

## Genetic evaluation LONGEVITY

### General

Breeds: Fleckvieh, Brown Swiss, Pinzgauer, Grauvieh, Gelbvieh, Vorderwälder  
since 1995 genetic evaluation for functional longevity  
since 2001 together with Germany, since 2011 genomic evaluation, since 2021 single-step evaluation  
Implementation: ZuchtData Vienna

### Data

Length of productive life of dairy cows that have calved since 1995  
Countries: Austria, Germany, Czech Republic (Fleckvieh), Italy (Fleckvieh), Slovakia (Fleckvieh), Hungary (Fleckvieh).

**Traits:** Productive life up to 7<sup>th</sup> calving divided into 9 stages, each survived yes/no.

Sections: 1<sup>st</sup> lactation (up to 50<sup>th</sup>, 51<sup>st</sup>-250<sup>th</sup> and 251<sup>st</sup> day until 2<sup>nd</sup> calving), 2<sup>nd</sup> lactation (up to 150<sup>th</sup> and 151<sup>st</sup> day until 3<sup>rd</sup> calving) and each 3<sup>rd</sup> to 6<sup>th</sup> lactation

### Model

multivariate BLUP animal model (single step)  
Software MiX99

### Effects:

- Region-first calving year and Region-year-season.
- Alping pasturing-herd-year
- Age at first calving
- (Change in) herd size
- Relative milk yield (fat-kg+protein-kg) within herd → yield-independent longevity
- Heterosis and recombination loss (Fleckvieh, Pinzgauer)
- Genetic effect of the cow

### Genetic parameters

#### Heritabilities:

Individual sections: 1.2 bis 4.8%

Heritabilities for longevity calculated from the section breeding values:

Breed	Heritabilities (%)
Fleckvieh	10.6
Brown Swiss	13.1
Pinzgauer	10.6
Grauvieh	11.8
Gelbvieh	9.3
Vorderwälder	11.5

## Publication

Combination of the 9 section breeding values according to the economic weights to a longevity breeding value.

Combination with conformation traits as auxiliary traits, genetic correlations:

Breed	Fleckvieh	Brown Swiss	Pinzgauer	Grauvieh	Gelbvieh	Vorderw.
Frame	-0.09		-0.08	-0.09	-0.11	-0.12
Feet & legs*	+0.30	+0.25	+0.36	+0.39	+0.31	+0.32
Udder	+0.40	+0.28	+0.39	+0.45	+0.50	+0.40
Cross height		-0.11				
Pelvis		+0.20				
Muscling		+0.24				

\* Grauvieh: Shape

Breeding value for **functional longevity (ND)** as relative breeding value with mean value 100 and deviation 12

## Relationship between breeding value and phenotype

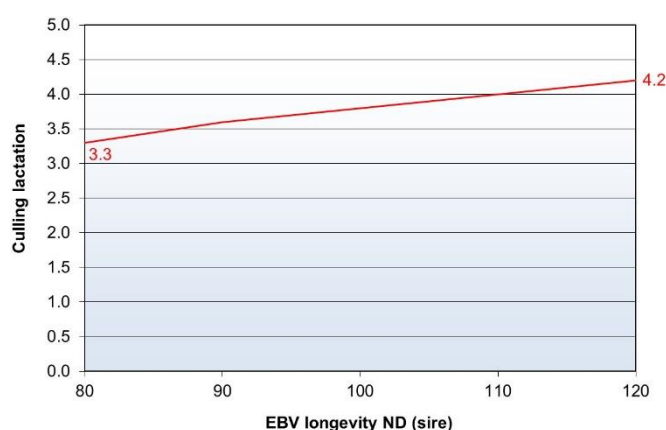


Fig.: Average culling lactation of the daughters depending on the breeding value for longevity of the sire (Fleckvieh, Austria)

## Genetic trends

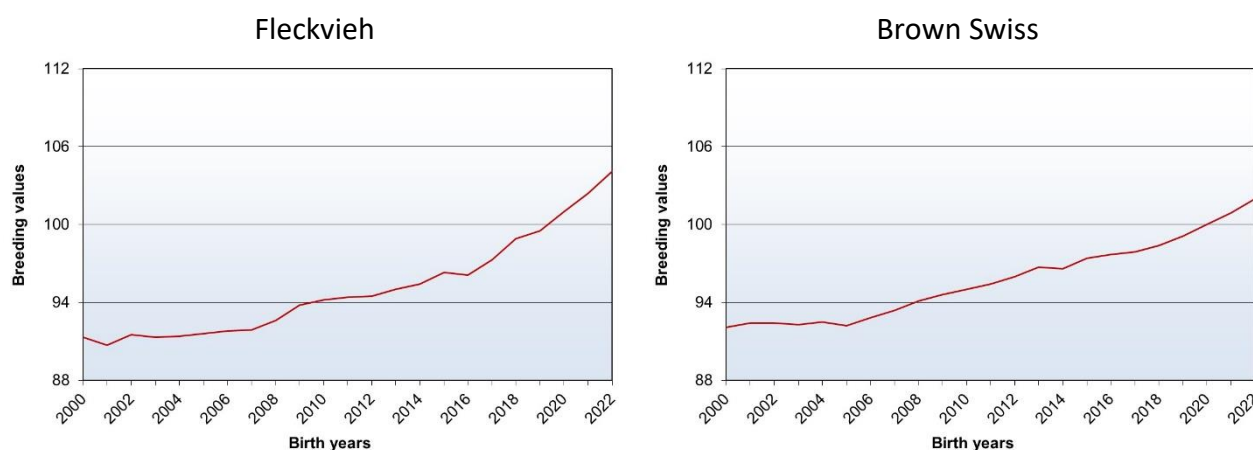


Fig.: Genetic trends for the breeding values for longevity (ND) for the cows (Austria)