Somatic Cell Counts as a selection criterion for goat mastitis resistance

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Different steps to take into account Somatic Cell Counts (SCC) as a selection criterion

- **Assessment of SCC data in herds**
- **Implementation of divergent selection in an experimental flock :**
  - Effect of SCC based-selection on infectious level
  - Correlation with milk bacteriological status
- **Taking into account in selection scheme**

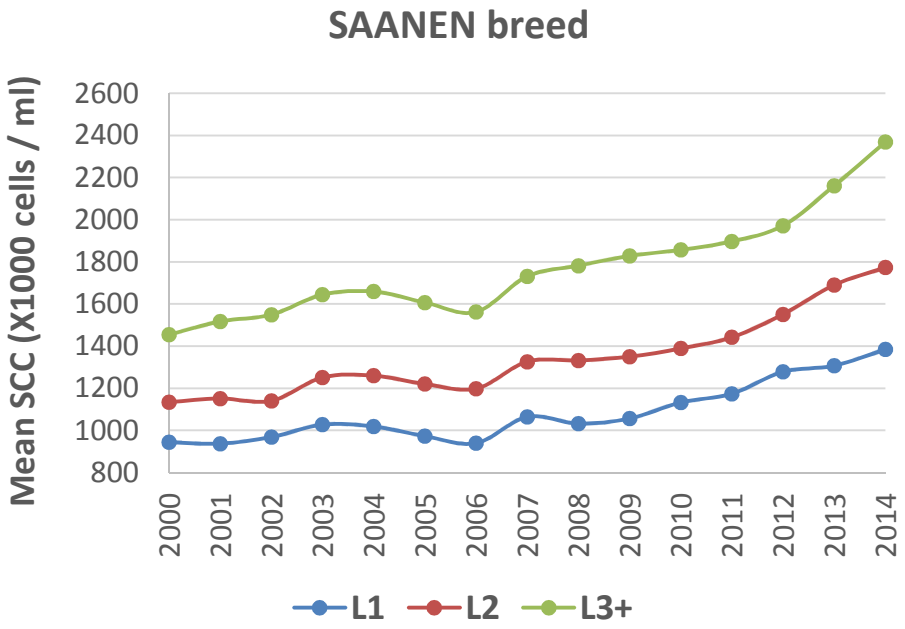
Analyse of SCC data in commercial flocks

Results from MAMOVICAP project

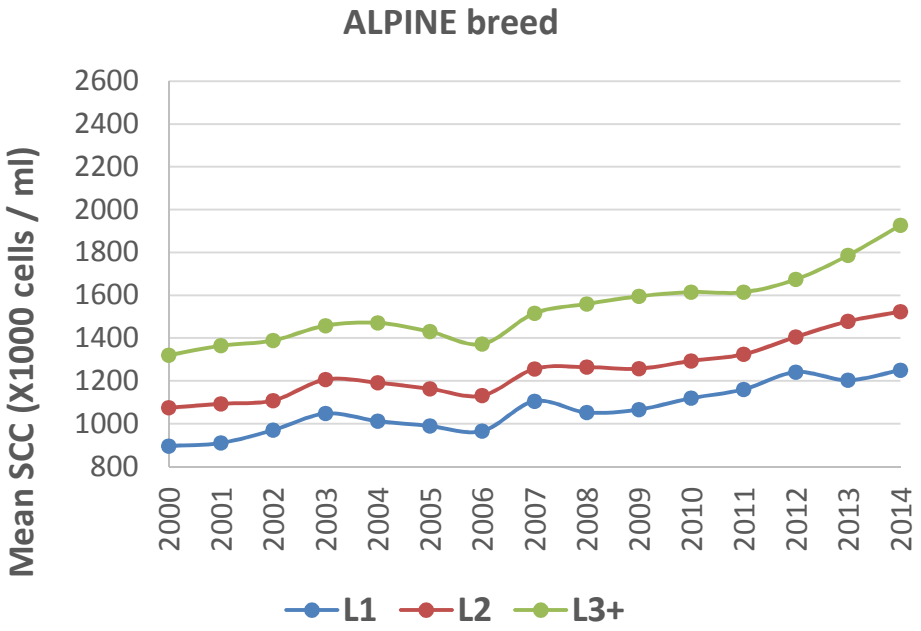
Analyse of SCC data collected by Milk Recording Organisations

- **Data :**
  - Individual SCC from milk recording flocks
  - Period : 1995 to 2013
  - Breed : Alpine and Saanen
  - 5 or 6 records per lactation
- **Variables analysed :**
  - Test-day SCC in cells/ml
  - SCS : logarithmic transformation of SCC
  - LSCS : mean lactation SCC computed as the weighted arithmetic mean of test-day SCS, adjusted for days in milk

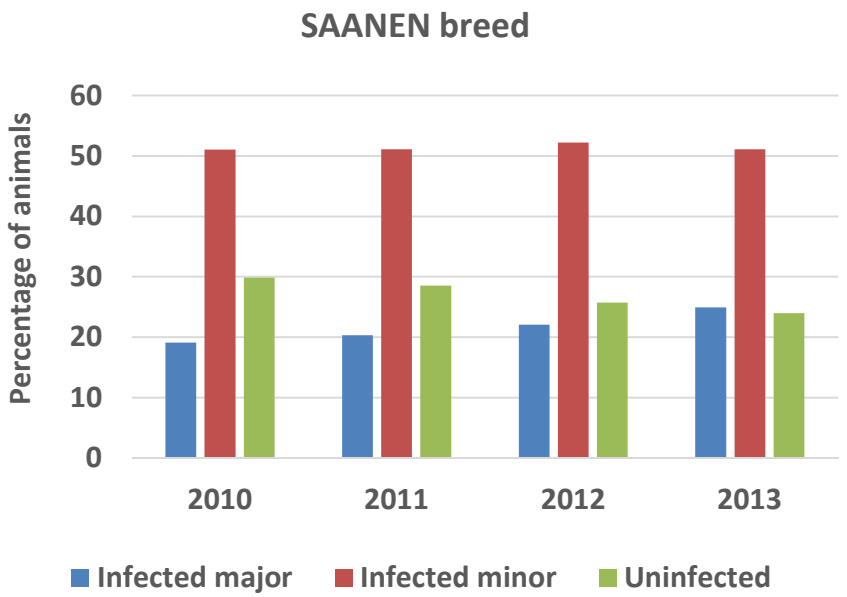
Evolution of individual SCC over time

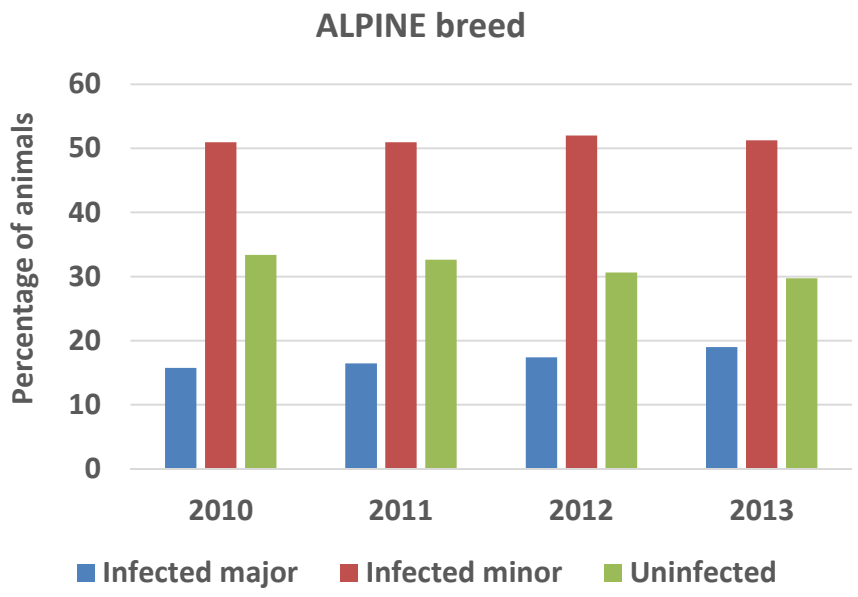


+55% in Saanen breed, +43% in Alpine breed for fifteen years



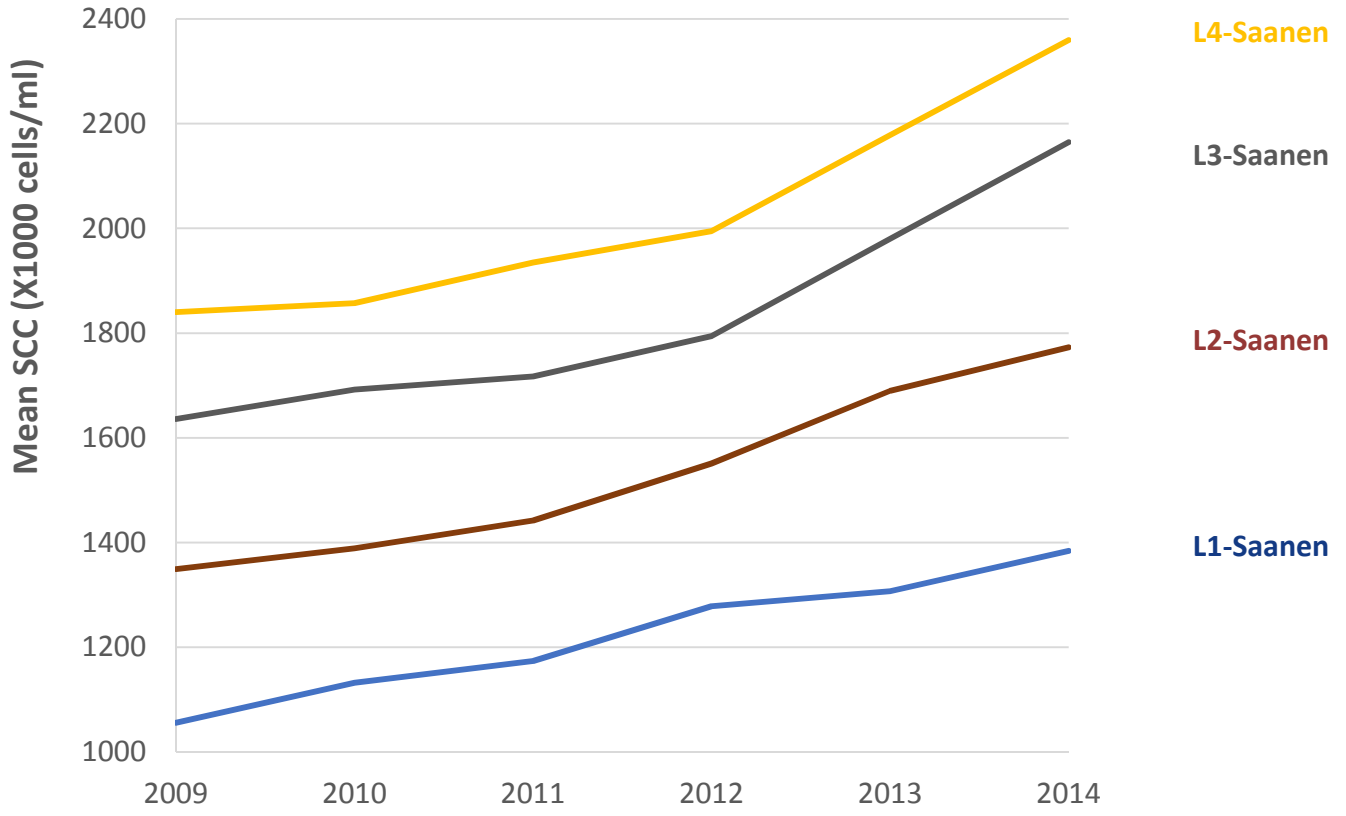
Evolution of individual infectious level



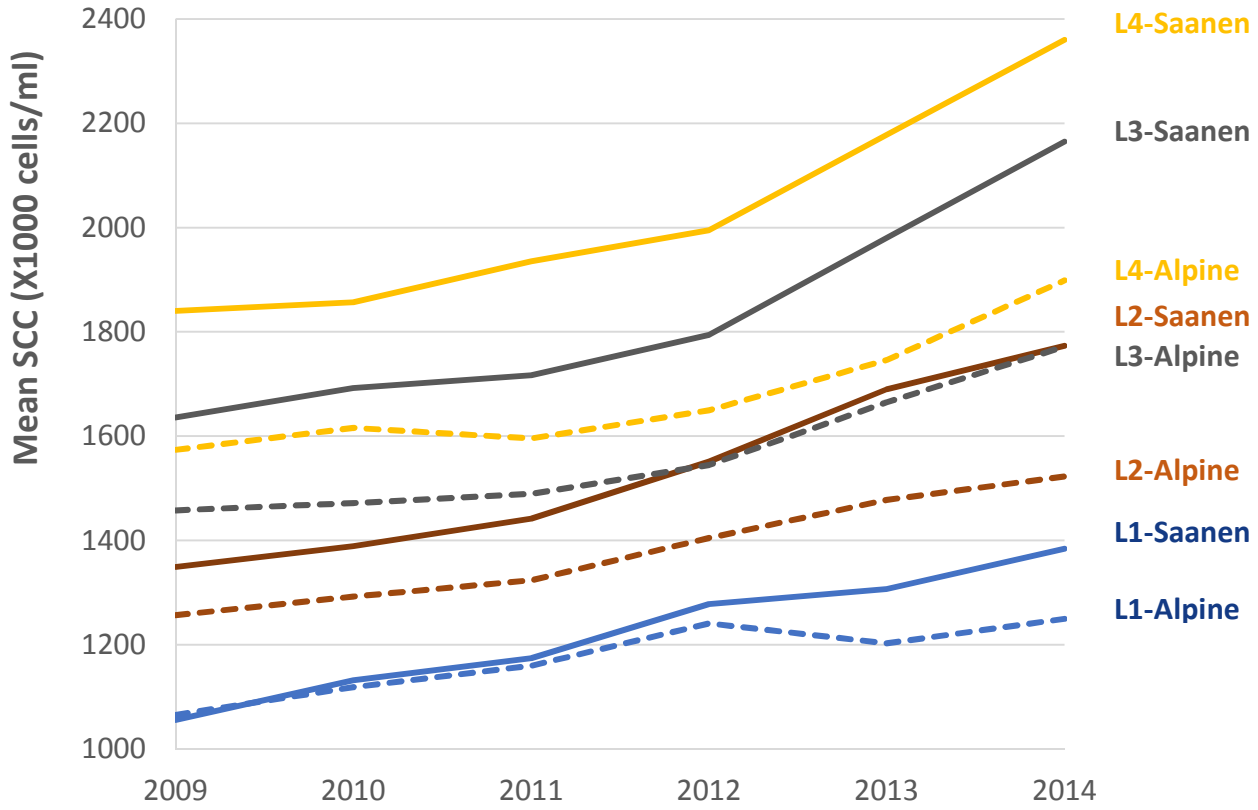


Infected by a major pathogen : + 6% in Saanen breed, + 3% in Alpine breed since 2010

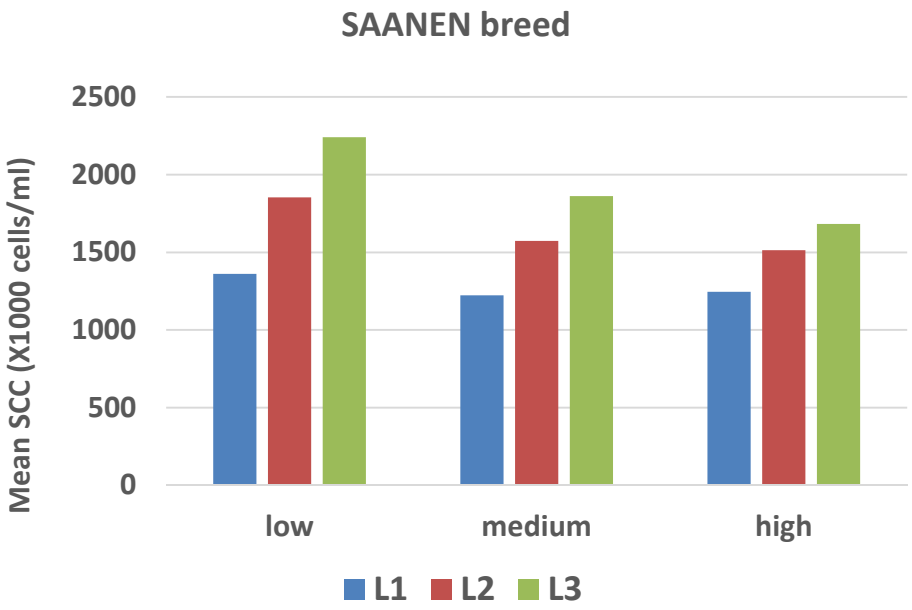
Evolution of individual SCC depending on breed and parity

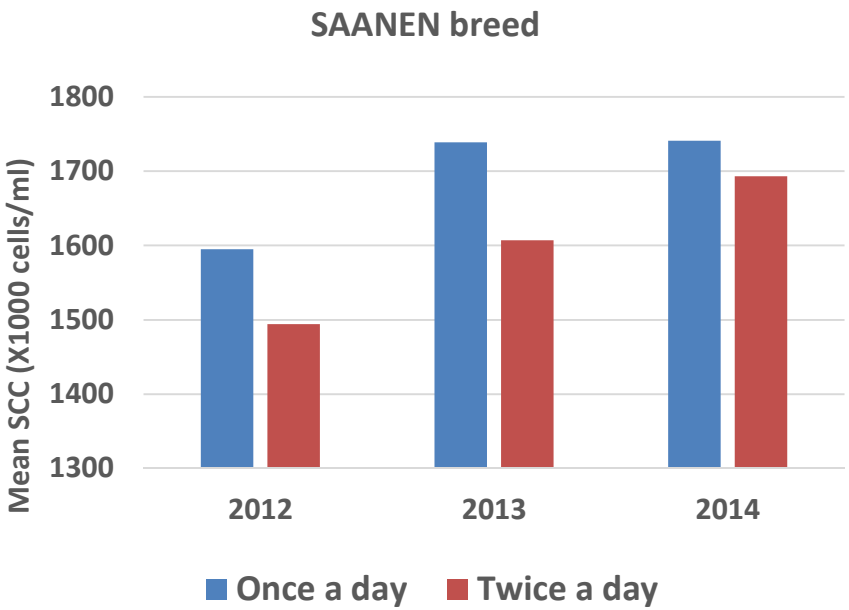


Evolution of individual SCC depending on breed and parity



Impact of individual production level and milking once a day





Analysis of SCC data in commercial flocks

- High increase of SCC over time
- Aggravation since 2012
- Impact of non genetic factors : breed, parity, milk production level, herd management, …
- Benefice of genetics ?

Implementation of divergent selection in an experimental flock

CAPRIMAM and CAPRICEL projects

Région Centre

Genetic parameters

- **heritability**

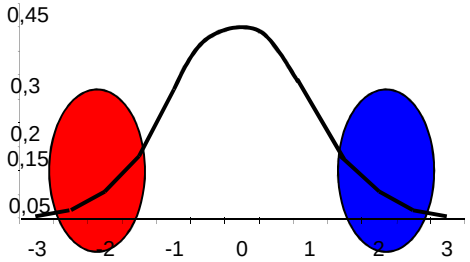
Alpine	0.24
Saanen	0.20

- **Correlation with milk and protein yields**

	Milk yield	Protein yield
Alpine	0	-0.04
Saanen	0.12	0.06

Creation of divergent lines

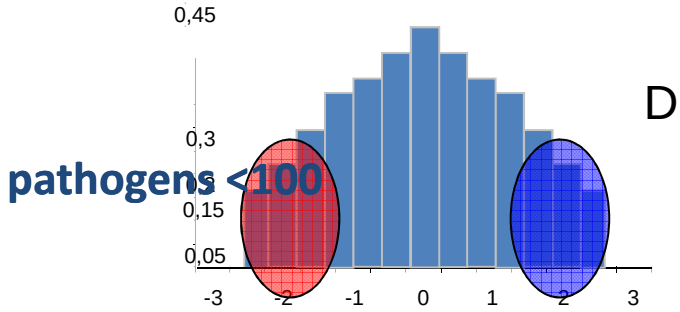
Progeny tested AI males



Sire
SCC index

Experimental flock INRA
(***Galles***, *Bourges*)

Alpine breed



pathogens <100

Dams (266 goats)

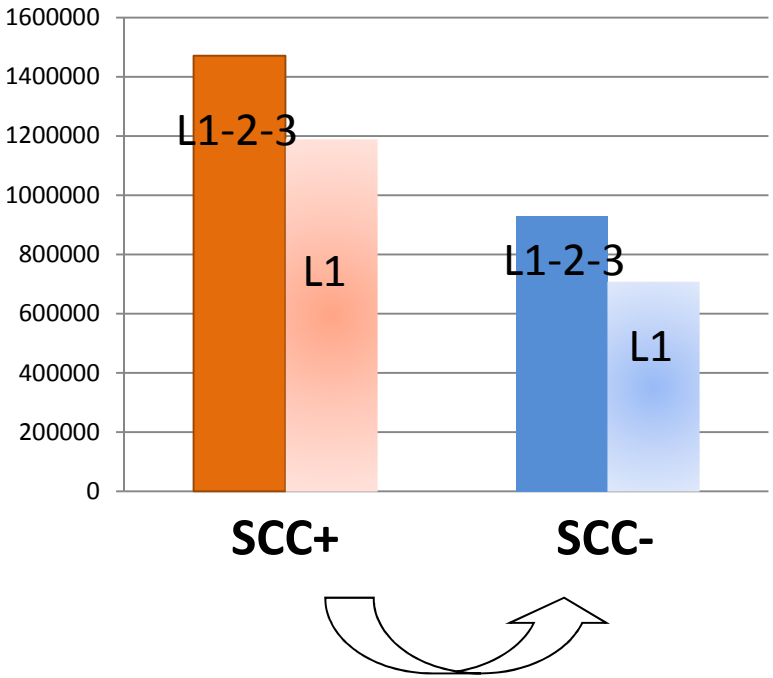
2010-2014

High SCC (SCC+)

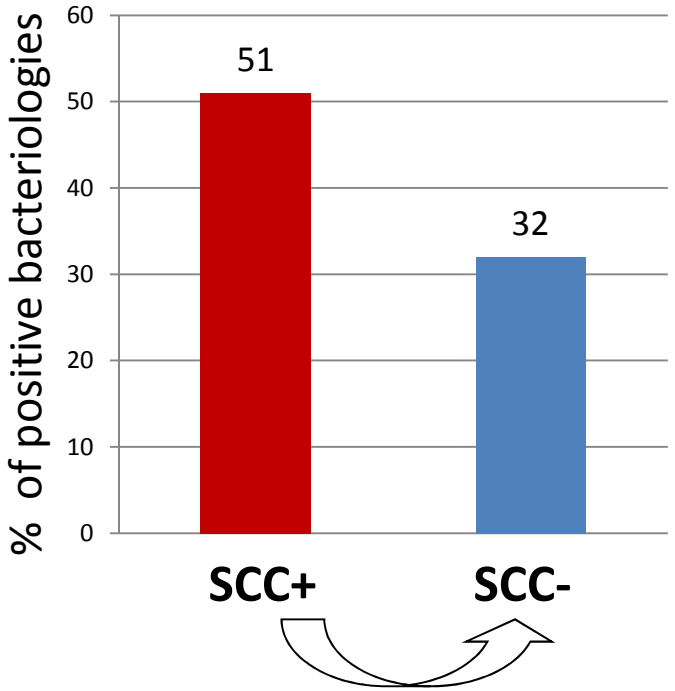
Low SCC (SCC-)

Consequence of SCC based-selection

SCC_{L1} = 1 189 000 c/ml **SCC_{L1} = 709 000 c/ml**



=> Halving of geometric mean of SCC



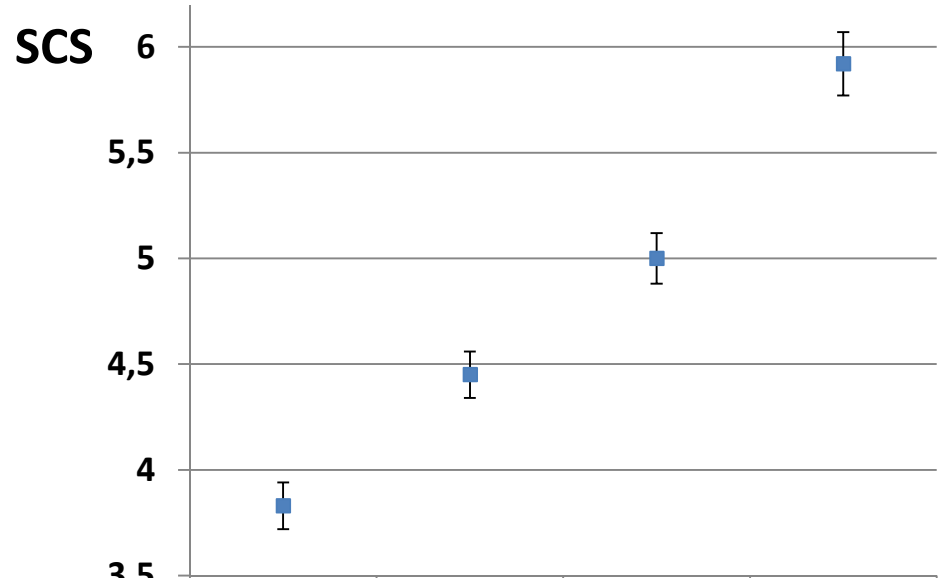
=> Difference of 37 % of the number of « positive » milk

Relation SCS – milk bacteriology

- **Score ranges from 0 to 3 depending on the severity of the infection**

- **Severity is evaluated with :**
  - the number of half-udder infected : 0, 1 or 2
  - the number of pathogens in milk : <100 or >100
  - the presence or absence of *S. aureus*

Relation SCS – milk bacteriology



	0	1	2	3
SCS	3,83	4,45	5	5,92

Scores for biological status

Effect of udder bacteriological status on SCS

Implementation of divergent selection in an experimental flock

- **shows the effectiveness of SCC-based selection**
  - decrease of SCC
  - relation with milk bacteriological status

Implementation of genetic selection in commercial flocks

Implementation of genetic selection

- **Compute of SCC breeding value**
- **Inclusion in breeding objective :**
  - Estimation of selection differentials
  - Estimation of expected genetic progress
  - Determination of weight of SCC in total merit index

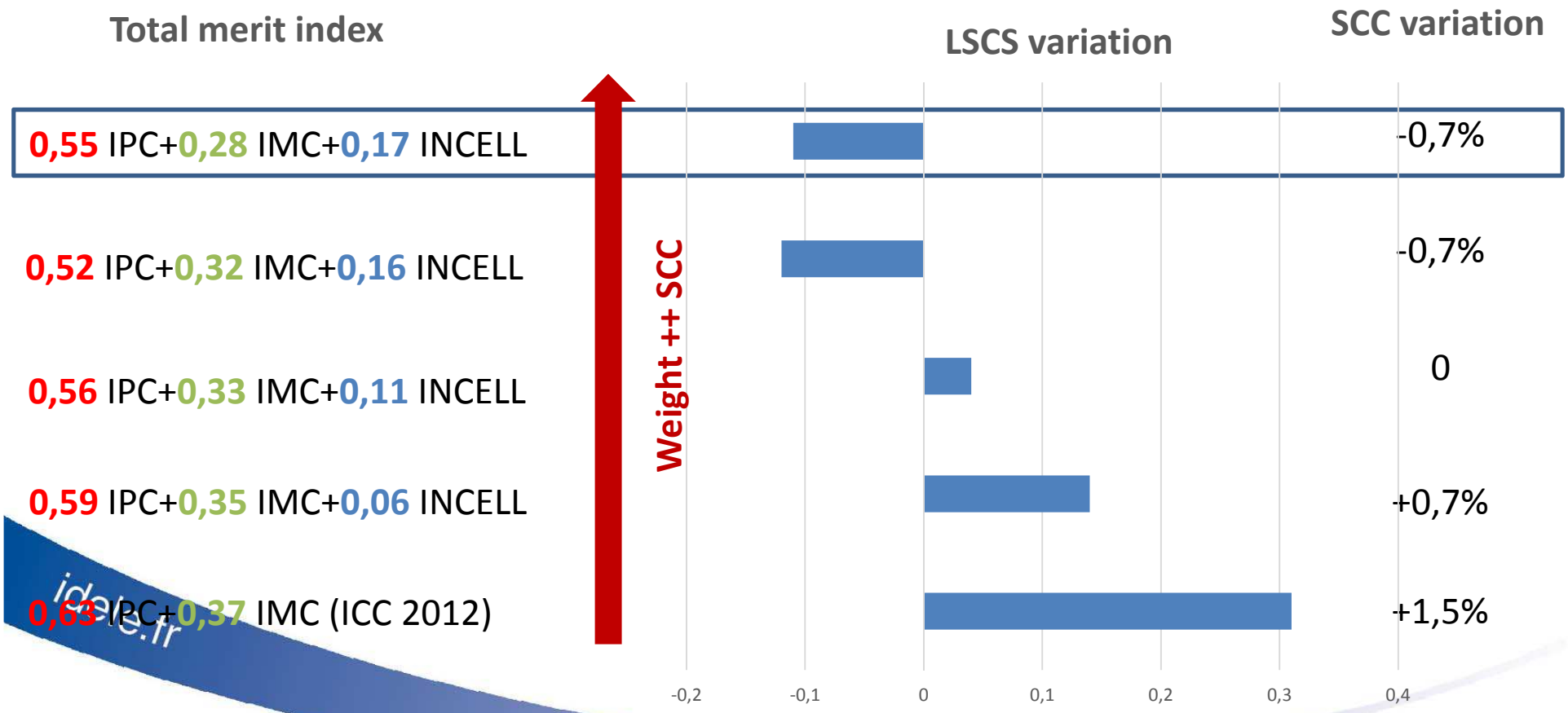
Estimation of expected genetic progress

IPC : synthetic production index

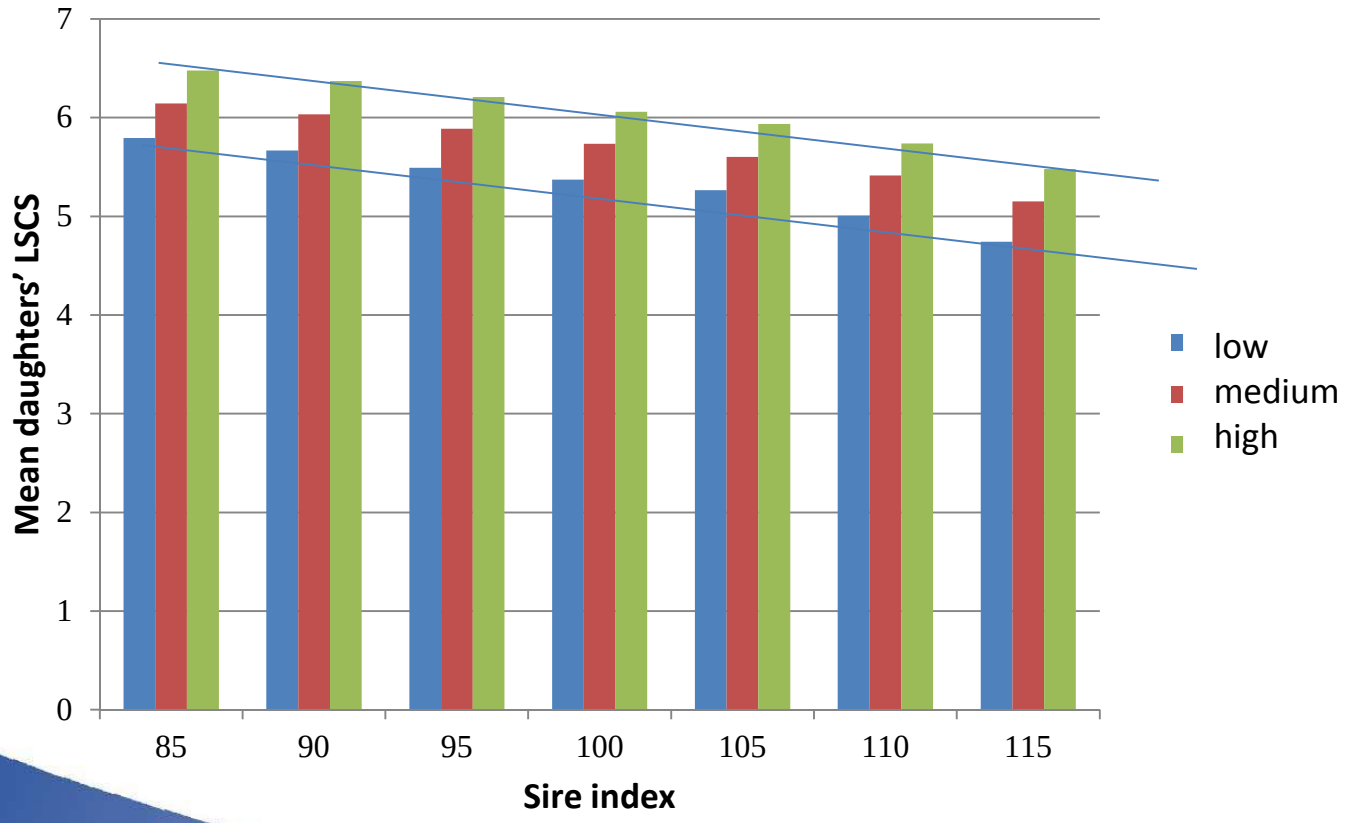
IMC : synthetic morphological index

INCELL : SCC index

SAANEN breed



Relation between sire breeding value and daughters‘ LSCS depending on SCC level of the flock



Genetic selection in commercial flocks

- Expected decrease of 0,7% of individual SCC in Saanen breed, 1,5% in Alpine breed, in average
- No unfavourable trend on other selected traits

Thank you for your attention