CHOICE
Caring for life

We Live in the Genetics Era

James Rohl

Field Genetics Manager, Choice Genetics

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GRIMAUD Families
- Majority -

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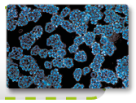
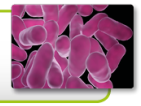
Financial Partners

Biopharmacy

valneva
Main shareholder at 15,6%
Vaccines and human antibodies



Filavie
Vaccines, bacterial cultures and analysis

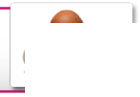


Hypharm
Sera, pharmaceutical proteins and specific pathogen free animals

Animal Genetic Selection

GRIMAUD FRERES SELECTION
TOMORROW'S GENETIC TODAY
Waterfowl, Pigeons

novogen
Genes for better eggs
Layers



ERBEEK

GALOR
Guinea fowl

Hypharm
Rabbits

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Pigs

blueGENETICS
Aquaculture

M.A.J. : 11/2018

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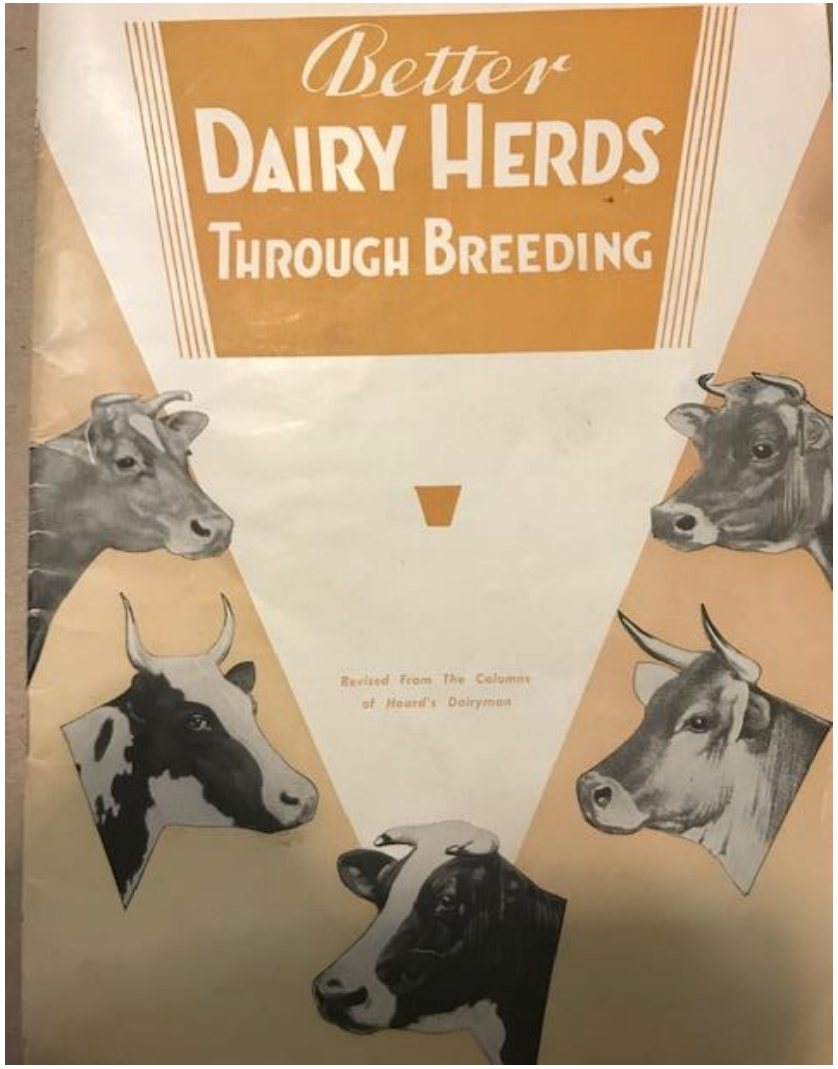
Dairy Industry

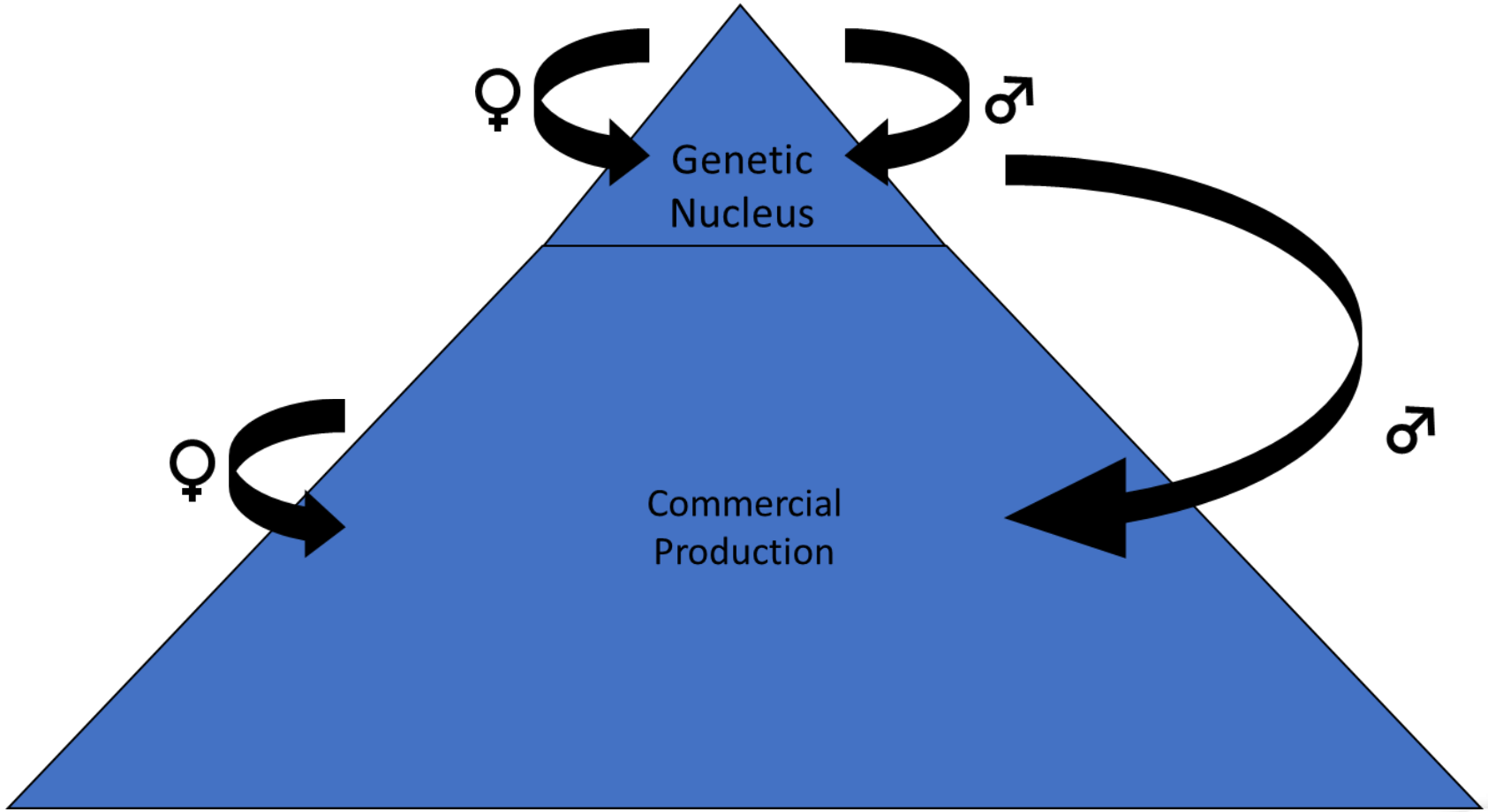
- Use of Field Data
  - ✓Large amount of data
  - ✓Lack of bias
  - ✓Commercial conditions
- Identification and Management of Genetic Defects
- Industry Wide Use of Selection Index
  - ✓Training of Commercial customers
  - ✓Inclusion of Type as well as Production traits
  - ✓Lowly heritable traits
- Genomics

Dairy Industry

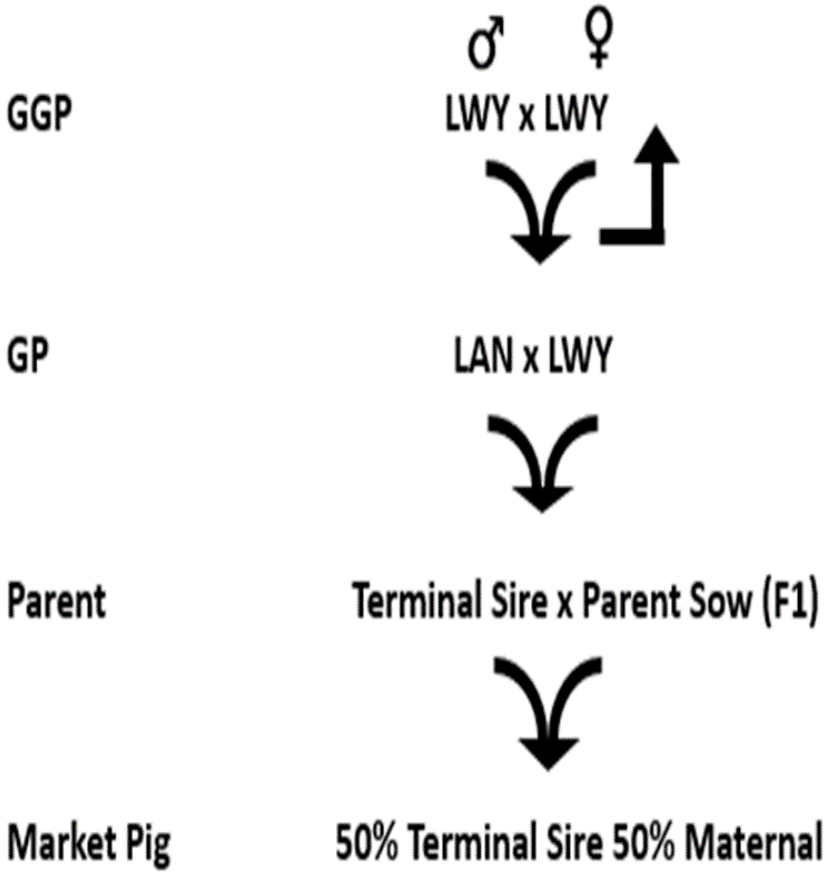


- 1946
  - ✓Economic value of good cattle
  - ✓Mendelian Genetics
  - ✓What is a good pedigree
  - ✓Importance of tested bulls
  - ✓AI

Genetic Pyramid



Typical Swine Breeding Pyramid

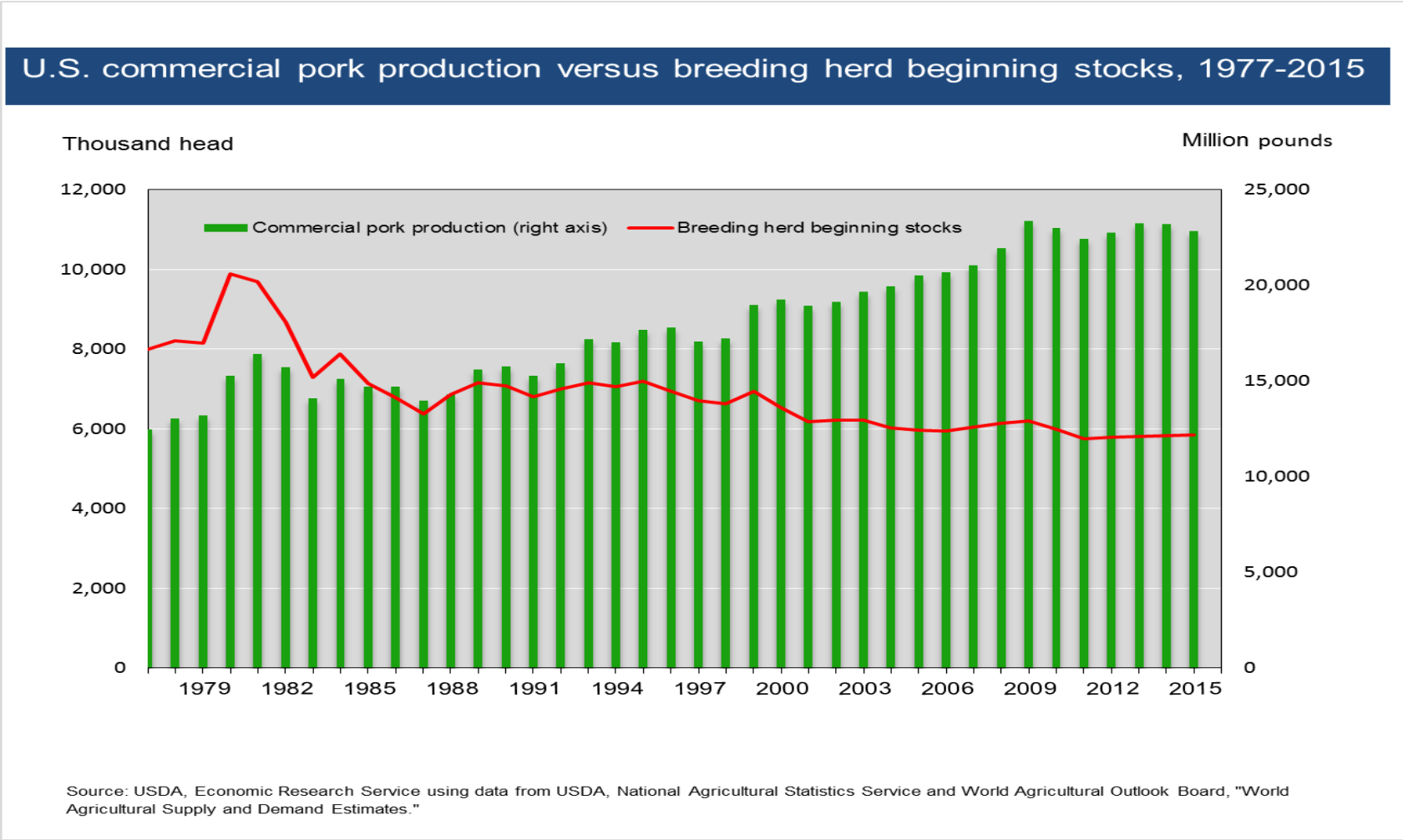


- **Driven by biosecurity**
- Specialized Maternal and Terminal lines
- Heterosis in Parent female
- Farm stocked with females from Breeding Stock multiplier
- Replacement females generated internally
- Multiplication may be embedded in commercial herd
- Semen from sires produced in genetic nucleus herd
  - Single sire matings at GGP and GP
  - Pooled semen at Parent Level

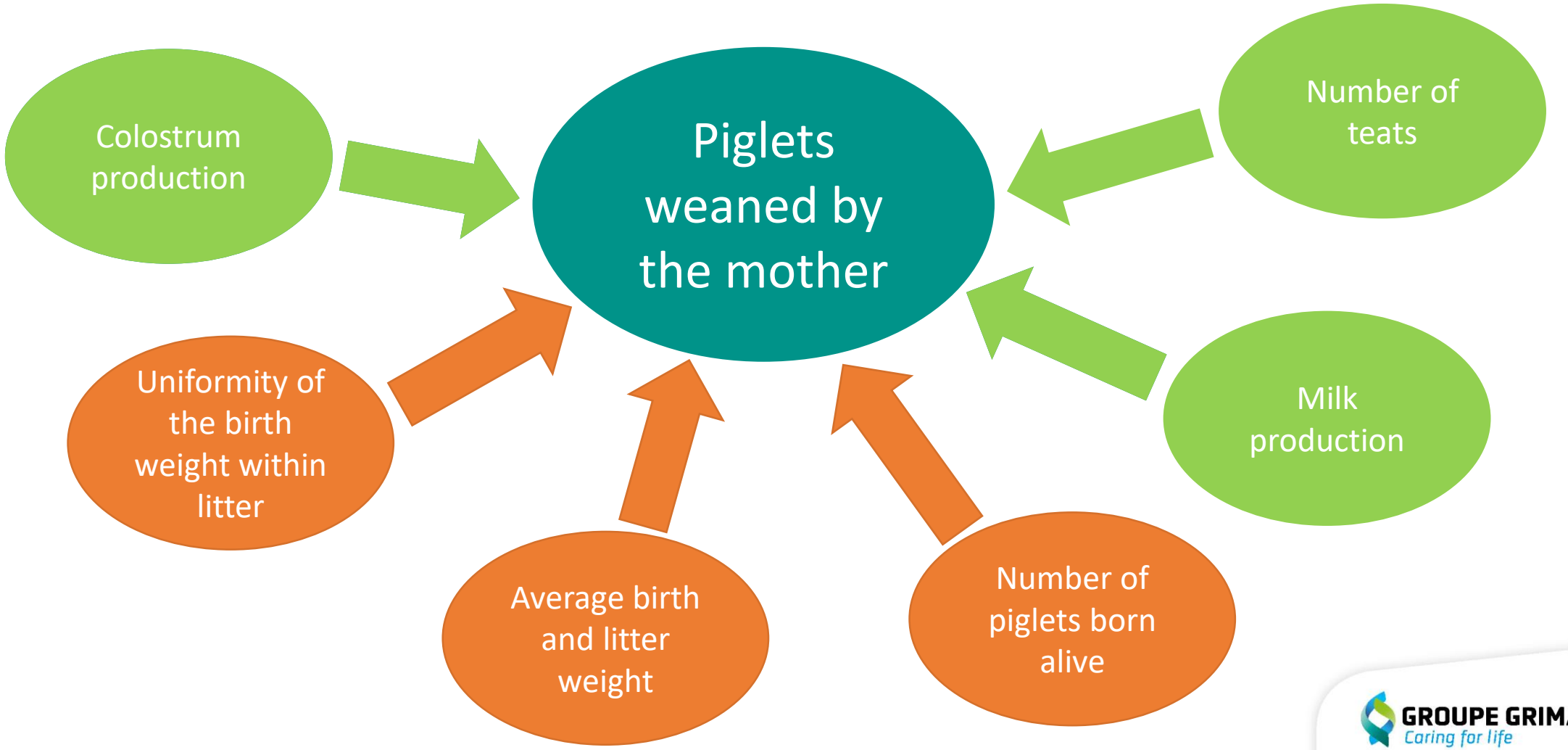
US Swine Breeding Business

- Each Breeding Stock company has it's own closed lines, even if the breeds are the same
  - ✓No outside introduction
- Each line has a specific index designed to maximize the desired traits
- Little interaction with the "purebred" pig world
  - ✓Breed type
  - ✓Showing
- Restrictions in place

US Sow Numbers and Pork Production



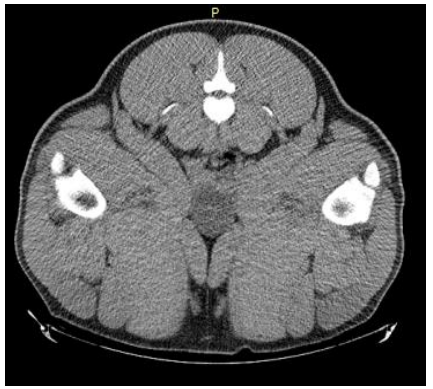
Our approach: piglets to be weaned by biological mother



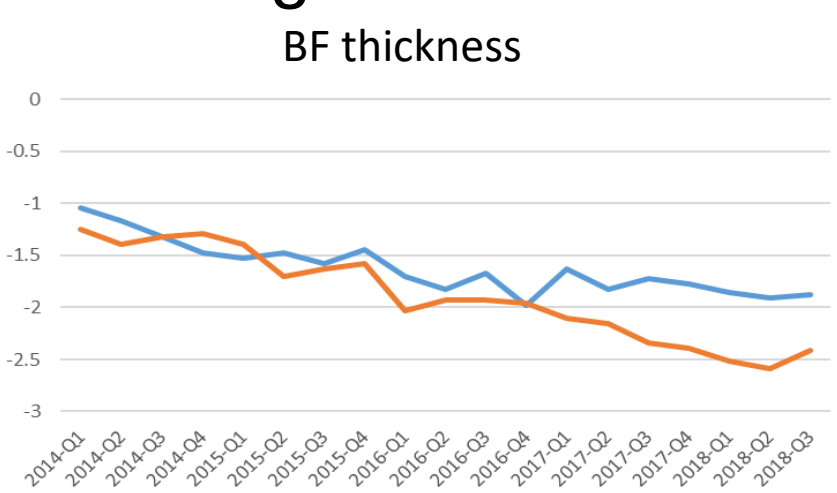
Genomics

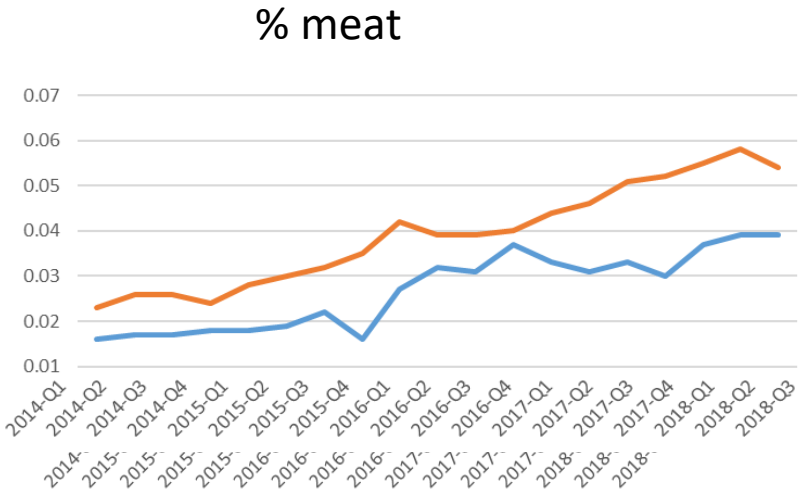
- Early Wins
  - ✓Elimination of deleterious alleles – HAL, RN
- Production Traits
  - ✓Difficult to quantify
  - ✓Everyone is doing something
  - ✓Within company research
  - ✓Benefit of multispecies approach
- Karyotyping for Chromosomal Abnormalities

Conformation



- Conformation → CT scan
- In-house developments of algorithms to evaluate content in fat, muscle and bone
- Evaluation of new traits derived from the CT-images

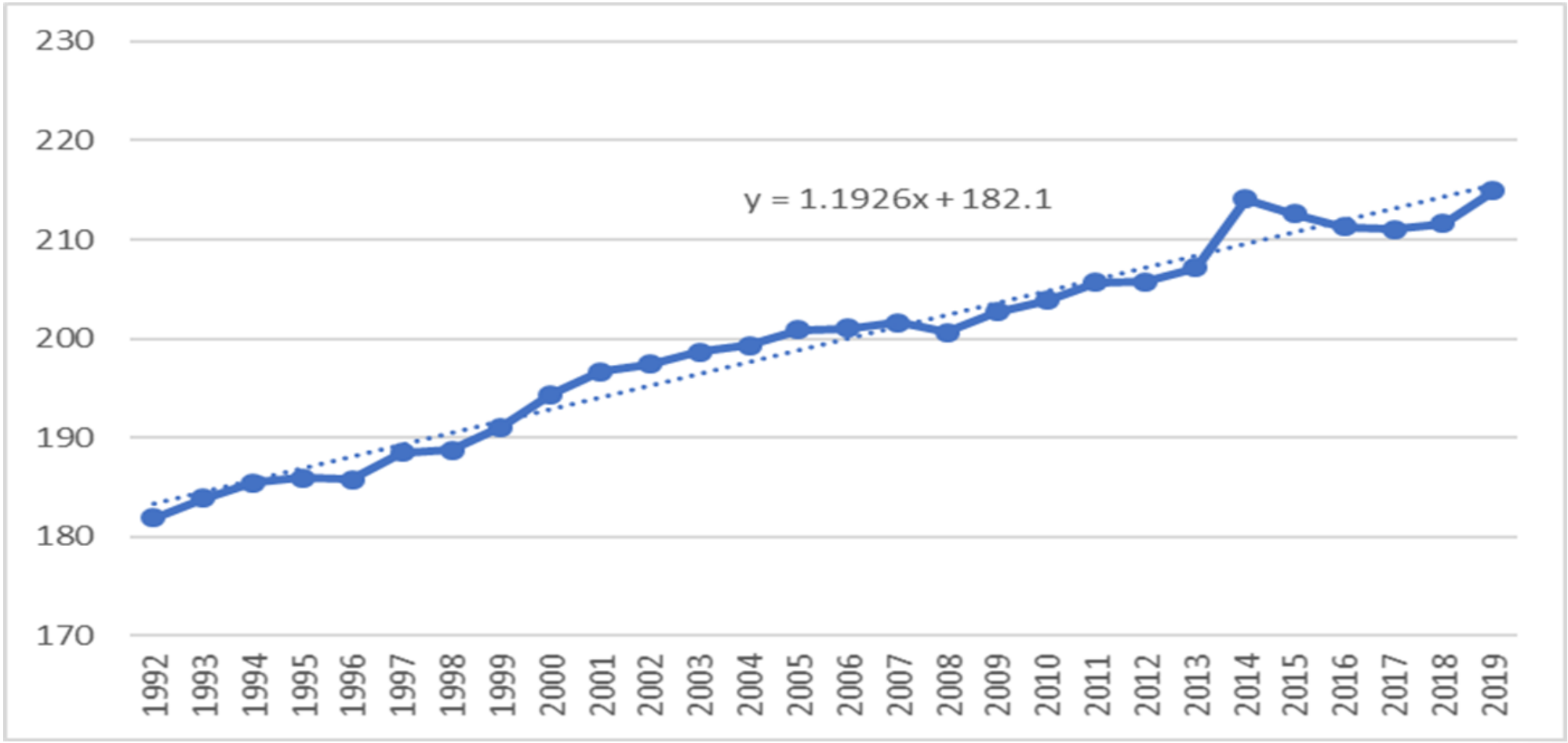




Feed Conversion Ratio

- Data collected in numerous environments
- All lines
- Males and Females

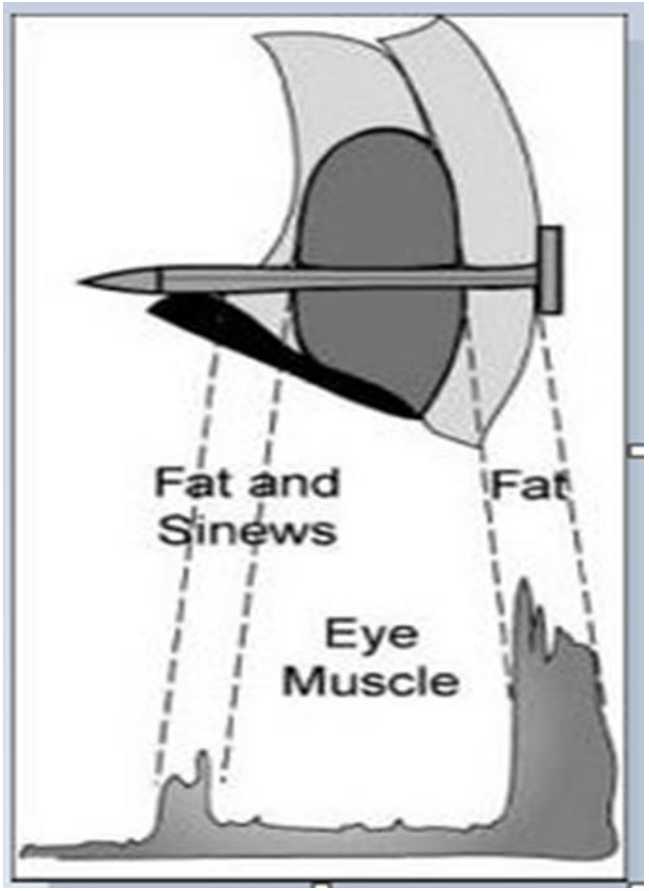
Average US HCW, 1994 – 2019, lbs



- Source: USDA Ag Marketing Service

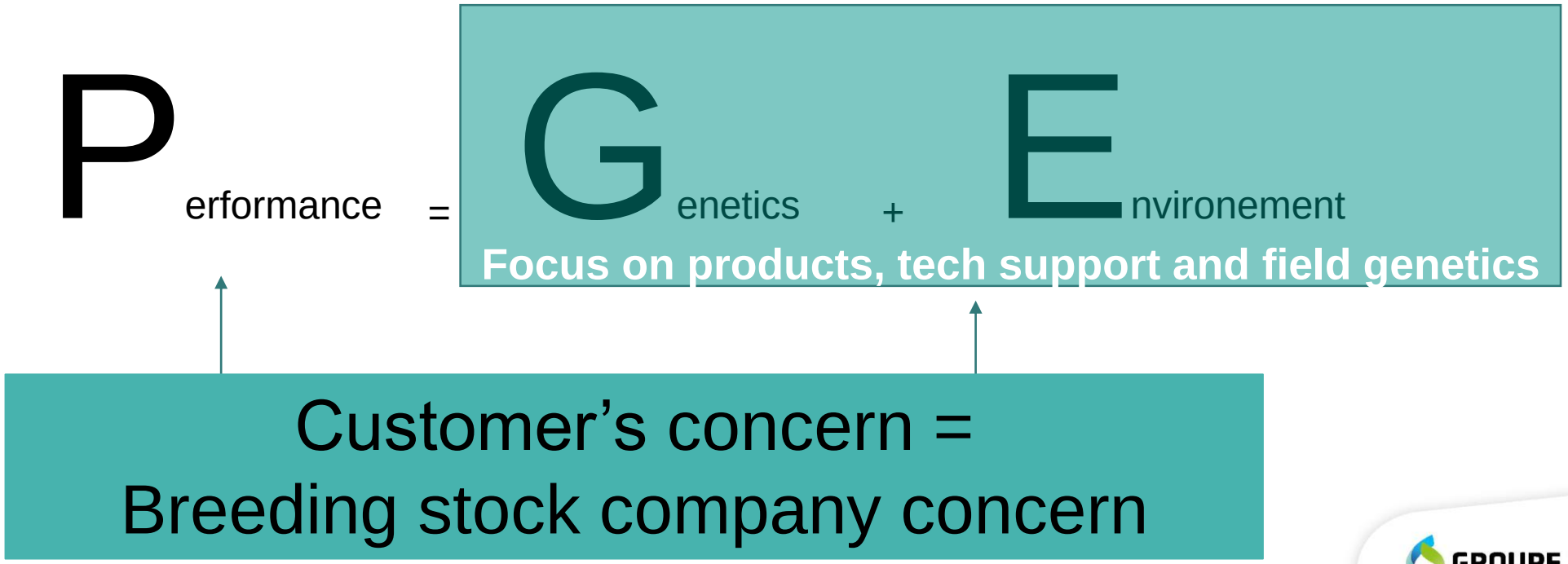
Increase in carcass weight over time

- Decrease in backfat
  - ✓RTU
  - ✓BLUP
- Evaluation of carcass at line speed
  - ✓Payment grid based on estimated lean %
- Change in grid over time to reflect value of fixed cost
- Demand for breeding stock that will produce market pigs that are lean and efficient to heavier weights
  - ✓Test facilities



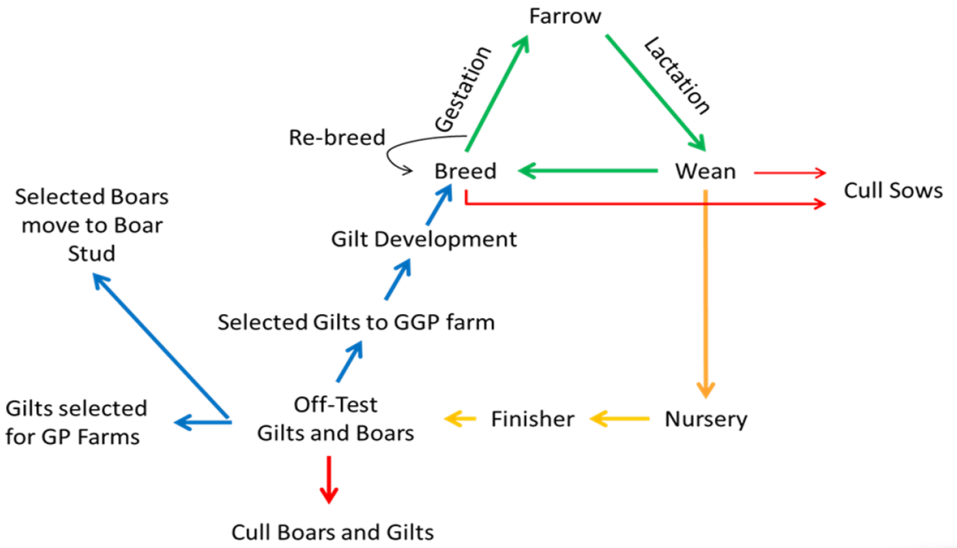
Field Genetics/Genetic Services

Solution provider



Breeding Programs

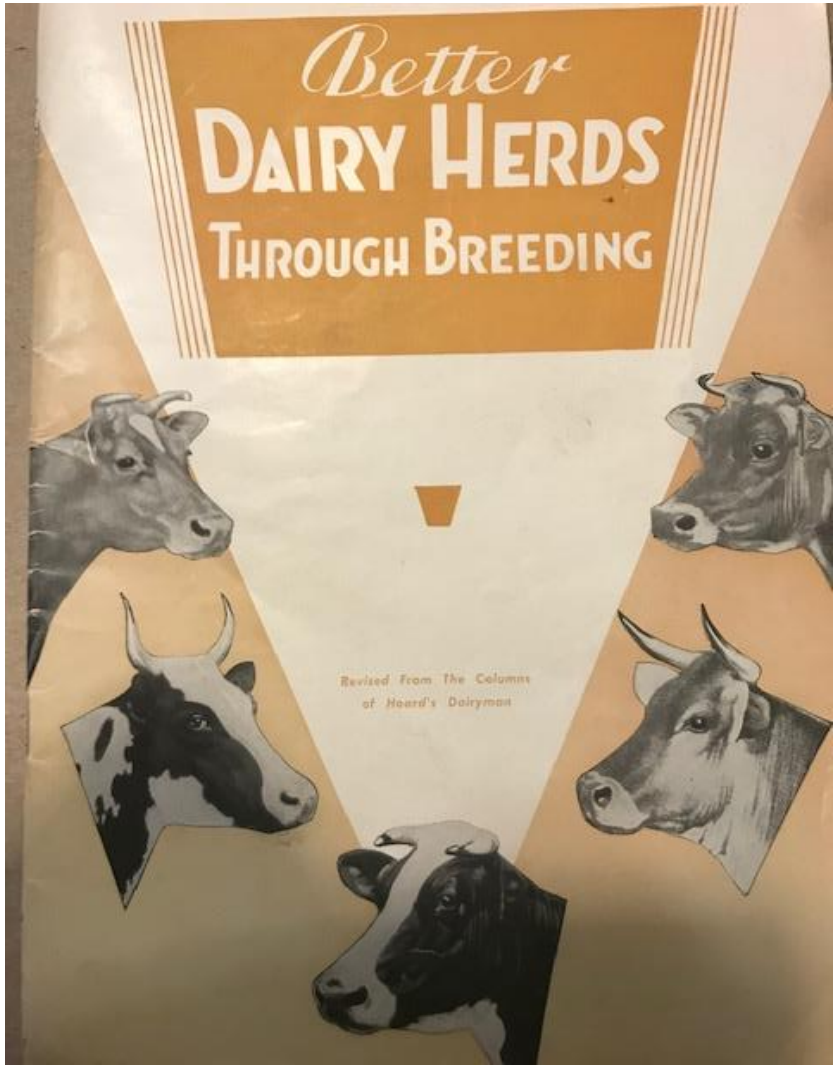
- Oversight or full management of the breeding program.
  - Regular Genetic Audits
- Data integration with other global systems.
- Digital collection program with cloud based compilation and focused regional field genetics team.



The 800 Pound Gorilla

- **Biosecurity**
  - ✓**ASF**
  - ✓**PRRS, PEDV, etc**
  - ✓**Increase in sow herd size – 250 to 5000**
    - Single sourcing
  - ✓What does it look like?
    - Fences, showers, down time
  - ✓Genetics can’t be good enough to overcome poor biosecurity!

Dairy Industry



- Biosecurity
- Genetic merit and production data flow
  - ✓Purebred system
- Adaptable breeders and Strong Breed Association
  - ✓Diversity of goals
  - ✓Openness to new technologies
- Genetic restrictions?

www.choice-genetics.com

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