

## Genetic evaluation CALVING EASE

### General

Breeds: Fleckvieh, Brown Swiss, Pinzgauer, Grauvieh, Gelbvieh, Vorderwälder  
since 1995 genetic evaluation calving ease  
since 2002 together with Germany, since 2011 genomic evaluation, since 2021 single-step evaluation  
Implementation: ZuchtData Vienna

### Data

all calvings (singleton births) since 2000  
Countries: Austria, Germany, Czech Republic (Fleckvieh), Hungary (Fleckvieh)

#### Trait:

Calving ease recorded during routine performance recording (AT) or by the farmer in the animal identification system (DE, CZ).  
in Austria 5-level scale (easy, normal, difficult, caesarean section, embryotomy)  
different calving ease codes between countries transformed to normal distribution within region-year  
1<sup>st</sup> calving and higher calvings considered as different traits, gestation length as auxiliary trait

### Model

Multivariate BLUP animal model (single-step)  
Software MiX99

#### Effects:

- Region-Year-Month
- lactation-calving age
- sex
- Herd (-calving year)
- Permanent environment of the cow
- Genetic effect of the cow (maternal)
- Genetic effect of the calf (paternal/direct)

### Genetic Parameters

Breed	Heritabilities		Corr. dir-mat
	direct	maternal	
<b>Fleckvieh, PI, GV, GE, VW</b>	<b>6.6%</b>	<b>10.5%</b>	-0.25
<b>Brown Swiss</b>	<b>5.7%</b>	<b>6.4%</b>	-0.33

Heritability auxiliary trait gestation length: direct 57%, maternal 7%

## Publication

1<sup>st</sup> calving and higher calvings combined in a ratio of 75% to 25%  
as relative breeding values with mean 100 and deviation 12

### Calving ease direct/paternal (KVP):

indicates how easy or difficult the calves of a bull are born (e.g. size of the calf).

### Calving ease maternal (KVM):

indicates how easy or difficult the daughters of a bull calve (e.g. size of the cow, shape of the pelvis)

the higher the breeding value, the fewer difficult births.

## Relationship between breeding value and phenotype

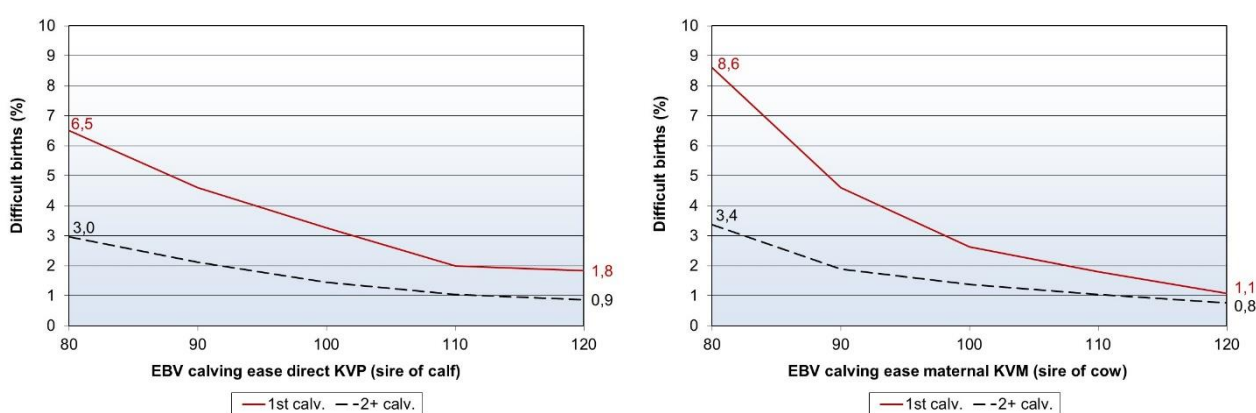


Fig.: Average difficult birth rate depending on the direct/paternal (KVP) or maternal (KVM) calving ease breeding value of the calf or cow sire (Fleckvieh, Austria)

## Genetic trends

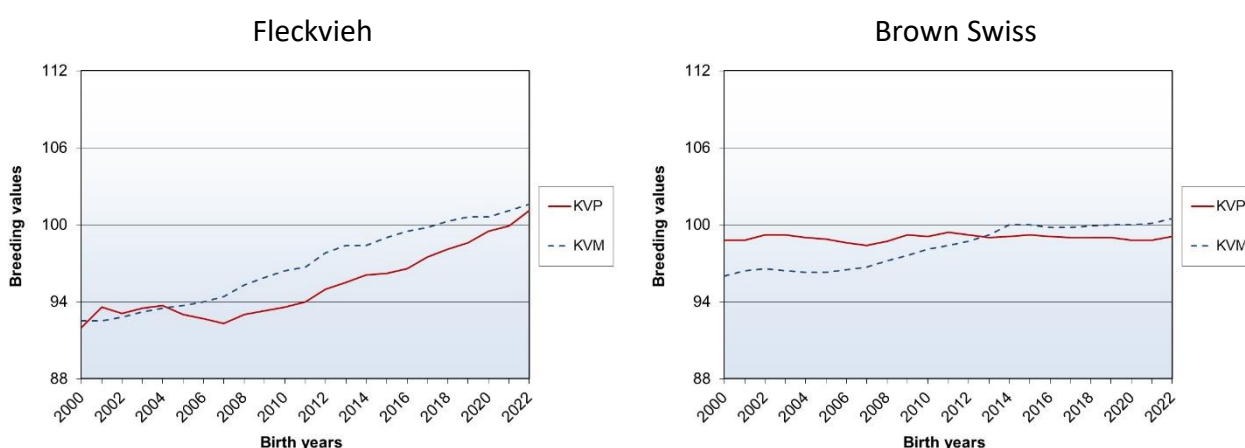


Fig.: Genetic trends for the direct/paternal (KVP) and maternal (KVM) calving ease breeding values for the cows (Austria)