Genomics for the Meuse-Rhine-Yssel Breed

Marianne Stoop

Meuse-Rhine-Yssel Breed

- Red-and-White

Meuse-Rhine-Yssel Breed

- Robust cow, sober, strong, self-reliant

- Dual purpose breed

- Easy manageable

- Low input farming

Alex Arkink

Meuse-Rhine-Yssel Breed

MRY FIGURES 2016

No. of registered pure-bred MRY animals	7527
No. of registered animals >50% MRY	24860
No. of inseminations with MRY	41.502
Average production MRY (305 days)	6560 kg milk with 4.45% fat and 3.69% protein
NR 56	68%
Calving interval	392 days
ICI	86 days

Danielle 95 was the MRIJ-cow of the year in 2016 and she is also, in a heavy competition, elected as the most economic cow in the Netherlands.
In 5 lactations she averages 9294 kg milk with 5.21 % fat and 4.05 % protein. Her cell count is low and she got pregnant in every lactation from the first insemination.
Danielle 95 is classified Excellent 91, with 94 for udder and 93 for feet and legs.
CRV is happy to have her Rivaal-son Vinkenhof River in the MRIJ-portfolio.

Meuse-Rhine-Yssel Breed: Genetics

- Good fertility

- Good longevity

- Milk is high in protein

- Used in Holstein-crossbreeding

- MRY EBV are published on Dual Purpose Scale (base defined by MRY cows born in 2010)
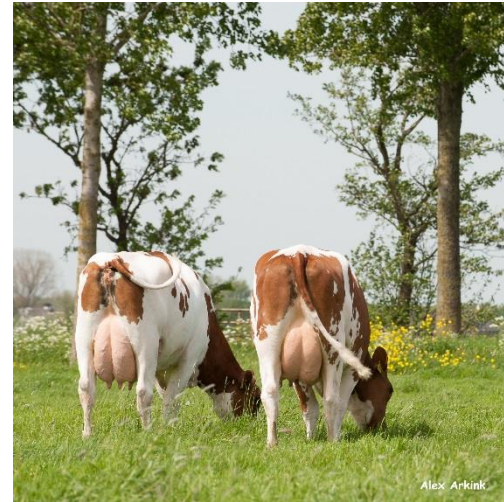
Meuse-Rhine-Yssel Breed: Dopple Nutzung

- Germany and Netherlands-Flanders

- Equivalent breeds

- Same ranking
  of MRY-DN bulls in
  both countries

Alex Arkink

MRY Genomics

- Small breed

- Low numbers

- ~140 MRY farms

- Active breeders

- Better selection

- More genetic improvement

Eric Elbers

MRY Genomics: Pilotstudy

- 550 bulls genotyped and with conventional proofs (NLD + DEU)
  - 266,382 daughters

- Standard Validation:
  - 75% of animals in training population
  - 25% of animals in validation population:

What added reliability to expect

- Cooper *et al* (2014, 2016)

  – Guernseys: average 16.8 %, training pop of 943

  – Ayrshire: average 8.2 %, training pop of 646

What added reliability to expect (kgM)

- Holstein:
    - 35000+ bulls in training population
    - Added reliability kgM is ~65% (13 EDC)

- Extrapolated backwards to 550 Holsteins using formulae of Daetwyler:
    - Added reliability kgM is ~3% (0.2 EDC)

- MRY inbreeding% high
    - Training population is likely to closely resemble validation population
    - Possibly increased added reliability compared to 550 Holsteins

Validation results

Trait	addEDC	addrel	gebv_rel
kgMilk	0.61	0.09	0.35
kgFat	1.08	0.16	0.38
kgPro	1.48	0.17	0.39
kgLact	1.72	0.22	0.41

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kgLact	1.72	0.22	0.41
Sta	0.84	0.11	0.36
Cwi	0.00	0.00	0.30
Bde	1.55	0.12	0.36
Ang	8.71	0.20	0.40

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N56	6.20	0.06	0.33
IAI	0.65	0.03	0.31
CI	2.12	0.08	0.34
IFL	6.21	0.11	0.36
Beef	1.89	0.11	0.36

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IFL	6.21	0.11	0.36
Beef	1.89	0.11	0.36
Average	2.36	0.09	0.35

Alternative Validation: Leave-one-out

- Standard Validation:
  - 75% of animals in training population
  - 25% of animals in validation population:

- Alternative Validation: leave-one-out
  - All bulls in training population
  - 1 bull excluded
  - 99 repeats = 99 validation bulls
  - Advantage: maximum training population size
  => Results were worse…. (due to variation between runs?)

Conclusions

- Training population of ~400 bulls gives a slight increase in GEBV reliability:
    - Production: 0.35-0.40
    - Conformation: 0.30-0.40
    - SCS   :   -
    - Longevity :   -
    - Calving :   0.30-0.34
    - Fertility :   0.33-0.36

- Leave-one-out validation did not give better results.

- Results are comparable to other studies/breeds

Continuation

- Currently genotyped 2,000 cows to improve reliability.

- 20 farms

- Bull + Cow training population

- New validation this autumn

- On-farm genotyping starting January 2018
  (See my presentation at EAAP about our Holstein genomic system)