



Re-Livestock
RESILIENT FARMING SYSTEMS

AGBT Agriculture 2026

Advances in Genome Biology and Technology · 12-15 April
2026, Phoenix, Arizona, USA

Re-Livestock Abstracts

INTEGRATING TECHNOLOGY TO REFINE THE ESTIMATION OF SOCIAL GENETIC EFFECTS IN PIGS.....2

P. NUÑEZ¹, S. NEGRO², J. CASELLAS³, L. VARONA⁴, N. IBAÑEZ-ESCRICHE¹



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Integrating technology to refine the estimation of social genetic effects in pigs

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Abstract

Advances in automated recording systems in pig production provide detailed information on feed intake and social behaviour in group-housed animals. These data create new opportunities to solve a classic problem in the analysis of social genetic effects in pigs. In the classical formulation of social genetic models, the phenotype is expressed as the sum of its direct genetic effect and the social (indirect) genetic effects received from its pen-mates, together with contemporary-group effects: $y = Xb + Zu + Zs + Zc + e$ where u , s , and c represent vectors of direct genetic, social genetic and contemporary-group effects, respectively. A major difficulty in modelling social genetic effects lies in separating them from contemporary-group effects, because both are usually highly collinear. In this study, we constructed an interaction matrix based on information from automatic feeders to describe the intensity of contacts among pen mates. Rather than assigning identical interaction weights to pigs within the same group, we first estimated frequency and intensity of pairwise interactions at the feeder and combined them into a continuous variable, which was then allocated to each pair of animals in the social incidence matrix. This matrix was compared with a conventional binary matrix assuming equal interaction among all individuals in the pen, and both approaches were evaluated against a standard model without social effects.

We analysed feed conversion ratio (FCR) and residual feed intake (RFI) from 1,357 Iberian pigs kept in groups of 12 ± 3 animals, with feeding behavior continuously recorded. Models including social genetic effects explained a larger proportion of total genetic variance. However, the binary interaction structure failed to clearly distinguish contemporary-group effects from indirect genetic effects, resulting in inflated estimates of the social component. By contrast, the intensity-based matrix enabled a clearer separation between contemporary-group and social genetic effects, increasing total genetic variance from 0.15 to 0.40 for FCR and from 0.25 to 0.32 for RFI compared to the classical animal model. These results highlight the value of detailed behavioral records for improving genetic evaluations by providing realistic representations of social interactions among pigs.



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