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NORWEGIAN INSTITUTE OF
BIOECONOMY RESEARCH

**NORWEGIAN GENETIC
RESOURCE CENTRE**
genressurser.no

Selection of new bulls for genebanking in Norway

Nina Svartedal, Norwegian Genetic Resource Centre.

In situ - Ex situ Conservation WGs joint meeting, 24th April 2024, Nicosia , Cyprus



Photo: Michael Angeloff, NIBIO

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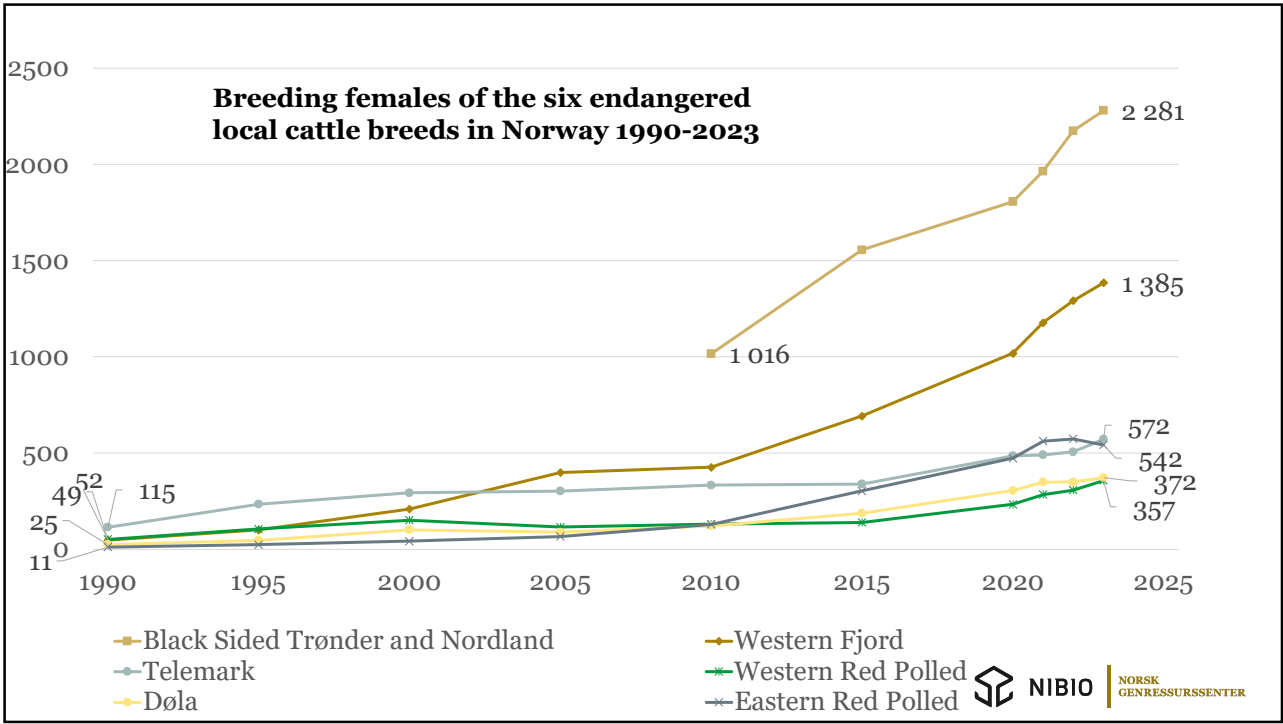


In 2023 Norway celebrated that no native breeds of cattle, horses, sheep or goats are **critically endangered**, they are **only endangered**.

In 1990 four of the six breeds had less than 50 breeding females.



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The Cow Register

- A pedigree database established in 1990
- Includes all the six endangered local cattle breeds in Norway
- Free of charge for the farmers
- Mandatory to join for subsidy payments
- Monitors the population sizes
- Pedigree data used for Ne estimates
- Independent of production system

Stamtavle
Østlandske rødkolle
27295810 0117 Malfang av Asch

Eier: Knut Halvor Aschjem
Gård: Aschjem Gård
Adresse: Holstadveien 103
1430 Ås

Prod.nr: 30210001

Individnummer: 0117
Kjønn: Olse
Født: 31.03.2024
Rase fra Kuregisteret: 100% ØR
Rase fra Kukontrollen/SFK: 100% ØR

Navn fra Kuregisteret: Malfang av Asch
Navn fra Kukontrollen/SFK: Malfang av Asch
Innavskoeffisient: 0.0309
Pec-verdi: 0.9243


Innavskoeffisient og Pec-verdi (pedigree completeness) er basert på stekskapsinformasjon fra 12 generasjoner bakover.

Far: 0080 Grav DyreID: 27295810 0080 Født: 02.09.2020 Rase: 100% ØR Eier: Knut Halvor Aschjem	Farfar: 0056 Romeo DyreID: 02140001 0056 Rase: 100% ØR	FFF: 5813 Leopold av Søråsen DyreID: 04021772 5813 Rase: 99% ØR FFM: 0028 Rosa DyreID: 02140001 0028 Rase: 98% ØR
	Farmor: 1700 Gunhild DyreID: 06230382 1700 Rase: 100% ØR	FMF: 6768 Ulvar DyreID: 04021772 null Rase: 100% ØR
		FMM: 0167 Granhild DyreID: 05340098 0167 Rase: 100% ØR
Mor: 0199 Mia DyreID: 01050709 0199 Født: 10.11.2017 Rase: 100% ØR Eier: Knut Halvor Aschjem	Morfar: 1401 DyreID: 01350623 1401 Rase: 100% ØR	MFF: 6751 1 Eng (Lund) DyreID: null Rase: 100% ØR
		MMF: 0148 RØDKOLLE DyreID: 05380089 0148 Rase: 97% ØR
	Mormor: 0082 Victoria DyreID: 01050709 0082 Rase: 97% ØR	MMM: 0072 DyreID: 01050709 0072 Rase: 96% ØR
		MMM: 0227 Valdrøst DyreID: 05420377 0227 Rase: 94% ØR

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Regular extension (1-3 ai-bulls/year) of the gene bank

	Black Sided Trønder and Nordland Cattle	Western Fjord Cattle	Telemark Cattle	Western Red Polled Cattle	Døla Cattle	Eastern Red Polled Cattle
No of gene bank bulls 2023	79	67	62	63	56	43

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Selection criteria for gene bank bulls in three eras

1. 1978 - 1990 – by chance, no pedigree information available
2. 1990 - 2019 – manual evaluation of the bull’s pedigree
3. 2019 - today – evaluation of the bull’s genetic contribution to the gene bank

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Selection criteria 1990-Sept 2019

- Phenotypic characteristics eg;
 - mother’s phenotype, (yield and exterior)
 - bull mother’s phenotype
- Pedigree information
 - Based on manual evaluation
- Number of recorded offsprings and ai-bull brothers

Far: 49576 Petrus DyrelD: 15280625 0212 Født: 10.03.2019 Rase: 100% VFF Eier: Hans Gubhage	Farfar: 46945 Kvitebjørn DyrelD: 15191077 0470 Rase: 100% VFF	FFF: 0410 OKSE DyrelD: 15191077 0410 Rase: 100% VFF
	Farmor: 0697 Stjemoğa DyrelD: 15280625 0697 Rase: 100% VFF	FFM: 0339 KAREN DyrelD: 15191077 0339 Rase: 100% VFF
Mor: 1286 Eva DyrelD: 05130078 1286 Født: 20.09.2017 Rase: 100% VFF Eier: Hans Gubhage	Morfar: 46947 Sole DyrelD: Rase: 100% VFF	FMF: 6820 Frey DyrelD: 15191077 null Rase: 100% VFF
		FMM: 492 Dalmøy DyrelD: Rase: 100% VFF
	Mormor: 1206 eva DyrelD: 05130078 1206 Rase: 100% VFF	MFF: 6820 Frey DyrelD: Rase: 100% VFF
		MMF: 1093 Nusse DyrelD: 05180611 0340 Rase: 100% VFF
		MMM: 1072 Justin DyrelD: 15280625 0180 Rase: 100% VFF
		MMM: 0009 Eva DyrelD: 14170066 0070 Rase: 100% VFF

Possible new ai bulls of Western Fjord Cattle

The kinship between the bulls in the gene bank today is 0.0605 (using EVA-prog)

- The candidates’ kinship:
- a) Lavrans (0.0246)
 - b) Halvard (0.0337)
 - c) Erik (0.0333)

Conclusion:
All three will add positive genetic variance to the gene bank.



Photo: Ann Holene

Possible new ai bull of Døla Cattle

The kinship between the bulls in the gene bank today is 0,0941 (using EVA-prog)

This candidate's kinship: 0,0521

Conclusion:
This bull calf will add positive genetic variance to the gene bank.



Photo: Nina Svartedal

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Inbreeding Trends in Norwegian Cattle Breeds at Risk

Inbreeding rates and effective population sizes 1991-2020

NIBIO REPORT | VOL. 7 | NO. 154 | 20

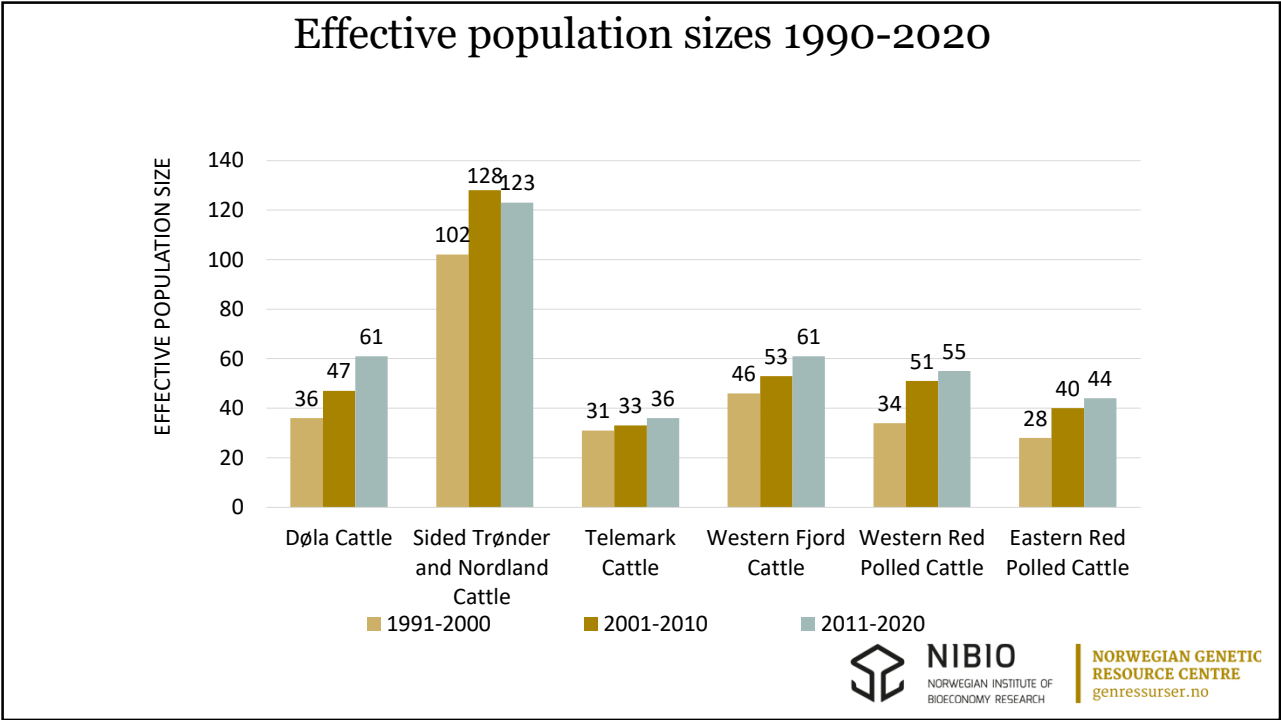


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Documenting the effective population sizes based on pedigree information

Estimating the effective population sizes in 2020 in six native breeds with extremely small population sizes in 1990.

[NIBIO Brage: Inbreeding Trends in Norwegian Cattle Breeds at Risk \(unit.no\)](https://unit.no)



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Thanks for your attention!

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Important actions to save the endangered cattle breeds

- Pedigree database “The Cow Register” – free of charge to register
- Breed societies – communicating knowledge and live animals to new owners
- Regular extension of the gene bank – Today: Geno has appr 60 ai bulls of each breed in the gene bank
- Sustainable breeding in small populations – basic knowledge for all stakeholders
- Easy access to breeding advice at farm level – and free of charge
- New areas of use – today 75 % of the cows are in beef production as suckler cows.
- Production subsidies to breeding cows and breeding bulls