



Effect of mating strategies on genetic and economic outcomes in a Montbéliarde dairy herd

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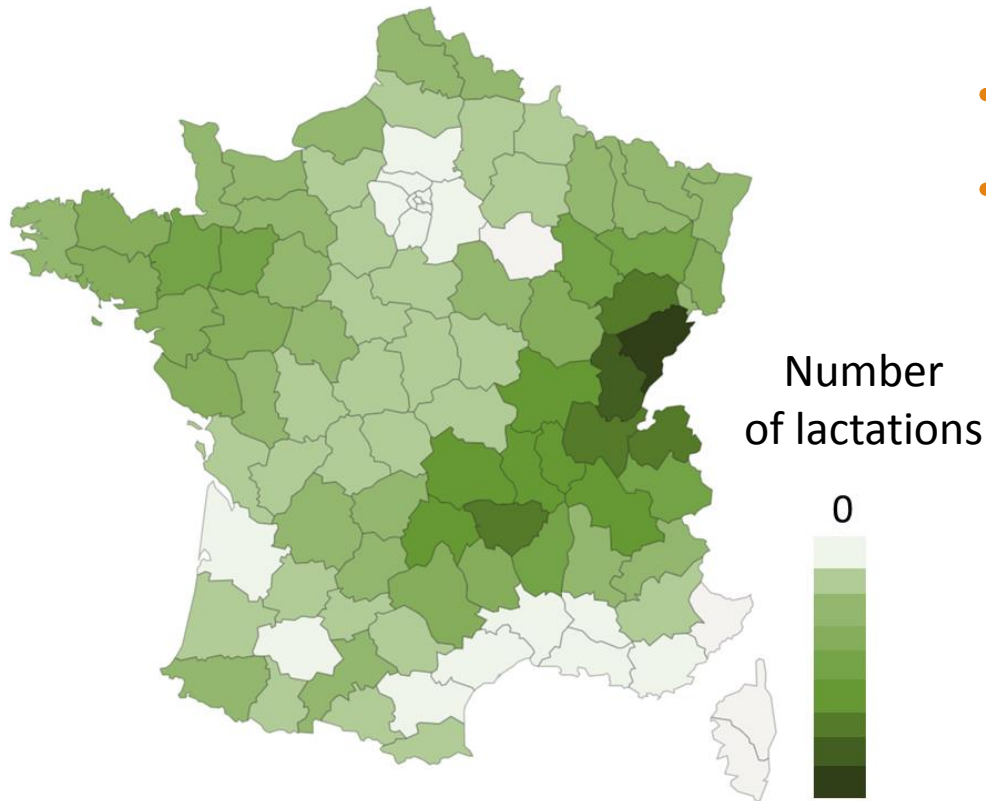
Study funded by MO3



The Montbéliarde breed in France

In 2017

- Dual purpose breed
- 2nd dairy breed in France
 - 17.7 % of French dairy cattle
 - 388 124 lactations recorded



<https://www.montbeliarde.org/localisation-nationale-fr.html>





2009: X- Sexed semen



↑ within herd selection intensity



Umotest ©

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Umotest ©

2011: Commercial female genotyping



↑ within herd selection accuracy



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↑ within herd genetic gain



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What is the impact of alternative replacement and genotyping strategies on genetics and economics at herd level?

Simulation study - Method

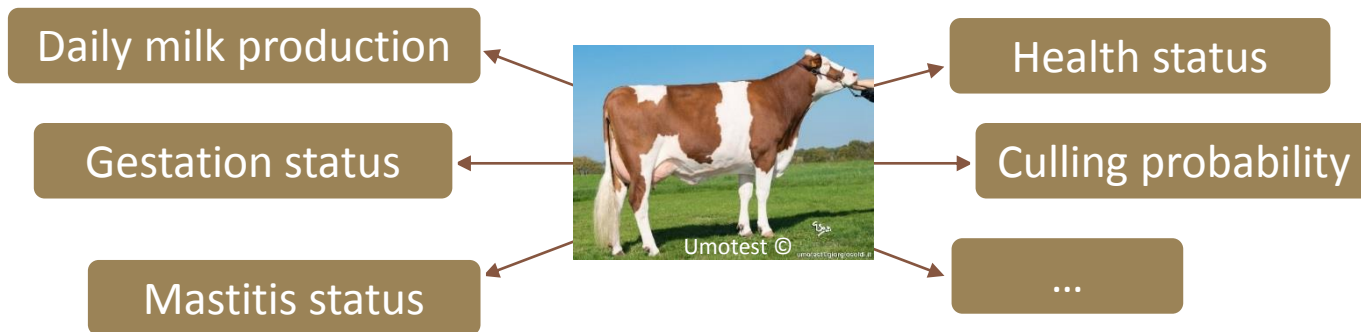
ECOMAST simulation program

- 77-cows Montbéliarde herd

Simulation study - Method

ECOMAST simulation program

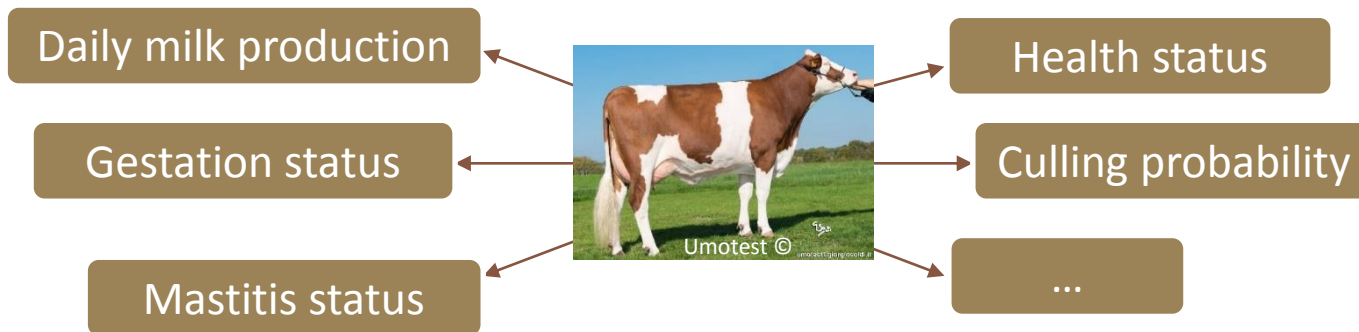
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Simulation study - Method

ECOMAST simulation program

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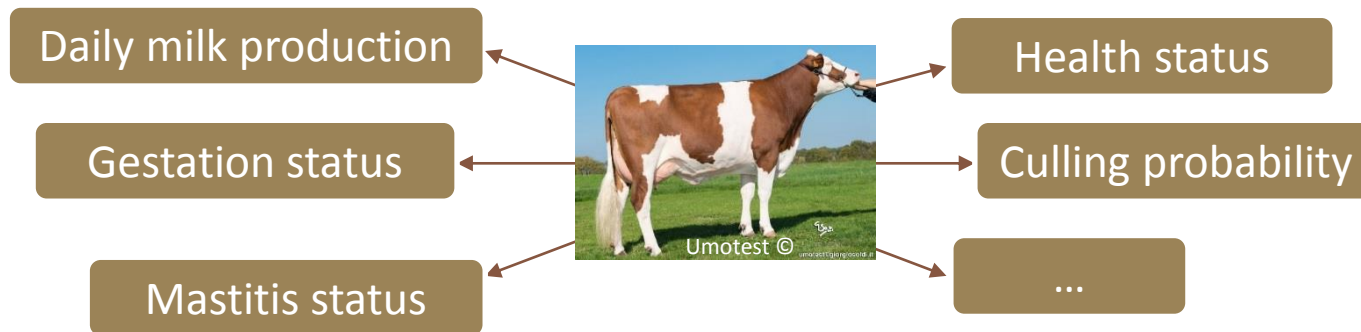


- Pasture based farming system with relatively high milk price

Simulation study - Method

ECOMAST simulation program

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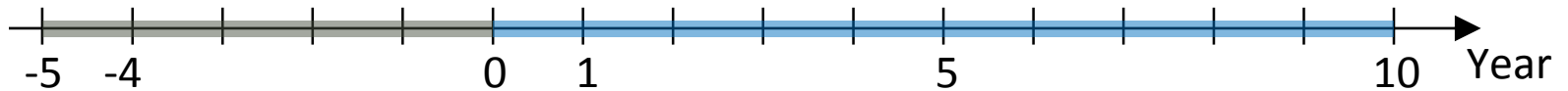


- Pasture based farming system with relatively high milk price
- Females genotyped when 15-day old (40€ all included)



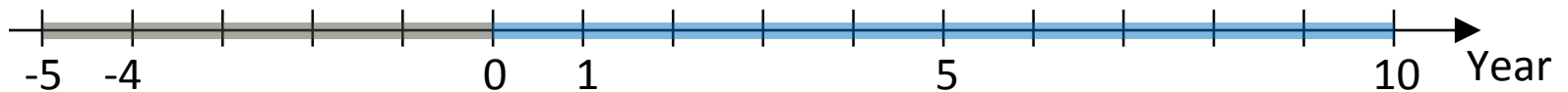
Simulation study - Method

- 15 years of simulation
 - 5 initialization years: no genotyping, no sexed nor beef breed semen
 - 10 years of different strategies

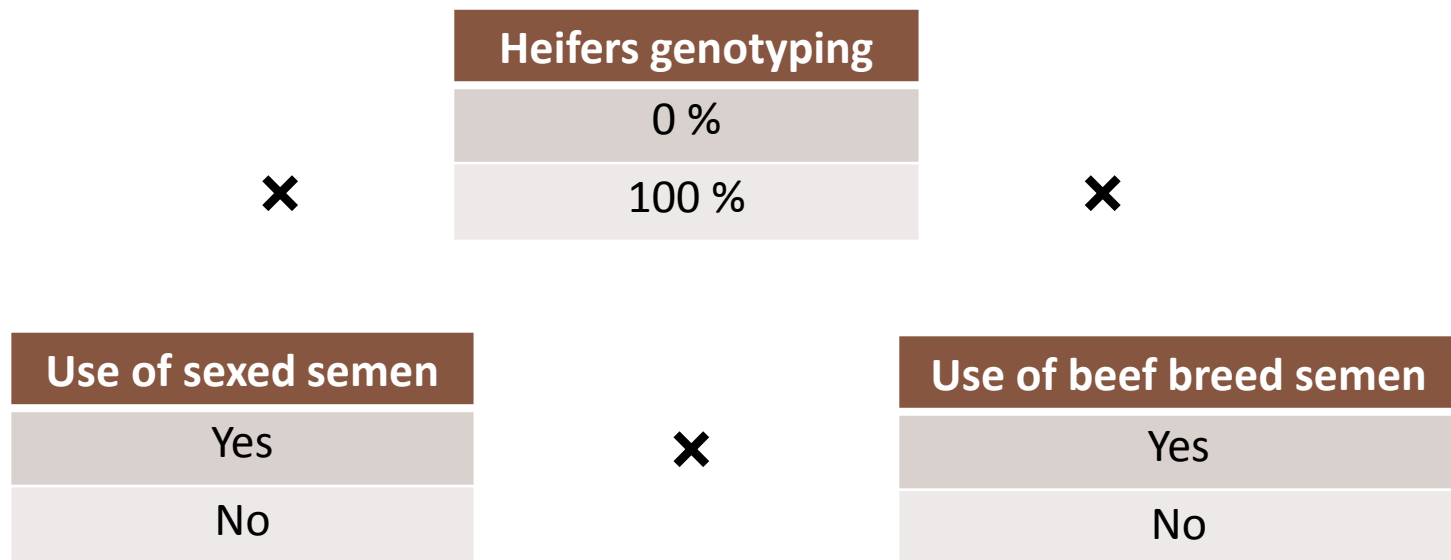


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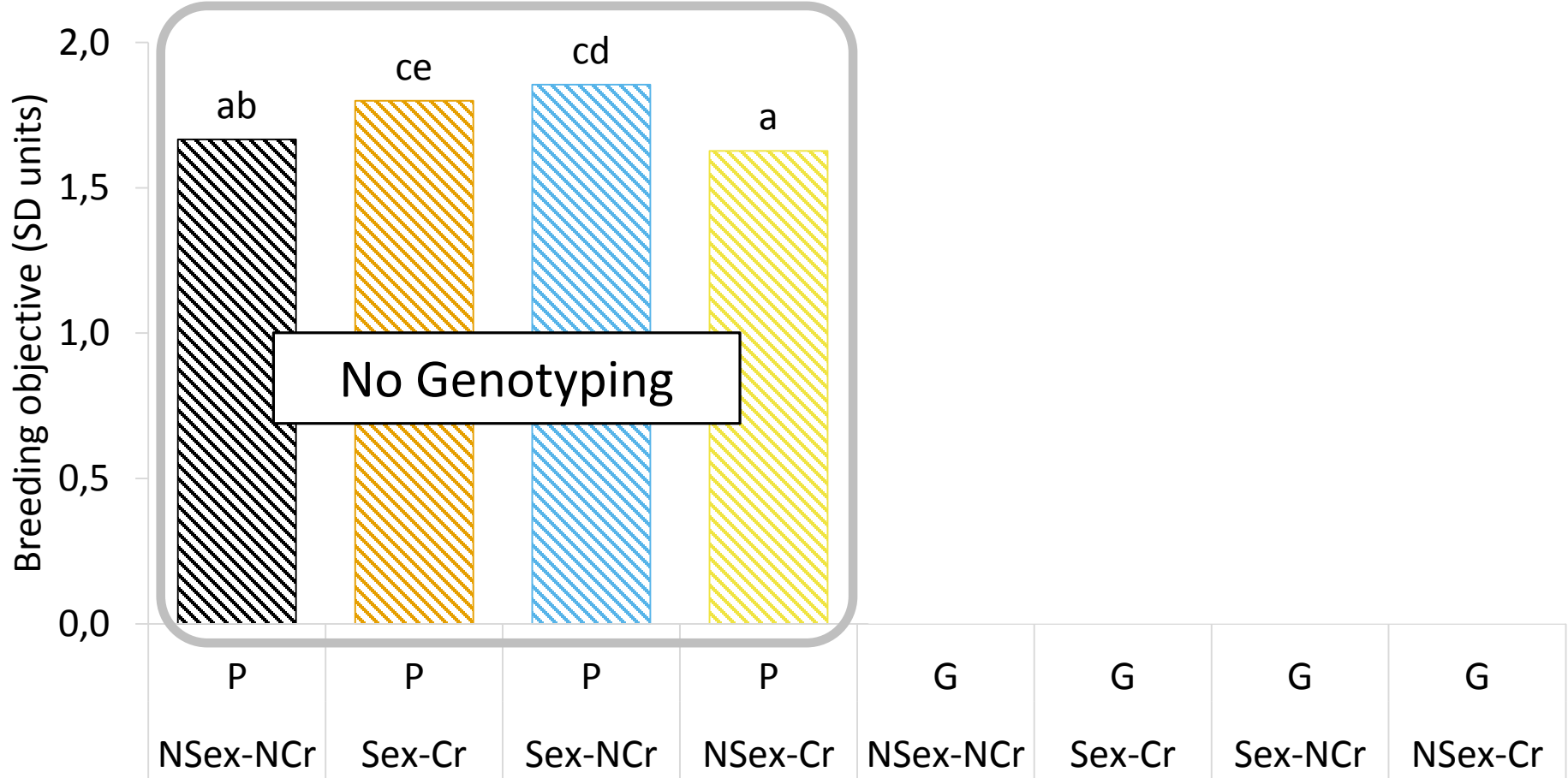
- Strategies:



Simulation study - Results



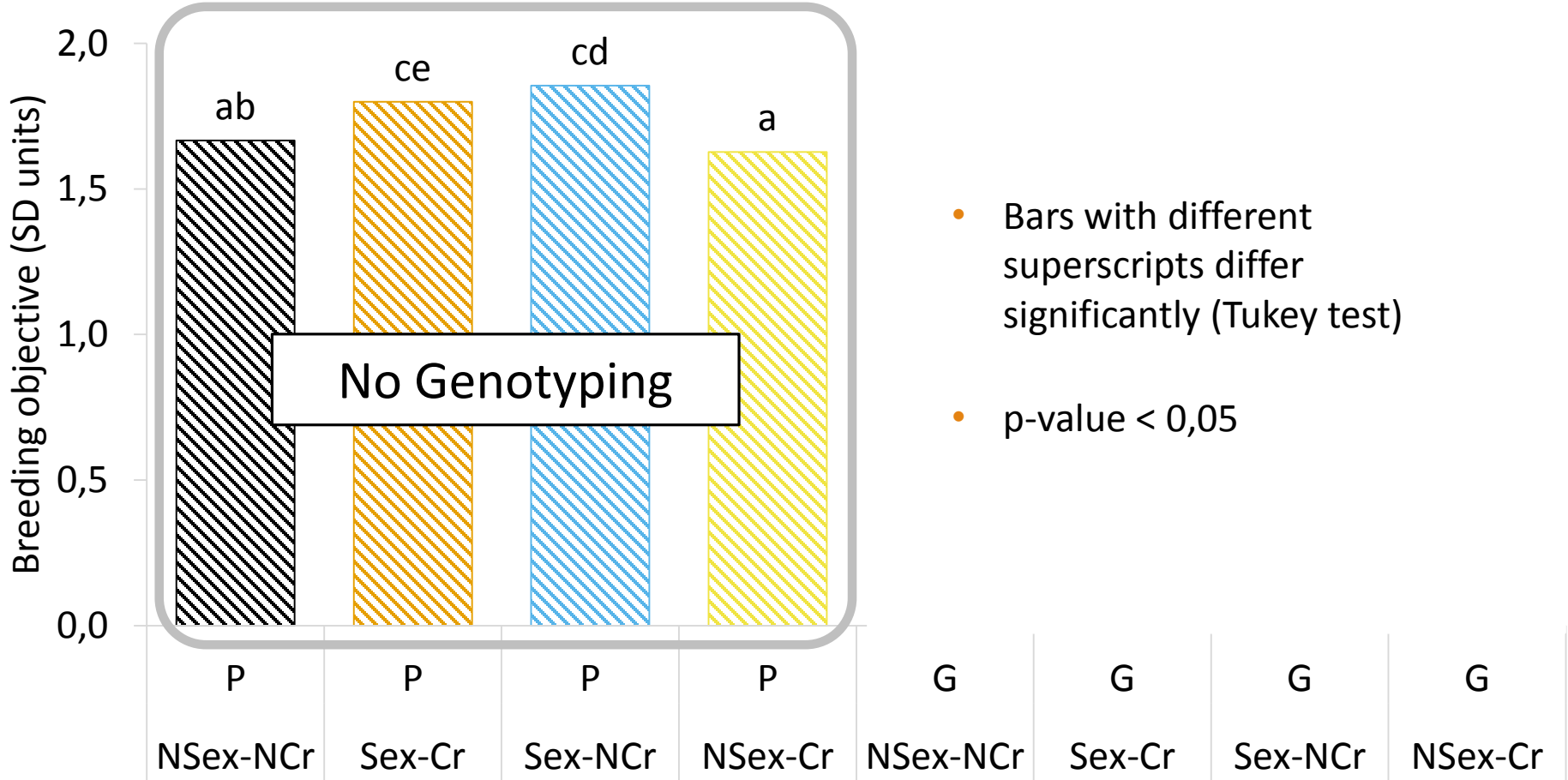
Variation in ΔG of breeding objective from year 0 to year 10



Simulation study - Results



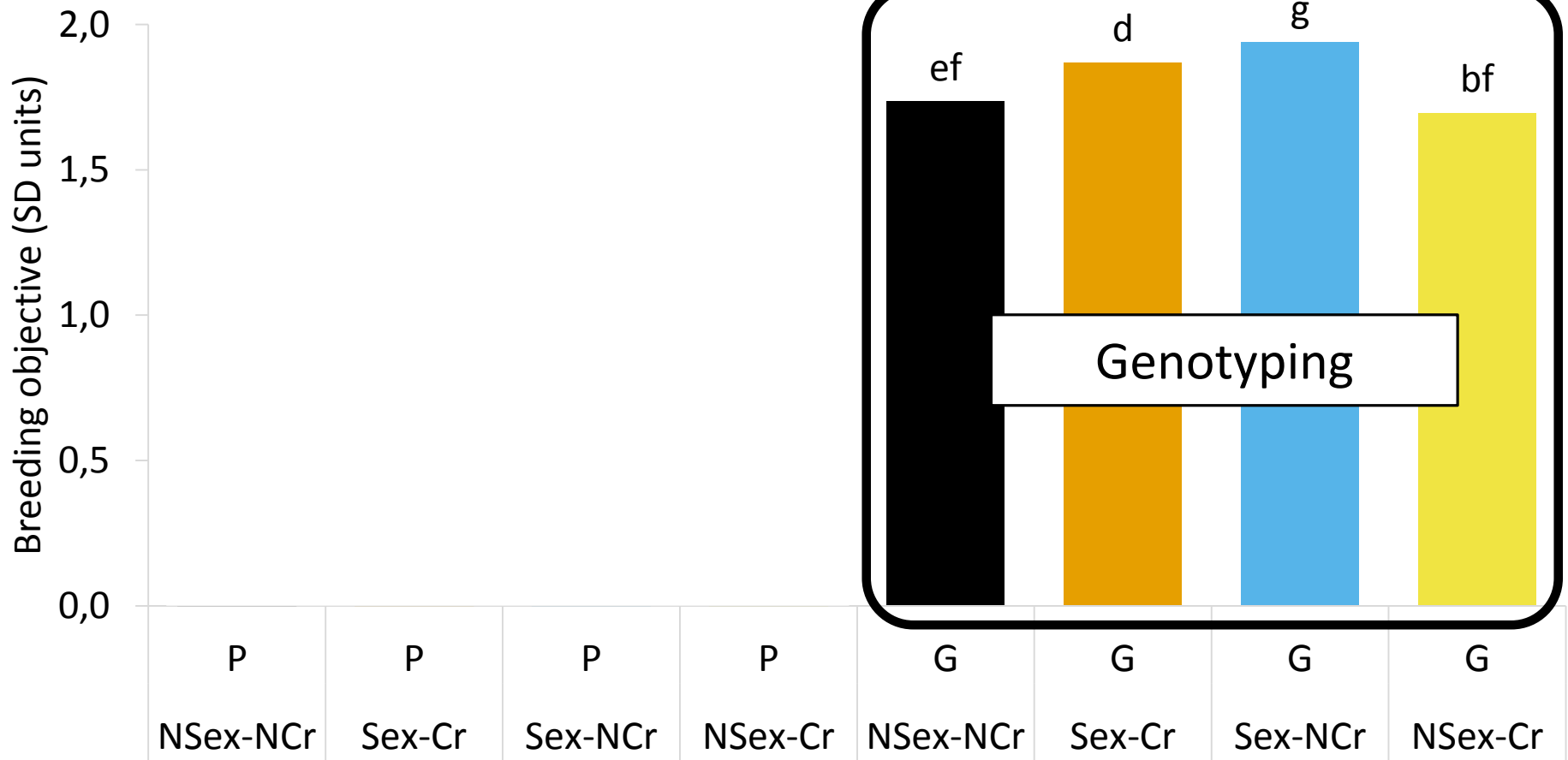
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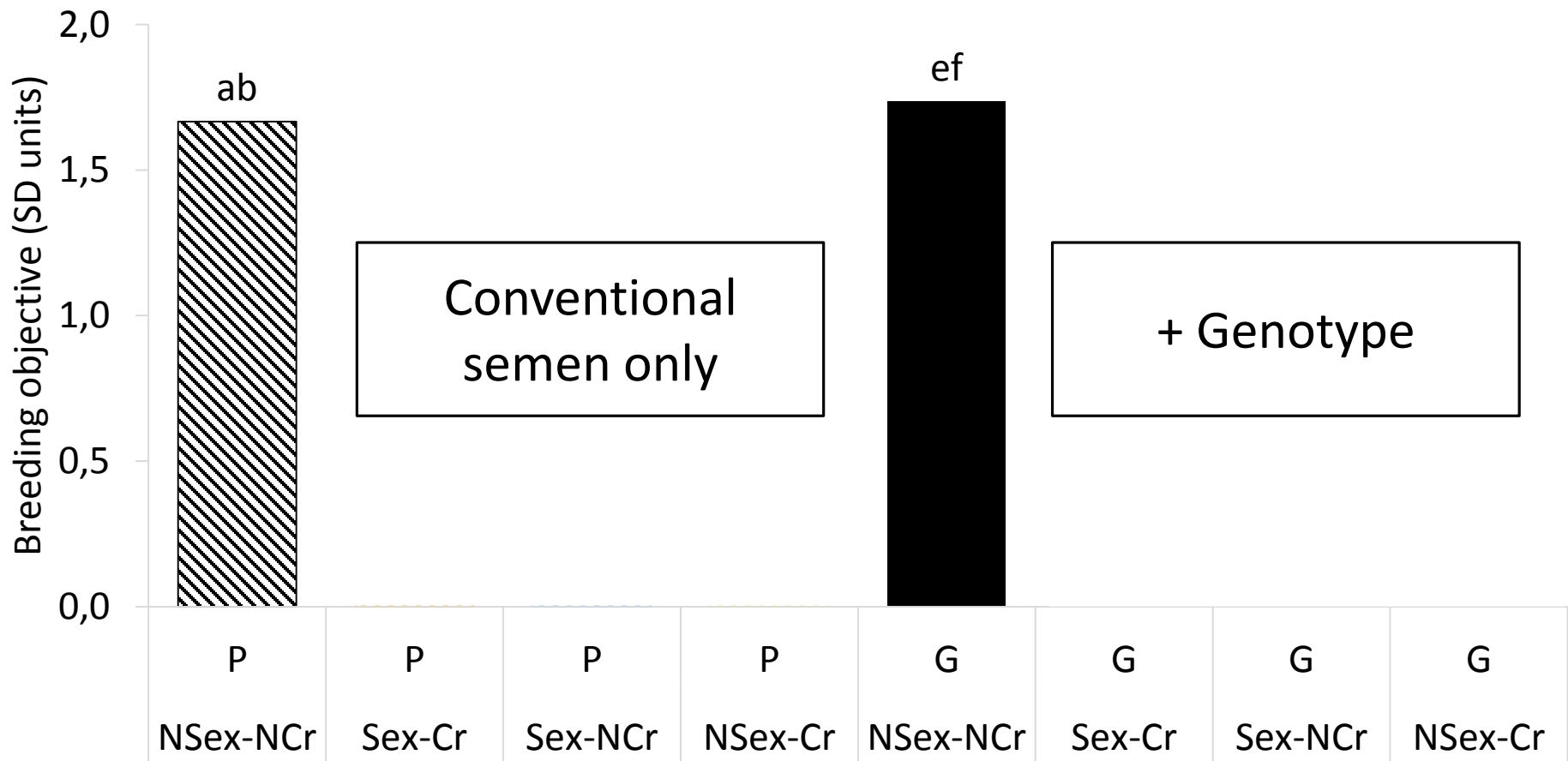
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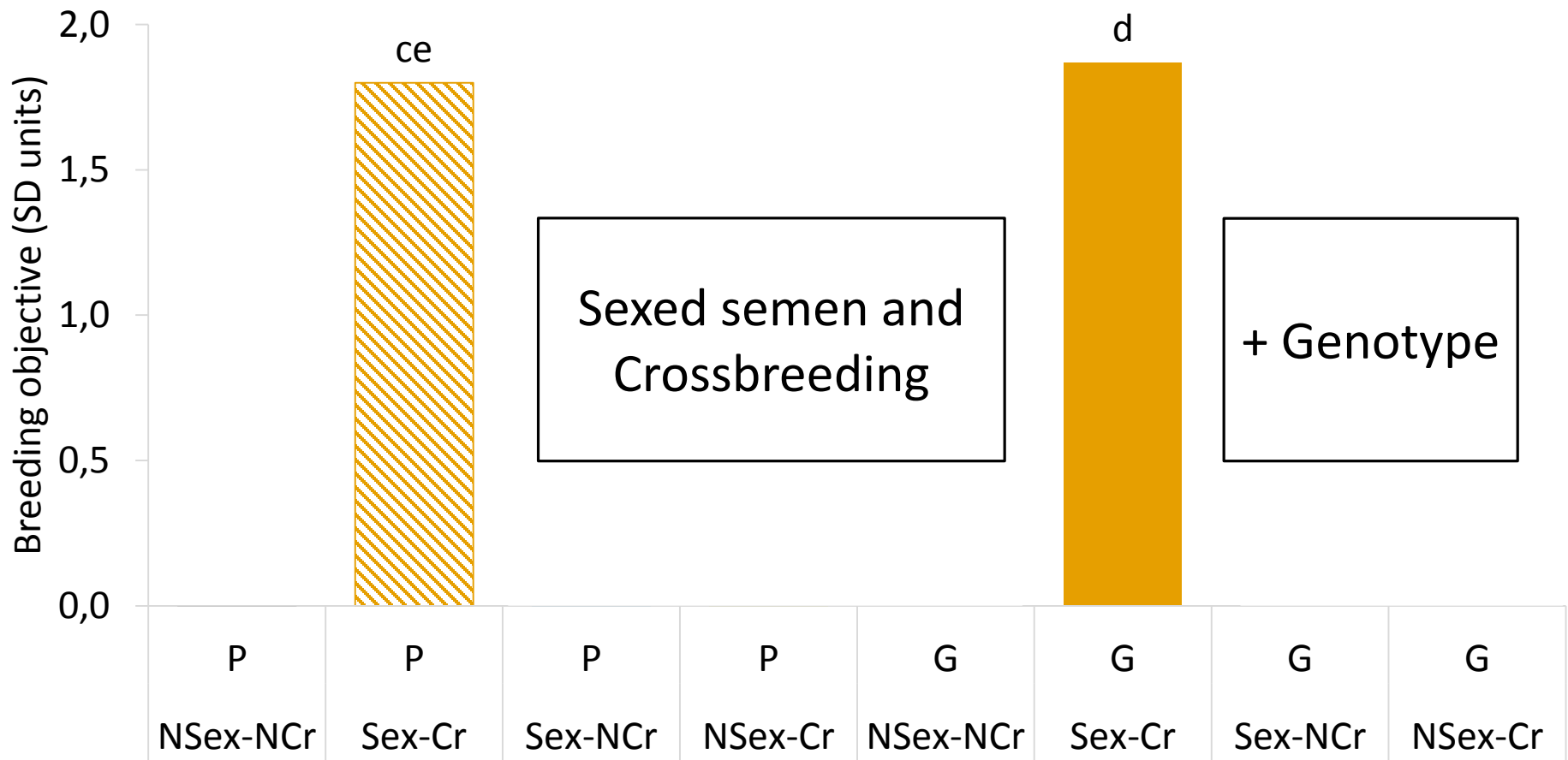
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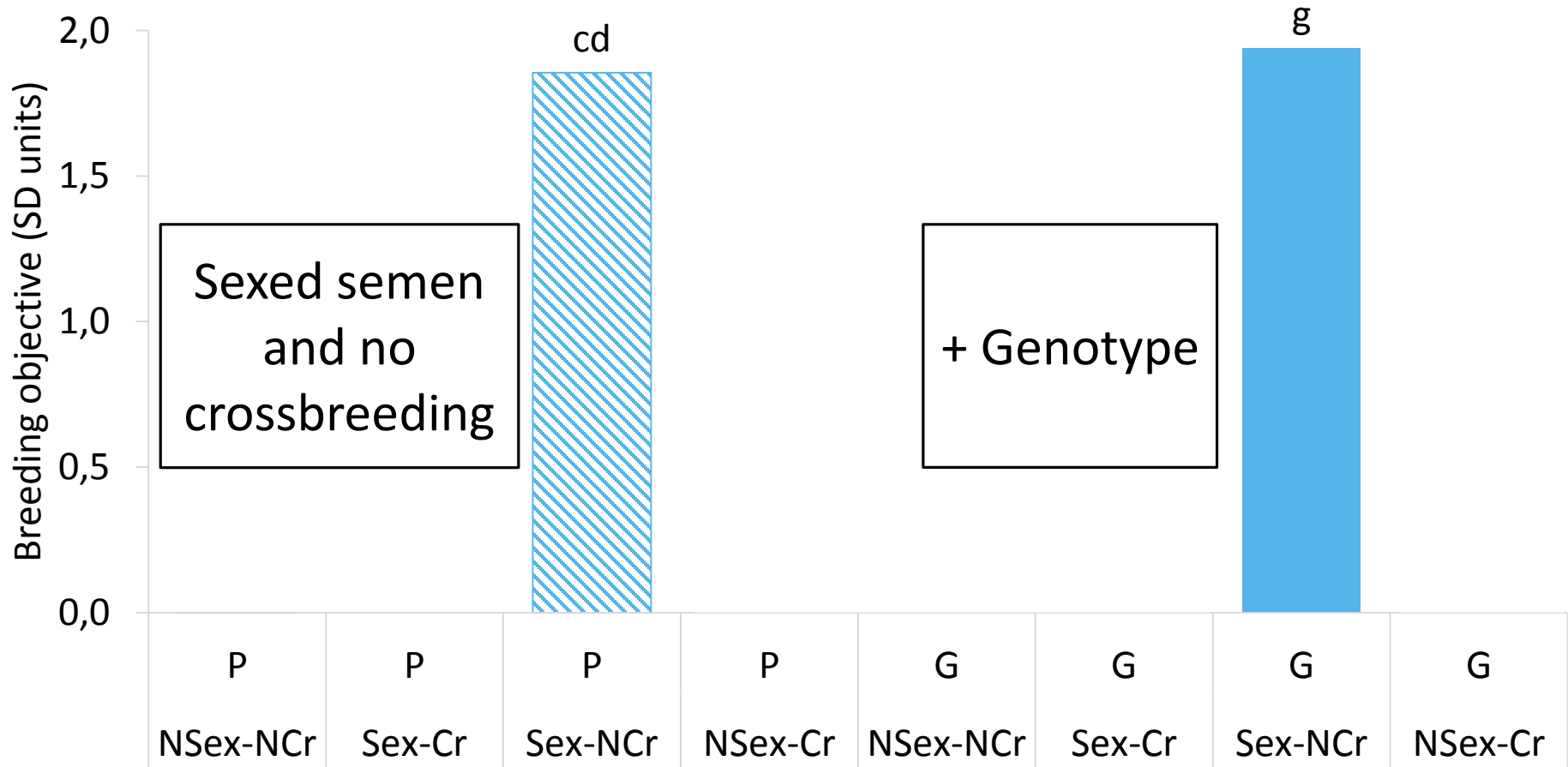
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Simulation study - Results



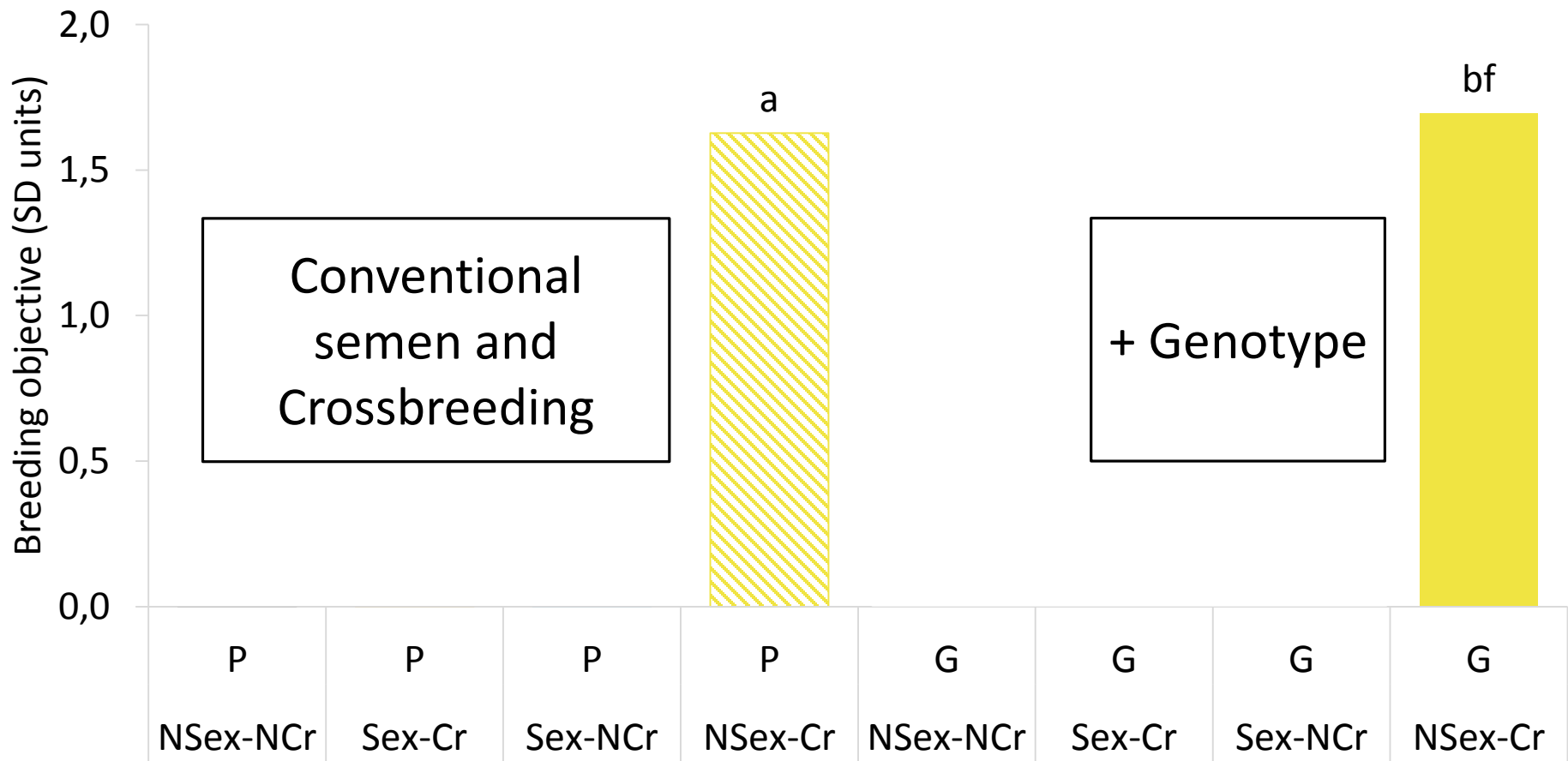
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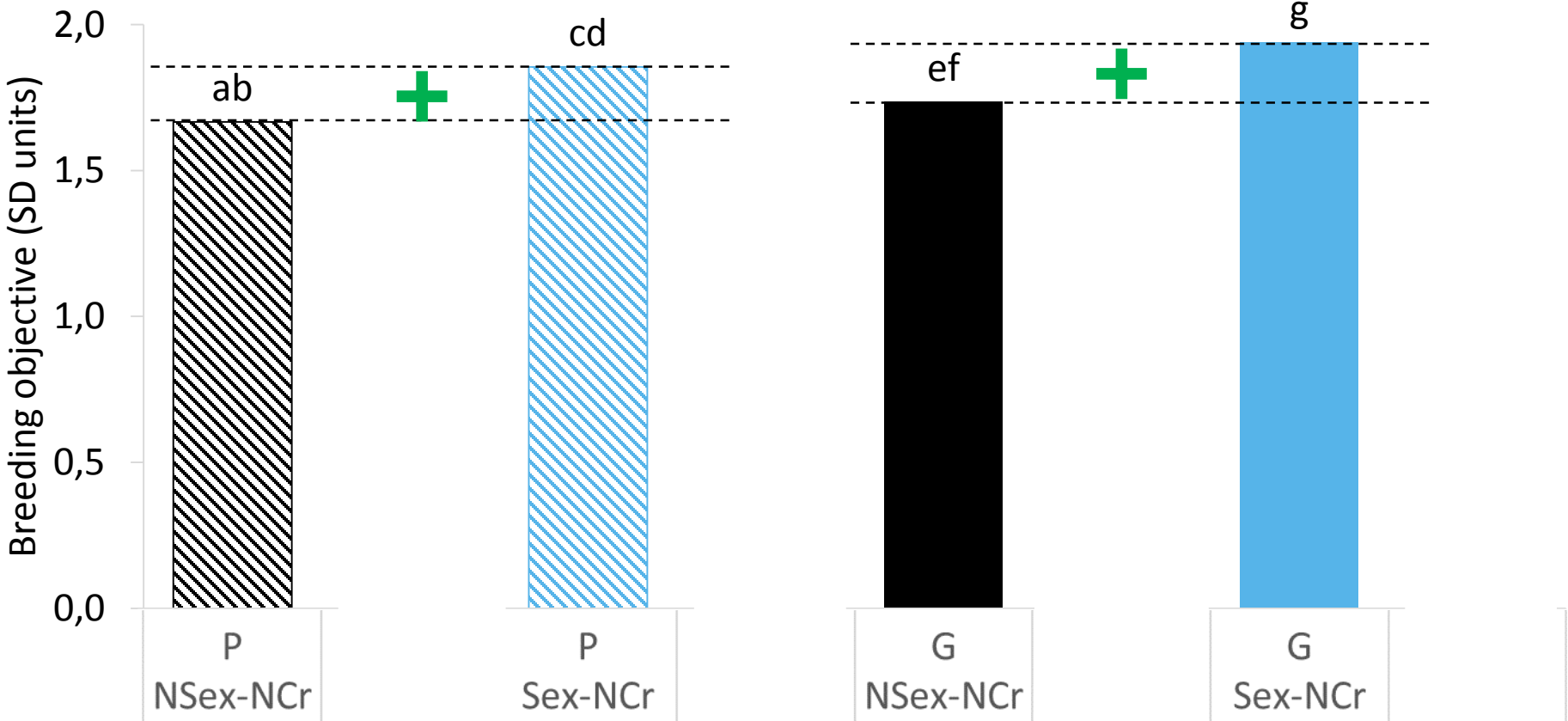
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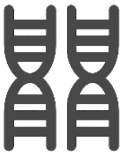


Simulation study - Results

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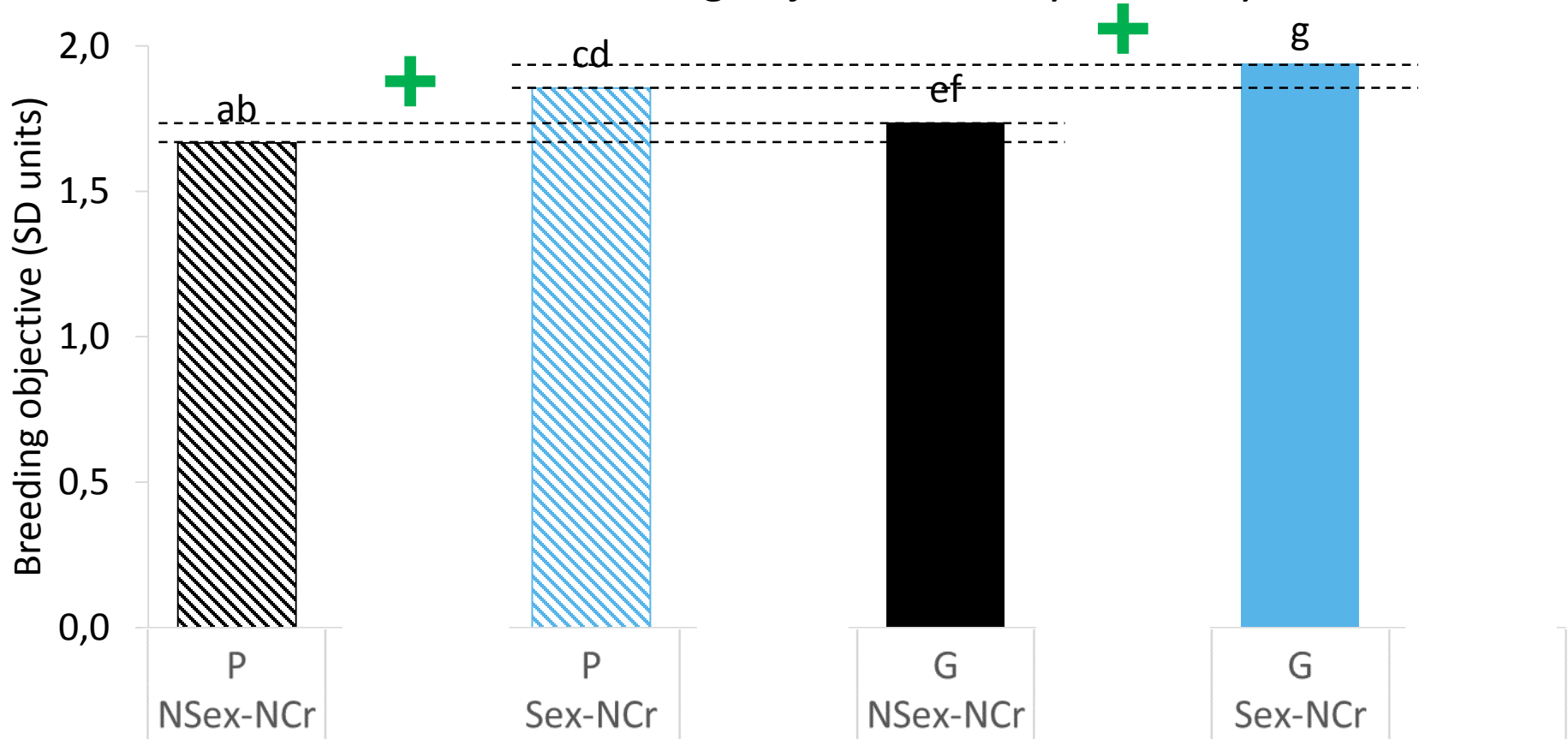


Sexed semen \uparrow genetic gain (+ 0.18 σ)



Simulation study - Results

Variation in ΔG of breeding objective from year 0 to year 10

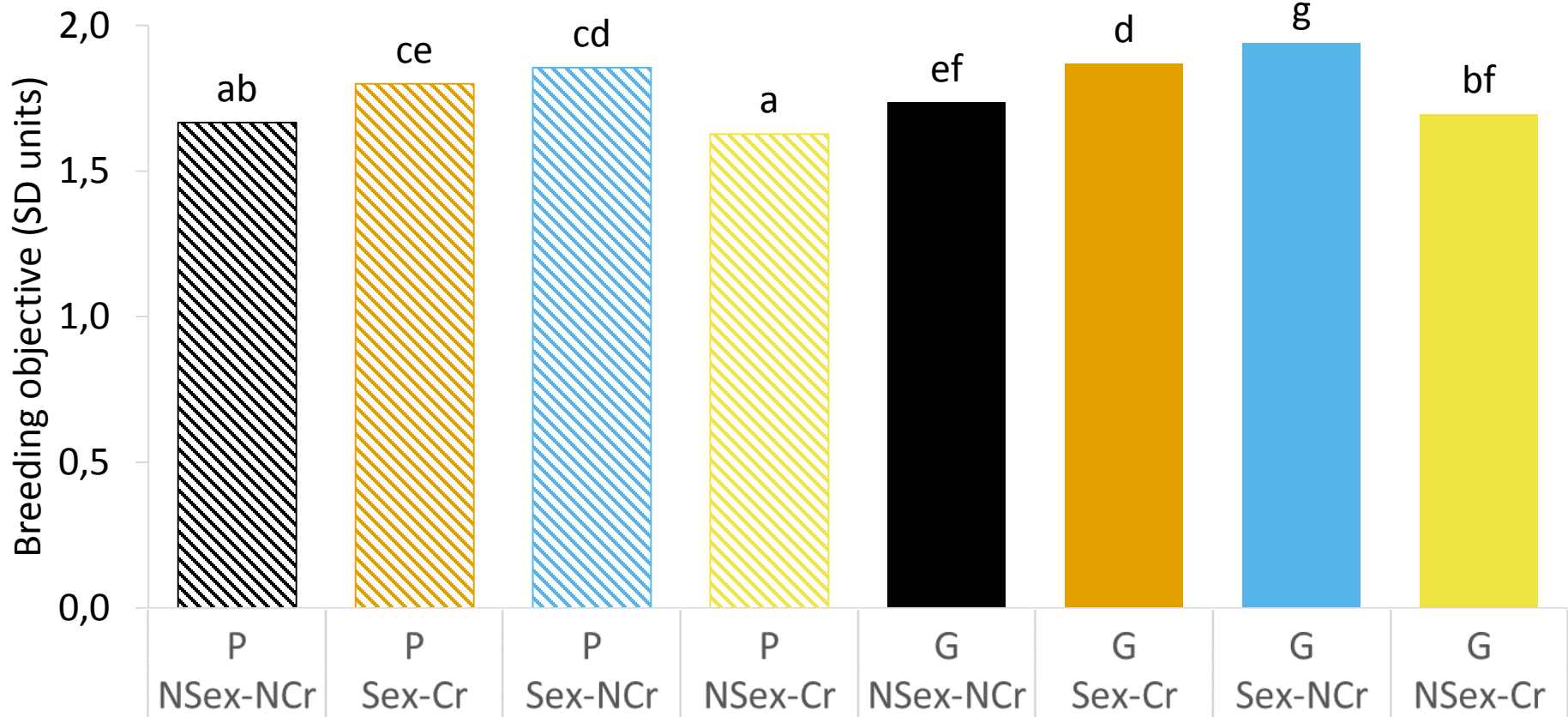


Female genotyping \uparrow genetic gain (+ 0.07 σ)

Simulation study - Results



Variation in ΔG of breeding objective from year 0 to year 10

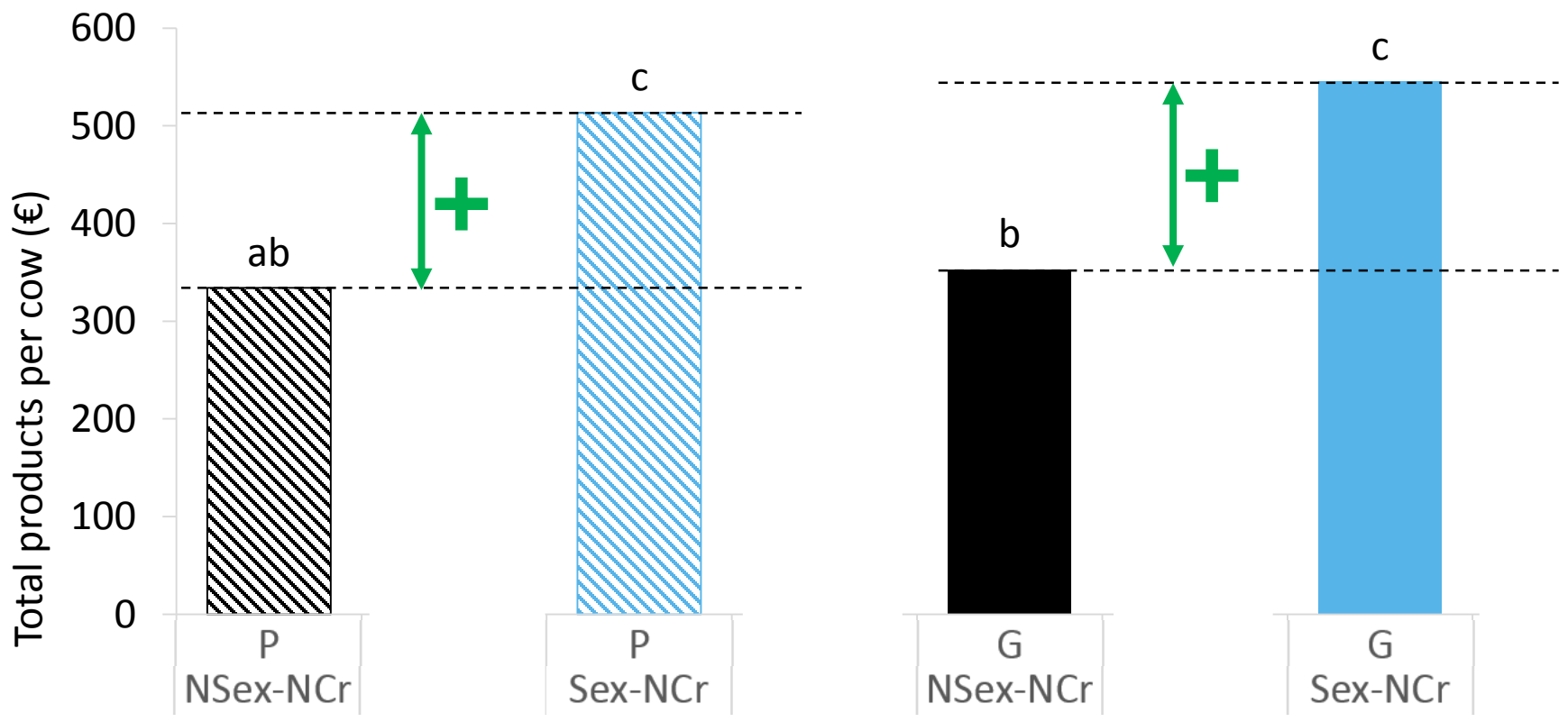


Use of sexed semen and female genotyping \uparrow genetic gain



Simulation study - Results

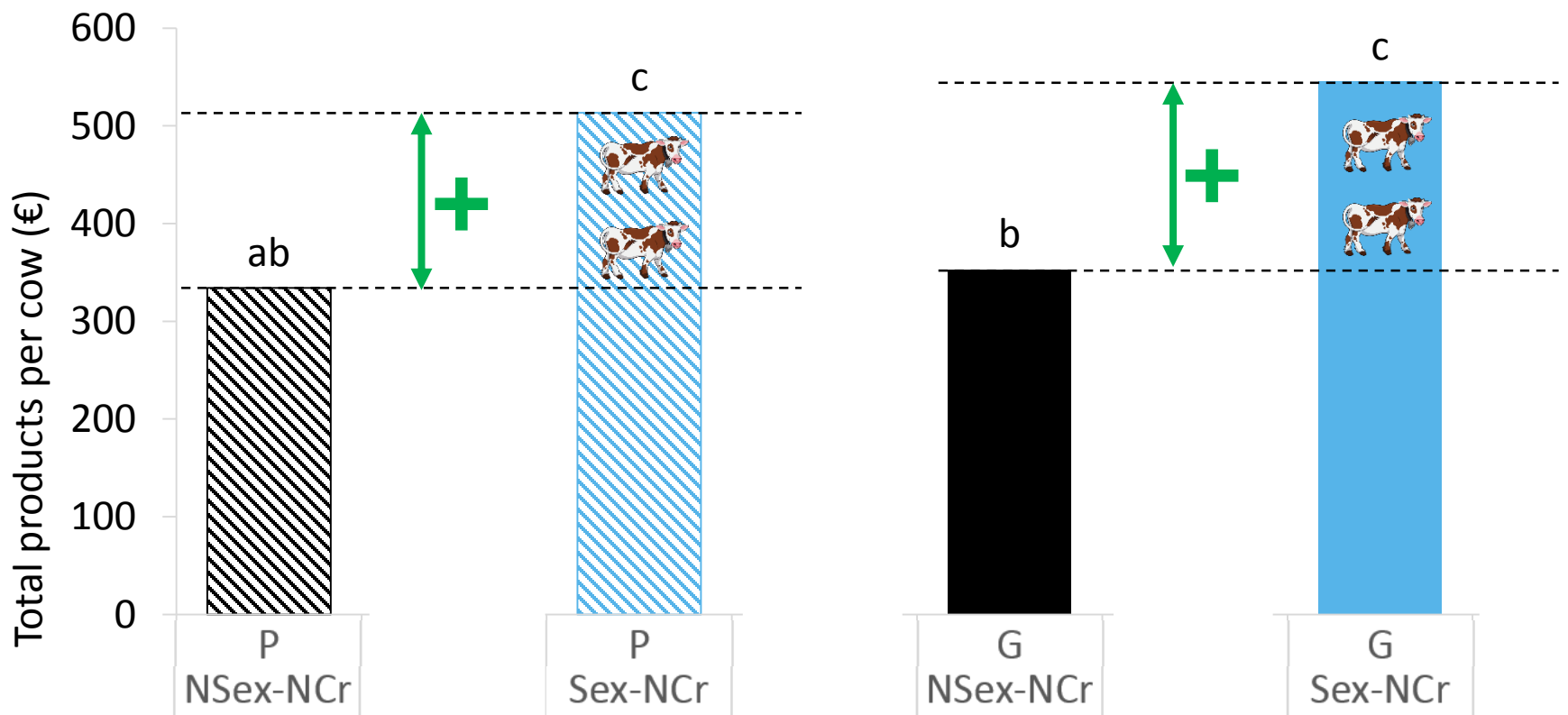
Variation in total products from year 0 to year 10





Simulation study - Results

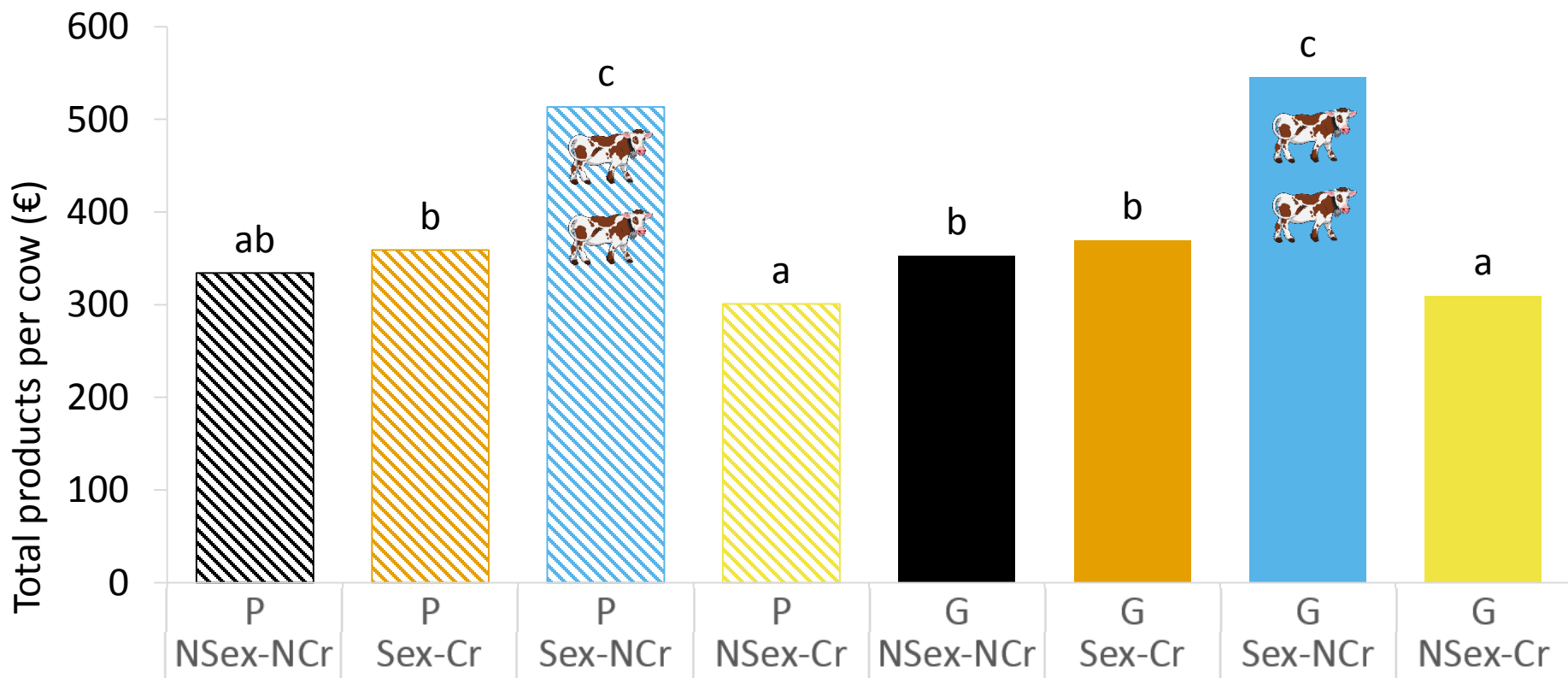
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Simulation study - Results

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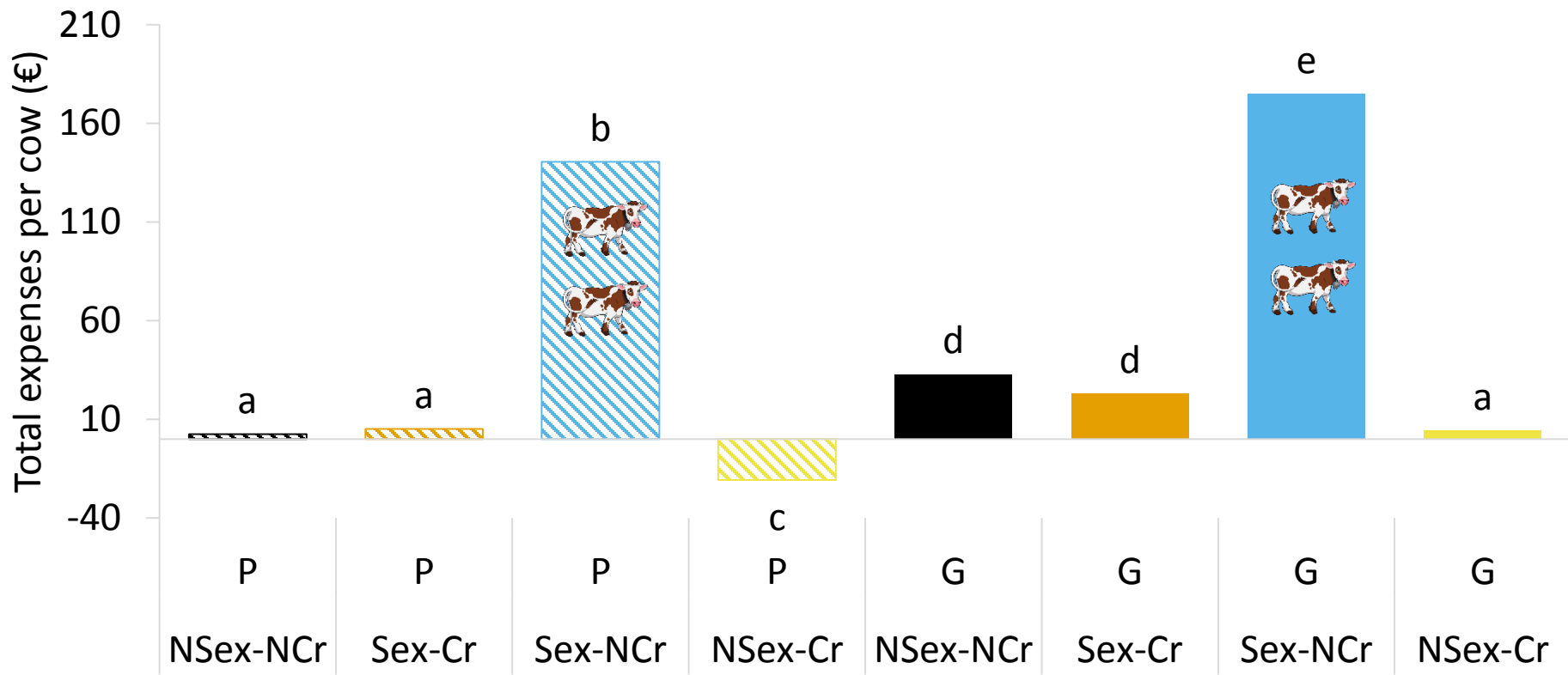


Variation in total product is linked to animals sales



Simulation study - Results

Variation in total expenses from year 0 to year 10

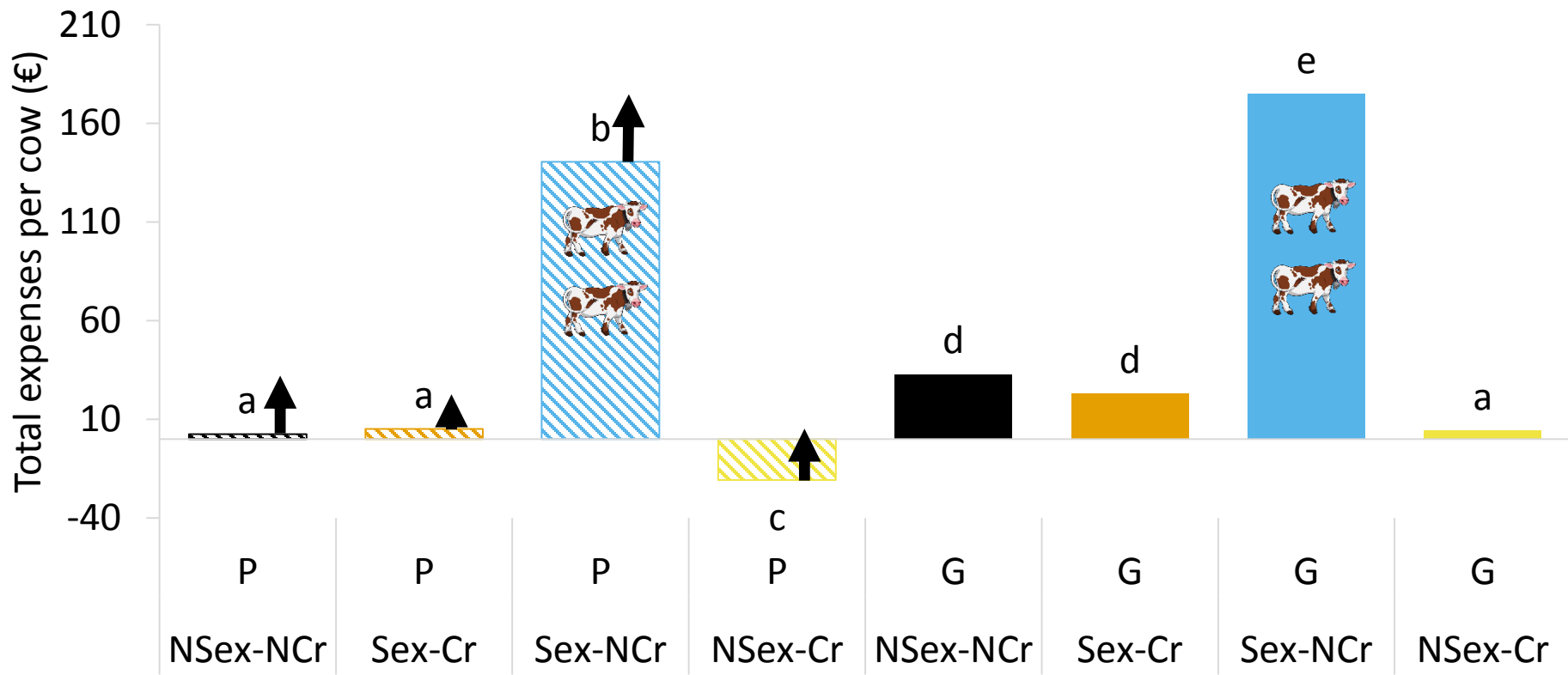


Raising and reproduction costs increased a lot



Simulation study - Results

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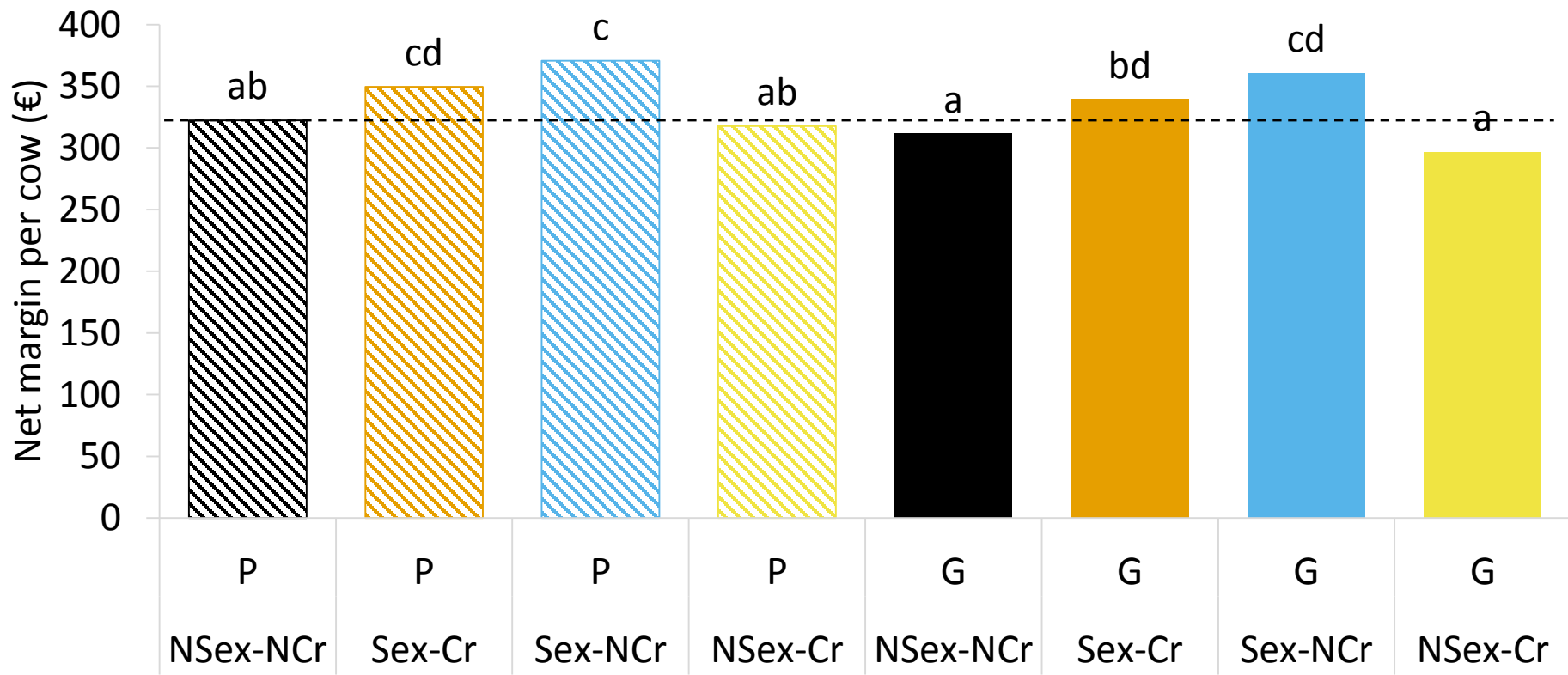


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Simulation study - Results

Variation in net margin from year 0 to year 10



Always a gain in net margin

Take home messages



- Use of sexed semen and female genotyping → ↑ genetic gain

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- Long term sustainable strategy: “G – sexed – crossbreeding”:
 - increases genetic gain,
 - maintains the increase in net margin
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- Delay of several years before observing a return on investments

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Interest of combining genotyping with use of sexed semen