

Genetic evaluation FERTILITY

General

Breeds: Fleckvieh, Brown Swiss, Pinzgauer, Grauvieh, Gelbvieh, Vorderwälder

since 1995 genetic evaluation fertility

since 2002 together with Germany, since 2011 genomic evaluation, since 2021 single-step evaluation

Implementation: ZuchtData Vienna

Data

all heifer and cow inseminations since 2000 and veterinary diagnoses and farmer-based observations close to birth since 2006

Countries: Austria, Germany, Czech Republic (Fleckvieh), Italy (Fleckvieh).

Traits:

- Non-return rate 56 heifer/cow: conception within 56 days after 1st conception yes or no.
- Time from calving to 1st insemination in days
- Time from 1st to last/successful insemination in days for heifer/cow
- Early fertility disorders: uterine inflammation, postpartum retention, puerperal diseases (up to 90 days after calving plus departures due to infertility, from veterinary diagnoses and observations close to birth).
- Cysts (30 to 150 days after calving, from veterinary diagnoses)

Model

multivariate BLUP animal model (single-step)

Software MiX99

Effects:

- Region-Year-Month
- Lactation-insemination age class (heifer) or calving age class (cow)
- Herd (-year)
- Inseminator year (NR56 only)
- Type of insemination (frozen semen, natural semen, fresh semen, sexed)
- Data type (diagnoses only, diagnoses+observations, observations only) - Recording type (performance recording, electronic, ...) - Year (early fertility disorders and cysts only)
- permanent environment of the cow
- genetic effect of the heifer/cow

Genetic parameters

Heritabilities: individual traits: 1.0 to 5.0%

Fertility index FRW:

Breed	Heritability (%)
Fleckvieh, Brown Swiss	2.5
Pinzgauer, Grauvieh, Vorderwälder	2.0
Gelbvieh	1.2

Publication

Combination of the 7 individual breeding values according to the economic weights (in %) to the fertility index FRW:

Trait	Fleckvieh	Brown Swiss	PI, GV, VW	Gelbvieh
NR56-heifer	6.6	6.4	10	10
NR56-cow	19.9	19.1	25	35
1 st -last insemin.-heifer	6.6	6.4	10	10
1 st -last insemin.-cow	19.9	19.1	25	35
Early fert. dis.	33.0	34.0	20	10
Cysts	14.0	15.0	10	0

Fertility index FRW and breeding values for early fertility disorders (FFR) and cysts (ZYS) as relative breeding value with mean value 100 and deviation 12

the higher the breeding values the better (for FFR and ZYS the direction is reversed)

Insemination success (BEF): corrected NR56 for frozen semen in % (male fertility)

Relationship between breeding value and phenotype

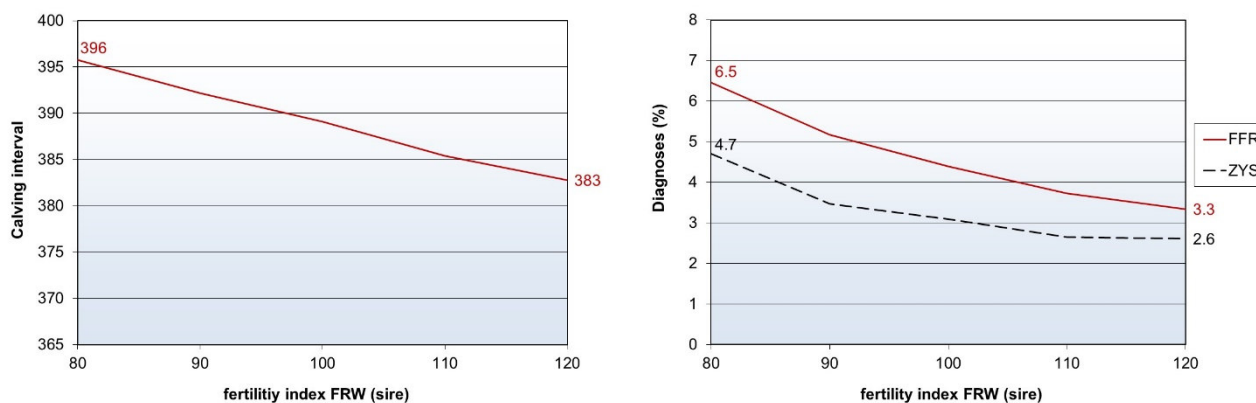


Fig.: Average calving interval and diagnoses for early fertility disorders (FFR) and cysts (ZYS) depending on the fertility index FRW of the sire (Fleckvieh, Austria)

Genetic trends

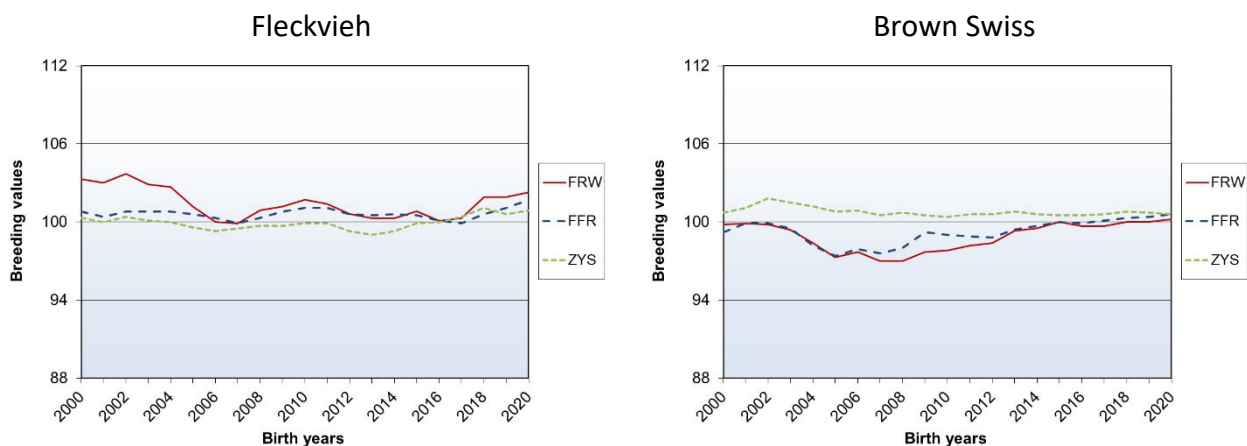


Fig.: Genetic trends for the fertility index FRW and the breeding values for early fertility disorders (FFR) and cysts (ZYS) for the cows (Austria)