Animal breeding for the future

Phenotype or genotype

An important issue that farmers and breeders have to solve is:
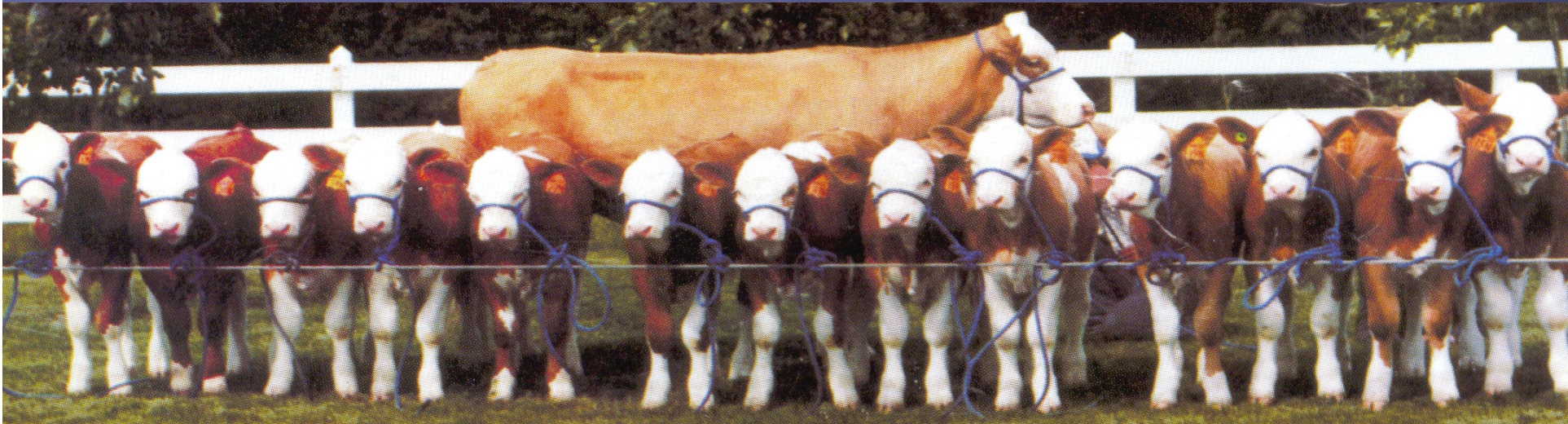
Can I breed / select my animals on visual appraisal alone, EBV's alone, a balanced combination of both or is there even more information that needs to be considered ?
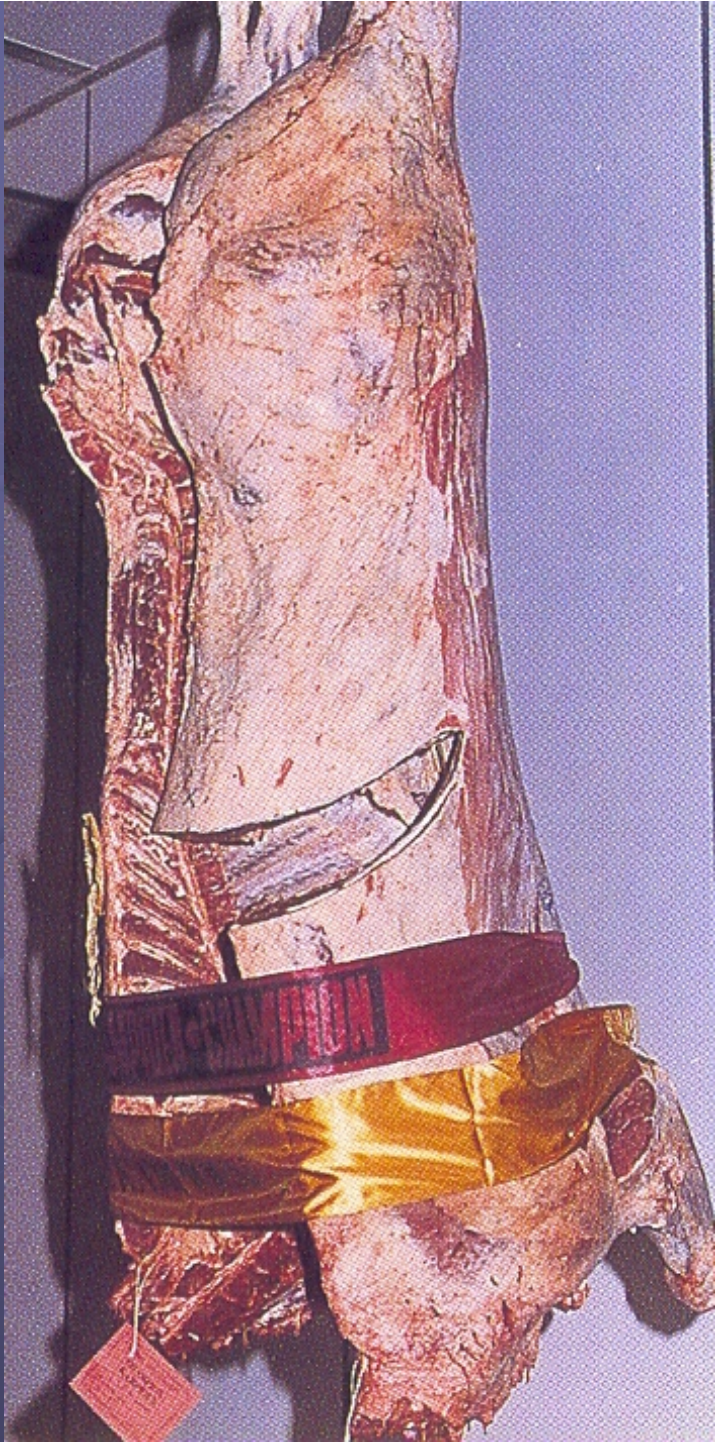
Philosophy

We are all lunatics and only he who can analyze his delusion is called a philosopher

Different traits

- Functional / reproductive / fitness
- Production / growth
- Product quality
- Type / quality / structural / appearance
- Input
- Behaviour

Value of animal

- Value of an animal for breeding / production is determined by more than one trait:

    - not independent

    - not equally important

    - not all cheap or easy to measure

    - not all asses / judge subjectively

Trait importance depends on:

- Effect of trait on profitability
- Animal Breed – purpose, performance
- Climatic conditions
- Production system
- Market requirements
- Socio-economic system

Current solution is:

The Modern Approach to animal breeding

Definition of Modern Approach

Objective use of **breeding values** in conjunction with **visual appraisal** to improve the **profitability** of a production system

Moral issues

Issues of increasing importance to consider:

- Climate change and global warming
- Animal rights and animal welfare

Environment

Methane production – climate change

      - 700 l methane/day

      - 18% of total greenhouse gas

Degradation of natural resources:

      - soil erosion

      - deforestation

      - air / water pollution

Animal

Do animals have moral status?
  If so, as moral agents or moral patients?
Do we have certain responsibilities?
Do they have certain rights and freedoms?

Do we have to choose between cruelty
  and profitability?

More Information

QTL,s / gene marker technology

Solution for the future is:

The Sustainable Approach to animal breeding

Definition of Sustainable Approach

Objective use of visual appraisal, genetic information (EBV's / QTL's) and ethical principles to improve the sustainability of a production system

Aim of the sustainable approach to animal breeding

- To change the genetic merit of future generations so that they will be able to produce the required products under future economic, natural and social circumstances in a sustainable manner.

Historical development of selection systems

Selection

Visual approach

Performance approach

Economic approach

Sustainable approach

Visual approach

Oldest method (still used)

Subjective idea of best / most beautiful animal

Uniformity, type, colour, colour pattern

Structural correctness, general appearance

Pedigree, show results

Performance approach

'Measure and Know' idea

Subjective trait selection

Growth related

Limited or single trait objective

Aim – highest not optimum performance

Undesirable results

Economic approach

Objective and formal definition of breeding objective

A number of traits are included

Selection for most profitable animal

Economic selection index

Developed for Simmentaler and Simbra in Southern Africa:

- Self-replacing-feedlot
- Grass-fed
- Terminal-sire

Sustainable approach

Build on Economic Approach by also considering:

Management and conservation of Resources
      – natural, human, genetic, capital
Reduce Risk involved – environment
Socio-economic system
Ethical principles – animal welfare

Advantages

- Use combination of EBV's and other information that will ensure optimum long term genetic and economic progress

- Use EBV's more efficiently

- Relate EBV's with profitability

- Improve sustainability of production system / genetic progress

Advantages

- Farm management improves
- Information easier to understand / use
- Conservation / management of resources improve
- Reduce risk
- Satisfy consumer demand
- Socially acceptable