Selection of pigs for social genetic effects improves growth of crossbreeds

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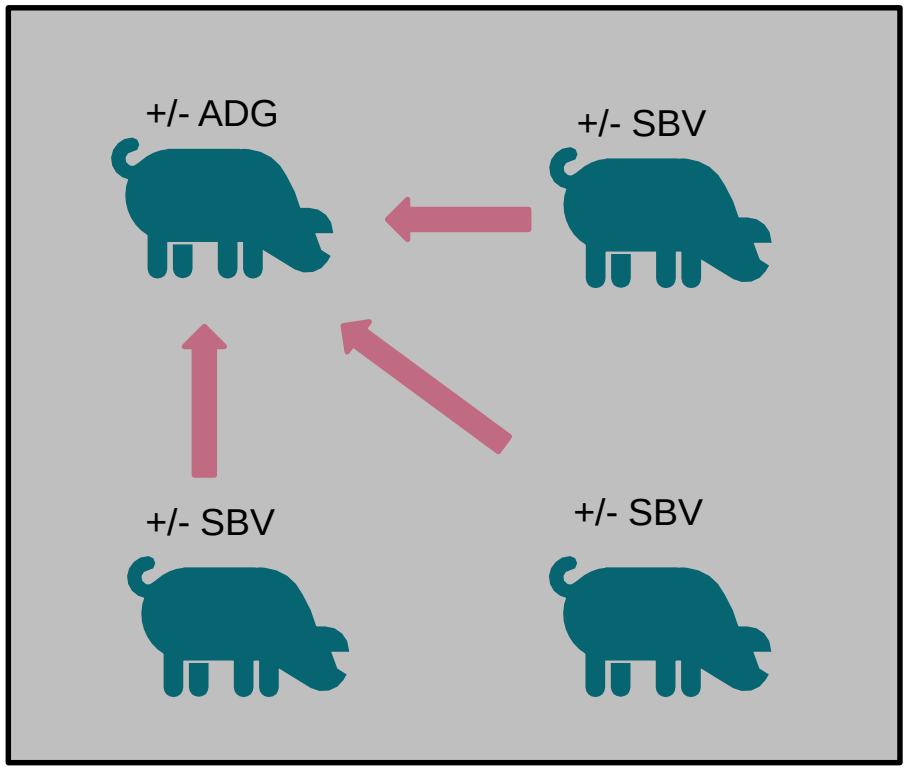
Why consider social genetic effects?



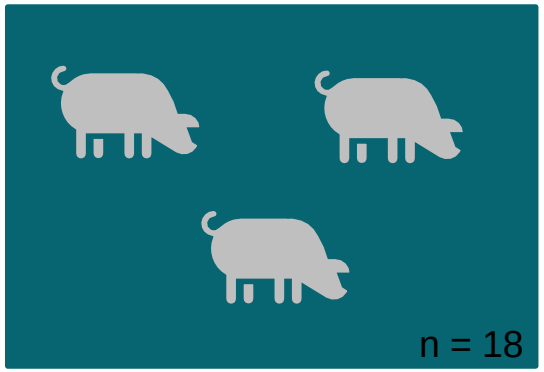
Response to selection for combination of direct and social genetic effects is expected to be higher than selection only based on direct genetic effects!

Objective

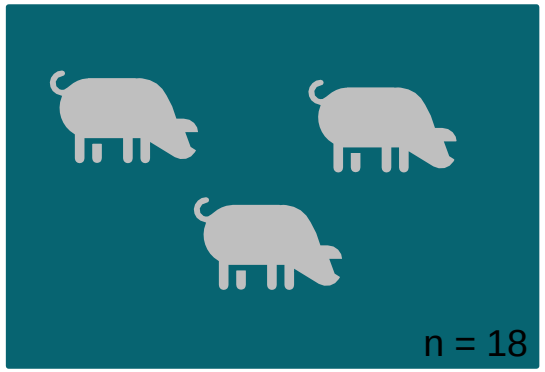
Identify if selection for social genetic effects in purebred pigs improves ADG in groups of crossbred pigs

Design of the selection experiment

HIGH SOCIAL GROUP (1.11)



LOW SOCIAL GROUP (-0.85)



	No.
Sires (YY)	199
Sows (LL)	911
Litters (YL)	1171
Groups	270
Observations	4470

Method 1: Mixed Linear Model, individual level

$$ADG_i = F_i + b_{DBV}DBV_i + b_{sd.wgt}sd_{wgt,i} + b_{SBV}\sum_{j=1}^{n-1} SBV_j + b_{sd.wgt,SBV}sd_{wgt,i}SBV_j + l + e_i$$

Fixed effects: year, season, barren type, start weight

DBV_i = direct breeding value

$sd_{wgt,i}$ = standard deviation in start weight

$\sum_{j=1}^{n-1} SBV_j$ = sum of pen mates' social breeding value

$sd_{wgt,i}SBV_j$ = interaction effect

l = random litter

Method 2: Linear Model, group level

$$ADG_k = F_k^* + b_{DBV}\overline{DBV_k} + b_{wgt}sd_{wgt,k} + b_{SBV}\gamma_k^* + b_{wgt,SBV}\gamma_k sd_{wgt,k} + e_k,$$

k = group

$\overline{DBV_k}$= average direct breeding value

$b_{SBV}\gamma_k^*$ = average social breeding value

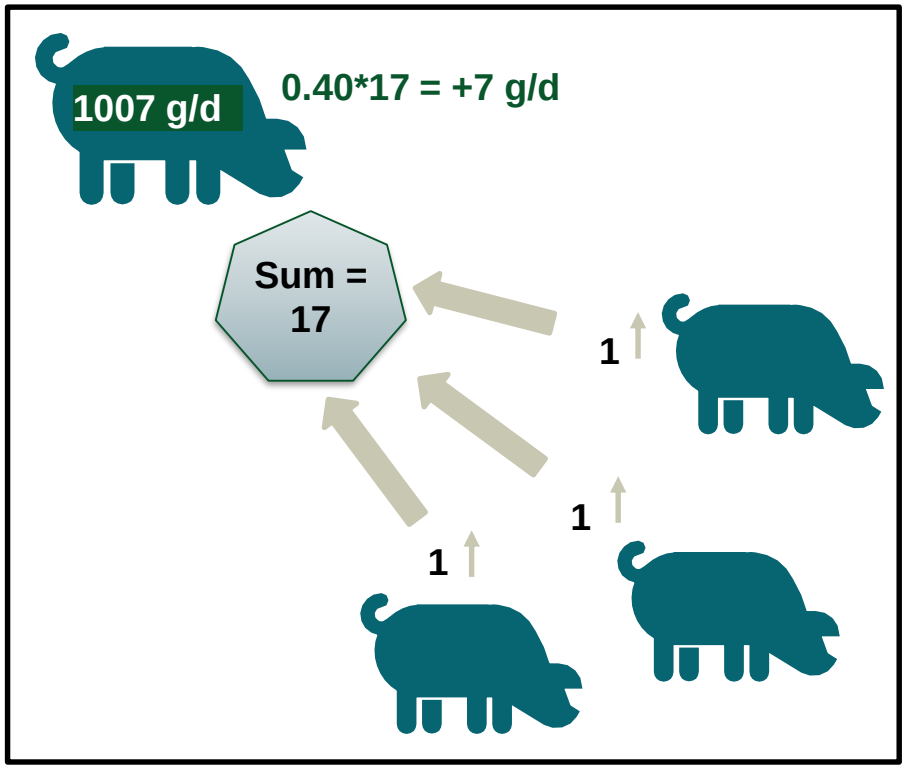
Results, individual level

- Model fit by REML in R (t-test)
- Coefficients (g/d):

$\hat{b}_{DBV}$ = 0.30 (p=0.02)

$\hat{b}_{SBV}$ = 1.74 (p=0.01)

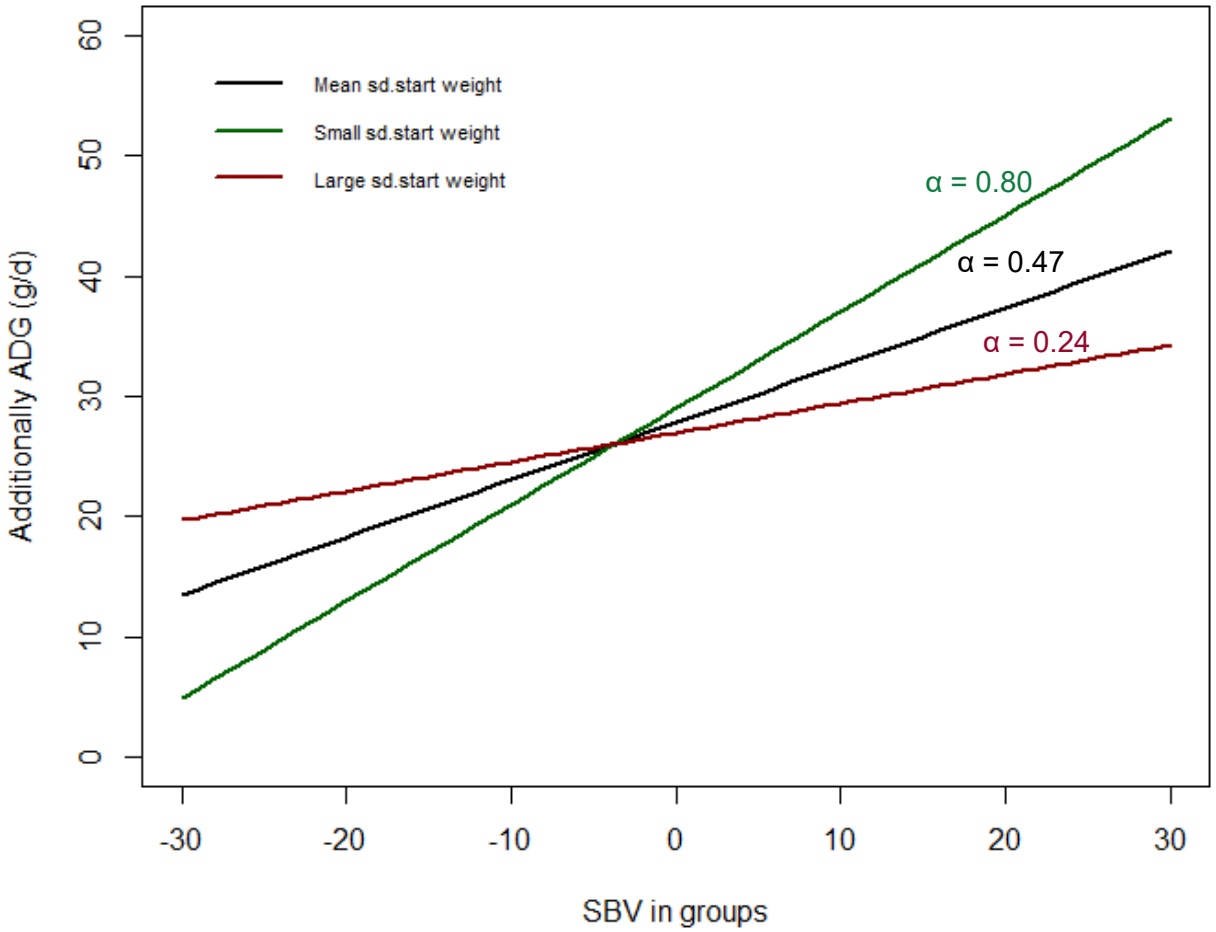
$\hat{b}_{sd.wgt,SBV}$ = -0.26 (p=0.03)



Results, group level

- Coefficient (g/d):
  $\hat{b}_{SBV}$ = 2.45 (p = 0.02)
  $\hat{b}_{sd.wgt,SBV}$ = -0.38 (p = 0.04)

- Decreased variation in start weight increases effect of SBV



Conclusion

Selection of social genetic effects for growth in purebred pigs improve the phenotypic growth of crossbred pigs!