

Analysis of relationship between claw disorders, metabolic status and milk yield.



Introduction

healthy and productive lactation

adaptation to the lactation = negative energy balance

clinical disease and impaired milk production

=

poor adaptive response

Sub-clinical ketosis

- major dairy cow metabolic disorder
- strong dietary negative energy balance around calving
- estimated prevalence in Europe is at 25 %

- decreased milk yield in early lactation
- several postpartum diseases
- increased culling

Sub-acute ruminal acidosis

- particularly prevalent in high-producing dairy herds
- caused by feeding excessively fermentable diets
- repeated episodes of depressed pH below 5.6 in rumen

- associated with decreased feed intake
- diarrhea
- laminitis
- milk fat depression

F/P ratio

- reflects energy balance status in early lactation
 - from 1.1 – 1.5
 - optimum 1.2 – 1.4
 - >1.0 SARA
 - <1.5 SCK

M&M's

- 3 commercial dairy farms (Holstein)
- claw trimming observation (IDHE, DD, SU)
- regular milk recording data (BS SR s.e.)

$$Y_{ijklmn} = \text{Herd}_i + \text{NoLact}_j + \text{CalvYear}_k + \text{CalvSeason}_l + \text{DIM}_m + \text{F/Pratio}_n + e_{ijklmn}$$

Herd_i – herd ($i=3$)

NoLact_j - number of lactation ($j=3$, 1st, 2nd, 3rd and higher)

CalvYear_k - year of calving ($k=4$, 2012, 2013, 2014, 2015)

CalvSeason_l - calving season ($l=4$)

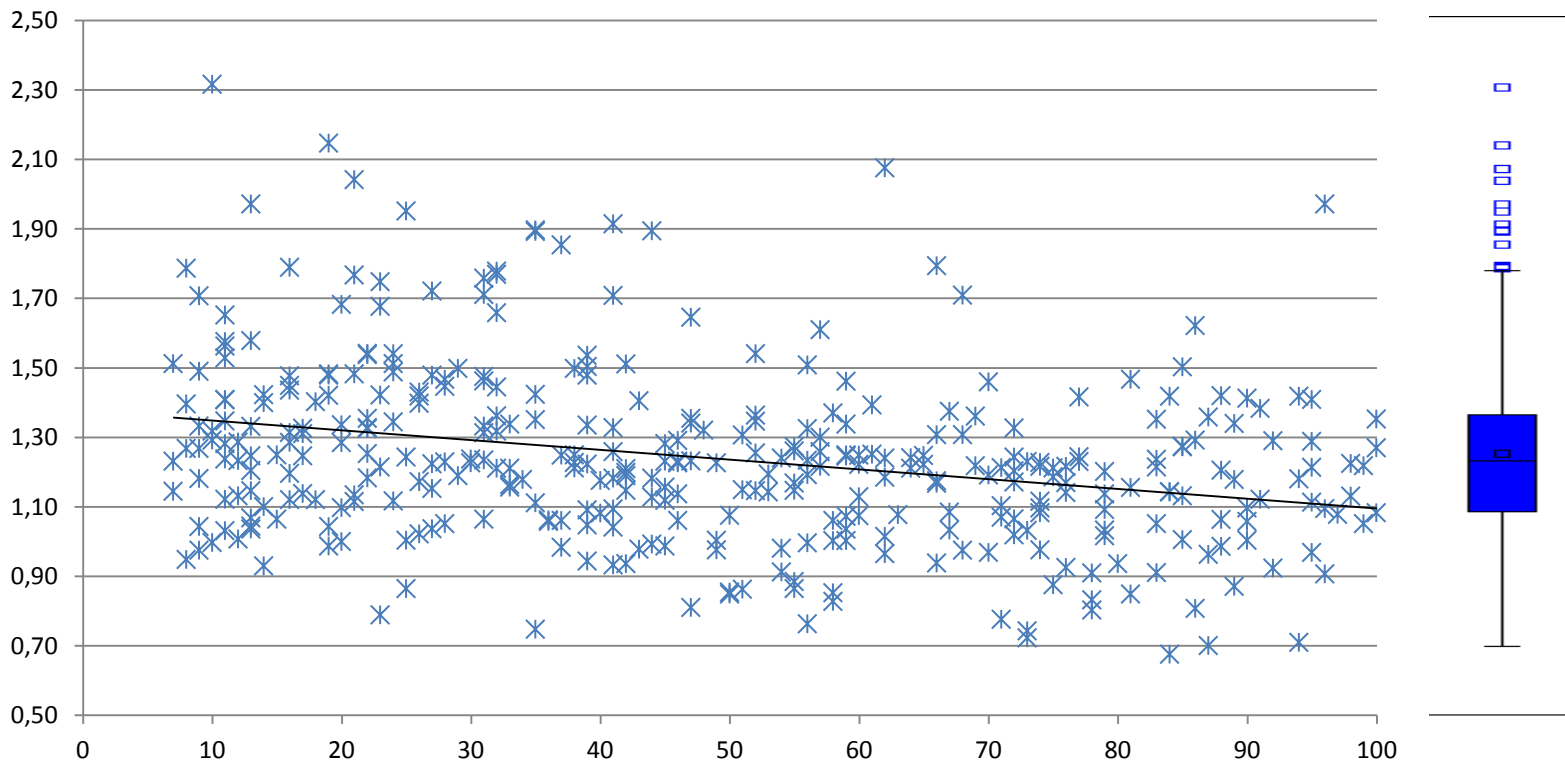
DIM_m - days in milk (from 5 to 100)

F/Pratio_n - Fat/Protein ratio

e_{ijklmn} - random error

Results

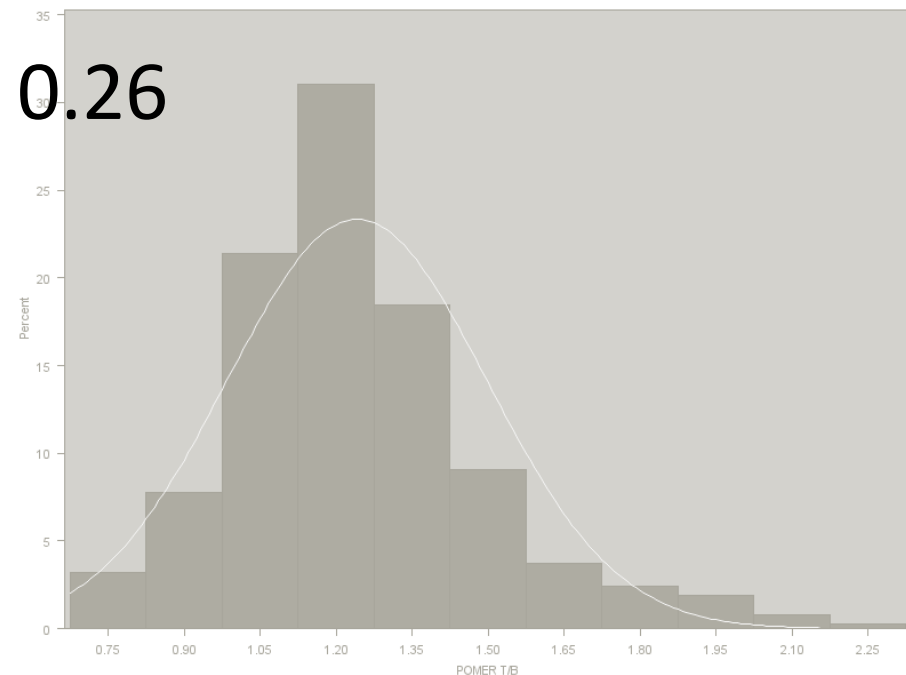
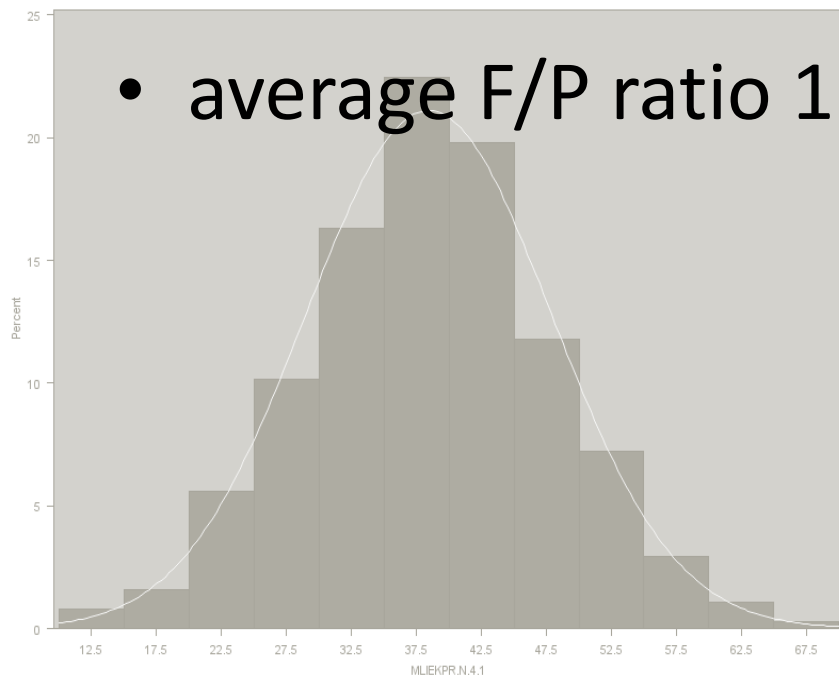
F/P ratio distribution over DIM



Results

- Average milk production $38.44 \pm 9.45\text{kg}$
- Average Fat: $3.79 \pm 0.81\%$
- Average Protein: $3.06 \pm 0.28\%$
- DIM 47.98 ± 26.59 d.

- average F/P ratio 1.24 ± 0.26



Results

- 13.9% under risk of SARA
- 13.1% under risk of SCK
- 20.1% IDHE
- 6.3% DD
- 20.1% SU



Results

- Model explained
- 47.40% in milk production
- 23.05% in IDHE
- 10.72% in DD
- 16.08% in SU
- 23.82% claw diseases in total

Expected incidence

- -1.92 kg/day ($P>0.05$)
- 0.17 ($P>0.05$)
- N/A
- 0.25 ($P>0.005$)
- 0.34 ($P>0.005$)

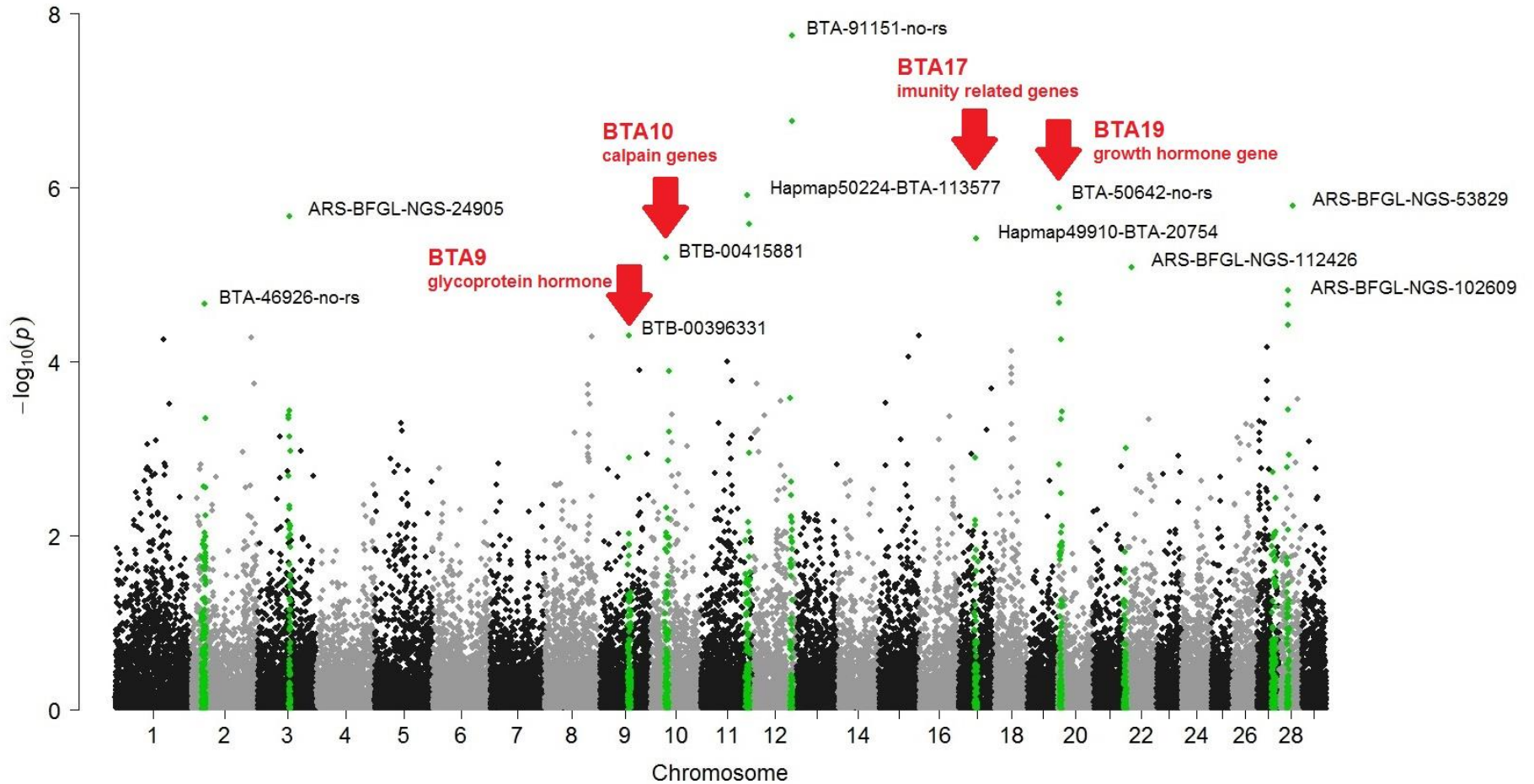
Discussion

- Milk F/P ratio is easily available from the routine animal recording
 - available immediately after test day (+2d)
- With use of sensors in milking parlor even on-line
- direct indication with use of bolus to measure rumen pH or sensors in milking parlor measuring BHBA
- low cost indirect evaluator of SCK, SARA
- confirmation on entire population needed
 - for different breeds diff. range of F/P ratio

Limitation

- # of claw evaluations
- No routine health data collection
- Re-establishment of health recording essential
 - Limited only to culling reasons
 - automated claw trimming/disease data collection not exists

GWAS future



Thank you for your attention!

