LATTeco Progetto presentato nell'ambito della Sottomisura 10.2 PSRN-Biodiversità 2014-2020 ANAFIJ

"Fondo europeo agricolo per lo sviluppo rurale: l'Europa investe nelle zone rurali" - Autorità di gestione: MIPAAF Ministero delle Politiche Agricole Alimentari e Forestali

The Use Of Economic Indexes And Genotyping In Practise On The Example of Italian Farms

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Italian Holstein and Jersey National Breeders Association (ANAFIJ)

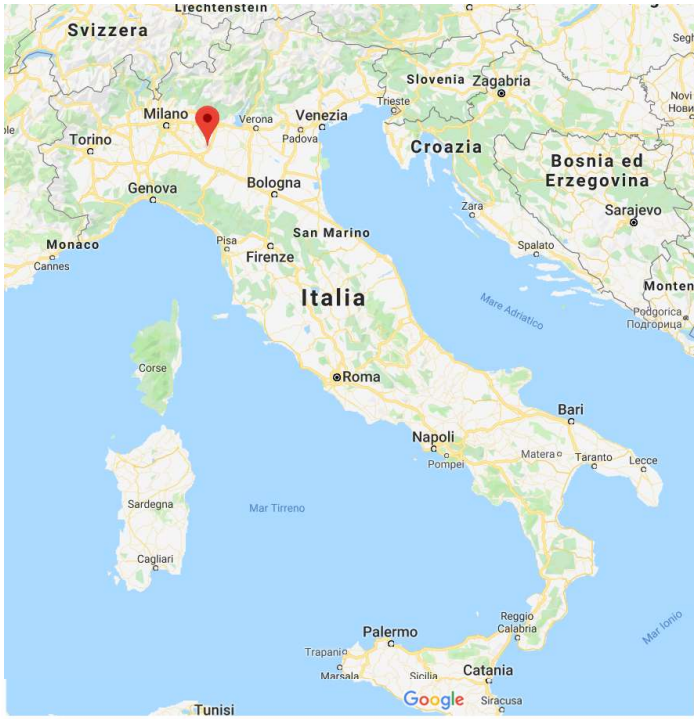
II Forum Genetyczne: Indeks Ekonomiczny stworzony przez hodowców – dla hodowców

Piątnica (Poland), November 16th, 2019

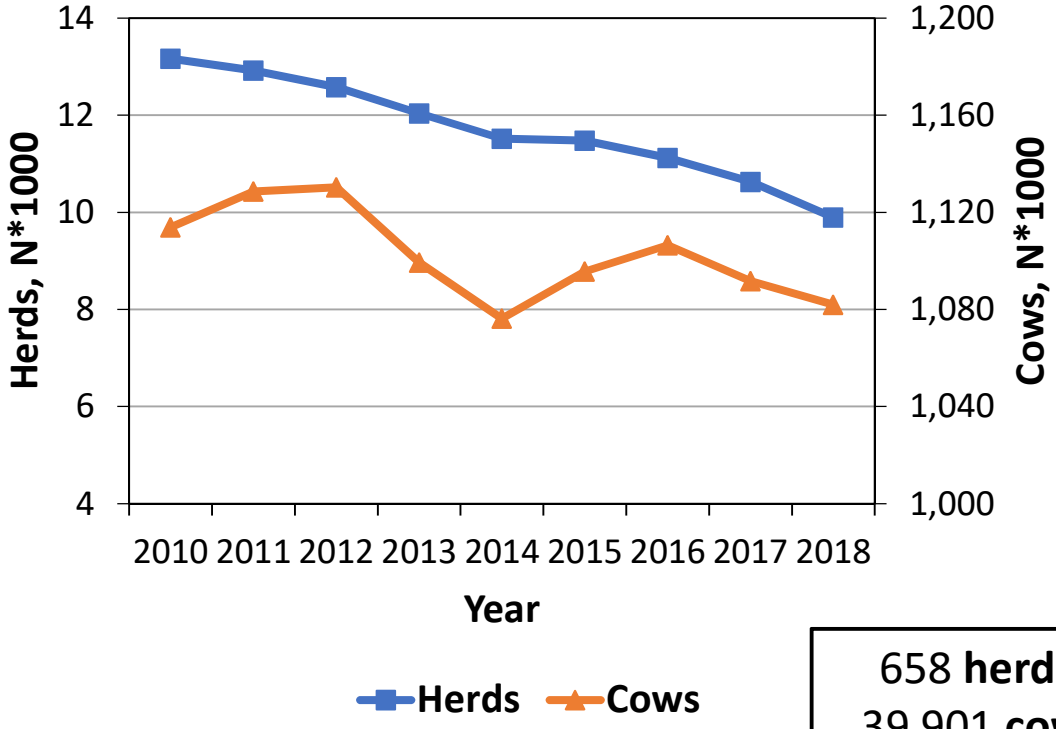
ANAFIJ (ex ANAFI)

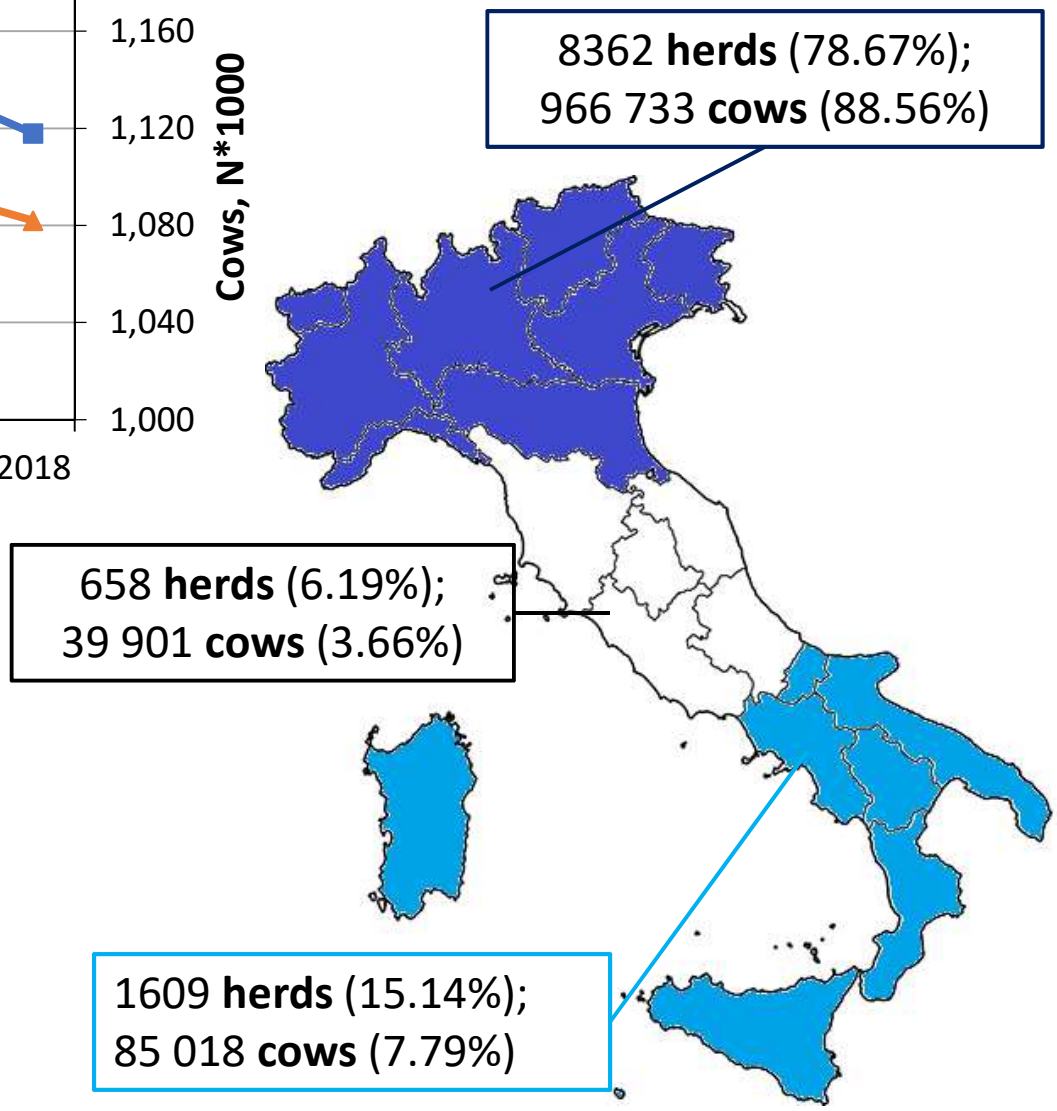
- **Selection**, **promotion**, and **valorization** of Italian Holstein and Jersey

- Herbook, genetic evaluation, linear type scoring, dairy show, bull quarantine, services for farmers and AI centers and importers



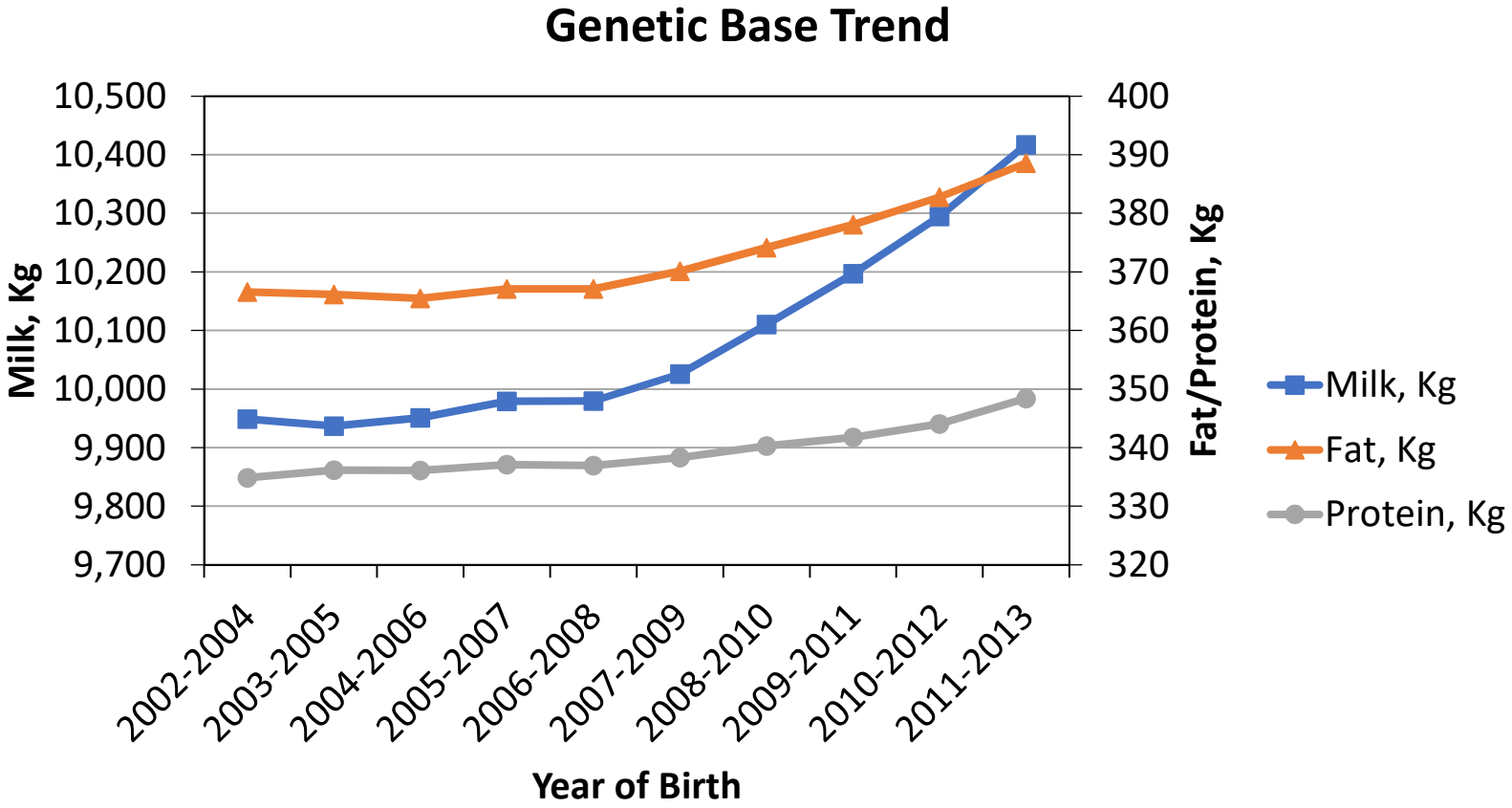
Holstein In Italy … In Numbers!





Holstein In Italy … In Pictures!

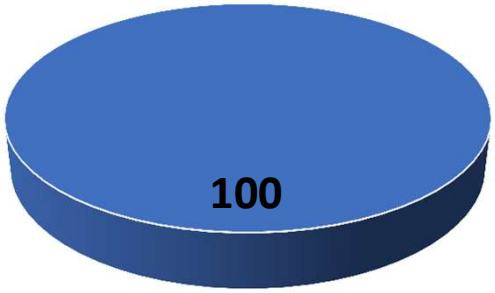
Holstein In Italy … Who Is She?



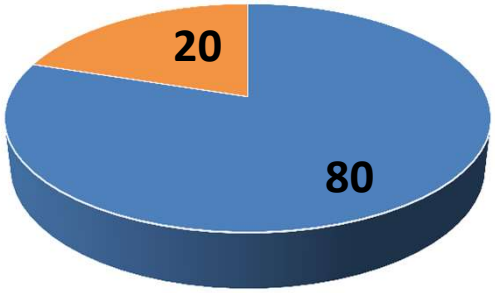
- +5% Milk Yield, +6% Fat Yield, +4% Protein Yield in 10 years
- 2.7 Lactations, 420 d Calving Interval, 3.73% Fat, 3.35% Protein

Evolution Of Italian Breeding Objective

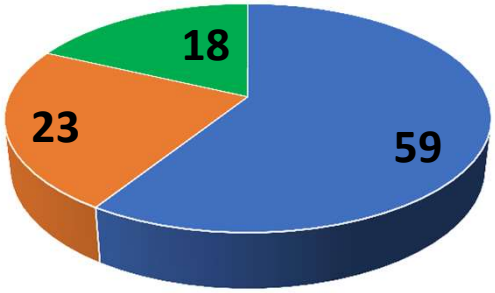
1983 Milk Quality Index (ILQ)



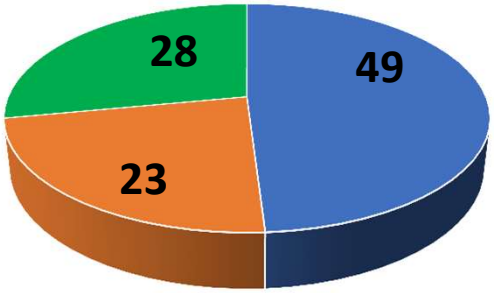
1993 ILQ + Morphology (ILQM)



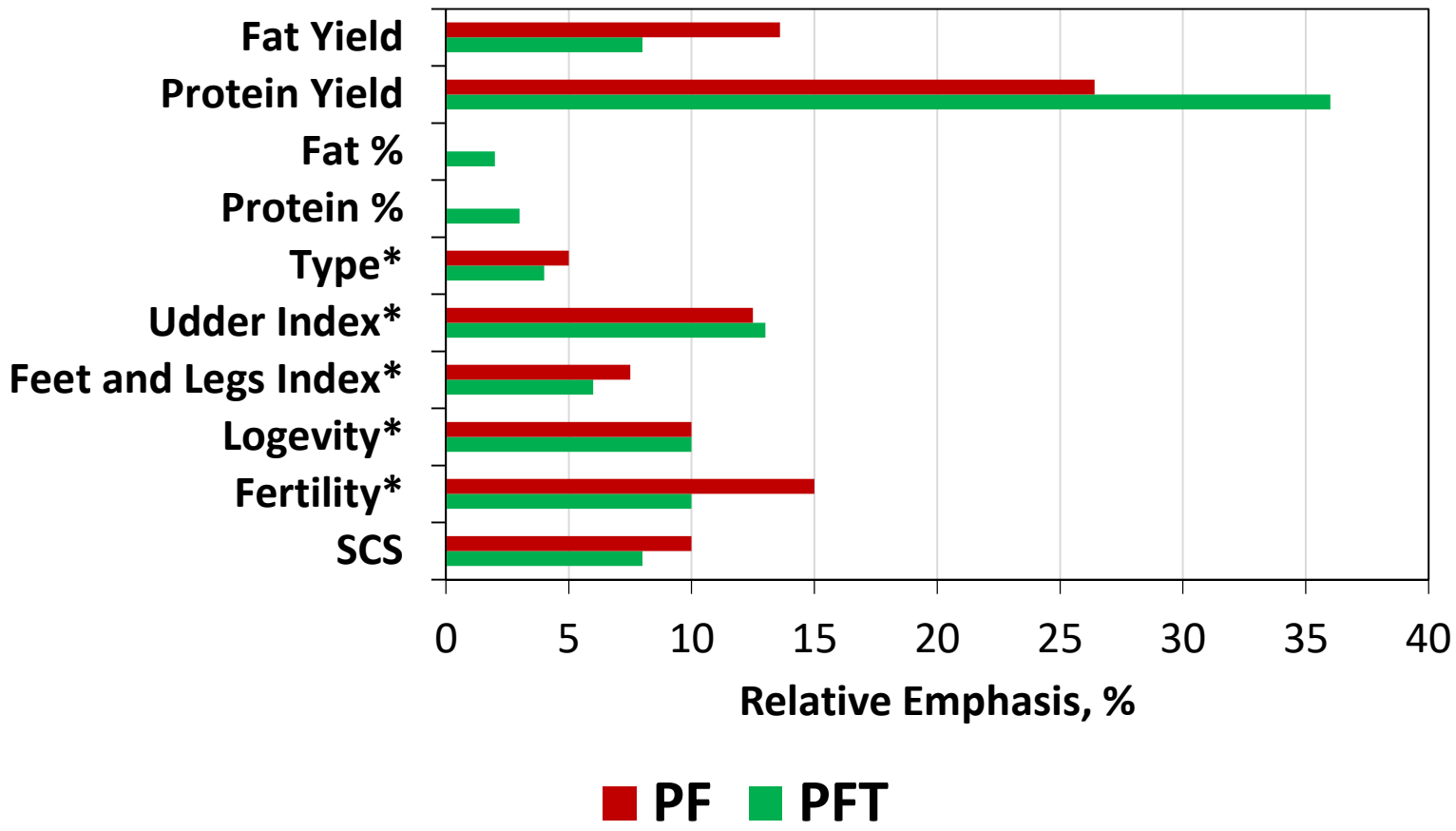
2002 Prod. Functionality Type (PFT)



2009 Prod. Functionality Type (PFT)



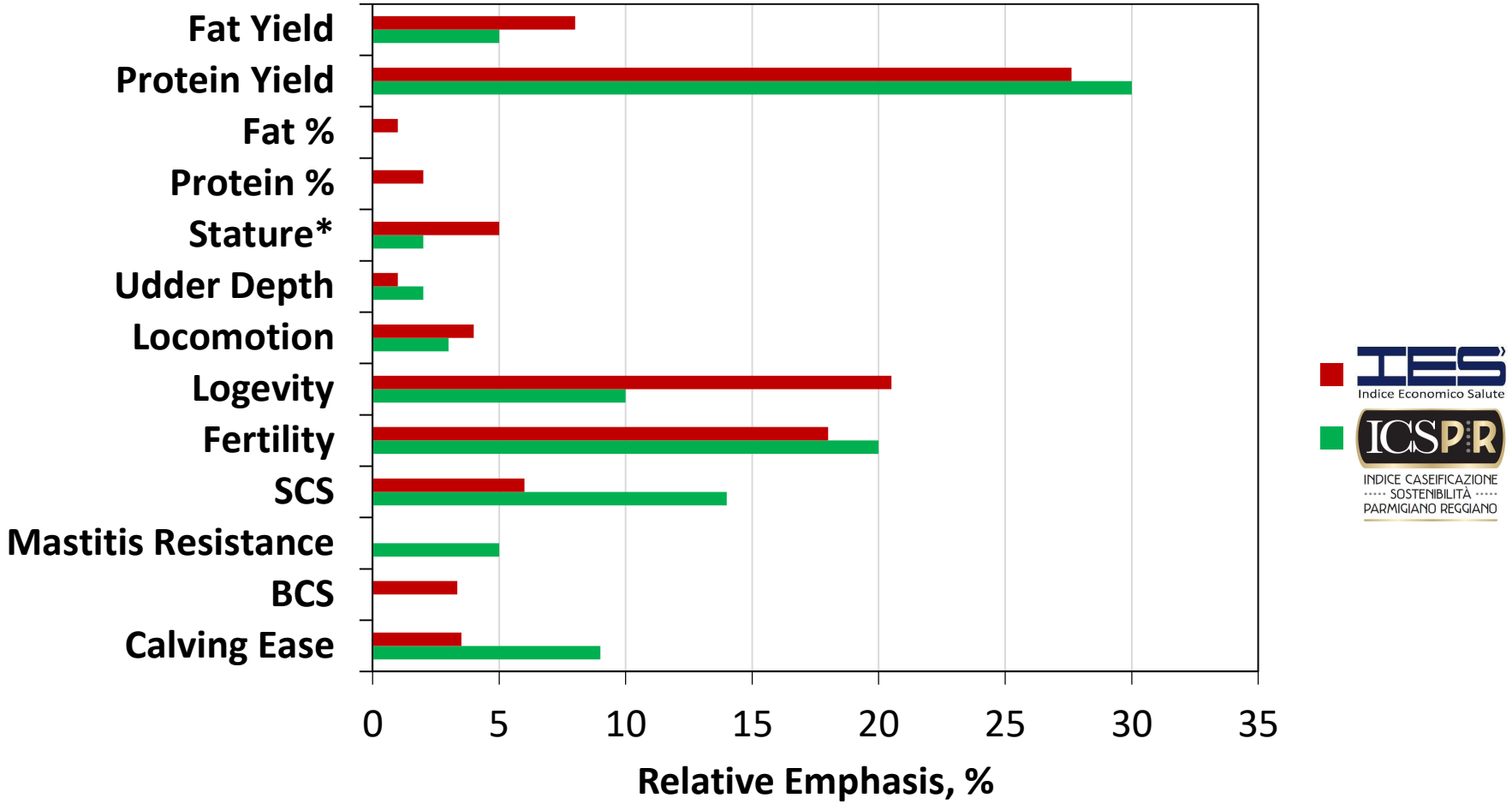
PF vs PFT



*Different traits included for calculation of aggregate indexes; Polish 'Type' combination of both Body Frame and Dairy Strength

IES vs ICSPIR

Indice Economico Salute



* Negative weight

Why Two Economic Indexes?

- Italian dairy farmers: many and operating in **various market systems**
- Economic value of genetic indexes differs based on milk final destination (i.e., fluid vs cheesemaking)
- IES and ICS-PR give farmers a more realistic idea of the capacity of a 'breeding decision' to contribute to **farmers profit**
- Breeding goal is the same: ▲**Revenues** ▼**Costs**

Genomic Testing

EFFORTS FOR FARMERS

- ✓ **Collection** of biological sample (hair/saliva)
- ✓ **Little cost** (30-40 €, paid back with ≈ 3 days in milk) once

ADVANTAGES FOR FARMERS

- ✓ **Highly reliable** genetic merit **early** in life
- ✓ Opportunity to choose the **best cows as dams** for next generation
- ✓ Preciser **mating plans**
- ✓ **Parentage** verification
- ✓ Test presence of advantageous/deleterious **genetic factors**/**haplotypes**

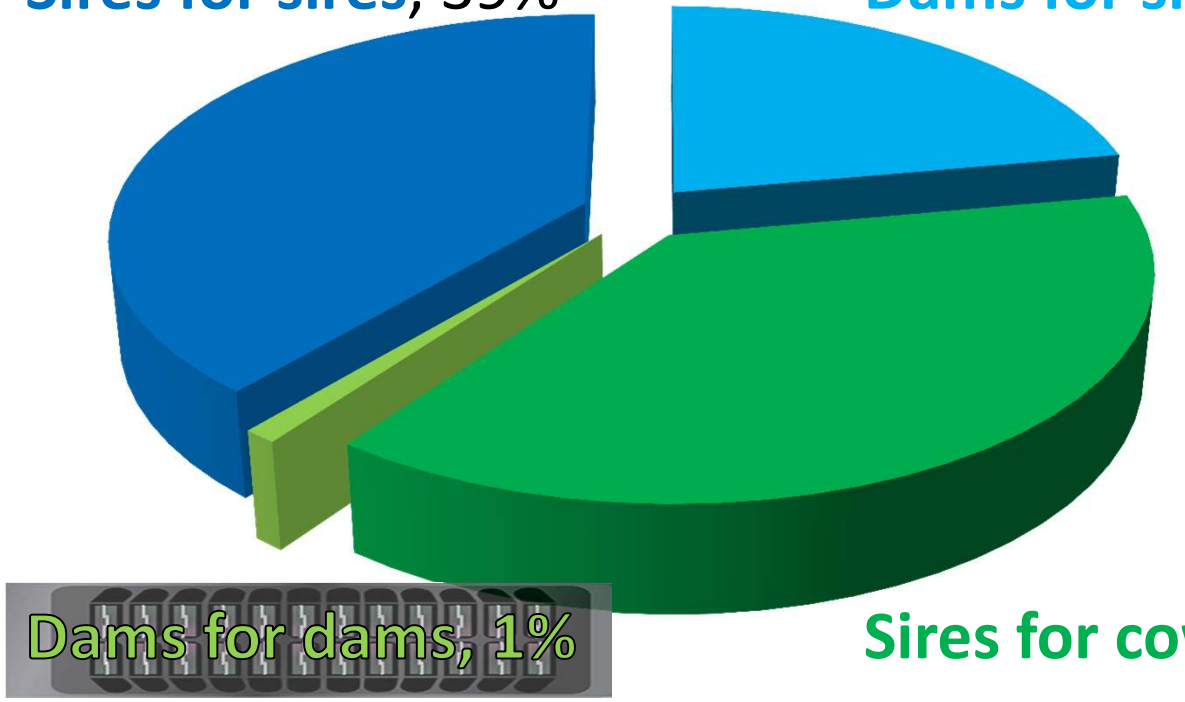
A Bit Of Refresh

- (Annual) **Genetic gain** is a measurement of the **effectiveness** of a breeding program to **improve** animals genetic merit

$$\Delta G_{annual} = \frac{i * r * \sigma_a}{L}$$

AI Center

Farmer

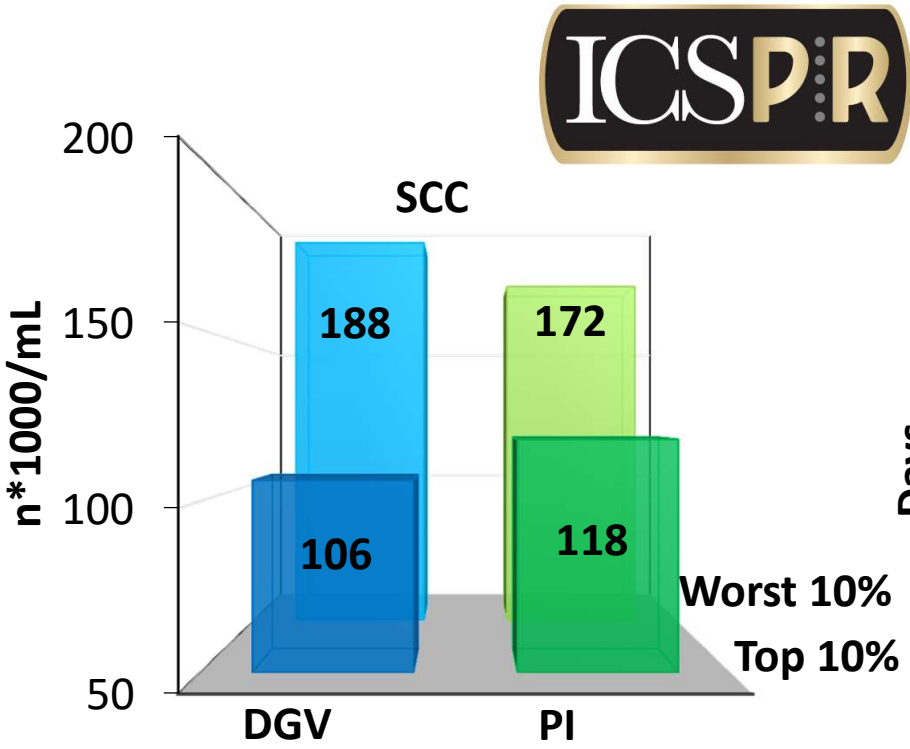


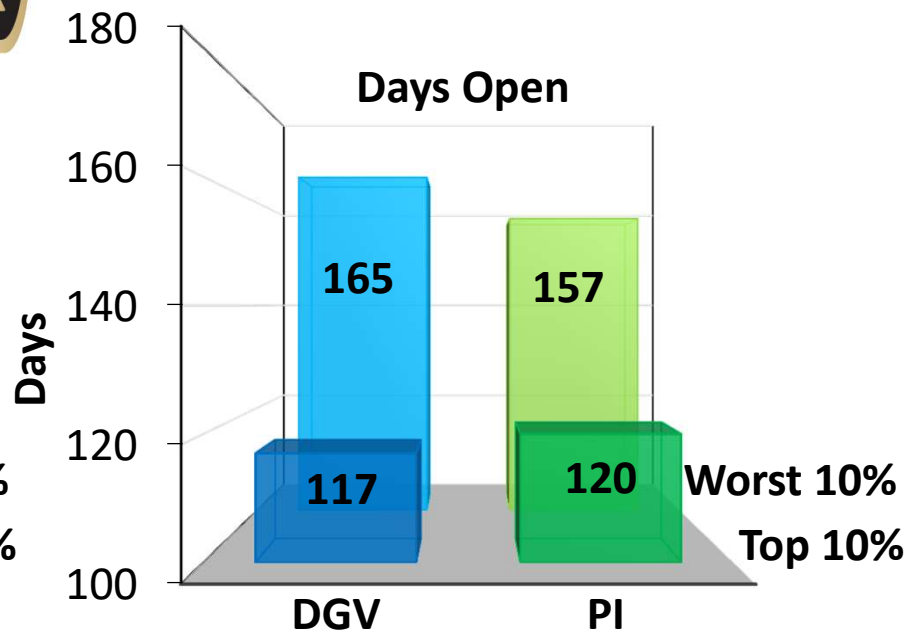
'Preciser' Ranking … Is This True?

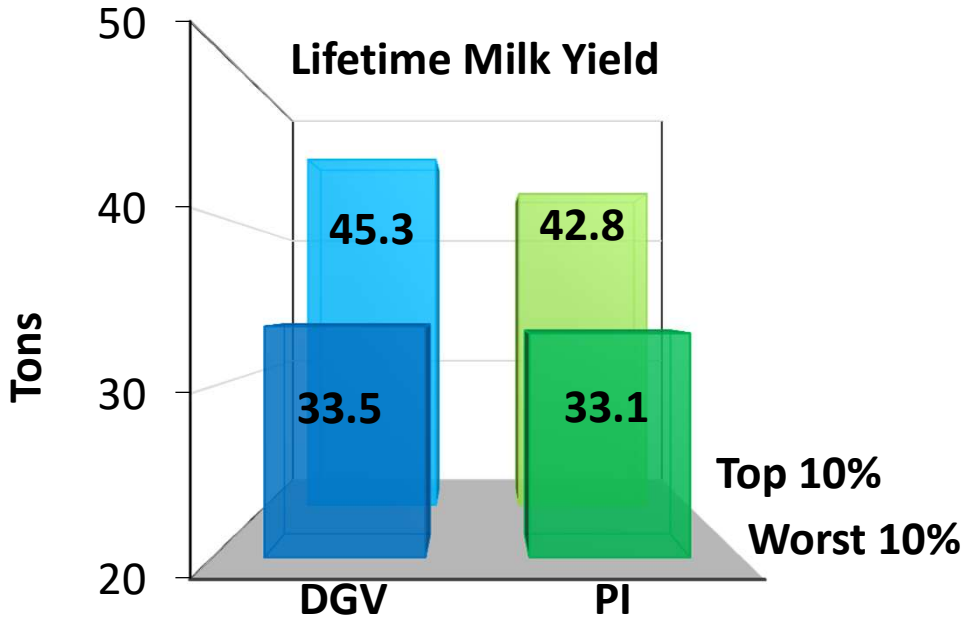
- 22,514 genotyped cows with phenotypes, 3 indexes available:

				
Pedigree Index	Parental average	-	★	★
DGV	Sum SNP effects	30-40 €	★★	★½
GEBV	Blended EBV	30-40 €	★★½	★★★

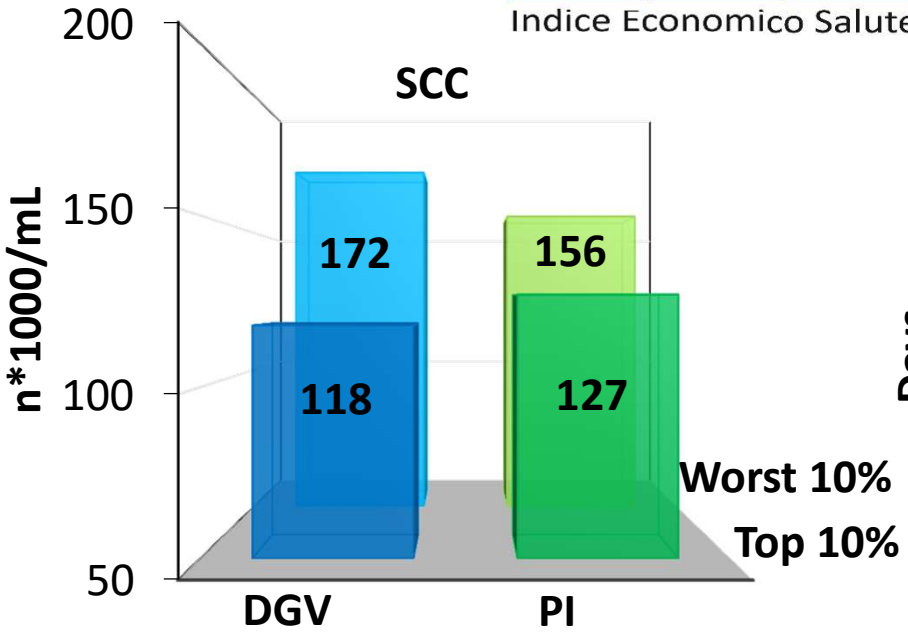
- Sort these cows for IES / ICS-PR both PI and DGV (like if they are heifers!!!) and compare their performances …

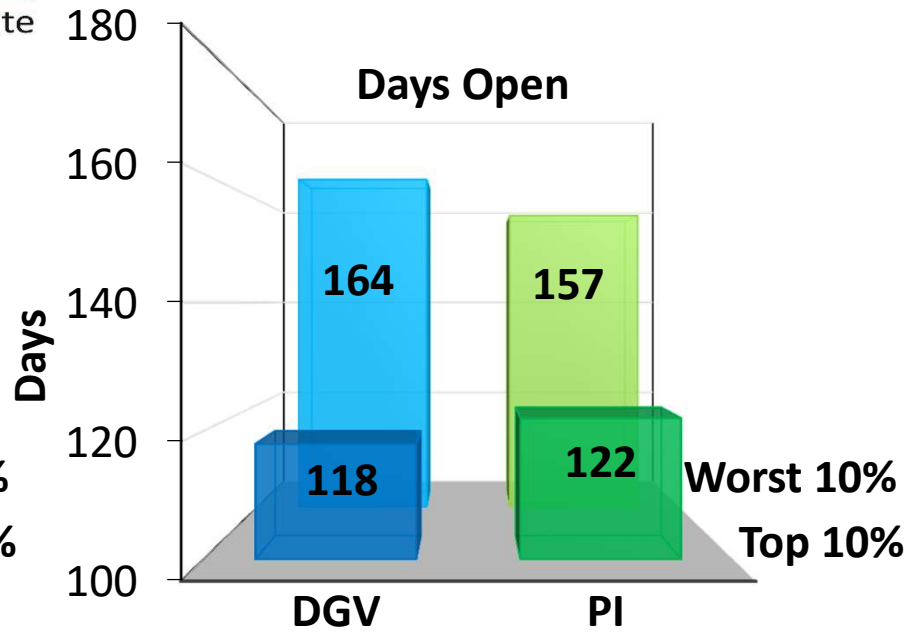

SCC
n*1000/mL
200
150
100
50
188
106
172
118
Worst 10%
Top 10%
DGV
PI

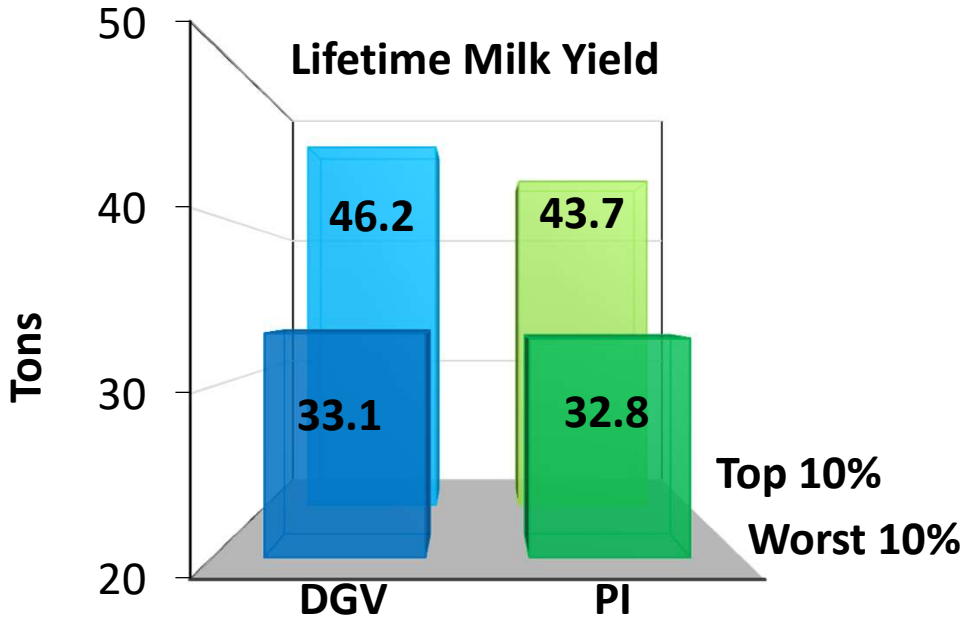

Days Open
Days
180
160
140
120
100
165
117
157
120
Worst 10%
Top 10%
DGV
PI


Lifetime Milk Yield
Tons
50
40
30
20
45.3
33.5
42.8
33.1
Top 10%
Worst 10%
DGV
PI

IES
Indice Economico Salute







'Preciser' Ranking … Is This True?

SCC

	DGV	PI
Δ Top-Worst, n/mL	54 000	29 000
€ Premium TOP	239	226
€ Premium WORST	85	85
€ Δ Top-Worst	153 (653 zł)	141 (601 zł)

Days Open

	DGV	PI
Δ Top-Worst, days	46	35
€ Lost TOP	0	16
€ Lost WORST	352	296
€ Δ Top-Worst	352 (1876 zł)	280 (1492 zł)

IES
Indice Economico Salute

Lifetime Milk Yield

	DGV	PI
Δ Top-Worst, Kg	13 100	10 900
Kg DM/Kg milk	0.44	0.44
€ Kg DM	0.30	0.30
€ Kg Milk	0.40	0.40
€ Extra profit	3511 (14 973 zł)	2921 (12 457 zł)

Genotyping In Italy

- All AI bulls (**pre-selection**), exchange with US, CA, UK and CH
- Farmers initially interested in genotyping top cows
- Some farmers starting to **genotype all females** in the herd
- **Research stimulus/i** (e.g. LATTeco) to show benefits of herd genotyping and facilitate farmers

Year	Holstein	Jersey
2017	8000 + 120 HD	400
2018	11 000 + 120 HD	400
2019	11 000 + 120 HD	400

- 30/10/2019: 61 258 ♀ with DGV/GEBV

Which Strategy?

THE 'CONSERVATIVE'

THE 'PROGRESSIVE'

WHAT THEY SHARE

Adult cows, n	100
Culling rate, %	30
Stillbirth rate, %	10
Calf-heifer culling rate, %	15
Age first calving, months	26

http://dairymgt.uwex.edu/tools.php

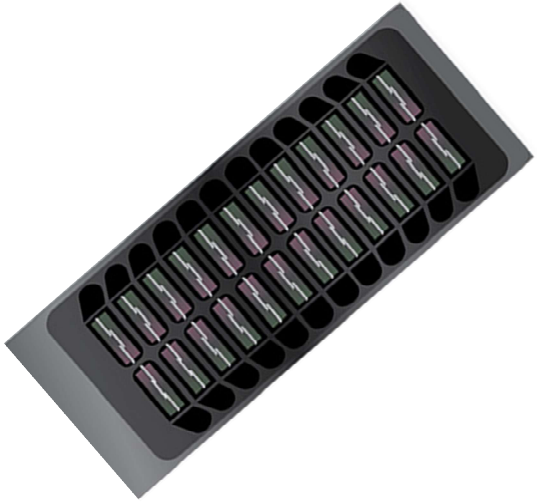
Replacement heifers, n	96
>7 mo. heifers non pregnant, n	45
Pregnant heifers, n	35
Replacement animals, n	77

Which Strategy?

THE 'CONSERVATIVE'

THE 'PROGRESSIVE'

WHAT THEY SHARE



GENOTYPE ALL FEMALES!!

How They Differ

THE 'CONSERVATIVE'

- ✓ **Sexed semen** not admitted
- ✓ **Conventional semen** used in both heifers and cows
- ✓ **Beef semen** used in cows exceeding replacement (low genetic merit cows)

THE 'PROGRESSIVE'

- ✓ **Sexed semen** in high genetic merit heifers, eventually cows
- ✓ **Conventional semen** used in remaining animals needed as replacement
- ✓ **Beef semen** used in cows exceeding replacement (low genetic merit cows)

A Few Values

		
Value purebred Holstein ♂	75 (1.5€*50 kg)	320 zł
Value CROSSbred Holstein ♂	280 (4€*70 kg)	1194 zł
Conventional semen dose	15-20	64-85 zł
Sexed semen dose	40-50	170-213 zł
Beef semen dose	5-8	21-34 zł

How Is He Doing?

THE 'CONSERVATIVE'

- Pregnant animals/year ≈ 110, beef semen used in 33 (110-77) low genetic merit cows


Higher conception rates (less semen doses to buy)


Some Crossbred males to sells


Lower selection intensity (more animals to breed)


Income from males selling = 12 165 € (51 871 zł)

How Is He Doing?

THE 'PROGRESSIVE'

- Pregnant animals/year ≈ 110, beef semen used in ≈65 (110-45) low genetic merit cows


More selection intensity (less animals serviced for next gen.)


More crossbred animals to sells (3-4 times more valuable!)


Lower conception rate (more semen doses to buy)


Income from males selling = 18 650 (79 523 zł)

Who is the winner? IT DEPENDS!

THE 'CONSERVATIVE' **THE 'PROGRESSIVE'**

- Both are looking at **preciser ranking**, good for genetic gain!!
- Both are **quantifying heifers** needed, good for environment
- Good market situation for **crossbred animals** (as nowadays) may give some advantage to '**the progressive**'
- '**The progressive**' needs **higher managment** capacity for fertility

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Dziękuję Bardzo!

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