasses with tail lesions but no condemnations and/or trimmings

Tail lesion score	No. pigs	Mean carcass weight (kg±S.E.)	Mean reduction in carcass weight (kg)	Total reduction in carcass weight (kg)	Financial loss [1] (€)	
					Total	Per pig
≤1	2481	80.02 ± 0.18	-	-	-	-
2	774	78.83 ± 0.31	1.19	921.06	1565.80	2.02
3	32	76.75 ± 1.45	3.27	104.64	177.89	5.56
4	13	68.02 ± 2.28	12.00	156.00	265.20	20.40
Total	-	-	-	1181.70	2008.89	2.45 [2]

[1] using current Irish pigmeat prices/kg (€1.70/kg as on 2/10/13)
[2] value per study pig with a tail lesion scored ≥2

What was particularly interesting about this finding was that even moderate tail lesion scores (i.e. tail lesion score 2) were associated with a significant 1.2kg reduction in carcass weight. Such lesions are not identifiable on the live animal and hence it would be very valuable to producers to receive such information from inspections of the carcass.

PIGWELFIND

PIGWELFIND is an acronym for 'PIG WELFare INDicators' (or 'Finding Pigs Well'!) which is a new project supported by funding from the Research Stimulus Fund of the Department of Agriculture Food and the Marine and involving a team of researchers from Teagasc, University College Dublin, Queen's University Belfast and CAFRE (Mark Hawe). This three year project will continue to investigate the potential for including indicators of pig health and welfare in the meat inspection process at pig slaughter factories.

To date, semi structured interviews with pig producers and stakeholders have been conducted. These aimed to establish perceptions on the current contribution of meat inspection methods, data capture and utilization to the diagnoses of pig health and welfare and to determine opinions of stakeholders regarding the potential enhancement of MI to improve its contribution to the diagnoses of pig health and welfare problems. The information is currently being analysed and the results will be made available in future Teagasc Pig Newsletters.

Two controlled experiments are planned to establish how well the lifetime welfare of a pig is reflected in meat inspection findings and to determine how well the prevalence of welfare problems detected at slaughter relates to the actual prevalence of those problems on-farm.

An experiment has also been devised to evaluate the impact of mixing prior to transport on sexual behaviour, skin lesions and loin bruises (associated with excessive mounting behaviour) of slaughter pigs. Further studies will estimate the financial implications for processors associated with downgrading of the value of the loin cut because of trimming due to loin bruises.

Conclusions

Tail biting has a significant and greatly underestimated economic impact on the profitability of pig farming. Our work to date makes a strong case for including information on the severity of tail and other welfare related lesions on the carcass in the MI process and for transmitting this information to the pig producer to inform herd health and welfare management plans. Over the next few years the PIGWELFIND project will provide the data to validate this approach. However, there ultimately needs to be an automated system to capture standardised information on carcass lesions available at MI.

Optimising output per sow (OPTIPIG)

Dr. Keelin O'Driscoll and Dr. Peadar Lawlor, Moorepark

Increasing output per sow has been identified as a main research area by Teagasc and the IFA. If an average Irish pig unit (500 sows) could increase sow output from approximately 24 to 27, the annual net profit would increase by over €35,000. Recently, Dr. Peadar Lawlor was successful in obtaining funding from the Department of Agriculture to commence work on how to increase sow output. Collaborators on the project include Dr. Laura Boyle and Dr. Donagh Berry from Teagasc, and Dr. Elizabeth McGowan from AFBI in Northern Ireland. Due to the potential benefits of this project to pig producers, the IFA have agreed that a research officer, funded by the newly launched IFA/Teagasc joint programme, can allocate 75% of their time to working directly on this project. Dr. Keelin O'Driscoll was recently hired by Teagasc as one of the research officers funded by this programme, and is fulfilling this role. The project aims to provide scientific knowledge that could result in significant financial benefits to the pig industry.

Sow output in Ireland and internationally

The annual output per sow in Ireland increased from 21.6 to 24.1 pigs sold per sow per year between 2000 and 2011 (PigSys, 2012). However, this is still below output in more efficient European pig-producing countries (Table 1)

Table 1. Comparison between Ireland, Denmark, France and The Netherlands (INTERPIG, 2012)

	Ireland	Netherlands	Denmark	France
Pigs born alive per litter	**12.33**	13.60	14.80	13.20
Pre weaning mortality (%)	**10.7%**	12.8%	13.9%	13.6%
Pigs weaned per litter	**11.01**	11.86	12.74	11.40
Rearing mortality (%)	**2.5%**	2.1%	2.9%	2.2%
Finishing mortality (%)	**2.7%**	2.4%	3.7%	3.4%
Litters/sow/year	**2.31**	2.38	2.26	2.34
Pigs sold per sow/year	**24.11**	**26.97**	**26.93**	**25.19**

In particular, Ireland lags behind our European neighbours with regard to pigs born alive. The highest number of pigs born alive was in Denmark; however, the Netherlands achieved slightly higher sow output per year than Denmark, even though there were 1.2 fewer pigs born alive per litter. This is due to both a greater number of litters per sow per year, and to a much lower level of

mortality. In fact, extreme selection for large litter size in Denmark has led to animal welfare concerns, primarily because large litters of light, marginally viable pigs are associated with high rates of stillbirths and mortality. This could also lead to negative publicity for the industry. Hence increases in sow output in Ireland should be achieved in a more sustainable manner, by increasing piglet viability at the same time as increasing the numbers born alive.

Overview of the planned research

The overall objective of our research plan is to increase the number of pigs produced per sow per year to levels achieved in the most efficient pig producing countries. This can be achieved by focusing on two sub-objectives:

1. To increase the number of pigs born alive/litter by 1.3 to increase the average Irish litter size to 13.6.
2. To improve the survival of live-born piglets, thereby maintaining mortality close to the current Irish industry average of 15.9% (pre-weaning, weaner and finisher combined; Table1).

These objectives will be reached by carrying out several research tasks that fit into two broad themes. The first theme will focus on investigating nutritional strategies for the sow, and how these can increase the number of viable piglets born per litter. The second theme will investigate management strategies that could help to keep weak pigs from large litters alive once born.

Theme 1: Increasing the number of piglets born alive, and piglet viability, through nutritional strategies

These studies will focus on nutritional management of the sow. The aim is to increase mean piglet birth weight and to reduce within-litter variation in piglet birth weight (a feature of larger litters). We will investigate a variety of targeted nutritional strategies during gestation to increase the number of pigs born alive and their viability. Some of these studies will be carried out on commercial farms, in order to obtain enough data to ensure statistical confidence in the results generated.

1. Determining the efficacy of additives (e.g. L-arginine and L-carnitine) in increasing the number of live born piglets per litter (*commercial farm*)
2. Examine the effect of increasing feed allowance in late gestation on subsequent farrowing rate and litter size (*commercial farm*)
3. Determining the efficacy of additives such as L-arginine, L-carnitine, fermentable substrates (e.g. lactose) DHA, fish oil and vitamin D

supplementation in increasing piglet birth weight and vitality, and reducing variation in piglet birth weight (*research farm*)

Theme 2: Management strategies to keep young pigs alive

Once these viable pigs are born the focus will then be on investigating methods to keep them alive. Again, nutritional strategies will be explored to ensure that colostrum quality is optimised. We will also examine management strategies as methods to reduce pre-weaning mortality in large litters.

1. Strategic use of nurse sows to reduce piglet mortality
2. Strategic use of Rescue Decks to reduce piglet mortality
3. Strategic use of energy supplements to reduce piglet mortality

Practical management tool

Information from the experimental work will be used to construct a simple and interactive Excel based tool whereby available data from individual units with sow output problems can be entered so that the most appropriate area for attention is identified. A list of prescriptive actions will be identified in the output. This tool will be of immense practical value in the dissemination of results and will have real practical value at farm and advisory level.

Industry impact

The Food Harvest 2020 target for the pig sector is 50% growth in output value by 2020, primarily achieved through improved sow productivity and an increased national sow herd. One of the recommendations is that "Producers, with the assistance of Teagasc, must focus on increasing sow productivity through the adoption of new technologies and best practice". Our planned research is exactly in line with this recommendation. Using our initial research to identify effective feeding and management regimes, we intend to develop a practical interactive decision management tool to aid producers. Thus the knowledge generated will have a rapid and direct route to farmer stakeholders. This will have the knock on effect of stimulating growth and employment in the sector.

The financial benefits to increasing output per sow are significant. Based on feed costs and marginal non-feed costs at the time of making the application, each additional pig produced is worth €24.93 net profit. The Netherlands and Denmark sold 2.86 and 2.82 pigs per sow per year, respectively more than Ireland in 2011 (Table 1), which is worth €71.30 and €70.30 net profit per sow per year,

respectively. If an average Irish pig unit (500 sows) could achieve the same output as the Netherlands, their annual net profit would increase by €35,650.

Teagasc National Pig Conference

Grain market outlook

Agenda

- Where We Have Come, 12months
- Price Action
- Supply & Demand
- Conclusion

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Where Have We Come From

- Harvest 2012/Dec'12 – Bullish Market
  - –Extreme weather, Drought USA, UK wetness
  - –Smaller wheat crop in exporting areas – Russia/Ukraine/Aussie
- Market drifting since Dec'12.
  - –Wheat €90 lower
  - –Corn €50 lower (New crop -€100)
- Funds lost interest in old crop story
- Large S. America corn crop, followed by Large N. Hemisphere crop.
- Cheap Corn, substituted Wheat.
- Stagnating demand (Ethanol, etc)
- Price back at 5 yr average

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Cause and effect: US drought in 2012 drives grain prices higher

December corn futures:

$8/bu $4.60/bu $4.70/bu

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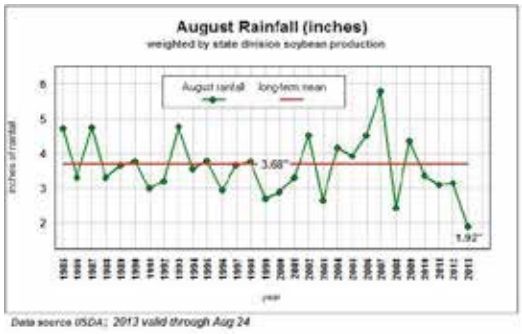
More recent events: Dry, cool august



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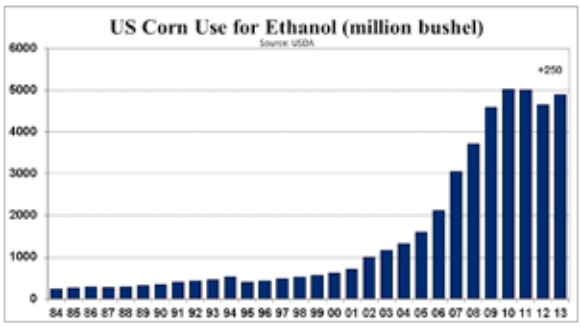
The ethanol influence: Ethanol demand stagnates



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Supply & Demand

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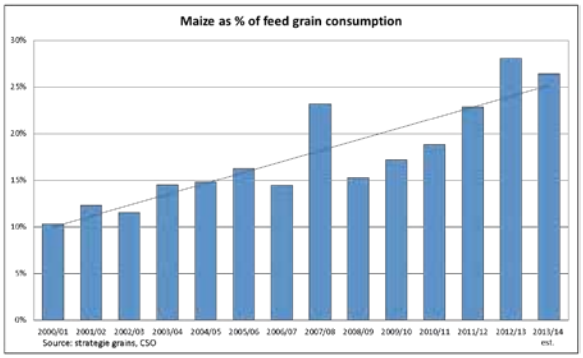
Maize having a growing influence on Irish grain price



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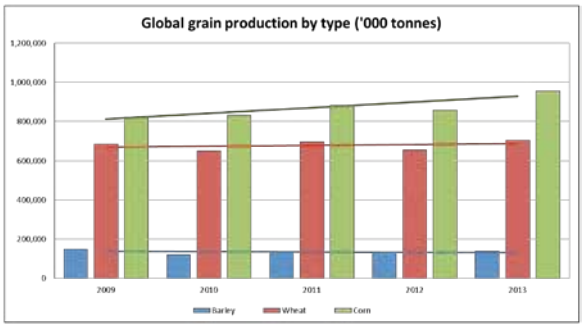
Grain supply: corn and wheat dominate



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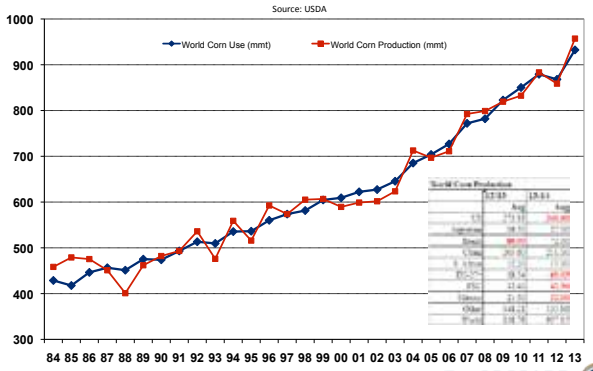
World Corn (mmt)



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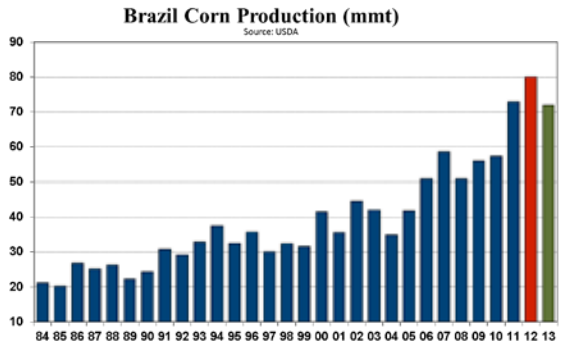
Corn production rebound: Northern hemisphere follows big SA supply



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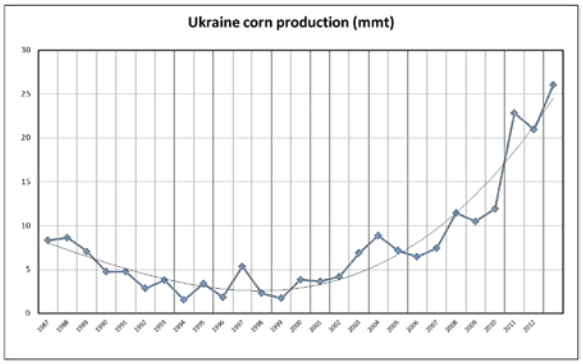
The Black sea influence: Ukraine developing corn production:



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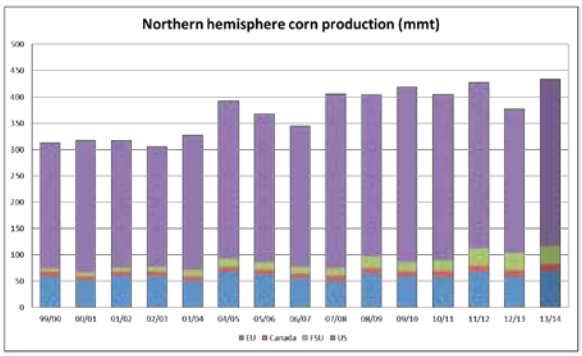
Corn production rebound: Northern hemisphere production recovery



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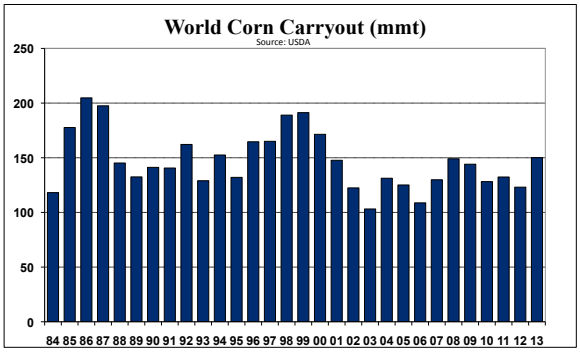

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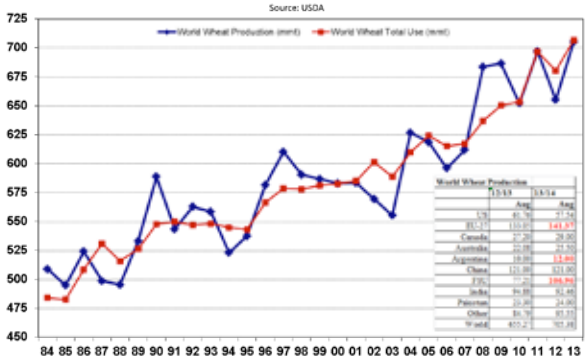
World Wheat (mmt)



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EU Wheat (mmt)

	07-08	08-09	09-10	10-11	11-12	12-13 F	13-14 F
					Stocks Rebuilding		
Carryin	14	12	19	16	12	12	7
Production	120	151	139	136	137	132	137
Imports	7	8	6	5	7	6	6
Available	141	171	163	157	156	150	150
Domestic	117	127	125	122	128	122	118
Export	12	25	22	23	17	22	19
Total	129	152	147	145	144	144	136
Carryout	12	19	16	12	12	7	**14**

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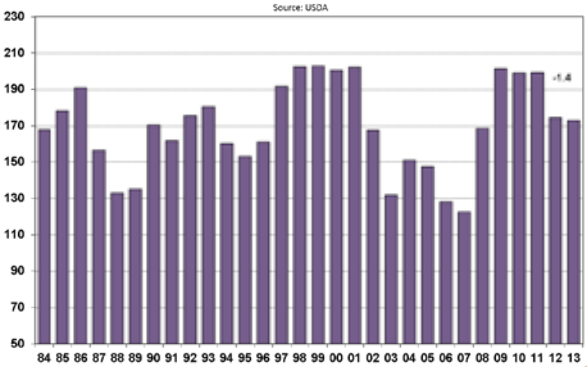
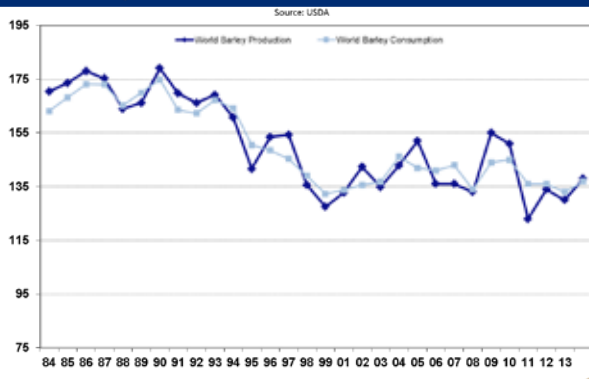
World Wheat Carryout (mmt)



R&H HALL

Global Barley



R&H HALL

EU Barley (mmt)

	07-08	08-09	09-10	10-11	11-12	12-13 F	13-14 F
Carry-in	6	5	12	15	8	5	4
Production	58	66	62	54	52	54	56
Imports	0.3	0.2	0.7	0.3	0.3	0.2	0.2
Available	64	71	75	69	60	60	60
Domestic	54	57	57	57	51	52	52
Export	4	2	2	5	4	4	4
Total	58	59	59	61	55	56	55
Carryout	5	12	15	8	5	4	4

Intervention Stock

Production remains static

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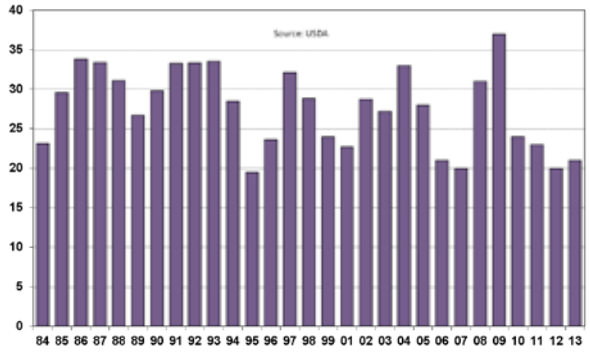
World Barley Carryout (mmt)



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Price Action

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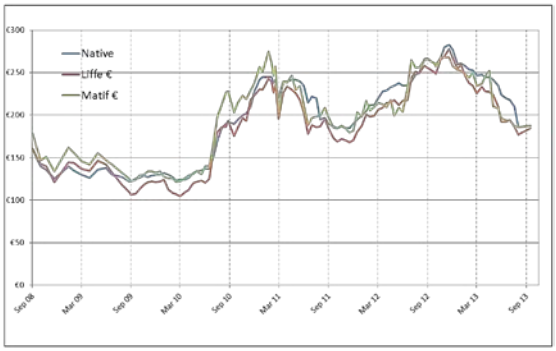
Native Wheat Price V's LIFFE/MAFIF (€): European Marketplace



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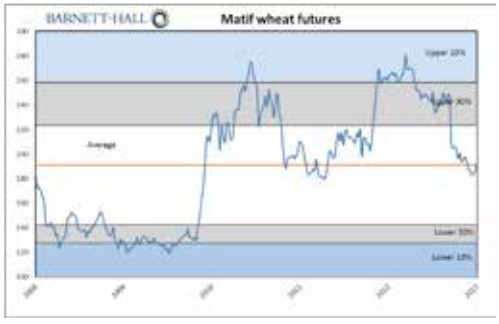
Grain price evolution: Average



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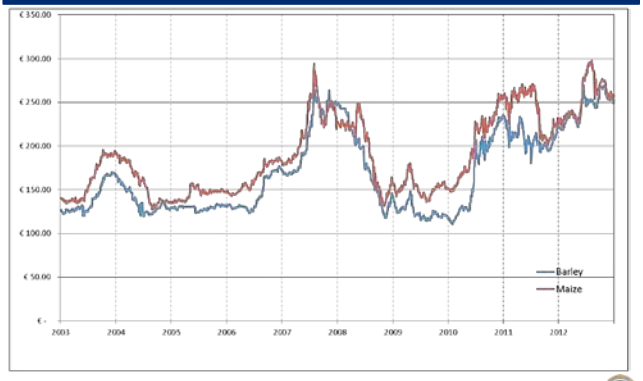
Corn/Barley Spread (€)



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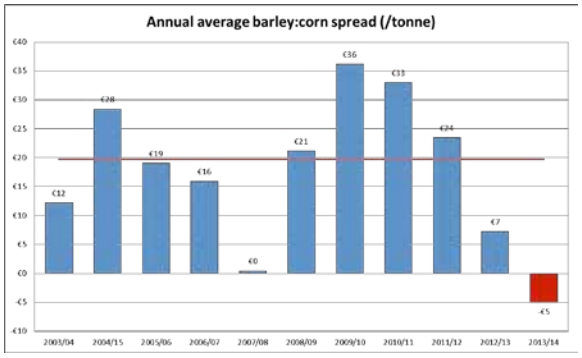
Corn/Barley Spread (€): Corn premium eroding with rising corn supply and falling barley supply



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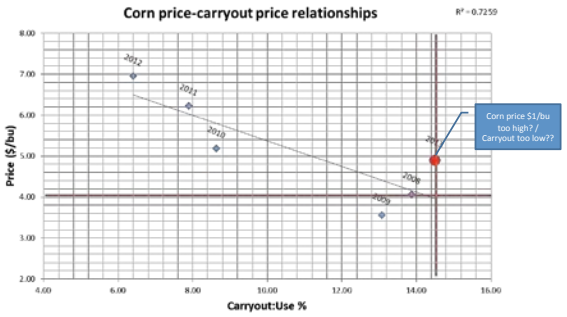
Corn price vs stock/use



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China prices stay strong, producer prices fall

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Soya

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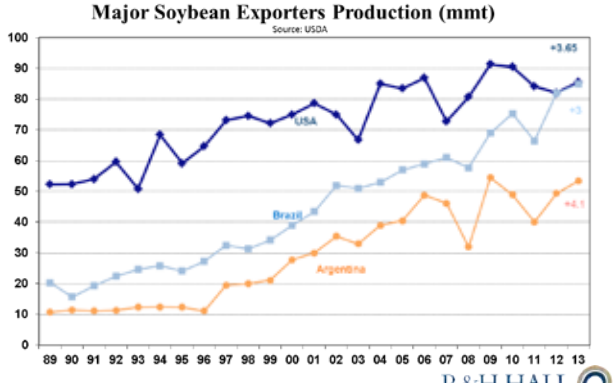
Major Soybean Exporters Production (mmt)



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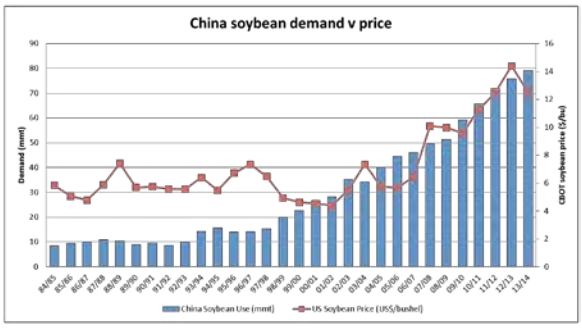
China soybean demand v price



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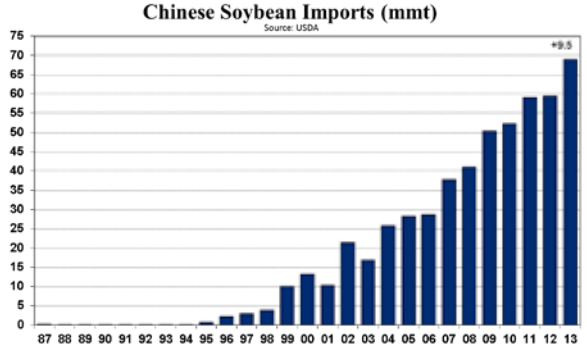
Chinese Soybean Imports (mmt)



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Volatility

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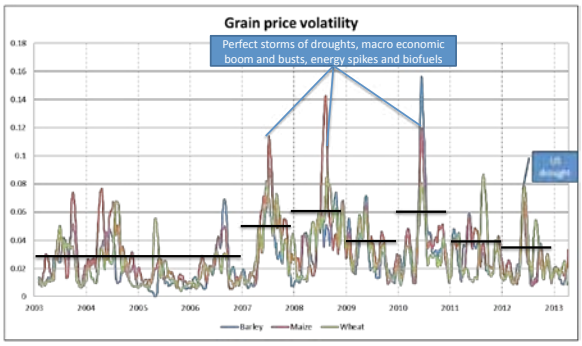
Historical price volatility: Volatility decreasing as supply recovers



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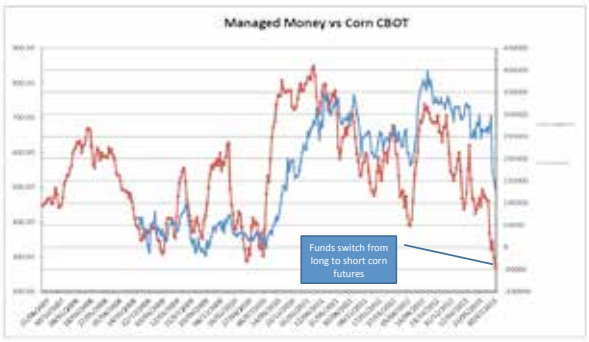
The fund influence: Corn CBOT versus managed money (hedge funds)



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Final thoughts: Conclusion

- Prices have fallen a lot but….
  - Still at or above 5 season average
  - Domestic and EU/Black Sea harvest pressure has been limited due to poor weather
  - Wheat to stay stronger on smaller UK and Ireland crops
  - Funds, South American weather, China demand?
- Corn value to continue to dominate price evolution
- Wheat will trade at premium to maize
- In a year of stock rebuilding

R&H HALL

The Responsible and Prudent use of Antibiotics on Irish Pig Farms

Denis Healy, Veterinary Inspector, DAFM

Background

Antibiotics (ABs) were developed in the 1940s to treat bacterial infections in humans and animals. Following the rapid development of intensive pig farming systems in Europe/Ireland from the 1960s the levels of infectious diseases on farms, both bacterial and viral, that needed to be controlled, increased. Throughout the 1970s/80s ABs, particularly in feedingstuffs, were not only used to treat pigs but also to prevent them developing diseases and to promote their growth. The use of ABs as growth promoters was banned in the EU in 2006. In the late 1990s the Dept of Agriculture commenced an enhanced sampling/testing programme of pigs at slaughter for residues of ABs (>55,000 samples annually). At the time there were concerns that pig herd owners were not adhering to the required withdrawal periods following the administration of ABs to pigs, prior to sending them for slaughter. Laboratory test results confirmed that 'there were problems' with AB residues in pig meat from a small number of farms. The finding of ABs in a pig carcase resulted in the 'supplier herd' being placed on 'a blacklist' and flagged for increased testing for ABs for the next two months. The cost of such testing was borne by the herd owner. The testing programme, the improved enforcement of veterinary medicines legislation together with advice/information given by the veterinary practitioners helped make farmers more aware of the necessity to adhere to the correct periods of withdrawal after the administration of ABs.

In recent years DAFM are satisfied that the results of the sampling programme carried out annually under the National Residue Plan reflect the fact that farmers are very careful in adhering to the correct withdrawal periods prior to presenting pigs which received medicines, for slaughter. Since 2009 the number pig meat samples which tested positive for ABs has been very low, ranging from 0-3 pigs per year out of a total of almost 3 million pigs slaughtered.

Is there still a problem with misuse of ABs in pigs since the findings of residues in pig meat is 'almost historic'? What is the issue?

Antimicrobial/antibiotic resistance (AMR)

ABs are no longer 100% effective in the treatment of some bacterial diseases in both humans and animals, with particular strains within families of bacteria developing a complete resistance to treatment with certain ABs. ABs can be divided into a number of 'major families' e.g. Tetracyclines, B-lactams/Penicillins, Sulphonamides, Quinolones, Cephalosporins, etc.

Why, as pig farmers should you be concerned about AMR? Is the over prescribing of ABs by the medical profession not the main causative factor in the development of AMR? The reality is that any kind of antibiotic use in people or animals can promote the development and spread of AMR. Moreover, the misuse of ABs in food animals has important consequences for public health, as it promotes the growth of AB resistant bacteria and resistant genes that can be passed on to people. Some bacteria e.g. Salmonella, E. Coli , Staphlococci, that cause diseases in pigs can also be infectious to humans and are classed as 'zoonotic bacteria'.

Strains of these zoonotic bacteria e.g. Salmonella typhimurium (DT)104 are known to have developed multi resistance. Some ABs are classed as critically important for human medicine e.g. the Quinolones (similar to Marbocyl, Baytril) and Cephalosporins. Should resistance develop to these medicines, as is the case, then we are looking at treatment failures. Tackling AMR is a public health priority. Experts in human and animal health have come together under the auspices of the WHO, OIE (Animal health), Food and Agriculture Organisation of the UN(FAO), Codex Alimentarius Commission and the Eur. Commission, to tackle AMR from a food safety perspective. AMR infections in humans, in the European Union region, are known to contribute annually to more than 25,000 deaths, 4 million patients acquiring health care associated infection and costs of €1.4 billion (lost productivity, healthcare).

Need for action-Urgent

The EC have developed an action plan to tackle AB resistance. This multifaceted approach involves effective coordination of actions and an exchange of information among agricultural, food, veterinary and health sectors. A number of action points relevant to the food animal sector include:

- Improving awareness on the appropriate use of antimicrobials;
- Strengthen EU law on veterinary medicines and medicated feed;
- Have recommendations on prudent use of ABs;

- Strengthen surveillance systems on AMR and antimicrobial consumption in animal medicines.

In Ireland there are currently expert groups working on an inter sectoral national strategy and action plan on AMR. It is expected that targets will be set to reduce the use of ABs in food animals, with a particular focus on use in feed in the pig industry.

2013 –The Irish pig industry and the use of antibacterials

What is the attitude of the commercial pig farmer to the use of ABs in all forms i.e. injectables, oral powders/ water and most critically in feedingstuffs? Is there a danger that a level of complacency exists since the tackling of the problem of AB residues in pig meat has been largely successful? Is there a perception that the industry does not have a problem with AB usage or misuse?

The prevalence of AMR organisms in pig herds is not as easy to quantify and measure as is the testing for AB residues in carcases. The results of research work done in recent years in this field in Ireland cannot be ignored.

Does Ireland as a country have data regarding the use of ABs in food animals, and moreover on a species basis? The truth is we do not have such definitive data. Currently, the Irish Medicines Board (IMB) collates information re usage as part of a European wide surveillance. Recent information indicates that approx 100 tonnes of ABs 'are used across all food producing species' annually in Ireland, of which 40%+ relates to usage in the pig industry. How does usage on Irish pig farms compare with that in other EU States e.g. Denmark, Netherlands? Currently, there is insufficient data available in Ireland to make an accurate comparison. However, data available regarding the production of medicated feeding stuffs at feed mills and also 'home mixed on farms indicates that the level of AB usage on a small percentage of pig farms is high.

In October 2012 there were 1,700 active pig herds, having approx 1.35 million pigs; 40,000 breeding pigs and 1.21 million fatteners. Only 18.50% of herds had more than 500 pigs and only 1.5% of herds had more than 10,000 pigs. The latter category (26 herds) accounts for approx 30% of the total pig population.
What information does the Department of Agriculture, Food and the Marine (DAFM) have on the usage of ABs in the pig industry? DAFM inspects and licences compound feed mills and a number of pig farms (home mixers—approx 40) to manufacture medicated pig feed. The use of medicated feed is prescribed and

directed by specialist veterinary consultants. DAFM are aware of the pattern of usage of ABs in the various pig diets, from creep, through link, weaner and early fatteners. DAFM have actively engaged with the specialist vets and individual producers advising the more targeted usage of medicines, particularly in the feed.

What factors are currently influencing the high usage of ABs (mostly in feed) on some commercial pig farms?

The answer lies in the presence of viral diseases like PRRS, Circo virus (wasting) with secondary bacterial infections—respiratory or enteric (gut related). Vaccination programmes against the former and other viral infections are proving successful but there is a reluctance on the part of some herd owners to request a specialist veterinarian to carry out investigative work, herd health assessment, post-mortems and laboratory tests to determine if ongoing AB usage is necessary or could it be more targeted with a view to ceasing the practice in the long term. The attitude may be that there is no need (or producers are afraid) to change the practice of routine, prophylactic in feed medication if the pigs are 'doing well'. However AMR is a global problem and the pig industry needs to be seen to be acting responsibly on this issue.

Type of feed mixing and delivery systems: Many of the larger integrated units use a 'wet feeding system' that does not have dedicated mixing tanks to service the different age groups of pigs. At worst, one mixing tank may mix and feed sows and weaners. In such cases, if a vet were to prescribe medicated feed for the 1st stage weaners, there is the risk of a residue of AB carrying over into the 2nd stage and sow diets with the possibility of encouraging the development of AMR bacteria in the latter groups.

Many in feed medications are licensed for the treatment of conditions like pneumonia for periods from 7 days to 14 days. However, many pig farms have satellite wet mixing tanks that service a group of weaners for a 4/5 week cycle. With such a system it is difficult to target the treatment of a small group of pigs e.g. for one week post weaning, if all 1st stage weaners are on the same feed delivery line. Whether a herd owner is purchasing or home mixing medicated feed there is no doubt that this method of feeding would have to be adapted to ensure that only a small number of target groups receive medication. Water medication is a good solution to the problem outlined above and both the Dutch and Danish pig industries have embraced this alternative to in-feed medication. However,

there are some practical difficulties associated with water medication (e.g. wet feeding systems). The availability of water soluble AB is less than those licensed for use in feed. Her downers perceive the cost of the former to be high. However, there is no doubt that the use of water medication has to be considered as it would allow a much more targeted delivery of medication than is currently possible with some feeding systems..

Who decides that medicated feed is required for weaners month after month? Is it primarily the farmer or a veterinarian? What role does the feed compounder play in making the decision as to which AB is incorporated in the feed? Where a compounder 'provides the herd owner with a choice of incorporating only two different medicines in a diet' is there a risk that the farmer may 'due to custom and practice' convince himself that a medicine is effective (on both medical and cost grounds)? Herd owners need to engage with a veterinarian or a nutritionist to critically evaluate the benefit (if any) of continued use of in feed medication in weaners.

Veterinary services to the pig industry: many pig farms use the services of two or more veterinarians. Which vet prescribes and supplies ABs? Does the farmer purchase the bulk of the antibiotics from a vet who is not the primary vet to the pig unit, purely on cost grounds? Legally, a vet shall not prescribe the use of a medicine for animals unless he or she has visited the farm sufficiently often and recently enough to have an accurate picture of the current health, welfare and disease status of the pigs on that premises. Do pig herd owners fully understand and appreciate the importance of this statement? The prescribing vet must also know what vaccination programmes are in place, be fully aware what other vets have advised/prescribed and be prepared to change the course of treatment, including the complete cessation of in feed medication, albeit that some farm clients may not accept the latter advice. Pig herd owners should ideally contract one veterinary practice to draw up a comprehensive herd health programme that aims to prevent infectious diseases by ensuring biosecurity, good production and management conditions together with proper vaccination programmes. The use of antimicrobials in intensive pig farming is unavoidable but their use MUST be justified by science.

Concentration of pigs on one site: There is no doubt that having a system where all stages of production from birth to finishing/slaughter are on a single site contributes to difficulties in breaking the cycle of infection (bacterial or viral). It

may not be possible to have any 'rest time' between the movement of batches of pigs to allow for proper disinfection of premises. Herd owners, may decide to 'request a vet' to prescribe in feed medication for all young pigs post movement 'as a precaution'. This could not be described as the 'responsible use' of ABs.

Biosecurity failure: Pig herd owners and the consultant veterinarians shall ensure that all the employees on farms fully appreciate the importance of adhering to a comprehensive documented 'biosecurity programme' to prevent the entry and spread of diseases to livestock. Failure to deliver this message on some farms could result in a general acceptance by management that 'the use of in feed medicines is required to maintain a level of health in pigs'.

The way forward:

The European Commission are drafting guidelines for the prudent use of antimicrobials in veterinary medicine. A number of bodies associated with human and animal health are helping to develop a national policy for Ireland to ensure the prudent use of ABs and minimise the misuse in food animals. Ireland will be setting targets to reduce usage of ABs over the next 5 years. The focus will be on mass/group medication of pigs and poultry initially. France have set a target over a 5 year period to reduce the use of ABs by 25%, the Dutch have set a target of a 70% reduction by 2015. The Danes are well on the way to achieving a 50% reduction over recent years and are continuing to set the standards. What can the Irish pig industry expect and what can be achieved? The primary responsibility for prudent use of ABs in the pig industry lies with the small number of prescribers (vets) and the end users.

To achieve the targeted reductions in the use of ABs, pig farmers may have to consider implementing multiple changes to their production practices (e.g. improved diet, later weaning, and increased space per pig) together with adapting the feed mixing /delivery systems to permit the targeted delivery of in feed medication.

Farmers should consider having one primary veterinary advisor who has overall responsibility for the care of the animals. A documented herd health programme is an absolute requirement and regular updating shall take place to include close monitoring of the efficacy of ABs being used and also the quantities administered. The use of ABs must be justified by the decision of a veterinarian (scientific), and based on a clinical evaluation of the herd. Where the latter is not possible then

diagnosis should be based on past experience, on previous laboratory sensitivity testing and on the epidemiological status of the farm. Consideration should be given to alternative forms of treatment that may be equally efficient.
There should be no pressure on the vet by the farmer to prescribe particular ABs.
Before commencing treatment the vet should ascertain that the infection does have a bacterial element. Where possible, laboratory tests should be used to determine the main pathogen and the sensitivity to ABs.

The course of AB treatment should be in accordance with the instructions on the product data sheet, or as prescribed by the vet. The person administering a medicine should adhere fully to the dose rate and duration of treatment and should not make changes without consulting the veterinary practitioner. If the vet prescribes a three day course of treatment then do as directed.

The prolonged use of in-feed AB medication e.g. 3/4 weeks (unless permitted by the information on the data sheet for a medicine as authorised by the Irish Medicines Board) is very likely to increase the risk of AMR organisms in the pig herd.

It is important to note that some families of AB (e.g. Quinolones[Baytril type] and some Cephalosporins) which are critical to successful treatment of certain infections in humans e.g. forms of Salmonellosis, Coliform infections, Streptococcal infections are also being used to treat infections in pigs. Therefore these medicines should not be included in the first line of defence and their use in pigs should be limited to cases where AB sensitivity tests indicate that their administration is required for effective treatment.

The use of all medicines, including in feed, must be recorded by the herd owner.

Will DAFM follow the example set by Denmark and require the vets, the pharmacists and the end using pig farmer to submit information to a central agency re the quantities of antibacterial medicines prescribed, dispensed and administered respectively on a bi annual basis (or more frequently)? This option is under consideration. Responsible pig producers should see this exercise as something that would be beneficial to promoting the industry. Where necessary, the information acquired would allow the regulating body to take sanction against any one of those parties (farmers or vets) if the quantities of ABs being used in a particular herd, deviated greatly from what could be considered prudent use.

Raising Awareness: Across the pig industry there is a need to provide the herd owners, farm managers and pig farm employees in general with the relevant information on AMR and correct use of AB medicines. How is this best delivered? The primary veterinarian contracted to a pig farm should factor in the education of the end users in the correct usage of medicines as part of any herd health programme. Pig farmers should welcome such a development. Education programmes for the pig producers should focus on correct treatment and appropriate use of ABs. DAFM has a role to play through its veterinary inspectorate and possibly via an information campaign directed to the intensive farming sectors. The recently formed Irish branch of RUMA (Responsible use of Medicines in Agriculture Alliance) should consider developing and publishing a sector based guidance on the responsible use of ABs.

The consumer of pig meat

The general public needs to be assured that the food derived from animals is produced in a manner with the minimal use of medication. There are moves afoot, by retailers of poultry products in other EU countries to demand of their suppliers that they do not exceed a set limit of usage (mg/kg bodyweight) of ABs throughout the lifetime of the bird. This is one of the requirements for membership of their quality assurance schemes and is a pre requisite to being accepted as a supplier to that food retailer. The Irish pig industry should be leading the way in setting standards for the production of pork products with the minimal use of ABs and should embrace the concept of being able to provide the information to back up any marketing campaigns promoting Irish pigmeat.

In conclusion, the message that you as the producing farmer should understand is that the primary responsibility for the prudent use of ABs on Irish pig farms lies with the prescribing veterinarian and the herdowner who administers the products. AMR is a global problem and the Irish pig industry has a part to play in helping to solve what is a serious issue for both human and animal health.

New Record Analysis System

Gerard McCutcheon, Oak Park & Shane Brady, Ballyhaise.

Keeping accurate records of performance is a critical component of managing any business. Good records allow targets to be set and are useful in examining the factors to be considered if targets are not achieved.

The Teagasc PigSys record system has been upgraded in 2013 and is now part of the Teagasc eProfit Monitor (ePM) System. The benefits of the new system are:

- More prompt assessment of performance trends in the "national" herd
- Individual farmers can access their records/reports as it is a web-based system
- These reports compliment other recording systems being used on many pig farms.

There are a number of items that need to be taken into account in the new systems.

The Data Input Sheet:

It is important to ensure that there is no overlap of dates between one data set and the next. The new system will reject the data set if this occurs. The Lean Meat % must have a figure of 0 to 100 %. All cells in the input sheet apart from two, must be populated with a figure even if that is zero (please refer to Appendix 1).

There are now two "Mandatory Targets" on the Data Input Sheet. There must be an entry in for each of these two targets. The first Mandatory Target is for the "Number of Pigs Produced/Sow/Year" – this ranges from 22 to 32 at present. The second compulsory Target is "Feed Conversion Weaning to Sale". This is listed as A to R with the associated FCE and ADG figures shown in Table 1 below.

There are a number of new entry items. The sow feed usage and cost has been split to allow for the dry sow and lactating sow feed usage and costs.

In the "Financial" section four new extra cost items are now included. These are:

- Housing Rent
- Contract Finishing
- Water
- Dead Pig Disposal

Table 1: Targets for FCE Weaning to Scale A to R explained:

Target Feed Code	FCE Weaning to Scale	Weaning Wgt. Kg	Sale Wgt. Kg.	Age of Pigs at Sale Days	Weaning to Sale Feed Intake g/day	g/day
A	**2.55**	6.5	110	**188**	1640	642
B	**2.50**	6.7	110	**184**	1640	656
C	**2.45**	7	110	**178**	1665	680
D	**2.40**	7.3	110	**174**	1680	700
E	**2.35**	7.5	110	**170**	1680	715
F	**2.30**	7.5	110	**167**	1680	730
G	**2.63**	7	110	**174**	1840	700
H	**2.55**	7	110	**170**	1840	722
I	**2.55**	7	110	**168**	1865	730
J	**2.58**	7.3	110	**168**	1880	730
K	**2.54**	7.5	110	**166**	1880	740
L	**2.51**	7.5	110	**164**	1880	750
M	**2.55**	7	110	**170**	1840	722
N	**2.50**	7	110	**167**	1840	737
O	**2.48**	7	110	**164**	1865	752
P	**2.45**	7.3	110	**161**	1880	767
Q	**2.40**	7.5	110	**158**	1880	782
R	**2.35**	7.5	110	**155**	1880	800

It is important to choose the correct target for your unit based upon the unit's previous performance and realistic goals.

There are three "Optional Targets". These are useful if you want all possible Target figures populated in the Target Column of the Pig Detailed Report and Sensitivity Analysis Report.

The Target Herd Size is most important if you want the Target number of services and farrowings / week shown.

The Value of the Stock categories has also been updated for 2013 data and future data sets. Table 2 below shows the value of each category which will be reflected in the "Stock Valuation" on Page 4 of the Pig Detailed Report.

Table 2: Value of each Category of Pig:

	PigSys	ePM from 2013 onwards
Sow	**€190**	**€200**
Gilt	**€100**	**€160**
Boar	**€190**	**€150**
Piglet	**€19**	**€25**
Weaner	**€32**	**€40**
Finisher	**€70**	**€85**

The Default value of the Average Closing Weight of Weaner is 20kg (same as PigSys) while the Average Closing Weight of Finisher is now 70kg (up from 58kg in PigSys). This is to reflect the increase in finisher sale weight on farms.

ePM Reports:

There are 3 main reports generated on the Teagasc ePM. These are as follows.

- Pig Input Data Report
- Pig Detailed Report
- Benchmark Report

These reports give a very good assessment of the performance on the unit.

Pig Input Data Report: This shows the input data as uploaded for your unit. This is a useful report to see trends in performance figures over a number of data sets.

Pig Detailed Report: This is quite similar to the PigSys report that most producers are familiar with. There are a number of new items now included.

The first new parameter in this report is "kg of pig meat /sow /year". This is calculated by multiplying the number of Pigs /Sow /Year by the Average Dead Weight by the % Finishers sold (at bottom of Page 4 of Report). Obviously this figure is comparable for integrated units selling all pigs as finishers but will be of less value if there is a % of pigs sold as weaners.

The second new item in the Pig Detailed Report is the "tonnes of feed /sow /year". This is calculated by adding the total tonnes of all feed used in the data set and dividing it by the Average Herd Size and annualising the figure.

These 2 items will allow units see how they are performing in terms of the 2 tonne from 7 (tonnes of feed) target. This target is a benchmark that allows you see how your unit performance compares with other pig farms at a national and international level.

The financial section of this report has also been updated and is worth examining.

Benchmark Report: This is a useful report to compare your performance (in the most recent data set) with the national average, the top 25% and the top 10% of producers in the country.

There is also a Sensitivity Analysis Report which should be discussed in conjunction with your Adviser. The figures and layout of this report need to be discussed and understood before you show them to any external party.

The Teagasc ePM system is a web based system. Every pig producer may access their records on the Teagasc ePM once they are logged onto the system. To do this you need to know your PPS number and password. You will need to talk with your Adviser to get registered on the system. This will allow access to your records once you have access to the internet.

Lastly, there is the facility to look at the asset value and net worth of your business by completing a couple of extra screens. This is an area that some units may wish to look at in greater detail. It is certainly worth a discussion with your Adviser.

Bench Marking Performance

The parameter "kg of pig meat /sow /year" is worth looking at for a number of countries. We are behind our European counterparts as shown in Table 3 below.

Table 3: Feed required to produce carcase gain:

	Denmark	France	Germany	Netherlands	Ireland
Pig meat/Sow/Year kg	2247	2240	2353	2464	1904
Feed/Sow/Year t	8295	8365	8766	8413	7172
Feed kg /kg of Carcase	**3.69**	**3.73**	**3.73**	**3.41**	**3.77**

Source: 2012 Interpig Report

The kg of feed/kg of carcase shows the Netherlands with the best overall FCE (3.41) which was reflected in the Dutch pig farmers having the best feed cost of €1.03 per kg deadweight.

Conclusion

There are pig units in Ireland that are competitive by comparison to the figures shown above for other countries.

All farms need to measure their own performance and should not be afraid to benchmark their results against other producers. This new Teagasc Recording system is available to all Irish pig producers as part of the Teagasc/IFA Pig Joint Programme.

APPENDIX 1 - **ePM Data Input Sheet**

TARGETS			
No Pigs Produced / Sow / Year			
Feed Conversion Weaning to Sale		Farmer CIMS No.	***Not necessary***
Optional Targets		Pig Herd ID	***Not necessary***
TARGET FEED PRICE €/TONNE		Period FROM	
TARGET PIG PRICE C/KG DW		Period TO	
HERD SIZE			
PRODUCTION		**FEED**	
Opening Stock Boars		No. Weaners purchased	
Opening Stock Gilts		Total Wt. Weaners purchased	
Opening Stock Sows		Total Cost Weaners purchased	
No. Boars purchased		Total Finisher Live Wt. Sold kg	
No. Boars sold		Total Finisher Dead Wt. Sold	
No. Boar deaths		Average Lean Meat %	
Ave. No. Boars		Total Weaner Wt. Sold kg	
No. Gilts selected		Ave. Wt. at Weaning kg	
No. Gilts purchased		Dry Sow Feed used - tonnes	
Total Wt. Gilts Purch. kg		Cost of Dry Sow Feed €	
No. Gilts sold		Lactating Sow Feed used - tonnes	
Total Wt. Gilts Sold kg		Cost of Lactating Sow Feed €	
No. Gilt deaths		Creep Feed Used - tonnes	
Ave. No. Maiden Gilts		Cost of Creep Feed €	
No. Gilts served		Link Feed used – tonnes	
No. Sows sold		Cost of Link Feed €	
Total live wt. Sows sold kg		Weaner Feed used – tonnes	
No. Sow deaths		Total cost of Weaner feed €	
Ave. Herd size		Finisher Feed used – tonnes	
Adjusted Herd size		Total Cost of Finisher Feed €	
Closing Stock Boars			
Closing Stock Gilts		**FINANCIAL**	
Closing Stock Sows		Finisher Sale Value	
Opening Stock Piglets		Weaner Sale Value	
Opening Stock Weaners		Sow/Boar Sale Value	
Total Services		Gilt Sale Value	
No. Repeats		Healthcare	
No. Farrowed		Heat, Power, Light	
No. Born alive		AI	
No. Born dead		Manure	
No. Pre-Weaning deaths		Transport Costs	
No. Sows weaned		Miscellaneous Costs	
No. Pigs weaned		Labour Costs	
Ave. Stock piglets		Repairs	
No. Weaner deaths		Administration /Accountancy	
No. Weaners sold		Repayments	
No. Weaners transferred		*Interest Charges	
Ave. Stock Weaners		Management Costs	
Closing Stock Piglets		Environment	
Closing Stock Weaners		Insurance	
Ave. Closing Wt. Weaners		Housing Rent	
Opening Stock Finishers		Contract Finishing	
Total Wt. Weaners trans kg		Water	

No. Finisher deaths		Dead Pig Disposal	
No. Finisher sold		Building Depreciation	
Ave. Stock Finishers		Total Cost Boars	
Closing Stock Finishers		Total Cost Gilts	
Ave. Closing Wt. Finishers			

Note: All cells must be populated (even with a Zero) apart from the 2 at top right hand side of the page.
This Data Input sheet is available electronically from your Teagasc Adviser.

Bio-security Top Tips

Amy Quinn & Michael McKeon, Moorepark

Good bio-security is important for all pig units. Some pig farmers may feel that their unit already has all the diseases available to catch so therefore there is no need to worry about bio-security. This is a very dangerous approach as new variant strains e.g. PRRS, can circulate which can effectively cause a re-infection and performance breakdown on your farm. The list below highlights the key points that all units should adhere to irrespective of their current health status.

1. Stock

The introduction of stock, typically replacement breeding stock is the most common entry path of disease to units purchasing stock. To reduce the risk of introducing diseases with incoming stock, the following general guidelines should be adopted:

- The health status of the source herd should be indentified when selecting the source and then supplied on a regular basis (e.g. quarterly) thereafter if keeping the same supplier. The health history of the source should also be considered when initially selecting the supplier. It is important to note that a recent health report is not a guarantee of the absence of disease merely that its presence was not detected on testing.
- Keep the number of source herds to a minimum; ideally use a single-source where possible with a stringent bio-security program.
- Incoming animals should have been vaccinated prior to delivery (at least three weeks) in order for immunity to have developed and for the purchaser to revaccinate after arrival.
- The isolation facility should ideally be located 3 miles but at least 400 m from the rest of the herd. As a rule of thumb, the isolation facility should be far enough away so that it is not readily and easily accessible to staff as they perform their regular duties. Isolation facilities should also have its own unloading facility and located so that surface drainage and prevailing winds can not carry contamination to the existing herd.
- All in-coming animals should be isolated from the herd for 8 weeks, 4 weeks in complete isolation and 4 weeks with a sentinel animal (e.g. a cull sow). As the incubation period for different diseases varies, signs of illness may not be evident for several weeks therefore the length of isolation is crucial. The addition of a sentinel animal allows for the new

stock to acclimatise to the diseases present on the unit. Pigs should be blood sampled at week four by your veterinarian and not removed from the isolation before results are received.

- Preventive treatments such as de-worming and vaccination can be started in preparation for moving to the herd.
- The isolation facility should be managed all-in/all-out. No animal should be moved from the isolation facility to the recipient herd until the most recent addition has completed the testing protocol and isolation period.
- Animals should be carefully observed at least daily during the isolation period for signs of illness such as; coughing, sneezing, diarrhoea, blood or mucus in the urine of faeces, unusual or severe skin lesions and lameness. Pigs showing any signs of illness should be immediately separated and promptly examined by a veterinarian.
- Duties should be sequenced so the person caring for the isolation animals does not come into contact with other pigs later that day. If possible, the person taking care of the isolation animals should have no other pig-contact duties for that day (i.e. last job of the day).
- Outerwear (boots, overalls, hats) worn while tending these animals should be only used in the isolation facility.
- Equipment such as feeders, shovels, scrapers, hand tools, etc., used in the isolation facility should not be used in other parts of the pig unit.

2. Staff

Although diseases are most commonly introduced into a herd by movement of animals there is also a perceived risk of introduction through staff on the unit. To reduce the risk of introducing diseases through staff on the unit, the following general guidelines should be adopted:

- Employees should clearly understand the bio-security protocol for the unit.
- Workers should have no contact with other pigs (including pet pigs) or pig manure outside of their employment and this should be a condition of employment.
- Farm employees who have livestock other than pigs at their own home should be required to report to work personally clean and in clean clothes that have not been exposed to their own livestock.

- Employees should be provided with outerwear and boots that are to be left on the farm when the employee returns home. Showering, changing and laundry facilities should be provided on the farm.
- Prior to entering the canteen employees should remove workwear (boots and outer clothes) and wash hands.
- The use of foot baths is an unreliable method of routine disinfection, unless boots are thoroughly scrubbed before immersion and adequate contact time in the disinfectant is permitted. Usually at least five-minutes contact time is required. Heavy duty work boots with deep corrugations in the sole are difficult or impossible to disinfect properly. Selection of work boots should take account of ease of cleaning.

3. Visitors

There is a risk of disease introduction by people travelling between farms or between groups of animals. To reduce the risk of introducing diseases with visitors to the unit, the following general guidelines should be adopted:

- All visitors should sign a visitor declaration form or visitors book which should record the interval since their last pig contact, on arrival. Visitors should be aware of the bio-security protocols for the unit prior to entry.
- Visitors should not enter pens, passageways used for moving animals, or touch animals unless necessary.
- Showering facilities should be provided for visitors to allow them to shower in and out of the unit using a clean/unclean area protocol.
- Visitors should be asked to wear overalls provided by the unit or disposable overalls if none are available. Footwear should also be provided by the unit or disposable boot covers if none are available. If disposable gear is provided it should be disposed of on the unit.
- Any sampling, measuring or recording equipment brought by visitors should have been thoroughly cleaned and disinfected. A stock of appropriate tools, extension leads and equipment should be kept on the farm to minimise use of tools and equipment, which have been used on other pig units.
- Potentially contaminated hands and forearms should be washed with soap and water. Finger nails should be brushed clean.

4. Dead Pig disposal

The collection of pigs by rendering trucks from units poses a bio-security risk due to the collection of pigs from several units per day. In order to reduce the risk of introducing diseases in this way the following general guidelines should be adopted:

- Outline to staff a clearly defined routine for dealing with dead pigs and their removal.
- Dispose of dead stock and after-birth's promptly.
- Provide safe sealed storage for dead pigs.
- The rendering truck collection point should ideally be located off-site. Where this is not possible then meet the truck at the entrance to the unit.
- Clean and disinfect all storage equipment after every batch.

5. Wild boar and hobby pig farmers

A bio-security risk that is receiving heightened attention in recent years is the threat posed by wild boar and people keeping pigs as a hobby/pet. While it may seem like this is a minor issue the numbers of both groups are steadily increasing. Since 2009 there have been 39 wild boar sightings mainly distributed in the midlands, eastern and south eastern regions of Ireland and in 2012 there were 941 registered herds with 5 or less pigs and a further 315 with 20 pigs or less. Wild boar and hobby pigs threaten bio-security as they have the potential to act as highly mobile disease reservoirs. They can carry a high number serious viral and bacterial diseases and parasites which pose a threat to commercial pig units. In order to minimise this potential threat it is recommended that the following instructions be followed:

- Ensure the unit perimeter and buildings are secure to prevent entrance of unwanted animals.
- If contact is made with these pigs the same procedure as if you had visited another pig unit (i.e. 24 hours pig free) should be followed.
- If you know of any wild boar sightings in your area ensure the sighting has been logged with the National Biodiversity Data Centre and the Department of Agriculture, Food and the Marine.
- If you know of any hobby farmers or pet pigs in your area inform the owners that a herd number is required for owning 1 or more pigs.

6. Vehicles:

Vehicles pose a disease threat either from aerosol transmission if some pigs are on-board (alive/dead) or from the vehicles carrying infected organic matter. The documented risk is difficult to accurately ascertain in literature however the objective should be to minimise or completely eliminate the risk. In order to reduce the risk of introducing diseases in this way the following general guidelines should be adopted:

- Do not allow transport containing pigs into the unit, either with alive or dead pigs on-board.
- Provide a 'dirty area' for transport which staff and pigs have no direct access to from inside the unit.
- Ensure all feed bins and the pig lairage are accessible from the outside of the unit
- Ensure pig trucks are washed, disinfected and dry before arrival.
- Enforce the rule that unit staff do not enter the truck or step on the tailgate
- Instigate a policy of 'no return' once a pig has gone beyond a certain boundary i.e. pig has stepped onto the tailgate.
- Provide all truck drivers with clean boots and overalls
- Do not allow any truck driver to enter the pig unit.
- Ensure all feed deliveries are full loads thereby eliminating the need for a truck to do two unit deliveries with a single load.

7. AI:

Most AI studs provide a low risk of disease outbreak but when it occurs it can have rapid disease transmission across a wide area. While the principle form of transmission is the presence of the pathogen (disease) within the AI dose, the physical delivery of the AI package to the unit can provide also a risk. Infection within the unit can also be transmitted from sow–to-sow if proper hygiene procedures are not adhered to i.e. sharing catheters. In order to reduce the risk of introducing diseases in this way the following general guidelines should be adopted:

- Get an AI stud heath report before deciding on which stud to purchase from.
- Once selected get regular herd health monitor reports from the AI stud

- Ensure the AI delivery box is ideally located away from the unit at another location or at a minimum secured on the outside of the unit.
- Do not share catheters between sows to prevent bacterial cross-contamination.

8. Vaccination:

The use of pig vaccines is an important tool to reduce the level of pathogens in the pig's environment. The selection and type of vaccination (live or dead) is important to ensure that the risk of disease outbreak is reduced in a cost effect manner. In order to reduce the risk of introducing diseases in this way the following general guidelines should be adopted:

- Select the most suitable vaccine for your unit based on: disease risk, mode of action (sow/ piglet), type (live /dead vaccine), cost, and benefit analysis.
- Plan a suitable vaccination program for your farm with the unit vet.
- Ensure all vaccination of pigs is undertaken as a team to reduce individual fatigue. Two people vaccinating 400 pigs will lead to mistakes.
- Ensure all vaccines are stored at the correct temperature e.g. 3-5^{0}C. Use a thermometer to verify the temperature. There should never be ice-crystals in the vaccine bottle.

9. Rodents:

Rodents and pests are harbours and transmitters of disease. It is important to contain the level and ideally exclude them from the unit where possible. Rats and mice can transmit pig diseases such as Leptospirosis, Toxoplasmosis, Erysipelas and Swine dysentery. The common method of transmission is via urine, saliva, blood, faecal droppings or by contact. As a rule of thumb a rat can eat 0.5 kilograms of feed per week but can contaminate 10 times the volume of feed eaten. While cats can reduce the mice/rat population they can also spread disease themselves and therefore should be eliminated from units. In order to reduce the risk of introducing diseases in this way the following general guidelines should be adopted:

- Use a rodent bait plan
- Routinely inspect building for evidence of rodent infestations and act immediately.

- Instigate clear-areas around buildings to eliminate any vegetative or physical hiding places.
- Ensure no cats are permanently present on the unit – do not feed them or encourage their presence.

10. Birds:

In addition to bird infestations consuming significant amounts of pig feed (Starlings eat 50% of their body weight each day) they also pose a significant disease risk. Salmonella can spread through feed contact and bird droppings and other pig diseases can be physically transmitted from unit-to-unit over a wide area. In order to reduce the risk of introducing diseases in this way the following general guidelines should be adopted:

- Ensure all buildings, not just pig buildings, are bird proofed.
- Eliminate bird perch's around the unit.
- Promptly clean-up any feed spills around feed bins.
- Reduce the bird population around the unit where necessary.

11. Pig Flow:

All-in /All-out should be used on units to reduce the exposure levels of pathogens in the pig's environment. This reduces the risk of disease outbreaks where pathogens levels are high. It also prevents the transmission of disease from older pigs to younger pigs thereby improving the pig unit's health status and growth rates. In order to reduce the risk of introducing diseases in this way the following general guidelines should be adopted:

- Ensure all rooms are emptied fully.
- Remove all organic matter and wash rooms fully. Allow to dry and then disinfect and allow the room to re-dry. Enter new pigs into room.
- Never bring older pigs back from other pig housing even if they appear to be a similar size. They will transfer and increase pathogen levels thereby increasing the risk of a disease breakdown within the house e.g. meningitis.

Lameness in pigs

Dr. Laura Boyle, Amy Quinn and Dr. Julia Calderon Diaz
Teagasc, Moorepark

Introduction

Lameness is a major production disease of pigs. It poses a threat to the sustainability of current pig production methods because it is a major cause of poor longevity and performance in sows which in turn reduces profitability. The negative welfare consequences of lameness pose another threat to the sustainability of current methods of pig production. The prevalence of lameness, risk factors for lameness and ways of addressing it (focusing on replacement gilts), was the topic of a three year program of research the findings of which were presented at a research dissemination day held at Moorepark in July 2013.

Lame pigs have very poor welfare because they are in pain

Discussions of animal welfare often focus on behavior leading to disagreement between scientists, farmers, animal welfare charities, policy makers and industry groups as to what poor welfare means. However, there is better agreement between stakeholders when the focus is on welfare problems like pain. This is because most people agree that animals which are in pain have poor welfare. Lame pigs have poor welfare because they are in pain. Nevertheless, lameness is often overlooked on pig units. Lame pigs are also at a serious disadvantage when it comes to accessing food and water particularly if they have to compete with pen mates. This means that not only do they suffer pain but they also often suffer hunger and thirst. Finally, such discomforts are exacerbated by the uncomfortable floors they are kept on.

Lameness awareness

Awareness of the problem is the first step in addressing lameness and because of the implications that culling gilts for lameness has on herd productivity and profitability the sow herd is the most important place to start. Indeed our research clearly showed an increased risk of lameness associated with group housing which is an added incentive to improve awareness of the problem. Awareness of lameness in the sow herd has to start with an assessment of reasons for culling sows, and sow replacement and mortality rates. It is important to note whether sows/gilts being culled for reproductive/poor performance are also lame and to start recording the number of sows with

obvious clinical problems such as missing dew claws or external abscesses on their limbs. The farrowing house is a good place to do this.

Claw lesion inspections

If you're serious about tackling lameness in the sow herd you also have to start looking at claw lesions which are a significant cause of lameness. Research from Moorepark shows that irrespective of gestation housing system, the majority of sows are affected by claw lesions. Hence, incorporating routine claw inspections into the management program for breeding sows is an essential first step in addressing lameness. This will enable you to become familiar with different types of claw lesions and the anatomy of the foot. Routine inspections done in the farrowing house will also mean that the lesions can be monitored such that intervention happens early rather than later to prevent lameness occurring.

Lameness detection

Lameness is much easier to identify in group compared to individually (i.e. stall) housed sows. Provided that gilts/sows are not overstocked severe lameness is relatively easy to detect in any group system but especially those in which sows are fed simultaneously at specific times of the day. In such systems, sows are usually observed during feeding and animals that don't stand up or that have obvious difficulty moving to the trough at the point of feed delivery are clearly visible. Lameness detection in ESF systems is more difficult and lame sows are often missed until they reach the point where they are missing meals. This is worrying considering that levels of lameness are often very high in such systems because of constant re-mixing on slatted floors. One tip we learned from Dutch veterinarians is to place a tray filled with dry lime into the ESF station for sows to stand in while eating. The lime dries out and disinfects the feet every time the sow enters the station which could help to prevent lameness caused by claw lesions.

Locomotion scoring

Detecting sows in the earlier stages of lameness at which time they are more likely to respond to treatment requires a more specific lameness protocol or locomotion scoring system. Visual locomotion scoring systems take the speed of walking and indications of asymmetry such as step length, head and hindquarter movements, willingness to walk and contact between the feet and the floor into account. They do not give any information as to the cause of lameness.

Sows should be locomotion scored when walking on a clean, dry, level, solid surface (i.e. not on slats). A simple scoring system involves a four point scale where:

0 = no lameness
1 = mildly lame
2 = moderately lame
3 = severely lame

A mildly lame animal moves freely but may appear stiff, a moderately lame sow exhibits shortness of stride or a 'limp' but still bears weight on the affected limb while a severely lame sow does not bear weight on the affected limb and needs encouragement to move. It is important to remember that lame sows will tend to move better immediately after weaning when their body condition is lighter so this is not a good time to diagnose lameness in the sow herd.

Lameness prevention

Clearly there are very good reasons why we should try to prevent lameness in sows. However, this is complicated by the fact that lameness is a multi-factorial problem with genetic, mechanical, chemical and biological processes involved. Nevertheless, our research identified several strategies to do with flooring and gilt nutrition that may help to prevent lameness.

- Rubber flooring reduces the problem of lameness in fully slatted group housing systems, it significantly improves sow comfort and may reduce culling for lameness
- The use of slatted steel (Tribar) type flooring in the farrowing crate should be avoided as it is not only detrimental to the claw health of sows but is also a major risk factor for limb and claw lesions in piglets. Consider cast iron under the sow instead
- Trace mineral supplements specially designed for claw health (i.e. Zn, Cu and Mn) reduce claw lesions in group housed gilts
- Slowing the growth rate of replacement gilts reduces the severity of joint lesions
- Combining these features in a specially formulated 'developer diet' for replacement gilts could improve sow productivity and longevity

Treatment of lame sows

Prevention is clearly better than cure but where pigs become lame they can recover with appropriate care and treatment. This is lacking on many units where often the only 'treatment' of sows at least is to cull and too less often, to

euthanize, the affected animal. Unfortunately such 'treatment' is generally delayed until lame sows have farrowed meaning that suffering is prolonged. Typically we forget the tremendous investment of money, time and resources that are associated with bringing a replacement female into the herd. It may make better economical sense to try and keep a lame sow with good performance records in the herd by treating her rather than to introduce a young and unproven gilt in her place.

Lame pigs and especially those with claw injuries (e.g. dew claw amputation) should be kept in a solid floored, bedded or rubber mat covered recovery pen where they do not have to compete for food and water. Depending on the condition, treatment may involve antibiotics but lame pigs should always be treated with anti-inflammatory drugs to improve chances of recovery. The use of analgesics (pain killers) such as aspirin in powdered form may be a useful adjunct therapy. The pain relief they provide encourages pigs to get up and walk around and to eat and drink thereby speeding up their recovery. The surface of exposed, cleaned lesions may be sprayed with antibiotic, e.g. tetracycline, or dusted with an antibiotic wound powder. Culling should not be delayed for pigs that do not recover following the treatment outlined above. Sows/pigs that have great difficulty walking or that are clearly in a lot of pain should not be sent for slaughter and instead euthanised as soon as possible.

Lameness in growing pigs

The root cause of most production diseases lies in the interaction between the demands placed on animals for high productivity and the sub-optimal environment/management systems under which they are produced. Nowhere is this relationship more evident than in the case of the finisher pig where our research identified a clear positive relationship between growth rate and lameness. That is to say that by selecting pigs for fast growth rate we are contributing to the problem of lameness in these animals. Addressing lameness in these animals is even more challenging because of the ubiquitous use of fully slatted flooring which is a major risk factor for lameness. Our research shows that narrower voids between slats (≤18mm) and better hygiene (i.e. cleaning pens at least 4x p.a.) would go some way towards reducing the risk of lameness in these animals.

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