Mycotoxins and their implications in gilts

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The raising of gilts, later to serve as replacements for integrated sow herds has become a crucial part of pig production and reproduction. In recent years, with the advent of integrated systems so called Gilt Development Units (GDU) have been created to take in gilts and raise, select and finally provide these gilts to the sow herds.

Health, management and timing or scheduling play an important role as these gilts represent the replacement necessary for one or various sow units.

Difficulties often arise incorporating these gilts at the right time and much effort is put into the correct raising and scheduling of the groups or individuals.

The final objective is to get the gilts farrowing at the right time and to fill the farrowing schedule determined by the cull sows exiting the sow herds.

Predicting the variables

There are many variables in this process and much time and effort by breeding companies, universities, company nutritionists and not least the producers, have been made to make this process as predictable as possible.

Variables may include disturbed growth patterns, infections, selection issues, reproductive disorders, physical disorders, nutritional issues, quality of semen, insemination process, stimulation patterns, age and weight. One of these factors may also be the occurrence of mycotoxins in gilt rations, which are known to have adverse effects on reproduction parameters and the immune system of the young animal amongst other things.

Furthermore, this is a variable that can be controlled very badly as even good looking corn or feed can invariably be contaminated. Most mycotoxin formation occurs during the growing period.

Even if precautions are taken and a monitoring system is in place mycotoxins come in so-called 'hotspots' and may be present in one load of feed and not in another. Feed analysis programmes for mycotoxins, although better than doing nothing, often seem like a waste of time and resources because symptoms may be seen in the herd despite analytical freedom in the monitoring protocol.

In particular, the mycotoxin zearalenone and a group of mycotoxins known as trichothecenes will adversely effect reproduction.

Zearalenone (ZEN), a compound known to mimic oestrogen in the body will induce swelling of the ovaries and uterus often simulating heat.

Gilts will show all visible signs of heat even before maturity and may even stand for service yet the net result is a false heat.

Vulva vaginitis, mammary swelling, vulval swelling, anoestrus for up to 50 days and a lengthening of the cycle are other clear signs in gilts.

Other symptoms in sows and gilts include embryonic death, reduction of the weight of the uterus or foetuses, birth of weak and splay legged piglets and vulval enlargements in piglets.

The implications may be that so called opportunity gilts will, in fact, not be true opportunity gilts at all and Heat No Serves (HNS) may in fact be falsely recorded and not true heats at all.

Boars semen was previously thought to be unaffected by ZEN, motility, quantity and deformities of sperm are all known to be affected.

Trichothecenes, which include such compounds as DON (deoxynivalenol, also known as vomitoxin) T2, HT2 and approximately 150 plus other compounds, wreak similar havoc.

Feed intake may be affected and the immune system of the animal may be compromised.

Many of the toxic effects of trichothecenes stem from their capacity to inhibit DNA replication and protein synthesis.

Bloody diarrhoea, severe dermatitis and haemorrhages are other symptoms commonly associated with this group of toxins, but not necessarily the most economically dramatic as, with such signs, it is clearly visible that there is a problem.

Subtle problems – dramatic effects

Subtle problems may, in fact, be the worst problem associated with ZEN and the group of trichothecenes in that a single false heat or missed service will have quite a dramatic effect on the production pyramid.

Such as a single return to service will incur $US6-8 of extra feed cost and at least the semen cost which may vary from system to system and depending on the value of the animal.

Bearing all the above in mind what measures should be taken in GDU's to ensure that this variable is eliminated for the GDU.

The following may be a logical approach to the problem:

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- Screen suspect grain for presence of mycotoxins on a regular basis.
- Include a training session for signs of mycotoxins in staff training.
- Watch for tell tale signs in gilts and act upon them with a treatment or removal of the grains in question.
- Use a suitable product with a known ability to deactivate ZEN and trichothecenes as an insurance policy to counteract mycotoxins in the feed.

Economic implications

Much time and effort is spent raising our breeding gilts ultimately to become replacements within the herd, so what is the true value of a breeding gilt?

These efforts include vaccinations, added space allowances, selection, royalties and improved diets for these animals.

Taking a slaughter pig as a base and calculating the added expense or value a breeding gilt represents we can easily assume that a factor of 2-2.5 x slaughter value or $US100-150 can easily be applied by the time all costs have been allocated.

Many authors have written about the economic implications of a lost reproductive cycle due to mycotoxin contamination, but often an exaggerated figure will be quoted to include many incidental costs, which do not necessarily reflect the direct loss incurred to modern integrated systems. To identify a true unequivocal cost, only clearly associated and actually incurred costs need to be calculated.

In the case of a lost cycle only the feed cost and semen cost are true lost expenditures, which will represent anywhere from $US10-12 per animal.

Mycofix Plus from Biomin can be used as an insurance policy to circumnavigate the problem profile!

Mycofix Plus has been developed to offer a broad protection against aflatoxins, ochratoxins and fumonisins but also zearalenone and the whole group of trichothecenes.

By combining adsorbing substances with enzymatic deactivation of toxins Mycofix Plus offers the most complete protection on the market today.

Marginal cost analysis for a GDU using Mycofix Plus in all diets at 1kg/ton of finished feed; based on a very conservative cost calculation only one out of every 120-160 breeding gilts needs to be selected and brought into the herd to pay for the additional feed cost.

However, the largest benefit is to be expected from the timely and unproblematic integration of breeding gilts in the herd.

A single return to service will incur an additional $US10-12, which means that Mycofix Plus will pay for itself 10-15 times if used across the board in GDU's for this reason alone. ■