Validation and implementation of new genomic traits in The Netherlands:

lactose, urea, calf survival, ketosis, heifer fertility, and AMS traits.

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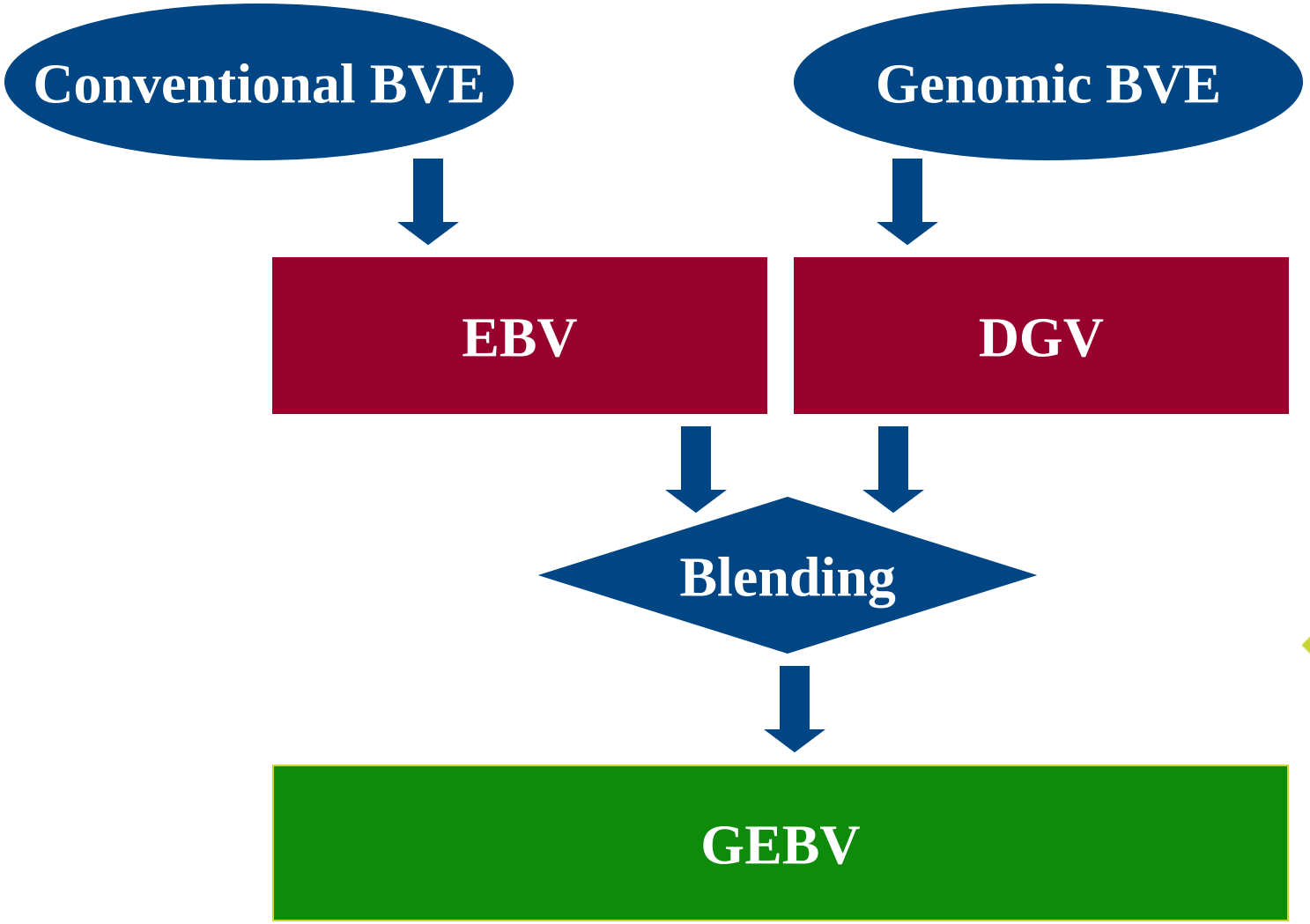
CRV – The Netherlands

Content

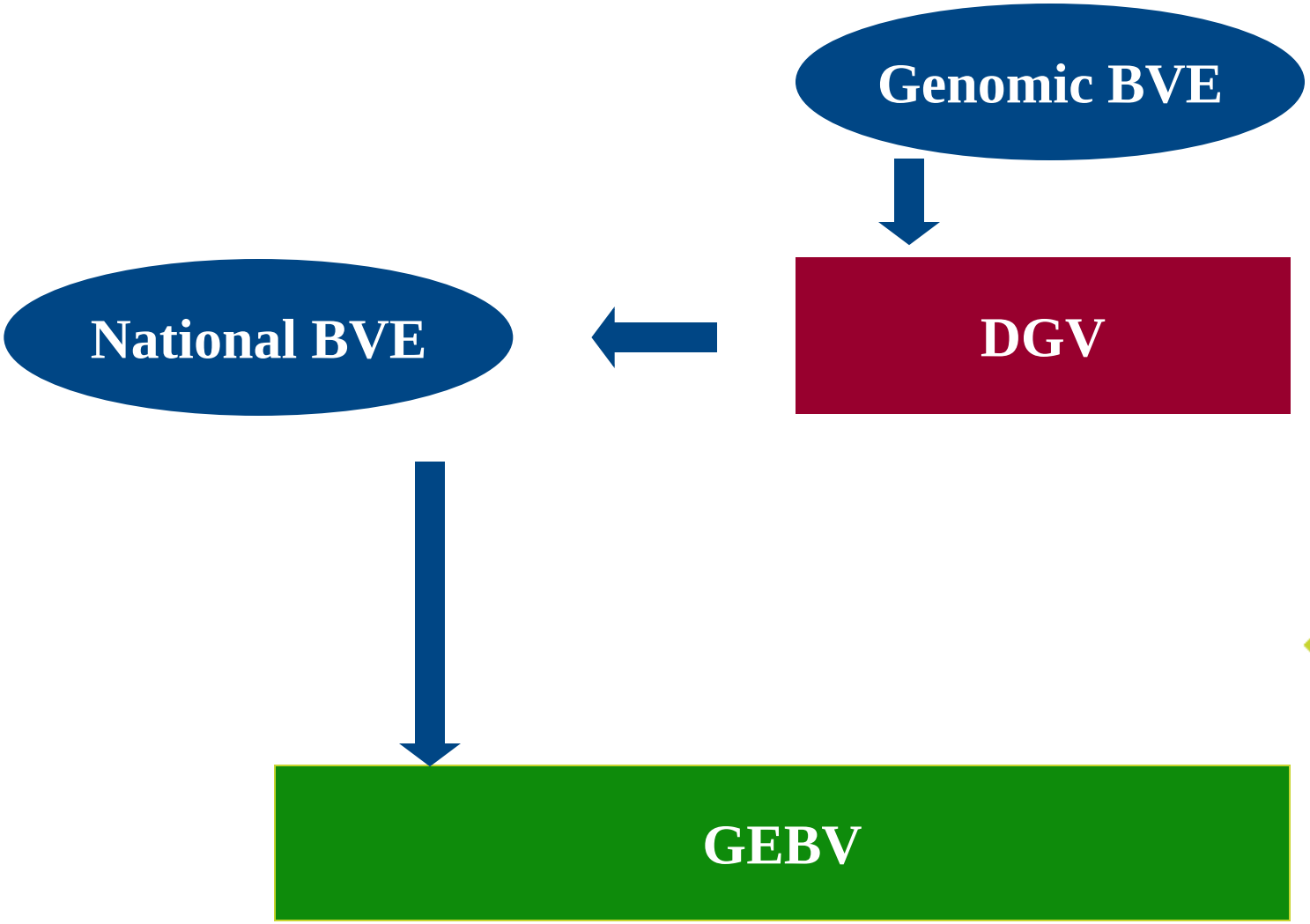
- Genomics in the Netherlands
- New traits: validation
- Alternative validation

Genomics in the Netherlands

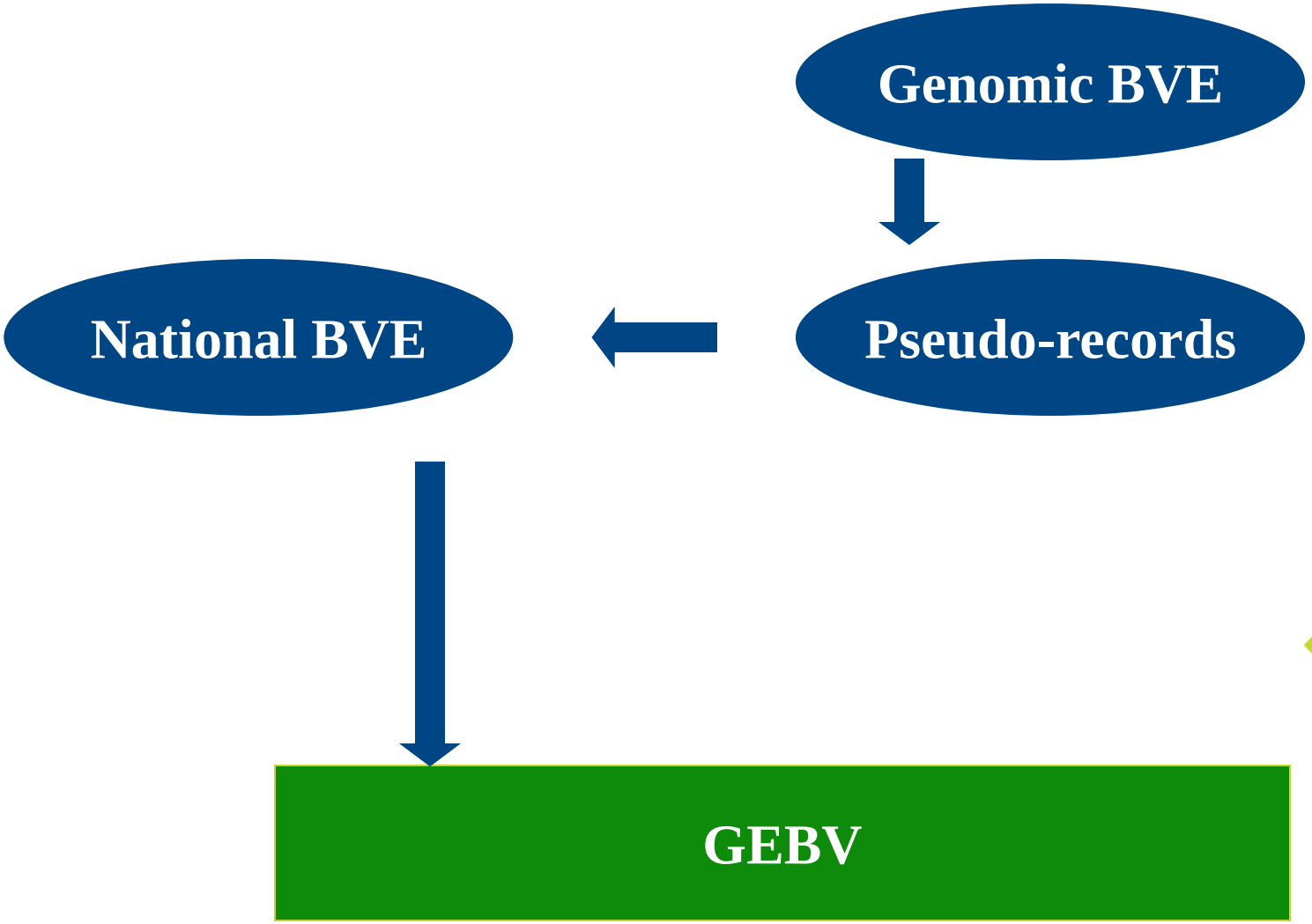
Blending System 2010



Pseudo-Record System 2014



Pseudo-Record System 2014



Genomic traits

Overall Index
NVI

Production
kg milk
kg fat
kg protein
kg lactose
fat %
protein %
lactose %
persistency
rate of maturity
INET
Urea

Longevity
longevity
longevity + pred.

Conformation
stature
chest width
body depth
angularity
body condition
rump angle
rump width
rear legs rear view
rear legs side view
foot angle
locomotion
fore udder attachment
front teat placement
front teat length
udder depth
rear udder height
udder support
rear teat placement
frame
dairy strength
overall udder
overall feet leg
overall conformation

Fertility
fertility index
nonreturn56
cow recycling
calving interval
interval fisrt-last ins.
conception rate
conception rate heifers
age first insemination

Calving traits
direct calving ease
maternal calving ease
direct stillbirth
maternal stillbirth
calf survival
gestation length
calving index

Udder health
somatic cell score
subclinical mastitis
clinical mastitis
udder health index

Functional traits
milking speed
temperament
meat index

Other Health traits
claw health index

Automatic Milking
robot efficiency
robot interval

CRV specific
better life health
better life efficiency
dry matter intake
ketosis

Average GEBV reliability young bulls

	Add rel	GEBV rel
Overall index NVI	60	64
Production (kg prot)	60	67
Longevity	41	47
Overall conformation	49	70
Fertility index	66	67
Calving index	55	62
Udder health index	60	65
Claw health index	32	47

New traits: Validation

Genomic traits: what's new in april 2015

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kg milk
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Genomic traits: what's new in april 2015

- Lactose yield
  - Trait in kg
  - Used in INET (production index) and NVI (total merit)
  - For foreign bulls lactose EBV is derived from milk yield EBV

- Urea
  - Trait in mg/ 100 g milk
  - Already in conventional evaluation since 2009
  - Now added to genomics

Genomic traits: what's new in april 2015

- Fertility

- Conception rate cows
  - Send to Interbull as T3 instead of NR56

- Conception rate heifers
  - Send to Interbull as T1

- Age at first insemination
  - Measured in days

Genomic traits: what's new in april 2015

- Calf survival
  - Survival of day 3 -365 (replacement dairy heifers)
  - Hardly any cullings in 2nd year of rearing
  - Two predictor traits:

    survival day 3-14 (all calves), survival day 15-180 (veal calves)

- Ketosis (based on acetone, mBHBA en fat/protein ratio)
  - Based on measurements acetone, milk-BHBA, and fat/protein ratio
  - Fat/protein ratio corrected for animal's own fat&protein genetics (animal 'base' level)
  - Validation study by Van der Drift (2012)

Genomic traits: what's new in april 2015

- Automatic Milking Systems
- Robot efficiency
  - kg milk per total AMS time in minutes

- Robot interval
  - # minutes between 2 consecutive successful milkings

Validation reliabilities

	# bulls in ref.pop.	h^2	added rel	GEBV rel
kg Lactose	28,686	.55	35	47
Urea	5,446	.60	51	57
Conception rate cows	15,068	.036	55	57
Conception rate heifers	11,422	.018	26	41
Age at first insemination	5,776	.045	21	36
Calf survival	5,674	.011	28	42
Robot efficiency	3,226	.27	35	47
Robot interval	3,296	.12	18	35
Ketosis	3,964	.24	52	58

Alternative Validation

Validation edits

- Standard:
  - Bulls included in training population if reliability of trait >50%
- Lactose:
  - Foreign and young bulls: kg lactose derived from kg milk, reliability > 50%. Deleted.
- Locomotion:
  - Foreign bulls: correlation with Dutch traits low, but reliability > 50 %. Deleted.

Validation edits

	Added rel standard	Added rel alternative
kg Lactose	35	39
Locomotion	48	32

Validation edits

	Added rel standard	Added rel alternative
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- For kgL added reliability seems to increase when derived breeding values are not included in the training population -> less ‘noise’, derived observations do not add information

- For locomotion added reliability decreases when Interbull breeding values are not included -> loss of information due to loss of # bulls in training population

Summary

- Over 65 genomic traits in current genomic evaluation
- Reliability of young bulls GEBV between .40 and .70
- Choosing appropriate edits can improve validation results, but there is a balance between more reliable data and loss of training bulls

More info on PSR model & validation

ADSA-ASAS Joint Annual Meeting

Tuesday 3:45 pm

Penzacola F-4

Session

Breeding & Genetics: Feed Efficiency and Methods