[redacted]

Euroopa Maaelu Arengu Põllumajandusfond: Euroopa investeeringud maapiirkondadesse

Production of quality meat on grass fed basis

Jens Fjelkner
Sjövången Jordbruk AB

Sjövången

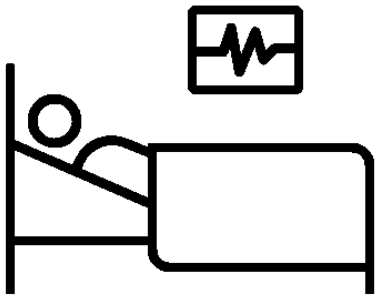
- Purebreed herd of Black Angus est. 1968
- Breeding & housing of horses
- 70 ha arable land, 110 ha native pastures & meadows, 12 ha forest
- Regenerative ambitions
- 100% grass fed
- No housing
- Organic

What is quality?

Animal welfare

Carcass

Eating



Health

Soil health

Biodiversity

Climate

Environment

Definition of grass fed

- USDA: "Grass (Forage) Fed" means that grass and forage shall be the feed source consumed for the lifetime of the ruminant animal, with the exception of milk consumed prior to weaning. The diet shall be derived solely from forage consisting of grass (annual and perennial), forbs (e.g., legumes, Brassica), browse, or cereal grain crops in the vegetative (pre-grain) state. Animals cannot be fed grain or grain byproducts and must have continuous access to pasture during the growing season.

Eating quality

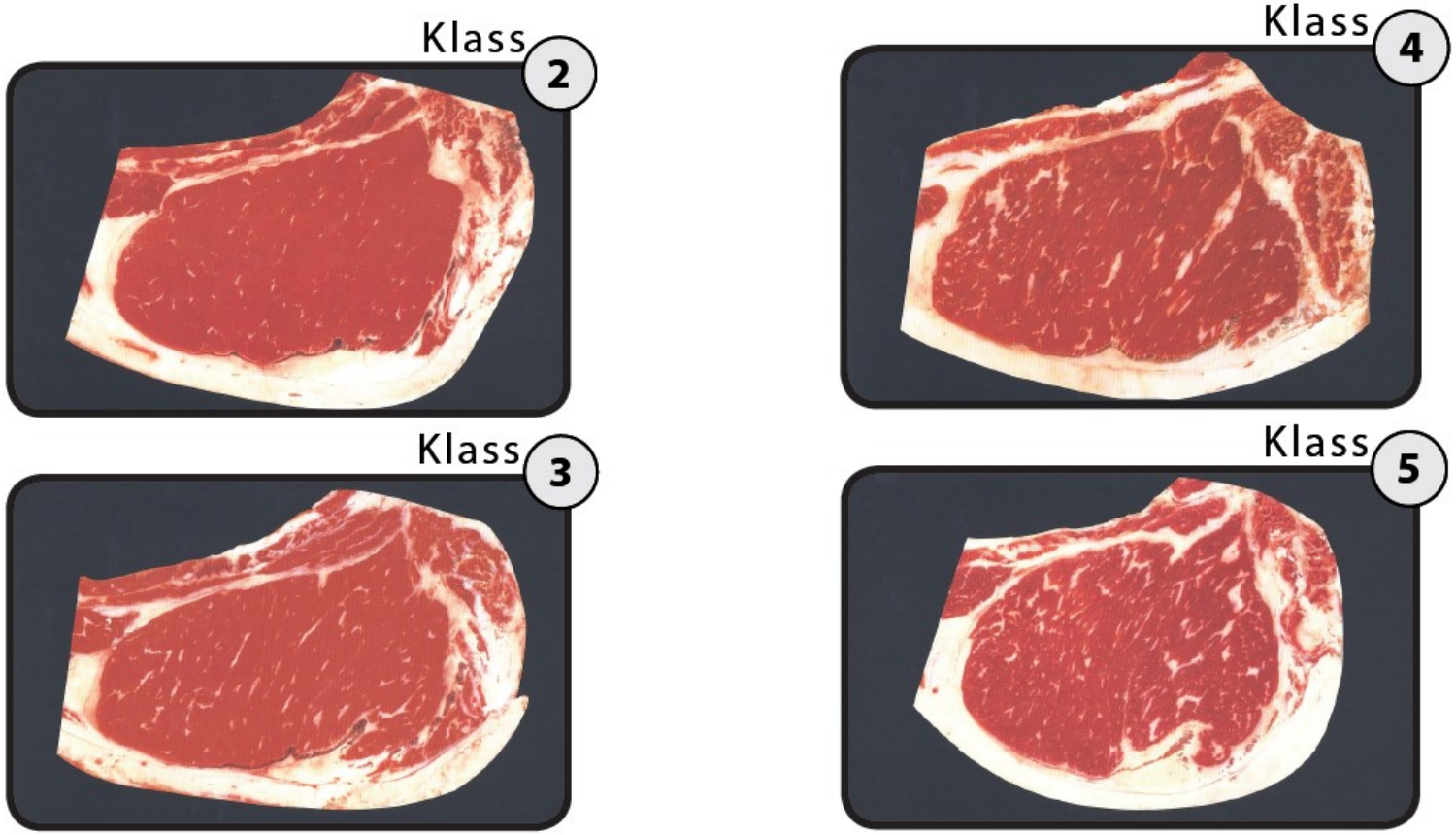
- Subjective
- Cooking, hanging, slaughter routine, transport, feeding, sex, age, fat, breed
- Conformation score uncorrelated to eating quality
- Taste, tenderness, juiciness

Marbling

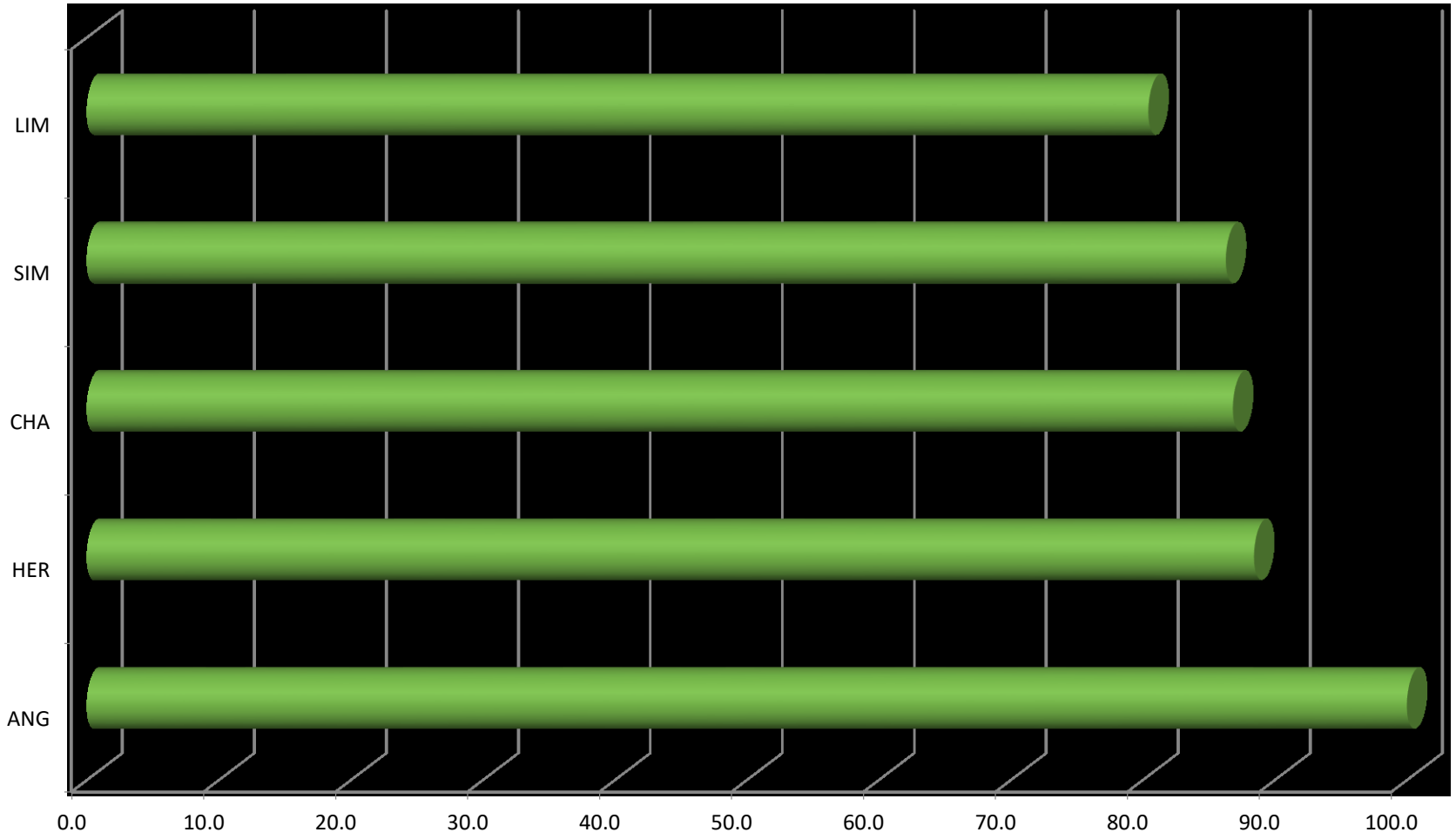
- Intramuscular fat
- Enhance taste and juiciness
- Less shear force- more tender
- Associated with animal category, slaughter weight, fat score, feeding intensity, feed stuff and breed

Marbling

- Swedish classification introduced in 2014



Relative marbling USMARC



Grass fed vs grain fed - nutrients

- Teagasc (Doyle et al., 2023) grass vs grain fed steer:
- +90% CLA (conjugated linoleic acid)
- +100% more *n*-3 PUFA
- +80% more EPA+DHA fatty acids
- Omega 6 / Omega 3: 1.15 vs 2,82
- Antioxidants i.e vitamin E
- Increased forage proportion have beneficial effects especially grazing
- Lower the risk for diabetes, heart disease & cancer

Regenerative agriculture

(Nordic network for regenerative agriculture)

”To enable highest possible vitality in the ecosystems, by satisfying human needs effectively”.

They who farm the land should, with as little inputs as possible, allow the four ecosystem processes to function as well as possible.

- **1. Energy flow**
  Maximize photosynthesis
- **2. Water flow**
  Retain the rainfall in the soil as long as possible before it returns to the oceans and the atmosphere.
- **3. Mineral flow**
  Facilitate the circulation of nutrients.
- **4. Diversity**
  Allow more diversity and community dynamics.

Grass fed vs grain fed - environment

- Less run off – keep water and nutrients at the right place
- Less soil erosion
- Mitigation of flooding

Grass fed vs grain fed - climate

- Less GHG from the long carbon cycle
- Teagasc (Doyle et al., 2023): grass favorable when compared to net production of human edible food
- Less nitrous oxide from tilling and fertilizer
- Increased possibilities for carbon sequestration
- Healthy soil contain methanotrophic bacteria
- Dung beetle reduce GNG-emissions

Soil carbon

Horizon	AHSD	CG - Rotation	CG – Cont.
1	4.26	3.28	2.72
2	3.22	3.76	2.74
3	3.10	2.06	0.80
4	2.98	2.04	1.08
5	2.80	0.76	0.80
6	1.98	0.82	0.68

- AHSD – adaptive high stock density
- CG – rotational grazing
- CG – contionius grazing

- Horizon -1= 0-15 cm
  -6= 76-91 cm

Källa: Allen Williams, https://www.sfa-mn.org/wp-content/uploads/2016/02/Allen.2017.DirtRich-1.pdf

Grass fed vs grain fed - biodiversity

- Polyculture instead of monoculture
- Planned grazing can improve diversity of organisms both above and below ground
- Less or no need for spraying

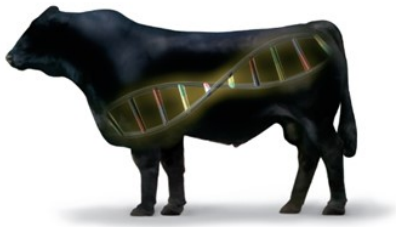
Genetics

Genetics

- Well adapted to the farm
- IMF
- Early maturity
- Full package
- Frame score + mature weight + body condition
- Optimal milk
- Depth & width

Genetic selection

- Maternal: Birth weight, calving ease direct, calving ease maternal, stayability, heifer pregnancy, docility, and milk.
- Performance: Residual feed intake, average daily gain, weaning weight, yearling weight, and scrotal circumference.
- Carcass: Tenderness, marbling, ribeye area, fat thickness, hot carcass weight.
- Tested animal must be related to the reference population
- Highest value for young animals
- Phenotype is king



Mob breeding

- Multi sire breeding
- Short breeding season
- Bulls from functionally correct cows > three offspring
- Selection for female fertility, longevity
- Selection male fertility & libido

Sex and age effects

- Bulls leaner and less tender, possible to grass finish
- Steers, heifers, young cows similar (but increasing) eating quality

Harvested feed

- Hay, silage
- Protein early
- Energy late, less legumes (or more mature)
- Animal in positive energy balance give more tender meat
- Increase roughage proportion give more meat taste

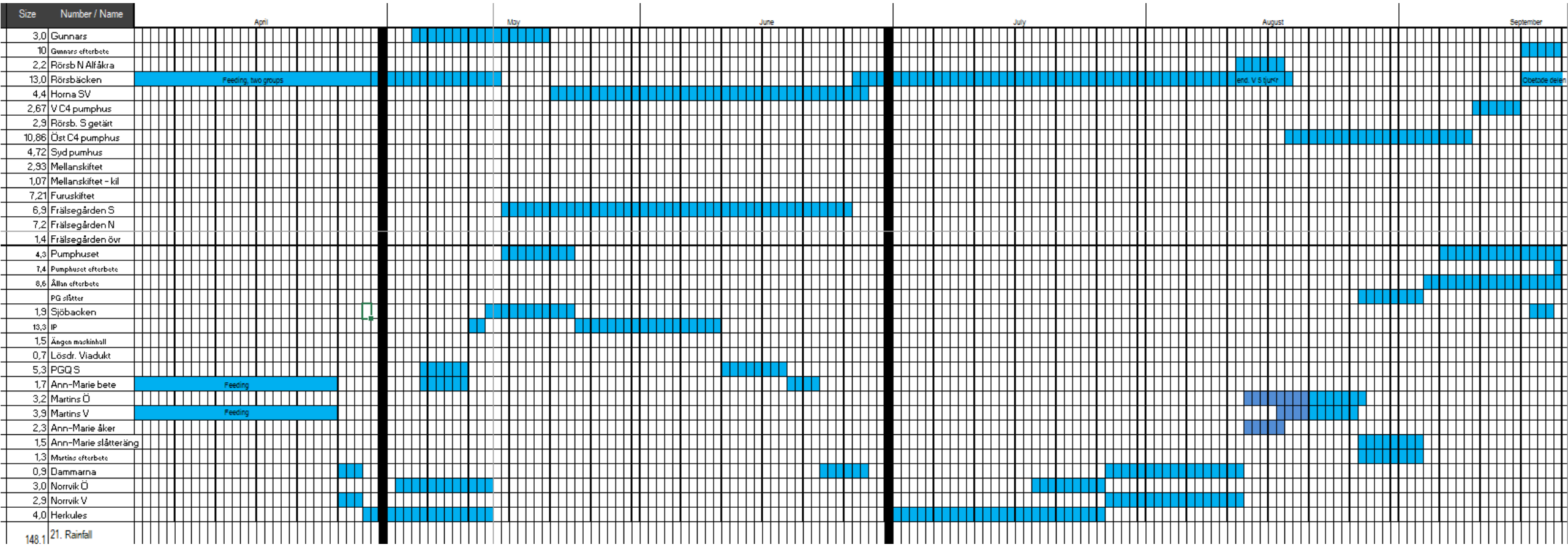
Other effects

- Housing
- Handling at farm
- Transport
- Stress

Grazing for quality

- Adaptive multi paddock grazing, holistic planned grazing
- More purposes than only feeding the animals
- Short grazing duration, daily moves common
- Often high density, kg animals / ha / move
- Long recovery, 2-3 (1-4) grazing's per year
- More mature pastures than conventional
- Accept or sometimes strive for high degree of trampling
- Change grazing patterns etc from year to year, planned disturbance

Grazing chart



Grazing legumes safely

Continuously monitoring and adapting

- Gut fill
- Faeces
- Behaviour
- Animal performance

- Grazing height
- Trampling

- Grass growth
- Weather forecast

Cow poop analyzer

Stop chasing peak nutrient stage

- Stressful for the farmer
- Adapt your management to harvest the necessary level of nutrients for the category of animals you are feeding
- Resiliency against draught and heavy rain

Trampling & regrowth

- Two weeks, warm dry conditions on sandy soil

Parasites

- Life cycles can be considered in the grazing plan
- Genetic heritability for parasite susceptibility
- Chemical treatment also kills beneficials
- Be aware of development av resistance
- Condensed tannins anti parasitic; birdsfoot trefoil, plantain, sanfoin (esparsette), berseem clover (alexandriner clover), hawthorn

Integrate livestock in crop production

- Utilize crop residue
- Convert cover crops to valuable protein
- Animal presence positive soil health effects
- Great possibility for young farmers to get started
- Portable infrastructure

Thank you!

Euroopa Maaelu Arengu Põllumajandusfond: Euroopa investeeringud maapiirkondadesse