Special Report:

Pig producers adapt to evolving market

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Examples of some alternative sow housing systems.

Courtesy of Big Dutchman.

EU pig producers struggle to meet 2013 gestation sow stall deadline

Experts predict sow decreases in Western Europe and fewer medium- to small-sized pig farms.

By Roger Abbott

Pig producers across Europe are facing stark choices as they approach the 2013 deadline for EU curbs on the use of gestation sow stalls, as well as a raft of new welfare regulations and environmental constraints due to be enforced in several European countries over the next few years.

For many, the cost of converting to a new pig production system will force producers to decide whether to push on in the hope that profits will return, cut back on production, or get out, especially if feed prices and other input costs continue to rise.

While some countries, including the UK, Finland and Sweden, have already made the change and lived through the pain caused by the costs of new housing and changing management systems, it is understood that a large percentage of pig producers in other EU countries have not even started planning. Some industry leaders fear this could lead to severe challenges in the markets, especially if aggravated by the continuing slump in pig prices and rise in feed costs.

France not prepared

Adding to concerns, a recent Organization for Economic Cooperation and Development report says EU meat exports "are expected to decline due to reduced domestic output following policy reforms and growing domestic consumption brought about by EU enlargement."

Seasoned EU observer Wojciech Wójcikiewicz, who has been closely involved with the European pig industry for the past 27 years and is currently PIC's European marketing coordinator, believes the region is facing "incredibly difficult conditions."

Wójcikiewicz is particularly concerned about France, where he believes pig producers are far behind in converting to group housing and just won't be ready in time for 2013. He also questions whether EU authorities will be able to police the new rules effectively.

Group housing system conversion

Geneticist Dr. Grant Walling points out that pig producers could struggle to maintain high production levels for four to five years after conversion, as both sows and staff adapt to the new group housing systems.

"When we converted about a decade ago, we were very concerned about the effect it had on high-performance sows, particularly the Landrace, which did not acclimate well to group housing for several

"Sows take time to get used to group housing."

— Dr. Grant Walling, managing director of UK-based JSR Genetics.

"It is not looking very bright at the moment."

— Dutch Pig Farmers' Union chairman, Wyno van Zwanenburg

years," said Walling, who is managing director of UK-based JSR Genetics.

"It was also quite a challenge for our stockmen, who found that they had to deal with a visibly higher incidence of bullying in the new systems at first and they had to discover new ways to manage animals individually, especially at feeding times," he said.

"Judging from our experience, it would be a very good idea for pig producers in other countries to start getting their animals used to the new systems now to reduce any potential losses. I honestly think they need to start doing this at least two years before they finally convert to ensure both animals and staff adapt to the changes without any major hitches."

Sow numbers may drop

Looking ahead to prospects for the EU industry up to and after 2013, Walling is pessimistic about sow numbers and the long-term future for medium to smaller-sized enterprises.

"I think we will see sows decrease in Western Europe and a number of smaller pig producers will drop out altogether, because they will be either reluctant to invest any more capital into the industry now, or they just won't have enough money to go forward," he said.

This was particularly likely to happen in countries like Spain, Holland and Germany, which were reliant on export markets in Southeast Asia and Eastern Europe, where countries were becoming more self-sufficient and reducing demand for imports.

Russia and South America, for example, were using smart genetics to help them develop at a faster rate than the EU at present to meet local demand, as well as boost production to allow them to compete for export markets, he claimed.

Lower pig production could benefit industry in the long run
Read more at
www.WATTAgNet.com/24961.html

Efficient production systems needed

However, Walling has not lost hope for the EU, where he believes pig producers need to concentrate on production efficiency, rather than producing more pigs.

"We need to look at total lifetime production and get cleverer with our breeding programmes and develop new targets, like reducing sow mortality instead of increasing litter numbers," he said.

The EU pig industry also needs to change its attitude and exploit opportunities to export its efficient production systems, genetics and other production skills to emerging markets rather than product, which it should retain to supply local markets.

More changes ahead

Stewart Houston, executive director of the UK's National Pig Association, predicts, "it's going to be a crazy, mixed up market in the EU after 2013."

Houston said he was concerned that a substantial number of units would not

Finland pig producers growing with the industry

Although Finland only has a population of 5 million people and is not known as a major pig producing country, it boasts 120,000 to 150,000 sows and is starting to make its mark in the EU pig market.

Based mostly on family farms between 100ha and 150ha, pig producers are supplying a growing domestic market, as well as maintaining a healthy export trade with neighboring Russia.

"It appears to be a very stable industry, with opportunities for growth," says Tony Suckling, the international director for the British-based animal feed company, BOCM PAULS International, which just appointed two Finnish companies to sell and distribute its range of pig feeds.

"We had been selling game feed in Finland for about five years, before we realized there was a vibrant pig market," said Suckling.

"So, we went there to investigate and came back with a positive report about the pig industry, which is split between farrow-to-finish units and weaner producers. Although many are home mixers, the report revealed opportunities for pre-starter and starter piglet feeds up to 12kg, with concentrates to produce grower feeds to take the pigs up to 30kg, as well as concentrates to provide nutrition for lactating and gestating sows."

Praising Finnish pig producers for their stockmanship and "eye for a pig," Suckling said they were also concerned about the pending EU curbs on gestation stalls. "I don't think there is an EU pig-producing country where you don't spend a lot of time talking about the forthcoming difficulties," he said.

"However, I believe the Finnish industry has good opportunities for the future, especially because it is so close to Sweden, Norway and Denmark, as well as Russia."

Asked how he saw the market after 2013, Suckling said he expects Europe to find a way through the challenges, although there will probably be a lot of "hot air" from all sides. "It will happen, but only after the 2013 deadline," he predicts.

» Sow stall deadline

convert in time, resulting in "an awful lot of illegal pigs swishing around the EU" – and nobody was quite sure what the authorities were going to do about that yet.

"I can't see the EC granting any new derogations and I am sure the major retailers will not want to be seen selling 'illegal' pork, or using 'illegal' manufacturing meat."

While pig producers who had already moved away from gestation stalls would be in a better place, they still face new animal welfare standards, tougher anti-pollution and emission regulations, new moves on castration and a depressed economy.

"The whole supply chain needs to work together to target production to meet domestic needs, as well as the growing demand for exports to non-EU markets in Asia and Eastern Europe," he said.

Meanwhile, Dutch Pig Farmers Union chairman Wyno Zwanenburg points out that issues such as animal welfare and reducing greenhouse gas emissions are even bigger challenges than the ban on gestation stalls for the majority of the EU's pig producers.

Many EU producers are far behind in their plans to convert their units to accommodate group housing.

— PIC's European marketing coordinator, Wojciech Wójcikiewicz

"Here in The Netherlands, 80% of our pig producers have already moved away from gestation stalls and keep their pigs in group housing and of the 20% who still had to convert, at least one-third were expected to leave the industry before the end of 2012.

"I really don't believe that our pig producers will face many problems when the ban is enforced across the EU from 2013. Most of us already are used to the new system.

"National regulations forcing us to reduce emissions and the current state of the economy pose much bigger challenges for us in the future. Pig prices will have to go up to provide producers with the necessary funds to invest in improvements to their unit.

"I am afraid it is not looking very bright at the moment: Costs are rising and the message from across Europe is still that a large number of pig producers are going to go out and the number of pigs is going to decrease."

Asked what the remaining pig producers could do to save the situation, Zwanenburg said, "We have to all work together to reconnect the market to our costs. One of the big problems now is everybody is talking about animal husbandry and welfare, but nobody is prepared to pay for it.

"We are already talking to pig producers in Germany, Denmark and Belgium and I am hoping all producers will stick together so that we can make the retailers and the processors seen sense and be paid properly for the products we produce."

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European Commission clarifies gestation stall housing rules

The European Commission claims that its Directive on gestation stalls does not call for a complete ban on farrowing stalls from 2013; rather, it foresees group housing of all pregnant sows from that date.

"These provisions were introduced in 2001 (Dir. 2001/88), which means producers have had 11 years to adjust the housing systems," a spokesperson told *Pig International*.

She said the Directive says: "Member States shall ensure that sows and gilts are kept in groups during a period starting from four weeks after the service to one week before the expected time of farrowing.

"The pen where the group is kept must have sides greater than 2.8 meters in length. When fewer than six individuals are kept in a group the pen where the group is kept must have sides greater than 2.4 meters in length.

"By way of derogation, sows and gilts raised on holdings with fewer than 10 sows may be kept individually during the period mentioned, provided that they can turn around easily in their boxes."

Asked how the EC was planning to police the new regulations, the spokesperson explained that any infringements will be handled on a case-by-case basis and, "the Commission will work with member states to help them meet the necessary requirements as soon as they can. It has the authority to impose fines as a last resort, if states refuse to take any action."

The EC has pointed out that there is already EU legislation banning the permanent keeping of sows and gilts in individual stalls. This ban started for newly built or rebuilt holdings in 2003 and will apply to all holdings on Jan. 1, 2013.

Lower pig production could benefit industry

Danish Agriculture and Food Council senior market analyst Karsten Flemin commented that the forthcoming 2013 curbs on gestation stalls will lead to lower production, which he says could benefit the industry in the long term.

"We are currently going through the longest downturn I can remember, and we need to see production fall by about 3% to force prices back up," said Flemin. "This ban provides an opportunity for this to happen. We need a better structure and higher prices for the pig producers who stay in the industry. This should help keep prices at the right level through 2013. It will also provide stable production in the long term, because it is never easy to increase production."

In Denmark, pig producers claim 70% of producers have already converted to loose housing, but they warn it could be difficult for the remaining 30% to change in time, because of local laws.

Danish pig producers need a special permit before they change housing systems and the red tape is holding many people back, they explained.

Producers who do not meet the new rules in time will be excluded from the Danish pig producers' quality program and will not be able to sell their products.

Combating the high cost of pig feed

Nutritionists need to look at all options when considering swine diet

By J.E. Pettigrew

The most significant change impacting the pig industry and nutritional practices during recent years has been the dramatic increase in the cost of major feedstuffs, due primarily to droughts and ethanol production. What's more, the cost of special ingredients for nursery diets such as fish meal and milk products has also risen. The combination of these factors has forced swine nutritionists to look thoughtfully and creatively at new and cost-effective options for pig feed.

Pros and cons of DDGS

The pig nutrition community has done an admirable job of learning how best to utilize distillers dried grains with solubles, the dominant co-product of ethanol production. Although the most valuable part of the corn, the starch, is lost during ethanol production, the remainder can be salvaged and put to good use.

The principal role of the diet is to provide nutrients, but there is accumulating evidence that specific diet components can contribute to herd health.

» The pig nutrition community has done an admirable job of learning how best to utilize DDGS. «

Pig nutritionists have learned a great deal about DDGS and its effective use in pig diets. Positive aspects include:

- Its use can often lower diet cost significantly.
- Generally, all components of corn (except starch) are concentrated about three-fold in DDGS.
- The energy value is similar to that of corn, due to high levels of both fiber and fat.
- Phosphorus digestibility in DDGS is quite high.

Negative aspects include:

The digestibility of amino acids, especially lysine, in DDGS is rather low and variable. However, attention to this fact has improved processing conditions. As a result, the extremely low digestibility values reported several years ago are not now generally seen.

The high levels of polyunsaturated fatty acids can result in soft carcass fat. However, it is still possible to use rather high levels of DDGS without causing carcass fat to be soft enough to cause problems.

The three-fold concentration of non-starch components of corn in DDGS holds for mycotoxins as well as nutrients. This three-fold concentration of mycotoxins in DDGS created special concerns about DDGS made from the 2009 U.S. corn crop, much of which had damaging levels of mycotoxins because of weather conditions late in the growing season. Mycotoxin binders and other products to reduce the impacts of mycotoxins were used widely.

Other considerations

Phosphorus nutrition. The swine industry has widely adopted the use of phytase to increase digestibility of phosphorus in plant materials, and at higher dietary inclusion levels than used a few years ago. Benefits are in lower diet cost and in reduced phosphorus excretion. There is now a strong trend to formulation on the basis of digestible phosphorus rather than available phosphorus, largely because the measurements of digestible phosphorus are easier, cheaper, and more consistent across laboratories. Some diets containing high levels of both DDGS and phytase do not require additional phosphorus supplementation.

Carbohydrases. The widespread use of DDGS with its high fiber level has spurred interest in increasing fiber digestibility by use of carbohydrase enzymes such as xylanases beyond the previous interest in using such enzymes in lower-fiber diets.

Crystalline amino acids. There has been a continuing increase in the amounts of crystalline amino acids used in swine diets during recent decades. The use of DDGS stimulates even more use of crystalline amino acids because of the relatively poor amino acid balance of the proteins in DDGS.

Other diet components

The principal role of the diet is to provide nutrients, but there is accumulating evidence that specific diet components can contribute to herd health. A few examples:

» Specific diet components can contribute to herd health «

Sow nutrition

Besides the inclusion of DDGS, there is another significant reason for changes in sow diets. The last decade or so has brought a startling increase in the number of pigs produced per litter and the amount of milk secreted by the sow. These advances in production increase quantitative nutrient requirements of both gestating and lactating sows, and we continue to struggle to estimate and meet these requirements. This challenge highlights the importance of estimating quantitative nutrient requirements using input-output calculations that relate the requirement to the level of production.

Pig nutritionists continue to seek nutritional contributions to a solution to the reduced piglet birth weights that have accompanied the increase in litter size, and the resulting increase in preweaning mortality and decrease in weaning weight.

» Spray-dried plasma, besides dramatically increasing the growth rate of pigs soon after weaning, provides a degree of specific protection against enteric infections by *E. coli*. It also moderates inflammatory responses.

» A high level of zinc oxide markedly reduces mortality in the face of a severe outbreak of enteric disease in nursery pigs.

» Research has shown that insoluble fiber, as found in DDGS, speeds recovery from *E. coli* diarrhea.

» Mannan oligosaccharide derived from yeast cell wall causes complex and potentially important changes in immune function, including moderation of inflammation. It partially counteracts the immune suppression caused by a PRRS infection.

» Both certain clays and certain plant extracts (essential oils) can reduce diarrhea in pigs infected with *E. coli*.

Research is in its early stages in the area of dietary effects on health of pigs, but there are reasons to believe that specific physiologically active diet components may be quite important for swine herd health. Much more progress is anticipated in coming years. **PIGI**

J.E. Pettigrew is Professor of Animal Sciences, University of Illinois

North America's pig producers surviving difficult market

The swine industry in the US and Canada may be contracting, but producers are adopting various strategies to grow the market.

By Roger Abbott

North American pig producers are certainly not immune to the hardships that have been affecting the industry in other parts of the world for some time now, and that outlook is set to continue through the rest of 2011.

Statistics published by the US Department of Agriculture towards the end of 2010 revealed that the US pig herd was still in a worrying "phase of contraction," although it predicted that this phase did appear to be slowing.

There are now fewer producers, although they are larger, and they now rely more on contracting for both swine production and marketing.

More information

For an in depth look at Canada's restructuring, read: Canada to emerge stronger following restructure

www.pig-international.com/15077.html

The best chance to get our consumers to fall in love with pork all over again, says US Pork Board president, Gene Nemecheck.

» Moving the Canadian pork industry forward in today's global market «

However, intended farrowings for December 2010 to February 2011 were up at 2.89 million sows and the USDA felt that, if producers followed through with these intentions, the industry could see the first year-on-year farrowing increase since the spring of 2008 and see evidence of a possible turnaround from liquidation to expansion.

More challenges ahead

But international observers, such as British Pig Executive analyst James Park, have warned that in a high feed cost environment and after a period of negative returns that had lasted for more than two years, US pig producers would still be facing severe challenges in the months ahead.

"It's never easy to predict what is going to happen in the medium to long-term future and I am afraid there is no sign of feed prices falling yet, so, like pig farmers here in the European Union where the total breeding herd fell by nearly 3% last year based on census returns from 17 member countries, US producers could still see hard times for a few months yet," he said.

Taking action

It seems, however, that Americans are not prepared to sit down and watch their industry decline, and many have already started to fight back with measures to improve production and traceability, as well as campaigns to persuade consumers to "fall in love" with pork again.

Details of the National Pork Board's latest marketing campaign were discussed by the board at its meeting early last year.

The campaign has been designed to achieve a 10% increase in real per capita domestic consumer expenditures for pork by 2014, compared with their spend on the meat in 2009.

"This is the culmination of a year-long examination of all our marketing efforts to give us as pork producers the best chance to get our consumers to fall in love with pork all over again," said North Carolina vet and president of the pork board Gene Nemechek.

Following along the lines of a similar exercise by Britain's National Pig Association in London, where UK pig producers held a rally in front of the Houses of Parliament to drive home their message that "Pigs are Still Worth It," the US National Pork Board's strategic plan will focus on:

- Refreshing and repositioning pork's image to increase domestic and international consumer demand;
- Pursuing strategies to enable US pork producers to remain competitive globally;

» Protecting the rights and ability of US farmers to produce pork in a socially responsible and cost-competitive manner.

Canadian herd shrinking

The picture doesn't look much brighter for pig producers in Canada, where the October 2010 pig census revealed that their national pig herd was still shrinking, although at a slower rate than the year before.

The census also revealed a declining trend in the sow herd, which statisticians believe practically rules out any chance of recovery in 2011. The increasing feed costs and continued uncertainty surrounding live pig exports are likely to worsen the situation even further, with slaughterings expected to see a further 2% decline in 2011.

However, with production forecast to decline by 1% this year and a higher demand likely for exports, tight market supplies are expected to keep prices as relatively higher levels during the first quarter of 2011, with some rebuilding on the back of stronger demand possible in 2012.

A strong traceability system will benefit Canada's pork producers.

Traceability

And showing its confidence in the industry, the Canadian government stepped in with a $3.7 million package in February this year to support the industry and help the Canadian Pork Council strengthen its national swine traceability system.

The council's system, Pig Trace Canada, has been designed to track the movement of hogs across the country. Phase I funding was for development of PigTrace Canada, including software development and system set up associated with the allocation of approved ear tags, as well as administrative and customer service support. Phase II funding of $3.7 million is intended for the implementation of PigTrace Canada. The education of Canadian producers and other system users is the key component to ensuring the movment reporting, as will be required by federal law, is as simple and straightforward as possible.

"There is no doubt that a strong traceability system benefits Canadian producers, the value chain and consumers," said agriculture minister Gerry Ritz.

He claimed that the government's investment in hog traceability would "pay dividends to the entire value chain in Ontario and across Canada for generations to come".

It is hoped that the scheme will give Canada a competitive edge when working to access the new markets it needs to obtain while, at the same time, using it as a marketing tool to help producers get a better return for their high quality products.

In addition, a national database could prove to be invaluable in the event of a national outbreak of disease by allowing it to quickly identify which farms the affected hogs come from and which other animals they may have come into contact with, to limit both the economic and trade impacts of such emergencies.

Managing risk

"The Canadian pork industry is working hard towards the implementation of a world-class swine traceability system that serves as a tool in moving the Canadian pork industry forward in today's global market," said Canadian Pork Council president Jurgen Preugschas.

"The investment shows the continued support of the government and industry to work towards the mutually beneficial goal of improving disease preparedness."

The $3.7 million will be delivered through the country's innovative Growing Forward through the Canadian Integrated Food Safety Initiative (CIFSI), which has been designed to integrate a complementary and mutually reinforcing set of programs.

This integrated delivery by Agriculture and Agri-Food Canada seeks to enable various sectors manage risk proactively, and effectively respond to demands from governments and buyers for demonstrable assurances on food safety and bio-security risks. PIGI

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The role of pig genetics in global sustainability and responsibility

The pig industry has achieved a lot in reducing its climatic impact, and further improvements lie ahead.

Dr Rex Walters

Over the last decade there has been increasing interest in environmental issues, such as climate change and sustainability. A key player has been the Inter-governmental Panel on Climate Change, IPPC, set up to assess technical, scientific and sociological impacts, including the role of agriculture in global warming.

Agriculture has been largely successful in feeding the world, but the global population is growing. The Food and Agricultural Organisation, FAO, has estimated that, to meet demand growth from 2000 to 2030, cereal production must increase by 50% and livestock production by 85%.

The sustainability debate was galvanised by the 2006 publication of the Stern Review on the Economics of Climate Change. It indicated that agriculture was responsible for 14% of global greenhouse gas emissions, GHGs, in 2000. The Australian Garnaut Review reported that this had increased to 15% by 2008.

Pig environmental studies

There are several studies on the impact of pigs on the environment. For example, Danske Slagterier reported in 2008 that between 1985 and 2008, there were highly significant reductions in chemical discharges from pig production: 39% less nitrogen; 42% less phosphorus; and 50% less ammonia.

Additionally, there was a 50% reduction in use of artificial fertiliser on arable land, due to increased use of pig slurry. Overall, it was estimated that GHG emissions per kg of pig meat had fallen by 17% in the 16 years since 1992.

Another Danish report considered changes in eutrophication, acidification and global warming/GHG. It showed highly significant projected falls from 1995 to 2015 of 74% in eutrophication, 50% in acidification and 25% in GHGs.

TABLE 1: Typical phenotypic progress from 1960's to the present

	1960s	Today	% change	Benefit
Weaned/litter	14	21	50	7 extra pigs
Lean %	44	55	37	11.25 kg more lean
FCR	3.0	2.2	27	75.2 kg less feed
Kg lean/metric ton feed	85	170	100	85 kg more lean/metric ton

Genetics has contributed to highly significant phenotypic changes from the 1960s.

Table 2: Emissions per metric ton of product in 2007

	CH4	NH3	N2O	GWP
Broilers	5	23	3	3448
Layers	8	28	4	3791
Pigs	49	28	2	4689
Beef	265	71	12	14704
Sheep	301	41	11	15813

Differences in emissions by species.

Table 3: Percentage change from 1988 to 2007 through genetic improvement

	CH4	NH3	N2O	GWP
Broilers	-20	+10	-23	-23
Layers	-30	-36	-29	-25
Pigs	-17	-18	-14	-15
Beef	0	0	0	0
Sheep	-1	0	0	-1

Attempts to control emissions from pigs and poultry have beem more successful than those to control emissions from cattle and sheep.

Influence of genetics

Plastow has reported that 40 years of genetic progress have halved the manure produced on a per productive sow basis, and that the land needed to produce a cooked breakfast of eggs and bacon has been reduced by 70% through improved efficiency. Perhaps, of greater importance

has been genetic progress across a range of performance and efficiency traits. Van der Steen, Prall and Plastow showed in 2005 significant phenotypic changes from the 1960s, which had a sizeable genetic component.

Walling (2008) noted that the best performing units now far exceed the average benefits, so that the percentage change from the 1960s in pigs weaned per litter is over 100% and more than 200 kg of lean per metric ton of feed is seen on the most efficient units.

Despite the positive trends in genetic progress, little has been published on the correlated benefits for the environment. However, Audsley, Jones and Williams (2007) reported on modelling work at Cranfield University, which looked at the effect of improved genetics in livestock on GHGs using an input: output life cycle model. Table 2 shows the differences between livestock in emissions.

Comparing the 20-year period 1988-2007, the authors reported significant percentage falls in methane, ammonia, nitrous oxide and GWP in pigs and poultry but not in beef and sheep.

Based on these data, the authors concluded that the annual reduction in GWP in pigs through genetic improvement was 0.8% over the last 20 years. They also forecast that, if the same levels of genetic progress were achieved over the following 15 years, then there would be further reductions in methane, ammonia and GWP of 15%, 14% and 14%, respectively.

Future Options

Genetics will continue to play a key role in ensuring global sustainability. The main advantages of genetics are that gains are cumulative and permanent. Furthermore, most genetic techniques are sustainable. Essentially, there are five main routes through which genetic improvement can help to reduce GHG emissions.

▼ Table 4: Percentage gains in feed conversion

	1988 to 2007	2007 to 2022
Layers	25	20
Broilers	20	15
Pigs	25	18
Beef	0	17
Milk	18	10

Pigs rival poultry in terms of current and future improvements in feed conversion.

Improved productivity and efficiency

As shown above, selection to date has been impressive. Among benefits from selection are higher gross efficiency by reducing the overall maintenance cost of production, a requirement for fewer animals and a reduced finishing period, directly lowering emissions and slurry produced.

Among particular challenges that may become more important are:

- Reduced feed intake. Reducing intake is a feature of many breeding programmes. The result is that genetic potential in lean growth is increasingly restricted.
- Heat stress. Increasing levels of heat stress are likely to occur as global temperatures rise. As a result, appetite will be reduced in order to reduce heat production. There is some evidence that heat stress related problems are emphasised in modern lines with high levels of lean growth and reproductive potential, so that genetic selection might be used to improve resistance to heat stress.
- Daily maintenance yields. Selection for lean growth has led to animals of larger mature size with higher maintenance needs. This has implications for breeding programmes faced with the need for increased efficiency and minimization of GHGs.
- Exploiting nutritional differences between genotypes. Several studies have shown that there is genetic and individual variation in digestibility and post absorption for energy, fibre and protein.

Reduced wastage

Selection for fitness traits will reduce wastage levels. Most of the traits are complex, but the underlying genetic components/genes are being unravelled.

One aspect of climate change is that higher global temperatures will result in greater disease burdens. Already the costs of disease are huge, so it is hoped that technologies will develop that allow disease resistance to be exploited.

Direct selection to reduce emissions

In the ruminant it is known that there is variation between animals, between breeds and across time for the production of GHGs. However, direct measurement in live animals is difficult, so selection for decreased GHGs must remain a goal. However, in the pig there is the example of 'enviro pigs' - genetically modified to excrete 60% less phosphorus.

Indices for emission selection

As the environment changes, it is possible to invest in broader breeding goals. These breeding goals can be built in a number of ways, but the valuation of traits may be complex as there are several scientific approaches.

Exploiting genetic resources

There is growing awareness of the potential long-term importance of domestic animal genetic resources. One of the reasons for maintaining these is that a pool of genes and gene combinations will be available. PIGI

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