On-line sensing of suitability of milk for cheese making

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Milk quality:
fat, total proteins, casein,
curd and…..
intramammary Infection

Cheese quality:
yield, structure, smell, flavor,

shelf life …..

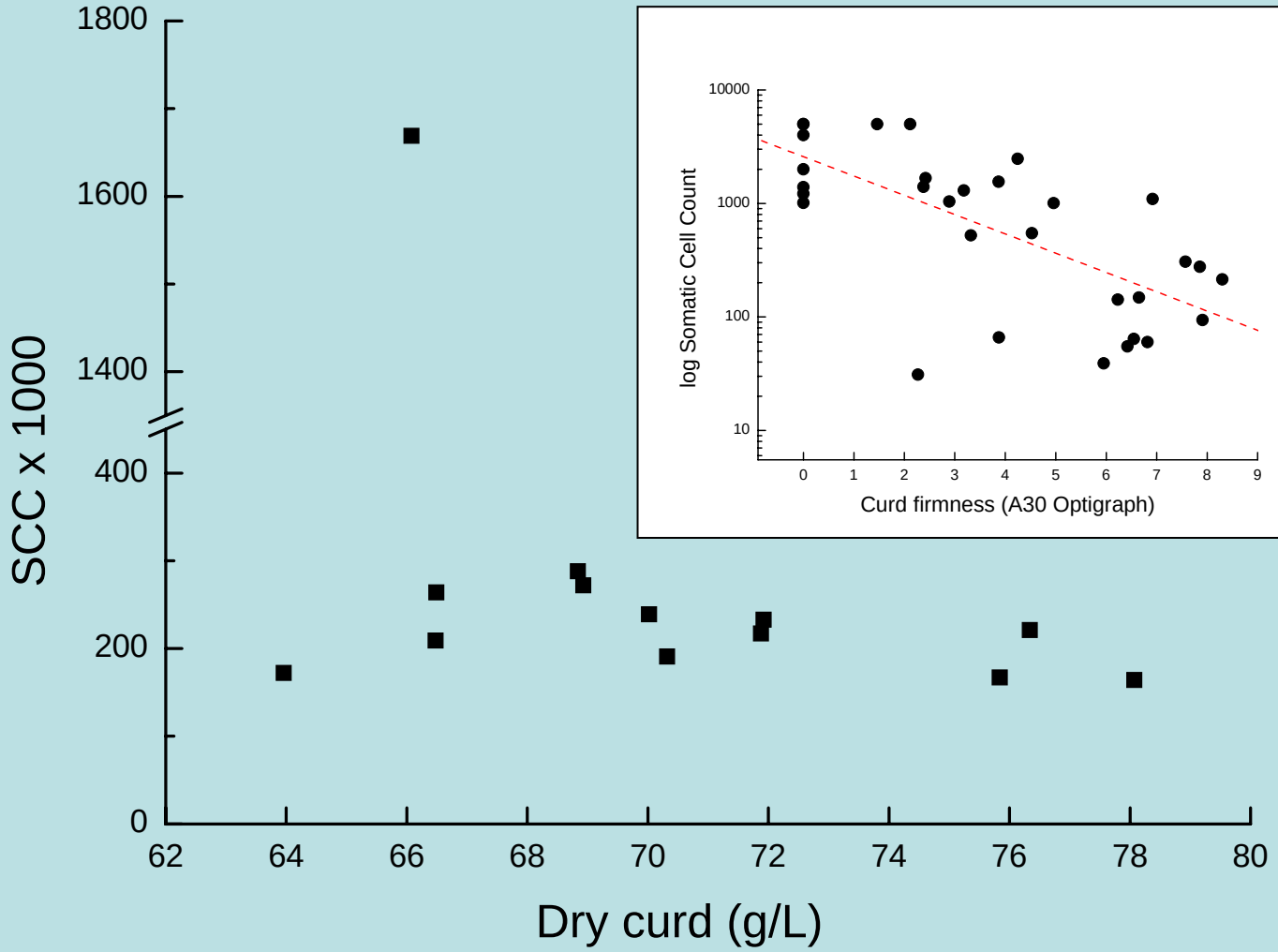
Traditional farming

1. Along the lactation different products are produced
2. Milk from clinically infected glands is discarded

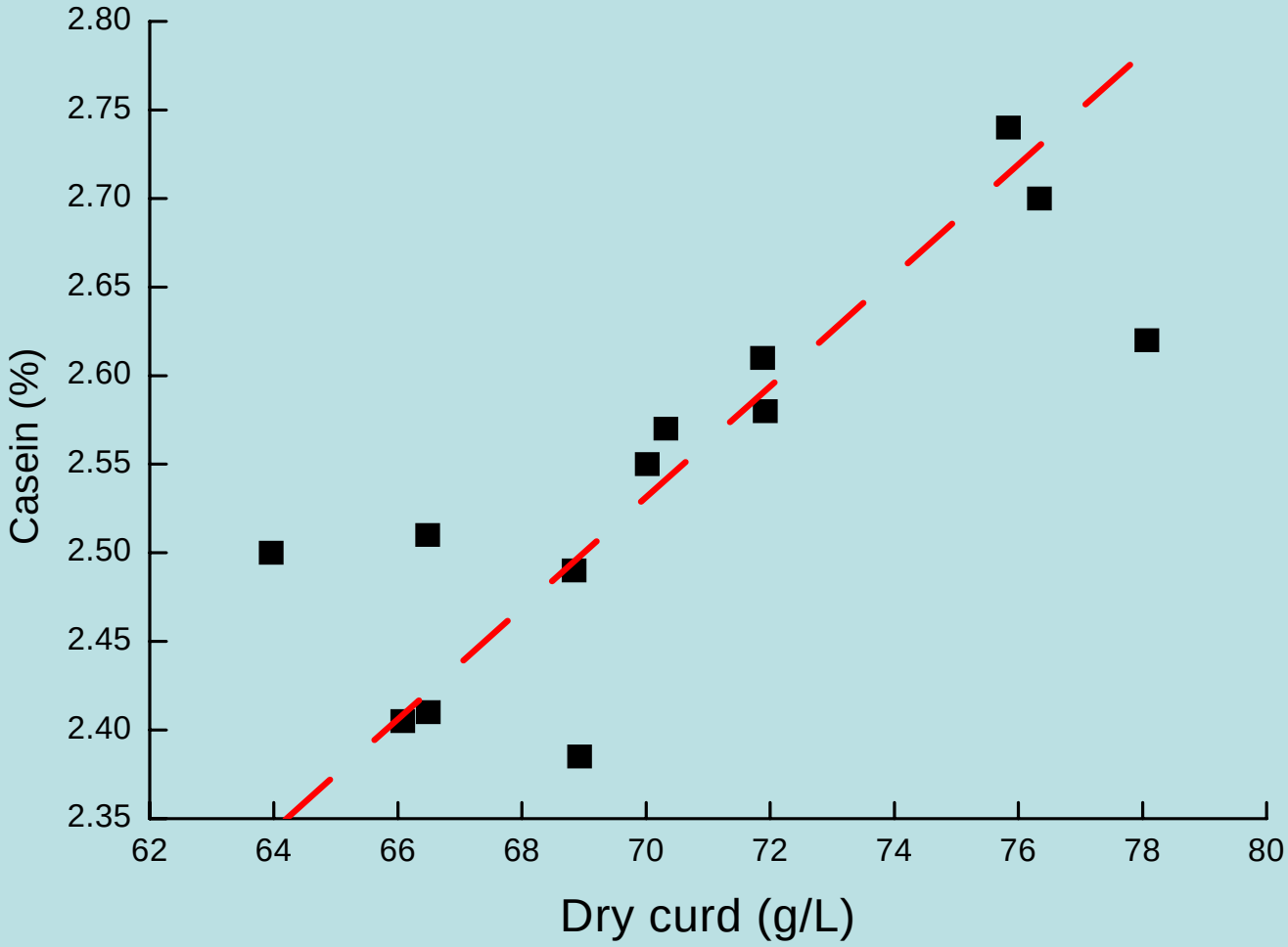
Modern dairy forming

1. Animals are milked while at different stages of lactation
2. A large number of glands are infected with a variety of bacteria

Dry curd vs. SCC of 15 cow's bluk milk Corralation (r= 0.24)

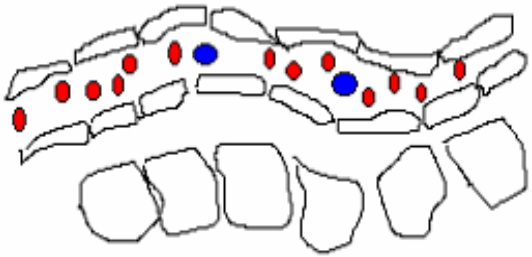


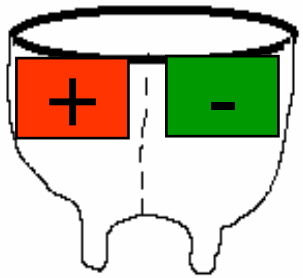
Casein vs. dry curd of 15 farms bluk milk
Corralation (r= 0.81)



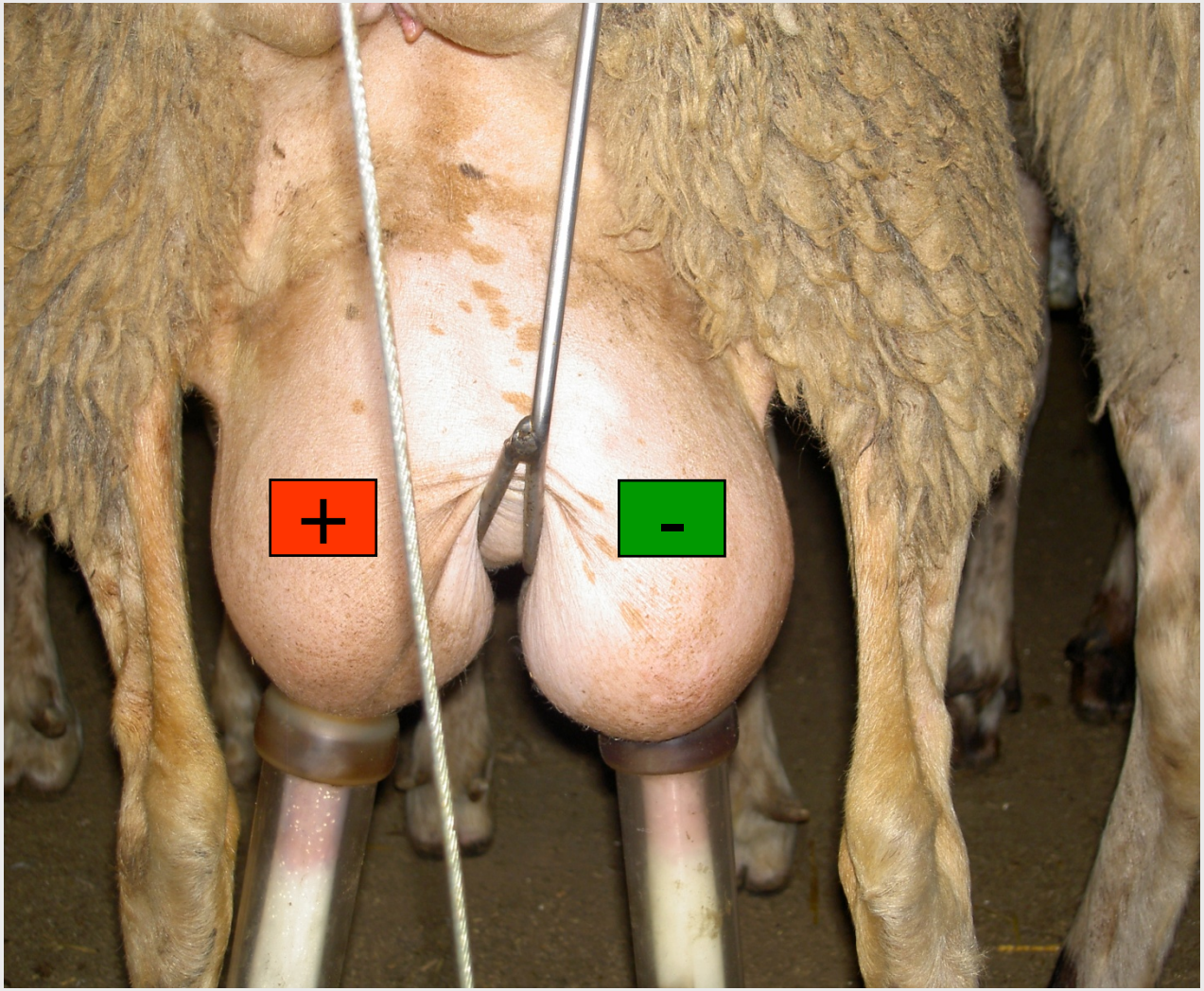
Animal model built on the gland level

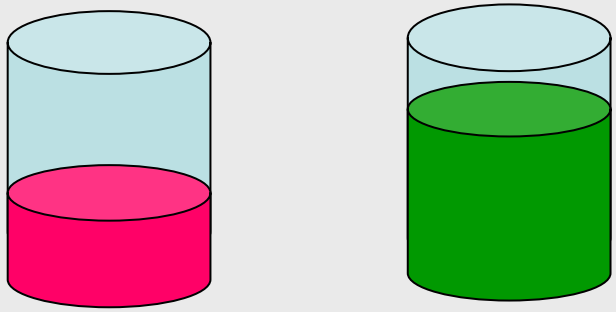
One udder-half identified with CNS species and the contra-lateral being free of bacteria



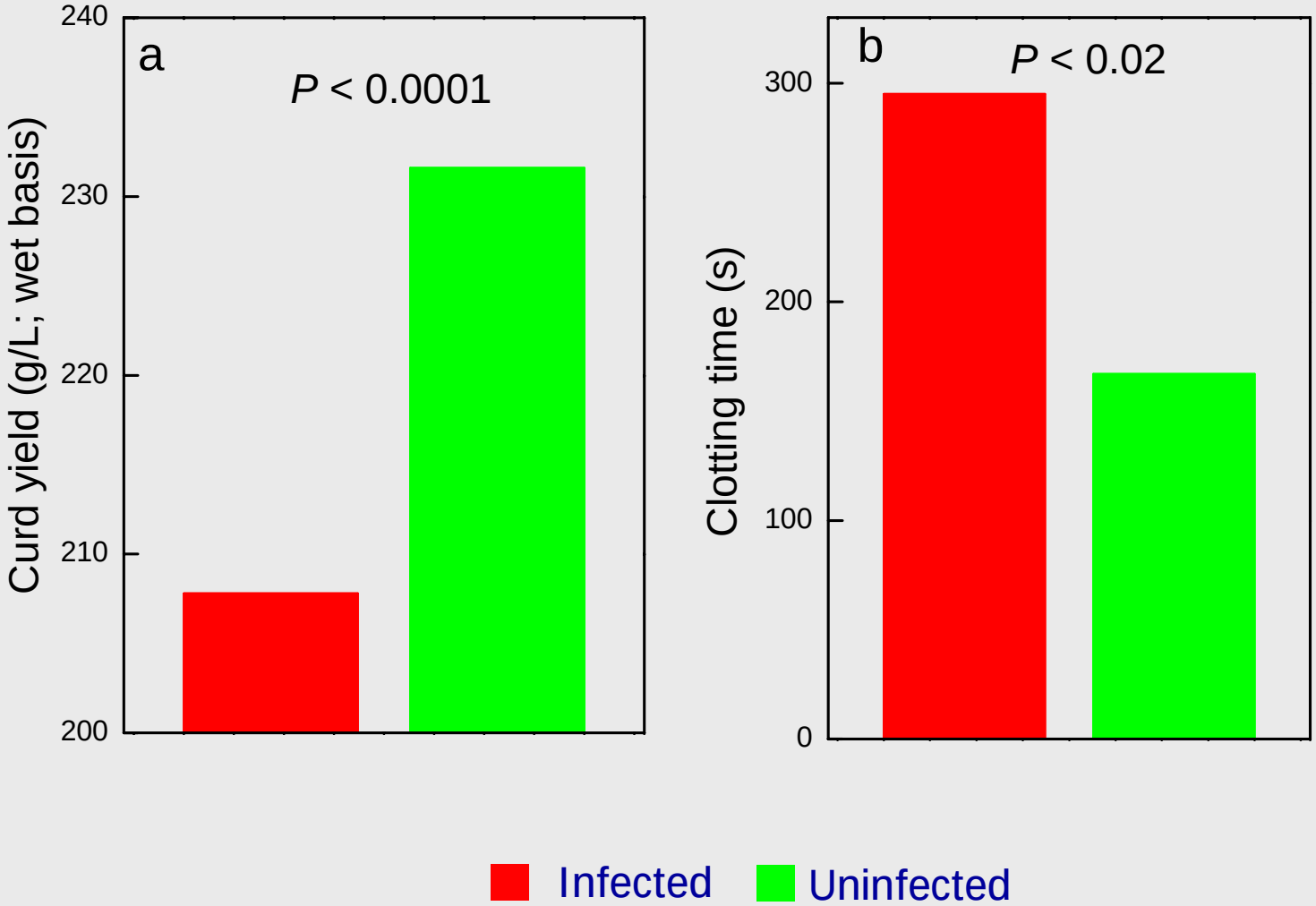


S. caprae
S. chromogenes
S. epidermidis
S. simulans
S. xylosus





Curd yield and clotting time of goat milk from infected vs. uninfected udder-halves



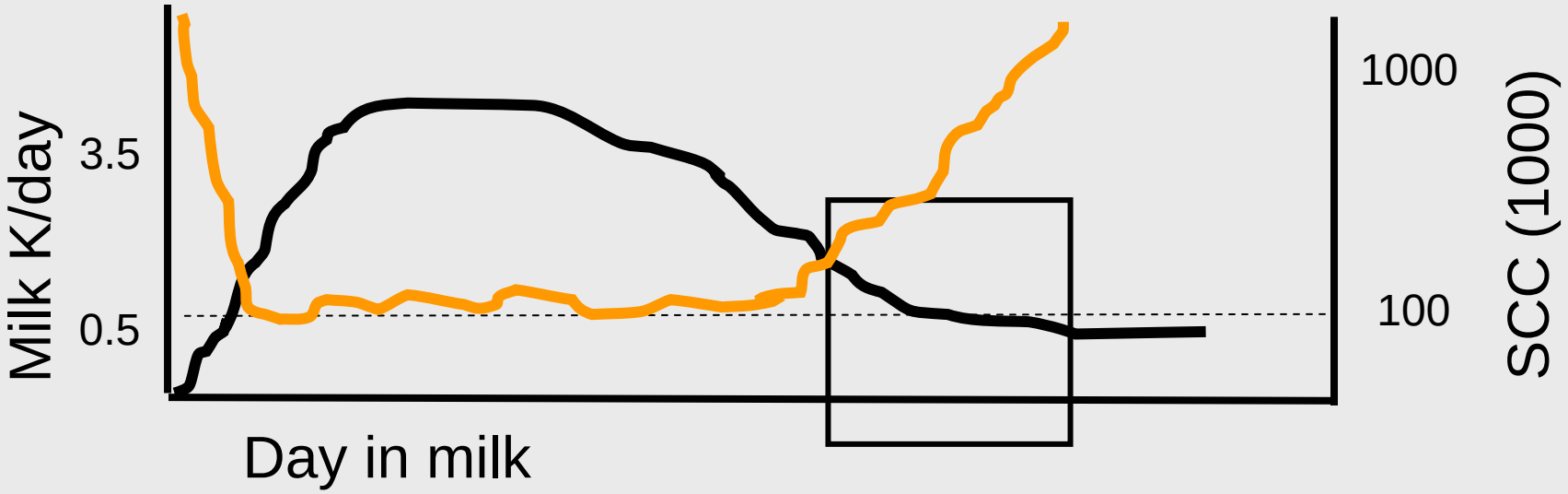
Healthy

Infected

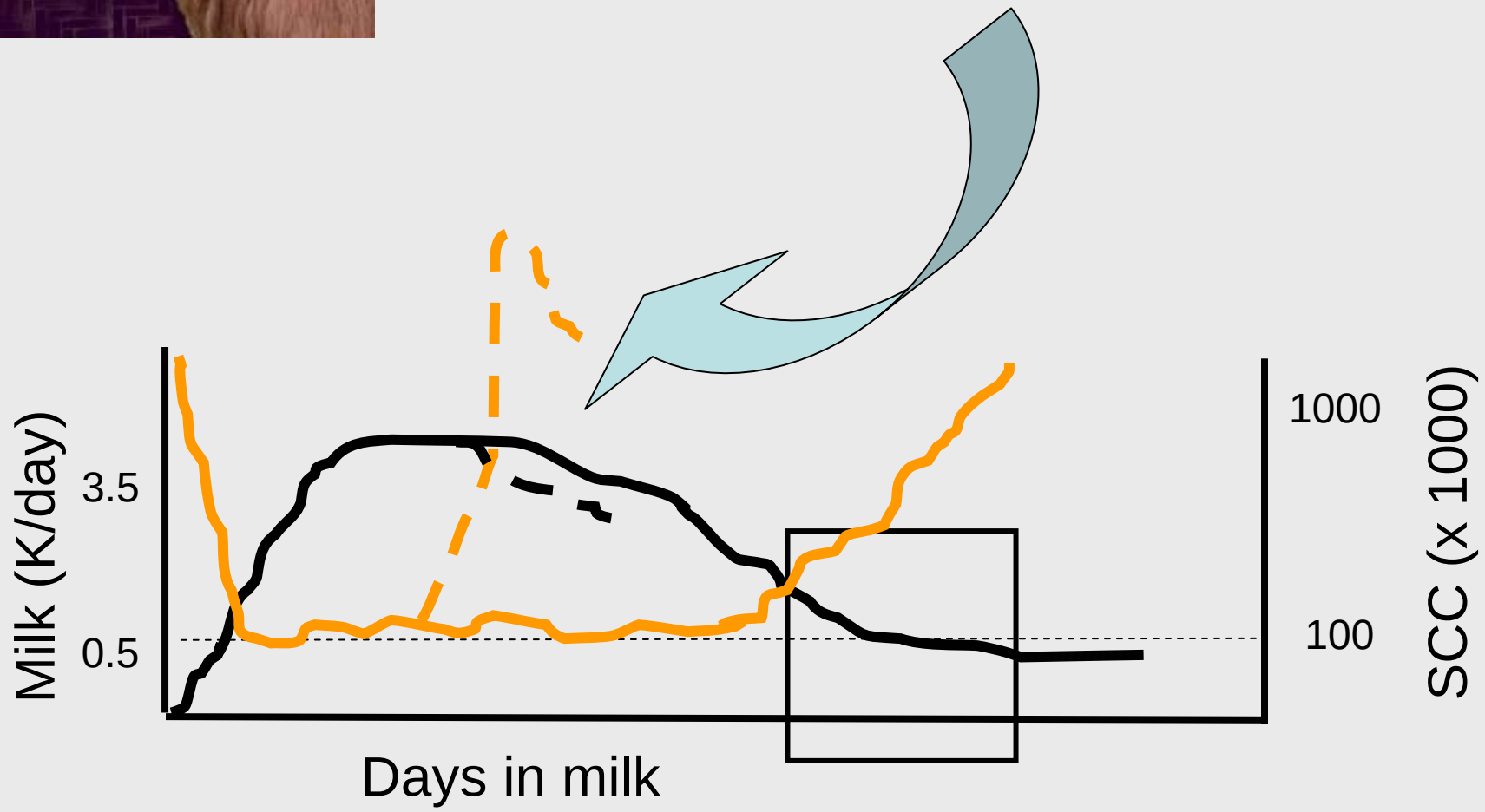
Staph. chromogenes

Strep. dysgalactiae

Milk yield and SCC along the lactation of uninfected glands



Milk yield and SCC along the lactation of infected glands



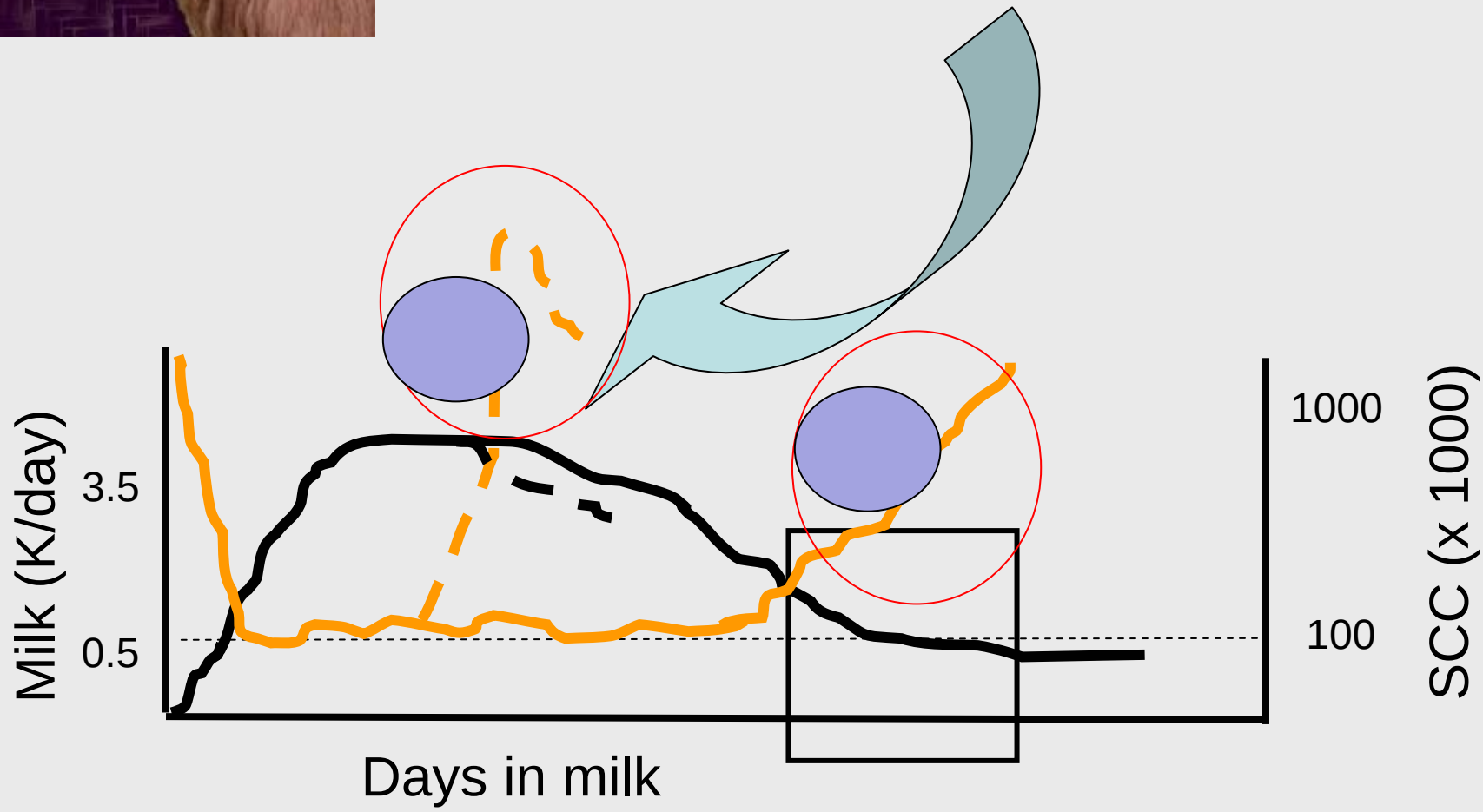
* Many of the animals with subclinical chronic infection are not noted because there are no recognizable symptoms and the milk appearance is normal

* End of lactation goats show increased SCC regardless of IMI

** Routine milk testing such as CMT on the animal side or more advanced techniques like the sophisticated cell counters allow the identification of subclinically infected animals close to the occurrence of the infection. However, it is laborious and/or require special equipment to perform

*** On-line computerized milking systems are designed in part to overcome these conditions and to apply genuine real-time data acquisition on individual animals, including milk yield and conductivity

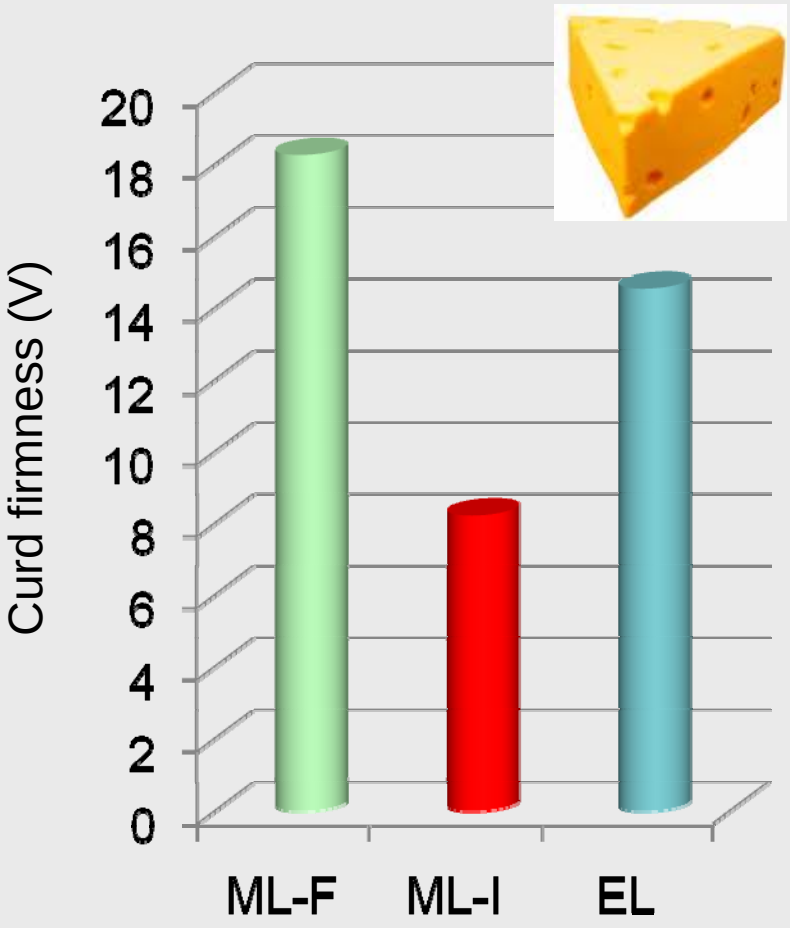
Milk yield and SCC along the lactation

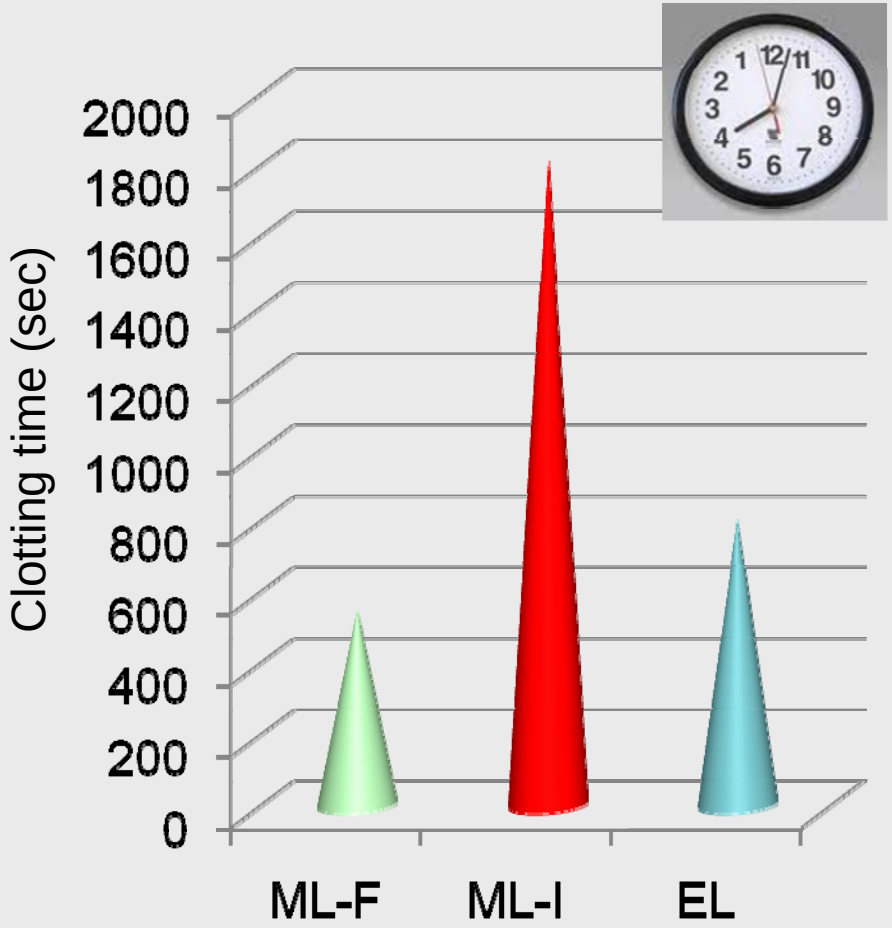


Mean and SE of sheep milk and constituents according to time in the lactation and IMI

	ML-F	ML-I	EL	R^2	*P*[F]
# (Quarters)	41	56	39		
DIM	99±9.2	119±8.5	204±4.9	0.452	*P*<0.001
Milk (L d $^{-1}$)	2.28±0.16	1.57±0.18	0.99±0.18	0.333	*P*<0.001
SCC (x 10^3)	129±48	7211±1197	403±94	0.299	*P*<0.001
Fat (g L $^{-1}$)	72.7±0.32	68.7±0.32	76.1±0.34	0.062	*P*<0.05
Protein (g L $^{-1}$)	47.7±0.17	50.1±0.17	51.8±0.18	0.059	NS
Casein (g L $^{-1}$)	35.8±0.11	34.1±0.11	36.3±0.16	0.051	NS
% Casein	76.4±1.43	67.9±1.44	74.6±0.51	0.294	*P*<0.001
Lactose (g L $^{-1}$)	47.9±0.12	40.5±0.11	43.8±0.13	0.205	*P*<0.001

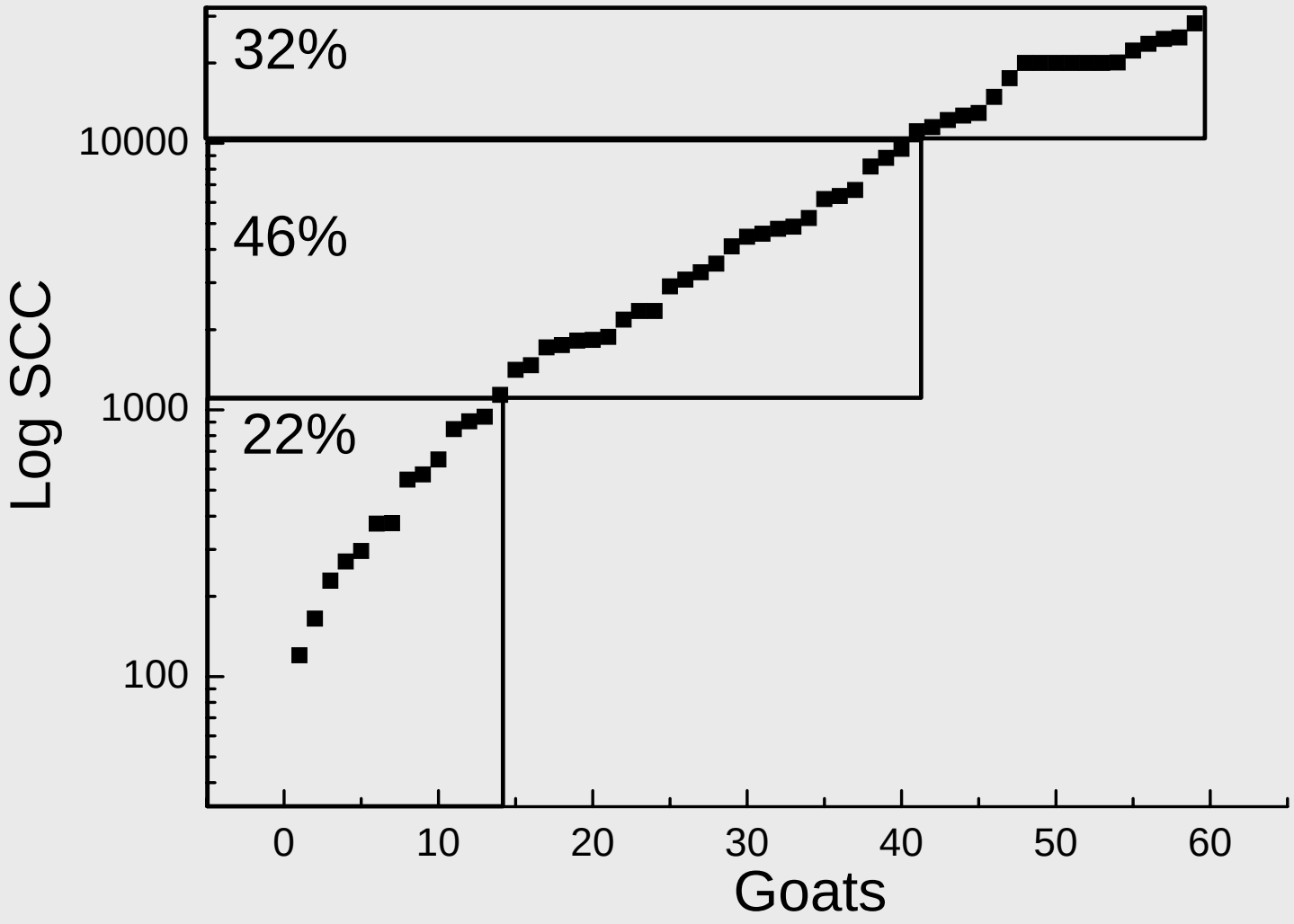
Mean and SE of sheep milk and constituents according to time in the lactation and IMI



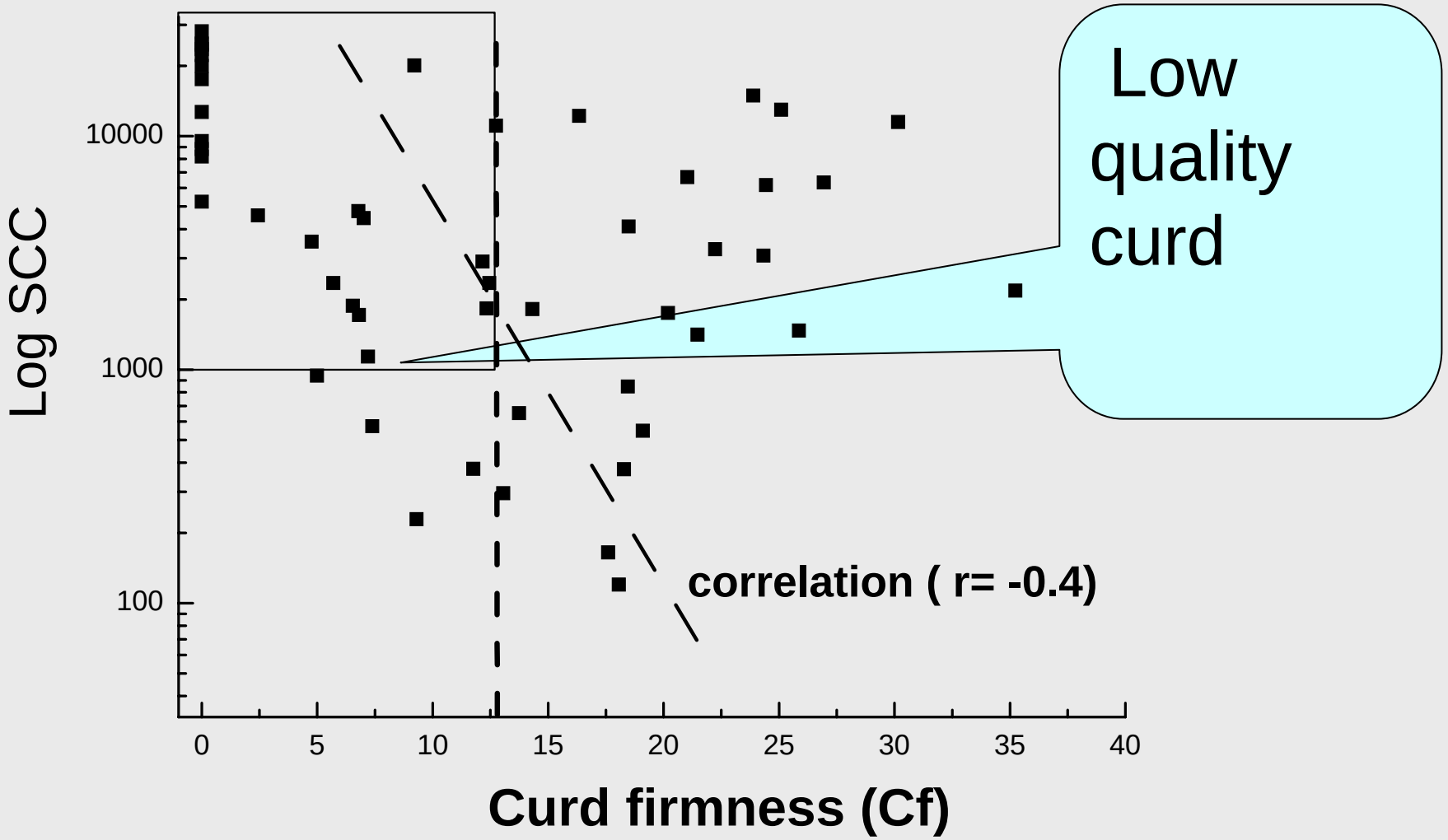


ML-F = mid lactation free; ML-I = mid lactation infected; EL = end lactation

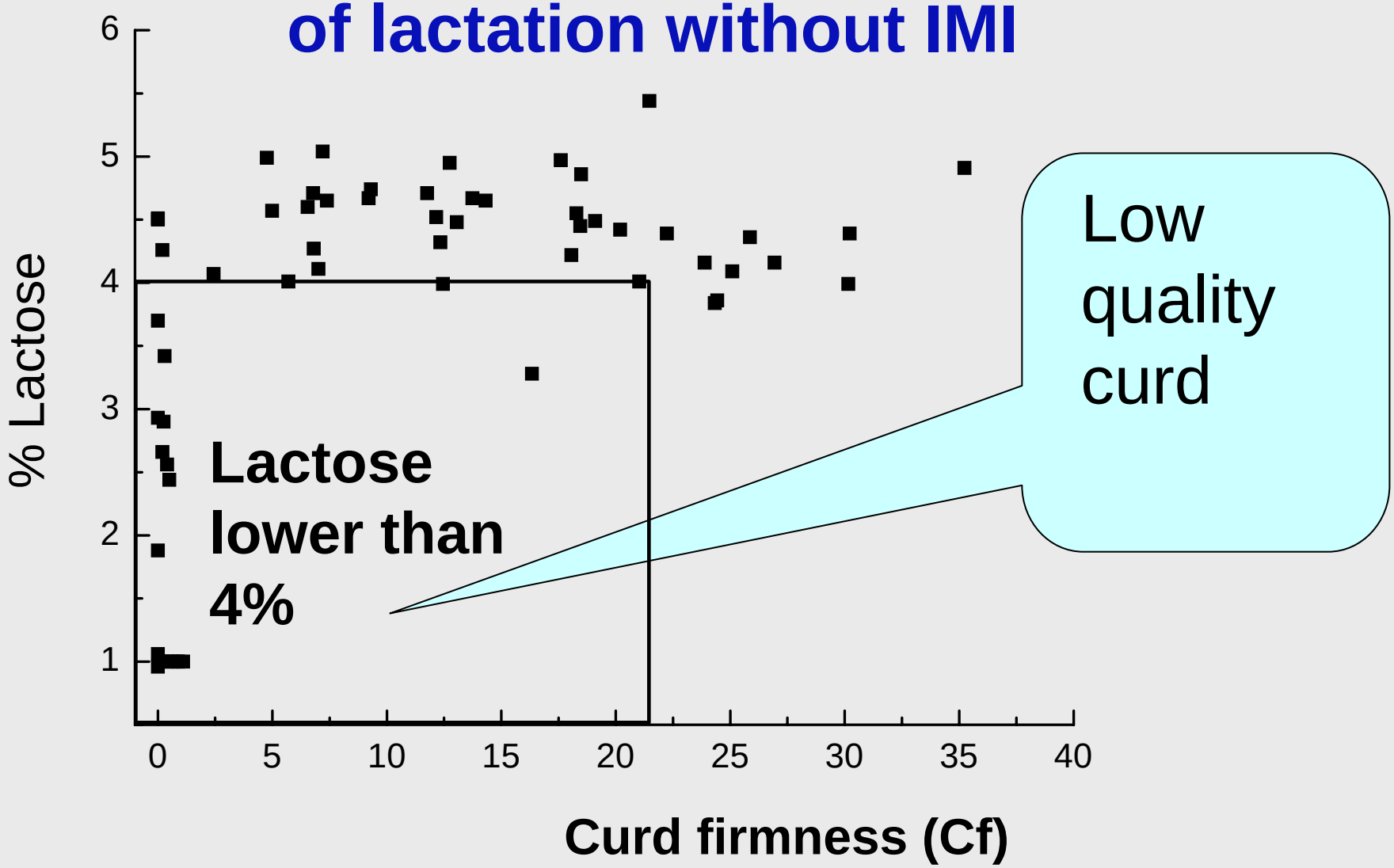
Log SCC of goat at mid-lactation with and without IMI and at the end of lactation without IMI



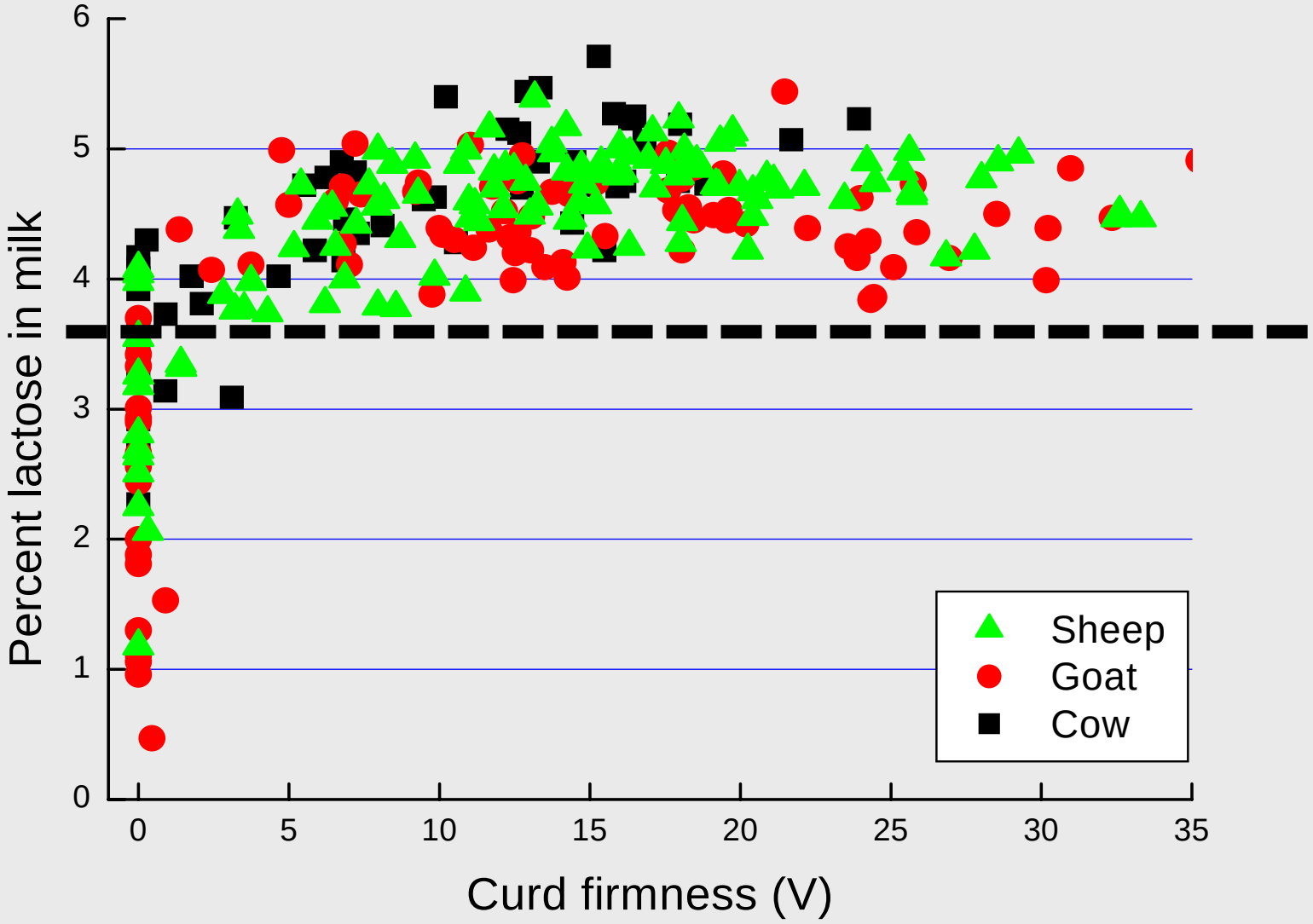
Log SCC and Cf of curd of goat milk at mid lactation with and without IMI and at the end of lactation without IMI



% lactose and Cf of curd of goat milk at mid lactation with and without IMI and at the end of lactation without IMI



Influence of percent lactose in milk on curd firmness as measured by the Optigraph



* It was found that to date, lactose content is the best indicator for milk quality for cheese making.

* It is already implemented in Afilab in dairy cows milking parlors

It will enable on-line sensing of cow producing milk unfit for cheese making

* Feasibility test of the system for small ruminants was conducted

The system will enable direct and cheap daily identification of animals with milk unsuitable for cheese making

On-line computerized milking systems enables genuine real-time data acquisition on individual animals with milk unsuitable for cheese making

Thanks