Waxy-leaf nightshade: an additional tool to help raise large litters

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How to ensure that piglets born into large litters survive and thrive until weaning is one of the main challenges in pig production today. Although the number of piglets born has markedly increased in recent years, the number of piglets weaned could not keep up and is lagging behind. This is not only an economical loss but also raises concerns regarding animal welfare.

Different factors from gestation to weaning play a role in piglet survival. These factors are influenced by the physiology and/or the management of the sow and the litter. This article, however, will only concentrate on physiology.

A good opportunity to support the sow in delivering and raising large litters is through nutrition. Examples of this are flush feeding to stimulate oestrus or high fibre diets to increase gut motility to reduce obstipation which can affect farrowing. Sufficient amount of high quality water and feed during lactation are other easily applied means to support the sow.

In recent times, alternative feed components such as phytogenics were discovered as potential tools in regard to large litters. The mode of action of phytogenics is as diverse as the plants used. Effects observed range from enhanced feed intake and supporting intestinal health to anti-oxidative effects and others.

A plant with special properties is waxy-leaf nightshade (*Solanum glaucophyllum*, SG). This plant is native to South America and produces 1.25-dihydroxycholecalciferol-glycosides (1.25$(OH)_2D_3$-gly). 1.25$(OH)_2D_3$-gly are precursors of the metabolic active form of vitamin D. Vitamin D needs two conversion steps in the liver and the kidney, respectively, to exert its biological function in the form of 1.25-dihydroxycholecalciferol (1.25$(OH)_2D_3$). This takes some time and an increase in supplemented vitamin D does not lead to an increase in the concentration of the metabolic active form. In contrast, supplementing 1,25$(OH)_2D_3$-gly can support the functions of vitamin D in the animal. As no conversion is needed, it quickly covers increased requirements of the animal without accumulating in the body due to the hydrophilic nature of the 1.25$(OH)_2D_3$-gly. Furthermore, as the glycosides need to be cleaved by intestinal enzymes before being available to the body, the absorption is prolonged.

Vitamin D and its metabolites have been known for a long time to be key elements in calcium (Ca) and phosphorus (P) metabolism in the body. In regards to sows this is not only essential for their proper skeletal development but also for easy farrowing.

Apart from being the most abundant mineral in bones, Ca is also an important element in muscle contraction. When Ca stores of the uterus are depleted, as may happen in large litters, the expulsion of the piglets is stopped and farrowing duration is increased. Prolonged farrowing in turn is related to increased piglet mortality.

In a trial it was shown that a standardised extract of the leaves of SG given on top of the usual feed significantly reduced farrowing time in multiparous sows (Large white x German Landrace).

Additionally, pig producers using a standardised mixture of the ground leaves of SG on top of their usual feed observed a reduction in assisted farrowings (reduced manual support or injections).

It is a rather recent discovery that vitamin D and its metabolites have additional effects beside the influence on mineral metabolism. These so called non-classical effects have so far mainly been observed in rodent and human studies but similar effects are to be expected in most mammals.

One of the non-classical effects is connected to the immune system. In adjusting immune tolerance and inflammatory reactions, 1.25$(OH_2D_3$ can help to support a successful pregnancy. Other non-classical effects of the metabolic active form of vitamin D are related to fertility.

There is evidence that 1.25$(OH)_2D_3$ positively affects implantation (nesting of the embryo into the uterus wall) and placentation (building of the placenta).

As both processes are necessary for the development and the growth of the embryo, supporting these processes helps in giving the piglet a good start.

In a field trial, performance of sows from November to May was compared with the performance on the same farm from June to October. In this second phase, the animals received the same diet as before but with 75g/t of a standardised mixture of the dried and ground leaves of SG mixed into the standard gestation and lactation feed. This mixture provided 0.75µg of 1.25$(OH)_2D_3$-gly/kg feed on top of the usual vitamin D supplementation.

The results showed that mean individual weaning weight of piglets born to sows fed the treatment was 200g higher than compared to the previous six months.

Furthermore, piglet mortality was reduced and one more piglet per sow and year survived until weaning.

These results show that the addition of a standardised mixture of SG to the standard diet is an additional tool beside good farrowing and litter management to reduce pre-weaning mortality and to raise large litters successfully. ■

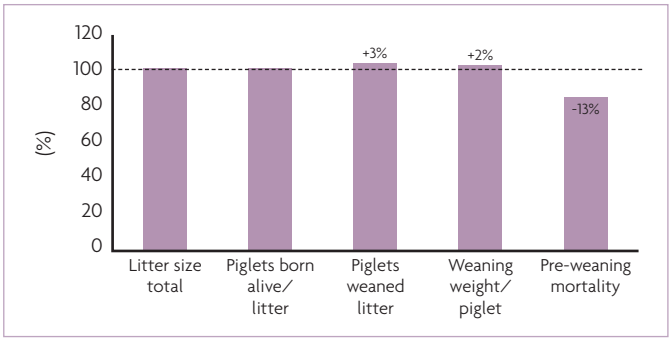
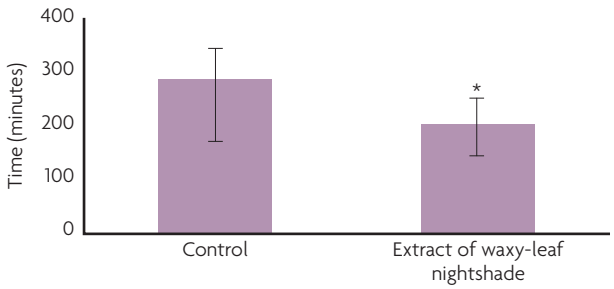


Fig. 2. Litter size and piglet performance in the treatment group supplemented with SG in relation to the control group (dashed line).

Fig. 1. Farrowing time of sows given a standardised extract of the leaves of waxy-leaf nightshade on top of the usual feed. The extract was given daily, starting seven days before the expected farrowing date. Farrowing time was measured as appearance of the first piglet to expulsion of the placenta.



References are available from the authors on request.