

# Feed Efficiency

*Limitations and challenges with RFI*

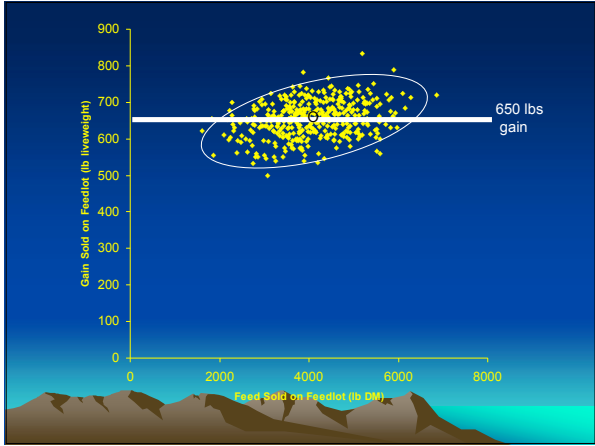
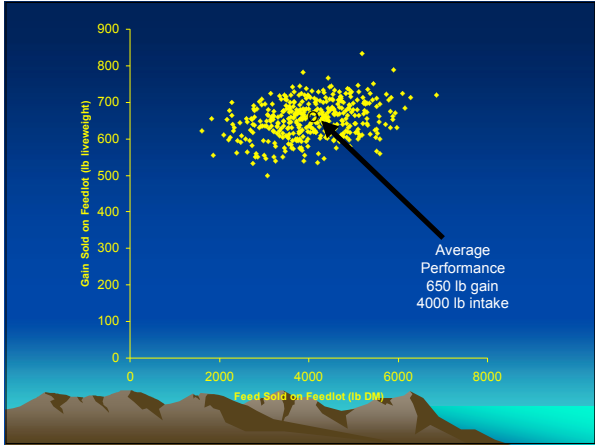
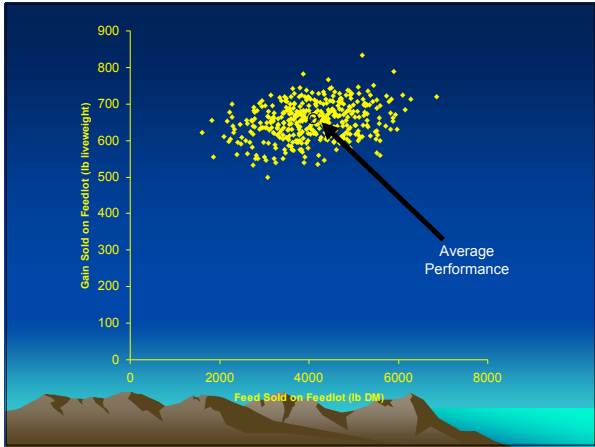
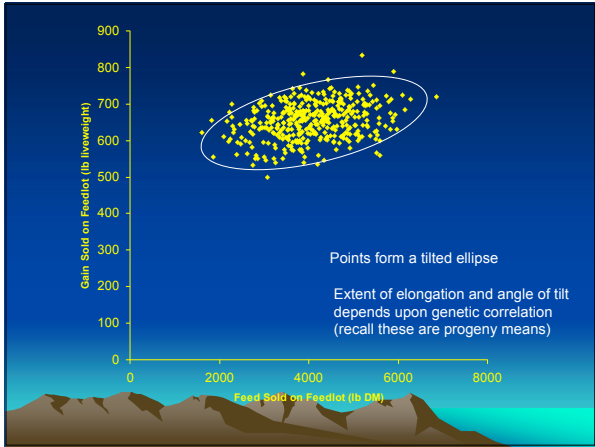
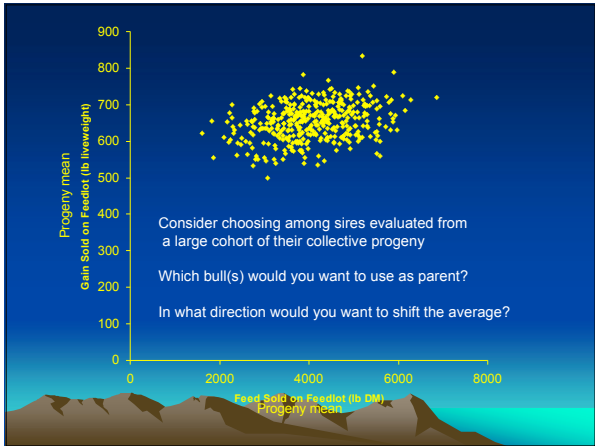
**Dorian Garrick**  
Lush Chair in Animal Breeding & Genetics

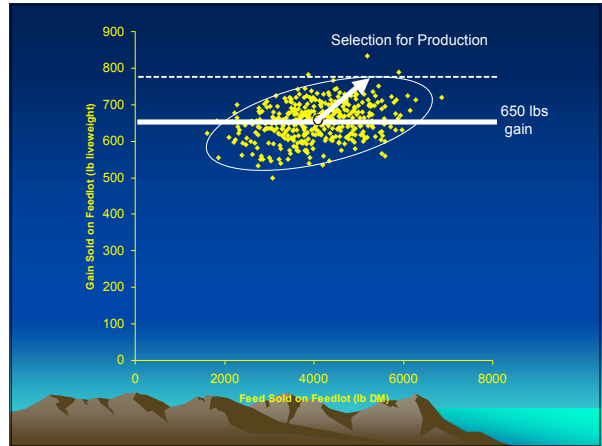
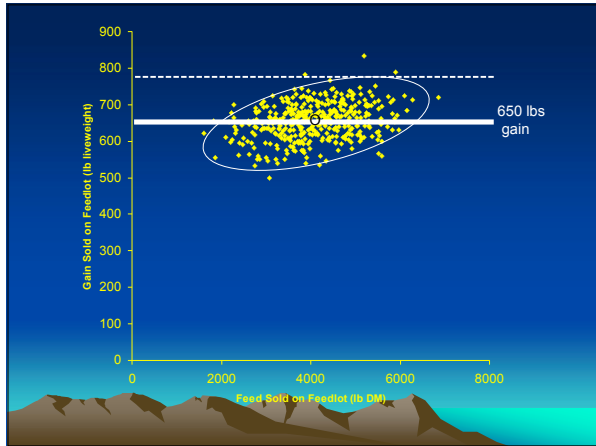






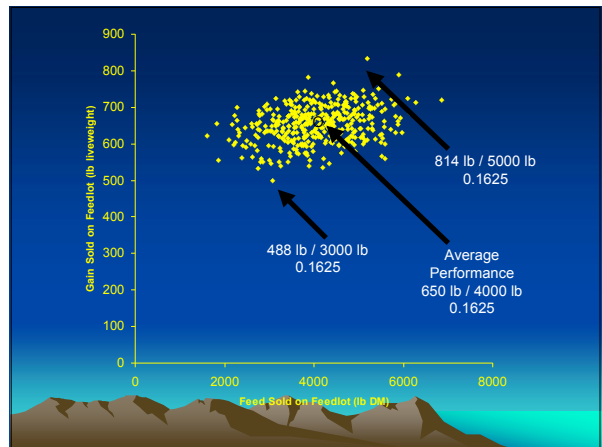
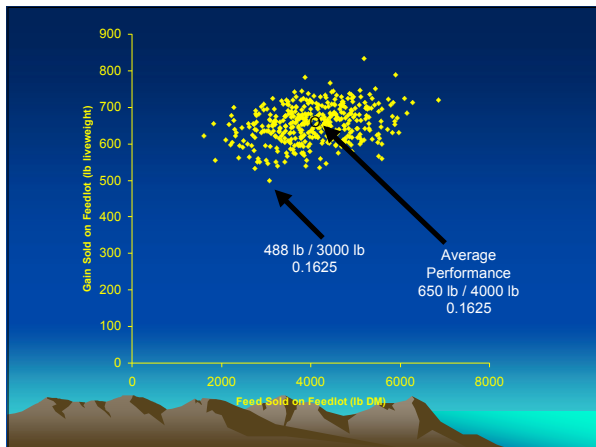
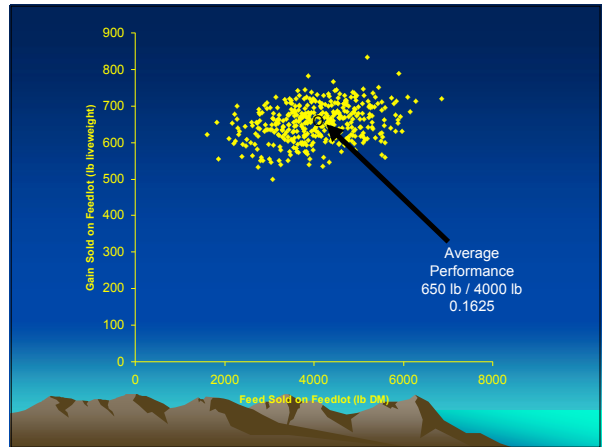


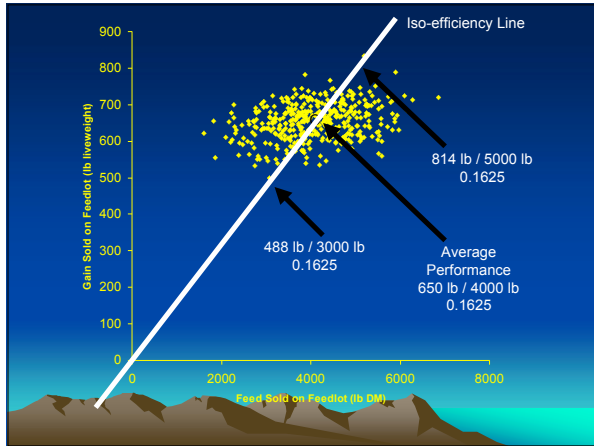




## Feed Efficiency

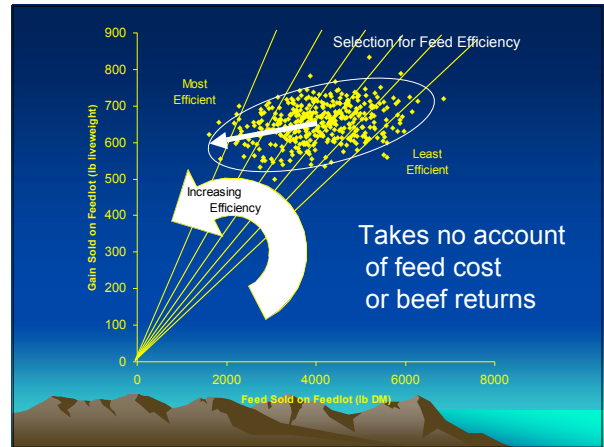
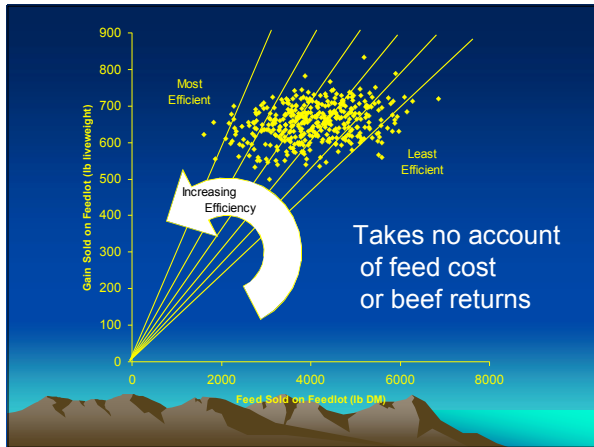
- Efficiency typically measures output divided by input
  - Big numbers are “desirable”
  - lbs gain per lbs feed (eg  $1/6 = 0.16$  lb/lb)
- Alternative is feed conversion rate
  - input over output
  - Small numbers are “desirable”
  - lbs feed per lb gain (eg 6 lb/lb)
- Rankings are “equivalent”





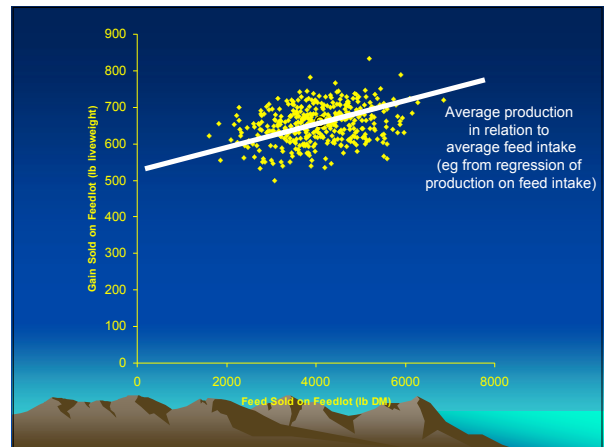
## Iso-efficiency

- All animals on the line have the same efficiency
  - If efficiency was your goal, you would be equally happy with any of those animals



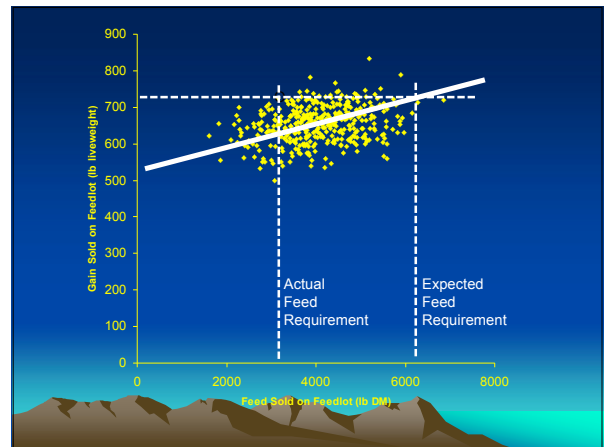
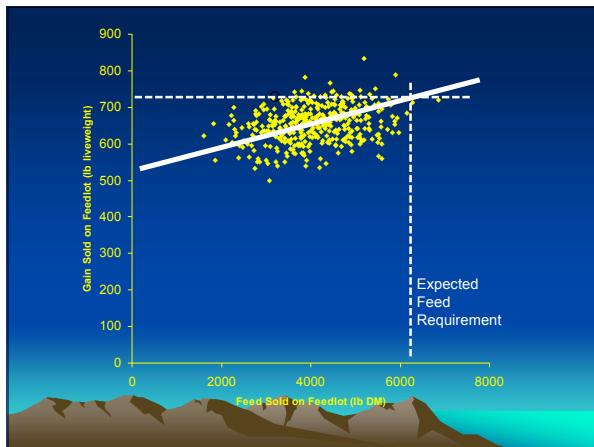
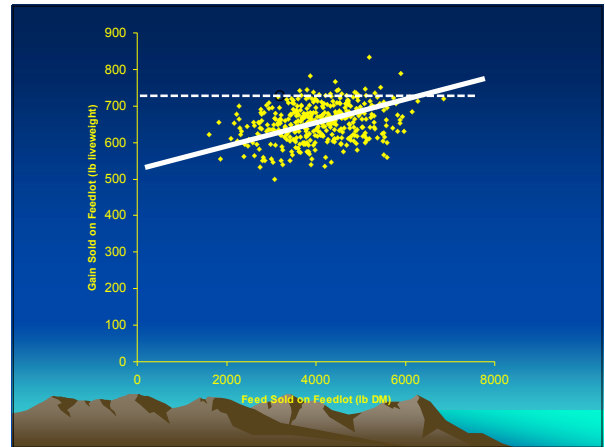
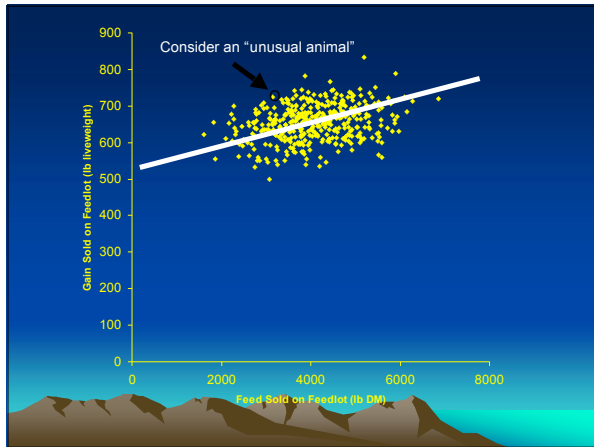
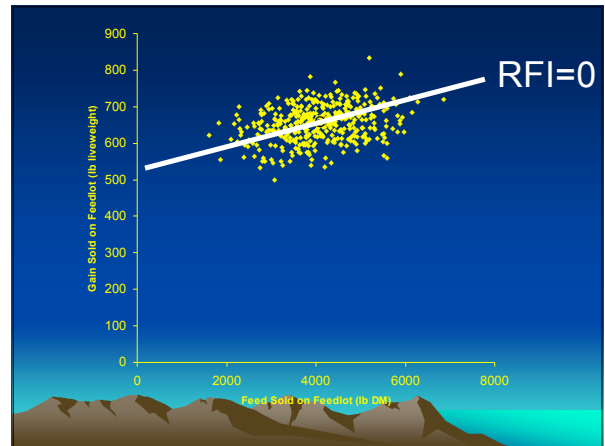
## Feed Requirements

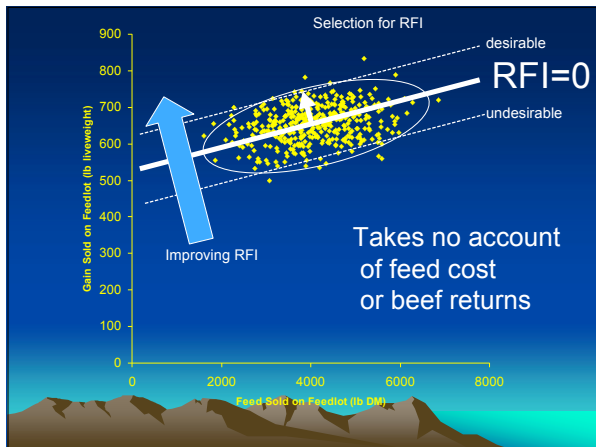
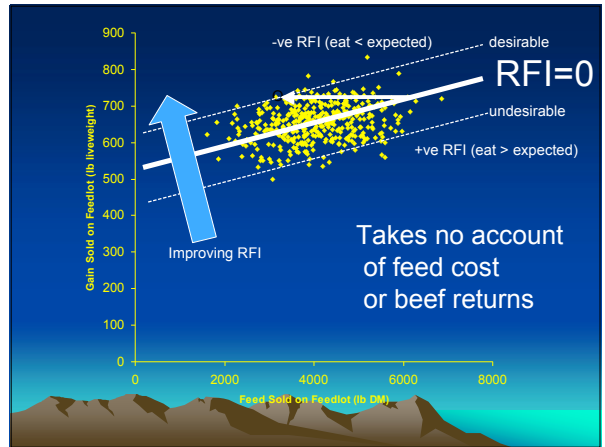
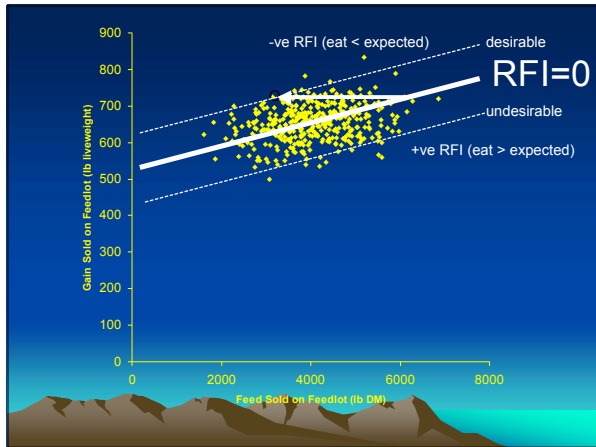
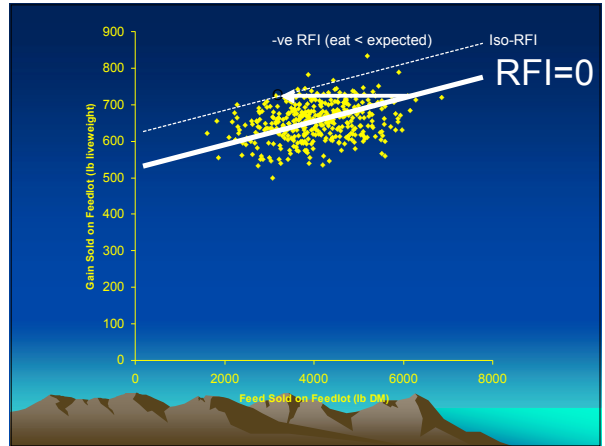
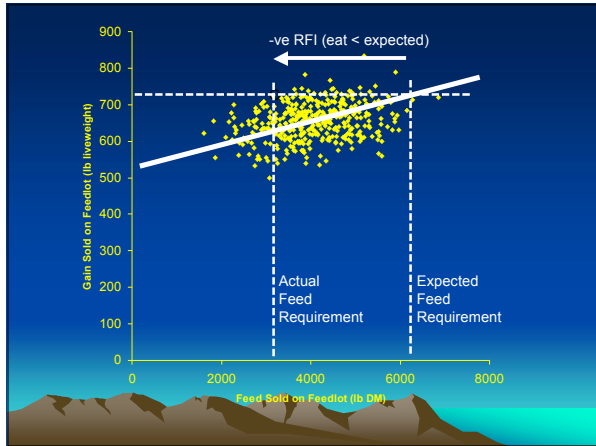
- More productive animals tend to require more feed
- This relationship can be quantified by analytical techniques, such as regression



## Residual Feed Intake

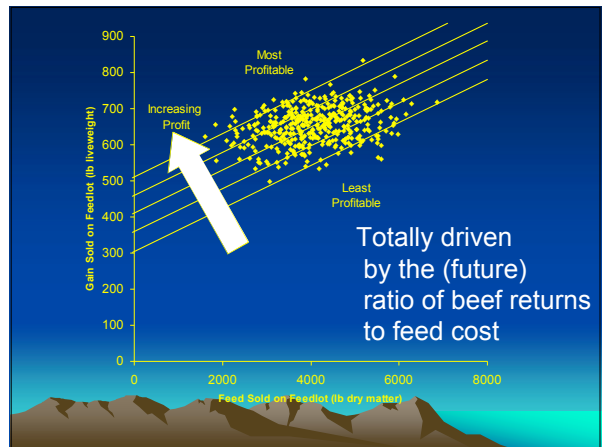
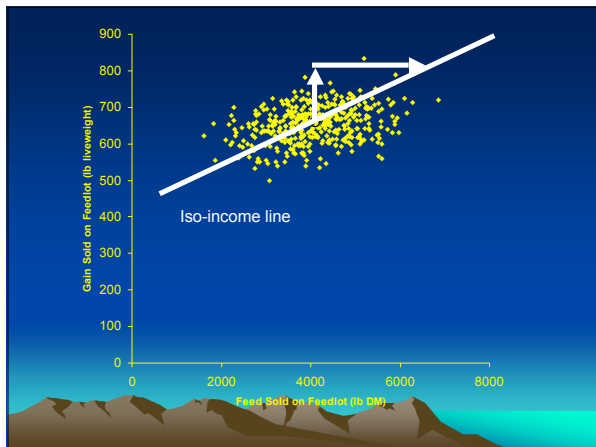
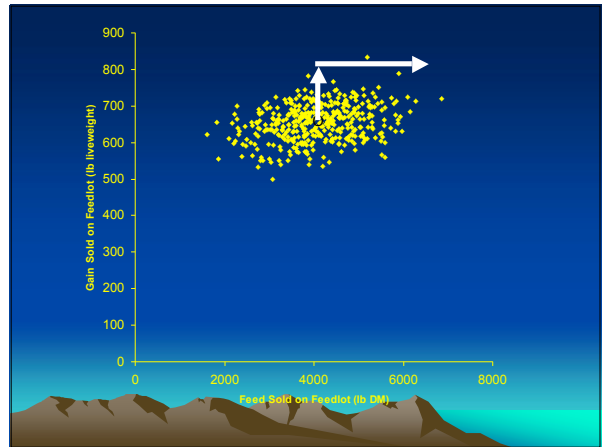
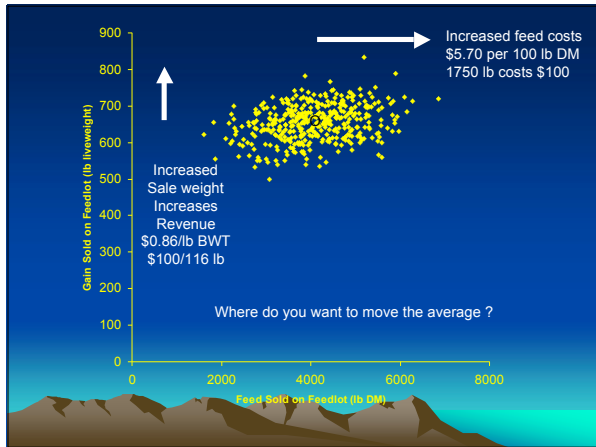
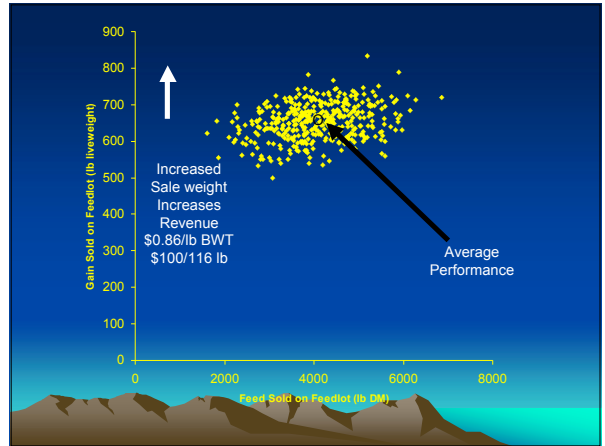
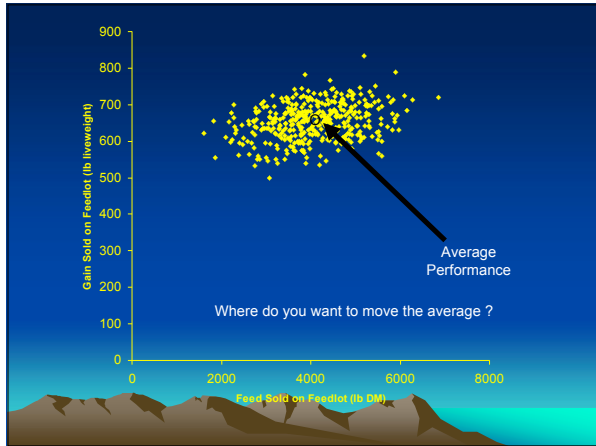
- Analysis of “large” bodies of data allows us to compute how much feed *average* animals requires to produce at *average* levels of *performance*
  - Some animals eat more than expected for their level of production and have positive residual feed intake (RFI)
  - Others (desirable animals) eat less than expected, having negative RFI

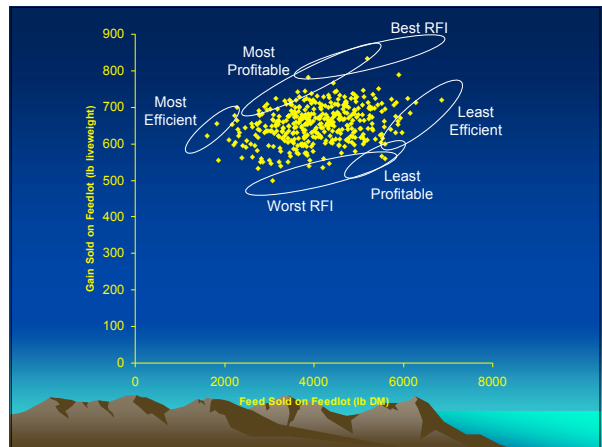
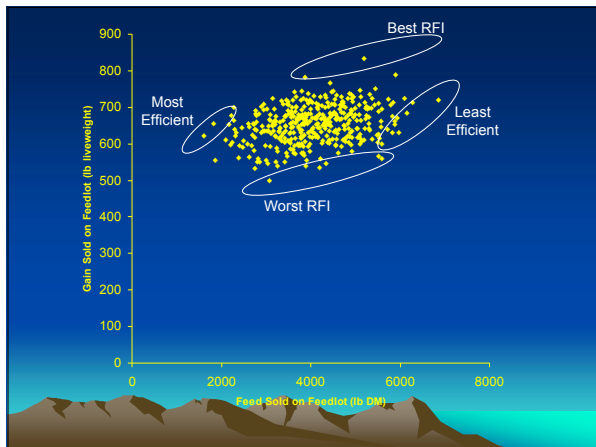
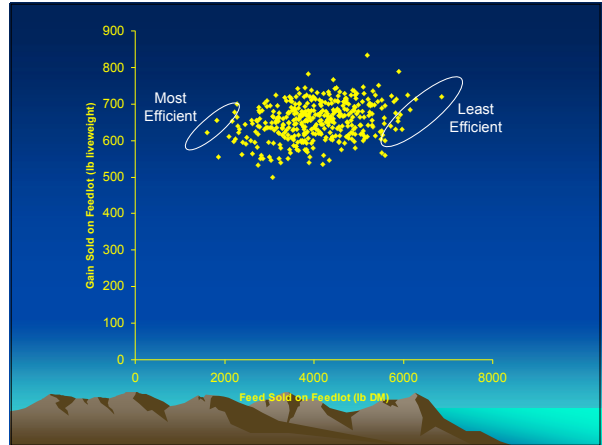
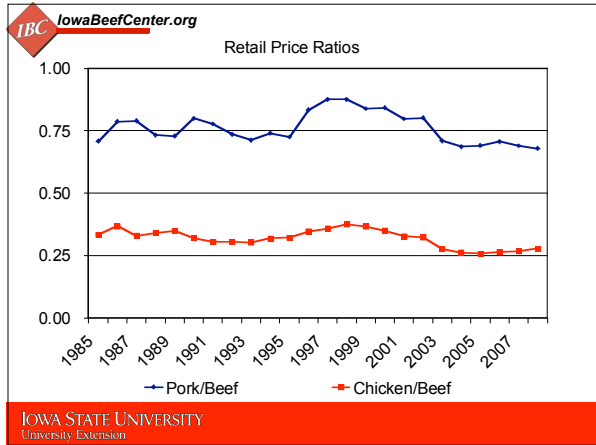
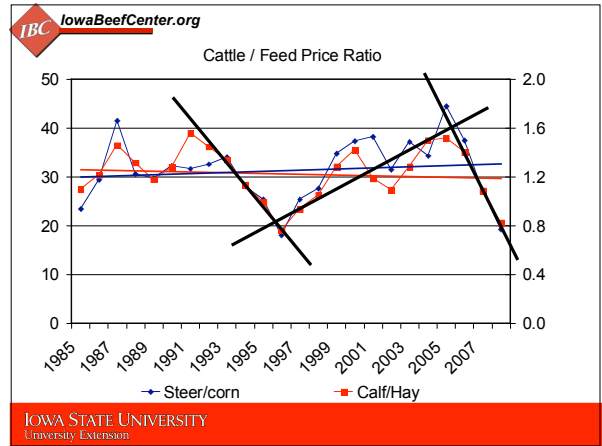
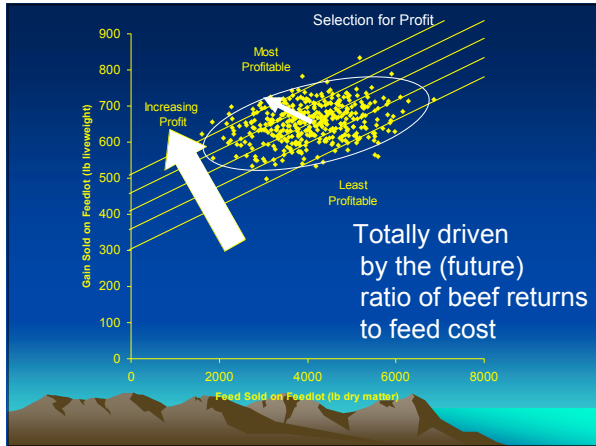


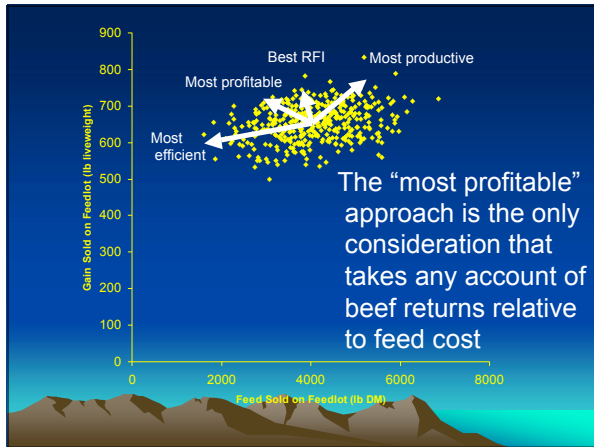
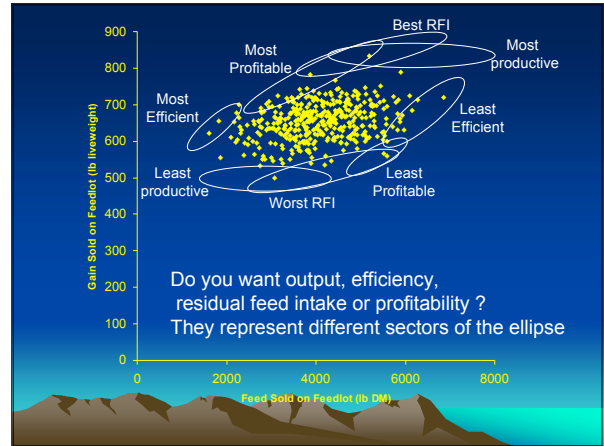
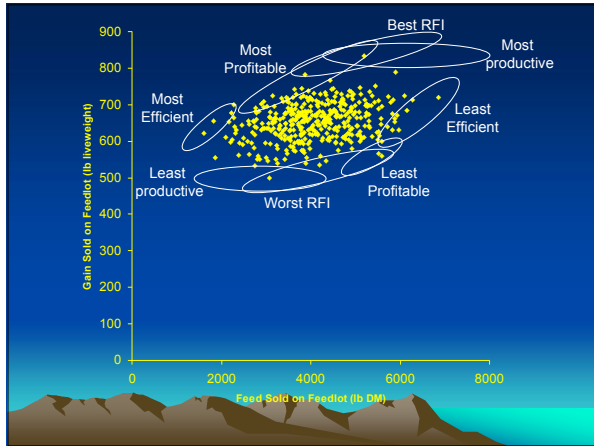


Economics

If you are not ranching for profit, we wish you well with your hobby







- ## Residual Feed Intake
- Pitfalls
    - RFI observations require measuring feed intake
    - You pay for all the feed you use, not just the feed that is more (or less) than you expected to require
  - Challenges
    - Need to measure feed intake
      - Cows, replacements and finishing
    - No economic basis for selection
    - Trait "appeals" after decades of selection on output

- ## Challenge
- Bull breeder
    - If you want to invest more in your breeding program, where should you buy extra accuracy?
      - Feed intake, ultrasound, progeny tests (eg carcass data), genomic tests, genetic defect tests?
  - Bull buyer
    - What traits would you pay a premium to your bull breeder to improve at a faster rate?