

The Benefits of Non-GMO Soy for Farmers: Less Birth Deformities, Lower Medicine Costs and More Profits

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“Pilegaarden” (Willow Farm)

Healthier, more productive pigs, more profit, and much less birth deformities; an important lesson for all farmers not to use GMO feed or glyphosate on their land.

I want to tell you what I have seen on my farm and about the on-farm and lab investigations carried out in collaboration with Professor Monika Krüger and other scientists.

My farm – ‘Pilegaarden’ – which translates as ‘Willow Farm’ – is an average Danish farm in the small village of Hvidsten. Our pigs are raised accordingly to United Kingdom regulations for pig housing, and exported to the UK for consumption.

Inside the pig farm is a straw-based system for the sows as well as a standard farrowing house.

I had read about the effects that GM feed has on rats in lab experiments (see [1] [GM Soya Fed Rats: Stunted, Dead, or Sterile](#), *SiS* 33), so I decided to change the feed from GM to non-GM soy in April 2011 without telling the herdsman on the farm.

Instant benefits from non-GMO soy

Two days afterwards, he said to me: “*You have changed the food.*” He always notices whenever there is any problem with the feed and tells me. This time was different. Something very good was happening with the food as the pigs were not getting diarrhoea any more.

The farm was using two thirds less medicine, saving £7.88 per sow. Not just my farm but three other farms in Denmark that switched from GMO to non GMO feed have also seen the same.

Medication after the changeover in the weaners barn also went down dramatically by 66%. One type of antibiotic has not been used since.

The sows have higher milk production; we can tell because the sows are suckling one, two or three more piglets and have more live born pigs, on average 1.8 piglets more per sow. They wean 1,8 pigs more per litter, and have more live born pigs.

We have seen an aggressive form of diarrhoea disappear altogether from the farm. It affected young piglets in the first week of life, killing up to 30% of the animals. It has completely gone now for over three years.

Sows no longer suffer from bloating or ulcers and they have longer productive lives, only dropping in fertility after eight litters compared to 6 on GM soy.

So, a change to non-GM soy makes the herd easier to manage, improves the health of the herd, reduces medicine usage, increases production and is very profitable.

Glyphosate toxicity

Deformities in the pigs used to be very rare and I used to be proud to send Siamese twins to schools for classes because it was a 'one in a million' event. But then they became frequent.

So I read a lot on the subject and my suspicion fell on glyphosate. I read how glyphosate had been shown in scientific studies (see [2] [Lab Study Establishes Glyphosate Link to Birth Defects](#), *SiS* 48, [3]) to cause deformities and noted it was the same type of deformities that I was seeing in my pigs.

I also observed deformities matching those found in anencephaly babies in Washington counties in US [4] that Don Huber talked about as well as the birth defects in Argentina [5, 6] ([Argentinas Roundup Human Tragedy](#) , *SiS* 48), as described by Dr Medardo Avila-Vasquez where high levels of glyphosate are used.

I had looked at studies showing that a 2-day exposure to 3.07 mg/l glyphosate herbicide caused only 10% mortality but caused malformations in 55% of test animals [7].

A toxicological study in 2003 led by Dr Dallegrave [8] found bone abnormalities, absence of bones or parts of bones, shortened and bent bones, asymmetry, fusions, and clefts in rats. So, after this I began to list all the deformities I saw in my pigs.

A catalogue of deformities in piglets

I decided to be on the safe side, by listing the clear deformities that cannot be missed, like a back that is totally kinked over (*see Figure 1, above right*). I have pictures of all the deformed piglets, which are born alive in most cases.

One had a 180° bend in one of its vertebra. There were also deformities in the soft tissue, and one without an anus. One had kidney problems; another had its stomach outside the body. One had a cranial deformity, with no eyes and its brain outside the head; this is very typical. One had no cranium at all.

Some are even messier. There was a piglet with only one eye, and one completely headless. There was a little nose, but it had no bones to grow on so it probably would have died just after birth. We also started counting deformities of the tail, which are never fatal but are actually spinal deformities.

I sent the deformed piglets to Germany to be analysed by Krüger at Leipzig University. She opened them up and took the organs including the lungs, liver, kidneys, muscles, nervous system, intestines and heart; and she found glyphosate in all of the organs (see Box). You can see some of them in the scientific paper I published with Krüger and other scientists [9].

Types of deformities seen 所看到的畸形种类

- Cranial 头盖
- Spinal 脊柱
- Tail 尾巴
- Limbs 四肢
- Feet 脚
- Dual Sex 双性
- Misplaced sex organ 错位的性器官
- Ears 耳朵
- No-Rectum 无直肠
- Kidneys 肾脏
- Eye 眼睛
- Tongue 舌头
- Stomach 胃
- Motoric problems 肌肉运动问题

Figure 1 List of documented deformities observed (with Chinese translations) in piglets born to sows fed a diet containing different amounts of glyphosate. Glyphosate is present in all animal feed (except organic) due to the indiscriminate use of Roundup pre-seeding, or as desiccant; manure has Roundup residues in it and is recycled in the feed.

Glyphosate detected in malformed piglets

A total of 38 deformed Danish one-day old piglets were euthanized and the tissues analysed for glyphosate using ELISA (enzyme-linked immunosorbent assay).

All organs or tissues had glyphosate in different concentrations. The highest concentrations were seen in the lungs ((0.4-80mg/ml) and heart (0.15-80 mg/ml). The lowest were in muscles (4.4-6.4 mg/g).

Rate of malformation increased to one out of 260 born piglets if sow feeds contain 0.87-1.13 ppm glyphosate in the first 40 days of pregnancy. In case of 0.25 ppm glyphosate one out of 1,432 piglets was malformed.

These piglets showed different abnormalities as ear atrophy, spinal and cranial deformations, cranium hole in head and leg atrophy; in one piglet only a single large eye developed. Piglets without trunk, with elephant tongue, and female piglet with testes were also present.

One malformed piglet showed a swollen belly and fore gut and hind gut were not connected.

The researchers note: *"Further investigations are urgently needed to prove or exclude glyphosate in malformations in piglets and other animals."*

Teratogenic dose a fraction of the regulatory allowed dose

In addition to these experiments, I had over 30,000 piglets born over two years and therefore have statistical data that are not easily available in the lab and this is where farmers have the ideal opportunity to do their own testing.

I tested the food, the foetuses, the urine and the grains that came into the farm. To do the tests, I would take representative samples from the batches of food, mix them, and take 100 grams in a plastic bag of each to be tested, or 100 ml of liquids.

When taking muck and urine for testing, you need patience. Blood tests can be done by a vet. Send it for analyses to a lab that has the facilities to test glyphosate down to about 0.1ppb = 0.1 milligram per tonne. If tests are only detecting at above 0.1ppm = 0.1 grams per ton, it cannot show you what is in urine and muck. It costs about £30-50 for one test. Tests in oils might not be possible; you need to ask beforehand.

The results of the tests showed that with 0.06 mg/kg of glyphosate residue in the feed – much lower than the allowed 20 mg/kg – I was getting cranial and spinal deformities after two months of feeding (*see Figure 2, above right*). At 0.1 mg/kg I was also getting deformities, but not many so that one pig could alter the numbers.

But, at 0.2 mg/kg the deformities start to go up. At the maximum dose used (but still under 12% of the maximum permitted dose) of 2.26 mg/kg the numbers start to get very high.

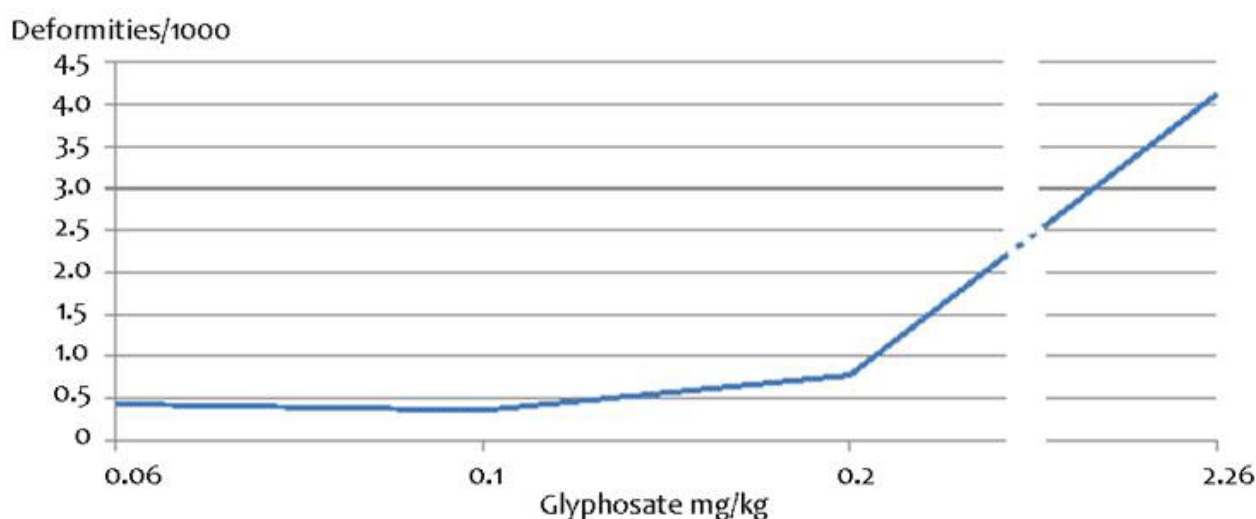


Figure 2 Rates of cranial and spinal deformities in pigs fed increasing levels of glyphosate in feed

Fewer piglets per litter

I also got help from Thomas Böhn from Norway who told me to look at longer intervals. We got numbers after six months to see an accumulative effect. The story is exactly the same. There is a very clear difference between low and high levels of glyphosate.

We also looked at the numbers of pigs born in each litter, which was significantly less after eating food with higher levels of glyphosate (*see figure 3*). We found a significant average difference of 0.95 fewer pigs born per sow when glyphosate was eaten in feed, between 'low' and 'high' intakes.

This was measured as accumulated intake of glyphosate over a 35 day period – the last five weeks of pregnancy. The ‘low’ intake was defined as under 3 mg/kg body weight, and the high intake was 3-9 mg/kg body weight.

So with glyphosate present in the feed, we have fewer births, as well as the odd ones that are deformed.

In short, a five-fold increase in glyphosate levels from 0.2 to 1 part per million (ppm) resulted in a five-fold increase in cranial and spinal deformities at birth, five times times more abortions, and 0.95 less piglets born per litter.

Glyphosate has known toxicities at extremely low concentrations

We can also relate the actual levels of glyphosate in feed to the level in the urine. So for 1,132 ppb (or 1.13 ppm), there is 44 ppb (~ 4%) in the urine and 246.33 ppb (~22%) in dung.

When I tested my own urine, I found that I had 2.58 ppb – and that is not from eating GM contaminated feed but from eating normal food from the Danish shops.

This is already at the level of higher rates of abortions and deformities and probably also fertility problems. Is this why in the Western world we have a very big problem with fertility (see [9] [Glyphosate/Roundup and Human Male Infertility](#), SiS 62)?

And at 1,000 ppb, glyphosate is patented by Monsanto as an antibiotic, actually killing the beneficial microorganisms. At 0.1 ppb (less than 1/25 the level measured in my urine) Roundup caused tumours in 80% of rats compared to 20% in the controls [10], which only developed them at 700 days.

To have that high level of glyphosate in my urine, I must have consumed at the level of about 0.2ppm or 2,000 times more than the test rats. So what does that mean for the rates of cancer (see [11] [Glyphosate and Cancer](#), SiS 62)?

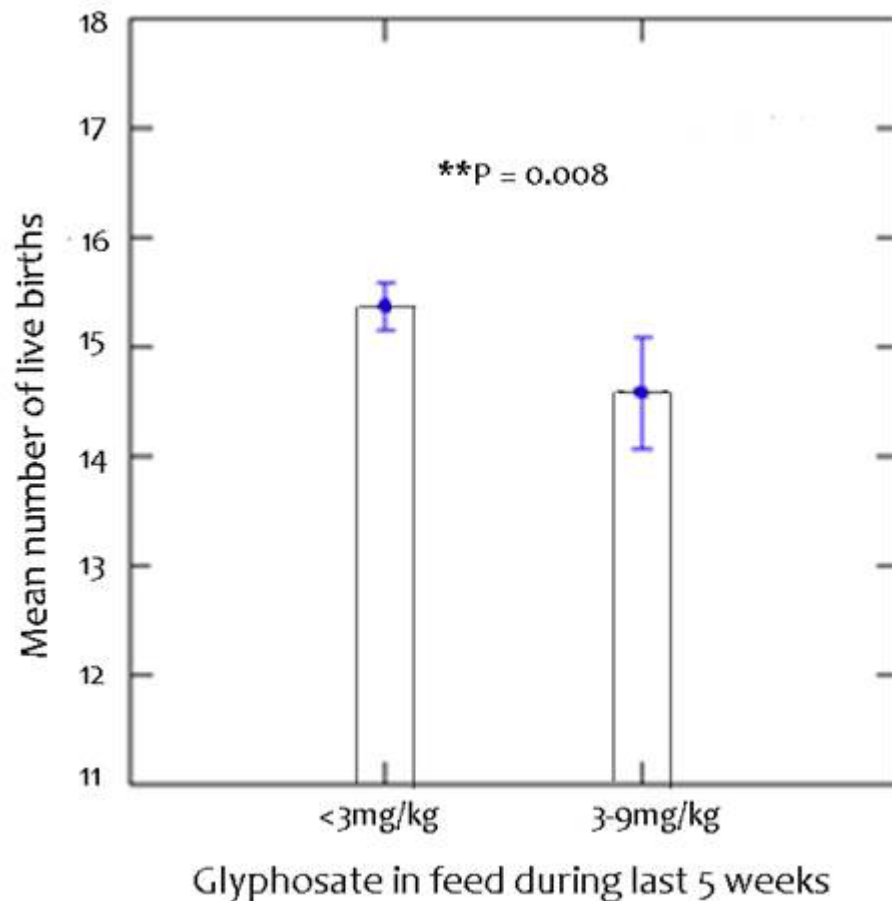


Figure 3 Rates of liveborn per sow after consuming low and high levels of glyphosate in feed in last 5 weeks of pregnancy; the amount of glyphosate is the total summed over the last 5 weeks

I have a short film about how it is to be a farmer, I always feel very bad about my pigs getting ill so I leave the film for people to see. These same things must be happening in Chinese farms also, as they are using the same feed as I used to.

Even non-GM soya contains glyphosate and we as farmers need to demand that it is not sprayed down with glyphosate, because it can affect people as well as pigs.

To conclude

Any farmer who switches away from GMOs and Roundup will experience improved health in their herd and crops.

I know of the scientific studies on malformations due to the chemical Roundup. I know that one in 80 people in certain towns in Argentina have the same defects after being exposed to the chemical. And I know of 14 Danish people born with deformities of the same type.

Now what I have seen in my pigs makes me wonder what we are doing – not just to them but to ourselves. And it scares me.

A farmer's task is to provide nutritious and healthy food for consumers, GMOs and Roundup provide neither. We can look back to DDT and how we thought that was healthy. That should remind us that we cannot ignore the warning signs for glyphosate.

Ib Borup Pederson is a Danish pig farmer serving the UK market, now also a scientific researcher and campaigner.

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