

Expression of the piglet's genetic potential

by Erwan Le Bras, Olmix, ZA du Haut du Bois, 56580 Brehan, France.

Huge differences can be noticed on the expression of the genetic potential between research stations and in the field. Several factors may explain this difference on reproduction and production performance but it seems that postnatal mortality rate and hygiene status are the main factors to take into account. More piglets are born, but more piglets die before weaning and so the genetic potential is not realised.

Another point is that microbial pressures are not the same between farms and research stations.

In farms, hygiene status induces an additional stress to the animals which limits their performance and requires the reinforcement of their immune systems from birth to their last day on the farm.

Management tools do exist to help piglets at birth and to improve hygiene status throughout their growing period to finally enhance the farmers' profit.

Optimised from birth

Sows' prolificacy and the number of weaned piglets are the first factors of profitability on a pig farm and the considerable genetic progress will be fully realised only when we control and increase the postnatal survival rate.

However, piglets' mortality still reduces the expected productivity in spite of the increase in sow prolificacy and the improvement of mothering qualities of the sows.

A study undertaken by the Chambres d'agriculture de Bretagne in 2008, showed



Colostrum intake (between 200 and 300g) is vital for the piglets.

that even if the number of weaned piglets is constant, mortality rates for live born piglets in 1997 and 2007 were respectively 11.3% and 13.4% for Brittany.

These figures highlight the European situation concerning the problem of saving additional born piglets.

To understand these figures, it is essential to come back to the basic needs of a new born piglet.

Indeed, neonatal piglet survival rate depends on several factors. These are:

- Its physiological status at birth (weight and maturity).
- The litter homogeneity to avoid excessive competition between piglets.
- Farrowing conditions (quiet, duration and treatment).

- The environmental conditions (sensitivity to coldness and poor hygiene).
- The piglets' capacity to intake a sufficient quantity of colostrum just after birth.
- The maternal quality of the sow to reduce scratching and to optimise colostrum and milk production.

In the last decade, increased litter size has been followed by an increase in piglet mortality. Performance is very dependent on the hygiene status (genotype versus phenotype) but we must also accept the fact that birth is a combination of stresses.

Piglets quickly go from a warm and clean placenta to a cold and dirty crate. In addition, the piglet has to compete and to look for its own feed, whereas previously it was fed by the sow during the gestation without fighting with its littermates.

This blend of stresses has to be reduced because it will determine its future success and hence, the farm's profitability.

Influence of stress

The influence of stress on performance is well recognised and birth is a combination of several stresses: thermal, physiological,

Continued on page 16

Table 1. Technical performance, health and environmental conditions with and without Mistral (2007).

	Control Group	Mistral Group	Variation (%)
Live born piglets/sow	10.94	10.13	
Mortality rate during the 1st week (%)	6.5	1.8	-72.3
Mortality rate after 1st week until weaning (%)	2.1	0	-100
Number of weaned piglets/sow	10	9.95	-5
Number of piglets lost during lactation/sow/year	2.35	0.45	-80.9

Continued from page 15

energetic and immune. Indeed, from its mother's body temperature, the piglet arrives in a cold external environment. In few seconds, the temperature drops by nearly 10°C.

This confrontation to a low temperature reduces the transfer of the colostrum antibodies due to a reduction of colostrum intake and a decrease of the intestinal blood flow which induces a decreased absorption.

This lack of absorption weakens the piglet, reduces the quantity of absorbed immunoglobulin, decreases the energy reserves of the piglet and compromises its future performance.

Indeed, in addition of the thermal stress,

the piglet is confronted to a physiological and an energetic stress due to its low reserves in glycogen.

The last stress – immunity – is dependent on the three previous stresses. Indeed, if they are too severe for the piglet, it will not have the vitality and the strength to reach the teats – the source of immunity and energy (immunoglobulin and nutrients).

In pig production, it is clear that low colostrum intake seems to be the primary cause of postnatal mortality and, even if sow colostrum production is very variable between individual, it is essential that the piglet reach the teats in the first few minutes after birth and it is important that it takes in a sufficient quantity of colostrum (between



Birth is a blend of stresses (temperature, energy and immune deficiencies).

200 and 300g). Once the colostrum is consumed, the piglet acquires the maternal antibodies and consequently its passive immunity. This will protect it against infections before the development of its own active immunity.

However, it is essential to know that the colostrum intake must occur in the first hours because its quality quickly degrades and intestinal mucosa of the piglet becomes impermeable.

Farm profitability

Therefore, in farming conditions, it is vital that the piglet takes in the colostrum as soon as possible to acquire its immunity.

Mistral used after weaning improves the hygiene and welfare of the piglets by drying their environment and by reducing stress.



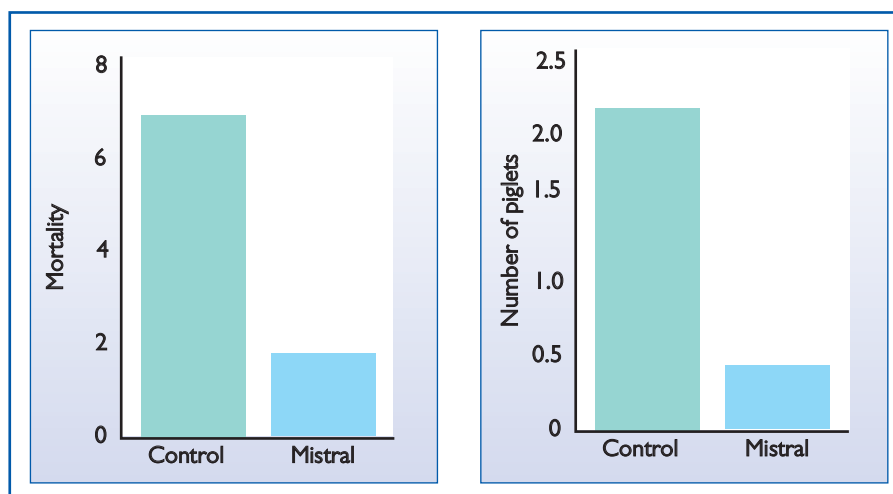


Fig. 1. Mortality rate during the first week and number of piglets lost/sow/year.

This transfer is fundamental for the future resistance of the piglet against infectious diseases but hygiene must also be taken into account.

Solutions do exist to help farmers to improve hygiene status and to see their piglets suckling quickly after birth.

Mistral, a 100% natural litter conditioner produced by Olmix, has proven its efficacy in improving piglet comfort and farm hygiene in more than 50 countries.

By drying the piglet at birth, Mistral (a mix of Montmorillonite clay and essential oils) prevents the piglets suffering from the cold and thus losing the energy needed to reach the teats.

Several trials demonstrate that piglets dipped in Mistral reach the teats within their first 10 minutes of life.

In this way, they can suckle and acquire their passive immunity through the maternal colostrum which is essential for survival in farming conditions.

Not only useful at birth, it is recommended that this litter conditioner is used all the time the piglets are in the farrowing pen.

Indeed, it greatly improves hygiene in the

pen and it helps to reduce the bacterial proliferation which is detrimental for piglets' health and their subsequent performance.

Fig. 1 demonstrates the efficacy of Mistral in improving piglet survival for a long time and Fig. 2 shows a reduction of the bacterial pressure by 75%.

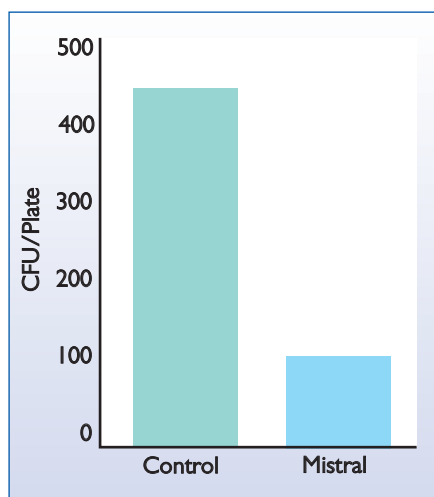
All these benefits can also be seen at every physiological stages (post-weaning, fattening and gestation) because Mistral prevent bacterial proliferation but also ammonia emissions which are detrimental for the respiratory tract of the pigs but also of the workers.

Indeed, each 10ppm of ammonia in the barn decreases linearly the average daily gain of fattening pigs by 40g, and adversely affects their feed conversion ratio in an exponential way.

To fight against ammonia and bacterial proliferation, Mistral can be blown in the rooms to complement the protocol of cleaning disinfection before the arrival of a new batch of pigs.

A study made on Canadian commercial farms shows that the use of a drying agent reduced the total bacterial load in finishing pens more effectively than common disinfectants.

Fig. 2. Effect of Mistral application on total bacterial count in the farrowing crates.



Conclusion

The genetic potential of the pigs is not fully optimised in farming conditions. Indeed, from the birth, piglets suffer from a combination of different stresses which can be detrimental for their performance and even for their survival.

It appears that farming conditions offer an environment which requires a stronger immune system to resist to pathogens infections but also gaseous emissions. Fortunately, management tools, like Mistral, are available to help farmers improve the comfort of their pigs and the hygiene of their buildings in order to achieve more profit. ■

References are available from the author on request