Red Breeds Genomics – Aust ABVg

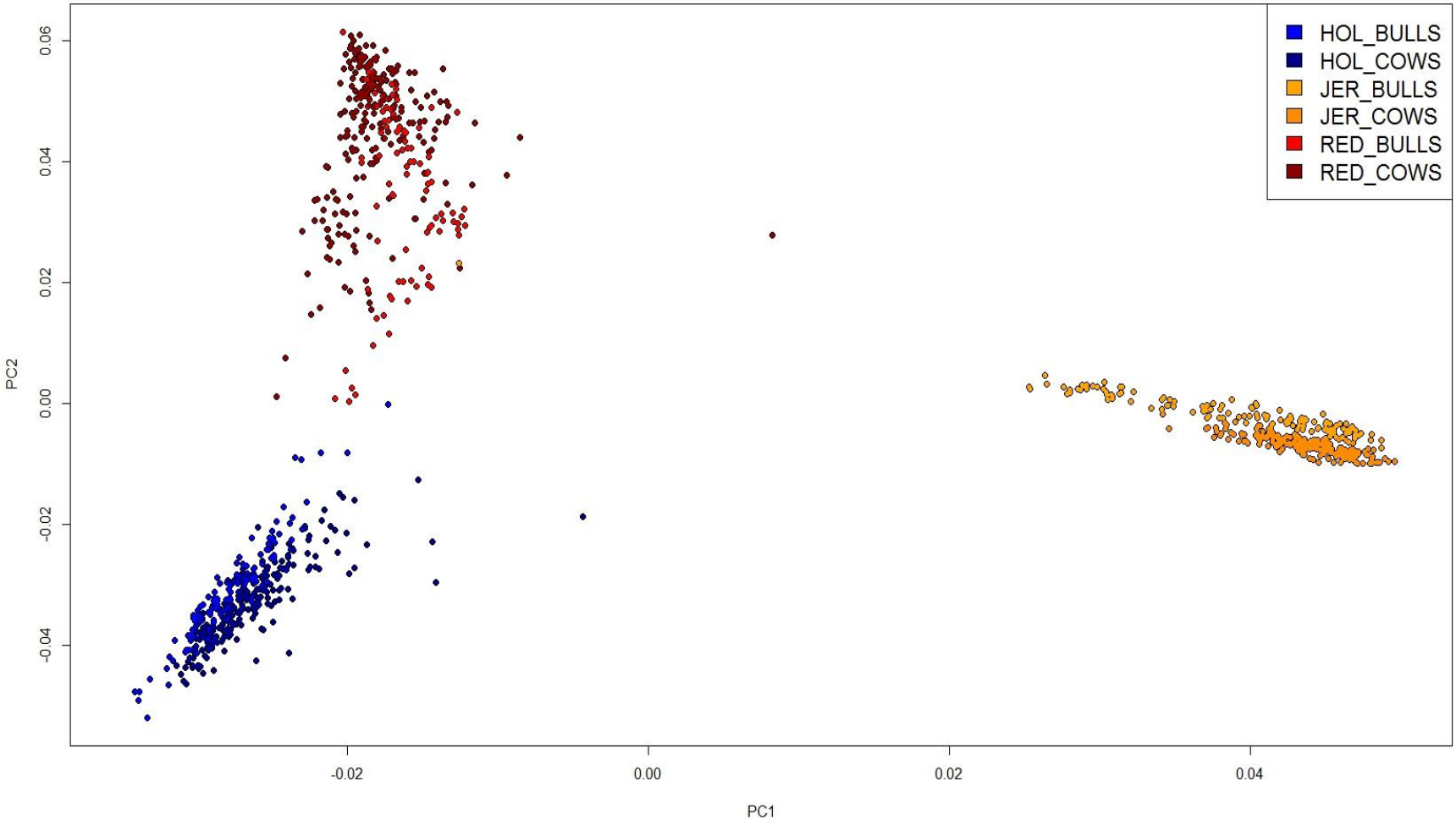
DataGene
Solutions for Herd Development

Our Journey

- Commenced in 2013
- Partnership between the Dairy Futures CRC, Australian Dairy Herd Improvement Scheme (ADHIS) and the Australian Red Dairy Breed.
- Pilot study to investigate the possibility of developing genomic ABV's.
- Cow samples from many Aussie Red breeders around Australia.
- Bulls samples from Genetics Australia and Viking Genetics (Australia)

DataGene
Solutions for Herd Development

Genetic Diversity - Reds are more diverse



DataGene
Solutions for Herd Development

Genetic Diversity

- Reds more diverse than Holsteins, Jerseys
- Lower rates of inbreeding!
- Roughly similar diversity amongst cows, bulls
  - *For genomic selection, larger reference population required for Reds than for Holsteins or Jerseys*

DataGene
Solutions for Herd Development

Where are our Red Breeds (g)

- Holstein 4,798 bulls
  30,858 females

- Jersey 1,219 bulls
  8,072 females

- Red Breeds 454 bulls
  1,546 females

DataGene
Solutions for Herd Development

Unofficial Genomic ABV's

- Genetics Australia has funded several unofficial runs used to select bulls for progeny testing.
- Professor Ben Hayes has contributed his own personal time to calculate the genomic breeding values.
- 5 traits
  - Milk, Fat, Protein, Cell Count and Survival.
- Reliabilities in excess of 40%.
- Other traits very low reliabilities, less than parent average.

DataGene
Solutions for Herd Development

Participate in the NAV Sweden

- Aust : 454 bulls 1,546 cows

- NAV : 9,208 bulls 40,000 cows
  (growing 10,000 / year)

This population is growing and representative of the vast population of European Red Breeds.

DataGene
Solutions for Herd Development

Logistics to investigate

- Collect DNA samples as we do now through the commercial partners – Zoetis , Neogen , ST Genetics
- DataGene would receive back genotype and would match that to pedigree and run parentage checks
- Send both Genotype and Pedigree to NAV and run them through their system to generate Scandinavian Breeding Values

DataGene
Solutions for Herd Development

- Those Scandinavian Breeding Values would then be converted through Interbull back to an ABV(i)

- DataGene would then load those ABV(i) results and include them in our full ABV model inclusive of Australian lactation and other relatives performance

- Another pathway to investigate is to get NAV to calculate a DGV (Direct Genomic Value) and we include that DGV in our existing three (3) line report
    - Pedigree / Parent Average
    - DGV
    - Blended ABV(g)

DataGene
Solutions for Herd Development

Pathways to Progress Red (g)

- Hybrid model - using O'seas reference population to run genomics then convert to a ABV equivalent via Interbull

- Genetic sequencing - looking at actual genes

- Multi-Breed - using the work already done in the Holstein & Jersey breeds to help to predict genomic predictions in Red Breeds or other coloured breeds

DataGene
Solutions for Herd Development

The Future

- World wide reference set.
  - The IRDBF is in a great position to co-ordinate and encourage this development
- Use genomics to highlight and develop the significant advantages red breeds have.
- Be ready to take advantage of new indices as they develop, such as the Heat Tolerance.
- Offer a strong alternative to the Holstein for dairy farmers around the world.

DataGene
Solutions for Herd Development