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From the Editor's Desk

Strategic Resilience: Reimagining the Future of Swine Production

The global swine industry sits at a critical crossroads, facing tight margins, grain price volatility, and persistent biological threats. Feed accounts for up to 70% of total expenses, making traditional flat-rate feeding unviable. Modern operations are adopting precision nutrition—utilising near-infrared spectroscopy (NIR) for real-time ingredient analysis to tailor diets to exact growth stages, eliminating waste and buffering against market shocks.

Simultaneously, endemic pathogens like Porcine Reproductive and Respiratory Syndrome (PRRS) and Porcine Epidemic Diarrhea (PED) severely erode profitability. Combatting these threats requires moving beyond reactive treatments toward continuous biocontainment. Positive-pressure air filtration, rigorous sanitation, and acoustic monitoring for early respiratory distress allow producers to isolate pathogens before clinical symptoms spread.

Digital infrastructure is further elevating barn management. Rising ambient temperatures make heat stress an immediate hazard to sow fertility and growth rates. IoT sensor arrays paired with real-time heat-stress monitoring apps compute dynamic Temperature-Humidity Index (THI) levels, automatically triggering evaporative cooling to safeguard animal welfare and performance.

Concurrently, regulatory and market pressures demand reduced antibiotic reliance. Targeted nutritional strategies—incorporating phytogenic additives, organic acids, and prebiotics—strengthen mucosal immunity and gut integrity, successfully replacing prophylactic antimicrobials during critical weaning phases.

Finally, long-term viability requires embracing the circular bioeconomy. Deploying anaerobic digesters converts manure into renewable energy and rich bio-fertilisers, while upcycled feed ingredients close nutrient loops—turning environmental challenges into sustainable revenue streams.

ARTICLE'S INDEX

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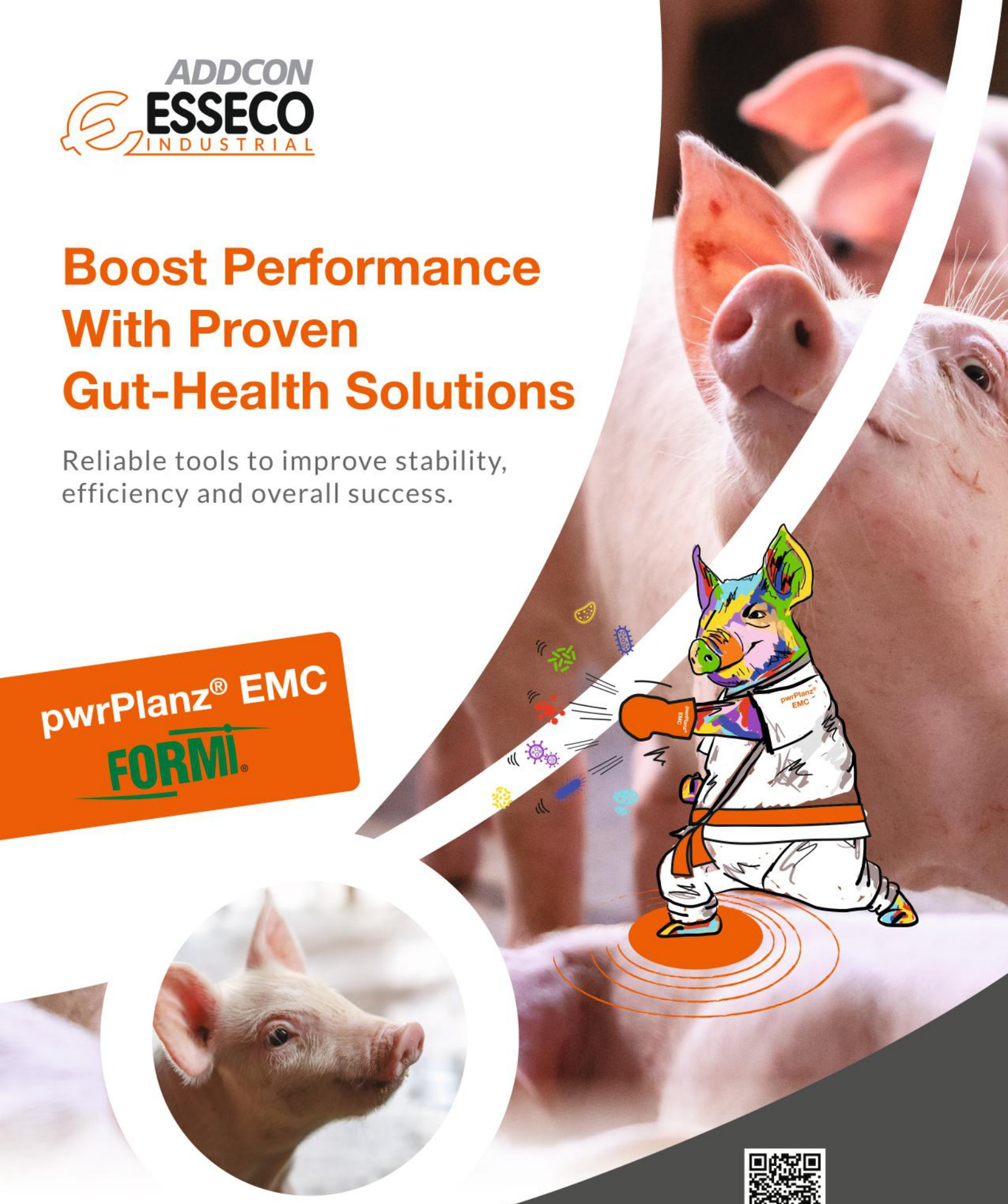

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Managing PWD in Piglets

The Natural Way

Dr. Badal Singh
(Poultry & Swine Consultant, South Asia)

Pork is one of the most liked and an important source of animal protein relished in number of countries world wide across numerous different cultures and geographical regions. The year 2022 recorded over 780 million pigs worldwide compared to 750 million heads in the preceding year(1). Despite the concerns and economic impact created by African Swine Fever (ASF) majorly in South-East Asia, there is still a high demand for pork.

One of the issues which swine industry has been facing over the years is the problem associated with compromised gut health of Piglets at the time of weaning leading to post weaning diarrhoea (PWD), one of the most important concerns impacting productivity and profitability of the flock. PWD in weaned pigs is characterised by frequent discharge of watery faeces during the first 2 weeks after weaning and represents one of the major economic problems for the pig industry (2).

PWD is a multi factorial condition which occurs both due to the management related issues and due to the pathogen proliferation, however still the complete and the precise pathogenesis is yet to be identified (3). Weaning in pigs is one of the most stressful times where there are many changes which impact the outcome of PWD. Pigs during weaning are required to deal with sudden change in environment, new piglets in the nursery and this the new littermates in addition to the stress of adapting to a new environment (4).

Separation of piglets from the sows, changing of diet from milk to solid feed, mixing up of different piglets in the nursery, change of environment and creating of social order and hierarchy among the piglets in the flock are some of the management related factors which predisposes the piglets to PWD not only through the inefficient physiological functioning of the body but at the same time allowing both intrinsic microbes as well as exogenous pathogens to proliferate and creating compromised gut health leading to PWD. Although at times the managemental factors are partly managed by late weaning of piglets, but due to its economic consequences, it is not widely acceptable piggeries.

Since the piglets need to have a quick physiological adaptation to change in the diet from more digestible Sows milk to less digestible plant-based proteins and carbohydrates which also contain multiple forms of anti-nutritional factors(5, 6).Since the major enzymes during suckling phase is lactase and after the shift to the solid diet, the body takes some time to establish the required levels of enzymes like amylase, protease etc which increases the chance of more undigested feed present in the GUT thereby acting as a predisposing factor for microbial proliferation and colonization. It also leads to sharp reduction in the feed intake immediately post weaning(7).

Among the most important infective agents leading to PWD is the proliferation colonization and of Escherichiacoli (E.coli) which happens to be a common resident of the pig's gastro intestinal tract (GIT) but proliferates as the conditions becomes suitable at the time of weaning. The strains of E. coli having fimbriae (K88 or F4) can attach with the enterocytes of the intestinal lumen and secrete enterotoxin which are majorly heat labile leading to opening of chloride channels and loss of chloride ions, fluid and this leading to diarrhoea. Since E. Coli happens to be the first opportunistic organisms in the to proliferate and colonize, the other organisms (Viruses, Protozoa) follow and aggravate the condition and therefore the symptoms.

One of the most common approaches which has been in practice for a long time for control of PWD is the use of antibiotics and minerals which include colistin sulphate, Zinc oxide, Copper sulphate etc often incorporated in the diets of the weaned pigs.(8). Although this strategy has helped in control of PWD to a good extent but at the same time has increased the evolution of resistant microbial strains along with the environmental constraints which Zinc oxide poses. This has effectively been looked up with a serious concern which has led to many countries globally either to completely stop the use of Zinc oxide or to phase out its use gradually by adopting new practices and solutions which are eco-friendly and at the same time effective to manage the problem of PWD in pigs.

Various other approaches for the prevention and control on PWD have since been tried which include immune modulators, probiotics, organic acids, anti-microbial peptides, essential oils etc. Each of the solutions have their own benefits but at the same time have not been able to completely replace the use of Zin oxide in the feed. One of the new strategies for the prevention of PWD which is gaining prominence is the use of whole plant botanicals. These whole plant botanicals having standardised levels of some important phytochemicals ensure the successful replacement of Zinc oxide in the feed and at the same time ensuring the complete prevention of PWD as well as positive impact on the growth of the piglets.

These whole plant botanicals have a muti targeted effect within the body of piglets which ranges from creating protective shield around the enterocytes which inhibits colonization and proliferation of pathogenic microbes, optimise the gut immunity, reduce the gut inflammation, and optimise the gut movement and secretion. These solutions through the synergetic combination of various standardised phytochemicals can target the specific systems within the body to create a unified response and thus helps in prevention of PWD. These solutions primarily are intended to act as preventive measure for PWD by creating an adaptive ecosystem within the body of Pigs. Various strategies can thus be incorporated for the use of these whole plant botanicals for the prevention and control of PWD in pigs.

Since the need of the hour is to find alternative solutions and strategies to prevent and control PWD by reducing its reliance on Zinc Oxide. One such solution has been formulated by Essence Natura Pvt Ltd, India with the brand name of NORFLUX. The solution is a synergistic combination of various essential herbs to fetch the target standardised phytochemicals which help in prevention and control of PWD through natural way by replacing Zinc oxide. Additionally, they have another product named NORGAIN which replaces the antibiotic growth promoters in the feed. The combined strategy of using both products have shown to have beneficial effect and a synergistic impact in control and prevention of PWD and at the same time enhancing the growth of the pigs.

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ARTICLE

Smart Feeding for Healthy and Profitable Pig Farming

Uma Kant Verma[1], Swarup Debroy[2], Hansmeet Kour[3], Shalini Pandey[3] and Jai Prakash[4]

Pig farming can be a profitable enterprise, but good management and proper feeding are the keys to success. Among all management practices, nutrition plays one of the most important roles because it directly influences growth, reproductive performance, disease resistance, meat quality and the overall efficiency of the farm. Pigs are omnivorous animals and can consume a wide variety of feed ingredients. However, this does not mean that pigs can be raised successfully on whatever feed is available. Unlike cattle and buffaloes, pigs have a single-compartment stomach and have limited ability to digest bulky, high-fiber feeds. Therefore, their diets must provide nutrients in a form that can be efficiently digested and utilized.

Modern pigs are genetically selected for rapid growth and efficient production of lean meat. As a result, their nutritional requirements are high. A well-balanced ration should provide adequate energy, protein and essential amino acids, vitamins, minerals, fiber and water. If even one of these nutrients is supplied in inadequate amounts, growth, reproduction or health may suffer.

Fun fact - the pig is the last of the 12 animals in the Chinese zodiac and is seen to represent fortune, honesty, happiness and virility.

The old saying that pigs will "eat anything" can therefore be misleading. Pigs may readily consume many feeds, but what they eat and how well that feed meets their nutritional needs are two different things. A cheap but nutritionally unbalanced ration may ultimately increase production costs because pigs take longer to reach market weight.

Energy:

Energy is the first major requirement in a pig's diet. It is needed for maintenance, movement, body functions, growth, reproduction and milk production. In simple terms, energy acts as the fuel that powers the pig's body. A pig first uses the energy it consumes to maintain essential body functions. Only the remaining energy can be directed towards growth, muscle development, reproduction or milk production. If the diet supplies more energy than the animal requires, the excess may be deposited as body fat. Environmental temperature also affects energy requirements. During cold weather, pigs use additional energy to maintain body temperature. Providing suitable bedding, protection from cold draughts and appropriate housing can help reduce unnecessary energy expenditure. In contrast, during hot weather, pigs reduce feed intake and spend energy attempting to keep cool. The energy value of a ration is influenced by its ingredients. Carbohydrates, starch, sugars and fats can contribute substantially to dietary energy, whereas high levels of fiber generally reduce the amount of energy available to pigs. Excessive fiber can also make the feed bulky and reduce its palatability.

For farmers, the message is simple: a pig should receive enough energy to grow efficiently, but not so much that unnecessary fat is deposited.

Protein and Amino Acids:

Protein is another critical component of pig nutrition. While crude protein is commonly used to describe the protein content of feed, the quality and amino acid composition of that protein are equally important. Amino acids are the building blocks used to form muscles, organs, enzymes and hormones. Among the essential amino acids, lysine is particularly important for growth and lean tissue development. The requirement for amino acids depends on the age, physiological stage and genetic potential of the pig.

Modern lean pigs generally have a greater capacity for muscle deposition and therefore require an appropriate supply of amino acids. Providing too little protein or an inadequate balance of amino acids can be expensive in the long run. A pig may consume more feed in an attempt to obtain enough of the limiting nutrient. If the additional feed supplies more energy than required, the animal may become excessively fat rather than developing lean tissue efficiently. Young piglets have relatively high protein requirements. The supplied material indicates that younger piglets may require diets containing around 16–17% protein, while finishing pigs and maintenance diets for sows may require lower levels, around 13–14%, depending on the production system and formulation.

Feeding should always be matched to the age, body weight, production stage and genetic type of the pig rather than providing the same ration to every animal.

Minerals:

Minerals are required in relatively small quantities, but their effects on pig health and productivity are substantial. Major minerals include calcium, phosphorus, magnesium, sodium and potassium, while trace minerals include iron, copper, iodine, manganese, selenium and zinc. Calcium and phosphorus are particularly important for proper bone development. Deficiency may result in poor growth, weak bones, abnormal joints and reproductive problems. Cereal grains alone generally cannot supply enough calcium for rapidly growing pigs or lactating sows. Iron is especially important in newborn piglets. Sow's milk contains relatively little iron, while piglets grow rapidly and have limited iron reserves at birth. Consequently, iron deficiency can occur during the early life of piglets, making appropriate supplementation an important part of piglet management. Zinc contributes to enzyme activity, immune function and healthy skin and hair. Deficiency can be associated with poor skin condition, coarse hair and reproductive problems. Selenium is an important component of the antioxidant defence system and is also associated with muscle health, reproduction and fertility. However, excessive selenium can be toxic, demonstrating an important principle of mineral nutrition: more is not always better.

A balanced mineral mixture is therefore preferable to indiscriminate supplementation.

Vitamins:

Vitamins are required in small quantities, but they support a wide range of biological processes. They are essential for normal growth, reproduction, metabolism, immunity and overall health. Vitamin premixes are commonly used to help meet the requirements of pigs maintained on balanced diets.

Vitamin A is associated with vision, reproduction and healthy mucous membranes. Its deficiency may reduce growth and cause problems such as poor coordination and blindness.

Vitamin D is closely associated with calcium and phosphorus metabolism and is therefore important for healthy bones. Pigs housed indoors may have greater dietary dependence on vitamin D because exposure to sunlight can be limited.

Vitamin E functions as an important antioxidant and contributes to fertility and disease resistance. It works closely with selenium, and young piglets are particularly vulnerable to deficiencies.

Among the water-soluble vitamins, B-complex vitamins play important roles in energy metabolism, nervous system function, growth, fertility and immune function. Pantothenic acid, riboflavin, thiamine, vitamin B6 and vitamin B12 all have specific roles in maintaining normal performance. Deficiency of these vitamins can produce signs ranging from poor growth and appetite to reproductive problems and abnormal movement.

Water:

Farmers often focus on feed while giving less attention to water. This is a mistake. Clean and readily available drinking water is essential for pigs at every stage of production. The supplied material indicates that pigs commonly consume approximately 2–3 kg of water for every kilogram of dry feed consumed, although actual requirements vary with body weight, feed composition and environmental temperature. If adequate water is unavailable, feed intake and growth can decline. Water requirements rise considerably in lactating sows. The source provides an approximate range of 15–50 liters per day for lactating sows, compared with about 5–10 liters for pregnant sows or replacement gilts under normal conditions.

Water should be clean, fresh and available throughout the day. Dirty or contaminated water can discourage drinking and may create additional health problems. Properly maintained drinkers are therefore an essential part of good pig farming.

Feeding Piglets:

The first few weeks of a piglet's life are extremely important. Rapid growth means that piglets have high nutrient requirements, but their digestive system is still developing. Therefore, feed must be introduced gradually and should be highly palatable and easily digestible.

Creep feed can be offered while piglets are still suckling the sow; it helps them become familiar with solid feed and supports the transition from milk to a conventional ration. Feed should be kept fresh and attractive because piglets can easily lose interest in stale or spoiled feed.

Sudden dietary changes should be avoided. Introducing new ingredients gradually allows the digestive system time to adapt and can reduce digestive disturbances. Good-quality feed during the early post-weaning period is particularly valuable because newly weaned piglets can be vulnerable to digestive problems.

Feeding Growing and Finishing Pigs

Growing pigs require a ration that supports rapid and efficient weight gain without excessive fat deposition. Under suitable conditions, feed intake generally increases as the pig becomes larger, but it is influenced by age, body weight, diet composition, genetics and environmental temperature. For commercial production, the goal is not simply to make pigs heavier. The objective is to produce marketable lean meat efficiently. A balanced diet improves growth rate, feed conversion and desirable carcass composition.

Poor-quality or unbalanced diets may appear cheaper, but slower growth can increase the amount of feed and time needed to reach the target market weight. Therefore, farmers should consider cost per kilogram of weight gain, rather than simply the price of feed per kilogram.

Feeding Sows:

Sows have different nutritional needs during pregnancy and lactation. During pregnancy, feed must support the developing foetuses while preventing excessive weight gain. Overfeeding can result in over-fat sows, which may subsequently have lower feed intake after farrowing and reduced milk production. Lactating sows, on the other hand, have very high nutritional requirements because they must produce milk for the entire litter. Their feed intake should therefore increase after farrowing. The source suggests gradually increasing feed from approximately 5 kg after farrowing to around 8-9 kg per day, depending on sow size, litter size and environmental conditions. Maintaining good body condition is important. Excessive weight loss during lactation can negatively affect the sow's subsequent reproductive performance. Good nutrition between weaning and mating also helps prepare the sow for the next reproductive cycle.

Can Kitchen Waste and Alternative Feeds Be Used?

Many small-scale farmers consider kitchen waste, grains, bakery products, milk, vegetables and other by-products as inexpensive pig feeds. Some alternative feeds can indeed be useful, but they should be used carefully and should not automatically replace a balanced ration. Bakery waste can be highly palatable and energy-rich, but its nutritional composition can vary considerably and it may spoil or become mouldy. Barley and other grains provide energy but may have limitations in amino acids, vitamins or minerals when fed alone. Maize is a high-energy cereal but requires appropriate supplementation because its protein and mineral supply may not meet the complete requirements of pigs. Milk can provide high-quality protein, but excessive feeding may contribute to undesirable carcass fat characteristics. Potatoes should be properly prepared, while green or sprouted potatoes should be avoided. Cereal grains may require processing such as grinding to improve their usefulness as feed.

The important principle is that alternative feed ingredients should complement, not destroy, the nutritional balance of the complete diet.

Pasture Is Not a Complete Diet for Most Pigs

Pigs enjoy rooting, exploring and foraging, and access to pasture can provide opportunities for natural behavior. However, most commercial pigs cannot obtain all the nutrients they need from pasture alone. Because pigs have a simple stomach and limited capacity to utilize bulky fibrous feeds, pasture generally contributes less usable energy to pigs than it does to ruminants such as cattle and sheep. Slow-growing pigs may make better use of pasture, but commercial growing and finishing pigs still require an appropriately formulated concentrate ration. Therefore, pasture should be viewed as a useful supplement and behavioral enrichment, rather than the sole source of nutrition for most production pigs.

Conclusion:

Successful pig farming does not depend simply on filling the feeder. It depends on providing the right nutrients in the right amounts, at the right stage of production. Energy supports growth and body functions, protein and amino acids build muscle and support milk production, minerals strengthen bones and support metabolism, vitamins help maintain immunity, reproduction and normal body functions and water keeps the entire system working efficiently. Farmers should also remember that the cheapest feed is not necessarily the most economical feed. A nutritionally balanced ration can help pigs grow faster, use feed more efficiently and reach market weight in less time. Good feeding practices, combined with clean water, proper housing, hygiene and careful observation, can therefore make a major difference to both animal welfare and farm profitability.

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10 Common Feeding Mistakes
That Reduce Pig Growth

Dr Rishabh Chugh

Every pig farmer wants the most efficient growth. They expect them to stay healthy and make more money in terms of profits. It means the higher growth of pigs gives more margins to farmers. However, there are times when pigs do not grow at their best. And the root cause of the problems lies in the feed.

And the quality of feed depends on the raw material components. There are so many things that need to be taken into account to get the best growth and manage everything. However, you must know the few mistakes that might be causing a negative impact on the overall output. Every wrong step can lower the quality of the feed.

But sometimes pigs grow slowly. Often, the problem starts with the feed. And the feed problem often starts with the raw materials inside it.

Here are 10 common feeding mistakes. Each one can slow down growth. Let's see how to avoid them.

10 Common Feeding Mistakes That Reduce Pig Growth!

1. Poor or changing feed

Pigs eat what you give them. So the feed must be good every time. If the feed keeps changing, then growth changes as well. Use feed you can trust, and the quality that stays the same in every batch.

2. Looking only at protein

Many people just check how much protein is in the feed. But pigs need the right kind of protein to build muscle.

Pigs need these three major things:

- Lysine
- Methionine
- Threonine

These are parts of a protein. So the feed should include ingredients which balance these amino acids well apart from having high percentage of protein

3. Feeding the same feed to all pigs

Baby pigs, young pigs, and big pigs are not the same. They need different feed. If you give one feed to all of them, some get too much, and some get too little. Change the feed for each stage. Your pigs will grow better.

4. Wrong mix of energy and protein

Protein alone does not make pigs grow. Pigs also need energy to use that protein. If there is not enough energy, the pig burns protein for power. Protein costs a lot, so this wastes money. Right balance of energy in the feed is very important for best growth of your pigs.

5. Bad fungus in raw materials

Feeds can grow harmful mould if they are wet or stored badly. This mould makes poisons called myco-toxins.

These poisons can:

- Stop pigs from eating
- Hurt the liver
- Slow down growth

The negative part is that you may not even see the signs. So always use dry, well-tested feed to avoid such issues.

6. Healthy animal and pure breed

Importance of healthy and pure bred animals and their impact on growth cannot be neglected in pig farming. Growth of pigs is suppressed when inbreeding is more. Introduction of pure bred females is important to maximize litter size and piglet growth.

7. Hidden harmful parts in some foods

Some feeds have cheap ingredients that block good nutrition. Mustard cake and raw soya are two examples. But this is easy to manage. Use the right amount and good processing. Then Mustard DOC and Soya DOC are safe and useful.

8. Wrong size of feed pieces

The size of the feed matters a lot.

- Too big, and pigs cannot use all the food. It just passes through them.
- Too small, and it can hurt their stomach and turn to dust.

The right size helps pigs get the most from every bite.

9. Forgetting about water

Water is food too. Even the best feed fails without clean water. If water is dirty or low, pigs eat less right away. And eating less means slower growth. Give clean water all the time. It is just as important as the feed.

10. Messy feeding and waste

This one feels small. But it adds up fast. Late feeding and too-full feeders waste money. Keep feeders neat and feed on time. Then the feed reaches the pig, not the floor.

The main lesson: Good Ingredient Mix feed

Look at the list again. Most of these mistakes have one cause. The feed and ingredients are not good, or they are not the same each time. Good, clean, well-tested feed is the base of healthy pig growth.

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ARTICLE

Anti-Mullerian Hormone in Swines

Ningthoukhongjam Linda[1],Keisham Merina Devi[2], Ritu Gupta[3], Dibakar Baruah[4],T Gyaneshori Devi[2]

Introduction

The reproductive efficiency of sows plays a major role in determining profitability of pig farms, making identification of highly fertile gilts an essential component of breeding programs. Conventional selection criteriasuch as body conformation, teat number and vulvar characteristics provide some indication of future reproductive performance but have limited ability to estimate ovarian reserve (Steel et al., 2019). To improve prediction several reproductive indicators including folliclestimulating hormone (FSH), inhibin B, estradiol (E2), and antral follicle count (AFC) have been investigated. However, predictive accuracy of these markers is often reduced by hormonal fluctuations associated withestrous cycle and significant variation among individuals (Jamil et al., 2016). In contrast, circulating anti-Mullerian hormone (AMH) concentrations remain relatively stable throughout reproductive cycle and can be measured at any stage making AMH a more reliable biomarker of ovarian reserve than many conventional reproductive hormones.Female fertility is influenced by quantity and quality of ovarian follicles collectively referred to asovarian reserve. Anti-Mullerian hormone (AMH) is secreted by granulosa cells of growing follicles and is widely accepted as a reliable biomarker of ovarian reserve (Ireland et al., 2012). A decline in ovarian reserve with advancing age contributes to reduced fertility in sows (Grynnerup et al., 2012). In addition to serving as a biomarker, AMH plays an important role in regulating follicular dynamics by restricting both initial and cyclic recruitment of follicles and by suppressing FSHinduced expression of LH receptors and aromatase thereby modulating follicular development (Hughes et al., 2010).Although AMH is predominantly expressed in granulosa cells of growing follicles, its expression has also been reported in theca cells of pre-ovulatory follicles and in corpora lutea of sows (Almeida et al., 2018). Limited evidence suggests that higher serum AMH concentrations at weaning are associated with an improved estrous response to subsequent boar exposure (Van et al., 2015). However, no significant age-related variation in serum AMH concentrations was observed among gilts at 60, 80, and 100 days of age. Furthermore, studies in heifers have demonstrated that elevated AMH concentrations are associated with an earlier onset of puberty (El-Sheikh et al., 2017).

Serum concentrations of anti-Mullerian hormone in gilts:

Am-in et al. (2020) evaluated serum anti-Mullerian hormone concentrations in prepubertal gilts of different ages to determine their relationship with future reproductive performance. The study examined association of AMH with age at puberty, ovarian follicle population and ovarian response to hormonal stimulation through two separate experiments.In first experiment blood samples were obtained from 200 prepubertal gilts between 90 and 200 days of age to measure serum AMH and estradiol (E2) concentrations and found gilts that reached puberty earlier had significantly higher AMH levels than latepubertal and anestrous gilts ($p < 0.05$). Serum E2 concentrations were also higher in pubertal gilts than in anestrous gilts, whereas age at puberty had no significant effect on number of preovulatory follicles at first estrus.Experiment two involves an intramuscular (IM) injection of 400 IU eCG and 200 IU hCG (PG600®, MSD Animal Health) was administered to 152 prepubertal sows who were then exposed to a boar so that the onset of estrus could be detected. Serum AMH concentrations were higher ($p < 0.05$) in the first 25 gilts to show puberty and additionallyformer also produced more preovulatory follicles ($p < 0.0001$). Taken together, these data point to an association between serum AMH concentrations, degree of physiological maturity and ovarian follicular development in reared gilts.In second experiment a total of 152 prepubertal gilts received an intramuscular injection of 400 IU eCG and 200 IU hCG (PG600®) and were subsequently exposed to a boar for estrus detection. Gilts that exhibited estrus earlier had significantly higher serum AMH concentrations ($p < 0.05$) and a greater number of preovulatory follicles ($p < 0.0001$) than those showing estrus later indicating that higher AMH concentrations are associated with advanced physiological maturity and improved ovarian follicular development in gilts.

Effect of circulating anti-Mullerian hormone:

Xia et al. studied association between circulating anti-Mullerian hormone concentrations in gilts aged 110-160 days and their reproductive performance, while also comparing ovarian and uterine characteristics among gilts with different AMH levels.High circulating AMH concentrations in gilts between 110 and 160 days of age were associated with earlier puberty had improved reproductive performancewith greater herd retention over three parities. Gilts with higher AMH levels also exhibited enhanced uterine development, characterized by increased glandular density, vascularization and expression of uterine functional markers. In addition, they possessed more antral follicles and greater follicular gene expression.

Transcriptomic analysis revealed enrichment of genes involved in steroid hormone biosynthesis arachidonic acid metabolism and gonadotropinreleasing hormone signaling, suggesting a molecular basis for the superior reproductive potential of highAMH gilts.

Anti-Mullerian Hormone in boars:

Boars selected for artificial insemination (AI) programs are typically evaluated based on genetic merit and conventional semen quality parameters, such as sperm concentration, motility and morphology(Broekhuijse et al., 2011). However, boars with comparable semen quality may still differ in sperm storage capacity and field fertilityhighlighting limitations of conventional semen evaluation (Parrilla et al., 2012).

Significant research has been focused on identifying seminal plasma (SP) biomarkers of sperm function and fertility to improve prediction of boar reproductive performance. As seminal plasma interacts with sperm during ejaculation and with female reproductive tract after insemination, representing a promising source of fertilityassociated biomarkers (Rodriguez et al., 2011).Anti-Mullerian hormone is a 140 kDa dimeric glycoprotein produced by Sertoli cells that plays a crucial role in male fetal sexual differentiation by inducing the regression of Mullerian ducts (Josso et al., 1993). The presence of this hormone in SP is of interest for studying male reproduction as it has been suggested to provide information regarding spermatogenesis (La et al 2010). In addition, the fact that SP-AMH is able to bind to sperm surface suggests a role for this hormone on sperm function after ejaculation (Fallat et al 1998).Barranco et al.2020 investigated the association between seminal plasma anti-Mullerian hormone (SP-AMH) concentration and sperm quality, function and fertility in artificial insemination boars. SP-AMH levels were measured using an ELISA and their relationship with semen characteristics and fertility records from over 3,000 inseminated sows was evaluated. The study found considerable variation in SP-AMH concentrations among ejaculates, independent of breed. Although SP-AMH was significantly associated with sperm concentration ($p < 0.05$), it showed limited value in predicting other sperm quality traits, sperm functionor in- vivo fertility of liquidstored semen.

Conclusion

Anti-Mullerian hormone (AMH) is a promising biomarker of reproductive potential in swine. In gilts, circulating AMH concentrations are closely associated with ovarian reserve, earlier puberty, and improved lifetime reproductive performance, making it a valuable tool for selecting replacement breeding females. In boars, although seminal plasma AMH is related to sperm concentration, its utility as a predictor of overall semen quality and fertility remains limited. Overall, AMH has considerable potential for improving reproductive management in swine, but further research is needed to establish standardized applications in breeding programs.

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Importance of Needle Teeth
Clipping in Pig Management

Dr Deepak Kumar Kashyap, Dr Devesh Kumar Giri

Introduction

Pig farming is generally easier than other types of livestock farming due to its low maintenance requirements. It is highly popular for meat (pork) production, as well as for the leather and other associated industries. The demand for pork is high in certain regions, providing quick financial returns due to the large litter size of pigs, which typically ranges from 8 to 16 piglets. However, handling such a large litter size during the nursing period can be challenging, and various factors can negatively impact piglet growth during this time. One major factor is the presence of needle teeth. These sharp teeth can injure the teats of the sow during suckling, causing severe pain and irritation. This often leads the sow to refuse to lie down or allow the piglets to nurse.

What are Needle Teeth?

Newborn piglets are born with needle teeth, which are actually the deciduous canine and third incisor teeth. These sharp teeth can accidentally penetrate the sow's skin during suckling.

Importance of Needle Teeth Clipping

- **Avoids Injury to the Sow's Teats:** The excessive sharpness of needle teeth in piglets can cause superficial to deep wounds on the sow's udder, leading to udder infections (mastitis). This causes severe stress and pain, which ultimately leads to a fall in milk production.
- **Improves Nutritional Supply:** Clipping provides a smooth surface, allowing piglets more comfortable opportunities to nurse. Increased nursing opportunities ensure better supply of nutrients essential for the growth period, preventing runts.
- **Protection from Face and Body Injuries:** Apart from injuring the sow, piglets also inflict injuries on each other with their sharp teeth during fighting or playing. In severe cases, these wounds can become infected, leading to illness or even the death of the animal.
- **Prevention of Piglet Anemia:** Piglet anemia is a major problem after birth. Sharp needle teeth act as a predisposing factor because the irritation they cause makes the sow refuse to let the piglets suckle. This leads to a deficiency in milk intake. Since milk is a primary source of nourishment, its deficiency results in iron deficiency, which is the causative factor for piglet anemia.

Time of removal

The procedure to clip these needle teeth is normally performed within a week after birth, though it is best executed within the first 1 to 3 days.

Procedure

- **Preparation:** The handler must prepare by wearing gloves and washing the piglet's mouth with a normal saline solution (Fig.1).

Fig. 1: Washing of mouth with normal saline

- Disinfect all instruments, ensuring the clippers or cutters are ready alongside an antiseptic solution, hemostatic agents, and gauze to check any potential bleeding.
- **Restraint:** Restrain the piglet by supporting its body with one hand while using the other hand to open its mouth. Avoid applying excessive pressure to the face, snout, or other sensitive areas.
- **Exploration of needle teeth:** Use your fingers to gently open the mouth by separating the upper and lower lips, or by applying gentle pressure to the jaw joint (Fig.2).
- Closely observe all the teeth present—four in the upper jaw and four in the lower jaw. It is not necessary to clip all the teeth; only clip the sharp, pointed ones that cause irritation during suckling.

Fig.2: Restraining and placement of clipper over needle teeth

- **Clipping:** Open the jaws of the side-cutter/clipper and slide it down the tooth, clipping approximately one-third of the upper part of the tooth (Fig.2&3).

Fig.3: Cutting of needle teeth with clipper

- **Post-Clipping Care:** Check the clipped tip for any bleeding. If bleeding occurs, quickly apply a hemostatic solution, ice, or gentle pressure using gauze over the area. Check again to ensure bleeding has completely stopped. Wash the mouth once more with normal saline or an oral mouthwash, and ensure the piglet's respiration is normal.

Precautions

- Ensure safety throughout the procedure; avoid rough handling and improper positioning of the animal.
- Avoid over-cutting or extracting the teeth too deeply.
- Take extreme care not to damage the tongue, gums, or other sensitive soft tissues during clipping.
- Clean and sterilize the clipper after handling each animal.
- Avoid unnecessary clipping; cut only the sharp, pointed teeth.

Conclusion and Suggestions

Early and timely clipping of needle teeth helps maintain proper milk production by the sow and ensures adequate nutrient delivery to the piglets. It prevents secondary metabolic disorders and unusual injuries among littermates. Therefore, it is highly suggested not to delay the clipping of needle teeth, especially based on past management experiences. Teeth clipping is not a minor task; it is a vital management practice to avoid retarded growth in piglets.

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EVENT CALENDER

ECPLF 2026
14–17 SEPTEMBER, 2026
Venue : Valencia, Spain
Website : https://www.ecplf2026.com

ILDEX-INDONESIA
16 –18 SEPTEMBER, 2026
Venue : Hall 5 & 6, Indonesia Convention Exhibition (ICE) BSD City, Tangerang
Website : https://www.ildex-indonesia.com/

SPACE
15–17 SEPTEMBER , 2026
Location : Parc Expo, Rennes, France.
Website : https://www.space.fr/en/

ALLEN D. LEMAN SWINE CONFERENCE 2026
19–22 SEPTEMBER, 2026
Venue : St Paul Minnesota, USA.
Website : https://lemanconference.umn.edu

EXPOMEAT–2026
22–24 SEPTEMBER 2026
Venue : Sao Paulo, Brazil.
Website : https://www.expomeat.com.br/

INTERNATIONAL PRRS SYMPOSIUM–2026
6–8 OCTOBER, 2026
Venue : Barcelona, Spain.
Website : https://iprrs2026.or

PORK EXPO MEXICO–2026
21–23 OCTOBER 2026
Venue : Aguascalientes, Mexico.
Website : http://pork-expo.org/

15TH WORLD SWINE INDUSTRY EXPO–2026
22–24 OCTOBER, 2026 | Changsha, China
Venue : Changsha International Convention & Exhibition Centre
Website : https://www.lemanchina.com/

INAUGURAL APHVA CONFERENCE 2026
26–29 OCTOBER, 2026
Venue : Hobart, Tasmania
Website : aphvapresident@gmail.com

EUROTIER–2026
10–13 NOVEMBER, 2026 | Hanover, Germany
Venue : Hanover Exhibition Centre
Website : https://www.eurotier.com/en/

ICAR Develops Indigenous Vaccine for African Swine Fever

Scientists at ICAR-National Institute of High Security Animal Diseases (ICAR-NIHSAD), Bhopal, have developed the vaccine using a novel attenuated ASFV Genotype II virus

The Indian Council of Agricultural Research (ICAR) has developed India's first indigenous African swine fever (ASF) vaccine for pigs. The ASF, caused by the African swine fever virus, is considered as one of the most devastating trans-boundary animal diseases affecting domestic and wild pigs worldwide. The ICAR termed the development as a "major leap" in animal health.

Director General of ICAR M.L. Jat said the breakthrough marks the dawn of a new era in veterinary science. "It reflects India's growing scientific capability to develop world-class animal health solutions and paves the way for a new generation of indigenously developed vaccines and innovative technologies that will strengthen livestock health, enhance disease preparedness, and support the nation's food and biosecurity," he said.

Scientists at ICAR-National Institute of High Security Animal Diseases (ICAR-NIHSAD), Bhopal, have developed the vaccine using a novel attenuated "ASFV Genotype II virus". "The vaccine has successfully undergone comprehensive laboratory evaluation, including sterility, purity, safety, genetic stability, immunogenicity, protective efficacy and virulence reversion studies," the Union Agriculture Ministry said in a statement.

Helps pig farming sector

The vaccine is recommended for healthy pigs above eight weeks of age and is administered as a 1 millilitre (ml) intramuscular injection, followed by a booster dose 14 days after the primary vaccination. "The indigenous vaccine is expected to substantially reduce pig mortality, minimise economic losses and improve the livelihoods of pig farmers across the country. By providing an effective preventive tool against one of the world's most destructive livestock diseases, it will significantly strengthen India's animal health security and support the sustainable growth of the pig farming sector," the Ministry said.

The ASF's mortality rates may approach 100% and the disease has caused "severe socio-economic losses" to the global pig farming sector. "Since its first detection in India in 2020, ASF has spread to several States and Union Territories, resulting in massive pig mortality, disruption of pig production, restrictions on animal movement and trade, and significant livelihood losses for smallholder pig farmers, particularly in the Northeastern region," the Ministry said in the release.

The Ministry said in the absence of an effective treatment or a commercially approved vaccine in India, disease control has largely relied on rapid diagnosis, culling of infected animals and strict biosecurity measures. "The economic impact of ASF outbreaks in India has been significant. During the initial outbreaks in Assam in 2020 and 2021, pig mortality and culling resulted in estimated losses of approximately ₹276 crore. In Mizoram, ASF outbreaks have reportedly affected more than 11,382 households up to 2025, resulting in an estimated financial loss of approximately ₹982 crore," the Ministry said.

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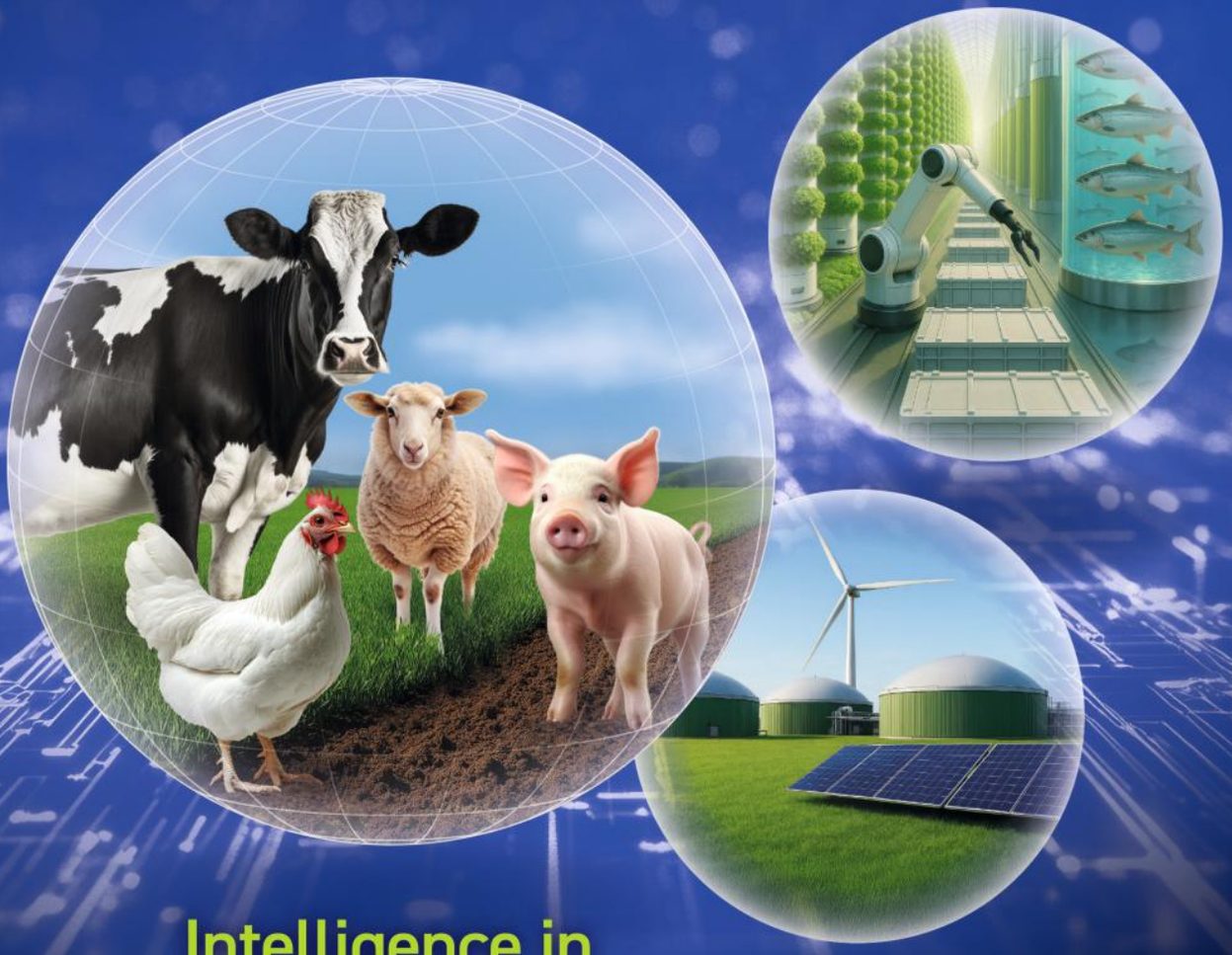

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ARTICLE

Kidney Worm (Stephanurus Dentatus)

Infection of swine

Alok Kumar Singh[1]#, Deepali Tiwari[2], Pradeep Kumar[3] and Alok Kumar Dixit[1]

Occurrence

Stephanurus dentatus infection is prevalent worldwide mainly common in tropical and subtropical countries having warm weather it commonly affects pelvis of kidney, perirenal fat, walls of ureters of swine also known as stephanurosis. Due to erratic migration parasites reaches to abdominal and thoracic organs and in spinal cord of pigs. All age groups, including foetuses, are susceptible for its infection. Pigs raised in tropical or subtropical areas on moist, shaded pastures are most often infected. Stephanurus dentatus infections once were common in several country. However, good control of the parasite was realized once its life cycle was determined. Indoor housing, confinement rearing and more effective parasiticides have further improved control. This parasite is mainly prevalent in feral and wild pigs and it remains subclinical and unnoticed until growth and productivity is harmed.

Etiology

- Adult kidney worms are 20-45 mm long and about 2 mm in diameter. These are stout body worm that encyst in pair along the ureters in perirenal fat and kidney of pig.
- They have a black and white mottling related to internal organs and their contents. Their life cycle is lengthy.
- Patency seldom is reached in less than 9-12 months and is usually only achieved in swine that reach breeding age. The mature parasites produce ova for at least three years.
- The ova are thin walled, modulated, and measure 120 by 70 um. Ova are passed in the host's urine.
- In a warm, moist, shaded environment, the ova hatch in one to two days and larvae are infective in three to five days. Under favourable conditions, the larvae can survive for several months.
- The larvae are susceptible to extreme environment, desiccation, and sunlight and don't survive <5°C.

Epidemiology

- Invasion by larvae can occur prenatally across the placenta, by skin penetration, ingestion in feed or, perhaps, by ingestion of earthworms (act as paratenic host). Ingestion probably is the most common route of infection.
- Larvae go through five developmental stages (L1-L5) to reach maturity. Ingested L3 larvae migrate from the small or large intestine to various sites. Many travels via mesenteric lymphatics or by portal venous blood to the liver where they migrate extensively for two to four months.
- The larvae then penetrate the liver capsule, cross the peritoneal cavity and encyst in their definitive site: the perirenal fat or near ureters. Here they establish fistulous connections with the renal pelvis or ureters.
- When mature, they discharge their ova into the urine. Occasionally the parasites can be found within the kidney and discharge in urine seen.
- When infection by the L3 occurs transcutaneously, larvae first migrate to the lungs, then ascend the trachea to the pharynx, and finally are swallowed to reach the intestine. They then follow the same route followed by ingested larvae as in liver migration ultimately affecting in common pattern.
- Development to patency usually takes at least 9-12 months after ingestion of larvae.
- Prenatal infections can result in patency in less than five months but this route of infection seems only to occur infrequently. Most swine are marketed before patency can occur.

Pathogenesis

- Severe damage is caused by the migrating larvae extensively 3-9 month. During migration through the portal vein, they often produce a severe phlebitis.
- Prolonged migration in the liver, prior to patency of the parasite, can cause severe interstitial hepatitis with extensive fibrosis.
- In slaughter age swine, hepatic fibrosis and abscessation can be extensive and lead to liver condemnation. Because larvae migrate widely, lesions are produced at many different sites.
- It mainly affects urinary system and hepatic system and some larvae migrate to erratic site where it produces lesion in organs and in foetus also.
- Clinical signs
- An unthrifty appearance, slow growth, poor feed conversion and occasional deaths in the herd are common signs.
- Other signs are usually seen only sporadically and reflect localization of larvae in aberrant sites.
- Posterior ataxia or paralysis occurs occasionally in pigs when larvae migrate in or along the spinal cord.

Lesions

- Lesions depend somewhat on the stage of parasitism observed. Often the most obvious lesion is a gray to white, cirrhotic liver which may contain small abscesses.

- Lesions usually are more severe than those caused by the larvae of Ascaris suum.
- Additional lesions may include swelling of mesenteric lymph nodes, phlebitis in the portal vein with occasional thrombi, and small abscesses in the pancreas or lung.
- Other less common lesions include peritonitis (sometimes with intussusception of the intestine), pleuritis, and localized abscesses or abscess-like lesions in the spleen, lumbar muscles, retroperitoneum or spinal cord.
- Adult worms are most often found in or near the kidney, in walls of the ureters, or in the perirenal fat. Differential diagnosis with Ascaris suum is essential as it have some similar post mortem finding and prepatent infection are difficult to diagnose and definitive diagnosis depend on demonstration of worm or lesion at post mortem examination.

Diagnosis

- Diagnosis is usually made at necropsy by observation of the abscesses and parasites at sites of localization. The extensively-scarred, enlarged liver seen with severe infestations is rather unique in swine and may suggest the diagnosis, especially in areas where the parasite is endemic.
- Diagnosis can be made in the live animal or at necropsy by identifying ova in the urine. The first urine passed in the morning often contains many ova. When worms are in kidney or in cyst that open in ureters than eggs may recovered in urine.
- Detection of eggs in urine occurs by gravity sedimentation, sedimentation by centrifugation, floating technique. Extensive economic loss occurs due to poor feed conversion ration and condemn of organs that are mainly affected as its liver show cirrhosis, scar formation, extensive thrombosis of portal vein and in errant migration in lungs can be affected.

Control and Treatment

- Control is possible through a breeding program that utilizes only gilts and young boars. These are slaughtered after producing one litter. This usually precludes their living long enough for ova of S. dentatus to be passed in their urine.
- Eradication has been achieved on some production sites by this and management changes that preclude swine coming into contact with the parasite on pasture in swamp areas. Placing feeding and watering equipment on concrete in a sunny, well-drained location is a simple management practice that has value.
- Confinement housing usually eliminates losses from kidney worms. Treating sows a few weeks prior to farrowing will usually prevent transplacental transmission of the parasite to foetuses.
- Antiparasitic treatment, sanitation, management changes are adopted for effective control of worms in susceptible swine population.
- The proper disposal of urine and strict avoid of ingestion of earthworm.
- The infected pigs should be kept in separate sty.
- Also control in intermediate host like earthworm which act as paratenic host and in some conditions act as source of transmission of infection.
- Stephanurus dentatus infected sow treated with suitable antiparasitic drugs such as: Ivermectin, Levamisole and Fenbendazole administer through feed and water which increases its efficacy and better control of parasite population as it effectively reaches in predilecting site in suitable concentration hence effective killing of worms. Hence with proper management, bio security measures and anthelmintics treatment in suitable period of infection causes effective control of infection and minimal loss to farmer economically.

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Managing Animal Behaviour on Pig Farms

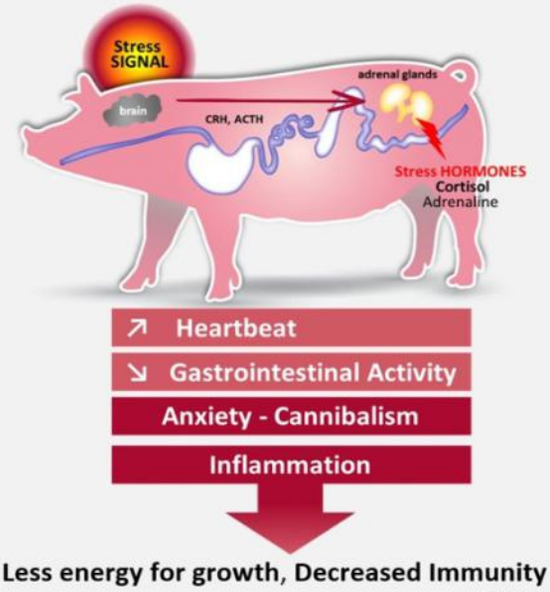
Faced with the constant challenges linked to animal nervousness in pig farming, TECHNA is innovating with **ROBUS ZEN**, a solution that tackles the root causes of the problem. This article explores multifactorial strategies for improving animal behaviour, offering rewarding prospects for pig farming.

Influence of rearing conditions on pig behaviour

Animal behaviour in pig farming can be influenced by a number of factors (housing, feeding, nutrition, watering, sanitation, etc.) and can be expressed in many ways (**digestive**, cardiac or respiratory problems, nervousness and deviant behaviour, poorer performance, poorer quality of processed products, etc.).

Farmers and all their technical partners (constructors, genetics, feed manufacturers, vets, etc.) work daily to improve living conditions for pigs by protecting them as best they can from various sources of **perturbations** during their presence on the farm.

Negative effects of stress on pigs' metabolism

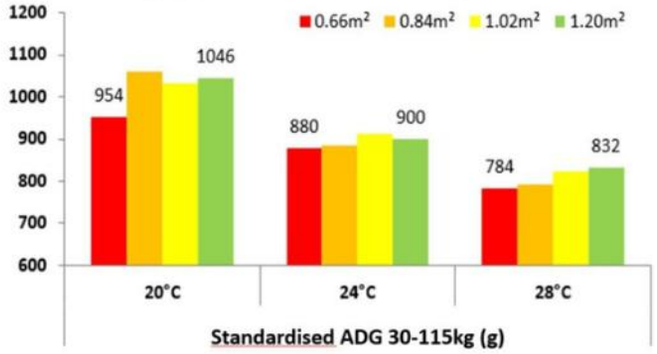


Less energy for growth, Decreased Immunity

Source : *Techna, 2022*

Regulations, practices and attitudes are changing with regard to the living conditions of pigs. The aim is to allow the animals to express as many natural behaviours as possible (free-range pregnant sows, free-farrowing pens, socialisation of piglets in the farrowing unit, provision of toys or materials that can be handled, natural light, presence of litter, ban of systematic tail docking, production of whole male pigs, etc.). Researchers are also helping to advance the industry by quantifying and analysing the impact of various changes in housing and farming practices. For example, the publication by Massabie et al. in 2006 clearly demonstrates the cumulative effect of different stress factors. The graph (Figure 2) from this publication shows and quantifies the impact of different densities coupled with different temperatures.

Evolution of fatteners' ADG according to density at different temperatures – Massabie et al., 2006



Some developments, originally virtuous such as the ban of **tail docking**, are however leading to new challenges on farms. A longer **tail** is more likely to be bitten, and this can lead to extreme cases of intense **tail biting** and a alteration of the integrity of pigs.

Another example to illustrate the importance of nutrition in improving **pig welfare** is the publication by Minussi et al, 2023. The conclusion is clear: a lack of amino acids is a source of stress in pigs and can manifest itself in less rest in the pen or in deviant behaviour such as **tail biting** despite the enrichment of the pen with manipulable materials (rope, wood, etc.).

Impact of tail docking on tail lesions in fatteners

	Docked tail	Undocked tail	*P-value*
Absence of tail lesions (%)	**99,8**	56,0	*<0,001*
Mild & Fresh tail lesions (%)	0,1	**8,8**	*<0,001*
Mild & Chronic tail lesions (%)	0,1	0,9	*<0,001*
Severe & Fresh tail lesions (%)	0,0	**7,2**	*<0,001*
Severe & Chronic tail lesions (%)	0,0	**27,3**	*<0,001*
Ear lesions (%)	**9,6**	4,6	*0,001*

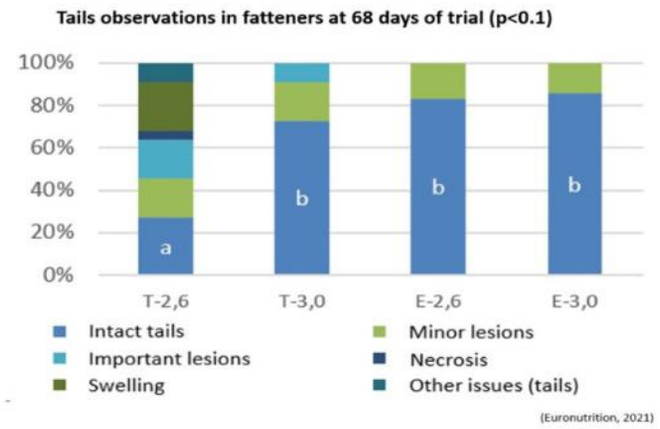
(Scollo et al., 2023)

ROBUS ZEN: a major advance in controlling aggressive behaviour in pigs

TECHNA works on improving the behaviour of pigs through **feed** and **nutrition**. Several trials have been carried out at the Euronutrition experimental station to enhance the solutions available to our feed manufacturer customers and their farmers. The feed programme is the first lever for **reducing stress**; access to feed and the daily quantities distributed are essential for satisfying nutritional requirements.

In nutritional terms, certain nutrients are well known for their effects on animal behaviour (tryptophan, magnesium, fibre, etc.).

A recent trial conducted at Euronutrition tested the impact of 4 feeding strategies on the performance and tail lesions of fattening pigs between 70 and 180 days of age.

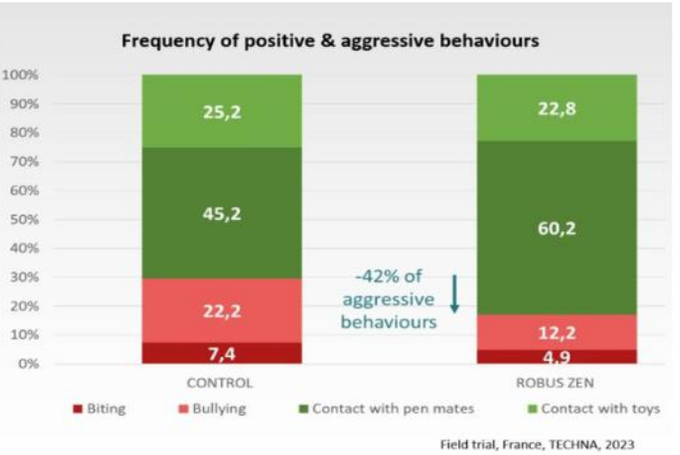


Growth was improved, without any deterioration in the FCR, not only by the quantity of feed distributed daily (+14g ADG with a restriction at 3.0kg/day) but also (and above all) by the nutritional levels (+35g ADG with the addition of tryptophan and fibre).

As previously mentioned, caudal lesions were observed at 68 days of age and the lesions decreased sharply with the increase in the feed quantity and with the addition of tryptophan and fibre.

Despite all its progress, behaviour management in pig farming is still a problem, both from a behavioural point of view and in terms of its technical and economic impact. FEEDIA has continued its efforts and developed ROBUS ZEN, a solution containing plants, plant extracts, additives and minerals. Incorporated into feed, ROBUS ZEN has already shown interesting effects with :

- **a reduction in aggressive behaviour**
- **heavier animals over the same fattening period : +3 kg live weight**
- **fewer dead or removed pigs during the fattening : -1.1% removed pigs**



Behaviour management in pig farming is a major concern for consumers, farmers and their technical partners. TECHNA is involved in finding effective, applied solutions to limit the negative effects of nervousness in pigs. Our results support our research guidelines and methods, with dietary and nutritional recommendations such as ROBUS ZEN.

ARTICLE

Status of African Swine Fever in India

Gourab Basak

African Swine Fever (ASF) possesses a severe global threat to pigs having significant regional surges. Its epidemiology focuses on high lethality in swine population, characterizing nearly 100% mortality in domestic herds, complex transmission cycles and extreme environmental persistence. ASF is caused by the African Swine Fever Virus (ASFV); which is a large, double-stranded DNA virus of the family, Asfarviridae.

The domestic pigs and wild boars are highly susceptible. African wild suids, e.g., Warthogs, bush pigs and giant forest hogs act as natural reservoirs. They generally experience asymptomatic or subclinical infections, allowing the virus to persist unnoticed in the wild. The incubation period ranges from 4 to 19 days. Clinically it is manifested in per-acute/acute, subacute and chronic forms.

The first form is the most critical one caused by highly virulent strains, manifesting high fever (up to 42°C), lethargy, cyanosis (blue-purple extremities), internal haemorrhage and death within 6 to 13 days. Symptoms are less severe in subacute form but include abortion storms in pregnant sows and fluctuating fevers, with mortality ranging from 30% to 70%. The chronic form is characterized by joint swelling, respiratory distress and skin ulcers over several months; low mortality but survivors become permanent viral shedders (carriers).

ASFV is strictly non-zoonotic, i.e., it does not infect humans and possesses no public health risk. ASF transmits directly through contact and inhaling droplets from the infected pigs, ingestion of contaminated feed and bites of soft ticks. Ticks of the genus Ornithodoros act as natural reservoirs. When they bite a pig to feed on its blood, the virus is transmitted to the pig. The virus sheds heavily in saliva, tears, nasal secretions, urine, faeces and blood from open wounds.

Feeding untreated food scraps, restaurant waste or garbage containing infected pork to pigs is a primary cause of global spread. Crops harvested from fields where infected wild boars roam, can carry live virus particles. Livestock trucks, shipping containers and farm tools easily transmit the virus between regions if not deeply disinfected. At the same time, farm workers and visitors can transport the virus on dirty boots, clothes and unwashed hands.

The virus is highly resistant and can survive for months in the environment or in carcass/meat. It can survive for more than 100 days in fresh or frozen pork, up to 180 days in salted dried meat and for months in contaminated soil or deep faeces. Wild boars migrate across open borders without human control, hence, constantly introduce the virus to new domestic farming zones.

ASF is maintained and propagated through four distinct, interconnected cycles, viz., sylvatic, domestic, wild boar and habitat-wild boar cycles. The sylvatic cycle is the ancient one, primarily persists in sub-Saharan Africa; where the virus circulates between wild African suids (warthogs) and soft ticks (Ornithodoros species) inhabiting their burrows. The domestic cycle occurs entirely within the domestic pig populations. Transmission is driven by live pig movement, swill feeding (feeding contaminated pork scraps) and contamination via workers, vehicles and fomites.

Wild boar cycle is predominant in Eurasia and Europe; propagated by migratory wild boars through direct contact across the vast geographical territories independent of human activity. The habitat-wild boar cycle is driven by the persistence of the virus in the environment. The freezing winter temperatures preserve ASFV in wild boar carcasses. Healthy boars are infected when they scavenge these carcasses or through the soil, contaminated by the decomposed tissues.

The transboundary introduction of ASF in India was characterized in the year 2020; and officially reported the first ever outbreak in January, 2020 along the international borders of Assam and Arunachal Pradesh. Since then, it remained as a persistent, endemic disease in the country. ASF is driven by distinct spatiotemporal waves, interstate trade routes and backyard swill-feeding practices. In fact, its epidemiological profile, spans from its geographical entry points to active outbreaks and structural transmission characteristics. Regarding the viral genotype, molecular sequencing by national laboratories confirms that the circulating virus in India belongs to Genotype II (specifically sub-genotype IIa); which is the same hyper-virulent strain responsible for the pan-epizootic expansion.

The outbreaks in India revolve around two cyclic trends, viz., Pre-monsoon (March to April) period, which is associated with a spike in local backyard livestock trading and Post-monsoon (August to November) period, which is accelerated by heavy seasonal rains and high humidity that help transport the virus mechanically through soil and runoff. Since its entry into the country, the virus has manifested sharp, devastating epidemic waves, recorded in 2020, 2022 and 2025.

Initially the disease was limited to Northeast India but human-mediated livestock transport has enabled the virus along major trade lines into a nationwide endemic state. The Northeastern region remains the primary hot zone or the hotspots of the disease; because of high pig densities and cultural dietary reliance on pork. Persistent epicentres of the same have actively mapped in Assam, Arunachal Pradesh, Mizoram and Nagaland.

In Assam, cases have emerged in regions like Kaliabor and Mahmora. In fact, the virus entirely wiped-out quality commercial herds, forcing administrations to ban all pork transportation and sales in the affected districts. ASF cases in Kohima led to strict bans on pig slaughter and pork transport, while intercepted infected trucks near the Assam-Bengal border.

Currently, the disease has expanded Pan-India; with its presence in the western and southern regions. Severe active cases have emerged in Udupi, Karnataka linked to both domestic farms and wild boars, Goa and Banaskantha, Gujarat. In Udupi, laboratory confirmed cases of ASF in wild boars and domestic swine been recorded in Kundapur taluk. Authorities also declared a 1 km infected zone, shut down the local pig farm and implemented mandatory culling alongside a 90-day closure.

The National Animal Disease Referral Expert System (NADRES) has tracked high risks across 55 distinct districts covering states like Kerala, Madhya Pradesh, Himachal Pradesh, Jammu and Kashmir and Tamil Nadu. The primary risk factors that drive the ASF in India include low-input backyard farming, widespread swill feeding and human-mediated dissemination.

Generally, majority of the Indian pig population is raised in unorganized, small-scale backyard enterprises with minimal physical separation. As a result, the field surveys showed that only about 6.9% of local farmers use protective wear and fewer than 28% use standard boot-dips. At the same time, roughly 35% of smallholders, practice swill feeding, i.e., providing pigs untreated food scraps and restaurant waste that enable easy spread of the virus particles among the healthy pens.

As the clinical symptoms of ASF overlap with those of Classical Swine Fever (CSF), a lack of field awareness often leads farmers to face mortality of the pigs and thus, further spreading of the virus to new areas. Hence, there lies a huge socioeconomic impact due to ASF. In the North Eastern region alone, the total cumulative economic loss from pig mortalities and culling operations is estimated between ₹17.87 billion and ₹44.62 billion. Moreover, during the outbreaks, the local administration enforces immediate 1 km radius culling zones and 10 km surveillance perimeters upon confirmation, along with a total ban on pork movement across affected borders.

Therefore, to culminate the disease, vaccination could be a milestone in prevention and control. ICAR-National Institute of High Security Animal Diseases (NIHSAD) in Bhopal have successfully developed India's first indigenous live-attenuated ASF vaccine using a cell-line method. This could be a practical tool in strategic transition from reactive culling to proactive, large-scale herd immunization; aiding in reducing production costs and improving biosecurity.

Besides, controlled isolation and proper scientific disinfection could be promising preventive and control measures. Isolation of newly purchased pigs in a dedicated quarantine facility for at least 30 days before introduction in the herd should be practiced. As the virus is very sturdy in organic environments, standard washing with water is not enough. Farmers must follow strict physical segregation rules combined with target chemical disinfection to successfully protect their pigs.

Therefore, application of disinfectants thoroughly to every crack, wall and surface should be made. The disinfectant must remain wet on the surface for a minimum of 30 minutes to ensure total viral inactivation. World Organisation for Animal Health (WOAH) outlines several highly effective disinfectants, provided they achieve a 30-minutes minimum contact time; these include

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Disinfectant	Required Concentration	Best Use In
Sodium Hydroxide (Caustic Soda)	0.8% solution	Structural concrete floors, vacant sties, and brickwork
Sodium Hypochlorite (Bleach)	0.03% to 0.5% available chlorine	Vehicle wheel dips, general tools, and clean surfaces
Slaked Lime (Calcium Hydrate)	Dry powder or thick whitewash paint	Earthen walkways, dirt floors, and structural walls
Virkon -S / Potassium Peroxymonosulfate	1% solution (per manufacturer guidelines)	Footbaths, rubber boots, transport crates, and equipment

सुअर पालन में उन्नत प्रजनन
प्रबंधन से बढ़ाएँ उत्पादकता एवं आय

उमा कांत वर्मा[1*], स्वरूप देबरॉय[2], जय प्रकाश[3] एवं नरेंद्र कुमार[4]

परिचय

सुअर पालन ग्रामीण परिवारों के लिए पशुपालन का एक महत्वपूर्ण व्यवसाय है और भारत के उत्तर–पूर्वी क्षेत्र में यह विशेष रूप से महत्वपूर्ण है। यह परिवारों की खाद्य सुरक्षा, रोजगार और आय बढ़ाने में योगदान देता है। सुअरों की तेजी से बढ़ने और प्रजनन करने की क्षमता के कारण, सुअर पालन किसानों और युवा उद्यमियों, दोनों के लिए एक आकर्षक व्यवसाय बन गया है। हालाँकि, फार्म पर सुअरों की संख्या बढ़ाने से ही मुनाफा नहीं बढ़ता। झुंड की प्रजनन क्षमता सुअर पालन व्यवसाय की सफलता तय करने वाले मुख्य कारकों में से एक है। जो मादा सुअर नियमित रूप से स्वस्थ बच्चे पैदा करती है, वह सीधे तौर पर फार्म की आय में योगदान देती हैय वहीं, अच्छी जेनेटिक गुणवत्ता वाले नर सुअरों का सही इस्तेमाल आने वाली पीढ़ियों के प्रदर्शन को बेहतर बना सकता है। प्रजनन प्रबंधन में कई गतिविधियाँ एक साथ शामिल होती हैं। इनमें प्रजनन के लिए नर सुअरों और मादा सुअरों का चयन, वीर्य इकट्ठा करने के लिए नर सुअरों को प्रशिक्षित करना, वीर्य की जाँच और उसे सुरक्षित रखना, सही समय पर प्रजनन के लिए तैयार होने की अवस्था का पता लगाना, कृत्रिम गर्भाधान का सही समय तय करना, साफ–सफाई से गर्भाधान करना और प्रजनन के बाद व्यवस्थित निगरानी करना शामिल है। जब इन प्रक्रियाओं का सही तालमेल बिठाया जाता है, तो प्रजनन से होने वाले नुकसान को कम किया जा सकता है और प्रजनन करने वाले झुंड की उत्पादकता को बढ़ाया जा सकता है।

नर सुअर का चयन एवं प्रबंधन

सुअरों के झुंड की जेनेटिक क्षमता तय करने में नर सुअर की अहम भूमिका होती है। यह तब और भी जरूरी हो जाता है जब कृत्रिम गर्भाधान का इस्तेमाल किया जाता है, क्योंकि एक बेहतरीन नर सुअर के वीर्य से कई मादाओं का प्रजनन किया जा सकता है। प्रजनन के लिए चुना जाने वाला नर स्वस्थ, फुर्तीला और शारीरिक रूप से ठीक–ठाक होना चाहिए। मजबूत पैर और खुर बहुत जरूरी हैं क्योंकि चलने–फिरने में दिक्कत होने से प्रजनन क्षमता पर असर पड़ सकता है। किसानों को नर को चलते हुए देखना चाहिए और ऐसे नर को नहीं चुनना चाहिए जिनमें अकड़न, कमजोरी या पैरों में कोई खराबी हो। शरीर की बनावट और सेक्सुअल व्यवहार पर भी ध्यान देना चाहिए। अच्छी शारीरिक बनावट वाला नर, लेकिन कम सेक्सुअल इच्छा (लिबिडो) वाला नर, प्रजनन के तौर पर अच्छा प्रदर्शन नहीं कर सकता है। इसलिए, प्रजनन को चुनने से पहले उसकी शारीरिक सेहत और प्रजनन व्यवहार, दोनों की जाँच करनी चाहिए। नर सुअर को आम तौर पर 7–8 महीने की उम्र में ट्रेनिंग दी जा सकती है। नेचुरल मेटिंग के लिए इस्तेमाल होने वाला एक वयस्क नर हफ्ते में लगभग 6–10 बार मेटिंग कर सकता है। नेचुरल मेटिंग में, एक नर को लगभग 10 मादाओं के लिए रखा जा सकता है, जबकि कृत्रिम गर्भाधान में, एक सही नर लगभग 40–50 मादाओं के लिए वीर्य दे सकता है।

वीर्य इकट्ठा करने के लिए नर सुअर को ट्रेनिंग देना

एक सफल कृत्रिम गर्भाधान प्रोग्राम सही तरीके से ट्रेंड नर सुअरों पर निर्भर करता है। ट्रेनिंग आमतौर पर 7–8 महीने की उम्र में शुरू की जाती है। नर सुअर को मादा पर चढ़ने के लिए प्रोत्साहित करने और उसे वीर्य इकट्ठा करने के माहौल से परिचित कराने के लिए एक डमी मादा सुअर का इस्तेमाल किया जाता है। ट्रेनिंग धैर्य के साथ की जानी चाहिए। नर सुअर का स्वभाव और उम्र, माहौल की स्थिति और हैंडलर का अनुभव, ये सभी ट्रेनिंग की गति को प्रभावित कर सकते हैं। शांत माहौल खास तौर पर जरूरी है क्योंकि कठोर व्यवहार या बहुत ज्यादा तनाव नर सुअर को मादा पर चढ़ने करने से रोक सकता है। डमी को जानवर के आकार के अनुसार सही ऊंचाई पर एडजस्ट किया जाना चाहिए। कलेक्शन एरिया में बार–बार ले जाने से नर सुअर को इस प्रक्रिया की आदत हो सकती है। कुछ नर सुअर जल्दी प्रतिक्रिया देते हैं, जबकि कुछ को कई हफ्तों की धैर्यपूर्ण ट्रेनिंग की जरूरत हो सकती है। एक बार जब नर सुअर सफलतापूर्वक ट्रेंड हो जाता है, तो वीर्य इकट्ठा किया जा सकता है। नियमित लेकिन नियंत्रित तरीके से संग्रह करने से वीर्य की उपलब्धता बनी रहती है और प्रजनन करने वाले नर पर अनावश्यक तनाव नहीं पड़ता।

गर्मी का पता लगानाः

- सुअर के प्रजनन प्रबंधन में हीट का सही–सही पता लगाना सबसे जरूरी कौशलों में से एक है। अगर गलत समय पर गर्भाधान किया जाए, तो अच्छी गुणवत्ता के वीर्य से भी गर्भधारण सफल नहीं हो पाता।
- हीट की जांच हर दिन एक ही समय पर दो बार करनी चाहिए। नर सुअर की मौजूदगी से हीट का पता लगाना आसान हो सकता है क्योंकि नर के संपर्क में आने से मादा में व्यवहार संबंधी प्रतिक्रियाएं शुरू होती हैं।
- किसानों को केवल एक संकेत पर निर्भर रहने के बजाय व्यवहार और शारीरिक संकेतों के मेल पर ध्यान देना चाहिए।

गर्मीध्रजनन काल के करीब पहुँच रही युवा मादा या वयस्क मादा सुअर में ये लक्षण दिख सकते हैं:

- जननांग में लालिमा और सूजन
- जननांग से पानी जैसा स्राव ज्यादा हलचल और बेचौनी
- दूसरी मादाओं पर चढ़ना
- ज्यादा आवाज निकालना
- चारा कम खाना
- पूंछ हिलाना
- ऊपर चढ़ने पर स्थिर खड़े रहना
- पीठ को धनुष की तरह मोड़ना
- देखभाल करने वाले व्यक्ति (Stockperson) की ओर खिंचाव महसूस करना
- पीठ पर दबाव डालने पर सकारात्मक प्रतिक्रिया
- नर सुअर की मौजूदगी में ज्यादा मजबूत प्रतिक्रिया

कृत्रिम गर्भाधान का समय

कृत्रिम गर्भाधान का समय बहुत महत्वपूर्ण होता है क्योंकि स्पर्म (शुक्राणु) और ओसाइट्स (अंडे) सीमित समय के लिए ही प्रजनन के योग्य रहते हैं। निषेचन से पहले मादा के प्रजनन मार्ग में शारीरिक बदलावों से गुजरने के लिए स्पर्म को समय चाहिए होता है, जबकि ओव्यूलेशन के बाद ओसाइट केवल कुछ समय के लिए ही जीवित रहता है। इसलिए, बहुत जल्दी या बहुत देर से किया गया गर्भाधान प्रजनन की सफलता को कम कर सकता है। एक सामान्य शेड्यूल के तौर पर सलाह दी जाती है कि पहली बार प्रजनन करने वाली मादा में ''स्टैंडिंग हीट'' का पता चलने के लगभग 12 घंटे बाद गर्भाधान किया जाए और लगभग 12 घंटे बाद इसे दोहराया जाए। वयस्क मादा सुअर के लिए, आमतौर पर गर्मी का पता चलने के लगभग 24 घंटे बाद पहला गर्भाधान और उसके लगभग 12 घंटे बाद दूसरा गर्भाधान करने की सलाह दी जाती है।

सुअरों में कृत्रिम गर्भाधान

पश्चिमी और विकासशील देशों में, सुअर प्रजनन के लिए कृत्रिम गर्भाधान का आम तौर पर इस्तेमाल किया जाता है। हालाँकि, भारत में पूरे देश में वीर्य की सीमित उपलब्धता के कारण कृत्रिम गर्भाधान को बड़े पैमाने पर नहीं अपनाया गया है। अभी, कृत्रिम गर्भाधान मुख्य रूप से कुछ रिसर्च स्टेशनों या पशु चिकित्सा केंद्रों के आस–पास ही किया जाता है। यह सीमा इसलिए है क्योंकि नर सुअर के वीर्य को लंबे समय तक स्टोर करने में चुनौतियाँ आती हैं, चाहे वह 5°C के कम तापमान पर हो या &196°Cपर जमाकर रखा जाए। हालाँकि, नर सुअर के वीर्य ''कोल्ड शॉक'' (अचानक ठंड लगने) के प्रति बहुत संवेदनशील होते हैं, जिससे असरदार कृत्रिम गर्भाधान के लिए जरूरी उच्च–गुणवत्ता वाले फ्रोजन वीर्य का उत्पादन प्रभावित हो सकता है। तरल में संरक्षण के दौरान लंबे समय तक स्टोर करने से वीर्य की प्रजनन क्षमता कम हो जाती हैय समय के साथ नर सुअर के वीर्य की जीवनक्षमता (Viability), गतिशीलता (motility) और पारगम्यता (permeability) कम हो जाती है। अभी, दुनिया भर में सुअरों के गर्भाधान में 1% से भी कम मामलों में जमाकर पिघलाया गया वीर्य का इस्तेमाल होता है, हालाँकि पिछले 15 सालों में कृत्रिम गर्भाधान के लिए स्टोर किए गए वीर्य का इस्तेमाल तीन गुना बढ़ गया है। ज्यादातर गर्भाधान वीर्य इकट्ठा करने के दिन या उसके अगले दिन ही किए जाते हैं।

- प्रशिक्षित कर्मियों द्वारा किए जाने पर सुअर में कृत्रिम गर्भाधान एक अपेक्षाकृत सरल प्रक्रिया है, लेकिन स्वच्छता और सावधानीपूर्वक संचालन आवश्यक है।
- गर्भाधान से पहले, बाहरी प्रजनन क्षेत्र को अच्छी तरह से साफ करना चाहिए। कैथेटर पर एक रोगाणुरहित, पानी में घुलनशील, शुक्राणुनाशक रहित स्नेहक का उपयोग किया जा सकता है।
- कैथेटर को प्रजनन पथ के माध्यम से धीरे से डाला जाना चाहिए और गर्भाशय ग्रीवा पर उचित स्थिति में रखा जाना चाहिए। यदि प्रतिरोध महसूस हो तो कभी भी बल का प्रयोग न करें।
- एक बार सही स्थिति में आ जाने के बाद, वीर्य को धीरे–धीरे प्रवेश करने देना चाहिए। गर्भाशय के प्राकृतिक संकुचन वीर्य की गति में सहायता करते हैं। अत्यधिक रिसाव गलत स्थिति या तेजी से जमाव का संकेत हो सकता है।
- स्वच्छता बनाए रखने और जानवरों के बीच संक्रमण के प्रसार की संभावना को कम करने के लिए प्रत्येक गर्भाधान के लिए एक नए कैथेटर का उपयोग किया जाना चाहिए। गर्भाधान के बाद, मादा को लगभग 20–30 मिनट तक शांत रहना चाहिए और अनावश्यक तनाव से बचना चाहिए।

कृत्रिम गर्भाधान के फायदे

- **बेहतर नर सुअरों का ज्यादा इस्तेमाल:** आनुवंशिक रूप से अच्छे नरों के वीर्य का इस्तेमाल कई मादाओं के लिए किया जा सकता है।

- **नर सुअर के रखरखाव का कम खर्च:** किसानों को हर फार्म पर प्रजनन करने वाले नर पालने की जरूरत नहीं पड़ सकती है।
- **बेहतरीन आनुवंशिक तक पहुंच:** छोटे किसान अच्छे नरों के वीर्य का इस्तेमाल कर सकते हैं।
- **बेहतर ब्रीडिंग रिकॉर्ड:** कृत्रिम गर्भाधान ब्रीडिंग की घटनाओं का व्यवस्थित रिकॉर्ड रखने को बढ़ावा देता है।
- **क्रॉस ब्रीडिंग में मदद:** स्थानीय आबादी को बेहतर बनाने के लिए चुने हुए नर सुअरों का इस्तेमाल किया जा सकता है।
- **योजनाबद्ध प्रजनन:** कृत्रिम गर्भाधान को व्यवस्थित ब्रीडिंग प्रोग्राम में शामिल किया जा सकता है।
- **प्रजनन शक्ति की जांच:** इस्तेमाल से पहले वीर्य की गुणवत्ता की जांच की जा सकती है।
- **आनुवंशिक का व्यापक वितरण:** वीर्य ब्रीडिंग सेंटर से दूर स्थित फार्मों तक भी पहुंच सकता है।

बेहतर प्रजनन का मतलब है फार्म से बेहतर कमाई

- प्रजनन प्रबंधन का सुअर पालन के आर्थिक पहलुओं से सीधा संबंध है। हीट का पता न चल पाना, असफल गर्भाधान या गर्भावस्था में देरी होने से वह समय बढ़ जाता है जब प्रजनन करने वाला जानवर बिना बच्चे पैदा किए चारा खाता है और जगह घेरता है।
- इसके विपरीत, कुशल प्रजनन से उपलब्ध प्रजनन स्टॉक से पैदा होने वाले बच्चों की संख्या बढ़ाई जा सकती है। ।प के जरिए बेहतर नर (इवंते) का उपयोग करने से आने वाली पीढ़ियों में अच्छे आनुवंशिक गुण भी लाए जा सकते हैं।
- छोटे किसानों के लिए, ।प प्रजनन वाले नर को पालने के लगातार खर्च के बिना बेहतर जेनेटिक्स (आनुवंशिक गुण) तक पहुँच प्रदान कर सकता है। व्यवस्थित फार्म के लिए, यह व्यवस्थित प्रजनन योजनाओं, आनुवंशिक सुधार और प्रजनन की निगरानी में मदद कर सकता है।

निष्कर्ष

प्रजनन प्रबंधन, मुनाफे वाले सुअर पालन का एक मुख्य आधार है। सफल प्रजनन किसी एक काम पर निर्भर नहीं करताय बल्कि, यह कई अच्छी तरह से प्रबंधित गतिविधियों का परिणाम है, जिनकी शुरुआत स्वस्थ प्रजनन पशु के चयन से होती है और इसमें नर सुअर की ट्रेनिंग, वीर्य इकट्ठा करना, वीर्य को सुरक्षित रखना, हीट का पता लगाना, सही समय पर गर्भाधान और प्रजनन के बाद की निगरानी शामिल है। कृत्रिम गर्भाधान आनुवंशिक रूप से बेहतर नर सुअरों के इस्तेमाल को बढ़ाने और ज्यादा मादा सुअरों तक बेहतरीन आनुवंशिक पहुँचाने का एक अहम मौका देता है। हालाँकि, कृत्रिम गर्भाधान की सफलता वीर्य की गुणवत्ता, सही स्टोरेज, हीट का सही पता लगाने, सही समय, साफ–सफाई वाली तकनीक और उचित फॉलो–अप पर निर्भर करती है। इसलिए, किसानों को अलग–अलग गतिविधियों को अलग–अलग मानने के बजाय प्रजनन प्रबंधन को एक पूरे कार्यक्रम के तौर पर अपनाना चाहिए। नियमित निगरानी, प्रजनन के तरीके, अच्छी साफ–सफाई और सही रिकॉर्ड रखने से प्रजनन से होने वाले नुकसान को कम किया जा सकता है और सुअर के बच्चों के उत्पादन को बेहतर बनाया जा सकता है।

अच्छी वीर्य गुणवत्ता. सही तापमान. स्वच्छ तरीके से संभालना. समय पर उपयोग = बेहतर वीर्य उर्वरता

उमा कांत वर्मा[1], स्वरूप देबरॉय[2], जय प्रकाश[3] एवं नरेंद्र कुमार[4]

[1]सहायक प्राध्यापक, पशु आनुवंशिकी एवं प्रजनन, पशु चिकित्सा एवं पशु विज्ञान महाविद्यालय, बांदा कृषि एवं प्रौद्योगिक विश्वविद्यालय, बांदा

[2]सहायक प्राध्यापक, पशु शरीर रचना विज्ञान, पशु चिकित्सा एवं पशु विज्ञान महाविद्यालय, बांदा कृषि एवं प्रौद्योगिक विश्वविद्यालय, बांदा

[4]सहायक प्राध्यापक, कुक्कुट पालन विभाग, पशु चिकित्सा एवं पशु विज्ञान महाविद्यालय, बांदा कृषि एवं प्रौद्योगिक विश्वविद्यालय, बांदा

[4]सहायक प्राध्यापक, पशु उत्पादन एवं प्रबंधन, पशु चिकित्सा एवं पशु विज्ञान महाविद्यालय, बांदा कृषि एवं प्रौद्योगिक विश्वविद्यालय, बांदा

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