

# Grappling with group size

**Group size has recently gained more attention with the difficulties producers are facing with the PMWS/PDNS syndrome. Performance and economic implications all play a part in determining the 'ideal' group size for each farm, but it seems that groups of 20, kept intact after weaning, are the optimum. Here is some of the evidence, supported by our own work at Green Hill Farm.**

By Dr Mike Varley, SCA Nutrition, UK



Mike Varley, technical manager

There is an on-going debate among producers and scientists on the optimum group size for pigs from weaning to slaughter. This hinges around individual pig performance, costs per pig and animal welfare. When flat deck-cages were first used in the 1970s, group sizes tended to be relatively small at between 10 and 20 pigs per pen. It quickly became obvious that by increasing the group size to 100 or more, there were significant savings to be made. The hardware, for example, pen divisions and fixed equipment, tended to be less expensive. Big pens also seemed to offer advantages in performance over smaller group sizes and many systems now incorporate large social groups.

Modern big pen systems offer design features not incorporated into smaller pens, such as more flexible water delivery systems and free choice environments for piglets where there are different physical parts of the pen with varying features such as solid or slatted floors, kennel or open plan areas and temperature gradients. Pigs in big pens often have the advantage of being able to choose their own stocking density by moving around the various locations within the pen.

### Group behaviour

It is important to understand the ethology or animal behaviour characteristics of young piglets. This will have a large bearing on the success of the system. When any group of pigs is re-mixed into a new social group there is very intense activity within the group as a new dominance hierarchy, or pecking order, is established. This goes on for around 48 hours until every pig in the group recognises every other pig and its social position; then the agonistic behaviours such as fighting and competition subside.

Subordinate pigs will usually express submissive behaviour towards pigs higher up the chain. The smaller the group the easier this is and the intense behaviour at mix-

ing is much less. As the group size increases, the ability of piglets to recognise and remember every individual in the group diminishes. The social hierarchy begins to fail and this can lead to errors in communication, leading to increased fighting and stress. Instead of linear hierarchies as in Figure 1 (a), a series of sub-populations and complex loops may arise as in Figure 1 (b).

This can lead to great disruption in medium sized groups of 25 to 60 pigs because of the constant competition at feed troughs, water supply units and lying areas. The dominance hierarchies are never stable and are constantly altering as pigs strive to work their way up the tree. Growth is reduced because feed energy is diverted significantly into the competitive activities and less time is available for feeding itself.

When we move to very large groups of 60 to 200 pigs the belief is that because the social group is so large, pigs will abandon the need to interact with every other individual in the group and therefore live and socialise within the confines of a smaller group within the large group. As a result, performance may

Figure 2. Relationship between growth rate and group size (first 20 days after weaning).

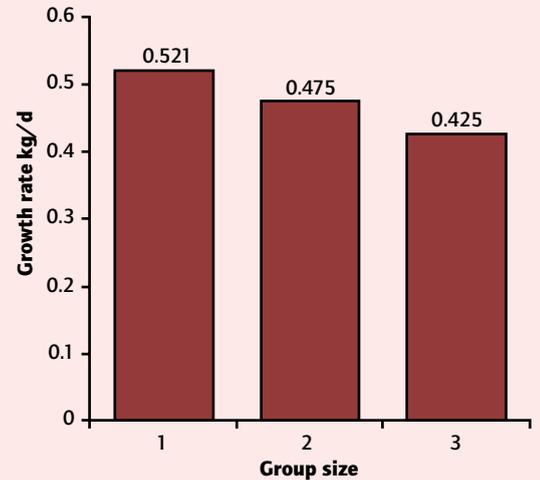
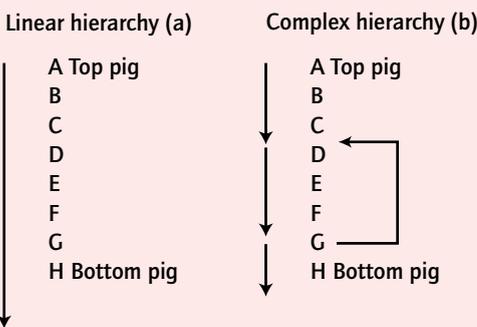
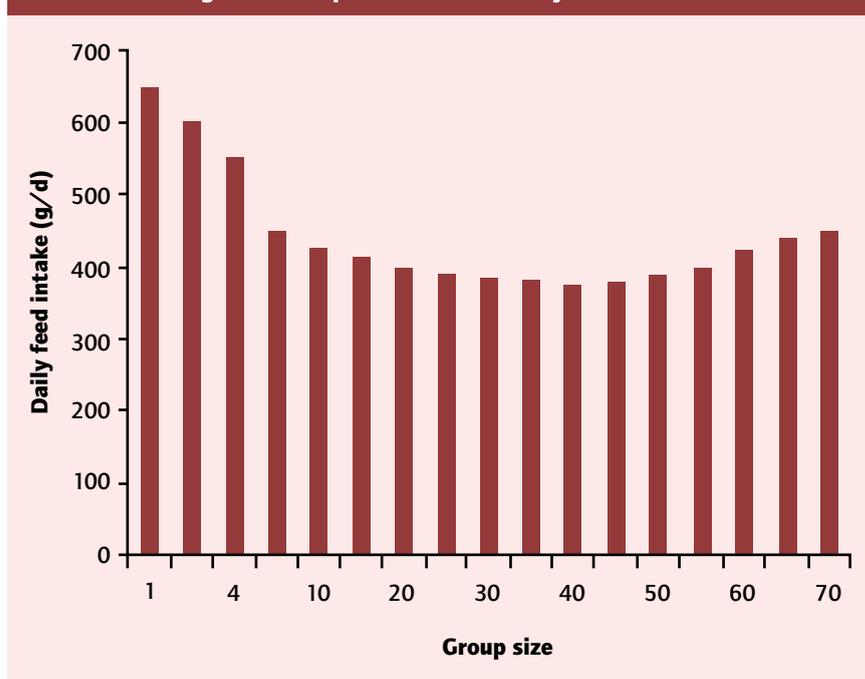


Figure 1. Dominance hierarchies in pig groups



**Figure 3. Group size effects on daily feed intake.**



tend to rise again for these large groups because of the more settled social status.

**Growth rate**

Trial work demonstrates the effects of group size on actual performance. Focussing on smaller groups, Figure 2 shows the relationship between growth rate for the first 20 days after weaning and group size. Clearly, with a group size of 1, the competition within the dominance hierarchy is removed and there is a significant bonus in performance terms.

However, it is not an economic proposition to accommodate weaned piglets in individual pens and indeed this would represent a compromised welfare position for what is a very social animal.

Figure 3 shows the general pattern that group size has on daily feed intake, seen in practice. This is based on experience and trial data from a number of sources, including SCA's feed evaluation unit at Green Hill Farm. The effect on feed intake is obvious and is at its lowest in the medium sized groups; not forgetting

that, irrespective of the group size, feeder space per pig will also have an overriding influence on feed intake, performance and the efficiency of feed utilisation, whatever the system in place on a particular farm.

If the main objective is individual pig performance, however, it is better to go for small pens rather than big pens. Smaller groups will have a more stable social environment and feed intake behaviour will be far less prone to distur-

bances, compared to larger groups. The general relationship of better gain for small groups will also be associated with improved health status for the smaller, more easily managed and controlled groups. For the nursery pig particularly, growth rate in the early stages has a crucial impact on growth through to slaughter.

**Economic balance**

Figure 4 shows the connection between individual growth performance and economic performance for a variety of group sizes. Because of the progressive depletion of individual physical performance as group size increases, the optimum group size is around 20 piglets per group. Above this value, performance drops off and profits are reduced accordingly.

Health implications are particularly important too with experience from the French industry leading to the conclusion that small pen and group sizes are an essential part of the control measures for the wasting diseases, PMWS and PDNS. It is said to reduce the spread of the PCV-2 virus amongst animals within a farm and, coupled with other control measures (e.g., improved hygiene status, later weaning, improved nutrition and lower stocking densities), this can go a long way to curb the worst excesses of PMWS.

**An ideal world**

Optimum group size on individual farms will vary, depending on stocking densities, feeding and water systems and even genotypes. But, in an ideal world, a complete litter of piglets at weaning is best moved from the farrowing crate, around seven days after weaning, into a single nursery pen as an intact social group. This group then remains together, all the way through the post-weaning phase with no mixing of litters. This is difficult to envisage for most farms, but as a compromise, efforts to keep group sizes smaller can be justified in physical and economic performance of the pigs. **PP**

**Figure 4. The relationships between group size, growth rates and total costs per kg pig produced for post-weaned piglets to 30 kg.**

