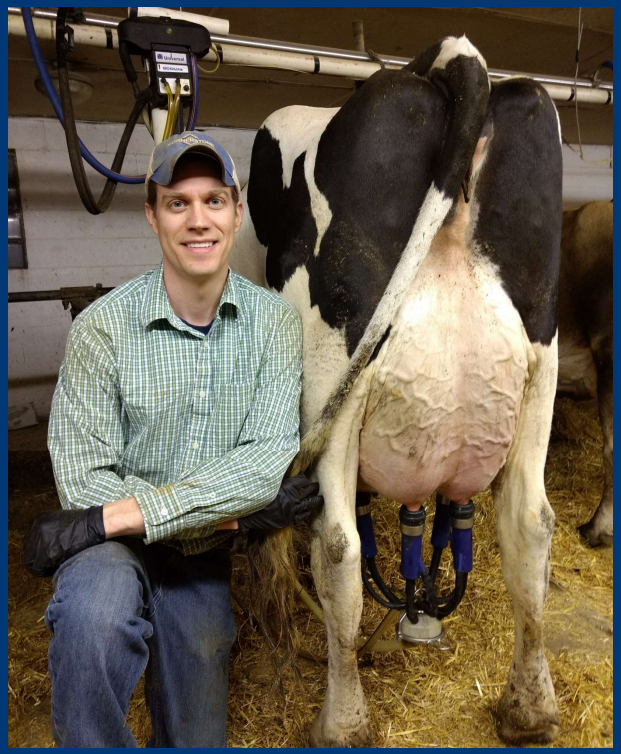

Lethal Recessives and Impact within Cattle Production

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Livestock have a great reference population

- Cattle (particularly Dairy) have ancestries recorded
  - 3-7 generations (20 years) in commercial settings
  - >70 years in seedstock and registered herds
- Genetic evaluations are the backbone of productivity advancement
  - 5 Milk production traits analyzed
  - 12 Health related traits evaluated
  - 24 Conformation traits measured
- Information taken from offspring estimated genetic performance of parents until genomic introduction

Uncovering Recessives Was Painfully Reactionary

- Cattle are mated to minimize inbreeding with common ancestors
- Eventually there will be a common relatives in pedigrees after several generations
- Breed associations track abnormal offspring cases
  - Recessives found when enough cases involving a common sire are known
- Very detrimental to the industry
  - Sire often infused into breed for 30+ years before found
  - Animal welfare and humane treatment concerns
  - Negative profitability for farmers

Known Dairy Cattle Recessives

Bulldog
BLAD
Brachyspina- BY
Cholesterol Deficiency
CVM
Dwarfism
DUMPS
Hairless
Imperfect Skin
Limber Leg
Mule Foot
Prolonged Gestation
Pink Tooth
Rectovaginal Constriction
Spinal Muscular Atrophy
Weaver


a
b

Genomics has sped up identification by decades

- Traditionally - Identify a sire that can caused embryonic loss or euthanized calves 30 years after genetic distribution
- Today – Analyze genotyped animal populations and search for genes that don’t exist in the homozygous form
- 10 haplotypes identified using genomic testing to date in dairy

How recessives handled on farm

- Males (0.1%) of a known recessive carrier are heavily culled and removed from the population unless exceptionally elite for performance
- Females (80%) with an ancestor as a carrier are only mated to negative sires out of caution
- Minimized introduction of new sires and prevention of mating carriers will cause the recessive to fade out of the gene pool
- New dairy technologies allow for greater selection intensity and thus flush those carriers out of the population if warranted