Welfare Quality®
Science and society improving animal welfare

SIXTH FRAMEWORK PROGRAMME

Reducing Aggression in Pigs Through Selective Breeding

From increased injuries, social stress and reduced growth to increased risk of infection to the animal and damage to the carcass, aggressive behaviour in pigs can reduce both economic returns and animal welfare. Finding ways to reduce this behaviour will become even more important in 2013 when the European Union requires pregnant sows to be group housed.
Researchers at Welfare Quality® have found this aggressive behaviour, which arises when unfamiliar animals are mixed together, could be reduced by selective breeding to improve overall welfare.

Because observing behaviour in individual pigs - whose levels of aggressiveness are individual - is time consuming and impractical, Welfare Quality® researchers at the Scottish Agricultural College (SAC), who are also supported by the Scottish Government, developed a method that was more efficient and quicker for commercial breeders. Researchers monitored the behaviour of mixed groups of pigs balanced for weight and the number of unfamiliar pigs, then counted lesions on the skin caused by fighting 24 hours later. By doing so, researchers were able to more easily determine how much aggressive behaviour a pig had engaged in.

Aggression is a Heritable Trait

The two pig populations monitored by the researchers, one each in Denmark and Sweden, showed that aggressiveness is affected by genetics to a similar extent as other traits currently included in selection programs. The number of skin lesions 24 hours after mixing showed similarly moderate levels of heritability in both Danish and Swedish pigs. Fighting behaviour itself was also moderately heritable, while bullying was only slightly less so. Being the target of bullying, on the other hand, was shown to be only mildly heritable.
The studies also showed that pigs who fight also bully other animals, but were rarely bullied themselves. Lesions on the head and shoulders, which are the usual attack targets in fighting, were associated with fights and being the target of bullying while lesions on the middle or rear of the body were only associated with being bullied. This means that aggressive pigs - which fight and bully other pigs - can be identified and selected against based on a distinctive pattern of skin lesions arising after mixing into a balanced group: they are genetically predisposed to have many lesions on their head and shoulders, and fewer on other parts of the body.

Looking Beyond Aggression

Once aggressive pigs are identified, it then becomes important to understand what happens if a pig breeder begins to select against aggression. Welfare Quality® researchers have shown previously in Danish pigs that selection to reduce aggression would not affect growth rates. Aggression among mixed groups of pigs is one situation, but aggression also occurs when the group composition is stable.

This research was executed within the third Subproject of Welfare Quality®, which focuses on the development of practical strategies to improve farm animal welfare. Research topics are:
- Improving human-animal relationships
- Genetic solutions to welfare problems
- Eliminating injurious behaviours
- Reducing lameness in cattle and broilers
- Minimizing neonatal mortality in pigs
- Alleviating social stress in pigs and cattle

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So, for this particular study of Swedish pigs researchers looked for genetic links between aggression during mixing and other aspects of pig behaviour, including aggression in a stable social group, activity levels and ease of handling.
Groups where high numbers of lesions were seen 24 hours after mixing also showed high levels of lesions three weeks later. Therefore, the aggression that occurs immediately after mixing and that which occurs in more stable groups are genetically linked.

Handling and Activity Levels

The Swedish pigs were scored for ease of handling when being weighed on two occasions–just prior to mixing and three months later just before reaching slaughter weight. Pigs who fought and bullied more at mixing were more active when weighed before slaughter–moving more quickly in and out of the weigh crate and moving more when in the crate itself.
On the other hand, pigs who were most likely to be bullied were also most likely to emit high-pitched vocalisations in the weigh crate.

These observations show that selection to reduce aggression at mixing could make pigs less active and therefore harder to handle. However, this may also indicate that low aggression pigs are less stressed by handling and it is possible that these low aggression pigs would be less reactive to other stressful events like transport and slaughter.
Concerns have been expressed that non-aggressive pigs might be less active in general, but this assumption was not supported by Welfare Quality® research. Although activity observed for a one-day period three weeks after mixing was weakly heritable, it was not genetically associated with aggression. Thus, selection to reduce aggression at mixing could have a longer-term impact, reducing low-level aggression between familiar pigs without affecting general activity levels.

Though more research needs to be done to confirm the links between aggression and behaviour in stressful situations, such as handling, Welfare Quality® researchers showed that genetic selection to reduce aggression in pigs is feasible using lesion scores following mixing, providing a way in which pig producers may be able to improve overall animal welfare and economic returns.

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Welfare Quality® is a European research project focusing on the integration of animal welfare in the food quality chain. The project aims to accommodate societal concerns and market demands, to develop reliable on-farm monitoring systems, product information systems, and practical species-specific strategies to improve farm animal welfare. Forty-four institutes and universities, representing thirteen European countries and four Latin American countries, participate in this integrated research project.
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