

Living role of a live yeast

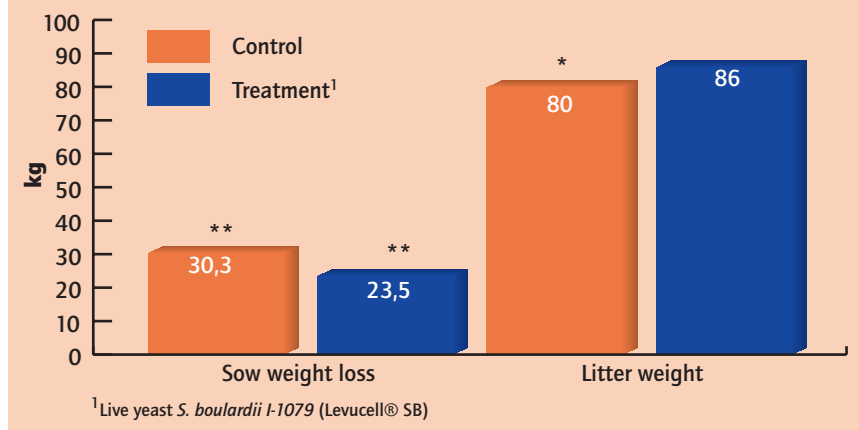
Litter size and weight are critical measures when judging the chance of making target farm output. Sow nutrition has a sensitive role in this respect and here, a recently authorised probiotic is put to the test.

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The pig industry has undergone tremendous changes in the past decade and now has to address specific issues common to the modern production herd. In this context, the peripartum period, from roughly one week pre-farrowing to several days post-farrowing, is particularly challenging due to its impact on ultimate herd output. The fact remains that while genetic progress has introduced better performing, hyperprolific sows, up to 50% of the piglets gained by modern breeding lines can be lost before reaching the abattoir.

The sows' hyperprolificacy can also result in increased heterogeneity within the litters and increased mortality, either at birth (e.g. stillbirth has increased again in recent years), in the first days of life, or post-weaning; piglets which are less vigorous and smaller at birth being more vulnerable. Farrowing duration

Figure 1. Sow body weight loss during lactation and litter weight at weaning (Poland, 2005).



is indicated as a further pointer to weak piglet vulnerability with quality colostrum intake, e.g. optimum supply of immunoglobulin G and vitamin B12, declining over time.

Solutions can be sought via management practices, for example, the current practice of fostering piglets can increase heterogeneity and exaggerate low 'quality' colostrum intake. Sow nutrition can also play a major role, and yet, traditionally there has been a tendency to overlook the importance of a well-balanced digestive flora (especially with the extensive use of antibiotic growth promoters); an average sow hosts over 2 kg of micro-organisms within its gastro-intestinal tract.

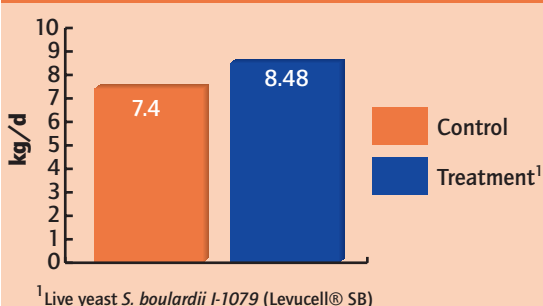
Considering more closely the latter nutrition aspect the probiotics authorised in sows do target digestive balance in sows during gestation. In particular, live yeast *S. boulardii* I-1079 (Levucell® SB) has been specially selected and developed by Lallemand for its benefits in monogastrics. In October 2005 the product was permanently authorised by the European Commission for use in piglets and sows (authorisation number E1703). Numerous trials have shown its positive impact on lactation and the farrowing process.

Positive weight data

One of the latest trials took place at the OHZ centre in Tarnawatka, Poland, between November 2004 and February 2005. The farm rears 300 sows per year. The trial involved 60 Polish LW x Danish LW gestating sows. Sows were moved to the farrowing unit 14 days before the expected parturition and evenly distributed between two groups (control and treated) on the basis of parity, body condition score and general health status. Between their entry in the farrowing unit and weaning (usually day 30), treated sows received a lactation diet supplemented with Levucell SB (1.10^9 CFU/kg feed). During the trial, the following parameters were followed: sow weight, body condition score, feed intake, litter weight and size, piglet weight. The evolution of the number of piglets per litter was recorded from birth until weaning, knowing that no piglet exchange (adoption) occurred between sows.

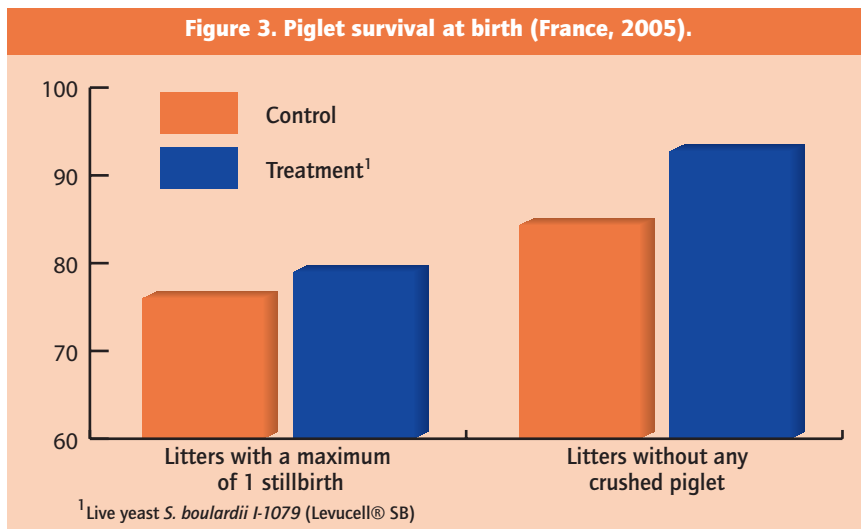
Sow feed intake was not affected by the treatment, while weight loss in lactation was significantly reduced in the treated group reflecting an overall better feed efficacy (Figure 1); sow body condition score at weaning was also significantly improved – treated

Figure 2. Sows average feed intake during lactation (France, 2003).



at peripartum

Figure 3. Piglet survival at birth (France, 2005).



group 3.09, on average, versus 2.70 for the control group.

Piglet mortality in the treated group was significantly decreased - 3.4% versus 8.9% for the control group - and consequently, the number of weaned piglets was 5% higher with the treatment. While litter size was not significantly different between groups, treatment litter weight at weaning was on average +6 kg and growth rate was 2.0 kg/d versus 1.81 for the control group, i.e. daily gain was 10.5% higher.

The investigators who performed the study concluded that *S. boulardii* I-1079 supplementation proved to be profitable for the lactating sows, which were in a better shape for the next service, and for the farm productivity due to the increased number of piglets weaned and the higher weight of the piglets at weaning.

Feed intake rise

Previous trials have shown a positive effect of *S. boulardii* I-1079 supplementation on feed intake during lactation due to its action on the transit and digestion process, increasing appetite and feed efficacy. In 2003, for example, an INZO° conducted trial in France indicated an average feed intake increase from 7.4 to 8.48

kg, or 1 kg/d during lactation (Figure 2). The trial involved 60 sows in lactation, allotted in three repetitions, receiving the same diet supplemented with 1.10^9 CFU/kg feed of *S. boulardii* I-1079 three weeks before farrowing and during lactation. The increased feed intake was reflected in piglet performance, probably due to increased milk production; litters were heavier at weaning (+7.12 kg, on average).

Sow comfort

The action of *S. boulardii* I-1079 in the gut is well-defined (see In a nutshell), enhancing the sows' digestive

comfort (constipation, bloating and pain are reduced) and overall health status during the critical period of gestation and farrowing. The farrowing process is then naturally improved and reduced farrowing duration has been observed; stillbirth and crushed piglets are reduced. For example, a recent trial (France, 2005; Lallemand internal results) shows that supplementation with 1.10^9 CFU/kg of Levucell SB for three weeks before farrowing resulted in significant decreases in stillbirth and crushed piglets (Figure 3). Data at birth also indicated litter weight and homogeneity increased, which was reflected at weaning; 75% of the piglets weighed 5-7 kg when sows were supplemented with *S. boulardii* I-1079, versus 60% in control group. Survival at weaning is also linked to birth weight.

Additional benefits on sow behaviour around farrowing have repeatedly been reported, but are more difficult to quantify. Nevertheless sows are reportedly calmer but actively stimulate suckling, e.g. lie easily on their sides. It is further claimed that mastitis-metritis-agalaxia and post farrowingagalaxia syndrome are progressively reduced with the administration of the probiotic. Finally, both direct and indirect complications can be limited, such as toxins or even septicaemia, due to the documented effect of *S. boulardii* I-1079 on *Clostridium difficile* toxins and pathogen colonisation (*E. coli*, *salmonella*). **PP**

In a nutshell

Live yeast of the *S. boulardii* sub-species is well-known in human medicine and largely prescribed to prevent antibiotic-associated diarrhoeas, for example. Its mode of action in the gut are well-described and illustrated by around 150 scientific publications; described as a shield effect that reinforces the gut microbial ecosystem and protects the animal's digestive tract, via three scientifically proven mechanisms:

- Limitation of damage caused by *Clostridium difficile* by producing a protease which destroys its toxins (A and B) in intestinal mucosa and helps limiting diarrhoea.
 - Positive balance of the digestive microflora by agglutinating pathogenic flagellate bacteria, such as *E. coli*, *Salmonella*, and expelling the complex through the faeces.
 - Reinforcement of the mucosa and intestinal wall integrity, by stimulating enzymatic activities, improving epithelial cell maturity. As a result, immune response is enhanced and feed utilization improved.
- Additionally, studies by Di Giancamillo A. et al. (2003) showed that Levucell SB supplementation also favoured the development of the gut in pigs by increasing the height of micro-villi; a larger absorption surface promoting optimal use of nutrients.