BIF Genetic Prediction Workshop

December 5-6, 2018
Neogen Corporation today.....

- Product offering
- Vision for future genomic evaluation
- Impact of sequence level information
Technology innovator

Setting the standard in genetic research
- Neogen GGP cited 950+ scholarly articles and 125+ published studies
- Neogen gene-marker selection outpaces competitors

Comparing Minor Allele Frequencies (MAF) between the GGP 50K and Illumina Bovine SNP50
<table>
<thead>
<tr>
<th>Product</th>
<th>Portfolio Role</th>
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<tbody>
<tr>
<td><strong>GGPF250</strong></td>
<td><strong>Discovery</strong> of new traits to add to commercial profiles</td>
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<td><strong>GGPHD150K</strong></td>
<td><strong>Elite</strong> nucleus studs and dams, A.I. studs, donor dams</td>
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<td><strong>GGP50K</strong></td>
<td><strong>New standard</strong> to select, manage and market sale bulls</td>
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Angus GS™

Powered by Neogen GeneSeek  The world leader in animal genomics
New Igenity Beef Profile
Powered by Neogen
Neogen Corporation today.....

Affymetrix Arrays
- Affymetrix Axiom Chicken Array
- Affymetrix Axiom Equine HD Array
- Affymetrix Axiom Plant Arrays
- Affymetrix Axiom Porcine Array
- Affymetrix Axiom Trout Array
- Affymetrix Axiom Salmon Array
- Custom Panels & Arrays

Illumina BeadChips
- Illumina BovineHD BeadChip
- Illumina GoatSNP50 BeadChip
- Illumina Maize BeadChips
- Illumina OvineSNP50 BeadChip
- Illumina OvineHD BeadChip
- Illumina PorcineSNP60 BeadChip
- Custom BeadChips

Canine
- DNA Identification & Parentage
- Illumina CanineHD BeadChip
- CanineHD 712k
- Ingenuity Canine VDD-GNA

Food Genomics
- 16S Metagenomics
- Salmonella Serotyping

GGP Beef
- GGP 50K
- GGP Indicus

GGP Dairy
- GGP 50K
- GGP HD150K
- What is GGP?

Other GGP
- GGP Equine70k
- GGP Porcine
- What is GGP?

Ingenuity® Beef Portfolio
- Ingenuity® Beef
- Ingenuity® Angus Gold
- SeekSire™
- Genetic Health & Conditions
- Ingenuity® Beef Dashboard

Ingenuity® Dairy Heifer Program
- Ingenuity-Elite
- Ingenuity-Prime
- Ingenuity-Select
- Ingenuity-Essential
- Ingenuity-Basic
- Dairy Trait and Condition Testing
- Ingenuity® Dairy Dashboard

Mouse Universal Genotyping Array (MUGA)

Parentage Testing

Research & Development / Genomic Discovery
- Cattle
- Equine
- Mouse
- Plants
- Sequencing
- Sheep (Ovine) & Goat
- Swine (Porcine)
- Custom Panels & Arrays

Veterinary Diagnostics
- Bovine Early Stage Pregnancy Detection (BioPRYN)
- Bovine Johne’s Disease
- Bovine Viral Diarrhea Virus (BVDV)
- Mycoplasma hyopneumoniae (M. hyo.)
- Porcine Circovirus Type 2 (PCV2)
- Porcine Enteric Coronavirus (PEDV, PDCoV, TGEV)
- Porcine Reproductive & Respiratory Syndrome Virus (PRRSV)
- Porcine Stress Syndrome (PSS)
- Swine Influenza Virus (SIV)

Other Options Available
- SeekGain™
- SeekSire™
- SynchroGait

https://genomics.neogen.com/research-and-development-genomic-discovery#mouse
Thoughts on the future……

• Lower cost – the mythical “$25” price point
• Arrays versus sequence…..stability versus cost and discovery; GBS?
• Adjacent technology – GPS, biometric monitoring, feed intake, different (more rapid) statistical models and hardware to support, sexed semen
• Microbiome
• Gene editing and traceability
• Individual animal management tied to optimal profitability
Thoughts on the future......what I don’t see

• Any migration away from the black box
• Any focus on understanding underlying biology – will this be an unknown consequence of sequence?
Livestock Genetic Services

- Commercial ranch applications
- Support of genetic evaluations that drive genomic testing
- International genetic evaluations
GeneSeek
A New Brand of Partner