

American Boer Goat Association

Board of Directors

Special DNA Meeting via Zoom

February 19, 2024

President, Kevin Richmond calls the meeting to order at 7:00 CST.

Roll Call: Directors Present

Ken Baty-R2
Kim Veal-R10
Chuck Fitzwater- R12
Gage Taylor-R7
Mike Reis-R5
Rosalinda Vizina-R1

Kim Morgan-R9
Lauren Green-R6
Paige Gunderson-R4
Casey McClain-R7
Sam Knott-R8

Not Present

Cameron Drew-R14
Brad Mackey-R13
Dan Elliott-R11

DNA Committee Members

Zach Westfall
Tara Hicks
Katherine Klug-ABGA Office
Brittany Scott
BJ Carbino
Jaelynn Reyes-ABGA Office
Mike Smith
Joe Bentley-Arrived at 7:20 CST

Special Guests

Dr. Rebecca Ballone, Director of Laboratories, UC Davis, currently on sabbatical.
Dr. Robert Grahn, Associate Director of Services, UC Davis
Shayne Hughes, Acting Director of Laboratories and Assistant Director of Technology, UC Davis

Ken Baty, Chair of the DNA committee, gave an introduction as to why we are having the call.

Paige Gunderson gave a historical perspective of the research conducted by the DNA committee over the last couple of years and explained the need for the ABGA to move forward with the new technology, SNP testing. Our goal is to do more with our test results and find out what we can do with those results.

Brittany Scott expressed the DNA Committee is in agreement with the new technology and the need to build the best foundation for the DNA process to get us in line with other livestock industries. Our past DNA testing process of using Microsatellites is extremely outdated and asked the representatives from UC Davis to explain their processes and what they would have to offer the ABGA.

Dr. Rebecca Ballone, UC Davis presented PowerPoint presentation along with the Q&A information (Exhibit attached to minutes)

Ken Baty made a motion to add Lauren Green to the DNA committee. Seconded by Chuck Fitzwater. Voice vote. Motion passed.

Ken Baty made a motion to adjourn the meeting at 8:55PM, CST. Seconded by Mike Reis. Voice vote. Motion Passed.

Respectfully submitted
Kim Morgan, ABGA Secretary

ABGA Transition to SNPs

Veterinary Genetics Laboratory

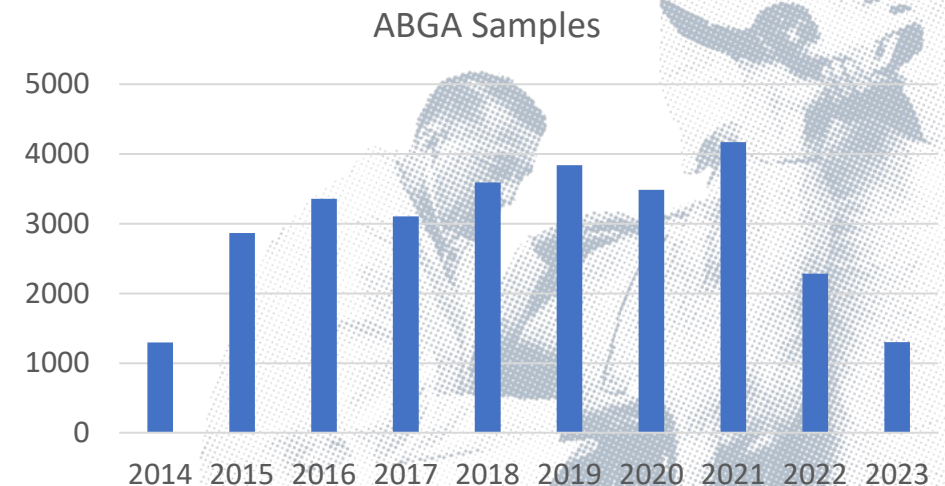


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Nearly 10-year long partnership between UC Davis VGL and ABGA

- For ABGA= 29,300 animals tested and stored (both data and samples)!
- VGL leading expert in parentage testing across species since the 60's
- ANAB accredited since 2017
- VGL expert in developing assays and SNP testing since the 90's using multiple platforms

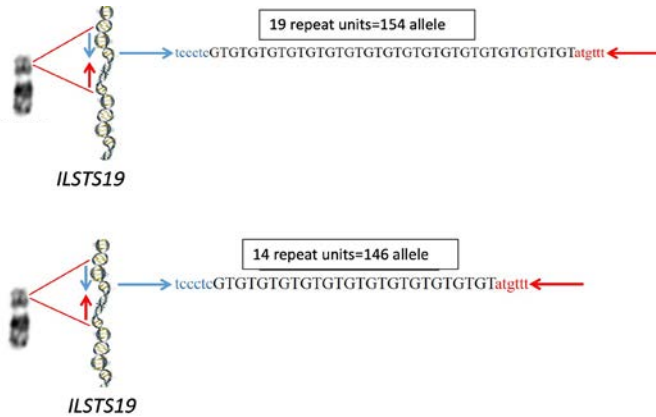


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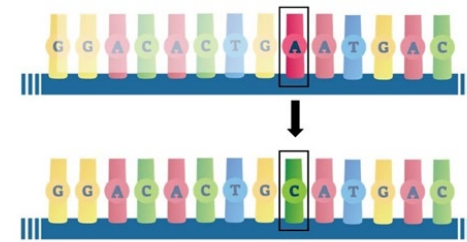
What is the difference between a SNP and a STR?

STR



- Place in the DNA where a series of nucleotides are repeated
 - Example: GT repeated, 7 forms
- Polymorphic = many forms in the population
- For most species 12-19 STRs enables accurate parentage and identity
- Cost effective
- Skill for accurate typing

SNP



- Place in the DNA where one base is changed
 - Example: A>C
- Typically, only two forms
- Requires more typed than STR for parentage (hence more expensive)
- The number is dependent on breed-informativeness
- Can be typed on many different platforms.
- Specific requirements for ABGA studied in only ~30 Boer goat from the US. (Talenti *et al.*, 2018)
- 1000 SNPs for ABGA use under investigation at the VGL

More on what the VGL does with SNPs

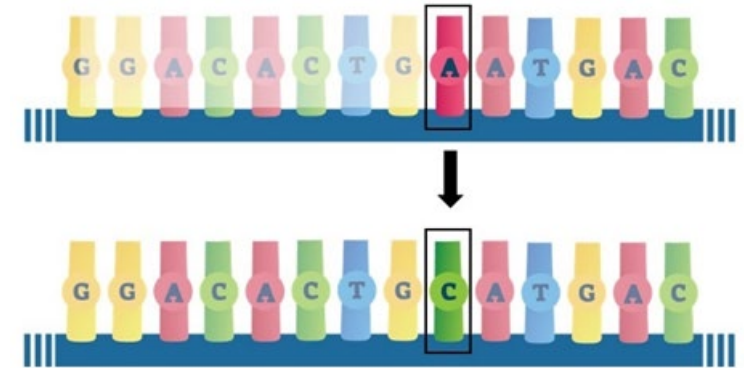
- **Low density SNPs (100s)** since the **1990's** for diagnostic testing (coat color, performance, and disease) across animal species on multiple platforms.
- **Expert at analysis** of medium density (1000's) and high density (100,000s SNPs) data for research purposes since early 2000's
- **Equipped to test** medium density on-site since **2018** and high density **2023**
 - Two platforms – Thermo Fisher Inc. Genotyping by Sequencing (GBS) and Illumina Array (ISCAN)
- Currently leading international research project for ISAG approved Equine SNP parentage panel
- Collaborated on research that led to Dog and Cat ISAG Approved Panels



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SNPs for Parentage

- Better than STRs?
 - For parentage, it depends.
 - For discovery/research, undoubtedly yes.
- Not all SNPs are useful for parentage.
 - Must be informative in the population
- How many SNPs are needed is dependent on diversity in the population.
- No approved ISAG parentage panel for Goats.



SNPs for Discovery

- Goat_IGGC_75K_v3 from Illumina expected April 2024.
 - Autosomal markers: ~77,000
 - XY markers: >2,000
 - mtDNA markers: >300
 - Trait-related markers: >1,000
 - Targeted for Parentage: ~200 markers
- Collection of accurate phenotype data is essential
- Experimental design is important
- Data analysis required expert
- Expertise and further investigation is needed to discover causal variant(s).



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Diagnostic Testing

- Screening tests vs. diagnostic tests
- Testing the causative variant is the only accurate way!
- Many variants are not compatible with SNP chips
- Ensuring accuracy is VGL standard
 - Testing in duplicate
 - Quality controls



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VGL services are all-inclusive services

- Sample collection kits
- DNA isolation
- Data storage (phenotypes and genotypes)
- Testing (genotypes)
- Remediation and necessary repeat testing
- Parentage Analysis – including searches
- Reporting
- Sample storage
- Research happens as part of what we do daily
- Not for profit
- Note that specific phenotype investigation may require additional funding.



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UC DAVIS
VETERINARY MEDICINE
Veterinary Genetics Laboratory

GOAT PARENTAGE AND GENETIC MARKER TEST REPORT

Provided Information:	Case: ABG28000
Name: RFS REID FAMILY FARMS OLE RED	Date Received: 03-Jan-2023
Registration: 10905338	Report Issue Date: 06-Jan-2023
	Report ID: 7073-6125-9864-8195
Verify report at www.vgl.ucdavis.edu/verify	
DOB: 03/27/2021 Sex: Male Breed: Boer Microchip: L7 / RFS	
Sire: RFS REID FAMILY ACE OF SPADES	Dam: RFS REID FAMILY FARMS LAFFY-TAFFY
Reg:	Reg: 10903151
Microchip: H1 / RF5	Microchip:

RESULTS AND INTERPRETATION

RFS REID FAMILY FARMS OLE RED 10905338 qualifies as an offspring of RFS REID FAMILY ACE OF SPADES without consideration of the dam.

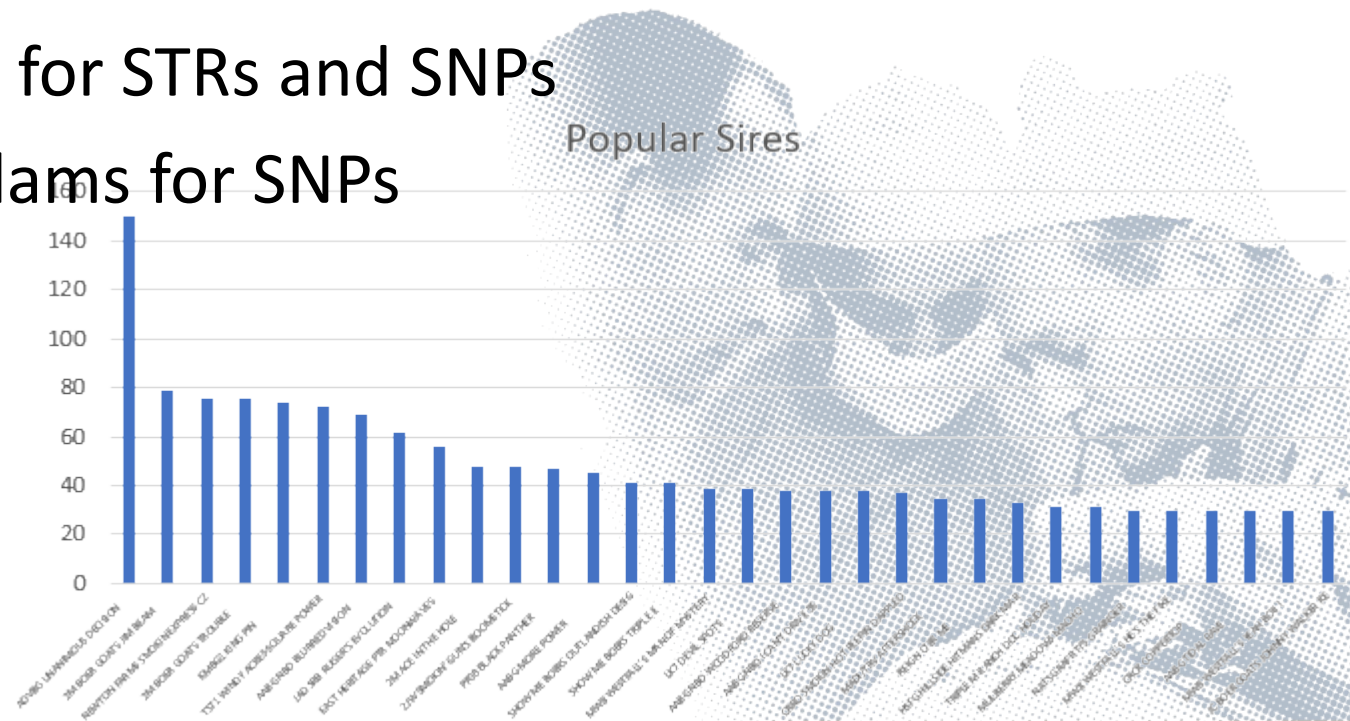
GENETIC MARKERS

LOCUS	TYPE	LOCUS	TYPE	LOCUS	TYPE
CSR247	233/241	HSC	267/273	ILSTS008	177
ILSTS19	146/154	ILSTS87	143/147	INRA005	115
INRA006	111	INRA023	205	INRA063	177
MAF65	127/135	McM527	156/164	OarFCB20	97/123
SPSI13	148	SRCRSP23	97/103	SRCRSP5	169
SRCRSP8	212/224				

Designing a transition plan

- Make use of past data and ABGA's future plans
- Design to minimize cost and hassle
- Initial transition period- test for STRs and SNPs
- Retest important sires and dams for SNPs
- Final transition to SNPs only

	Exclusion	Single Parent	Two Parents
2018	5%	89%	5%
2019	6%	80%	14%
2020	5%	74%	21%
2021	4%	68%	27%
2022	5%	62%	33%
2023	10%	61%	28%
2024	6%	65%	29%



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Cost of Transition Plan

- Full-service parentage testing on 65K array-\$65 per sample
- Samples needing genotyping on two platforms (SNP and STR) during transition phase \$85
- Possibilities to reduce cost if 1000 panel proves to have high power of exclusion and/or with increased volume



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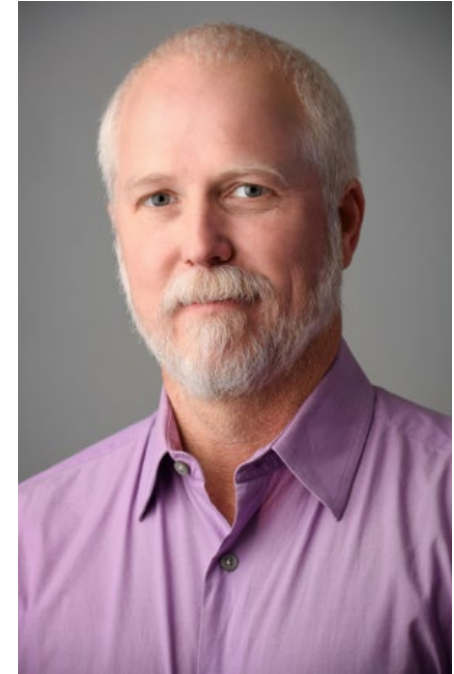
Questions?



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