

International Pig Topics

Volume 35 Number 2 (2020)

Independent thoughts for independent minds

AFRICAN SWINE FEVER

How can we stop
it from spreading?

FEEDING

Management of piglets
with dry lacto-initiator feed

ENVIRONMENTAL CONTROL

We look at options
from around the world

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PUBLISHED BY
Positive Action Publications Ltd

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International Pig Topics (ISSN 0963 5866) is published eight times a year (January, March, April, May, July, September, October and December) by Positive Action Publications Ltd and distributed in the USA by UKP Worldwide, 3390 Rand Road, South Plainfield, NJ 07080. Periodicals postage paid at Rahway, NJ and at additional mailing offices. Postmaster: Send address changes to International Pig Topics, Positive Action Publications, c/o 3390 Rand Road, South Plainfield NJ 07080.

firstservice

A world shortage of pork meat is looming, and not only because of African Swine Fever. The growing urban population and a larger percentage of people being able to afford meat are increasing the need for ready-to-eat pork cuts. It will take a major effort to fill the expected gap between production and demand.

This will lead to increased meat prices and where the money ends up, at producers' level or in the trade, depends very much on the integration level of the industry.

It is to be hoped that the profit is shared with the producers, simply because if there is no product there is no trade.

The industry has suffered from a number of low-income years and it is time to earn money for necessary investments. These resources should be used to produce more kilograms of pork per unit.

Expanding facilities is not always easy, due to building restrictions and environmental constraints. The carbon footprint is a real threat, as is a lack of water in some countries. Real progress can be made by increasing the number of piglets per sow per year that make it all the way

to the slaughterhouse. Between countries and regions this figure can differ enormously. Lessons can be learned from the top, but the world will benefit most when those at the lower end are able to invest in knowledge and methods to increase their output.

It all starts with preparing the sow for the next litter. Feeding regimes for pregnant and lactating sows, and creep feeding for young piglets are special tasks that require knowledgeable staff. Health care through sow and young piglet medication and vaccination is another area requiring competence.

All efforts are aimed at a higher output in the number of piglets born and weaned. Optimal targets are more important here than maximum targets. More low-weight piglets born and more piglets dying is not desirable. The current percentage of piglets that die around parturition and before weaning is simply unacceptable. Percentages of over 25% are not uncommon, even in the top 10 countries.

It is time to work on producing high quality piglets with the knowledge, materials and methods that can be handled by the staff on the farm. ■

Cover Picture:

A perfect insight into pig growth
(Photo courtesy of Hotraco Agri BV)

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worldfocus

An executive summary of key international issues

America

Coronavirus impacts pork prices

To the industry's surprise, the coronavirus infection in China has not only caused shockwaves in man but has also had a big impact on pork prices in the USA. Traders assumed that the Chinese were going to consume less pork at home and in restaurants. Consequently, they thought that the volume in pork exports would drop. So, based on several assumptions regarding the future, the trading price for pork dropped sharply by about US\$25 per head. This is the 'cost' you must now pay when you want to sell your pigs for processing in June 2020. It is already a volatile market due to African swine fever, but it was a surprise to see such an effect caused by a human virus.

Europe

Defending against the spread of ASF

Controlling the spread of ASF is at the top of all activities in the industry. The border between Poland and Germany and the one between Denmark and Germany have been turned into frontline zones. There are dedicated fences, warning signs and increased border checks all aimed at preventing ASF from entering these top of the league countries when it comes to pork production. Also in Europe, the antibiotic guidance paper for veterinary antimicrobial usage has been updated by the EU classifying antibiotics into groups – A (Avoid), B (Restrict), C (Caution) to D (Prudence). It also considers the Critically Important Antimicrobials (CIA) for human use.

Rest of the World

An excellent 2020 for Latin American pork production

Pork exporting countries in Latin America enjoyed an excellent 2019, and 2020 looks to be even better, although the reported imports of Chinese pork into Latin American countries is worrying. Looking at land, water and labour, Latin America has a great future in animal production. Poultry and beef have developed into major industries with significant shares in global trade and there is no reason why pork should not go the same way. Traditionally, the domestic market in these countries is small, however extra profits can provide financial resources to promote and boost domestic consumption. This is important as domestic demand is more stable than the export markets, as recent occurrences have taught us.

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African swine fever: how can we stop it from spreading?

African swine fever (ASF) does not need an introduction. The characteristics of the virus have been described in numerous scientific articles. The epidemiology of the recent spread has been studied in great detail. All the details about how genotype II of this ASF virus is travelling around the globe are well known. Journals, magazines, and websites have been full of reports over the alarming situation in a steadily increasing number of countries. There are also success stories but they are few. Most reports are dramatic when describing the economic damage, the social disruption in rural areas, the psychological impact on pig farming communities, the empty shelves signalling the reducing pork supply in bigger cities of China, etc. Is there nothing that can be done to stop this tragedy?

by Alex Eggen,
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Before trying to answer this question, some aspects involved in the spread need to be considered. It all starts with the virus, secondly the role of domestic pigs and wild boars, and last but not least it is the human involvement that has proven to be a crucial aspect in the control programme.

African swine fever virus

The structure of ASF was recently detected by using electron microscopy. A quote from researchers stated that 'the cryo-EM structure of African swine fever virus unravels a unique architecture comprising two icosahedral protein capsids and two lipoprotein membranes. This high-level organisation confers to ASFV a unique architecture among the nucleocytoplasmic large DNA virus (NCLDV) that likely reflects the complexity of its infection process and may help explain current challenges in its control'.

The genotype II of ASF virus affecting pigs is not very contagious and direct contact is needed. It is far less contagious than, for example, CSF or FMD virus, but the virus is



Delicious pork meat. The whole industry must ensure that it is free of ASF virus.

very pathogenic. Close to 100% of the ASF virus affected pigs die within 10 days. The immune apparatus of the pigs has no chance to provide any sort of immunity against ASF virus in that short period of time.

The percentage of ASF seropositive wild boars is still very low (<2.0%). This can be considered a good sign because no ASF virus carriers are present. But on the other hand, because there is no immune population, the infection will not die out by itself. There will be always naïve animals.

The ASF virus is also a bug of 'steel'. It can survive for long periods in all kind of edible materials. The OIE has issued a study on the survival of ASF virus in different materials and Kansas State University determined the half-life of ASF virus in feed ingredients.

Both revealed that all materials tested under their conditions can be a prolonged source of ASF virus infection. Epidemiology could not demonstrate any evidence of airborne infection, which should make control easier.

There are promising reports on the development of a vaccine. But here caution is in place because there are still many questions to be answered and regulations to be altered before it can be used.

In summary, the combination of a virus that will survive for longer periods in all kind

of (edible) materials, that either has been in contact with pork or contains ingredients of pork origin, that is transported over the globe, combined with the presence of an ASF naïve pork (and wild boar-) population that encounters possible ASF infected materials, makes control of ASF very difficult.

Domestic pigs versus wild boar (or feral pigs)

The role of domestic pigs in the epidemiology of ASF differs from the role of wild boar or feral pigs.

In wild boar an ASF reservoir will be created by continuous infection, which might lead to infections in the domestic population. In countries where the soft tick is present, the tick will act as an reservoir.

When the wild boar gets sick it will seek shelter and in the case of ASF, it will die in the sheltered place. This can be in the forest but also inside a corn field, contaminating the harvested corn. When that harvested feed is fed within a short period after the harvest, domestic pigs can be infected.

In countries where biosecurity is at a high level (for example Belgium, Czech Republic and Poland) and harvested feed is only fed some months after harvesting, only very seldom will the wild boar population act as a source of infection for the domestic population.

The situation is totally different when the ASF virus infects the domestic pig population. Now there are a lot of possibilities for direct and indirect contact between the infected population and the non-infected domestic pig population.

The current global spread of the ASF virus in the domestic population is almost exclusively caused by material of domestic pig origin. Even a number of infections in the wild boar population can be traced back by making infected domestic pork material accessible to these wild boar.

In conclusion, many attempts are made to reduce the wild boar population in order to control the spread of ASF, while the main source of ASF virus for both the domestic pig as well as the wild boar population, are products made of the ASF virus infected domestic pig population. Only seldom are

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DAY 1	
9:45	Open and welcome
10:00	Polyherbal phytogenic approach for profitable farm production <i>Praful Kumar, Ayurved, India</i>
10:30	Maintaining good welfare standards improves profitability <i>Victor Yamo, World Animal Protection, Kenya</i>
11:00	Optimal usage of zinc and copper in monogastrics diets <i>Arturo Pinon, Animine, France,</i>
11:30	African swine fever – how can we stop it spreading? <i>Alex Eggen, AEVC BV, The Netherlands</i>
12:00	Lunch
13:00	Nutritional challenge of new generations of hyper prolific sows and their large litters <i>Preden de Cacqueray, Raizup Nutrition Care, France</i>
13:30	The role of feed additives in reducing antibiotic resistance in pigs <i>Neil Gannon, BIOMIN, Australia</i>
14:00	Fibre is essential for piglet gut health <i>Rüdiger Kratz, Agromed Austria GmbH, Germany</i>
14:30	Positive effects of an isotonic protein drink on gut health and performance of pigs <i>Mathieu Cortyl, Tonistry International, Ireland</i>
15:00	Break
MINI SYMPOSIUM: Water – how do we know it is good enough? See website for details	
17:00	DISCUSSION AND CLOSE

DAY 2	
8:15	Open and welcome
8:30	Building a productive, efficient, and resilient herd <i>Jeru Abelilla, DSM Nutritional Products, Singapore</i>
9:00	Benefits of stimulating sow feed intake during lactation <i>Angela Riemensperger, Adisseo, Ireland</i>
9:30	Title to be confirmed <i>Yoann Perrault, Phileo-Lesaffre, Vietnam</i>
10:00	Optimizing gut performance for maximizing swine production <i>José A. Oroz, Novation, Spain</i>
10:30	Break
MINI SYMPOSIUM: Notifiable Diseases – the true costs See website for details	
12:30	Lunch
13:30	Biting and fighting—improving animal well-being by a combination of organic minerals and plant extracts <i>Andreas Lewke, Dr. Eckel Animal Nutrition (Thailand) Co Ltd, Thailand</i>
14:00	Pathobiome composition of fattening pigs <i>Viviána Molnár-Nagy, Dr. Bata Ltd, Hungary</i>
14:30	The microbiome as part of your biosecurity programme <i>Josephine Verhaeghe, CID Lines, Belgium</i>
15:00	Break
15:15	Prevention, the solution against oedema disease <i>Emili Raimon Barba Vidal, HIPRA, Spain</i>
15:45	Innovatively treated copper and zinc reducing diarrhoea in post weaning piglets <i>Torben Liermann, Provita Supplements GmbH, Germany</i>
16:15	Effect of L-selenomethionine in pigs <i>Brecht Bruneel, Orffa Additives BV, Belgium</i>
16:45	Multi-protease: more effective in amino acid digestibility in weaned piglets <i>Alex Wu, Kemin Industries (Asia), Singapore</i>
17:15	DISCUSSION AND CLOSE

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ASF virus infected wild boar products involved. This makes controlling ASF infection in pigs a problem for the industry keeping domestic pigs. Why is this such a problem?

Human involvement in controlling the spread of ASF

At ESPHM2018, the keynote lecturer in the ASF session posed the title 'ASF is a human driven disease' to the audience. Dr Klaus Depner, and also other scientists, tried to make it clear that the human factor is an extremely complicated matter.

There are many different individual aspects that play a role when small scale pig farmers, small scale meat processors and meat traders get confronted with a possible loss of income.

There are many examples reported, including a director of a zoo who bought tons of pork from (ASF infected) Vietnam because the zoo was losing money and the animals needed to be fed. This was done in an attempt to survive and they were willing to take risks to do so.

But this is the key message: in the case of controlling the spread of ASF the industry cannot take any risk. ASF virus infected pork should never end up in any of the food chains. Not in the human food chain but

also not in the feed chain for animals. If the industry cannot control the risk that some of the parties involved are willing to take, ASF will continue to spread around the globe.

The risks are clearly identified and reported in all kinds of communication materials. However, discipline to adhere to the recommendations and control of proper execution is often lacking. This is mostly fuelled by a loss of income when applying the no-ASF-virus-spreading-risk attitude. On the other hand, providing financial compensation might lead to over reporting, which is another typical human peculiarity.

In countries with low biosecurity standards and greater backyard farming or outdoor production, ASF will enter the domestic pig population first, mainly by swill feeding, and from there it will enter the wild boar or feral pig population because of unsuitable, lacking or insufficient rendering capacity. These countries will focus on ASF virus freedom in the domestic population.

In countries with high biosecurity standards, ASF might enter the wild boar population through international travellers coming from countries where risks are taken. In these, often more sophisticated countries, an increasing level of outdoor production is present. This has to stop immediately. Contact between wild boar and outdoor raised domestic pigs cannot be prevented by any (affordable) means. These countries will

focus on ASF virus freedom in the wild boar population or eradicating the wild boar population, as some states in the USA are currently investigating.

Border control of possible ASF infected materials is essential. This is not only for free countries on incoming goods, but ASF infected countries also have a global obligation to help in controlling the spread of ASF virus by checking outgoing goods.

Conclusion

Yes, ASF virus spread can be stopped. Spreading is 100% a human activity and so is its control. The industry supplying services and ingredients, the pork producers themselves and the pork processing industry need to all be convinced that they can do it together. Their work must be coordinated and they should take a no-risk approach.

When all ASF infected material is kept away from the domestic pig population, no new cases will occur.

Early diagnosis (on-site PCR test), the correct disposal of all pigs on infected farms, proper disinfection and strictly adhering to restocking procedures, frequent checking of meat processing plants and meat on the market, are just a few of the recommendations.

In a no-risk scenario, a comprehensive list is a long one! ■

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Piglet feeding management with dry lacto-initiator feed

The objective of applying creep feeding techniques (supplementing the milk of suckling piglets with feed), is to get them to start eating solid feed as soon as possible. This will produce more homogeneous piglets with higher weights that, most importantly, can better adapt to the delicate weaning phase.

by Josep Rius,
Rotecna, Spain.
www.rotecna.com

The benefits of creep feeding include:

- It favours the adaptation of the piglets to weaning, as if they have eaten feed during the suckling period, the latency period (the time between weaning and the first intake of feed) is reduced and hence, the post-weaning weight loss, making it possible to prevent loss of appetite and anorexia situations.
- It stimulates maturity and the enzymatic capacity of the piglet's digestive system, thus preventing diarrhoea and favouring the digestion of starch and protein, and adaptation to the transition from a liquid milk-based diet to a solid diet of plant origin.
- It improves piglet productivity, as it accelerates their growth and reduces heterogeneity during suckling and the first weeks after weaning.
- It reduces the mortality of suckling piglets.
- It supplements the absence of the mother's milk by partly covering the growth needs of the piglet, particularly in the case of the smallest ones.
- It improves the bodily condition of the sows at the end of the suckling period (especially in weaning periods of 28 days), increasing their fertility potential.

Management tips

The best option would be to offer feed at an early age, and for the piglets to eat it. However, it is no easy task to get them to eat. Regardless of the characteristics of each farm, there are general guidelines that can be applied:



- To start with, offer a small quantity of feed (50g/litter) and often (three times a day).
- If they finish it between each feeding session, clean the dish and give them more.
- If they do not finish it between each feeding session, remove it, clean the dish and replenish with fresh feed. Never throw fresh feed onto old feed, as it could be soiled and lose its palatability and aroma.
- Then increase the quantity of food offered as the appetite of the piglets increases.
- It is very important that the dishes are easy to transport, put in place and remove, in order to keep them clean and dry.
- Place the dishes at a distance from heat sources, corners and the sow. Whenever possible, they must not be near the place where the sow urinates and defecates, to

prevent splashing and droppings adhered to the legs of the sow from being transferred to the dish. A good location is near the sow's feeding trough, so that the piglets can imitate the behaviour of their mother at feeding time. It is also a good idea to put the dish near a drinking trough installed for the piglets.

- Offer the feed when the piglets are awake, to arouse their curiosity. It is important for them to see the operator handling the dish or throwing in the feed.
- The feed must be stored tightly closed in a cool, dry place to ensure it conserves all its nutritive and sensory properties.

Piglet water consumption in the farrowing pens

The water content for a newborn piglet is around 80% of its bodyweight. A water loss of just 10-15% can cause death due to dehydration.

At birth, a piglet consumes water through its mother's milk (which has a proportion of water of 80%). However, it is well known that not all newborn piglets have the same opportunities of suckling and consuming the necessary quantity of milk for their correct development.

In such cases, a water deficit reduces their appetite and has a direct effect on the development of diseases such as diarrhoea, cystitis, oedema and others. Furthermore, as the piglets grow and are given lacto-initiator

If access to water is improved, feed consumption increases.



feed, the water consumption stimulates the intake of dry feed and thus ensures their correct adaptation after weaning.

Many studies show that when access to water is improved, the feed intake increases and that the quantity of feed eaten by the piglet depends on the quantity of water it drinks.

How to satisfy the piglet's water needs?

● Type of drinking trough:

Bowl-type drinking troughs are much more effective than nipple-type ones, as the latter are more difficult for the piglets to find and use.

● Drinking trough location:

Place near the piglets' comfort area, and also

near the dish where the feed is placed. A water flow rate of 300ml/minute is recommended, and bowl-type drinking troughs must be placed at a height of between 5-8cm from the ground.

Factors that influence water consumption

- Room temperature.
- The sow's capacity to produce milk.
- Water temperature and quality.
- Quality of the lacto-initiators.
- Need to evaporate water from the lungs (directly related to the room temperature).
- Piglet stress level.
- Number of drinking troughs, their position and the water flow rate.
- Sanitary conditions.

Practical tips for increasing water consumption

- Facilitate access to water by providing an additional dish (such as the feed dish) filled with water from the day of birth.
- Add a palatability enhancer to the water.

Water management

- Daily cleaning (as often as required) of bowl-type drinking troughs and supplementary dishes, and checking of their correct operation.
- Checking of the water flow rate and its adjustment to the age/needs of the piglets.
- Regular water analyses.
- Consumption of 100-200ml/day/piglet is recommended.

Feed bases for piglets in transition

From a humane perspective, it is easy to understand that weaning a piglet, especially during the first few days, is an extremely stressful period in its life. In natural conditions, suckling lasts about 70 days and the transition to a solid diet is gradual.

At present, weaning is done when the piglets are between 21-28 days old, leading to an early and sudden change for the piglet, not only in terms of its diet, but also in social and environmental terms.

If we focus on the transition diet, it must always be gradual and gentle, to facilitate the difficulty in adapting and the development of the digestive and immune systems.

to slow down, and some even lose weight. For this reason it is very important to help them adapt in terms of their diet and socially, and provide them with facilities.

First of all, during the suckling phase, it is advisable to give the piglets food and water often and in small quantities. Piglets that eat feed during farrowing start to develop their enzymatic system, which helps them adapt better to a diet with compound feed once weaned, so they start to eat and grow earlier and have greater daily weight gains.

Once weaned, it is very important for the piglets to start drinking as soon as possible. For this reason, the use of drinking troughs that require no learning is recommended, such as those with water levels and no mechanisms, or where there is water left by

more advanced pigs that is accessible for the lagging ones, such as bowls. They must be installed at an appropriate height to facilitate access to the water.

As for the feeding troughs, as the farrowing animals each consume small quantities of milk on their nipple simultaneously approximately every hour, it is important to temporarily increase the feeding spaces with extra dishes, until the piglets create the hierarchy to use the feeding troughs in turns, reduce the number of feeding times per day and increase their feeding rate.

Offer soft food

Feeding troughs can also be used to prepare soft foods during the first few days, making the change from liquid to solid food more gradual. Soft food provides the piglets with both water and feed and as they eat in a group, this method also reproduces the pull effect (as with their mother). Initially the soft food must be prepared with lukewarm

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Piglets need to adapt

Changing from milk, whose energy and protein values are of great biological value, to feed in which carbohydrates are the main source of energy, is by no means an easy task. After weaning, the piglets must adapt to their new surroundings, a different group of animals and a new hierarchy.

Apart from the change in their diet, the water is different and the animal must learn to differentiate between thirst and hunger. Some studies show that up to 40% of piglets take more than 10 hours to eat again after being weaned, 10% more than 40 and some up to 100 hours.

All this means that it is quite usual for the growth rate of most recently-weaned piglets



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water, the dish must be clean and the frequency, three times a day.

The quantity must be in proportion to the number of piglets in the pen and their feeding rate. The idea is to provide it in the freshest possible condition, without it remaining in the dish for too long, but taking care not to offer too much a day, as they will become too accustomed to it and not go to the hopper with the dry feed. The proportion of water to feed must be reduced gradually, making it more and more concentrated. Its withdrawal must not coincide with a change in feed (lacto-initiator/prestarter).

During the growth phases, the animals usually consume freely available water and feed (ad libitum) to maximise food consumption and growth. Feeding with pellets (instead of flour) and water in the feeding trough (instead of dry feed) usually increases the feeding rate and total consumption of the food, with the ensuing improvement in the growth rate.

But offering moist feed requires adequate handling, as an excess or lack of feed flow due to poor adjustment, or the degradation of the feed due to remaining moist for an excessively long time may lead to problems in adapting, low consumption or an increase in waste.

The nutritional requirements of the pigs vary as they grow, and it is very important to

change the feed composition, to guarantee that the animals have a diet adapted to their needs and reduce the cost of food and the nitrogen and phosphorus content of their droppings, caused by undigested excess protein in their diet.

It should be considered that the feed transition is both nutritional and related to the ingredients it contains.

Gradual changeover

The piglets gradually adapt from metabolising proteins of animal origin to proteins of plant origin. So, the composition of the feed will also change to more and more basic ingredients with lower digestibility, changing from the highest to the lowest amino acids and from the lowest to the highest energies.

For this reason it is important to consider that changing from one feed to another must be done gradually over a period of at least three days.

The feeds must be mixed as homogeneously as possible to prevent sudden imbalances in the intestinal flora and without affecting the average daily consumption by applying a drastic change in terms of nutrition.

This is even more important after limiting the use of antimicrobial agents in the feed, such as antibiotics and zinc oxide.

It is of the utmost importance to keep in mind that in most facilities, the total capacity of the feeding trough hopper per animal is much greater than the quantity of feed the animals can eat in a day, and it may contain food for more than one week if the animals are smaller.

For this reason, telescopic tubes must be installed, allowing them to be partially filled so that the feed does not remain for too long in the hopper and lose its properties, and to guarantee that changes in feed are made correctly.

So, during the first few days it is advisable to dispense the feed they will eat in 24 hours, keep the feed opening correctly regulated and always keep the feeding troughs as clean as possible, with no remains of soiled feed. Lastly, it should be considered that any reduction in weight in a weaned piglet or a delay in weight gain after weaning is amplified negatively in the growth curve during the period from weaning to sacrifice, increasing the variability in weight among animals of the same age.

The objective of ensuring a good feed transition is to prevent a halt or a reduction in growth and the proliferation of enteric diseases. If we achieve that end, it will be much easier for us to preserve and maintain the health of the piglets and thus reduce production costs during this delicate phase in pig farming. ■



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Positive effects of an isotonic protein drink on gut health & performance

Thanks to improvements in genetic selection and sow management, an average extra 0.2 piglet per litter can be achieved year-on-year. However, it has been demonstrated in numerous experiments or surveys that an increase in litter size is usually associated with reduced weight at birth, increased pre-weaning mortality (PWM), and reduced growth post-weaning, resulting in decreased economic performance of the farm.

by **Mathieu Cortyl,**
Tonistry International, Ireland.
www.tonistry.com

Data from 260 farms and a total of 255,386 sows in Spain collected between 2009 and 2018 have shown that while the number of total born alive increased from 11.4 to 13.7 piglets per litter, this was counter balanced by an increase in PWM from 11.5 to 13.2% for the same period.

Typically, the PWM rate recorded in commercial swine herds is ranging between 10-20%. For instance, the most recent reports indicate an average piglet PWM rate of 13% in the European Union. In Thailand, a survey made on 199,918 litters from 74,088 sows indicated an average 10.8 piglets born alive per litter and a PWM of 11.2%.

In this study, piglet pre-weaning mortality was almost doubled when the number of piglets per litter increased from 11-12 to 13-16. The litters with 13-16 piglets born alive had an average piglet PWM of 20.8%.

Most of the PWM occurs in the first week of life, and it also appears from many studies that crushing is the principal cause of piglet PWM.

In a study performed on 30 Danish farms, Frandsen and Haugegaard (2017) have observed that the main reasons for mortality in the first four days were crushing (46.6%), weak born piglets (18.5%), and hunger (17.7%). However, crushing is often simply the final outcome of various factors related to the piglet, the sow and their environment.

In the first hours of life, piglets must recover from the stress of birth, adjust to environmental temperatures, and compete with their littermates. They are prone to chilling and starvation, especially because

they are born physiologically and immunologically immature. Piglets with lower vitality, especially the smaller ones, usually do not get enough nutrients and immunoglobulins from the colostrum. The reduced intake of colostrum is one of the main factors for increased PWM of piglets.

A reduced weight at birth also increases the risk for high PWM. For instance, data from two studies on four commercial farms, involving a total of 4,068 piglets from 394 litters, indicated an overall PWM of 12.2%, while the PWM for the piglets weighing less than 1.1kg at birth was 34.4%.

Depending on the number of litters per sow per year and the number of piglets born alive per litter, a reduction of only one percentage point in PWM means that an extra 0.20-0.50 piglet can be weaned per sow per year. Therefore, PWM remains a major welfare and economic concern in swine production, which needs to be properly addressed.

Weaning, the second big challenge for the piglets

For the piglets that survived through the first weeks of life, separation from the sow is probably the most traumatic event in their life. Weaning typically results in reduced feed intake, and consequently has a negative impact on gut health and performance of the weaned piglets.

Compromised gut health is generally associated with malfunction of the immune system and disease outbreaks can be observed, particularly during the first week after weaning. Additionally, transport of piglets right after weaning can exacerbate the effects of weaning stress, especially because a long transport increases the risk of dehydration.

Consequences at the intestinal level

When piglets undergo stress in their early life (right after birth, at weaning, or during transport) they may not consume enough quantities of colostrum, milk or feed. The shortage in nutrients rapidly results in an atrophy of the intestinal mucosa which can

be visible within hours of food withdrawal. It is known that stresses associated with weaning result in significant changes in the structure of the small intestine, with the most visible modifications being a reduction in villus height and an increase in crypt depth.

Hampson (1986) observed that on the first day right after weaning at 21 days of age, the villus height was reduced by 75% when compared to pre-weaning value. The villi were still 50% shorter than before weaning when measurements were performed five days after weaning.

The presence of shorter villi at weaning means that the absorptive capacity of the small intestine is reduced, which helps explain the increased predisposition of pigs to diarrhoea and growth checks in the post-weaning period.

The lack of nutrients in the intestine can also lead to interruption of the barrier functions of the digestive tract, resulting in gut atrophy, luminal starvation, bacterial translocation, and impaired immune functions. Especially, the stress associated with early weaning can alter the immune and physiology responses to infectious pathogen challenges.

Additionally, it has been shown that the quality of the intestine is related to birth weight. Indeed, the height of the intestinal mucosa is reduced for piglets which are lighter at birth.

Feeding the enterocytes to help the piglet

To address these different challenges and maintain a good quality of the intestine, a focused approach, called micro-enteral nutrition, consists of feeding the intestinal cells (the so-called enterocytes) and help them to do the best job they can of absorbing nutrients.

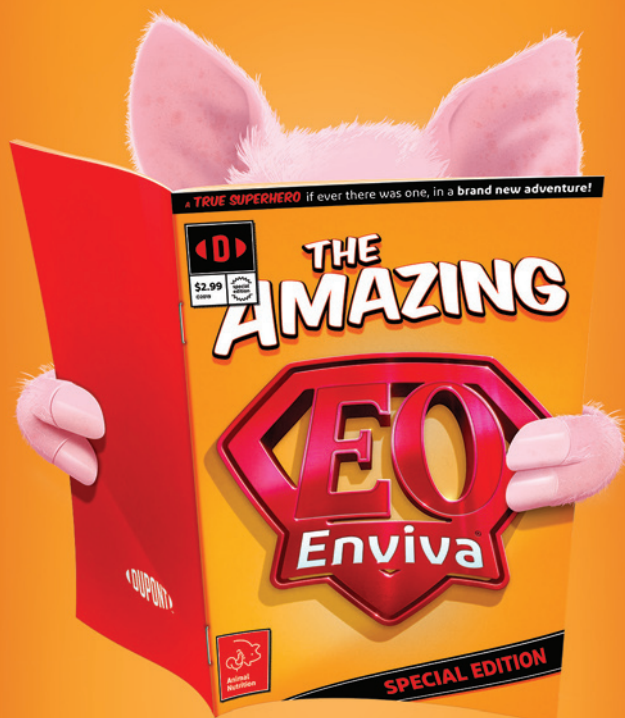
Micro-enteral nutrition consists of supplying adequate amounts of water, electrolytes, and easily absorbed nutrients (glucose, amino acids, and small peptides) directly to the gastrointestinal tract.

Those simple nutrients are directly absorbed and utilised by the intestinal absorptive cells, or enterocytes.

Continued on page 15

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Continued from page 13

The application of the concept of micro-ental nutrition to swine has resulted in the development of Tonisity Px – an isotonic protein drink, especially useful for piglets.

This solution, obtained by mixing a powder with fresh water, is very attractive to swine and consumed in significant volumes, even by piglets less than one week old.

To date, more than 100 scientific studies and field trials have demonstrated that the isotonic protein drink, when given during the first week of life, has a significant and positive impact on various performance parameters of pigs.

Meta-analysis of 40 trials

A recent meta-analysis, performed on 40 different trials and involving a total of 74,425 piglets, showed a highly significant reduction in pre-weaning mortality which allowed weaning, on average, an extra 33 pigs per each 1,000 pigs born (see Table 1).

This reduction in mortality is most likely due to the fact that the protein and amino acid profile of this isotonic protein drink delivers key energy-producing substrates to the enterocytes, leading to a positive impact on intestinal morphology.

Indeed, histopathology analysis revealed that piglets receiving the drink from day 2-8 of age had significantly greater villus height, villus density, and crypt density that persisted until at least 28 days of age, regardless of what creep feed they were given.

Those pigs also tended to have superior intestinal mucosal thickness.

It was also demonstrated that the administration of the isotonic protein solution early in life stimulated beneficial bacteria such as Lactobacilli, while reducing potential pathogens and reducing the number of E. coli-positive pigs.

Since most of the intestinal pathology around weaning is linked to E. coli,

Table 1. Positive impact of an isotonic protein drink for swine (Tonisity Px) on pre-weaning mortality. Meta-analysis of 40 trials involving 5,404 litters and 74,425 piglets in 17 different countries

Number of piglets	74,425
Pre-weaning mortality control group (%)	14.5
Pre-weaning mortality isotonic protein drink (%)	11.2
Difference (%)	-3.3
% Difference	-22.8
Extra pigs weaned per 1,000 born	33
P value	<0.0001

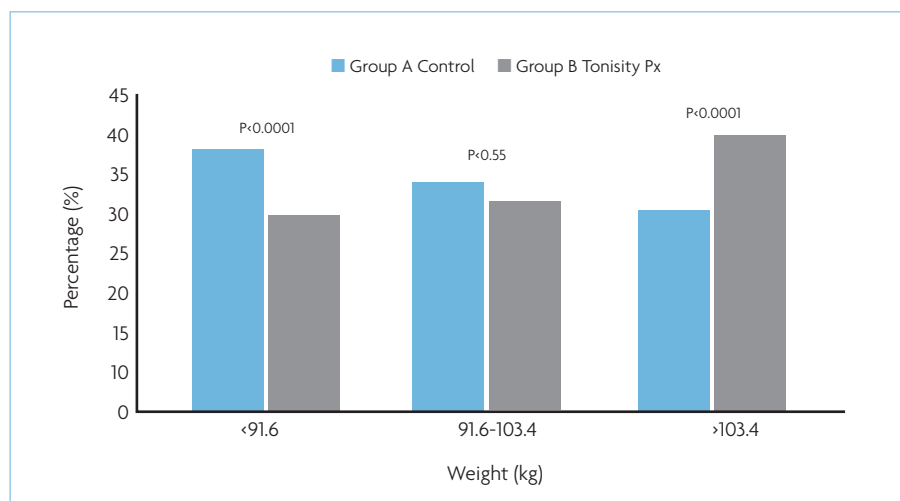


Fig. 1. Comparison of pig finishing weight.

administration of this solution can provide an alternative to antimicrobials.

The isotonic protein drink for swine can also be used at weaning to facilitate the transition and feed intake, by mixing it with feed, to obtain a gruel.

Feeding this gruel in the peri-weaning period has a positive impact on intake and weight gain, especially for medium-weight and light-weight pigs.

In a recent study involving 3,862 piglets, litters were allocated to one of two groups, control (Group A: 1,969 piglets) or supplementation with an isotonic protein drink (Group B: 1,893 piglets).

Group A litters received only pelleted creep feed from birth to weaning. Group B litters received the isotonic protein solution from days 2-8 of age, then three days before weaning, and finally for the first three days post-weaning, mixed with feed. All piglets were identified at day two with individual ear tags, and individual weights were recorded at birth, weaning, end of nursery and at 168 days of life.

The pre-weaning mortality was reduced from 14.2% in Group A to 10.9% in Group B, a 22.8% reduction consistent with results observed in multiple previous studies.

The mean weaning weight was not significantly different between groups.

At the end of nursery, Group B pigs were 0.41kg (1.7%) heavier than Group A pigs (P = 0.10), and at 168 days of age, pigs from Group B were 3.08kg (3.2%) heavier than Control pigs. This difference was highly significant at P = 0.002.

A further analysis, evaluating how low (below 1.0kg), medium (1.0-1.6kg) and high (above 1.6kg) birthweight pigs, responded to the supplementation with the isotonic protein drink, demonstrated that all classes of pigs benefited from the treatment.

What is interesting is that this study does not concur with the commonly accepted theory that small pigs rarely catch up.

The results here show that they do. Group B also had less pigs finishing at <91.6kg, and more pigs finishing at >103.4kg (Fig. 1).

This confirms that all piglets, not just small and lightweight at birth, benefit from the specific nutritional support provided by the isotonic protein drink.

An economical analysis performed in this trial also demonstrated how the return on investment (ROI) when using a nutritional supplement in the farrowing house should not be gauged on the outcomes purely achieved at weaning, or by the performance improvements seen in small piglets.

In this case, the ROI was above 3:1 when considering pre-weaning mortality reduction only, and 5.9:1 when both reduced mortality and increased final weights were taken into account.

Conclusion

One of the challenges faced by the swine industry is the rise in pre-weaning mortality, which is mostly due to the increase in litter size leading to smaller piglets and less availability of colostrum.

By applying the concept of micro-ental nutrition to pigs, an isotonic protein drink was developed. This drink, Tonisity Px, delivers key energy-producing substrates to the enterocytes, leading to a positive impact on intestinal morphology and intestinal microbiota.

Another benefit of this novel approach is the possibility to stimulate feed intake around weaning, especially in smaller piglets, by using a gruel obtained by mixing the solution with feed.

Extensive research has shown the ability of the isotonic solution to stimulate the intestine in that early life window of opportunity and to provide the potential for reduced pre-weaning mortality and accelerated growth in the post-weaning and fattening stages.

References are available from the author on request



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To control the humidity, for instance in very dry climates, VDL Agrotech offers nozzle cooling systems. They also supply complete heating systems fuelled on gas, oil or

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lighting in their barn. After all, a good light climate improves growth performance and results in better feed conversion.

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● **Increased productivity:** The climate well-being inevitably results in an increase in productivity.

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Strategies to improve the welfare of hyperprolific sows and their piglets

Animal welfare is an essential element of modern animal production. First and foremost, animal welfare is grounded on ethical concerns that derive from the fact that animals are sentient beings, for example, able to suffer and experience emotions.

by **Xavier Manteca Vilanova, Professor of Animal Behaviour and Animal Welfare, School of Veterinary Science, Barcelona, Spain, and Josep Gasà Gasó, Professor of Animal Science (pig production and nutrition), University Autonomous of Barcelona, Spain.**
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Societal concern over the welfare of farm animals has increased as of late and a growing number of citizens in many countries now demand that farm animals are reared, transported and slaughtered as humanely as possible. For example, according to a survey done in 2015 and involving more than 27,000 citizens from 28 Member States of the EU, 94% of them think that it is important to protect the welfare of farm animals.

Interestingly, this percentage ranged from 86-99%, showing that even in the EU countries that are supposedly less concerned about the welfare of animals, a clear majority of citizens believe that it should be protected.

Because of public interest in the welfare of farm animals, the European Commission has issued several directives that lay down minimum standards for the protection of farm animals, including pigs. Although EU legislation on pig welfare does not specifically address the welfare of hyperprolific sows and their piglets, it does include several elements that are relevant.

One of these elements is weaning age: according to the EU directive, piglets cannot be weaned before 28 days of age unless there is a risk of health problems for sow or piglets. Piglets can, however, be weaned as young as 21 days if they are weaned into adequate housing facilities.

Improving animal welfare may have additional benefits. As many welfare problems have a detrimental effect on production, improving the welfare of farm animals very often has positive effects on performance. Also, improving animal welfare is one of the strategies that may contribute to reduce the use of antimicrobials in farm animals.

An in-depth discussion of the concept of animal welfare is well beyond the scope of this article. However, it is important to mention that animal welfare encompasses not only the physical health of the animals (the absence of diseases and injuries) but also their behaviour and emotions.

Five Freedoms

For many years, the Five Freedoms have provided a useful framework to identify the welfare problems of farm animals. These freedoms, which represent ideal states rather than actual standards for animal welfare are:

- Freedom from thirst, hunger and malnutrition.
- Freedom from thermal and physical discomfort.
- Freedom from pain, injury and disease.
- Freedom to express most patterns of normal behaviour.
- Freedom from fear and distress.

More recently, the Five Freedoms have been criticised on the grounds that they can be misunderstood as aiming at eliminating all negative experiences (which is not realistic or even desirable) but also because they fail to capture our current understanding of the biological processes underlying animal welfare.

As an alternative to the Five Freedoms, the so-called Five Domains Model for assessing animal welfare was developed to address these problems.

The model incorporates four physical domains of 'nutrition', 'environment', 'health', 'behaviour', and a fifth 'mental' domain. Each physical domain has an impact on the affective state of the animal (on the fifth domain), and the net outcome in the mental domain

Welfare problems of piglets born to hyperprolific sows	
Problem	Cause
• Increased risk of hypothermia and starvation, potentially causing neonatal mortality	Low bodyweight at birth
• Health-related problems and increased stress reactivity	
• Increased risk of hypoxia	Large litter size
• Increased competition at the udder	
• Disruption of the mother-offspring bond	Cross-fostering, use of nurse sows and artificial rearing
Welfare problems of hyperprolific sows	
Problem	Cause
• (Possible) reduced heat	Large litter size
• Pain and fatigue at farrowing tolerance	
• Disruption of the mother-offspring bond	Cross-fostering, use of nurse sows and artificial rearing
• Longer crating period	Use of nurse sows
• Udder engorgement	

Table 1. Main welfare problems caused or exacerbated by using hyperprolific sows

resulting from the combination of the four physical domains represents the animals' overall welfare state.

There is a vast amount of information on the welfare of pigs, but the specific welfare problems of hyperprolific sows and their piglets have received much less attention. A sow is considered hyperprolific when she farrows more piglets than the number of functional teats she has.

One of the most obvious welfare problems caused by hyperprolific sows is an increase in neonatal mortality. Additionally, the high energy demands of hyperprolific sows during lactation may result in a loss of body condition that, in turn, increases the risk of skin ulcers. Undoubtedly, these are two important welfare issues.

However, as illustrated by both the Five Freedoms and the Five Domains, an assessment of the welfare risks

caused by using hyperprolific sows must include other problems that are not directly related to health but can have a negative effect on the affective state or the behaviour of the animals.

Behavioural restriction caused by a prolonged crating period of nurse sows and disruption of the mother-offspring bond caused by artificial rearing and other husbandry practices are examples of these problems.

The aim of this article is not to review the welfare problems of sows and piglets in general, but to describe the welfare problems that are either caused or exacerbated by using hyperprolific sows, as well as to discuss possible strategies to mitigate them.

The main welfare problems of hyperprolific sows and their piglets that are addressed in this article are summarised in Table 1.

WELFARE PROBLEMS OF PIGLETS BORN TO HYPERPROLIFIC SOWS

Increased neonatal mortality and stillbirth prevalence

Neonatal mortality is a major welfare problem. The amount of suffering experienced by piglets that end up dying shortly after birth is likely to vary depending on the cause of death. However, at least some causes of neonatal mortality such as injuries (caused by crushing by the sow, for example) and starvation result in moderate to severe suffering.

Although neonatal mortality can be high in very small litters, there is a positive correlation between litter size and neonatal mortality. This correlation is due mainly to the fact that large litter size is associated with lower birth weight. Piglets born to hyperprolific sows have an average bodyweight at birth lower than that of piglets born to conventional sows.

The effects of low bodyweight at birth on neonatal mortality are largely explained by the fact that small piglets have a poorer thermoregulatory capability than larger piglets, and hypothermia is known to play a key role in neonatal mortality. Although several studies indicate that crushing by the sow is the ultimate cause of piglet death, crushing often results from the effects of perinatal hypothermia and starvation.

Starvation is often secondary to, and interacts with, the effects of perinatal hypothermia. Hypothermic and undernourished piglets are more lethargic, less competitive at the udder and less likely to achieve an adequate intake of colostrum. Furthermore, they spend more time close to the sow and are more likely to be crushed.

Increased litter size is positively correlated with stillbirth prevalence and with the risk of hypoxia, partly due to prolonged farrowings. Although it has been suggested that stillbirth is unlikely to be associated with suffering, sub-lethal hypoxia reduces piglet viability and increases the risk of hypothermia and starvation.

Increased competition at the udder

Large litter size results in a more intense competition between piglets for teat access and this in turn may lead to an increased risk of hypothermia and starvation.

Increased litter size is associated with more facial lesions in piglets.

Facial lesions are a direct welfare problem and may result in more producers resorting to tooth reduction, which is known to be painful.

Effects of low bodyweight at birth on health, stress physiology and behaviour

Beyond its effects on neonatal mortality, low bodyweight at birth may have detrimental effects on the welfare of piglets that survive. These effects include health-related problems and an increased reactivity to stressors.

Additionally, piglets with low bodyweight show behavioural differences when compared with larger piglets and some of these differences may be relevant from an animal welfare standpoint.

Large litter size is positively correlated with the percentage of animals with knee abrasions, a direct welfare problem with an increase in the risk of infection. Low bodyweight at birth and increased litter size are also associated with a higher prevalence of splayleg.

Pigs that have a low bodyweight at birth tend to show an increased reactivity to stressors (as measured through the activity of the hypothalamic-pituitary-adrenal axis) later in life compared with pigs that have a higher birth weight. This finding must be interpreted with caution, as a higher activity of the HPA is not necessarily linked to a negative affective state.

However, an increased reactivity of the HPA axis could theoretically contribute to some of the negative effects that stressors have on health, including the effects of weaning stress on intestinal health.

Small piglets show less tendency to play than large piglets. Again, these results must be interpreted cautiously when drawing conclusions on the welfare of piglets born to hyperprolific sows. However, play is not only an indicator of good welfare because it is reduced or absent when animals are in a poor welfare state, but also because play behaviour is rewarding and hence may contribute to better welfare.

Disruption of the mother-offspring bond

Disruption of the mother-offspring bond can be a consequence of cross-fostering, use of nurse sows and artificial rearing. Cross-fostering is a

rather widespread practice in pig production, regardless of whether sows are hyperprolific. However, it may be more common on farms with hyperprolific sows. Nurse sows and artificial rearing are used on farms with hyperprolific sows.

Piglets recognise maternal odours and show a preference for their dam compared to other sows by 12 hours of age. By 24 hours of age, piglets can recognise their home pen. Therefore, piglets older than 12-24 hours will experience separation distress when taken away from their mother.

The possible effects of artificial rearing on the welfare of piglets can be best understood by looking at the

effects of early weaning. A discussion of the effects of weaning on piglet welfare is well beyond the scope of this article. However, it has been repeatedly shown that weaning is stressful, and the amount of stress increases as weaning age decreases.

Further, the stress of early weaning may have long-lasting effects on piglet health. Admittedly, artificial rearing is not equivalent to early weaning, as one of the main stressors of weaning, for example, transition from milk to solid feed, does not occur with artificial rearing.

However, separation from the mother, which is another major stressor encountered by piglets at weaning, does occur.

WELFARE DEMANDS OF HYPERPROLIFIC SOWS

Increased energy demands during pregnancy due to large litter size may reduce heat tolerance

Increased litter size leads to an increase in metabolic loading during late pregnancy, and this might in turn increase the risk of sows suffering from heat stress. Heat stress is an important welfare issue in several countries and it has significant detrimental effects on performance.

To the best of our knowledge there is no available information on the possible differences between hyperprolific and conventional sows in their response to high temperatures. However, it is accepted that genetic selection for production traits leads to reduced heat stress tolerance in farm animals.

Pain and fatigue caused by prolonged farrowing

Although pain caused by parturition in animals has received little attention, there is increasing evidence that even normal parturition may be painful and it has been suggested that pain caused by parturition is a welfare problem in several species, including pigs.

Furthermore, pain caused by farrowing may have important effects on the behaviour of the sow both at parturition and shortly after and painful farrowings are associated with increased offspring mortality in pigs.

As the average bodyweight at birth of piglets born to hyperprolific sows is smaller than that of piglets born to conventional sows, it could be argued that pain caused by the expulsion of fetuses will be less pronounced in hyperprolific sows than in conventional sows. However,

increased litter size results in prolonged farrowings which could be more painful.

This latter hypothesis is somehow supported by the findings of Mainau et al. (2010), who developed an 'ease of farrowing score' based on the total duration of farrowing, the birth interval, the total time standing or sitting, the number of position changes during the day before and the day of farrowing, the sow posture at birth, the viability of the piglets and their position at birth (head or back born). A common factor analysis model yielded three main factors and 'farrowing duration' was the factor explaining the largest proportion of variance in the 'ease of farrowing score'.

Udder lesions caused by large litter size

As mentioned before, increased litter size leads to more intense competition at the udder and this is likely to cause udder lesions in the sow. This problem may be particularly important in nurse sows and a cross-sectional study done with more than 50 sow herds in Denmark showed that nurse sows had more udder lesions than conventional sows.

Skin lesions

Shoulder sores may develop during the first and second week of lactation and are presumed to be painful. Demands for milk synthesis increase with litter size and, if sows cannot maintain a high feed and water intake, they will start to lose body condition and may be at greater risk of developing injuries such as shoulder sores.

Well-managed hyperprolific sows
Continued on page 20

Continued from page 19
wean heavier litters than conventional sows and the prevalence of shoulder sores was positively correlated with litter weight at weaning in an epidemiological study carried out on Danish farms. Besides the increased energy demands of raising a large litter, the positive correlation between litter size at weaning and the prevalence of shoulder sores can also be due to sows spending more time in lateral recumbency when suckling large and heavier litters.

Udder engorgement in sows that transition to nurse sows

When a sow is transitioning to become a nurse sow, she does not lactate for several hours and this may cause udder engorgement and discomfort.

Although pain and discomfort caused by udder engorgement has received little attention in sows, it has been suggested that cessation of milking at dry-off causes discomfort in dairy cows and it could be argued that something similar might happen in sows.

Disruption of the mother-offspring bond

Sows can distinguish their own piglets from foreign ones using odour cues at seven days of age. It is very likely, therefore, that separation of the sow from her litter causes distress.

Prolonged crating

Farrowing crates are widely used in the EU and elsewhere. However, there is scientific evidence that farrowing crates cause welfare problems as they fail to meet the behavioural needs of the sow. Some nurse sows are kept in farrowing crates for longer periods than conventional sows rearing their own litters.

Welfare problems caused by farrowing crates are likely to be particularly pronounced immediately before farrowing when the sow is highly motivated to build a nest and the space restriction imposed by the crate causes frustration and stress. However, it has been reported that prolonged crating may also cause chronic stress.

smooth transition at weaning and may contribute to reduce bodyweight variability after weaning.

Creep-feed is especially beneficial for large litters and for piglets that have been suckled for more than 21 days. Piglets with higher creep-feed intake get acquainted with a solid diet before weaning and, as a result, start to consume solid feed earlier after weaning and hence suffer less stress.

Genetic selection

There is clear evidence that genetic selection may reduce neonatal mortality either by selection for survival or by selection for related traits.

Husbandry-related strategies

Husbandry-related strategies (including an adequate supervision at farrowing) are extremely important to mitigate the welfare problems of hyperprolific sows and their piglets.

In practice, stockmanship requirements are higher on farms with hyperprolific sows than on farms with conventional sows to ensure both welfare and performance.

As mentioned, farrowing is likely to be painful and prolonged farrowings may pose a greater challenge than shorter ones. It has been shown that administering an analgesic to farrowing sows has positive effects on piglet performance and this may be even more important in hyperprolific sows.

There is some controversy in the literature on the optimal level of supervision during farrowing. Although inadequate or excessive intervention may have a negative effect on both welfare and performance, a reasonable degree of intervention by skilled stockpeople is likely to be beneficial.

For example, Andersen et al. (2007), observed that helping piglets to obtain colostrum by placing them at the udder and assisting them finding a teat reduced neonatal mortality. Early intake of colostrum is essential for all piglets and this is likely to be even more critical for small piglets. According to Furniss et al. (1988), early colostrum intake may be more critical for survival than immediate warmth, perhaps because early colostrum intake serves a triple purpose; providing maternally derived immunity and energy and assisting thermoregulation.

In fact, colostrum is a source of very digestible nutrients and various forms of bioactive compounds such as immunoglobulins, hydrolytic

enzymes, hormones, and growth factors. In commercial conditions, the management of piglets during lactation by using cross-fostering, nurse sows and/or milk formula supplementation is a key issue to guarantee their welfare and productivity. Even though the final protocol will depend on many circumstances, including the health status of the herd and the facilities, our advice for a high health status, well-managed hyperprolific farm would include:

- Reduce cross-fostering to a minimum, keeping as many piglets as possible with their dams.
- Implement a regular nursing programme when there is a moderate surplus of piglets (1.0-1.5 surplus piglets per farrowed sow).
- Use a system of milk formula supplementation when there is a higher surplus of piglets (more than 2.0 surplus piglets per farrowed sow).

A combination of the last two approaches may also be successful.

Reducing fear of people in sows not only improves their welfare but also contributes to reducing neonatal mortality.

Conclusions

Hyperprolific sows and their piglets suffer several important welfare problems, which must be addressed using a combination of nutritional and husbandry strategies, as well as through genetic selection.

Good husbandry is of paramount importance to mitigate welfare problems of hyperprolific sows and their piglets, and therefore the decision of whether hyperprolific sows can be used on a given farm must consider the quality of stockmanship.

A major welfare problem of hyperprolific sows and their piglets is the disruption of the mother-offspring bond that results from cross-fostering, use of nurse sows and artificial rearing. Although artificial rearing is not equivalent to very early weaning, both practices share a fundamental feature, early separation of piglets from their mother. Whether artificial rearing is an acceptable practice from an animal welfare standpoint is open to debate. Furthermore, weaning earlier than 21 days is not allowed in the EU on a routine basis and artificial rearing implies that piglets are separated from their mother at a younger age. Therefore, the legal implications of artificial rearing in the EU deserve further thought. ■

References are available from the authors on request

STRATEGIES TO REDUCE WELFARE PROBLEMS

Nutritional strategies

In general, nutritional strategies do not seem to be particularly useful to improve the welfare of pregnant or lactating hyperprolific sows. During pregnancy and lactation, daily intake does not satisfy the nutritional requirements of the sow, which undergoes a process of net tissue accretion (during most of pregnancy) or mobilisation (during late gestation and during lactation) which plays an important role in maintaining nutritional equilibrium.

Having said this, however, it is worth mentioning that nutritional strategies may contribute to improving sow welfare around farrowing. Indeed, the time around farrowing is very challenging for the sow. As the gestation and lactation diets are very different from each other, feeding a special diet from a few days before through a few days after farrowing may help the sow to transition from pregnancy to lactation diets and hence reduce stress and improve welfare.

Nutrition can have a significant effect on the welfare of piglets born to hyperprolific sows and there are two aspects that are particularly relevant: oral administration of colostrum and creep-feeding. Oral administration of colostrum to weak

piglets is a common husbandry practice on many farms and is likely to be particularly useful when dealing with hyperprolific sows.

Giving 10-15ml of colostrum once or twice during the first 24 hours of life should be enough to ensure a successful suckling period.

Furthermore, the benefits of combining maternal lactation with a milk formula during the suckling period was already reported by Azain et al. (1996), who found that supplemental milk replacer resulted in a significant increase in weaning weight and total litter weight. Milk replacer also reduced the difference in piglet weaning weight which is commonly found between primiparous and multiparous sows.

Pustal et al. (2015), found similarly positive results with piglets born to hyperprolific sows and reported a lower prevalence of treated facial lesions in supplemented piglets, probably due to a reduction in piglet competition at the udder.

Creep-feeding is a common husbandry practice on many farms to nutritionally support suckling piglets. The creep feed is a highly palatable and easily digestible diet that is offered to nursing piglets after the first week or 10 days of lactation. The main objective of creep-feeding is to facilitate a

This article appears in the book *Nutrition of Hyperprolific Sows* from Novus International, Inc. A free digital download of the book is available at <http://www2.novusint.com/sowbook>

Finland's largest piglet operation profitable despite forgoing docking!

Successful husbandry of long-tailed pigs is always a special challenge. This is made clear by numerous studies, for instance based on the frequency of tail injuries. However, Timo Heikkilä has demonstrated that there is another way. He is Finland's largest piglet producer and also a customer and partner of many years to Lower Saxon farming house supplier WEDA Dammann & Westerkamp.

by The Technical Team,
WEDA Dammann & Westerkamp GmbH,
Lutten, Germany.
www.weda.de

The Finn has developed a special concept for keeping pigs with non-docked tails. His practice is successful to the point that his farm was recently selected by the European Commission as an exemplary husbandry operation for long-tailed pigs.

Timo Heikkilä's farm with 3,500 sows, 6,000 piglets (between 7-30kg) on the flat deck and 1,200 gilts (between 30-140kg) is located in Rusko in the south-west of Finland, 200km west of Helsinki.

"Here in Finland, docking tails has been banned since November 2002. We started keeping long-tailed pigs in January 2003," Heikkilä reported. And his results are proof that his approach is right: merely 2% of animals arrive at the slaughterhouse with damaged tails.

Eliminating stressors

"The main cause of tail-biting is stress," emphasised Heikkilä. According to him, stress is caused by a number of factors: for instance, preventing animals from feeding at the same time.

Also, the environmental control is often not adjusted properly, leading to poor ventilation or draughts. "Another factor is a lack of material for activity or playing," he added. "Simply by eliminating these stress factors, much can be achieved," Heikkilä confirmed. Heikkilä therefore encourages pig farmers intending to switch to keeping long-tailed pigs.

"To reduce stress for animals, I recommend



Timo Heikkilä's farm with 3,500 sows, 6,000 piglets (between 7-30kg) on the flat deck and 1,200 gilts (between 30-140kg) is located in Rusko in the south-west of Finland, 200km west of Helsinki.

installing long troughs, meaning a 1:1 feeding place ratio. Also, animals are best supplied with a liquid feeding system." Timo Heikkilä has been working successfully with WEDA liquid feeding for years. "This ensures my animals receive high-barley feed. I am rather skeptical towards wheat, since it contains less crude fibre," he reported.

Timo Heikkilä exclusively feeds pelletised purchased compound feed. Pelletisation prevents contamination of his animal stock with salmonella via the feed. He also uses acids for feeding.

Not least, Heikkilä considers solid hygiene to be essential for liquid feeding: "Our system is equipped with the latest WEDA hygiene technology. It includes regular cleaning of tanks with UV light, rinsing the entire system with lye and cleaning the outlet pipes in the house." This way, Heikkilä does not give germs and bacteria any chance to develop.

A favourable house climate

Another pillar of his concept is a favourable house climate. To achieve this, harmful gas pollution must be reduced. In Rusko, this is

managed in three ways: by lowering ammonia levels, by channelling supply air directly to the pens and through a sealed-floor portion of two thirds. Especially the latter keeps down manure surfaces in the compartments.

Extra portion of straw to stimulate play instinct

For Timo Heikkilä, providing a sufficient amount of material for activity and play is vital:

"We rely on straw, quite puristically – but it must be of good quality," he stated. "As soon as we realise the animals start biting, we toss an extra quantity of straw into the pen. This distracts them and immediately motivates them to play."

Timo Heikkilä sees the installation of long troughs to avoid feeding competition among the animals as the first step in a successful transition to keeping long-tailed pigs.

"In my experience, it is key to plan all measures ahead instead of only reacting once problems are already present," Timo Heikkilä summarised, taking stock of his successful husbandry concept. ■

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THE FUTURE OF PORK PRODUCTION

With China losing 50% of their production, global pork production faces a completely new situation. Hopefully China will control the ASF epidemic and successfully restock the empty barns. But if not, and only a part (maybe 10%) of the culled pigs are replaced and when domestic demand for pork declines by 15%, it still means that the other 25% needs to be imported. Is that feasible?

The bigger picture

Generally accepted forecasts are that the human population will continue to increase and that the agricultural output needs to rise continuously to satisfy the growing (urban-) population.

Therefore the forecasts always predict a steady growth (see Fig. 1). But the reality in 2020 is that the chart shown is now outdated. In 2019 pork production declined with an estimated 15-20% on annual basis and not the predicted increase of 1%. Animal protein production is normally in balance with demand.

Overproduction leads to lower (ex-farm) prices, higher demand to higher prices. When the balance is disrupted the producers react and within a reasonable time the balance is restored again. The question now is if the world can handle a disrupted balance of this magnitude.

50% less pork in China means 25% less pork in the world. Can the rest of the world compensate for this loss in production and restore the balance? Let's have a look at China itself and to the other pork producing countries and continents.

China

China is a country of the very large and the very small. China has the lowest ratio between arable land and water per capita but China also has the highest number of pigs and the highest number of cities with more than eight million inhabitants. This discrepancy comes with a cost. Environmental pollution caused by pig farms is a major issue in China.

Many farms were forced to close down because of non-compliance with new environmental rules and regulations. Water consumption needed for pork production is in fierce competition with water for a growing urban population.

Water deviation projects using canals, more than 3,000km in length, for transporting water from the South to urban areas in the North, are not there to raise more pigs.

A large part of pork production is still in the hands of small farmers having little financial resources to move the industry forward. In short, ASF provides the opportunity for the Chinese to restructure their pork producing industry. Most likely the number of backyard farmers will be reduced and the total pork production will be aimed at a level that the country can sustain.

The remainder of the pork needed to fulfill the urban demand will be imported. Countries are lining up to supply China and China can choose their friends. How much they will import is difficult to predict but could easily be 25% of their pre ASF required needs. To counteract, the government advised their citizens to eat more poultry and ducks. The question is whether the world outside of China can produce the extra 25% that China might need? Time for a quick look at what the rest of the world can do.

Rest of Asia

As it looks now, China can expect little support from the neighbouring Asian countries. ASF continues to spread and kill pigs on a large scale, with Vietnam as a dramatic example. It looks like all countries will get infected, slowly and one by one.

The recent examples of ASF virus-infected pork seized at airports or harbours in the Philippines, Australia and Taiwan shows how difficult it is to make the general public aware of the dangers connected to processing and transporting ASF-infected pork. It is a ticking timebomb for the ASF-free countries in Asia.

The Americas

20% of the global pork production takes place in North and South America. North America has a good future to supply pork to China when they invest in the capacity to handle the extra number of pigs produced. In 2019 the USA produced roughly 6% more slaughter pigs.

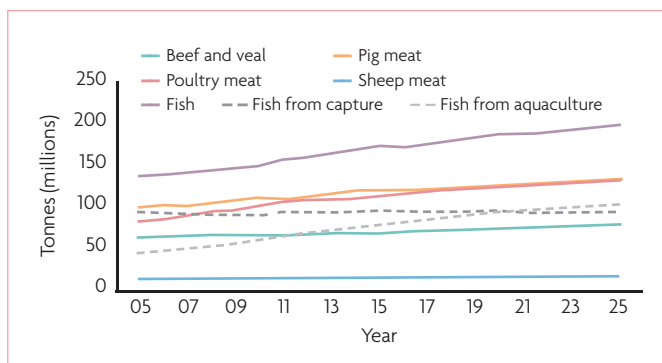


Fig. 1. The original forecast (OECD-FAO) predicted steady growth, but in 2019 the drop in global pork production was actually in the range of 15-20%.

This led to lower ex-farm prices because the meat processors did not have the capacity to slaughter these extra pigs. Farmers should consider themselves happy to have their pigs accepted by a slaughterhouse.

Of course after processing these extra pigs, the meat was sold by the meatpackers for higher prices to China. This will not stimulate pork producers to do the investments that are needed to help China. The 6% more pigs (for the USA 6 million pigs) sounds nice but when China needs to import 125 million pigs (25% of pre-ASF 500 million pigs), this six million pigs is only 4% of what China needs.

So the Americas can help China but that needs a concerted effort which is always difficult to get organised when a free market exists. Only real integrated companies owning both the pigs on farm and the processing plants can make a real difference.

Africa

The home continent of ASF stands little chance to help the world with extra pork production. It would already be great if the local demand for pork could be met with local production. The infrastructure needed for large scale pork production is simply missing in most countries. It will take an enormous effort to get the infrastructure in place and several generations to get it completed, although there are African countries that are making good progress in pork production.

Europe

In Europe all the variables are present. The Eastern part of Europe can be 'the' source of pork when the

infrastructure for pork production is up to modern standards. Romania, Bulgaria, Poland, and the Baltic States, are just a few countries with a great pork producing future. Reliable production figures from Russia are difficult to get but from a major pork importer, Russia came close to self-sufficiency before ASF struck. This is an example of what the potential is in the region. They all have a history in pork production, a strong domestic (pork-) demand and plenty of arable land, water and labour. You do not need more, it is just a matter of getting organised.

Western Europe is, of course, a different matter.

Undoubtedly the expertise to get large numbers of piglets per sow per year to the processing plants is there. Despite high production costs, pig farming can still be profitable. But to help China produce the amount of pork they need, it is very questionable whether Western Europe will be of any substantial use.

Although Spain and Germany both provide 18-20% of the current China imports, environmental problems, animal welfare issues and other consumer demands make life difficult for pork producers in Western Europe. Reduction in pork numbers (-1.8% for 2018-2019 in the EU) is more likely to happen than an increase in production.

The quote of a pig farmer in a Dutch newspaper tells it all: "Why should I produce pigs for China with feed from South America?"

The trend in Western Europe is towards regionalisation and sustainability.

Summarising the future? A global shortage of pork with higher prices providing more money for the industry but nobody can tell for how long!

A health menace at our frontiers

This French review (*Bull. des G.T.V. 91 61-66*) looks at the risk to France of African swine fever (La Peste Porcine Africaine), which is described as a significant health and economic threat at the borders of France. The virus is actively circulating in the wild boar population in several European countries.

The authors stress that a high vigilance must be maintained, especially for passive transfer by humans via shoes and boots or by them taking contaminated pork or wild boar meat into a pig farm.

They stress not to feed pigs with leftovers from human meals and be absolutely sure that any animals introduced to the farm are free of African swine fever.

The authors strongly recommend 72 hours of pig freedom for anyone returning from an African swine fever area with respect to both pigs and wild boar.

They also highlight the importance of a quick reporting and response by the authorities to suspect cases to minimise lateral spread of the virus.

This review also describes the history of African swine fever in Europe since 2007 and the main clinical signs and post mortem lesions as well as preventive actions.

Welfare – farmer and consumer preferences

This German survey (*J. of Agric. Econ. 70 293-315*) assessed farmers' willingness to accept (WTA) higher animal welfare standards and consumers' willingness to pay (WTP) for enhanced standards.

Some 140 farmers and 554 consumers participated in the survey.

It was found that estimates for consumer WTP are significantly positive for higher farm animal welfare standards and they particularly favoured more floor area per pig, more bedding material, less surgical interventions, and shorter transportation

times. Significantly, producers only supported the first two of these four consumer choices.

Male consumers found price to be more important than brand, origin or taste and were less likely to buy high welfare pork. Consumers who never buy organic pork are less likely to purchase high welfare pork.

There is an increasing market divergence between supply and demand for high welfare pork.

The market for pork that complies with a higher farm animal welfare programme with standards barely above the legal minimum is 44.6%.

Risk factors for pre-slaughter losses

This Brazilian study (*Meat Sci. 155 61-68*) looked at the incidence of non-ambulatory non-injured (NANI), non-ambulatory injured (NAI), and dead pigs on arrival, at three Brazilian slaughterhouses. Some 37,962 pigs were evaluated to identify risk factors linked to them.

Total pre-slaughter losses were 1.18% in which NANI and NAI contributed the most with 0.39 and 0.37% respectively.

A positive correlation was seen between on farm ramps with a steeper slope than 20 degrees and incidences of NAI, NANI and dead pigs.

In addition, farm size, pigs per pen, enthalpy at loading, transportation time, truck loading order, muscle thickness and carcase weight were identified as risk factors for pre-slaughtering losses.

Loading procedures influenced the occurrence of limb fractures and bruises.

Attracting piglets to creep areas in farrowing pens

This Australian work (*Animal 13 1696-1703*) looked at loose farrowing pens which have been considered as an option to enhance sow welfare. However, they have a major concern – a higher piglet pre-weaning mortality, especially due to crushing.

The study involved 108 sows and their piglets in sow welfare and piglet protection pens in commercial farm.

In situ behaviour observations were made



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every 15 minutes over a 72 hour period to record piglet time in creep, latency to enter creep for first time, latency for litter to remain in creep for at least 10 minutes and piglet and sow use of areas immediately in front of, and furthest from, the creep.

It was found that piglets with bright, well lit creeps spent 7.2% more time in them than those with dark creeps. Piglets spent an extra 2.1% more time in the creep for each one degree increase in temperature.

Light or mat temperature did not affect the use of pen areas or piglet weight gain. In general, piglet use of creeps increased with warm mat temperatures and creep brightness.

Sow multisuckle housing and separation systems

This Australian study (*Animals* 9 658) compared the effects of mixing sows in lactation (with or without piglets) at weaning or after insemination in terms of reducing aggression. The study also determined the effects of lactation housing on the piglet.

The study involved 120 multiparous Large White x Landrace sows and 54 litters. The sows were mixed in groups of six and allocated to multisuckle housing from day 21 of lactation, separated from the litter and housed in groups, with piglets left in crates for seven hours daily from day 21 of lactation, mixed at weaning at day 28 lactation, and mixed after artificial insemination. Behaviour, saliva for free salivary cortisol content and injury counts were taken at various times during the process. Reduced aggression (reduced bites, fights and knocks) were seen in the sows grouped at 21 days.

It was concluded that multisuckle housing could reduce aggression and stress at mixing with changes in the time of peak piglet injury (changing from weaning to mixing) but with no overall negative effects on the piglets.

African swine fever - Romanian update

This Romanian review (*Rom. J. of Vet. Med. and Pharm.* 3 176-188) looks at some of the recent Romanian outbreaks of African swine fever and concludes that the origin of the infection was unknown or inconclusive in all cases. This draws attention to the diversity of possible dissemination and propagation of the virus.

The authors feel that the number of outbreaks and spread of the disease will

increase in both Romania and Europe. Intensive work is being done on the development of a vaccine since, at present, there is no commercial vaccine available that can control the disease or limit its spread.

Chinese research into African swine fever virus

This paper (*J. of Yangzhou Univ., Agric. and Life Scis. Ed.* 39 50-51) details the research of the university's Prof Huaichang Sun who is involved in Africa swine fever research including the molecular diagnosis of the disease and the provision of techniques and reagents for disease diagnosis, prevention and control.

Prevalence of porcine circovirus type 3 in China

Porcine parvovirus type 3 (PCV3) was first reported in the USA in 2016 and later discovered in China. The prevalence of PCV3 in Zhejiang province in southeastern China is unknown although it has been reported in many parts.

PCR of 283 samples that were collected between 2014 and 2017 found 67.1% to be positive. Single infections with PCV3 accounted for only a third of the positives but the majority were co-infections, predominantly with PED virus (41.6%).

Indirect ELISA using PCV3 capsid protein as the coating antigen revealed a sero-positive rate of 60.2% in 2,345 serum samples between 2011 and 2017 with the earliest positives enterovirus.

Novel enterovirus G in South Korea

This Korean work (*Kor. J. of Vet. Sci.* 59 89-96) investigated the presence of novel enterovirus G recombinations.

The findings suggest that the exogenous PLCP gene has undergone continuous rapid mutation in the individual enterovirus G genomes following crossorder recombination, thereby causing clinical disease in pigs.

Ugandan genome sequences of ASF virus

Ugandan paper (*Microbiol. Resource Anns.* 7 e01018-18) describes the complete genomic sequences of five Ugandan African swine fever (ASF) virus isolates. Four of the sequences were identical and all five were closely related to the only other known genome sequence of p72 genotype IX.



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 AB Vista, in cooperation with its Taiwan distributor, Besta Biotech Co Ltd, recently hosted the International Phytate Summit in Tainan, Taiwan, to discuss the latest research on phytate and its multi-factorial impact on animal production. The by-invitation-only event has helped more than 100 participants, including nutritionists, formulators, feed millers and farmers, understand the anti-nutritional factors of phytate and identify advances in diet formulation to combat the anti-nutritional effect of phytate. Opening the summit, Dr Bi Yu, from National Chung Hsing University Department of Animal Science, highlighted the importance of further understanding the 'break down' products of phytate, particularly phytate esters and inositol, and their impact on the animal.

abvista.com

Victam and VIV 2022 partnership



Victam Corporation and VIV worldwide are to further their partnership by organising Victam International and VIV Europe together at the Jaarbeurs exhibition grounds in Utrecht in 2022 from 31st May to 2nd June.

"This means that the Victam International exhibition will move back from Cologne, Germany, to its home country, the Netherlands, and where it all started in 1965, the Jaarbeurs in Utrecht. The set-up of the exhibition is different from the set-up in Asia as VIV Europe and Victam International will be co-located but with each exhibition in their own halls," Sebas van den Ende, General Manager of the Victam Corporation, told International Pig Topics.

"We are enthusiastic about the synergy and good cooperation that Victam and VIV have established. This partnership continues with a different programme in Europe, which will bring to the animal husbandry industry an even wider and richer platform in 2022. We look at the co-location of VIV Europe and Victam International as an important achievement after nearly four decades of independent growth and development of the respective events in Europe and in the world," added Heiko M. Stutzinger, Director

of VIV worldwide, and Managing Director of VNU Asia Pacific.

"Today, the strong network of Victam in feed technology and animal feed processing, together with the Feed to Food concept that VIV Europe is famous for, are ready to deliver a very complete and professional platform to exhibitors and visitors."

viveurope.nl

Yeast enhances performance



Trial results presented at the 52nd Journées de la Recherche Porcine in Paris showed how the live yeast *Saccharomyces cerevisiae* var. *boulardii* CNCM I-1079 (Levucell SB) benefits high-producing sows when supplemented during the full reproductive cycle.

Improved parameters included: stillborn percentage, litter weight at weaning, piglet survival during lactation, and backfat thickness before farrowing. The study also indicated stronger effects for younger sows (at parity 1 and 2).

This new study complements previous trials demonstrating the benefits of this specific live yeast to support sow digestive health and feed utilisation. Modern sow management and genetics have optimised production performance

Feed additive for piglets



Innovative animal nutrition firm Biomin has achieved EU authorisation for the Digestarom DC Duplex capsule in its next-generation phytogenic feed additive, Digestarom DC Xcel, as a zootechnical feed additive in weaned piglets.

"This EU authorisation highlights the scientifically proven benefits of applying the proprietary mix of plant-based substances to piglet diets," Dr Antonia Tacconi, Global Product Manager PhytoGenics at Biomin, told International Pig Topics.

The zootechnical authorisation reinforces the conclusion of the European Food Safety Authority (EFSA) Panel on Additives and Products or Substances used in Animal Feed (FEEDAP) favourable Scientific Opinion on the safety and efficacy of Duplex Capsule (DC-C) in weaned piglets.

"Based on the results of three efficacy studies in which positive benefits were seen, the additive has a potential to improve the growth performance of weaned piglets," stated the Opinion.

Encouraging high feed intake in piglets is a key driver for producer profitability, animal fitness and overall performance. Application of

phytogenic feed additives is projected to increase in the coming years.

"Phytogenic feed additives such as Digestarom DC Xcel contain substances found in herbs and essential oils that improve swine feed digestibility, reduce inflammation and promote growth," Dr Tacconi told us. "A growing body of scientific knowledge led by the Biomin Research Center and our research network has gone into making Digestarom DC Xcel a value-adding solution for the feed and livestock industries."

As a next generation phytogenic feed additive, the unique advantages of Digestarom DC are the performance benefits, pelleting stability, ease of handling and a documented mode of action.

The triple-action formulation incorporates the innovative Biomin Duplex Capsule technology that ensures the plant-based active compounds are delivered where they are needed to be most effective.

The three modules include:

- Promoting appetising and endogenous secretions.
- Gut microbiota modulation.
- Gut protection.

biomin.net

through hyperprolifericity. Yet, these advancements generated new issues such as lower piglet vitality and increased incidence of piglet neonatal diarrhoea, which are detrimental to piglet health and future growth performance.

In this context, keeping a good balance within the sows' intestine microbial ecosystem is essential to maintain good body condition and to ensure optimal piglet performance.

A trial was conducted to evaluate the ability of a probiotic live yeast to address some of these concerns.

The research was performed in Murcia, Spain, by the Genera PM Office on 148 Danbred sows and compared two supplementation diets against a negative control: either a standard dose of *S. c. boulardii* CNCM I-1079 during the full gestation and lactation cycle or a double dose only with the lactation diet. The trial started one week pre-farrowing.

Sows that received the live yeast probiotic during the full cycle showed the best performance as compared to a higher dose applied only in lactation feed.

lallemand.com

New agent in Romania for Nucleus



French genetics company Nucleus has signed a distribution contract with Daniel Banica to represent the Romanian market. Daniel has worked in swine production for many decades and has experience in animal nutrition and swine semen equipment.

In a particular context where ASF is almost endemic, Daniel and Nucleus will combine their experience and skills in order to repopulate farms in Romania and thrive in this market.

nucleus.com

Multiphase feed control



Zinc oxide limitation in swine feed, to be enforced by the

European Commission from 2022, is causing uncertainty in the sector on how to handle the issues of animal adaptation and the appearance of diarrhoea, with the subsequent mortality rise. These issues ordinarily derive from feed changes among piglets during the process of adaptation to solid feed and whose regularity was, until now, minimised with this supplement.

Faced with this challenge, Rotecna has designed the Evofeed multiphase feed control system, which eases the steady transition from one feed to another by blending them, therefore improving adaptation and reducing digestive complications.

At weaning, piglets have to readjust to solid feed, and their nutritional requirements may differ due to their weight increase. Therefore they are fed with up to four different types of feed, of varying composition. To provide a correct transition between each one enhances the animals' adaptation, assures an optimal growth and reduces the possibility of diarrhoea; it also minimises losses due to low yield and an increase of the fatality percentage.

The Evofeed multiphase feed control system handles the pace of the feed delivery system motors from the silo of each feed to the system that dispenses them in the room. This allows managing the volume itself of the feed that is

allocated from each feed to the animals and, in the flow from one type of feed to another, generate mixtures that progressively lessen the ratio of feed to be removed and increase the percentage of feed to be introduced. In addition, it makes it possible to regulate the quantity of each feed dispensed by each room's system, thereby obtaining a more significant control over the animals' utilisation and evolution.

Computerisation of the weaning feed signifies essential savings in time and labour, as it avoids the farmer having to go through the corrals daily and mix the feed manually.

There is a touch screen with a straightforward and intuitive operating system to configure, regulate and monitor the feed, where the farmer activates the room in which the piglets enter, specifying the number of animals and their age. One can also configure which days the shifts in the type of feed should take place. The system then stores all this data to speed up future entries.

Additionally, the touch screen also allows one to examine the speed of the motors, the programmed feeding curves in each room and to control piglet deaths.

And lastly, there are also functions to modify some basic parameters like the increase reduction of the quantity of feed to be dispensed per room corresponding to the animals' development.

rotecna.com

Insecticide with on-animal applications



BioSafe Systems has developed an insecticide to kill insects and pests commonly found inside homes, livestock housing and food processing facilities.

Aptly named PYClear, this concentrated product utilises pyrethrins, a natural insecticide derived from chrysanthemum extracts.

Labelled for use on over 200 organisms, PYClear can be applied as a fog or mist to control indoor pests (ants, cockroaches, spiders, house flies, mosquitos, etc) and uniquely as a direct spray or dip application to domestic animals (pets, livestock) to

control ticks, fleas, horse flies, gnats and lice.

"We are excited about our new PYClear product to add to our building product portfolio of insect control products and solutions," Rob Larose, President & CEO of BioSafe Systems, told International Pig Topics. An official launch date is planned for early 2020.

biosafesystems.com

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Latin American pork



Latin America is a large region, and each country has its own challenges. In addition to challenges experienced by much of the pork world, such as difficulty in finding both skilled and unskilled labour, rising facility costs and the risk of new disease outbreaks like African swine fever (ASF), certain nations in the area face a hurdle unique to Latin America.

For major players like Brazil and Mexico, one of the biggest issues is around the volatile exchange rate linked to political instability. It impacts Brazil – a net pork exporter – as they need a strong currency to be competitive. Mexico imports a lot of feedstuffs from the United States, so the exchange rate affects them as well. Of course, with challenge also comes opportunity.

"The trend we are seeing in Latin America is the increase in the consumption of pork meat," Nelson Adrian Restrepo Echavarría, Key Account Manager, Latin America – Swine for Hypor, told International Pig Topics. "Countries like Peru have doubled their consumption in five years, and Colombia has gone from 4kg to 11kg consumption per capita in a short period."

Yet overall, pig production in Latin America is relatively low, with many countries relying on imports from Canada and the United States to satisfy demand. Historically, one genetics company dominated the region, leading to increased costs for breeders and lower product quality due to a lack of competition. Fortunately, that picture has changed dramatically in recent years.

"Hypor started working in Mexico in 2001 on a small scale, and we are now the second largest genetics company in the country with a 20% share of the market," added Luis Prieto García, Managing Director of Hendrix Genetics' Business Unit Swine (Hypor).

Hypor has also partnered with prominent companies in several countries who have exclusive dealerships to produce their genetics locally, yet with a continuous genetics link to, and full support from, Hypor nucleus facilities in Canada.

These countries include Ecuador, Colombia, Dominican Republic, Peru and Guatemala.

In addition, the company now has new export customers in Panama and has opened a new distribution centre in Costa Rica.



In its commitment to continual growth, Hypor is targeting Brazil for 2020. The company plans to start production there in the new year, giving them access to countries where they lacked a presence due to logistical barriers: Argentina, Uruguay, Bolivia, Paraguay and Chile.

hendrix-genetics.com

Termotecnica Pericoli's best year



Figures speak for themselves and 2019 was a positive year for Termotecnica Pericoli, thanks to the acquisition of important projects and the consolidation of solid markets.

More and more markets and countries are adopting policies aimed at safeguarding animal welfare. This involves the construction of sheds and farms equipped with the best climate control and sustainable equipment in order to guarantee a comfortable

environment for the animals and, at the same time, with minimum emissions and energy consumption.

Pericoli branded products have played a key role in this area, proving to be in compliance with the main European directives, while guaranteeing Italian quality.

"Our intention is to continue to invest in people, production technologies and in the research of cutting-edge climate solutions to remain among the leaders in our markets," Fabrizio Sappa, sales manager, told International Pig Topics.

pericoli.com

Salmonella-free buildings



An APHA field study has demonstrated that the Evans Vanodine

Cleaning and Disinfection programme using Target Power Gel and GPC8 significantly reduces the likelihood of residual contamination in salmonella-positive pig buildings.

It also suggests a significant reduction in the prevalence of salmonella in the pigs from cleaned and disinfected buildings when sampled before slaughter.

Salmonella is the second most commonly reported zoonotic gastrointestinal pathogen in the European Union, and a major cause of foodborne illness throughout the world. The bacteria are generally transmitted to humans through consumption of contaminated food of animal origin, mainly meat, poultry, eggs and milk.

Reduction of salmonella at the farm level helps to minimise contamination pressure at the slaughterhouse, and therefore the number of salmonella bacteria entering the food chain.

Cleaning and disinfection between batches of livestock is an integral part of biosecurity programmes in farms. However, the effectiveness of cleaning and disinfection programmes is rarely demonstrated in full field trials. This study was undertaken following laboratory testing that showed GPC8 to be

highly effective in killing bacteria under simulated practical conditions. In this study, two pig finisher buildings in each of 10 salmonella-positive farms were used. One building on each farm was cleaned and disinfected according to a rigorous protocol consisting of removal of gross soil, application of Target Power Gel, foaming detergent followed by wash off and application of GPC8. The second building was cleaned and disinfected as per normal farm routine.



Each building was sampled by APHA staff pre-cleaning and disinfection, post-cleaning and disinfection, post-restocking with the following batch of pigs, and shortly before these pigs were sent to slaughter. At each visit faecal samples were collected and salmonella isolation was carried out at APHA according to a standard method.

The test buildings were found to be significantly less likely to be positive for salmonella after cleaning and disinfection. Pigs housed in the test buildings were also significantly less likely to be positive for salmonella at slaughter age.

Cleaning and disinfection is a useful measure to help reduce the number of infected pigs going to the slaughterhouse, but should be supplemented by other control measures in the pig breeding and production chain.

evansvanodine.co.uk

A new partnership agreement



INRA and Phileo by Lesaffre have signed a partnership agreement in the field of nutrition and animal health. This partnership strengthens existing collaboration and will optimise many projects around a shared goal: the inclusion of agricultural and food systems in a sustainable and economically viable development.

This partnership agreement seals a partnership initiated 15 years ago. Initially focused on demonstrating the beneficial effects of probiotics on the production performance of a number of species (ruminants, pigs,

poultry), the collaboration between the two partners has evolved progressively towards more in-depth studies. These have involved the use of increasingly sophisticated tools in the field of metagenomics, transcriptomics and metabolomics applied to immunology and microbiology, areas for which INRA has provided its expertise, particularly through several CIFRE theses. Examples of the many topics studied are: the benefits derived from yeast-based products in relation to colibacillosis-related inflammation in piglets; and the ability of dry yeasts to resist pelletisation processes.

phileo.lesaffre.com

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www.livestockphilippines.com

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Florianopolis, Brazil
www.ipvs2020.com

World Pork Expo

3-5th June
Des Moines, Iowa, USA
www.worldpork.org

Pig Focus Asia 2020

7-8th July
Bangkok, Thailand
www.positiveaction.info

Victam Asia and Animal Health & Nutrition

9-11th July
Bangkok, Thailand
www.victamasia.com

Ildex Vietnam

22-24th July
Ho Chi Minh City, Vietnam
www.ildex-vietnam.com

SPACE

15-18th September
Rennes, France
www.space.fr

Vietstock

14-16th October
Ho Chi Minh City, Vietnam
www.vietstock.org



The 2020 World Pork Expo is back in Iowa for its 32nd year. The expo takes place from 3-5th June and will provide pork professionals with three full days of education, innovation, and networking. Since the outbreak of ASF in 2019, the United States has significantly stepped up biosecurity measures taken to prevent an outbreak. The 2020 Expo will have increased biosecurity on-site during the show. Additional changes to the 2020 World Pork Expo include the decision to relocate the live swine show to reduce an already negligible risk.

worldpork.org



Amino acids will play a crucial role



With the agricultural industry under increasing pressure to reduce carbon emissions and environmental concerns around meat and dairy production rapidly rising up the consumer agenda, Premier Nutrition has been looking at the crucial role amino acids could play in livestock diets throughout the next 12 months to help improve sustainability.

The protected amino acid (AA) market is becoming increasingly more accessible for inclusion in diets for all species.

The new crystalline AAs will play an important role in pig diets by reducing overall crude protein levels in feeds while cutting nitrogen excretion and improving gut health, potentially reducing the need for medication.

"Importantly, while we currently use lysine, methionine, threonine, tryptophan and more recently, valine in monogastric diets, the potential for isoleucine, arginine and other amino acids is looking very promising," Premier's pig product director, Mick Hazzledine, told International Pig Topics.

"Therefore, as future market requirements become clearer, thanks to Premier Atlas, a comprehensive description of available ingredients, the industry now has the information required to meet them."



State of the art premixing



D&D Ingredient Distributors Inc has started full-scale

operation of its new premix plant at the company headquarters in Delphos, Ohio, USA.

The high-tech, state-of-the-art facility features automated micro ingredient proportioning, blending, and precision mixing technology to serve their expanding range of customers.

D&D already supplies premixes and blends going into products sold throughout the US and nearly 30 other countries.

"Demand is growing for the reliable supply of precision formulated and manufactured custom premixes," Arnie Miller, D&D's President and CEO, told International Pig Topics.

"We are helping our partners in the feed industries to streamline their supply chains."

"We specialise in the micro ingredients they need," added Ted Williams, D&D's Chief Operating Officer. "By taking advantage of our ingredient knowledge, formulation expertise, and premixing technology, our customers can better optimise their manufacturing operations. We

are helping them concentrate even more on what they do best."

D&D's new premix facility consists of highly specialised equipment, including a precision-automated micro-proportioning system and a four-ton twin-shaft horizontal ribbon-paddle mixer. The system combines precise amounts of vitamins, minerals, and other micro ingredients in homogenous premixes that blend uniformly in manufactured feed products.

Products manufactured by D&D customers support the health, growth, and active life of dairy animals, beef cattle, pigs, poultry, horses, and many other species.

"Our vision is to be the partner-of-choice for outsource manufacturing services for the feed industries," added Mike Wright, Director of Operations & Business Development. "That means we must hold ourselves accountable to the highest standards of product quality and service, which requires continuous improvement through education and training programmes – for both our own employees as well as for participating industry partners."

d-dfeed.com

Ultimately the key message is, as supply increases and prices fall, the industry should have the tools to meet growing requirements for more sustainable diets which are lower in protein and soya.

premiernutrition.co.uk

Restocking in China due to ASF



According to Rabobank, around 50% of the Chinese herd has been decimated, which is around 25% of the world's production. China is now entering a repopulation phase.

Earlier this year a Chinese delegation from Zhenbang, located in Jiangxi province, visited Nucleus' GGP farms in France to select Large White, Landrace and terminal breeds.

Pending shipment to China at the end of this month, the 1,000 selected GGP animals are in official quarantine.

nucleus.com

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