# Genetic selection on social genetic effects to reduce feather pecking in layers

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ISA
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# Acknowledgement


ISA
A Hendrix Genetics Company
www.hendrix-genetics.com

BREED4FOOD
www.breed4food.com

- Financial contribution:

SenterNovem
The genetics of robustness in laying hens

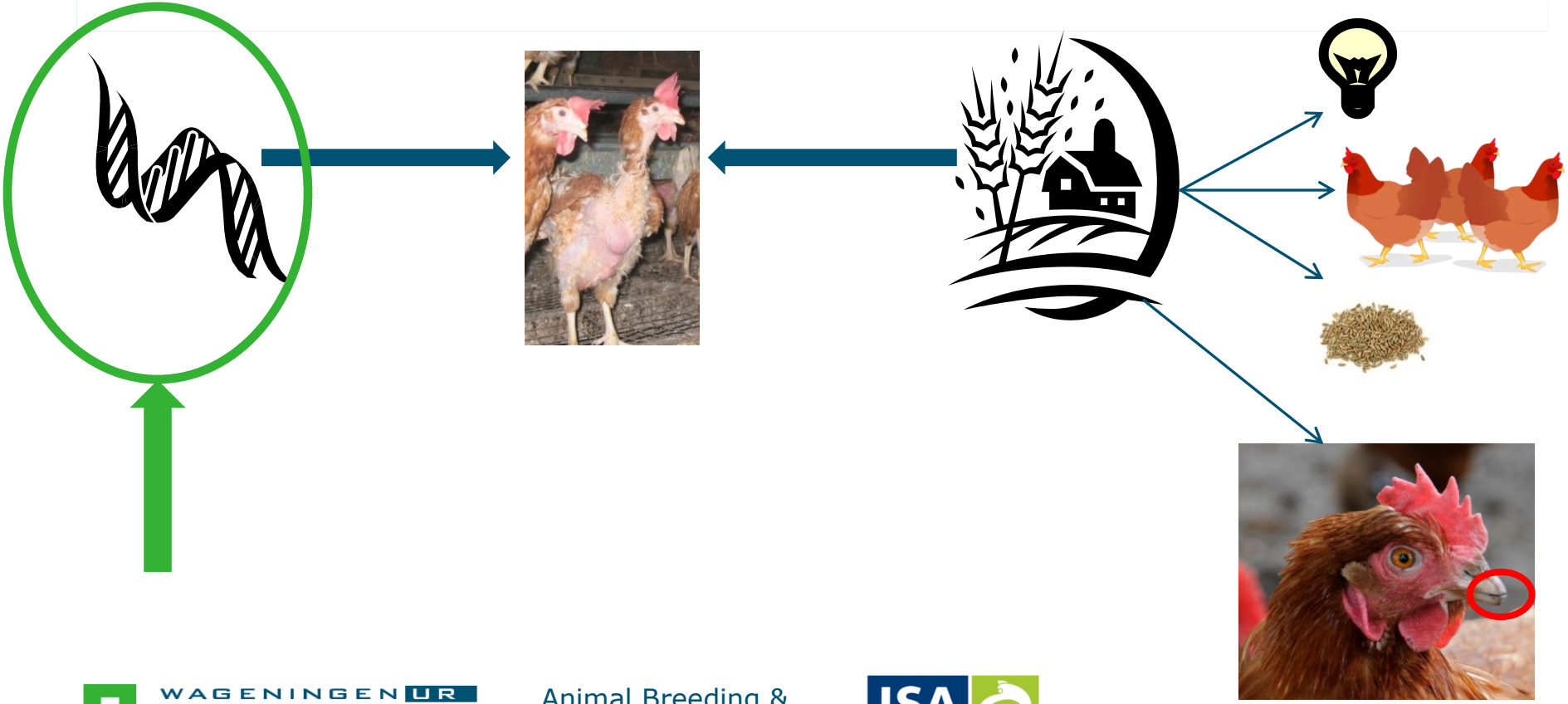
NWO
Netherlands Organisation for Scientific Research
Social interactions in domestic animals: Turning competition into cooperation

STW
Nieuwe technologie mogelijk maken
Genomic solutions for socially-affected traits: Genetic architecture and improvement of survival in cannibalistic laying hens

# Feather pecking

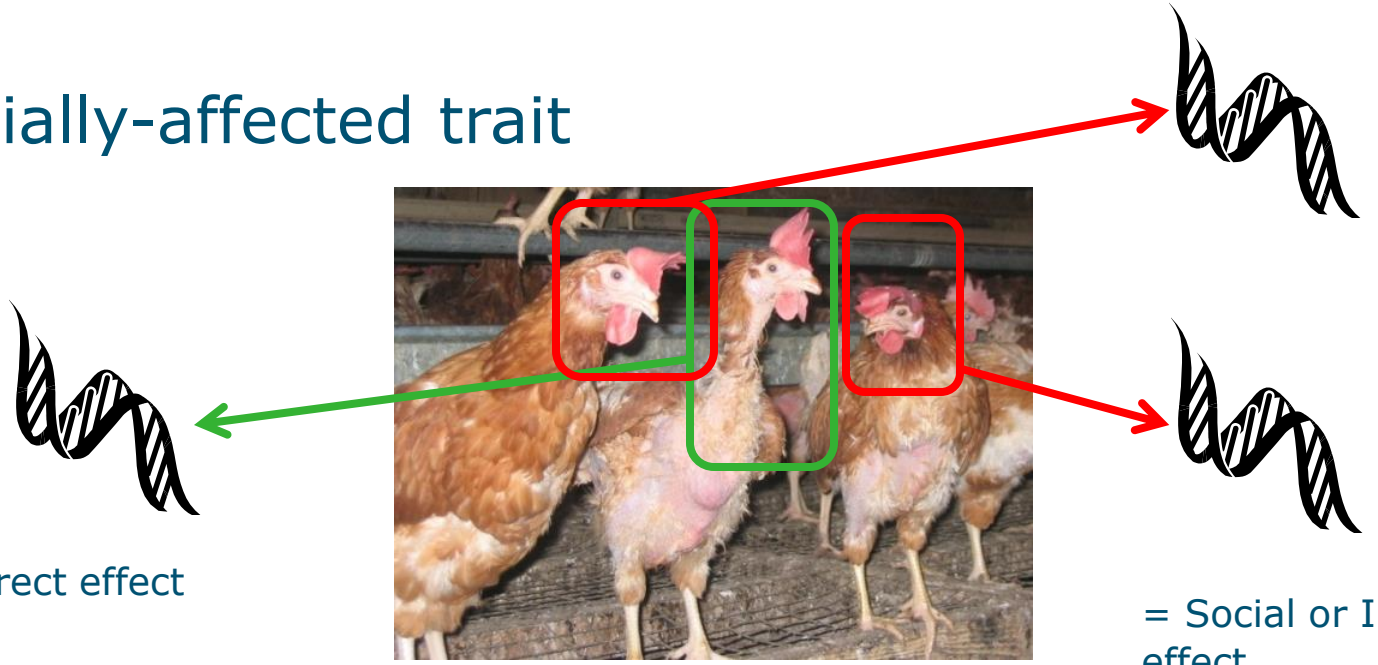
- Welfare problems
- Mortality
- Economic losses

# Multi-factorial



# Genetic selection

- Socially-affected trait



= Direct effect

= Social or Indirect effect

# Feather pecking behaviour


- Behavioural observations
  - Time consuming
  - Expensive
  - Difficult to collect data on both victim and pecker
  - ➢ Difficult to apply in animal breeding
- Solution: Statistical methods

# Statistical methods

- Allows to identify victim and pecker
- Using direct-indirect effects model
  - Victim - $h^2$ 4 – 10%
  - Pecker (group member)

$T^2$ 10 – 54%

33% - 94% of total genetic variation

Bijma et al., 2007; Ellen et al., 2008; Peeters et al., 2012; Brinker et al., 2014

# Selection against feather pecking

- Takes into account social genetic effects

- Collect individual egg performance

➢ **Selection based on relatives**

# Aim

To select against mortality due to feather pecking in purebred layer line

Using selection based on relatives

Selection candidates

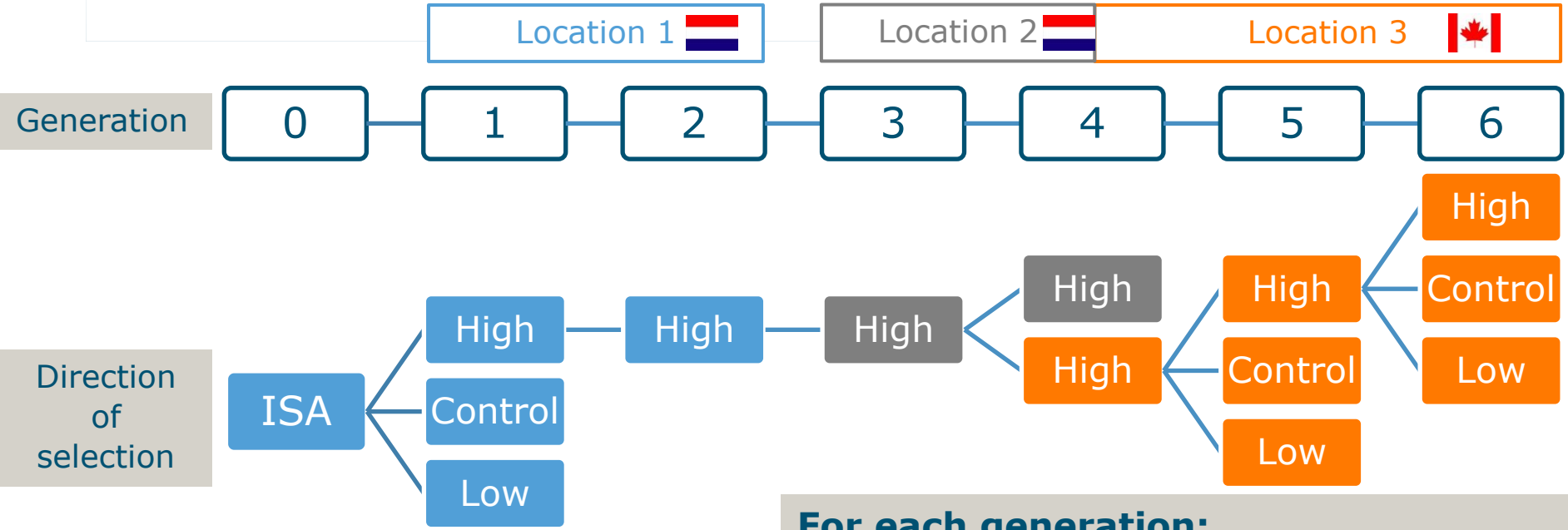
Sibs kept in family groups

# Material

- Population: 
- Group size: 
- Trait: survival time

- Generations: 6
- Locations:
  1. NL1
  2. NL2
  3. CA1

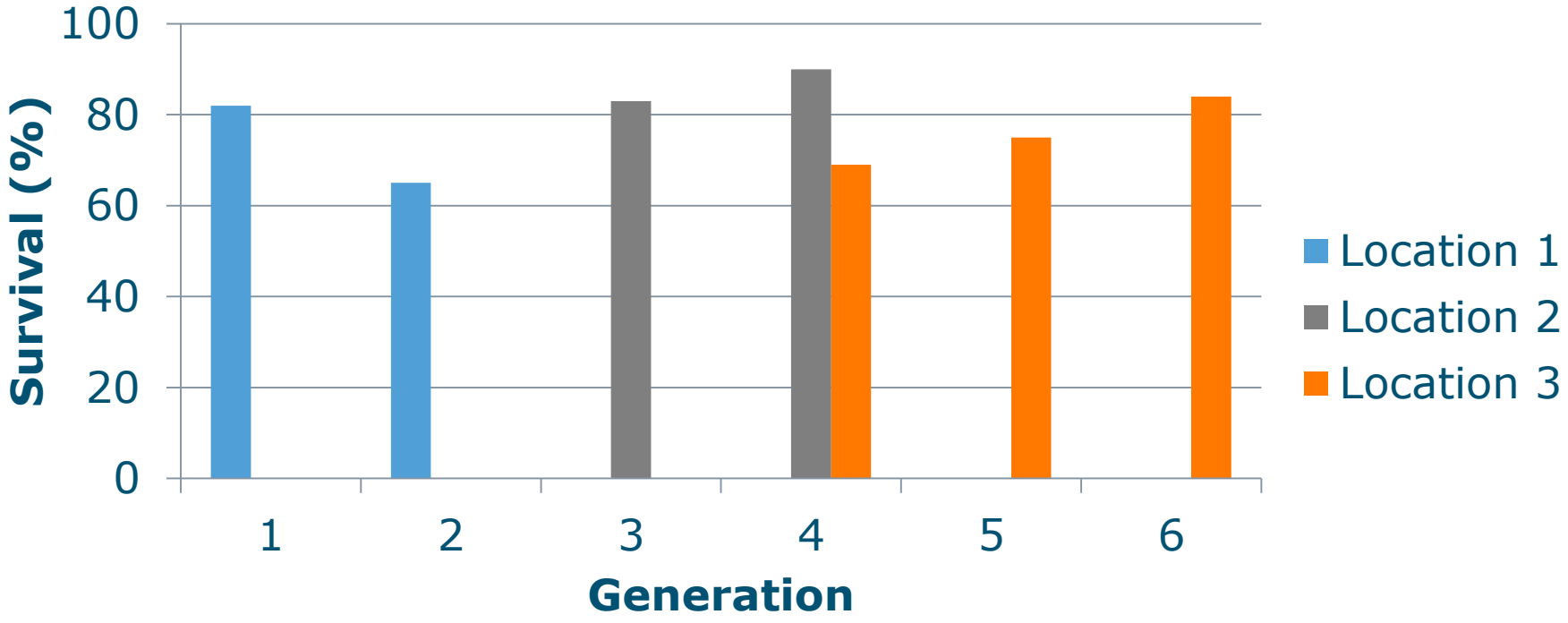
# Design selection experiment



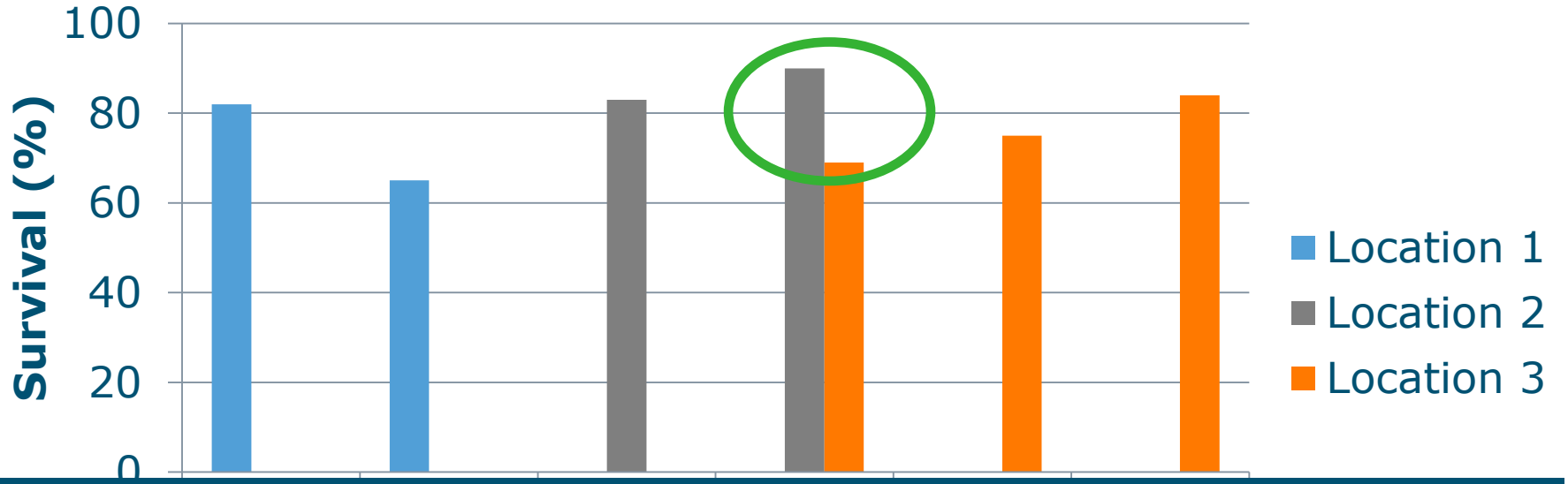

**For each generation:**

- Sibs of High were housed individually
- Selection: hens were ~55 weeks of age

# Survival per generation



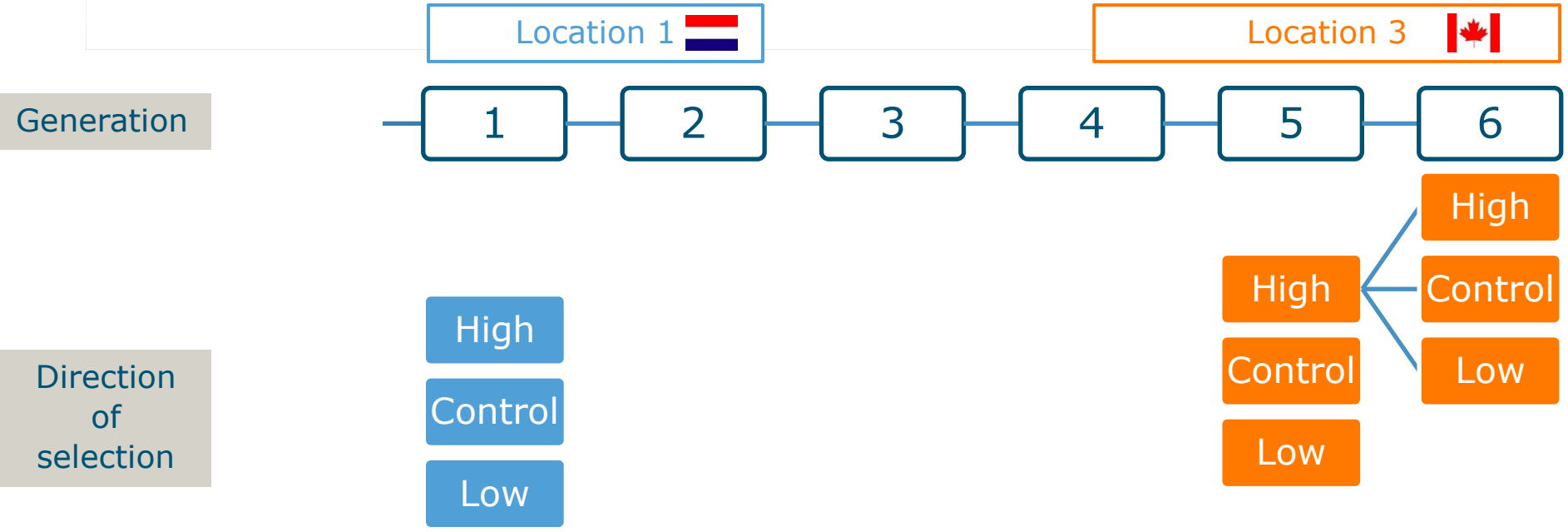
# Survival per generation




**Large effect of location on survival**

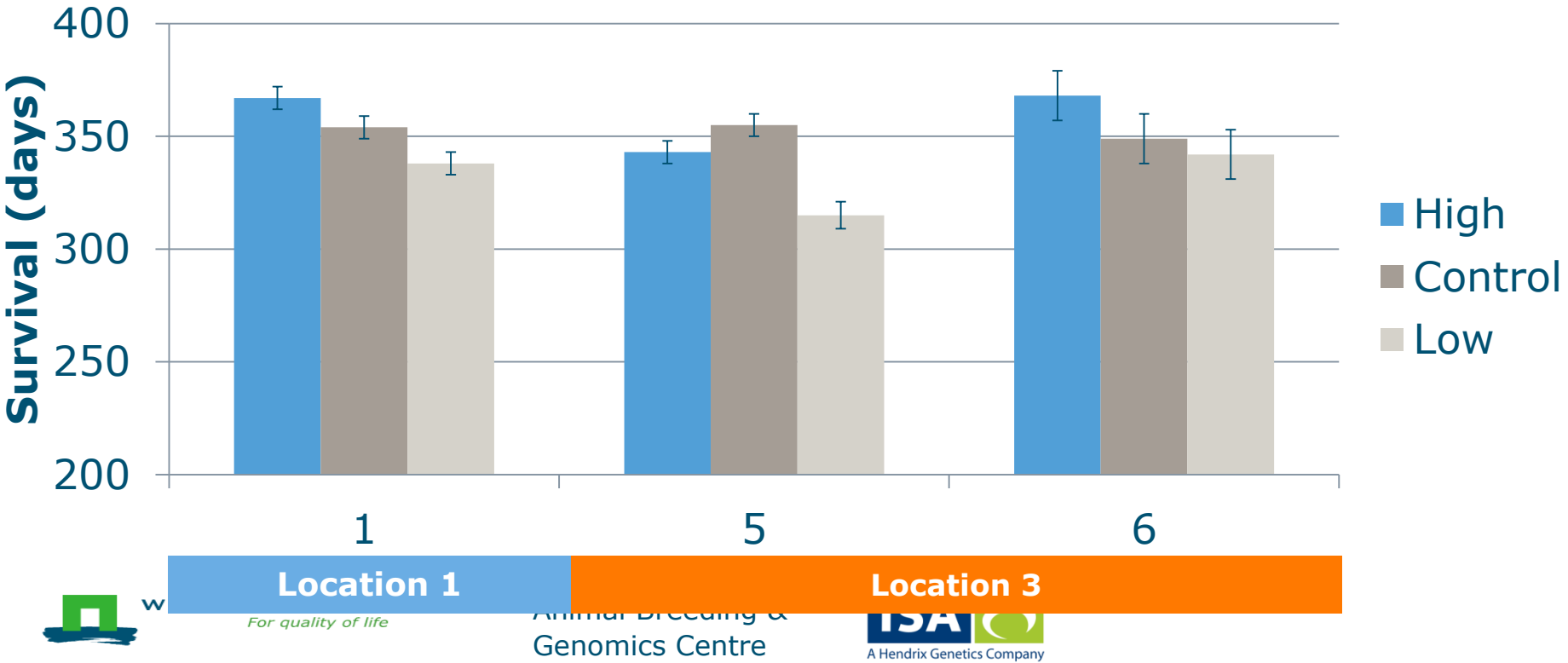
**Not possible to calculate response to selection over generations**

# Design selection experiment

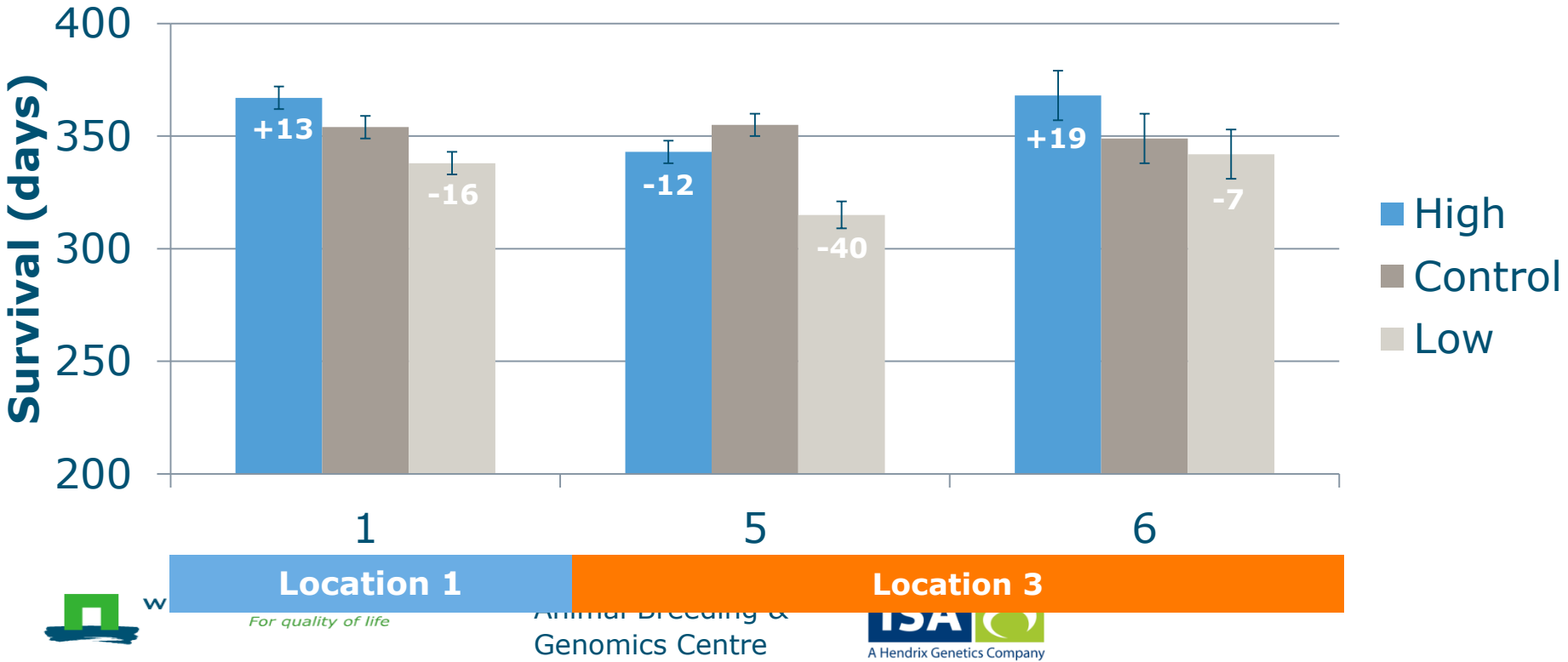



**Possible to calculate response to selection**

# Survival time and ΔG



# Survival time and ΔG



# Conclusion

- Selection against mortality due to feather pecking is feasible
- Large impact of environment

To reduce **mortality due to cannibalism** a selection method is needed that takes into account **social genetic effects**