

Water Max Min and Ratio [WMMR]

The WMMR method uses water use data extracted from Barn Report and then further processed to show three key factors in graphical form :

Max = Highest water used in one log interval as % of daily total

Min = Lowest water used in one log interval as % of daily total

MMR = Min and % of Max

Good		
Factor	Status	Possible Reasons
Max	High	Pigs are synchronised and can express this
Min	0 / V Low	No leakage. No competition.
MMR	0 / V Low	Because Min is low
Bad		
Max	Low	Intake suppressed. Pigs unable to drink through competition. Disturbed group behaviour.
Min	High	Leakage. Competition. Disturbed group.
MMR	High	Combination of Max Low and Min High

Explanation

Min, Max and MMR are simplified numerical ways of representing the pattern of water use over a 24 hour period. They compare the highest and lowest values with the mean value (of 1.04%, since there are 96 log intervals per day), and then with each other.

In normal circumstances, the pig's eating, drinking and general activity are concentrated into particular parts of the day (according to the body clock) and there are regular times (particularly 4 to 6 am) when all pigs are sleeping or at a very low level of activity.

So, if pigs have normal synchronised social behaviour and plenty of access to water, Max will be high, and Min will be 0 or very low. MMR (Min / Max) will therefore be low or zero also. Since the pattern will be the same each day, the percentages will come out about the same, only the total volume changes.

If there is a shortage or problem with water such as too few drinkers, pigs may have to queue. This suppresses the maximum level. If it is particularly bad, then minimum may rise, as pigs have to eat and drink at times which would normally be a sleeping time, so Min will be higher.

Equally, disturbed behaviour from environmental stressors such as poor temperature control, inadequate comfortable lying space, high levels of aggression will lead to indicators such as low Max, high Min and correspondingly very high MMR.

Leakage will show as a higher Min level, though it will have less effect on the peak (maximum).

General indications are that young pigs tend to drink more frequently than older pigs. Hence, Max is expected to be lower for younger pigs, though Min and MMR would still be low or zero, if they are properly socially adjusted.

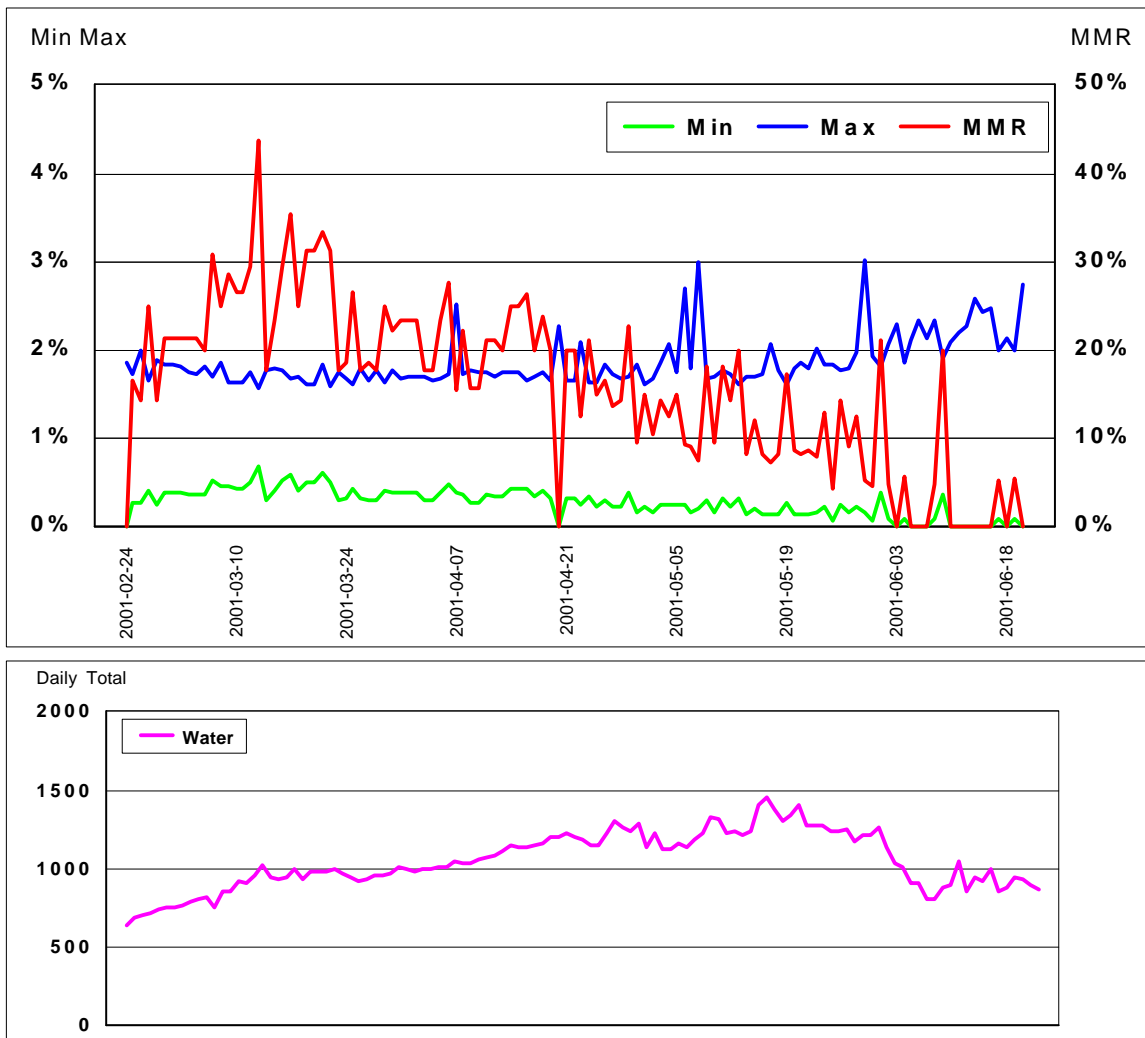
Initial analysis suggests that normal Max values for young pigs should be around 2 - 4% whilst for finish pigs it should be 4 - 6%. Min and MMR values should always be 0% or very low.

Note

Water use is logged measured by recording regular readings from electronic counters, and then calculating changes in the readings. Data errors can occur from time to time - such as due to counter reset or communication problems - leading to incorrectly high readings. Since Max records the highest reading on any particular day, it is therefore prone to a higher level of

spurious high values than other measures. Take care when considering the significance or otherwise of individual spikes and peaks.

Example



In this example, it's noted that Min and Max are relatively close together - around 0.5% to 1.7% - not far from the mean value of 1.04% - leading to a high value for MMR. However, this progressively drops. Later on, Min drops to zero when the total daily water (lower chart) goes down (this is when pigs start to be sold out of the building).

Whilst not certain, a reasonable interpretation is one of competition for feeder/drinkers. In this case, one might take the MMR value as a measure of competition for access. The effect of competition being that it pushes some pigs into eating and drinking when they would otherwise sleep. This appears to improve, perhaps because the pigs become more efficient (quicker) at eating and drinking, but finally gets better because some pigs are removed from the pens. This would reduce the overall competition, but particularly so since the pigs removed (up to weight) would be likely the more dominant individuals.