Executive Summary

This article addresses the question of sorting pigs by weight or sex as they are placed into social groups at weaning, when entering the grow/finish phase, or as gestating sows. A contrast is made between the stable, non-aggressive social behaviour of pigs in a free-ranging environment and our concerns about aggression and dominance related problems in commercial production. It is hypothesized that dominance will only be a problem if resources are limited and their access can be controlled by the pigs. Thus, historical systems in which pigs were limit fed on the floor were subject to dominance related problems. Limit feeding continues with gestating sows and sorting remains necessary unless some form of individual feeding occurs. For grow/finish pigs, feed is available ad libitum and floor space is difficult to defend. Thus, sorting by weight does not appear to be important for this phase of production. Sorting based on nutritional requirements should be practiced, and this leads to split-sex pens in grow/finish, and sorting by weight in newly-weaned pigs.

Introduction

In swine management we have the opportunity of determining the social groupings of our animals. We determine which pigs are in the same pen, and which pigs are not. In this paper I refer to this allocation process as sorting. I will not refer to the practice of removing pigs as they reach market weight, which may also be referred to sorting. With increasing farm size, more pigs may be selected from to form any group, and sorting strategies can be very effectively implemented. Within the industry there is a general consensus that sorting is important in order to achieve maximum productivity. In this paper I will question that assumption, suggesting how it may have developed and why it may not apply in many situations in our current industry.

The Social Behaviour of Pigs

Pigs are very social animals. With the exception of mature boars, and pre-parturient sows, wild pigs or those in free-ranging conditions are never alone. They live in groups of closely related individuals. It seems ironic that in managing such a social creature that we are so concerned about grouping animals and how it is done. We avoid group housing of sows, and we sort nursery and grow/finish pigs to avoid social problems. I’d like to examine the social behaviour of pigs and some of its implications for their management.

The basic social unit of free-ranging pigs is a small group of sows and their juvenile offspring (Graves, 1984). The number of sows in a group is largely dependent upon the density of

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resources, with larger groups existing if resources are abundant. Sows leave the main unit a few days prior to giving birth, but return with their newborn litter when it is approximately 10 days of age. Young boars leave the sow and offspring group as they approach puberty and live in small groups, eventually becoming solitary when they reach maturity. Boars will join a sow and offspring group during the mating season, and depart when it is finished. All of these social transitions, as well as the interactions within a group, are relatively free of aggression. Boars may fight in order to determine which one will join a sow group for breeding, but within the sow and offspring group most interactions involve avoidance rather than aggression (Jensen, 1982).

There are two reasons for this relative lack of aggression. Interactions among sows and their offspring involve closely related, familiar animals. The sows within a group are believed to be siblings or a female and her offspring. The juveniles are half-siblings (through their sire) or cousins (though their dam). A principle of sociobiology is that the greater the degree of relatedness among individuals, the less aggression occurs and the greater cooperation exists. An individual’s inclusive fitness, the probability that their genes will be more common in subsequent generations, is improved not only by their own survival, but also by the success of their close relatives. Within natural pig groups, cooperation is more beneficial than aggression.

The second reason for the lack of aggression in natural pig groups is that dominance related competition is rarely beneficial. During some periods of the year, resources (food, water) are abundant enough for all of the pigs to obtain as much as they want. At other times, resources are so scattered that a dominant animal could not defend and monopolize them even if they wanted to do so. In a cost benefit analysis, the cost of defending a food source is usually too high compared to the benefits obtained.

**Historical Reasons to Sort Pigs**

If life in free-ranging pig groups is so relatively free of social conflict, why do we expect it in commercially managed animals? The answer is that some of our historical means of management have encouraged conflict. Sows were once routinely kept in groups, being fed in a yard or trough. As we do now, we fed these animals a restricted ration. The animals had a reason to attempt to control the limited resource. We sometimes encouraged this competition by providing the feed in such a way that an animal could defend it until she had obtained as much as she wanted. Feed troughs did nothing to protect subordinate sows from more dominant ones. Feeding on the ground or floor allowed dominant sows to control part of the feeding area, and only effectively controlled aggression if the feed was widely distributed.

Things were not much better during the grow/finish phase. In order to control backfat, we fed pigs slightly less than their maximum intake. The animals remained somewhat hungry and dominant ones would attempt to control access to fed. We still fed in troughs, with little protection for subordinate pigs; and in crowded pens, with insufficient space for feed to be widely distributed on the floor. As a result, dominant pigs were able to obtain more feed if they defended the feeding area. In such systems, the dominant (usually larger) pigs grew faster than the subordinate (Botermans et al., 1997).

Under such production systems, it was advantageous to sort pigs by weight when placing them in groups. To reduce the incidence of thin sows, smaller sows and gilts were penned separate from larger sows. Grow/finish pigs were also sorted by weight so that the smaller pigs would not have to compete with much larger ones. Under these conditions, the strategy worked. But we no longer raise pigs in the same way. Do the old rules still apply?
Should We Sort Now?

The conventional means of managing sows is to keep them in individual stalls. In this way each animal is provided a protected feeding space. Although some feed does move to adjacent animals, the amount is generally considered insignificant. However there is growing concern over such restrictive housing, and interest in group housing is increasing again. Part of gestation management involves restricting the feed intake of the sows. Thus, there is a strong motivation of sows to control access to the feed in order to increase their intake. Various systems have been developed to prevent such control, and the importance of sorting is inversely related to the success of such devices. Electronic sow feeders provide the greatest control over access to feed. Once a sow has eaten her daily allotment, she should not be able to access feed again. Competition is for access into the feeder, rather than for the feed (Hunter at al., 1988). Consequently, sorting by weight may be advised, but is not considered essential.

Sorting by weight is considered essential in floor feeding and trickle feeding systems. Food feeding involves spreading the feed on the floor, either by hand or mechanically. No protection is provided for the smaller sows. Trickle feeding involves providing a partially protected stall for each sow, but the key is that feed is metered out slowly so that an animal does not want to leave its position. However, as eating speed varies with pig size, the recommendation for this system includes sorting animals by weight and maintaining small group sizes.

The majority of grow/finish systems in North America are based on ad libitum provision of feed and water. Although access to feed or water may be temporarily limited by another pig, all pigs are able to obtain as much feed and water as they want. There is no benefit to the dominant pigs defending the resource, even though the design of most feeders would make it possible. Theoretically, we could limit access to feed, rather than amount of feed, to such an extent that dominant animals would defend the feeder rather than the feed itself. As the number of pigs per feeder space increases, pigs adapt their eating behaviour to reduce the effect of this restriction. Pigs increase their rate of eating (gm/min), and decrease their total duration of eating (min/day) when feeder stocking density (pigs/feeder hole) increases. As many as 30 pigs have been fed from a single feeder space without a reduction in intake or gain (Walker, 1991). As long as they are able to obtain adequate amounts of feed, dominant pigs in such situations appear to adopt a strategy of eating more quickly rather than increasing their defense of the feeder.

Another type of resource restriction in grow/finish pigs is also interesting in its apparent resistance to dominance effects. Reducing the floor space allowance of pigs is known to reduce feed intake and average daily gain. Most grow/finish pigs are housed in crowded conditions, resulting in reduced productivity per pig, for at least part of the feeding period. However, rather than being affected by dominance, the depressed performance appears to be uniform throughout the social group. The coefficient of variation in growth rate is similar if the pigs are crowded or if they are not (Gonyou and Stricklin, 1998). To determine if dominance should be a factor in such a situation we again ask if the limited resource is possible to defend, or if it is worth doing so. It would appear that such is not the case. Perhaps a lying pig cannot defend its space, or the effort to stand to do so is too costly to be of benefit.

But surely the aggression we observe when pigs are regrouped is related to dominance and affects productivity. Again, this is not necessarily the case. The aggression among newly regrouped pigs is related to the lack of familiarity of the animals. Once familiarized with each other, aggression ceases except in the defense of resources. Even though unrelated,
familiarized pigs behave in a way similar to related animals (Stookey and Gonyou, 1998). Subsequent conflict is related to dominance control of resources rather than unfamiliarity. But does the initial fighting affect productivity? On the short term, pigs that receive more injuries during this initial aggression do not perform as well as other pigs. However, the reduced performance is short lived and undetectable after several weeks (Gonyou et al., 1988). Even so, the aggression that follows regrouping is greatest among similar sized pigs. Pigs that differ in size by a few kilograms fight very little, as the smaller pig indicates submission and ends the fighting (Jensen and Yngvesson, 1998).

We have conducted two series of studies examining the effects of sorting pigs as they enter the grow/finish phase. In the first study we examined the effect of different ratios of males and females in the pen. Males grew at the same rate whether they were in a pen of all males, or in a pen that included females (Gonyou, unpublished data). In the second series, we examined the effect of sorting pigs by weight into pens of large, medium or small pigs, versus placing an equal number of each size in the same pen. Again, we found no difference in the performance of similar sized pigs in each type of group (Gonyou et al., 1986). However, pens that contained a wide range in body weights emptied earlier (Gonyou, unpublished data).

When Should We Sort Pigs?

As suggested above, we should sort pigs into uniform groups whenever we intend to restrict feed and provide no means of controlling access. We should also sort pigs if it is advantageous to feed them different diets. Split-sex feeding better meets the nutritional requirements of the animals, and should be practiced whenever feasible. There are also times when the weight differential among pigs suggests that they should be fed different diets. The difference of one or two kilograms among newly weaned pigs may favour their being sorted and fed different diets.

Individual pigs behave differently and can be classified as ‘resistant’ or ‘non-resistant’ to restraint. If pigs are sorted by this characteristic, their productivity is reduced in pens of all ‘resistant’ or all ‘non-resistant’ pigs, compared to pens that included both behaviour types (Hessing et al., 1994). These results indicate that we could improve the productivity of pigs by assembling groups based on their behaviour type, but the best combination would generally be accomplished by a random allocation or ‘gate’-cut.

Conclusions

Sorting by weight is a means of reducing dominance related variation in production. This practice will be effective if resources (such as feed) are limited and easily defendable. Such conditions exist in groups of gestating sows if they are not individually fed. Grow/finish pigs are generally fed ad libitum and do not benefit from sorting by weight. Restricted space allowances do not lend themselves to defense, and so all pigs experience a reduction in growth within crowded pens.

Sorting on the basis of nutritional needs can be effective, and leads to sorting grow/finish pigs by sex, and newly-weaned pigs by size in order to provide the best diets to each group.

Implications

Grow/finish pigs should be sorted by sex if you are going to provide different diets to each gender. Otherwise, sorting is not advisable, and may add to the labour cost for this phase of production.
Newly-weaned pigs should be sorted by size if you will be providing a different diet to the smaller pigs. Group-housed gestating sows should be sorted by size if the feeding system does not feed the animals individually.

References


