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Male, female and non sex specific effects on artificial insemination result in French dairy sheep.
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Male, female and non sex specific effects on artificial insemination results in French dairy sheep

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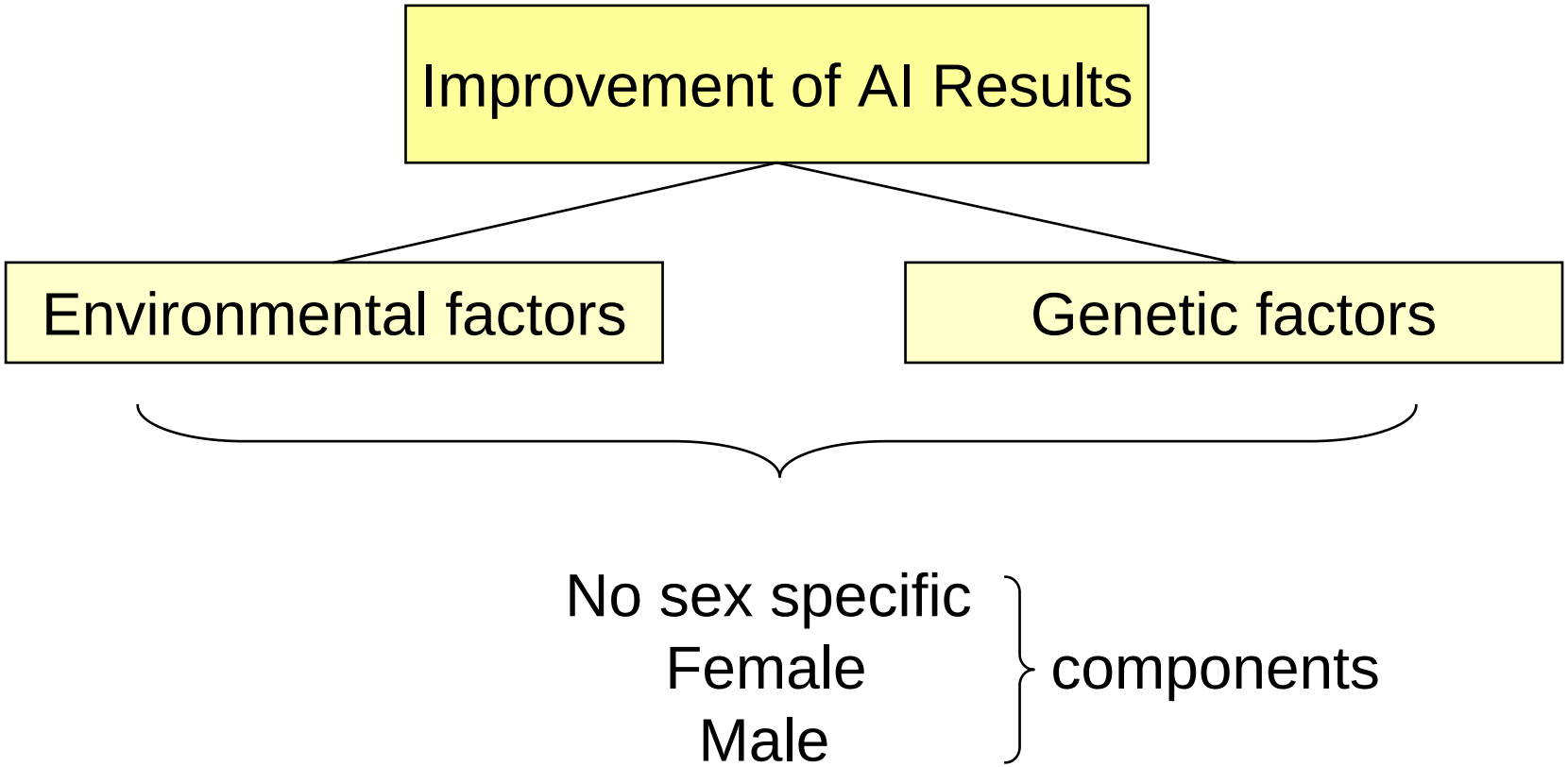
Motivations



Data

- 3 AI centres
- 4 breeds
  - Lacaune
  - Manech tête rousse
  - Manech Tête noire
  - Basco-béarnaise

- Annual lambing system
- AI at the end of the milking period
- Fresh semen collected few hours before AI

- 678 168 AI

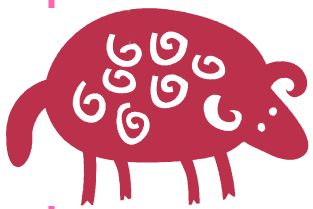
Data records

- Inseminator
- Date
- Flock
- …

Non sex specific factors

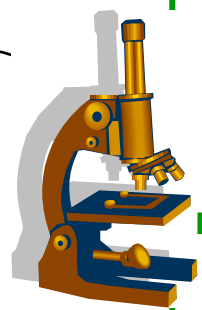
- Age
- Category

- Age
- Interval lambing-AI
- Milking status
- …



Link AI - ejaculate

- Semen features
  - Volume
  - Concentration
  - Motility
- Collection management
  - Interval previous collect
  - …



$y = 0/1$

Analysis 1

- AI result

  Joint additive model :

male fecundancy and female fertility

$$P(IA^{+}) = \overbrace{E_m + A_m} + \overbrace{E_f + A_f} + E_{ns}$$

Analysis 2

- Semen production
  - Volume
  - Concentration
  - Number of spermatozoa
  - Motility

Traits considered ≠ for young & adults rams

Analysis for each breed separately

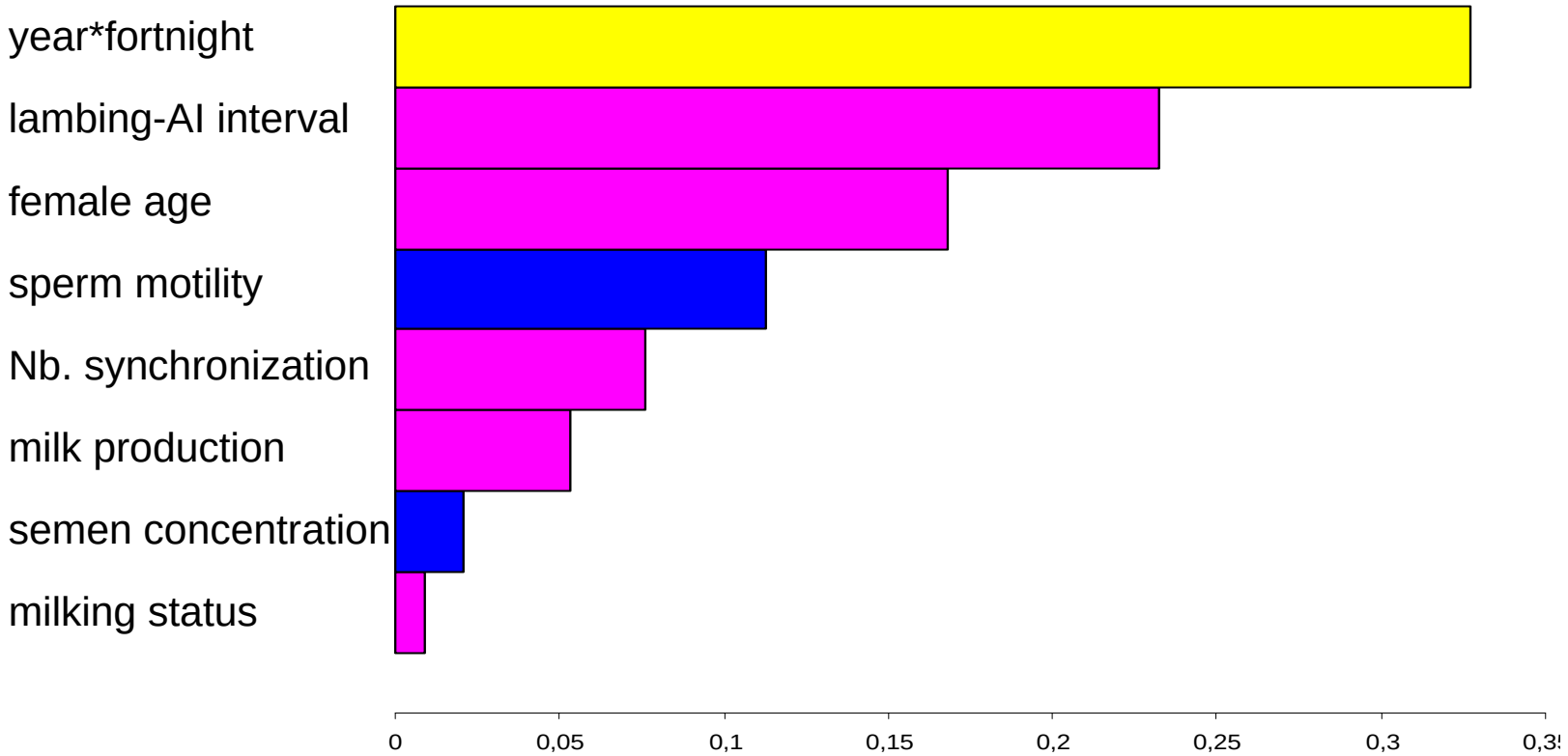
Results: AI result
genetic parameters

	Heritability	Repeatability
Female fertility	3.9 - 7.7 %	10.3 – 13 %
Male fecundancy	0.1 - 0.4 %	0.7 - 1.4 %

Standard polygenic selection not advisable

Results: AI result
environmental factors

Fixed effects:

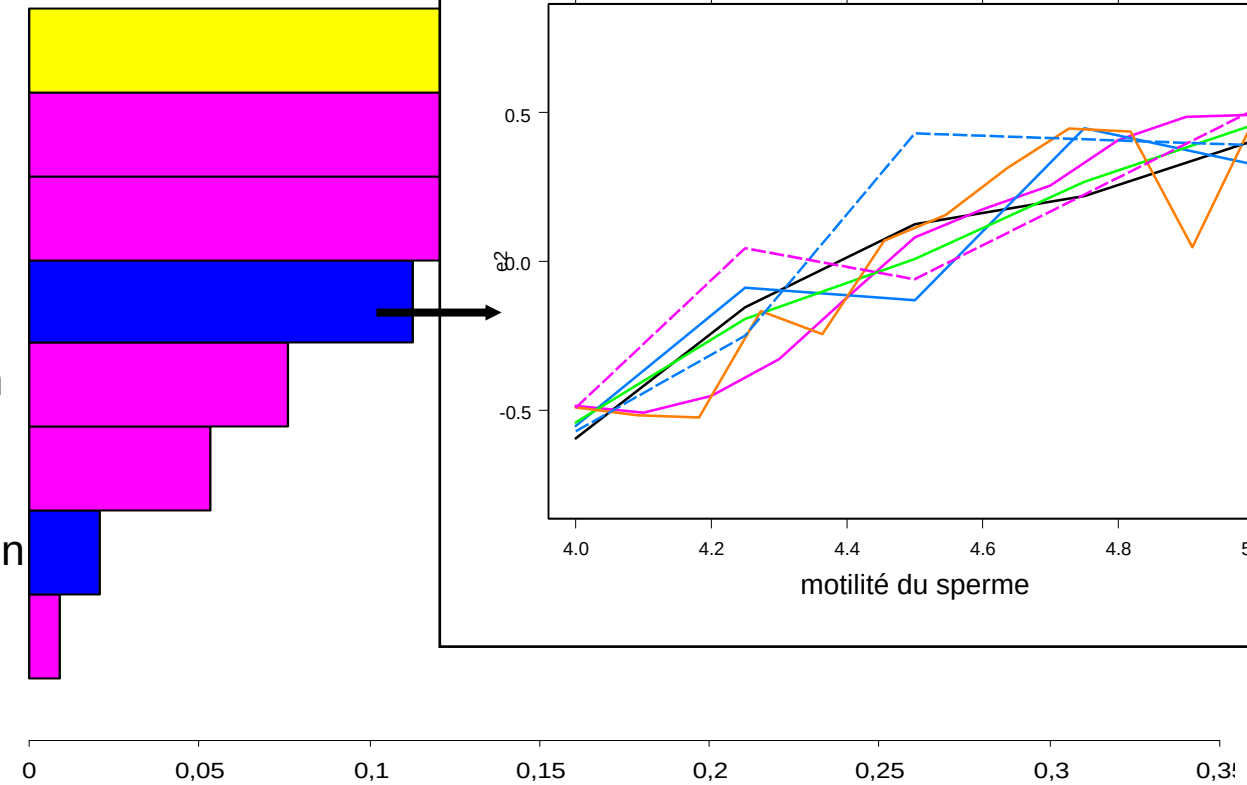


Random effects: Year*herd
AI operator

Results: AI result
environmental factors

Fixed effects:

- year*fortnight
- lambing-AI interval
- female age
- sperm motility
- Nb. synchronization
- milk production
- semen concentration
- milking status



Random effects: Year*herd
AI operator

Results: AI result
environmental factors

Fixed effects:

year*fortnight

lambing-AI interval

female age

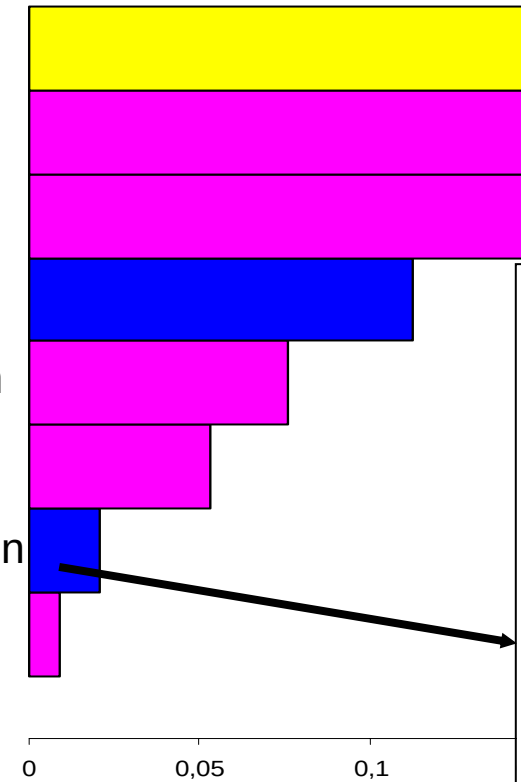
sperm motility

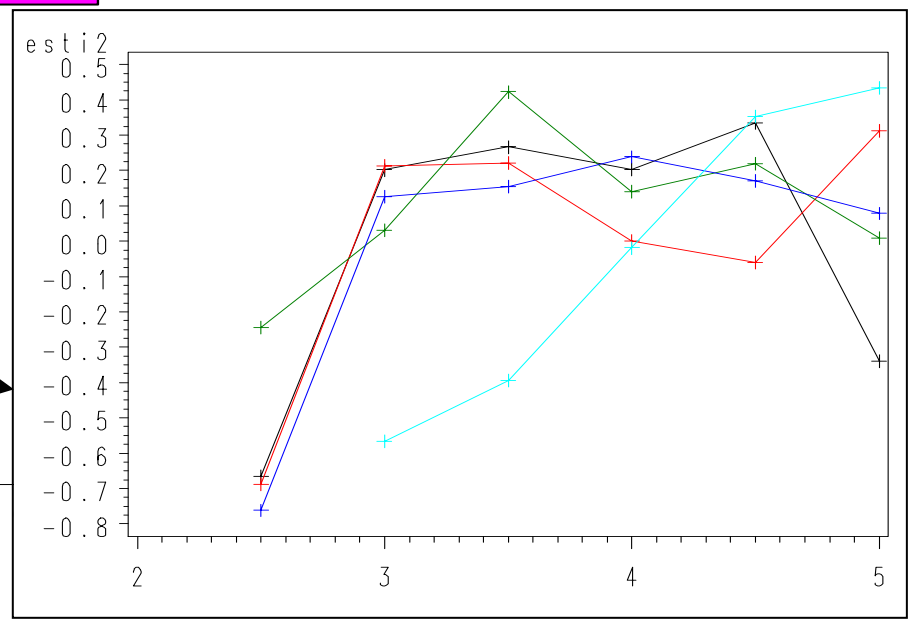
Nb. synchronization

milk production

semen concentration

milking status

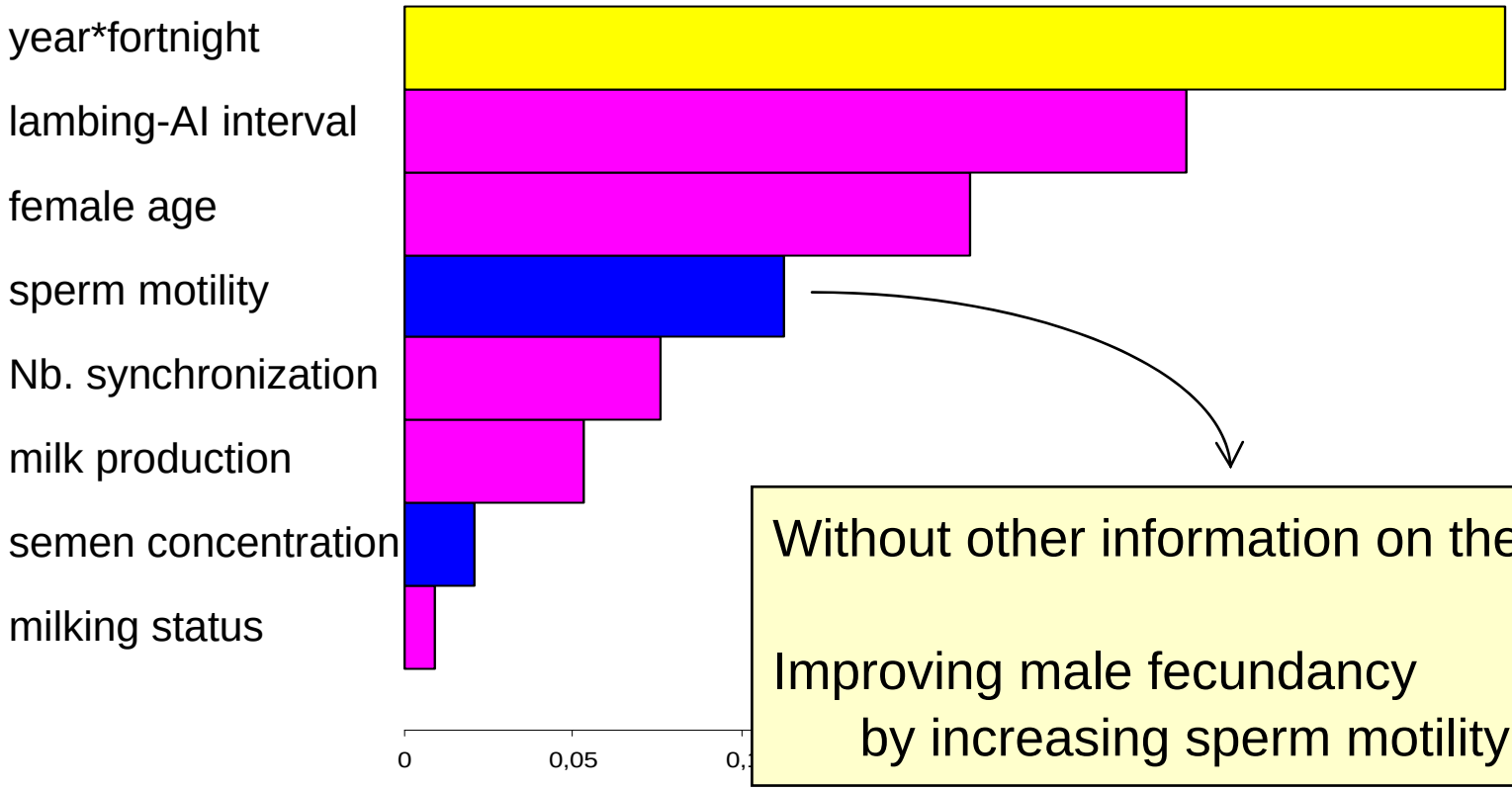




Random effects: Year*herd
AI operator

Results: AI result
environmental factors

Fixed effects:

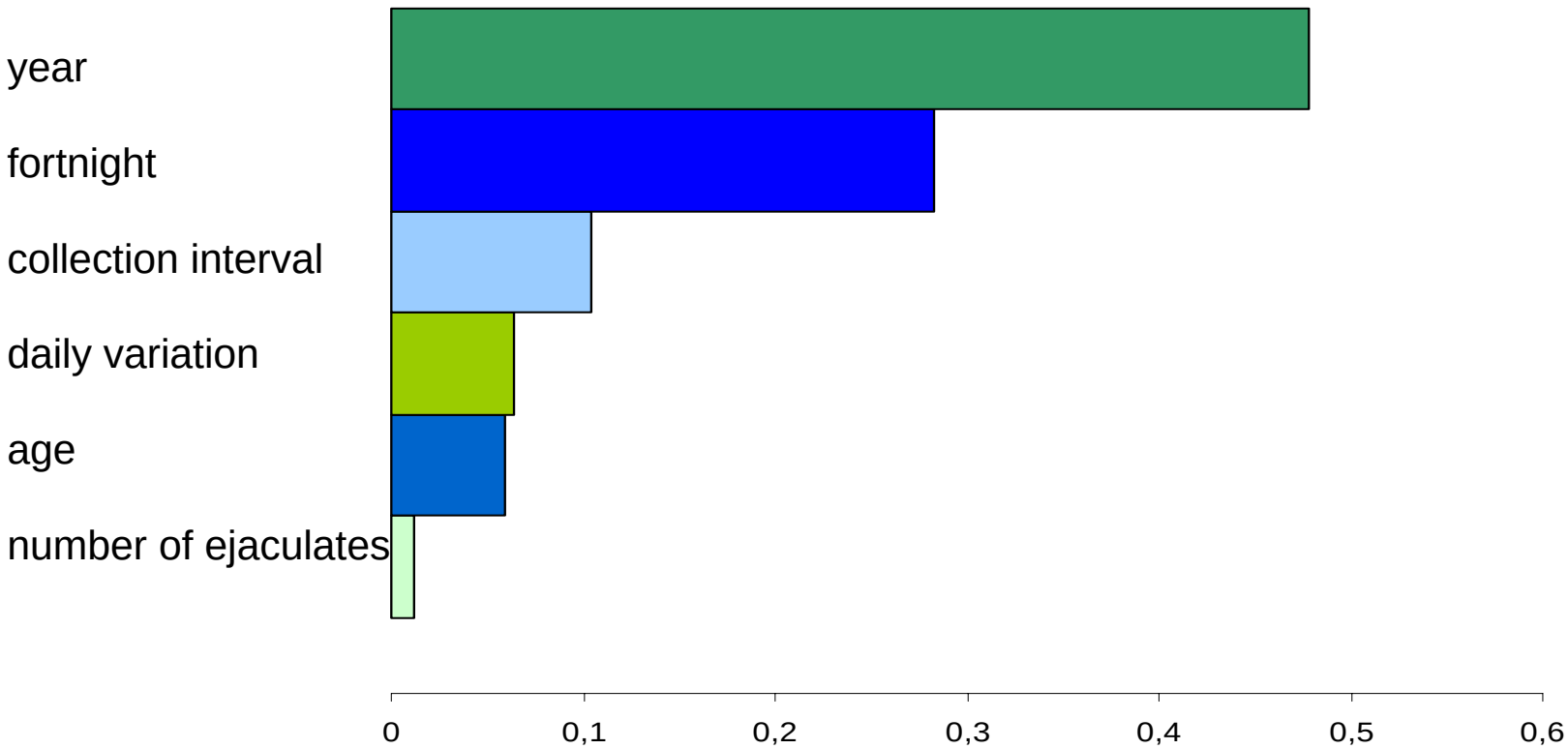


Without other information on the semen

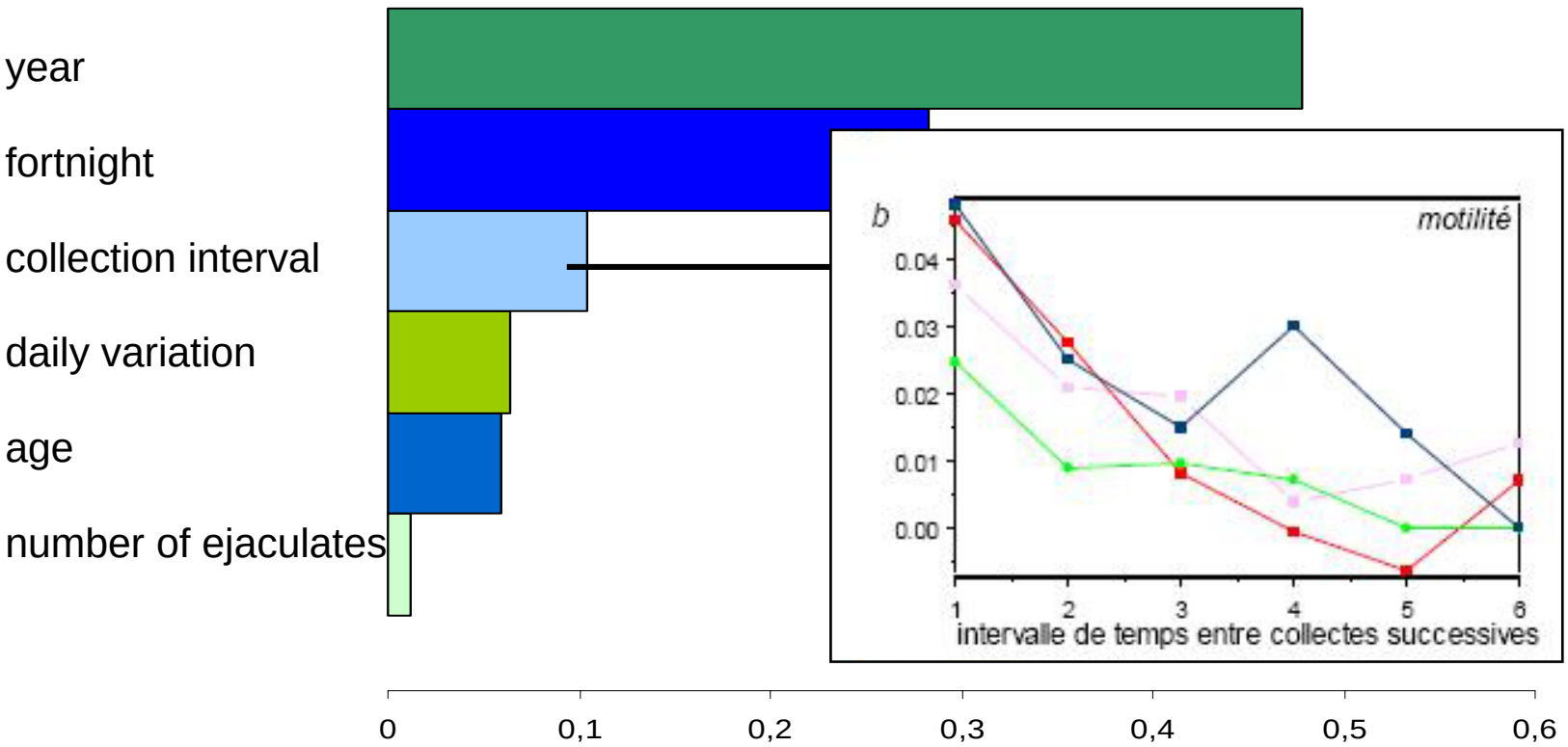
Improving male fecundancy
by increasing sperm motility

Random effects: Year*herd
AI operator

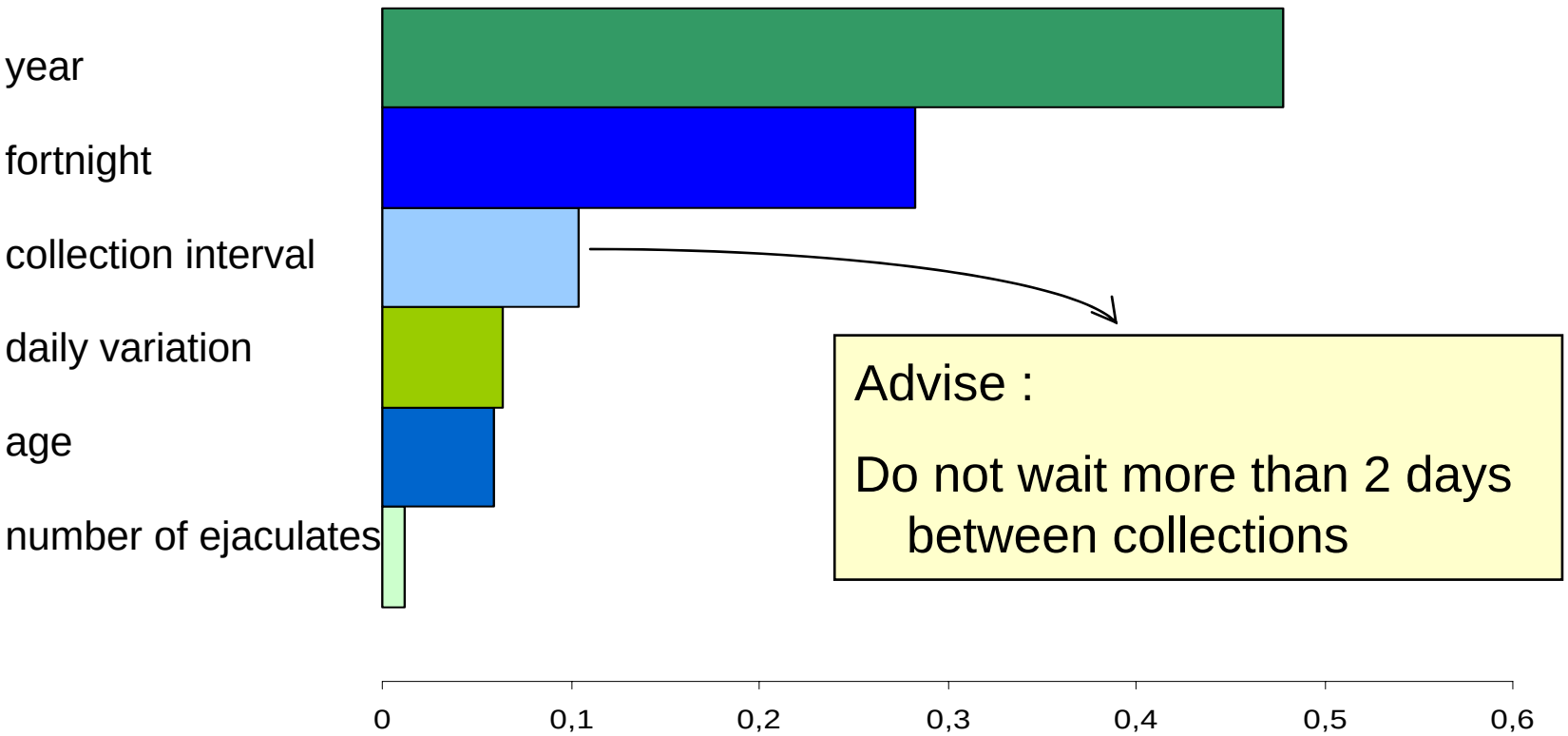
Results: Motility
environmental factors



Results: Motility
environmental factors



Results: Motility
environmental factors



Advise :

Do not wait more than 2 days between collections

Results: Motility
genetic parameters

	Heritability		phenotypic correlation
	Young	Adult	
Motility	0.07-0.14	0.02-0.13	0.58-0.62

Semen production in young rams is partly predictive of the semen production in adult rams

Conclusion

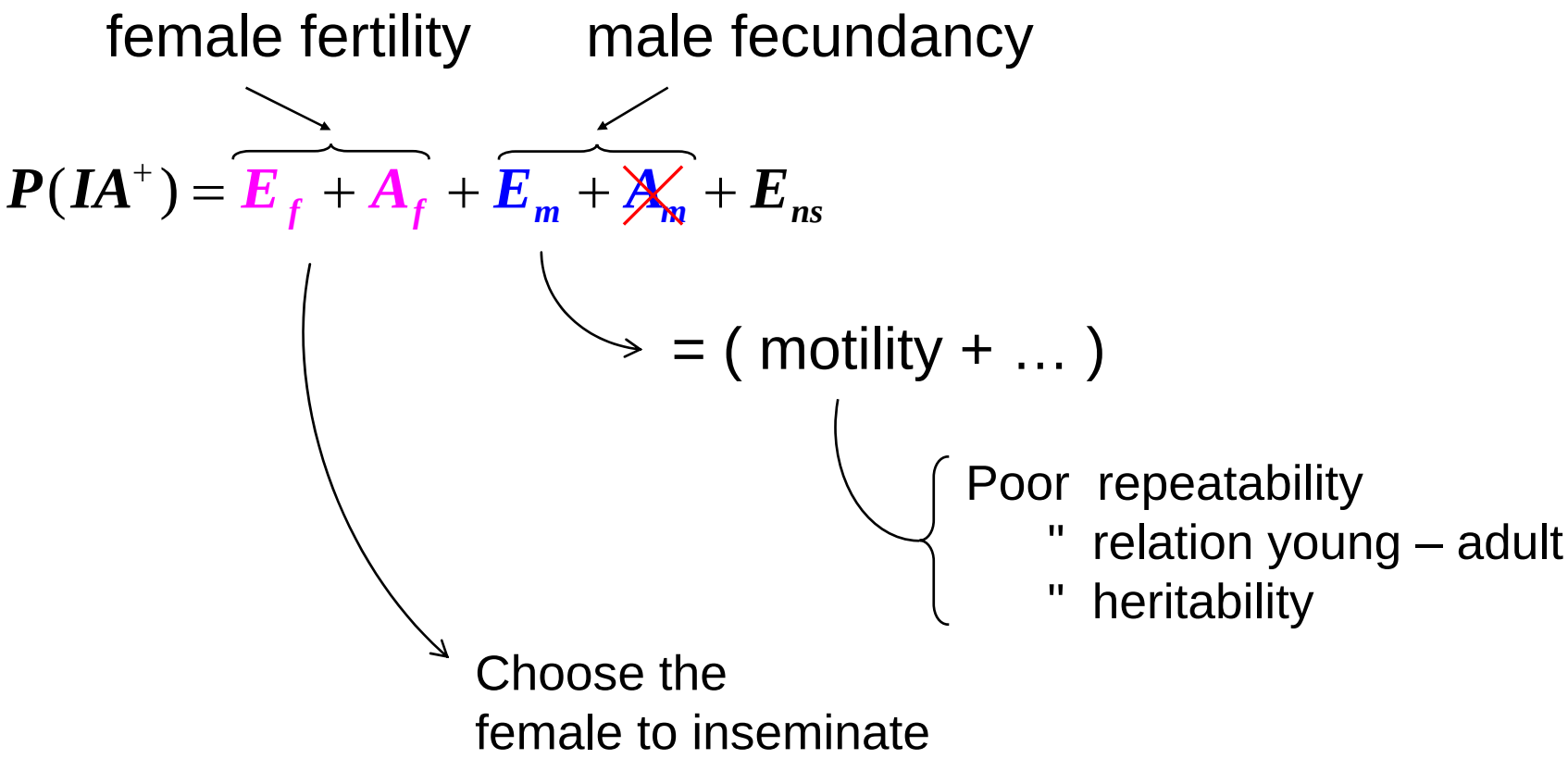
female fertility male fecundancy

$$P(IA^{+}) = \overbrace{E_f + A_f} + \overbrace{E_m + \cancel{A_m}} + E_{ns}$$

= (motility + …)

Poor repeatability
" relation young – adult
" heritability

Conclusion


female fertility
male fecundancy
$P(IA^+) = E_f + A_f + E_m + A_m + E_{ns}$
= (motility + …)
Poor repeatability
" relation young – adult
" heritability
Choose the
female to inseminate