Avl av rene (gamle/ isolerte) kuraser

Magnús B. Jónsson,

NØK-ársmote 25.-28 júlí 2010

Organised animal breeding

provided by Alan Cheese

- **Animal breeding originates from mid-1700 as the English Longhorn and Shorthorn became the first formed breeds.**
- **Followed by interest and activity for improving local breed both in England and in other countries**
- **Breeding for adaptation to local conditions became a widespread trend.**

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The begynning in Nordic countries

- **Systematic animal breeding started in Nordic countries in begynning of the 19. century**
- **Large number of breeds were established in the Nordic countries**
- **Emphasis on pure beed and clear characreristic such as colour body conformation ex.c.**
- **"Stedegenhetslæren"**

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Present international situation

- The situation to day totally changed
- Most of the "old" breed have lost their importance as a main production breed.
- Replaced with few breeds which are more or less intenationalized with close related breeding goals.
- Many of the "old" breed are in critical state or already extinct .
- Introduction of Genomic selection, a new treat?

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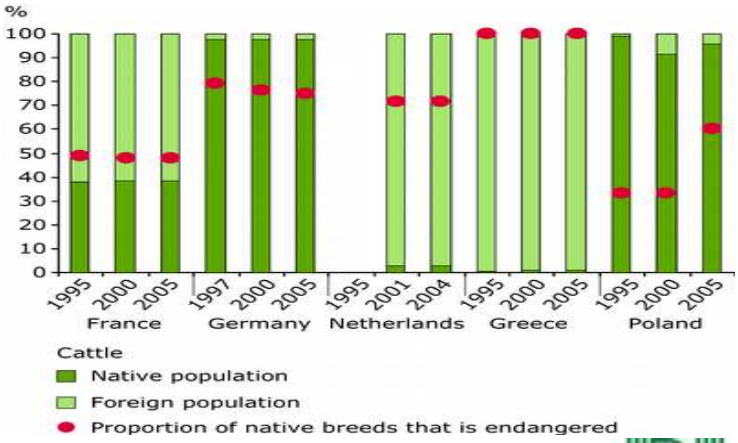
Comparison of status for some foreign and native breed in Europe



ETC/BD and BRG Paris (Bureau des Ressources Génétiques), 2009

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The Nordic sitation

- **Almost all of the native nordic breeds have lost their status in nordic milk production.**
- **Many of the "old" breed are only kept as part of a "hobby" farming.**
- **Some are extinct and other facing endangered situation.**
- **The Icelandic native breed is the only "old" breed used as a main milk producing breed.**

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Genetic Diversisty

- **Driving force in animal breeding.**
- **Fundamental resource for continuous developement of products.**
- **Threaten by globalisation of animal breeding ?**
- **International action for concerving .**
  - ✓ **RIO convention**
  - ✓ **FAO- actions**
  - ✓ **NGR**

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RIO-1992

1.The Rio Declaration on Environment and Development

2.Agenda 21

3.Forest Principles

4.Framework Convention on Climate Change – FCCC*

5.Convention on Biological Diversity –CBD*

* Int. convension

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Evaluation of breeds

- **Not all breed can be concerved! BUT**
  - **"Loss of a breed means loss of genetic variability"**
  - **Any breed should therefore be evaluated before unchangeable actions are taken according its future.**
  - **Breed evaluation could be made according to:**
    - **Economic competitiveness**
    - **Genetic significance (uniqueness)**
    - **Cultural and historical value**
    - **Special value ; i.e.special products , sociological values**

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Concervation strategy

- **Alternative concervation stratey:**
  - **In-situ concervation.**
    - **The breed is kept in the production system.**
    - **With defined breeding goal and selection programme.**
    - **The most efficient type of concervation.**
  - **Ex-situ concervation.**
    - **In reality a storage of the breed with the main purpose to be intact.**
    - **Minimising Δ_F is the main issue.**
  - **Cryoconcervation.**
    - **Ultimate situation.**
    - **Difficult to reproduce the population.**

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E(Δ$_G$) vesus E(Δ$_F$)

- **E(Δ$_G$)** can be defined as the covariance between genetic long term contribution (r_i) and the gametic Mendelian segregation process (Mendelian sampling term a_i).
  - **$E(\Delta_G) = \Sigma r_i a_i$**
- **E(Δ$_F$)** can also be defined as a function of ancesters long term contribution (r_i) to the present population (genepool).
  - **$E(\Delta_F) = 0.25\Sigma r_i^2$**
    - (Woolliams og Thompson, 1994).

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Expected breeding value

- **$EBV_i = ½(EBV_m + EBV_f) + a_i$**
  - i.e.:
  - EBV_i =the breeding value of an individual.
  - EBV_m ; EBV_f = it's parents breeding values
  - a_i = Mendelian term of the individual
- **$a_i = EBV_i - ½(EBV_m + EBV_f)$**

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Optimum Selection approach

- **The selection in reality quadratic i.e genetic gain can be obtained and the increase in inbreeding constrained at same time.**
- **The use of breeding animals depending, both on their breeding value and their kinship to the population .**
- **The breeding plan dynamic not static (Decision´s not made on beforehand.)**
- **Insured that only candidates with a_i> o are chosen as breeding animals.**

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The Icelandic dairy cow

The icelandic dairy cow is an old landrace brought with the settlers from Norway. Been isolatet since with minimum imigration of outside genes. The only milk producing breed in Iceland.

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The Icelandic dairy cow

Population size about 30 th., av. weight 470 kg., av. prodution 5300-5400 kg. pr. year. Near all polled with big variation in colour. 95 % incl. herd recording and A.I. 80 %. Breeding scheme according to the Nordic profile..

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The selection Index

BLUP-animal model , ex. sire model for longevity .

44% production (protein, protein content)
8% milkingability
8% somatic cell counts
8% cow fertility
8% udder
8% teath
8% lonevity
8% temperament

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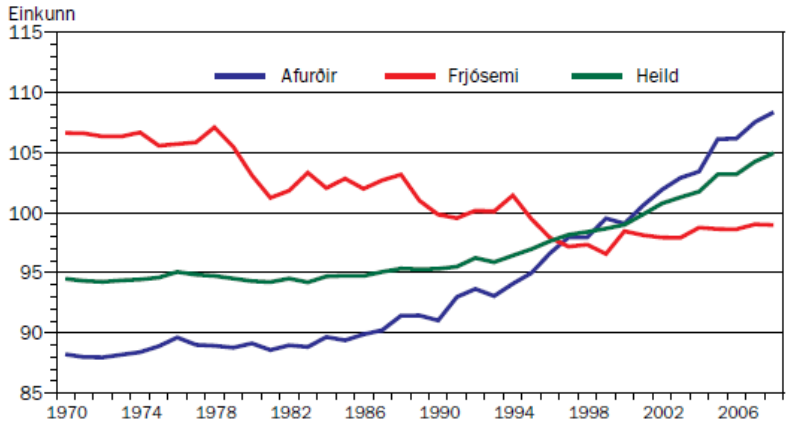
Genetic gain for production, fertility and total merit.



Águst Sigurðsson, Magnús Jónsson, 2009

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Increase in inbreeding (Δ_F)pr. gen. and change in N_e

Árabil	Aukning í skyldleikarækt yfir kynslóð, %	Virk stofnstærð
1985 - 1990	0,34	147
1995 - 2000	0,42	118

Þorvaldur Kristjánsson et.al, 2006

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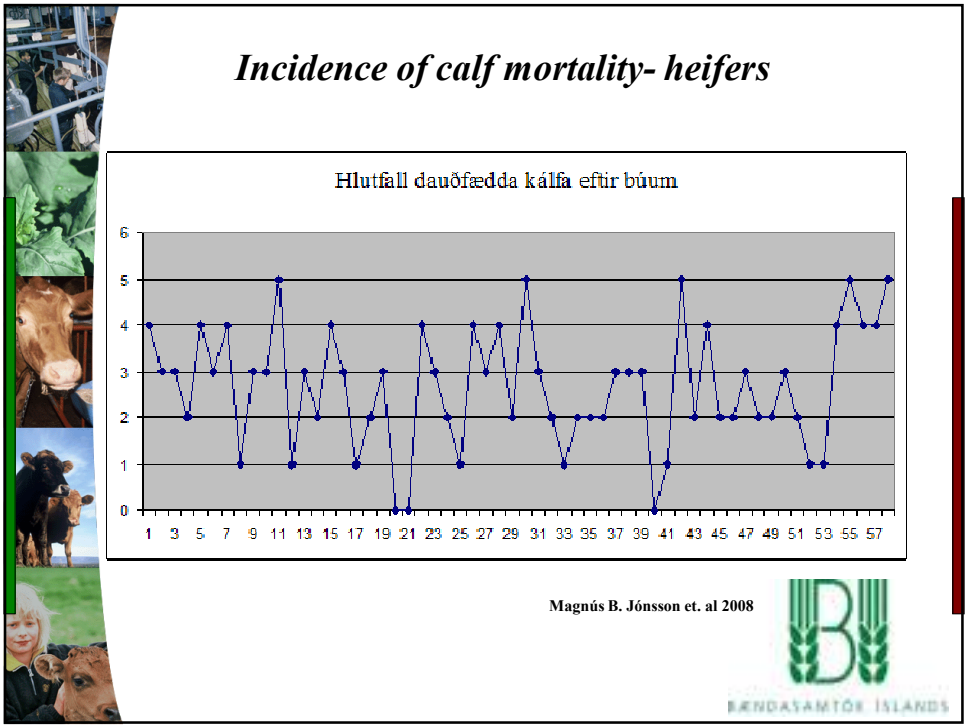

Incidence of calf mortality- heifers

Magnús B. Jónsson et. al 2008

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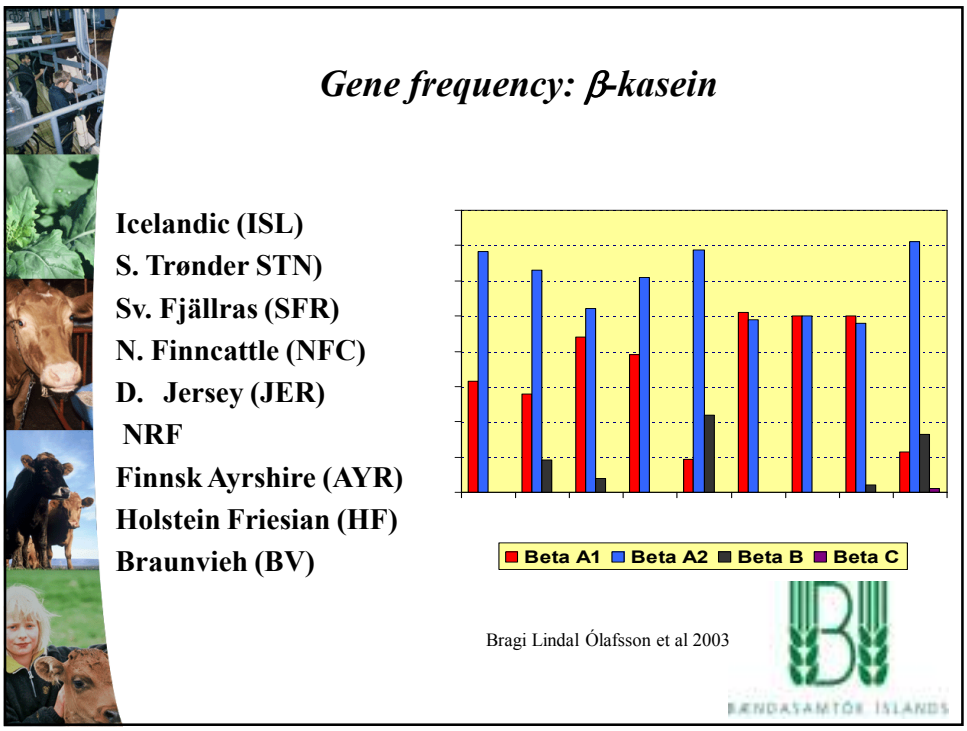

Gene frequency: β-kasein

Icelandic (ISL)
S. Trønder STN)
Sv. Fjällras (SFR)
N. Finncattle (NFC)
D. Jersey (JER)
NRF
Finnsk Ayrshire (AYR)
Holstein Friesian (HF)
Braunvieh (BV)

Bragi Lindal Ólafsson et al 2003

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Results from EVA

2005	Nr.	Mean BV	Mean kinship	Mean F
Bull f.	35	107,3	0,109	0,0358
Bull d.	574	115,4	0,095	0,0353

2006	Nr.	Mean BV	Mean kinship	Mean F
Bull f.	12	109,9	0,115	0,0332
Bull d.	937	115,3	0,092	0,0333

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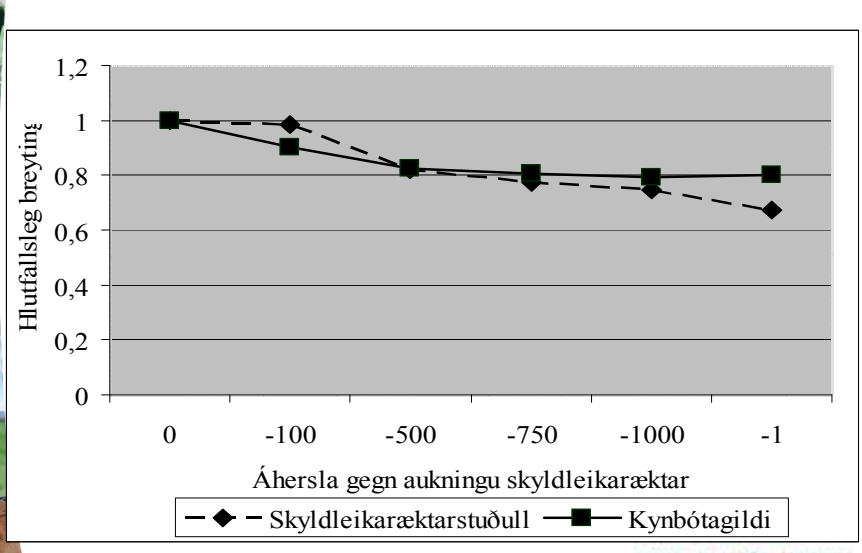
Change in Breeding Values according empasis on constraining inbreeding



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Contribution of most dominant elite bulls to the group of bulldams in 2005-2006

Nafn nauts	2005	2006
Kaðall-94017	15,2 %	19,5%
Punktur-94032	5,2%	12,4%
Smellur-92028	5,4%	3,6%
Pinkill-94013	5,4%	4,6%
Almar-90019	3,5%	
Soldán-95010		8,9%
Total	34,7&	49,0%
Nr. of their daughters	199	459
Total nr. of bulldams	574	937

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Present situation

•The future of the icelandic breed is naturally up to discussion .

- **Reports have shown substantial econmic befits by changing to a more profiable breed.**
- **Results from research project indicates valuable genetic resources in the breed**
- **The genetic status of the breed is so far in good shape.**
- **There are some problems, calf mortality, small genetic progress for some traits.**
- **Positive interst from consumers viewpoint**

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Overall conclusion

- **Globalisation of animal breeding and industrial food production can increase commersial use of animal genetic resources**
- **Genetic variability depends on variation between and within breeds of that species.**
- **Any breed represents therefore a genetic value and will add to the total genetic diversity.**
- **“Loss of breeds is therefore a loss of genetic variation”.**

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Overall conclusion

- **We are, due to, Internatioal conventions obliged to preserve , as much as possible the genetic diversity. Here must scientists and breeding organisations play a leading role.**
- **Any breeds situation should be through a research programme before action taken about its future.**
- **The Icelandic breed is among those breeds and can have future role in icelandic agriculture and have also value in future concervation of genetic variability.**
- **It seems most advisable to keep it as the main breed in icelandic milk produktion and that secure best preseving its gentetical values .**

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Thank you