Strengthening the intestinal function of sows and piglets

Recently some100 nutritionists, veterinarians and swine production experts from Europe, Asia and South America gathered to attend the 6th International Levucell SB meeting in Lombardi, Italy, organised by Lallemand Animal Nutrition.

Prof. Sbarbati from University of Verona shared his expertise looking at chemosensing mechanisms along the intestinal tract and their importance in absorption and microflora control, Dr Renaudeau from INRA, highlighted sow feeding and management strategies in heat stress conditions. In his presentation, Prof. Alborali from IZSLER, gave an overview of pre- and post-weaning enteric diseases of piglets.

Finally, D. Guillou, from Lallemand Animal Nutrition, reminded attendees how feeding the sow can strongly influence the piglet's gut development and have a long term incidence on its subsequent performances, pointing out the role of live yeast Saccharomyces cerevisiae var. boulardii CNCM I-1079 (Levucell SB).

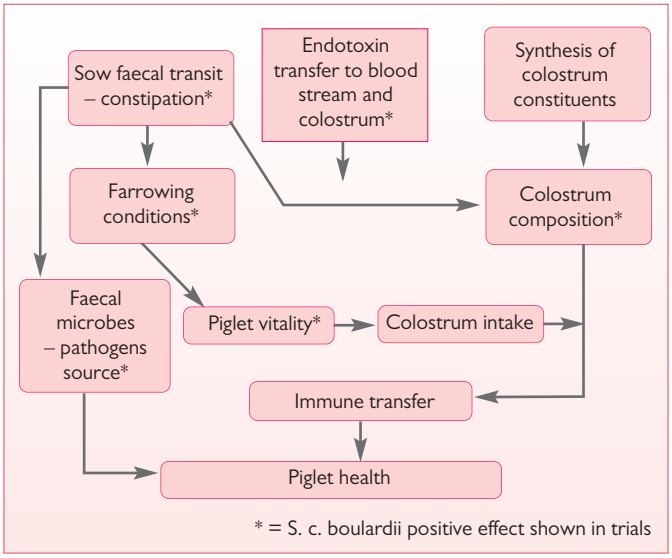


Fig. 1. The causes of neonatal diarrhoea in piglets originate from the sow: main causes and impact of Levucell SB as shown in trials (D. Guillou, Lallemand).

Major enteric pathogens

Italian Professor Loris Alborali, from IZSLER, Lombardi, gave an overview of the five major enteric pathogens involved in pre- and post-weaning piglets, as they represent important limiting factors in pig performance:

- E. coli and haemolytic E. coli.
- Clostridium perfringens.
- Clostridium difficile.
- Salmonella Spp.

He then described the key pre-disposing factors, stressing the importance of post-weaning water quality and feed quality.

All these pathogens interfere with the gut microbiota and alter its balance. The modes of action of Levucell SB to interfere with these pathogens are extensively demonstrated and form the basis of its beneficial effects on farm:

- It is able to specifically neutralise C. difficile toxins A and B, thanks to a specific protease.
- It specifically adheres to the fimbriae of flagellate bacteria such as E. coli or salmonella, preventing their attachment to the gut surface and forming aggregates that are easily 'flushed' through the gut.

Prof. Alborali insisted that control strategies should take into account every aspect, from sow management to nutrition, as well as financial considerations. He concluded that in today's context, the use of antibiotic as sole mean of pathogens control is no longer sustainable and profitable at farm level.

Instead he advocated an integrated approach, combining a limited therapeutic use of antibiotics with preventive and alternative solutions enabling to treat the problem from the root. These include appropriate management practices, vaccination, nutritional aids, with a preference to use the best documented solutions.

A pig in the making

David Guillou, from Lallemand Animal Nutrition, then reminded attendees that the piglet is not just a small pig but an immature pig, 'a pig in the making'. Hence, the sow's nutrition and the effects of Levucell SB in sow diets can influence both short- and long-term piglet issues. In the short term this meant pre- and post-weaning diarrhoeas. Neonatal diarrhoea results from a loss of balance between pathogen pressure and immune transfer: the sow is the source of both factors (Fig. 1). Trials have shown that, when fed to sows, Levucell SB has a positive impact on several of the steps that maintain piglet health:

- Farrowing conditions, hence piglet vitality.
- Sow microflora balance and potential pathogens.
- Sow digestive transit and endotoxins transfer to piglet.
- Colostrum and immunity quality.

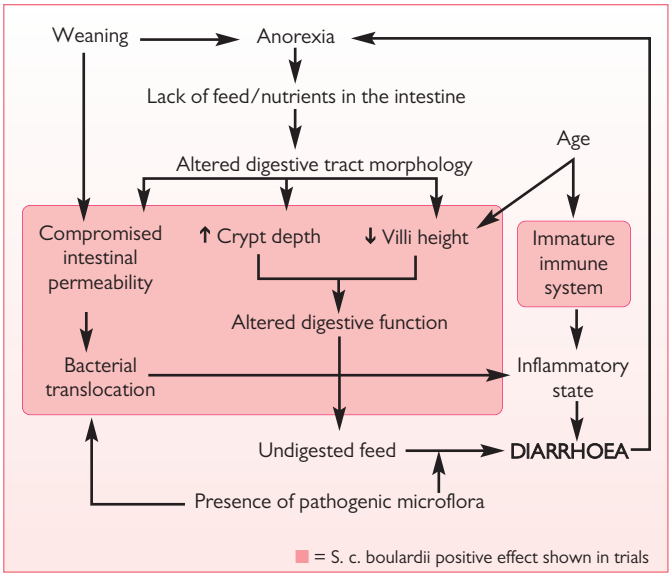
Fig. 1 shows the links between the sow and piglet health and the various effects of Levucell SB. This was illustrated by field experience of neonatal diarrhoea reduction on farm. Post-weaning diarrhoea has a different origin (Fig. 2), but again, immune status and pathogen exposure play key roles. Levucell SB can have a positive impact on several of the steps that lead to post-weaning diarrhoea.

- Immunity maturation.
- Enhanced piglet gut development and maturation.
- Barrier function.

It has recently been shown that very early disturbance of piglet gut microbiota establishment has long-term consequences on gut physiol-

Continued on page 41

Fig. 2. Major causes of post-weaning diarrhoea in piglets and the impact of Levucell SB shown in trials (D. Guillou, Lallemand).



Continued from page 39
ogy. One of the well described effects of Levucell SB is its positive effect on gut maturation (increased gut villous height).

David Guillou concluded that more attention should be paid to sow feeding and management and to the piglet's gut microflora to overcome diarrhoea in piglets, especially when reducing the use of antibiotics.

Heat stress

Dr David Renaudeau, from INRA Saint Gilles, in France, is familiar with heat stress issues and adapting sow nutrition to hot climates, as he spent several years working on this topic at INRA in Guadeloupe.

The impact of stress factors on high producing livestock is well known: it affects animal health and productivity, but also long term reproduction and longevity. In pigs in particular, hot climate is a source of production losses.

This problem concerns tropical countries, where pig production is rising, South-East Asia, where it is very strong, but also Mediterranean countries, and, more globally, temperate climate during the hot season. With global warming, this issue should certainly not be overlooked as it is expected to cause tremendous losses to the pig sector.

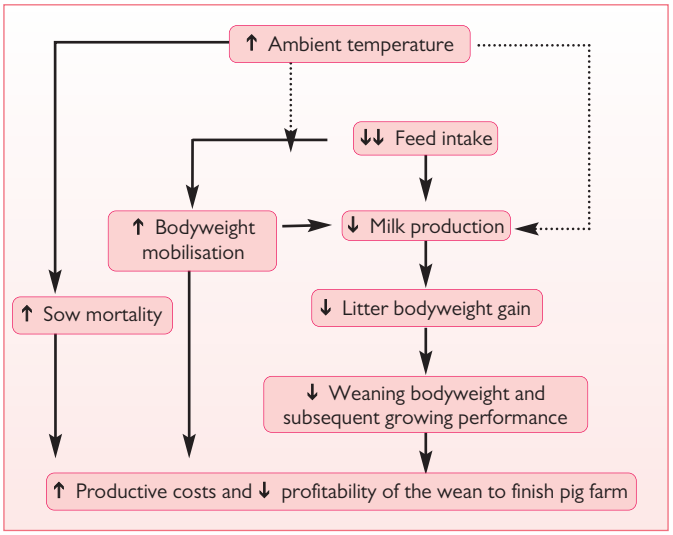


Fig. 3. The effects of heat stress on sow performance (D. Renaudeau, INRA).

One of the reasons why modern sows are very sensitive to heat stress is that the genetic selection has always favoured productivity over robustness and heat tolerance.

Dr Renaudeau exposed the consequences of heat stress over the whole pig production cycle – as the animal energy requirement for heat dispersion rises, they tend to reduce feed intake, hence energy level, leading to a negative energy balance (Fig. 3). Sows are even more sensitive than growing pigs. The consequences of this negative energy balance are:

- Decreased litter weight.
- Decreased sow body weight.
- Decreased milk production.
- Decreased piglet weight pre-weaning, and in consequence piglets' long term performance is affected.

Dr Renaudeau highlighted various strategies to reduce the impact of heat stress on sow productivity, based around three main objectives:

- Reducing the heat load using cooling methods.
- Increasing net energy intake in lactating sow: review diet formulation (high fat diet), see other nutritional solutions (number of meals, supplementation).
- Providing additional nutriments to the piglet: milk replacer, creep feed.

In practice, the selection of a strategy over another shall depend on the nature and severity of heat stress and the resource available at farm level.

Field experience

Field experience with Levucell SB indicates that the live yeast has the potential to help reduce the impact of heat stress in swine: the use of this product in fattening pigs under heat stress on farms in the USA has shown the ability to maintain feed intake, with positive consequences on performance.
Such effects need to be confirmed in sows.

In other high producing livestock (lactating dairy cows) several published trials have shown that specific live yeast, which can help improve digestive function and feed efficiency, is very useful under heat stress situations to alleviate the impact of heat stress on milk production and animal welfare. ■