



Genotyping and procedure for validation of pedigree

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Number of genotypes animals

	RDC	Holstein	Jersey
54K Males (candidates)	3444	5338	862
54 K Females	1818	3181	550
Reference population	4519	4.798 (DSF) +18394 (EG)	1132
Total	9756	13616	2404

	RDC	Holstein	Jersey
770K Males	754	578	400 in process

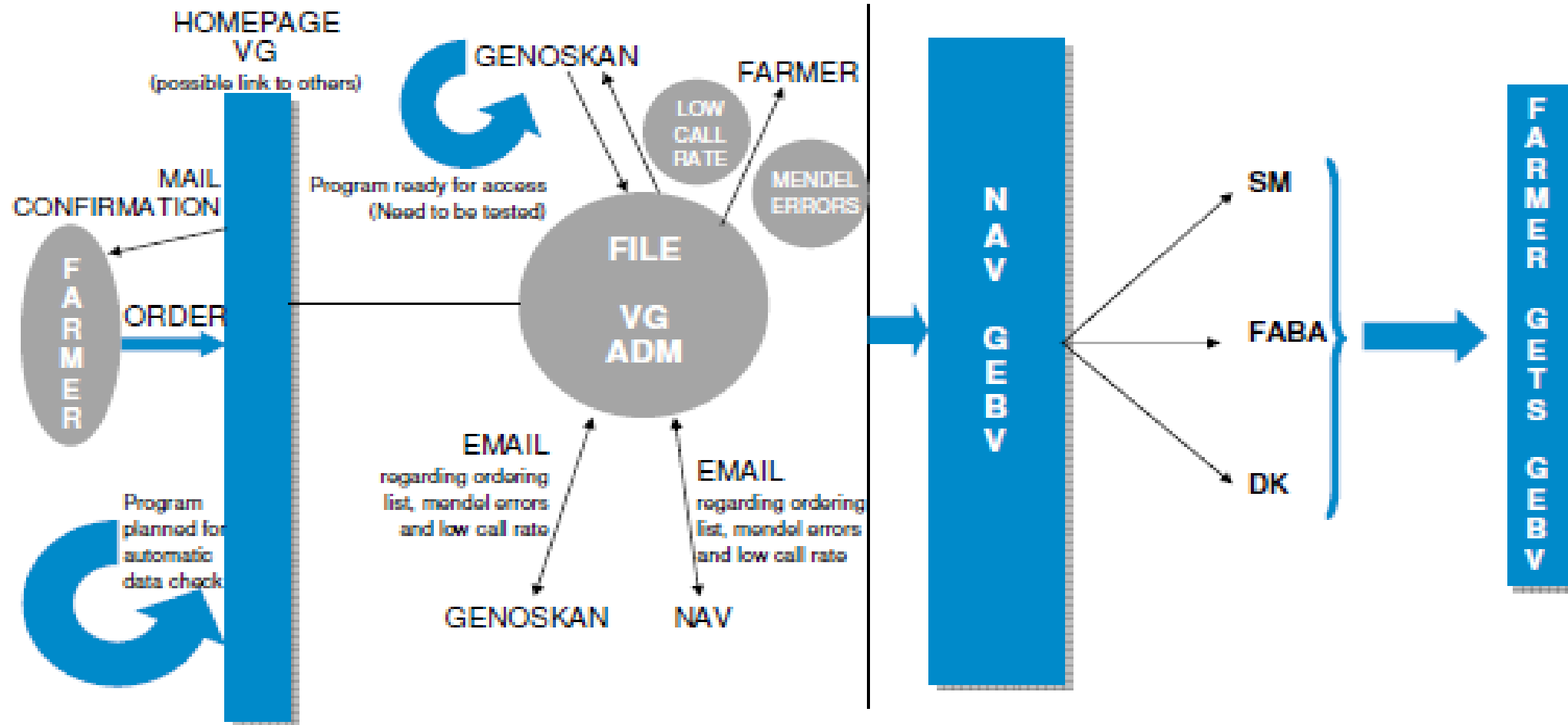
Flow chart

ORDERING

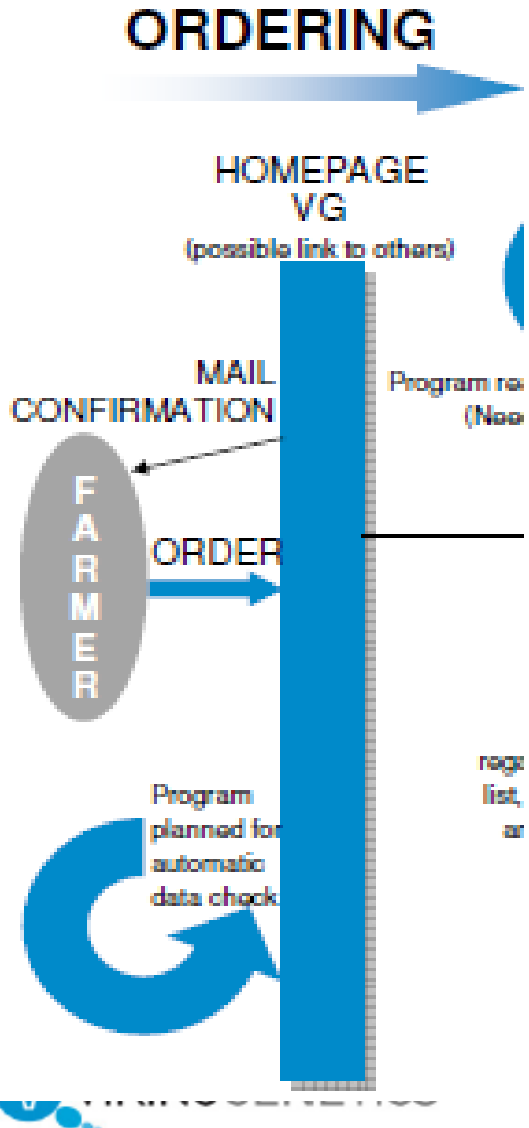
ANALYSIS

CALCULATION

SERVICE

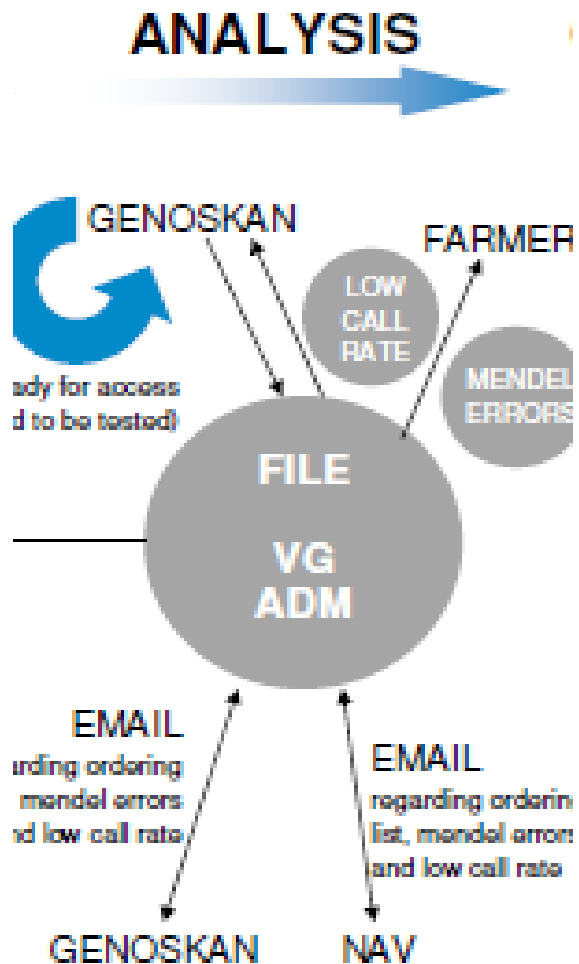


Flow chart - Ordering



- Farmer order females at homepage – Genoskan sends TSU
- VG order bulls internally and send letter and sample kit to farmer about wish to test bull calf
- Labels with ID and barcode are produced for samples
- All VG orders are collected in VG and send to Genoskan

Flow chart - Analysis

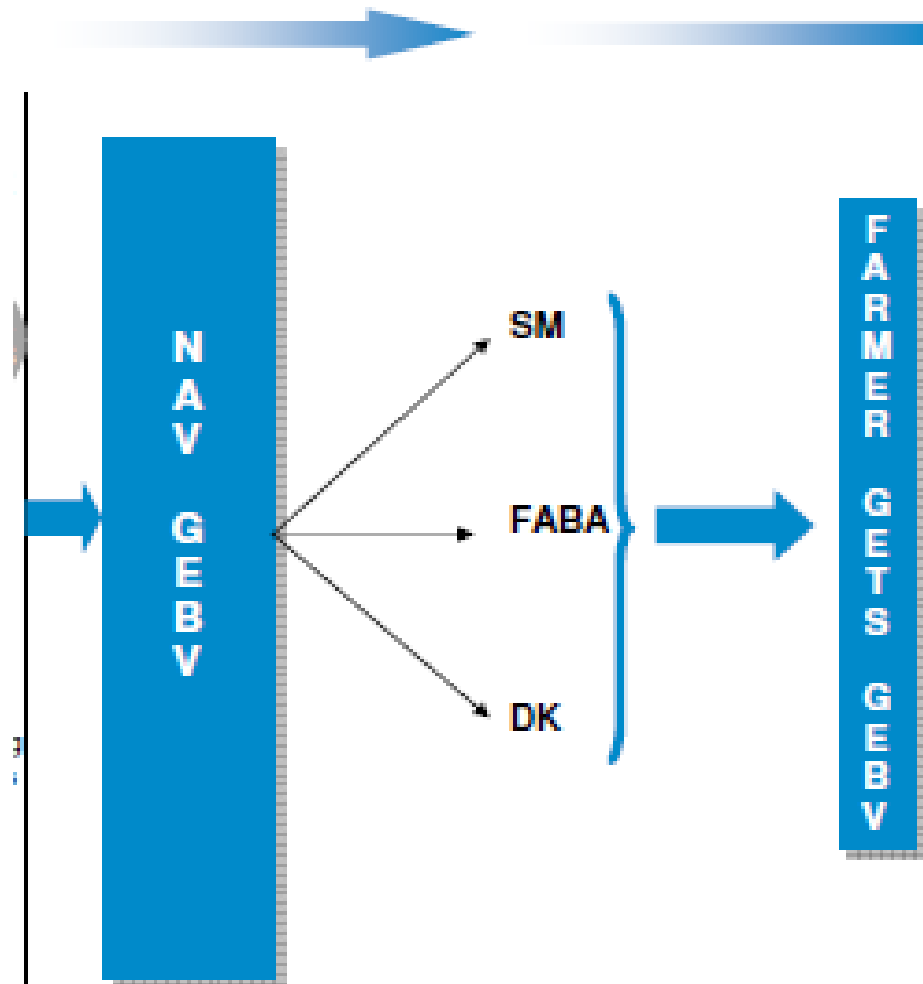


- All samples are sent to Genoskan
- All sample ids are sent to NAV for id check
- List from Genoskan with missing animals
- List from Genoskan with animals that have low call rate
- List from NAV with Mendel Errors

Flow chart – calculation and service

CALCULATION

SERVICE



- NAV calculates and sends GEBV to national databases that distributes GEBV's of females and males older than 20 months
- NAV sends bullcalfs younger than 20 months and females to VG for selection

Pedigree control and SNP based parenting

- Check of Sample ID
- Mendel Error Check
- Check of retyped animals

Check of Sample ID



- A list of Sample IDs in ID-nor format is received from VG, when samples are sent to GenoScan for genotyping.
- A lookup of sample ID-nor in an updated version of the NAV-pedigree file is performed
- ✓ If match, sample ID-nor is accepted
- ÷ If NO match, sample ID-nor is returned to VG for manual checking and correction

NAV



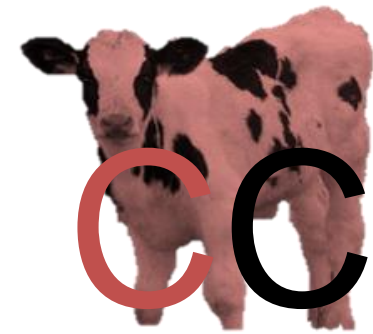
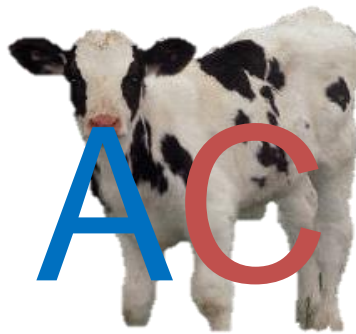
Mendel Error Check

- **If one or both parents are genotyped, Mendel Error Check can be performed**
 - **Parents from DFS and EuroGenomics/GENO are used**
- **Mendel Error Check is done by using PLINK**
 - **Incorporated in BC|SNPmax**
- **Mendel Error Check is performed at chromosom 20**

NAV



Principle behind Mendel Error Check



NAV



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Mendel Error Check

1 parent genotyped

- **PLINK can only scan full trios**
- **If only one parent is genotyped a parent dummy genotype is created**
 - **Parent dummy genotype = offspring genotype**
- **Only “homozygote” Mendel Errors between genotyped parent and offspring is counted**

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Mendel Error Check

1 parent genotyped

- Sire

A..G..C..A..C..C..A..A..T..C
C..G..A..T..G..C..A..C..A..C

} Homologous chromosomes

- Offspring

C..A..C..A..G..A..A..A..T..G
A..A..C..T..G..A..A..C..A..C

Mendel Error Check

2 parents genotyped

- Sire

A..G..C..A..C..C..A..A..T..C
C..G..A..T..G..C..A..C..A..C

} Homologous chromosomes

- Offspring

C..A..C..A..G..A..A..A..T..G
A..A..C..T..G..A..A..C..A..C

- Dam

A..A..C..T..G..C..C..A..A..C
A..G..A..T..G..A..A..C..A..C

Mendel Error Check

2 parrents genotyped

- Sire

~~A..C..C..A..C..C..A..A..T..C~~
~~C..G..A..T..G..C..A..C..A..C~~

} Homologous chromosomes

- Offspring

C..A..C..A..G..A..A..A..T..G
A..A..C..T..G..A..A..C..A..C

- Dam

A..A..C..T..G..C..C..A..A..C
A..G..A..T..G..A..A..C..A..C

Mendel Error Results

- Mendel Errors may result from:
 - True pedigree error
 - Wrong animal sampled
 - Switch of samples by technician/laboratory/me
- Do not include animals with Mendel Errors in genomic evaluation
 - Genotypes are saved in separate table
- List of Mendel Error animals is sent to VG

NAV Mendel Test is no official Parentage Test





ET-calf 1



ET-calf 2

NAV



9. november 2011

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Check of retyped animals

- Selected bulls, GenVikPLUS bulls, are retyped to avoid erroneous GEBVs
- The new genotype is compared with the old genotype for all common SNPs
- Clear separation of OK and erroneous retypings

NAV VG is informed about check-result of retyping





Handling of low call rate (VG)

- DNA samples collected are tissue(DK) and nose swaps (FIN and SV)
- Low Call rate → New samples from animals
 - Denmark, new tissue sample
 - Sweden and Finland, Hair sample
- Reason for new sample is possible twin reaction

Handling of Mendel errors (VG)

- Mendel Errors
 - Message to owner
 - Owner orders parentage test if animal still interesting for him or VG
 - Owner informs VG when parentship is verified → Animal enters next evaluation