

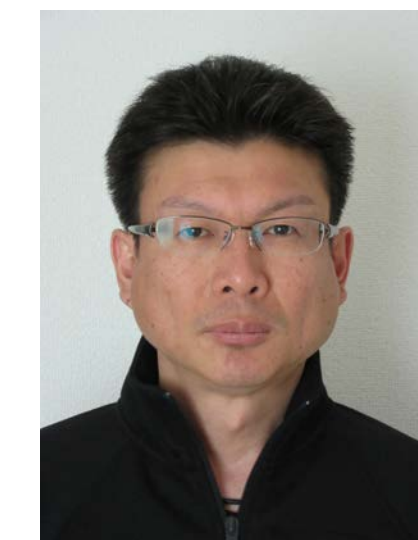
Genetic relationships between growth curve parameters and reproductive traits in Wagyu cattle



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Background

- ✓ In recent, the price of calves at calf markets has been rising and thus pressing feedlot farmers' businesses due to decreasing the number of calves in Japan.
- ✓ Genetic improvement for reproductive traits is therefore required to increase the cow population and their producing calves.
- ✓ Body size of cows has been increasing as a result of improving carcass weight, weight gain and so on.
- ✓ It is known that body size and growth pattern of cows may affect reproductive traits.

Objective

To estimate genetic parameters for growth curve characteristics (mature weight (**MW**) and rate of maturing (**ROM**)) and reproductive traits including conception rate (**CR**), age at first calving (**AFC**) and gestation length (**GL**) in Japanese Black female cattle.

Results

[Heritability \(diagonal\) and genetic \(upper diagonal\) and residual \(lower diagonal\) correlations among traits](#)

	MW	ROM	CR	AFC	GL
MW	0.58	-0.26	-0.42	-0.49*	0.09
ROM	-0.57*	0.29	0.91*	0.10	-0.20
CR	-0.11	0.00	0.02	-0.69*	-0.49
AFC	0.13	-0.20*	-0.63*	0.07	0.12
GL	0.08	0.02	0.02	0.10*	0.10

*P<0.05

- The heritability estimates for the growth curve parameters were moderate and high, whereas the estimates for reproductive traits were low.
- The genetic correlation of CR with MW was negative and with ROM was strongly positive.
- The genetic correlations of MW with ROM and AFC were negative.
- The genetic correlations of GL with MW and ROM were weak.

Conclusion

A heifer with faster ROM and smaller MW has better CR. On the other hand, a heifer with smaller MW would increase AFC. Selection for ROM could be an effective way of improving reproductive performance.

Materials and Methods

[Descriptive statistics for traits](#)

Trait	n	Mean / CR(%)	SD	Max	Min
MW(kg)	791	494.4	60.97	356.9	747.7
ROM	791	4.5e-3	0.81e-3	2.2e-3	7.3e-3
CR	2,660	65.7	-	-	-
AFC(day)	2,641	26.5	3.35	21.4	36.9
GL(day)	2,641	285.8	4.80	260	302

- CR: CR at first service for heifers (recorded 0 or 1).
- Ultrasonography was used for diagnosis of pregnancy.

[Model](#)

- A linear bivariate animal model.
- Different model was fitted to each trait.

[Gompertz growth function](#)

$$f(t) = Ae^{-Be^{-kt}}$$

- A: mature weight (MW).
- k: rate of maturing (ROM).
- B: constant of integration
- Fitted to body weight-age data of cows
- Cows were weighed monthly
- Cows with over 28 points were used

[Program](#)

- SAS 9.4:
for estimating growth parameters.
- AIREMLF90 (Misztal *et al.* 2002):
for estimating genetic parameters.

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