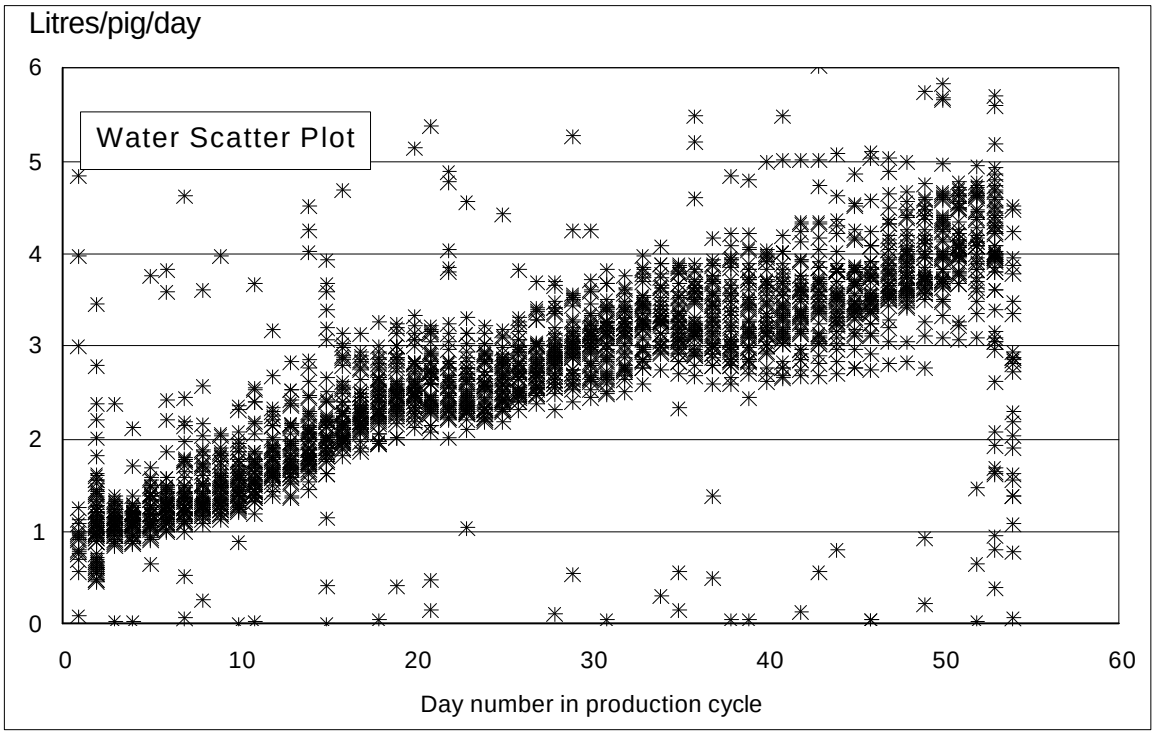
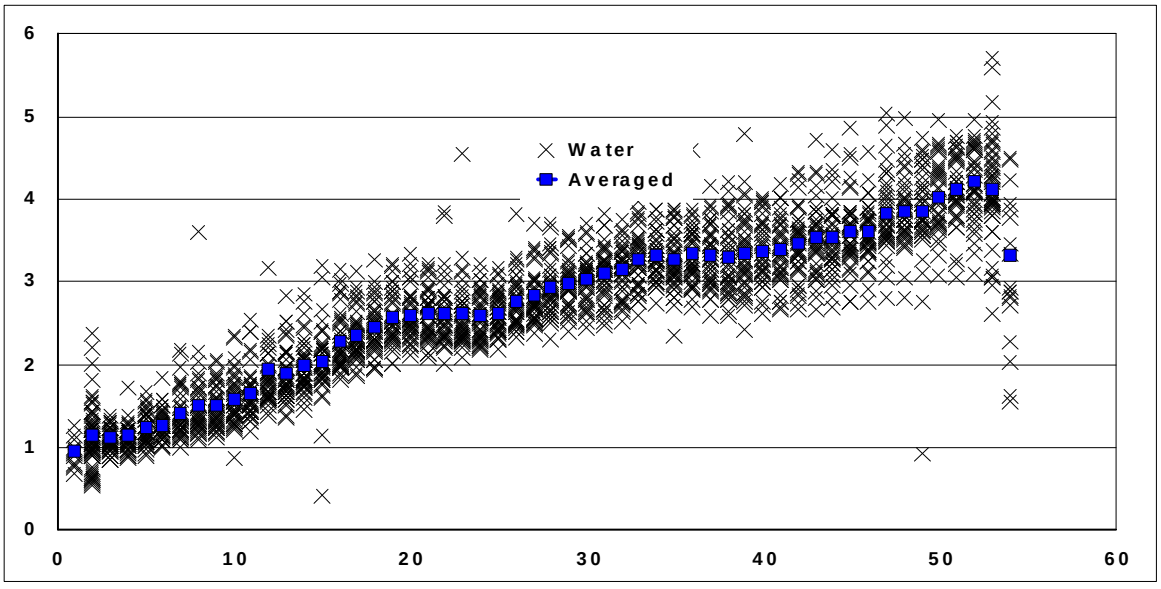
Case Study : Feed Changes and Effect on Water Intake farmref gts

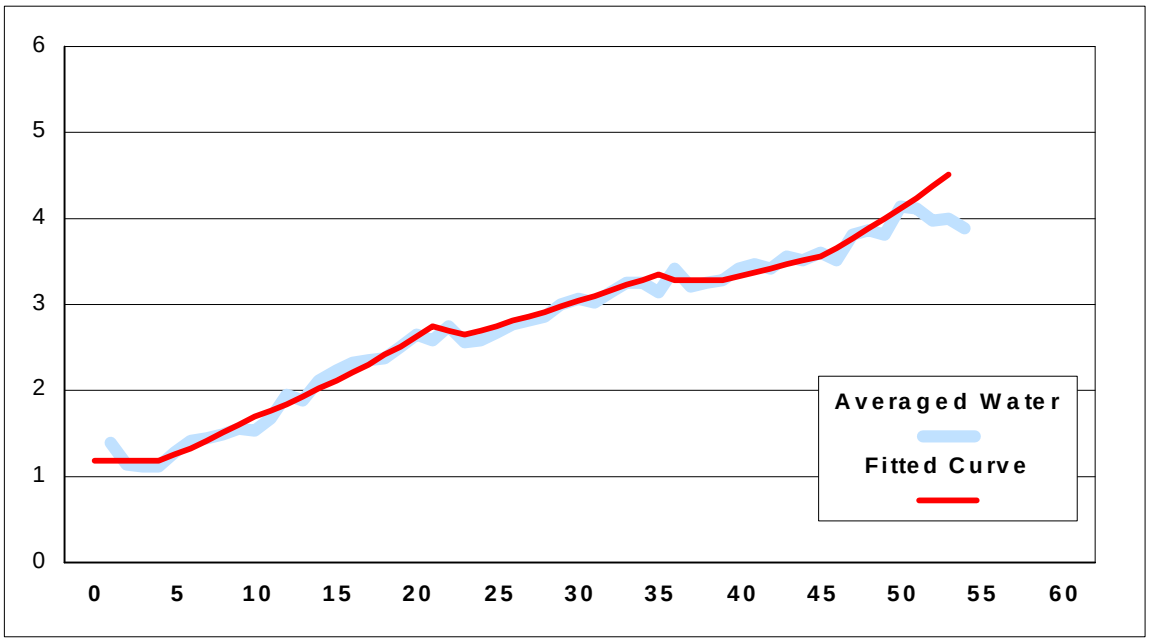
Data taken from UK nursery production site consisting of 7 houses of (typical) 600 pigs, housed for 54 days. Weight range approx 7 to 35kg. Feed ad lib by auger. Total production covered by this case study approximately 25,000.

Method :
Data from 42 batches of pigs (in different buildings) assembled into single plot showing litres of intake per pig, characterised by day number. (Note : Total daily use divided by daily pig numbers as recorded on site.)



On subsequent charts, the values for any day in the cycle have been filtered to remove exceptional/erroneous values, averaged, and then a curve fitted.





Firstly, It is clear that intake values are very consistent in this production situation - falling within around 15% of the average value - despite the number of batches, and a range of environmental and other conditions.

Secondly, that there are two very clear "knees" in the trace- around Days 20 and 35. These are not mere aberrations of logging, etc. - there is a set back in water intake on these two occasions. In both cases it takes water intake about 5 days to recover to the previous level.

These correspond to changes in feed ration. (These may not be the only changes in ration, but they are the ones with clear effects on water intake.) Clearly, there is an interaction between feed ration and water intake.

It has been established elsewhere that water consumed in relation to feed (water : feed ratio) reduces as pigs get older and larger.
The results here suggest that rather than a single continuous relationship there are, rather, a series of discrete relationships, with feed formulation being a significant factor.

It is recognised that the dietary needs of pigs change with age and size. For convenience in formulation and delivery, it is usual to provide this by step changes in ration, rather than a continuous day by day change.

Each formulation is intended for pigs a of a certain weight, usually formulated on a least cost basis for the required nutrients. In general, diet formulations are lower and lower cost as the pig grows, and there is an evident desire to change to lower cost diets for least feed cost.

It is therefore perhaps not surprising that there are step changes in the (presumed) proportion of water to feed, since this is how feed changes.

Were the slope to change simply to a new rate/angle, one would simply say that this represents a new balance between feed and water. However, it appears to go negative, or least remain flat for a few days, losing the previous day on day increase one. Several interpretations are possible.

The more optimistic interpretation is that water intake was previously excessive, perhaps induced by an excess of protein in the diet - needing more water for excretion. The negative slope reflecting the fact that there is more water in the body than necessary, so less water is needed until this is eliminated.

Another is that water intake goes down because feed intake goes down because of, similarly, an excess of protein, and that - for this short time - pigs need somewhat less energy in the diet to reach a balance.

The other, more pessimistic, is that water intake goes down because feed intake goes down, because the pigs are actually "going backwards" during this time. That there is not only a loss of growth but conceivably, an actual loss of weight.

If that were true, there is a cost to changing feed formulation (so many day's loss of potential production) which may outweigh the cost saving of the reduced ration cost.

More research and analysis would be required to verify whether feed intake showed similar steps changes or negative slope pattern (outside the scope of this particular study).

It should be noted that, typically, feed trials investigate effects and results from particular formulations, not the effect of changes from one to another.

If there be a significant cost to changing formulation, it would suggest a significant potential value for feed blending on farm.

Author's Comment
I would not hazard to suggest whether such changes are typical or representative of any other production situation. Rather, I suggest there are severe dangers in assuming that relationships determined in one trial or production scenario situation will apply equally in any other. This article merely reports what has been found on this site, with these pigs, over a period of around a year, along with possible interpretations.
However, I should mention that such periodic step changes in feed and water intake progression - that is, significant and noticeable departures from a previous pattern of steady increase - are regularly noted in logged data on a wide range of production sites.
The farm involved is, in fact, an able, successful and efficient producer with a very good standard of management.
Little as I would suggest one can extrapolate from this instance (however many replicates) to other farms de facto, it is equally dangerous for producers to assume that it does not happen merely because they don't know about it.