

瑞士與台灣乳業科技論壇

Dairy Technology Application - Switzerland and Taiwan
2017年9月12日
行政院農業委員會畜產試驗所技術服務館



Potential of Swiss Dairy and Beef Farmers

瑞士乳牛戶與肉牛戶之經營趨勢



KeLeKi

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Content

- 1) Some general information about Switzerland
- 2) Milk production
- 3) Beef production
- 4) Cattle breeding in Switzerland
 - Breeds
 - Organizations, especially Swissgenetics
 - New developments
- 5) Summary

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1) Switzerland

Located in the center of Europe



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Switzerland - Taiwan

Surface km ²	41'285	36'197
Population	8.4 mio.	23.6 mio.
Jobs on farms	154'000	
Farms	53'100 FT: 38'800	1'988
Dairy farms	21'875	549
Cattle	1.56 mio.	146'000
Dairy cows	550'000	110'754
Milk consumption per capita (kg milk equiv.)	369	
Beef & veal consumption per capita (kg)	14.0	

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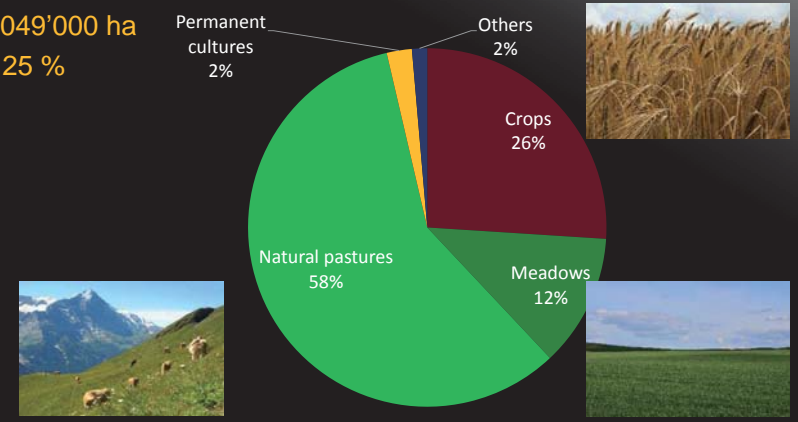
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Switzerland



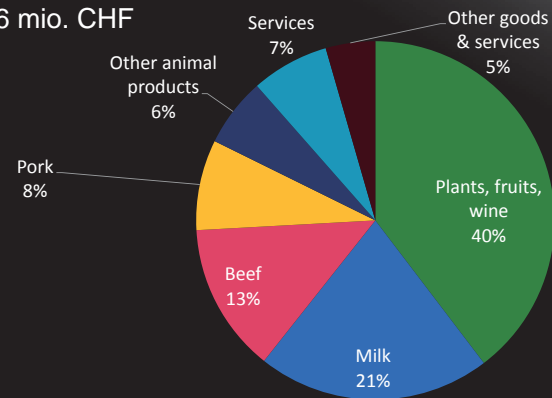
Agricultural land

1'049'000 ha
= 25 %



Value of the agricultural products

10'086 mio. CHF



Agricultural products import – export 2015

- Import 11'500 mio. CHF 71.7 % from EU
- Export 8'500 mio. CHF 57.3 % to EU

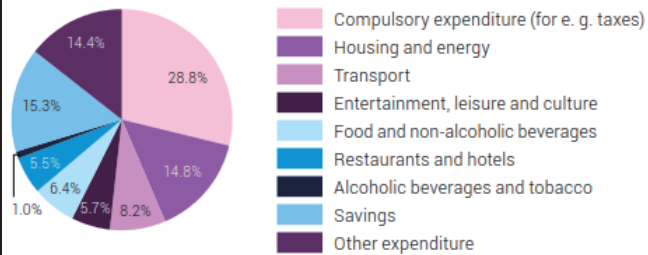
Level of self-sufficiency 2014:

- Animal products 100 %
 - Milk & milk products 115 %
 - Veal 98 %
 - Beef 86 %
- Plant products 46 %
- Net (considering feed imports) 50 %

Households spend little on food

Household expenditure, 2014

Proportion of gross household income

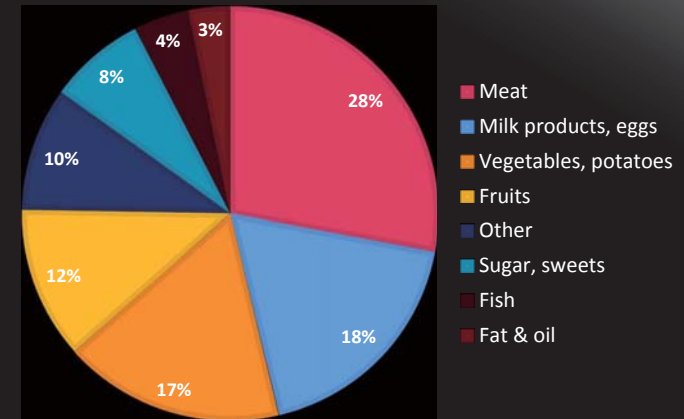


Average number of persons per household: 2.2

Source: FSO – Household Budget Survey

© FSO 2017

Consumer expenditure for food



Cattle production in Switzerland: What is important to know?

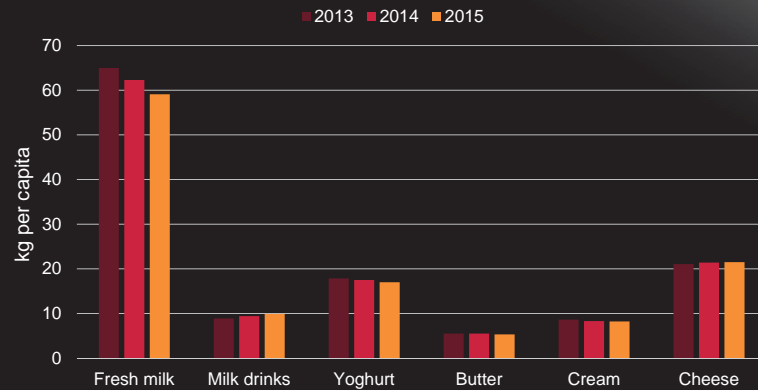
- ✓ Sustainable land use: 2/3 are pastures, which cannot be used for crops
- ✓ Species-appropriate feed: mainly roughage, few concentrates
- ✓ No hormones, no antibiotics for performance and growth promotion
- ✓ Feedstuff mostly produced locally. Imported are mostly soy beans out of certified production, GMO free
- ✓ Toughest law for animal protection
- ✓ Additional voluntary programs to promote animal welfare
- ✓ Complete meat traceability

2) Milk production in Switzerland



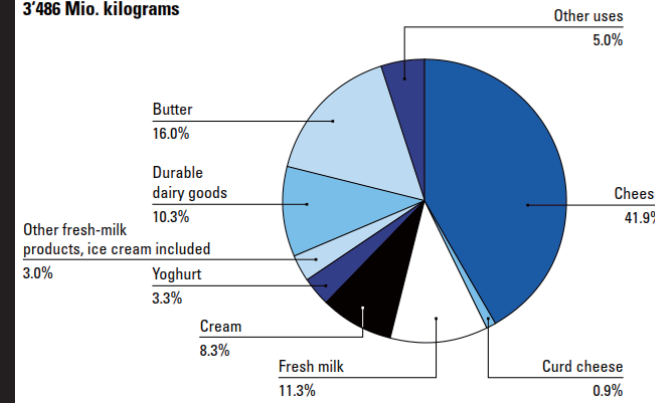
Consumption of milk and milk products

Per capita totally 369 kg milk equivalents per year



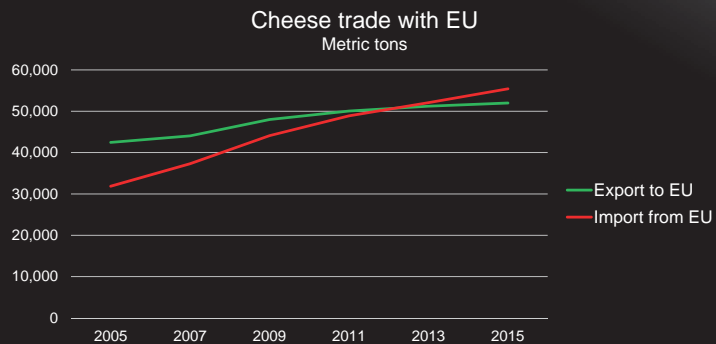
Milk processing

Total milk processing 2015:
3'486 Mio. kilograms

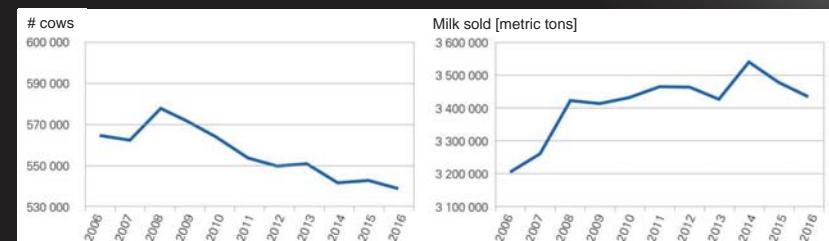


Milk market

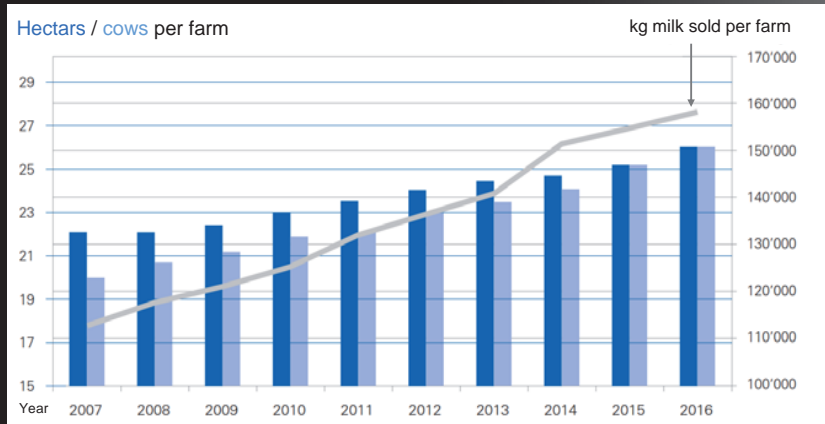
- Till spring 2009 milk quota system
- No import restrictions for cheese anymore since 2007



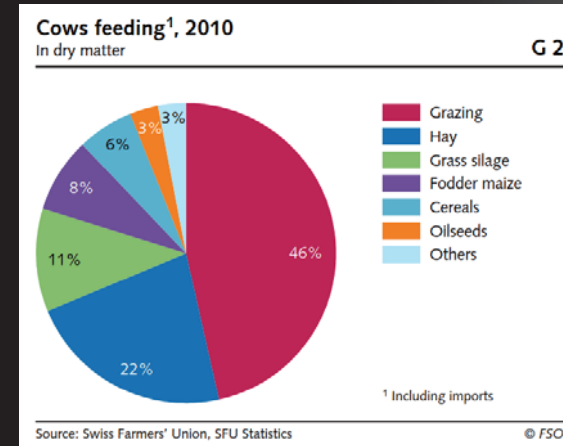
Less cows, more milk



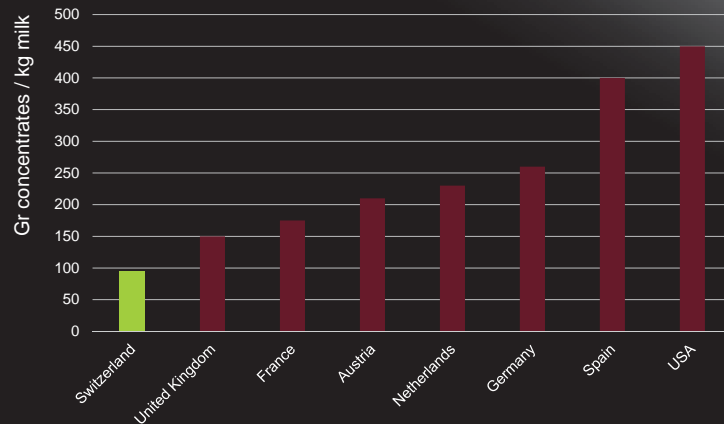
Increasing herd size



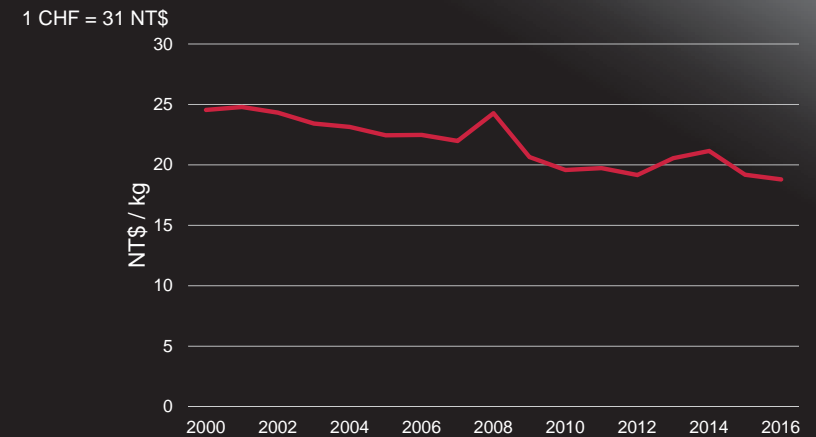
Cow feeding: mostly roughage



Use of concentrates in milk production

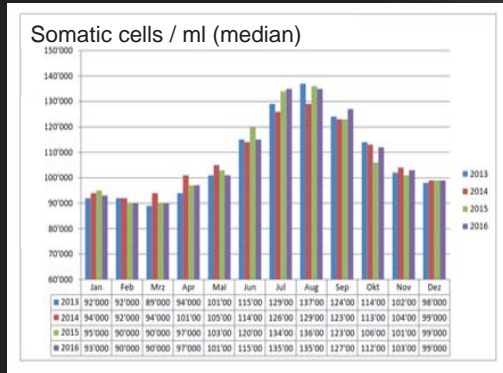


Producer's milk price is dropping



High milk quality

E.g. low somatic cell count



Dairy Extension

Extension > Agriculture > Dairy Extension > Milk quality and mastitis > How do the Swiss produce the world's best quality milk?

How do the Swiss produce the world's best quality milk?

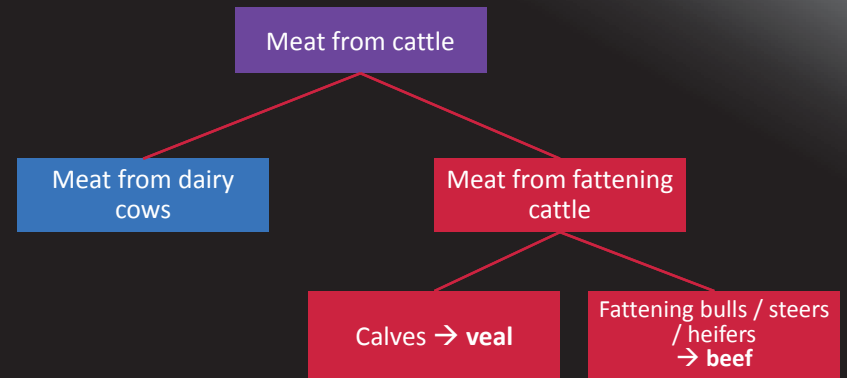
Jeff Reneau

Switzerland is known for high quality. When we think of Swiss chocolate, watches, the Swiss Army knife or other items, we always think of quality. The people of Switzerland do seem to have a quality mind set in

3) Meat production



Meat production



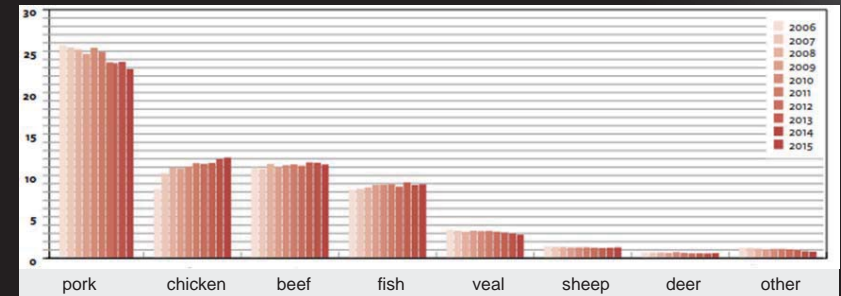
Beef production

Two systems

- a) Calves out of dairy and dual purpose cows sold to fatteners
 - Fattening mainly with milk and milk replacer to an age of 60 – 240 days, slaughter weight 80 – 235 kg → **veal**
 - Fattening mainly with corn silage to an age of 241 – 830 days, slaughter weight 155 – 500 kg → **beef**
- b) Suckling herds with beef breeds (mainly Angus, Limousin and Simmental)
 - Fattening mainly with grass (pasture)
 - premium products

Meat consumption

Per capita totally 51 kg per year (+ fish 9 kg)



4) Cattle breeding in Switzerland



Cattle breeding in Switzerland

- Origin of two world breeds
 - Braunvieh / Brown Swiss
 - Simmental
- Cattle breeding has a very long tradition
- Several breeds, well adapted to the local conditions
- Enthusiastic breeders → 80 % are members of cattle breeding associations
- Open market for genetics

Brown Swiss



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Brown Swiss

- ✓ Ideal cow for cheese production
- ✓ Functional conformation, healthy udders
- ✓ High longevity and heat resistance



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Original Braunvieh



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Original Braunvieh - dual purpose

- ✓ Dual purpose: both milk and beef
- ✓ Robust cows with high longevity and heat resistance
- ✓ Swiss origin



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Simmental



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Simmental – dual purpose

- ✓ Swiss origin
- ✓ Top dual-purpose breed: milk and beef
- ✓ Robust cows with excellent fitness traits



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Swiss Fleckvieh



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Swiss Fleckvieh – milk focused dual purpose



- ✓ Ideal for pasture and organic farming
- ✓ Great udders and exceptional longevity
- ✓ Excellent functional traits (top fertility, low somatic cell count \varnothing 77'000)

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Red Holstein



@gorgiosoldi.it

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Red Holstein

- ✓ Excellent milk production
- ✓ Higher protein content than Holstein
- ✓ Top for type traits, especially udder, feet & legs



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Characteristics of the different breeds

	Dual-purpose breeds					Dairy breeds		
	Simmental	Swiss Fleckvieh	Original Braunvieh	Eringer	Graubieh	Brown Swiss	Red Holstein	Holstein
Fertility	+++	+++	+++	+	+	+	+	+
Cheese / Protein	+++	++	+++	++	+	+++	+	+
Milk production	+	++	+	+	+	++	+++	+++
Udder health	+++	+++	+++	+	++	+	+	+
Meat production	+++	++	+++	+++	+++	/	/	/
Lifetime	+++	+++	+++	+++	+++	+++	+	+
Heat resistancy	++	++	+++	++	+++	+++	+	+
Conformation	+++	+++	+++	*	*	+++	+++	+++
Robustness	+++	+++	+++	+++	++	++	+	+
Pasture	+++	+++	+++	+++	+++	++	+	+

+++ = Excellent, ++ = Very Good, + = Good, / = Not relevant, * = No data

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Milk yield

Cows registered in herdbooks

Breeds	2013/14 Standard lactation Number	2014/15 Number	2013/14 kg	2014/15 kg	Change 2014/15	
					absolute	in percent
Brown cattle	128'346	124'991	6'917	7'059	142	2.1%
Red Holstein	80'532	77'281	7'783	7'960	177	2.3%
Holstein*	51'072	51'410	8'526	8'675	149	1.7%
Fleckvieh cattle	45'129	46'514	6'766	6'980	214	3.2%
Simmental	15'214	15'058	5'796	5'866	70	1.2%
Montbéliarde	5'879	6'186	7'269	7'420	151	2.1%
Jersey	2'795	2'970	5'466	5'641	175	3.2%
Herens	2'076	2'007	3'352	3'354	2	0.1%

Source: Milk statistics

* Calendar year

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Responsibilities in Swiss cattle breeding

Breeding associations	AI organizations
• Herdbook	• Bull selection
• Data recording	• Semen production
• Genetic evaluation	• Sales and marketing

Characteristics of the Swiss breeding industry

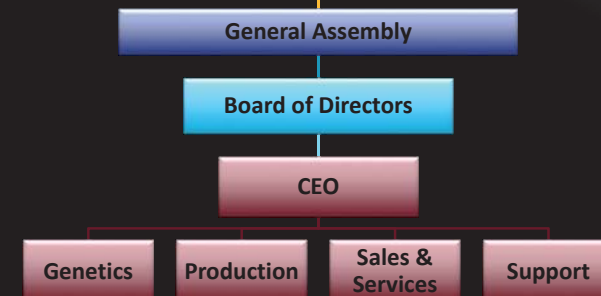
- Cattle farming has a strong tradition – 80% are herdbook breeders
- Small herds with high standard of animal health and welfare
- Main feed is grass or hay → feed no food
- Robust, tolerant cattle → easy to care
- Strong in type – long lasting cows
- Dairy industry suffers from low milk prices
- High quality and strong services are the key for success...

swissgenetics 

Swissgenetics – A breeders cooperative

founded 1960

30'000 Cattle Breeders – Breeders Associations



Key figures 2016/17

Customers	25'800
Employees (total / FTE)	369 / 278
Bulls housed	511
Young sires tested	118
No. of inseminations (1 st / total)	459'000 / 773'000
Domestic sales (units)	866'000
International sales (units)	559'000

Swissgenetics Breeding Programs

Brown Swiss



Red Holstein



Holstein



Original BV



Simmental



Swiss Fleckvieh



Beef

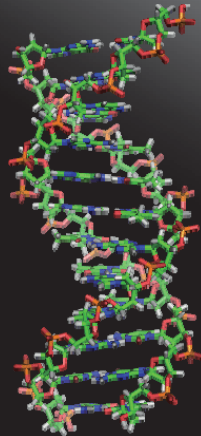


We are using latest technologies

- Genomic selection since 2009



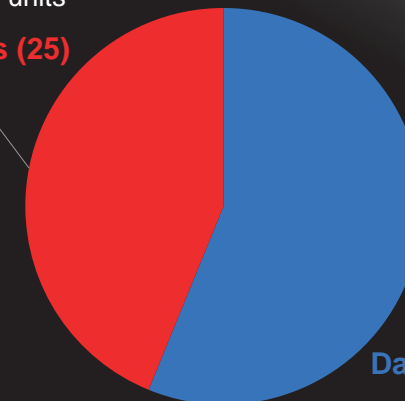
- Reproduction technologies
 - Embryo Transfer (ET)
 - Semen sexing
 - SpermVital®



Semen sold in Switzerland

Totally 866'000 units

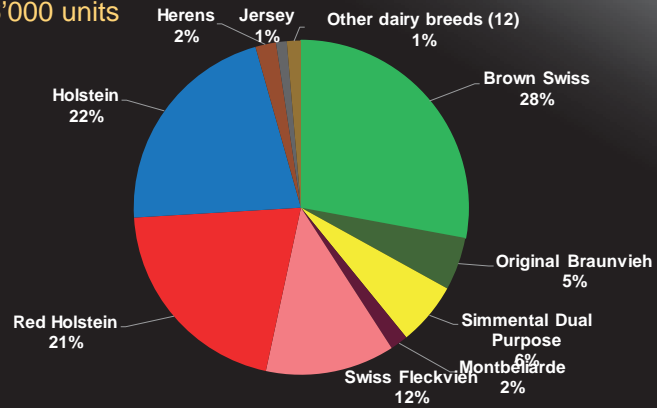
Beef breeds (25)
44%



Dairy breeds (21)
56%

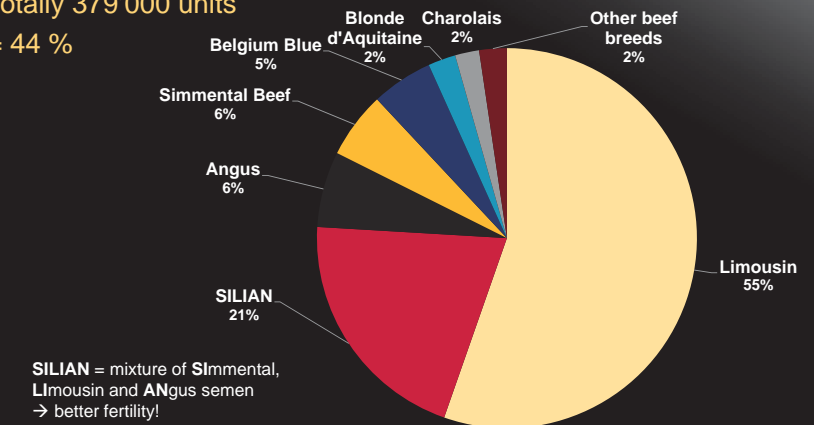
Dairy semen sold in Switzerland

Totally 486'000 units
= 56 %



Beef semen sold in Switzerland

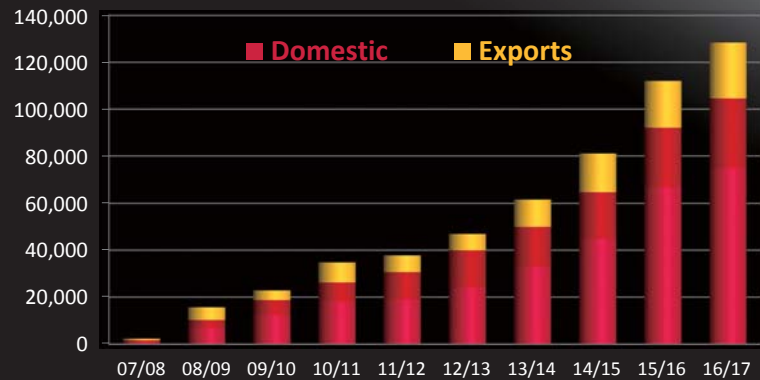
Totally 379'000 units
= 44 %



SILIAN = mixture of Simmental, Limousin and ANGUS semen
→ better fertility!

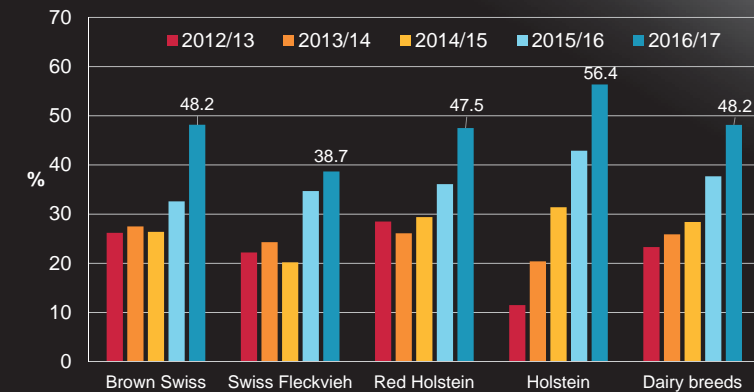
Sales of sexed semen

selexyon 



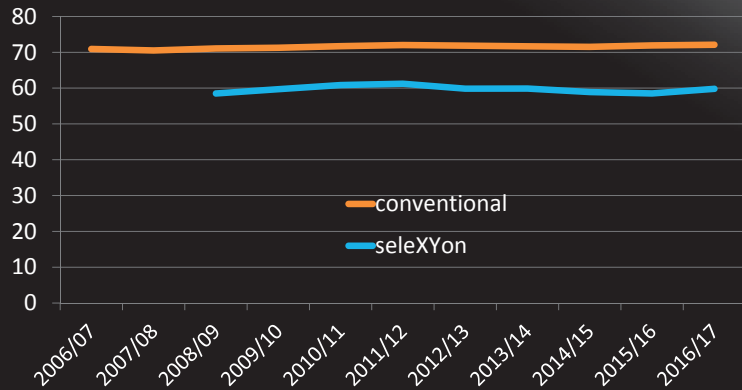
Domestic sales of genomically tested young bulls

optimis 

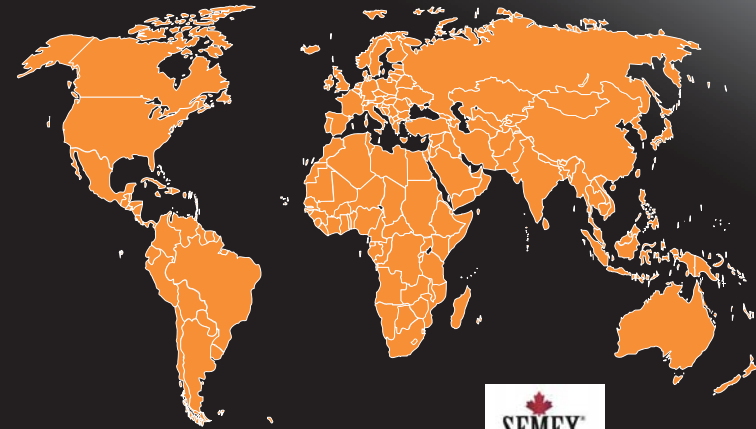


High bull fertility

Non Return Rate 56 days %



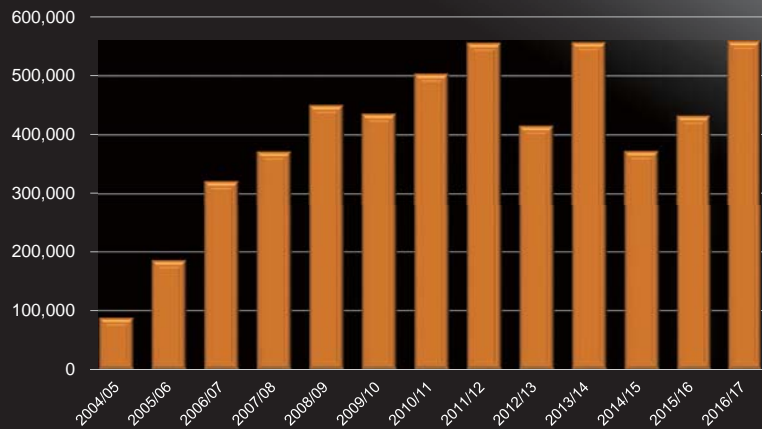
Exports to more than 50 countries



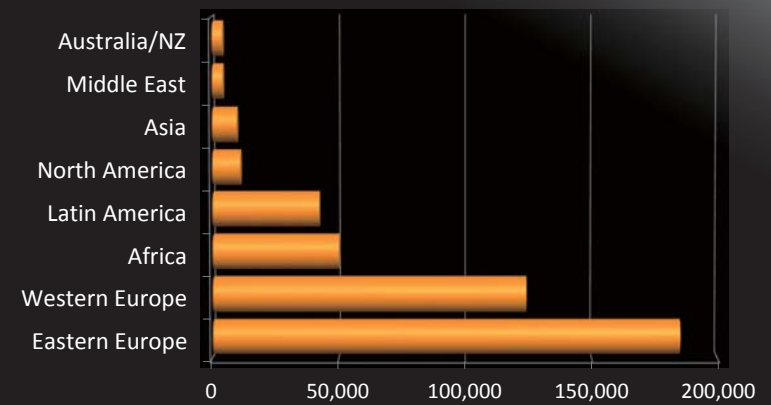
Distribution mostly through SEMEX partners



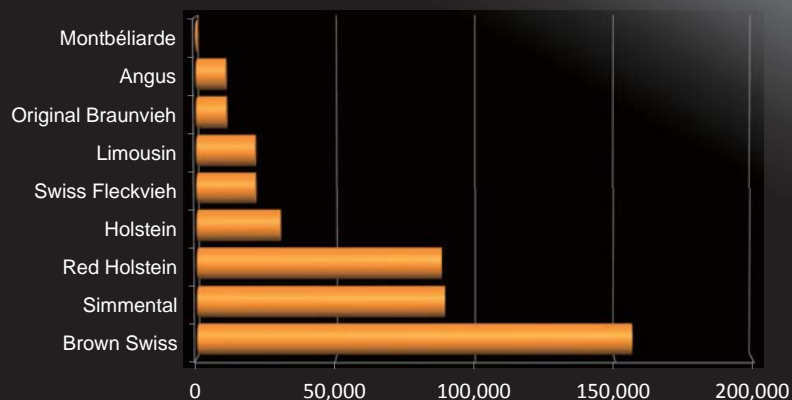
International sales (units)




International sales per region 2015/16




International sales per breed 2016/17



Our values



- Registered in the Swiss Herd Book
- Officially valued and recognized
- The quality of Swissgenetics semen is certified
- Designated non-return rate of field use
- Proven in Switzerland



- Breed of pure origin
- Born in Switzerland
- The quality of Swissgenetics semen is certified
- Evaluated in the Swiss testing scheme
- Products geared to different production systems

5) Summary

- Swiss agriculture is multi-functional and well adapted to its environment. High standards are set on animal health and welfare
- Sustainable production is essential
- Main feed for cattle is grass or hay → feed no food
- Swiss cattle is not only selected for high performance, but also for cost-effectiveness, robustness and high tolerance; genetic diversity is needed to suit different environments
- High quality of the products and strong services are the key for success!

Switzerland. Naturally.

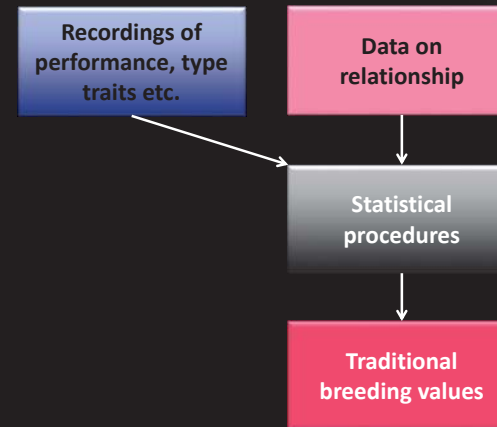
Thank you for your attention!



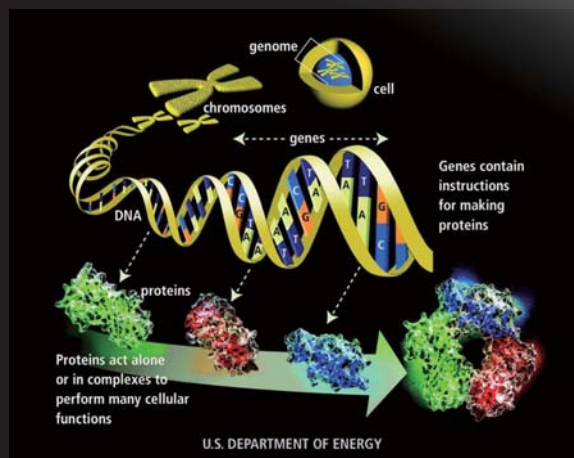
Goal of genetic evaluation

Recognize the genetic potential of an animal (= breeding value) **as early as possible** with a **reliability as high as possible**

Genetic evaluation before Genomic Selection



The fundamentals of Genomic Selection



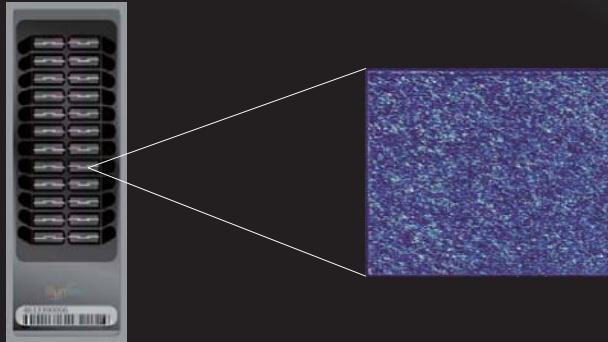
The fundamentals of Genomic Selection

- **Many** (several thousands) **markers** are analyzed
- Markers are here differences in one single base pair = **Single Nucleotide Polymorphism (SNP)**



The fundamentals of Genomic Selection

SNPs can be analyzed in labs rather cheaply

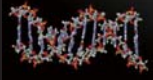



Sample

- Blood
- Semen
- Hair bulbs
- (Nasal swabs)



Genomic evaluation

- Marker information 
- + estimation equations 
- **Direct Genomic Value (DGV)**

- Pedigree Index
- own performance (if available)
- performance of progeny (if available)

Genomically enhanced Estimated Breeding Value (GEBV)

Or simplified: three breeding values

traditional breeding value

Direct Genomic Value (DGV)

Genomically enhanced Estimated Breeding Value (GEBV)

Summary

- Genomic Selection leads more reliable breeding values, especially for young animals, which translates to increased genetic progress
- Genomic Selection works for all traits, not only milk yield
- Swissgenetics applies Genomic Selection systematically in its genetic programs
- Swissgenetics follows an objective information policy, also in selling semen from young bulls
- There is still plenty of potential in Genomic Selection



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