CHOOSING A SIRE

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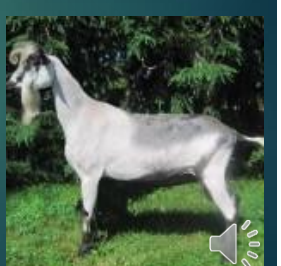
additional slides taken from presentations
by
Dr. George Wiggans



Part 1. Selection criteria and methods

A helpful first step is to:

- Determine the goals of your breeding program
  - Identify the traits to focus on to improve your herd
  - While avoiding inbreeding and serious defects
- The traits you are looking for in a sire vary from farm to farm
  - Commercial enterprise, important traits are likely those that most impact the survivability of your farm - production and efficiency.
  - Small show herd relying on the sale of breeding stock, choosing a sire may appear to be simply a matter of picking a sire with a lot of name recognition whose offspring are in big demand

Genetic progress in your herd is a continuous process

- Impacted by the decisions you make about
  - Which animals to keep and breed
  - Which specific matings to make
  - Which animals to cull

The culling you currently do can tell you a lot about what traits are important in your herd

- What are the most common reasons for you HAVING to cull animals (involuntarily culling)? **Are these reasons affected by genetics?** For example, mastitis → do poor udders contribute to it or is it strictly poor management in your herd?
- What are your main reasons for voluntarily culling animals, especially when you consider where your income comes from in your enterprise? Low milk production? Low protein yield? Frail conformation? **Again, are these traits influenced by genetics?**

Have you identified which animals are the best performers in your herd?

- If so, what traits can their ranking be attributed to?
- When you decide what young animals to keep, what traits most influence this decision?
- Are these traits the same as those of your "best performers"? How much are these traits affected by genetics as compared to environment (i.e. management)

When deciding what traits to focus on in selecting a sire

- Phenotype = Genotype + Environment
- Heritability is the portion of total variation due to genetics

Genotypic heritability values

- Milk Yield ~20-40%
- Milk Fat Percentage ~32-70%
- Postweaning Gain ~40-45%
- Loin Eye Area ~35-45%
- Udder Traits ~20-40%
- Fiber Diameter ~12-50%
- Kid and Lamb Survival ~5%

Rate of genetic progress - determined by:

- **Generation interval** – shorter in goats and sheep compared to cattle because they give birth at younger age
- **Heritability** – the lower the heritability, the slower the progress
- **Selection intensity** – are you considering only the superior 20% sires for this trait or the top 40%?
  - As the number of traits you select for increases, the progress in any one trait decreases because the selection intensity applied to each individual trait generally has to decrease

The greatest impact on genetic progress is from selection of bucks and rams

- Ability to have more progeny than does or ewes
- More likely to be represented in many herds, years and seasons

How to evaluate a sire for the traits you are focusing on?

- What online information is available?
  - Photos? Owner's description of animal?
  - Farm performance records, show records?

  Are they verified by a third party, for example, DHI or a breed association?
  - Quality recognition programs? Official performance tests? Genetic evaluation programs?

Genetic Evaluation Programs:

- A valuable tool for genetic selection
- Allow for comparison of animals in different environments (i.e. across different herds and seasons
- Generally include adjustment factors to account for differences in performance due to factors such as sex, litter size or age)

Accuracy of Evaluations

- Number of animals performing in the same herd/year/season (hys)
  - **more records → better estimate of hys effect**
- Number of sires with offspring having performance records in the same hys
  - **more direct comparisons → better ranking of sires**
- Number of total records
- Number of total offspring
- Completeness and accuracy of pedigree data

Methods of Expressing Genetic Evaluations

- **Estimated breeding value** (EBV)
  - Estimate of Animal's own genetic value
- **Predicted transmitting ability** (PTA)
  - ½ EBV
  - Expected contribution to progeny
- **Estimated transmitting ability** (ETA) used by ADGA when EBV can only be based on ancestors, i.e. no records from the animal itself or its progeny yet

Step Approach

1. Evaluate your herd for genetic traits most needing improvement, while also noting areas of extreme strength.
2. Determine which traits to emphasize.
3. Review the pedigrees of your animals and potential sires to control inbreeding. Check for special issues such as pollness (breeding polled to polled can result in hermaphrodites in many goat breeds) or other problematic carrier genes.
4. Look up performance records, genetic evaluations, or selection indices of potential sires
5. Use a spreadsheet or ranking approach to rank the bucks or rams for their breeding or transmitting values or for their selection indices.
6. Select the sires to use on your herd after also considering semen price and your insemination expertise.

Methods of genetic selection

- **Tandem selection** - focus on one trait until it's where you want it and then switch to another trait.
- **Non-assortative mating** - breed an animal that is weak in some traits to an animal that is strong in the same traits and vice versa.
- **Independent culling levels** – only consider sires that meet certain standards for specific traits
- **Use Selection index** - weigh each trait by its relative value and then calculate each sire's overall score.

Part 2. Dairy Goat Genetic Evaluations available in the United States

USDA Dairy Goat Evaluations

- Evaluations for milk, fat, protein, and type (conformation)
- Generate **Predicted Transmitting Abilities** (PTA) for bucks and does
- Production records are dependent on does being enrolled in Dairy Herd Improvement (DHI)
- Type records are dependent on goats being **"linearly appraised"**
- **GO TO ADGA Genetics**

https://www.adgagenetics.org/

American Dairy Goat Association (ADGA) Production - Type Indices (PTI)

- One PTI emphasizes production over type in a 2:1 ratio.
- The other PTI emphasizes type over production using a 1:2 ratio

Dairy Goat Type Traits

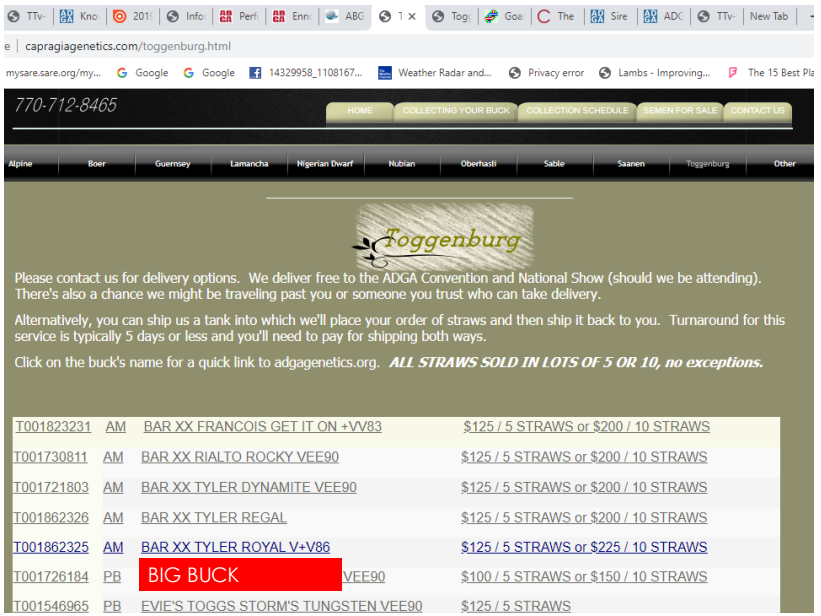
- Ideally evaluating dairy goats for traits with a direct relationship to increased longevity or increased productivity
- Traits must have sufficient heritability (≥0.15) to be worth trying to genetically select for
- Must be able to be scored fairly objectively by different appraisers
- **Linear Appraisal** – Official evaluation by ADGA , traits are scored on a linear scale that goes from one biological extreme to the other biological extreme for same trait
- 13 primary traits and 1 secondary trait that is still being researched (each scored 1 to 50 points)
- Final Score (Overall Assessment) is expressed as a value from 50 to 99

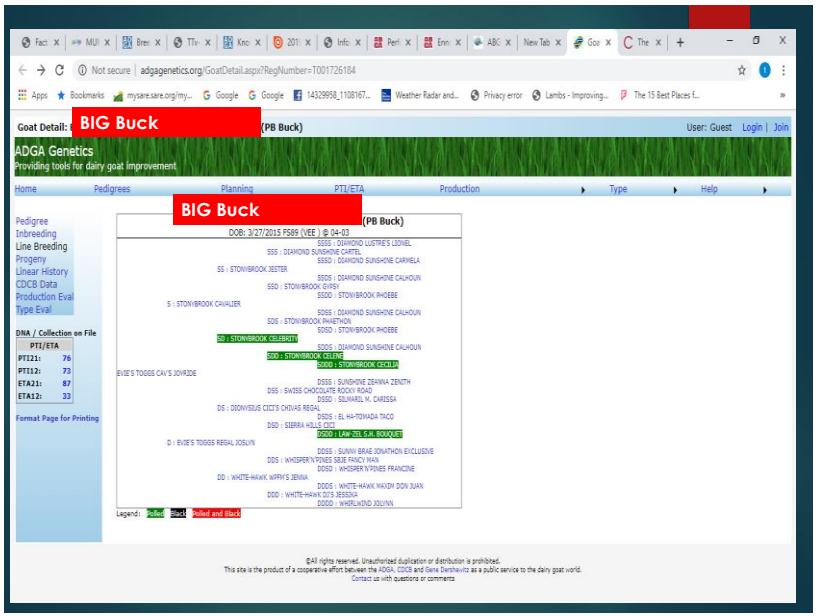
Linear Appraisal Traits

Linear Trait	Heritability	1-5 points	45-50 points	"Ideal" points
Stature	0.52	≤26 inches tall	≥34 inches tall	≥25 pts.
Strength	0.29	extremely narrow/frail	extremely wide/strong	27-30
Dairyness	0.24	extremely thick/coarse	extremely sharp/angular	33-38
Rump angle	0.32	Extremely steep (hips to pins)	Extremely level	30-35
Rump width	0.27	≤5 inches between thurls	≥9 inches between thurls	30-35
Rear leg angulation	0.21	straight legged (posty)	extremely angled (sickled)	25-30
Fore udder attachment	0.25	extremely loose	extremely snug	35-42
Rear udder height	0.25	extremely low	extremely high	40-45
Rear udder arch	0.19	extremely narrow/pointed	extremely wide/curving	32-40
Medial suspensory ligament	0.33	bulging udder floor	extreme cleft	28-32
Udder depth	0.25	Deep, floor ≥2" below hocks	Shallow, floor ≥6 " above hocks	22-27
Teat placement	0.36	extremely wide apart	extremely close to center	25-30
Teat diameter	0.38	extremely narrow	extremely wide	18-28
Rear udder side view		extremely flat	extremely bulgy	22-28

Linear Appraisal Procedure

- **First part** – For the purposes of genetic selection, the appraiser assigns points for the 13 primary traits and the secondary trait that is still being researched
- **Second part** – The appraiser evaluates eight structural/functional areas of the goat (head, shoulder assembly, front legs, rear legs, feet, back, rump, udder texture) and assigns descriptive values to them
- **Third part** – The appraiser assigns descriptive values to 4 major conformation categories for does (3 for bucks): - General Appearance, Dairy Character, Body Capacity and Mammary as well as a weighted Final Score . The descriptive values provide owners with a view of strengths and weaknesses of their animals' phenotypic conformation while the final score has some valuable for genetic selection
- **Descriptive values**, Poor ≤59 pts, Fair 60 – 69 pts, Acceptable 70 – 79 pts, Good Plus 80 – 84 pts, Very Good 85 – 89 pts, Excellent ≥90 pts


770-712-8465
HOME
COLLECTING YOUR BUCK
COLLECTION SCHEDULE
SEMEN FOR SALE
CONTACT US
Alpine
Boer
Guernsey
Lamancha
Nigerian Dwarf
Nubian
Oberhasli
Sable
Saanen
Toggenburg
Other
Toggenburg
Please contact us for delivery options. We deliver free to the ADGA Convention and National Show (should we be attending). There's also a chance we might be traveling past you or someone you trust who can take delivery.
Alternatively, you can ship us a tank into which we'll place your order of straws and then ship it back to you. Turnaround for this service is typically 5 days or less and you'll need to pay for shipping both ways.
Click on the buck's name for a quick link to adgagenetics.org. ALL STRAWS SOLD IN LOTS OF 5 OR 10, no exceptions.
T001823231 AM BAR XX FRANCOIS GET IT ON +VV83 $125 / 5 STRAWS or $200 / 10 STRAWS
T001730811 AM BAR XX RIALTO ROCKY VEE90 $125 / 5 STRAWS or $200 / 10 STRAWS
T001721803 AM BAR XX TYLER DYNAMITE VEE90 $125 / 5 STRAWS or $200 / 10 STRAWS
T001862326 AM BAR XX TYLER REGAL $125 / 5 STRAWS or $200 / 10 STRAWS
T001862325 AM BAR XX TYLER ROYAL V+V86 $125 / 5 STRAWS or $225 / 10 STRAWS
T001726184 PB BIG BUCK VEE90 $100 / 5 STRAWS or $150 / 10 STRAWS
T001546965 PB EVIE'S TOGGS STORM'S TUNGSTEN VEE90 $125 / 5 STRAWS


Goat Detail:
BIG Buck
(PB Buck)
User: Guest Login | Join
ADGA Genetics
Providing tools for dairy goat improvement
Home
Pedigrees
Planning
PTI/ETA
Production
Type
Help
BIG Buck
(PB Buck)
DOB: 3/27/2015 FS89 (VEE) @ 04-03
Pedigree
Inbreeding
Line Breeding
Progeny
Linear History
CDCB Data
Production Eval
Type Eval
DNA / Collection on File
PTI/ETA
PTI21: 76
PTI12: 73
ETA21: 87
ETA12: 33
Format Page for Printing
Legend:
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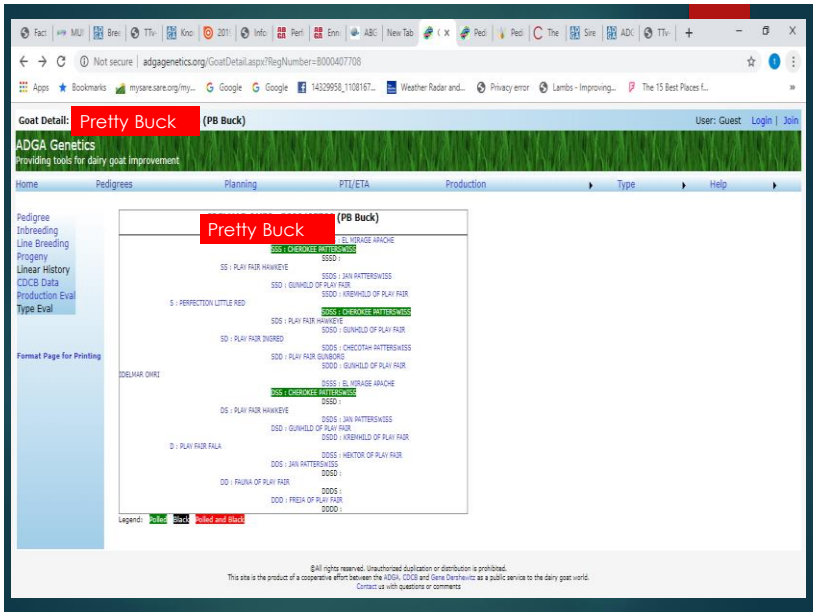
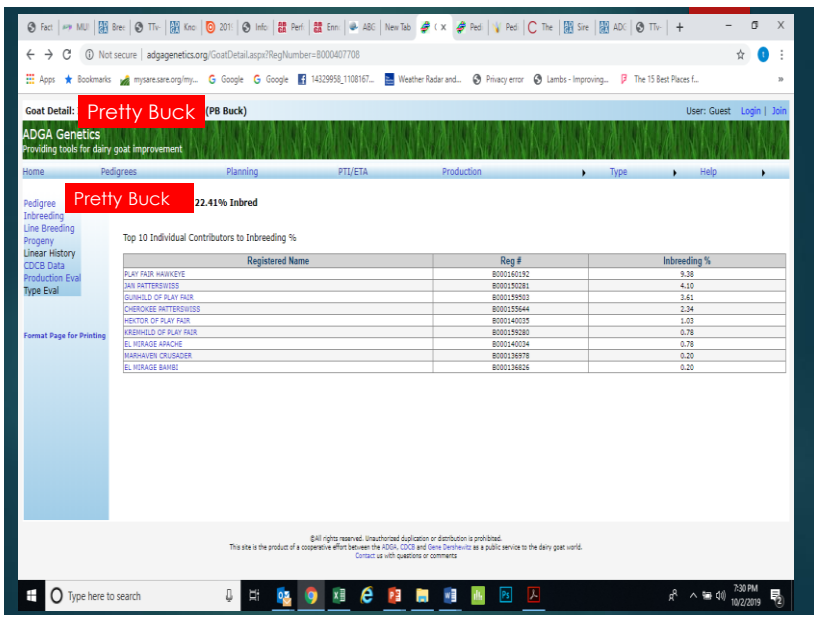
BIG BUCK- 1.39% Inbred

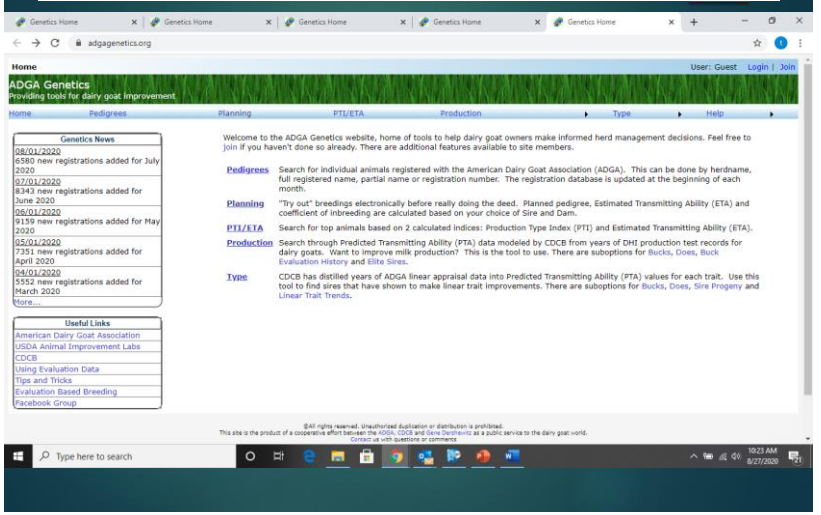
Top 10 Individual Contributors to Inbreeding %

Registered Name	Reg #	Inbreeding %
STONYBROOK CAVALIER	T000373597	0.44
STONYBROOK JESTER	T000300030	0.20
DIAMOND SUNSHINE REFORMATION	T000144186	0.18
DIAMOND LUSTRE'S LIONEL	T000163994	0.16
STONYBROOK CELEBRITY	T000238697	0.11
DIAMOND SUNSHINE CALHOUN	T000173499	0.08
DIAMOND POLARA	T000157195	0.07
DIAMOND N. LUSTRE	T000150849	0.04
CHIKAMING JENNIFERS CHALLENGER	T000130849	0.03
DIAMOND CRUSADER	T000160033	0.02

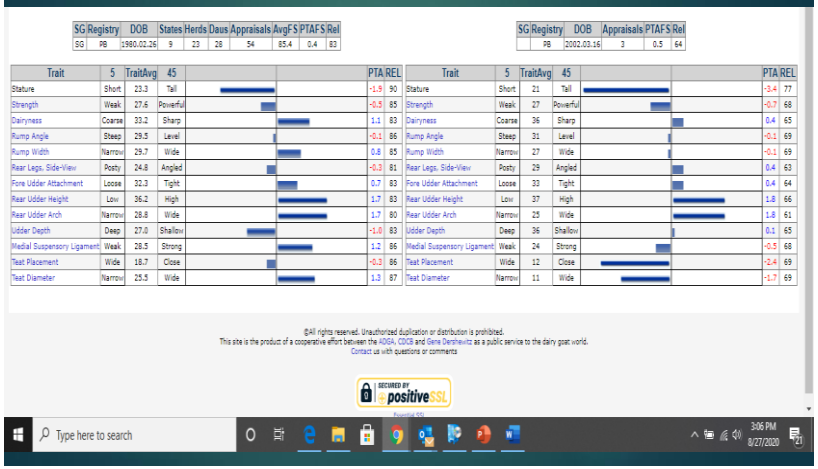




GO TO https://www.adgagenetics.org/
And click on "Planning"



Type comparisons of a potential sire and dam



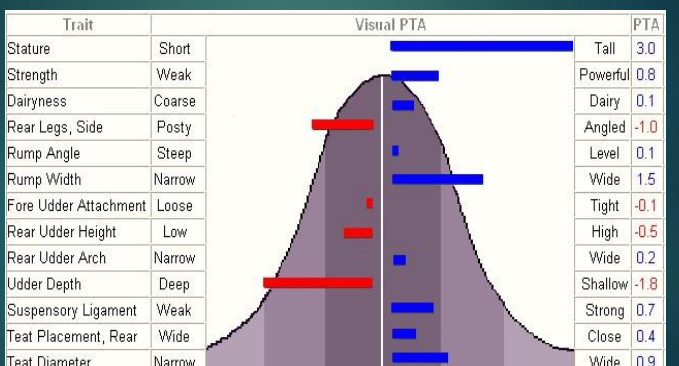
SG	Registry	DOB	States	Herds	Daus	Appraisals	AvgFS	PTAFS	Rel
SG	PB	1980.02.26	9	23	28	54	85.4	0.4	83

SG	Registry	DOB	Appraisals	PTAFS	Rel
	PB	2002.03.16	3	0.5	64

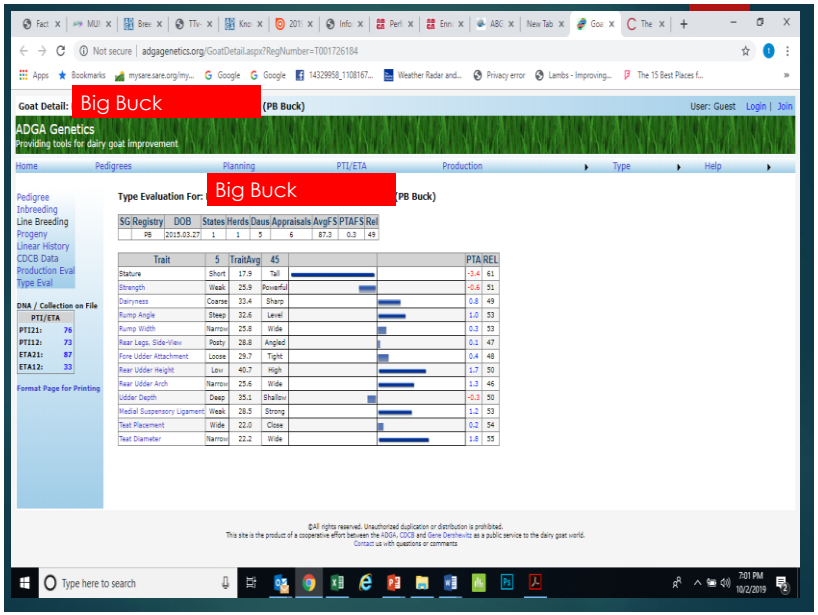
Trait	5	TraitAvg	45	PTA	REL
Stature	Short	23.3	Tall	-1.9	90
Strength	Weak	27.6	Powerful	-0.5	85
Dairyness	Coarse	33.2	Sharp	1.1	83
Rump Angle	Steep	29.5	Level	-0.1	86
Rump Width	Narrow	29.7	Wide	0.8	85
Rear Legs, Side-View	Posty	24.8	Angled	-0.3	81
Fore Udder Attachment	Loose	32.3	Tight	0.7	83
Rear Udder Height	Low	36.2	High	1.7	83
Rear Udder Arch	Narrow	28.8	Wide	1.7	80
Udder Depth	Deep	27.0	Shallow	-1.0	83
Medial Suspensory Ligament	Weak	28.5	Strong	1.2	86
Teat Placement	Wide	18.7	Close	-0.3	86
Teat Diameter	Narrow	25.5	Wide	1.3	87

Trait	5	TraitAvg	45	PTA	REL
Stature	Short	21	Tall	-3.4	77
Strength	Weak	27	Powerful	-0.7	68
Dairyness	Coarse	36	Sharp	0.4	65
Rump Angle	Steep	31	Level	-0.1	69
Rump Width	Narrow	27	Wide	-0.1	69
Rear Legs, Side-View	Posty	29	Angled	0.4	63
Fore Udder Attachment	Loose	33	Tight	0.4	64
Rear Udder Height	Low	37	High	1.8	66
Rear Udder Arch	Narrow	25	Wide	1.8	61
Udder Depth	Deep	36	Shallow	0.1	65
Medial Suspensory Ligament	Weak	24	Strong	-0.5	68
Teat Placement	Wide	12	Close	-2.4	69
Teat Diameter	Narrow	11	Wide	-1.7	69

TYPE PTAs – expressed as a difference from a population base average

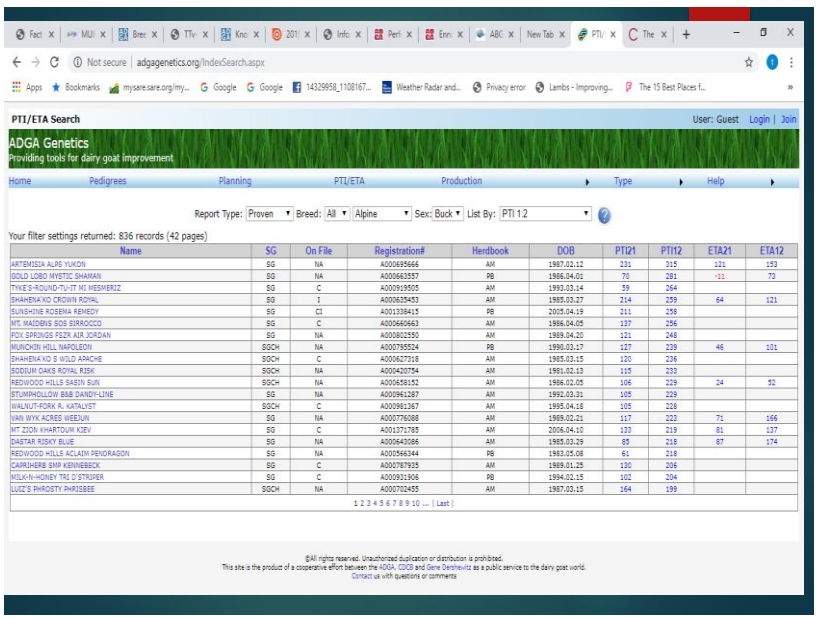


Trait	Visual PTA		PTA
Stature	Short	Tall	3.0
Strength	Weak	Powerful	0.8
Dairyness	Coarse	Dairy	0.1
Rear Legs, Side	Posty	Angled	-1.0
Rump Angle	Steep	Level	0.1
Rump Width	Narrow	Wide	1.5
Fore Udder Attachment	Loose	Tight	-0.1
Rear Udder Height	Low	High	-0.5
Rear Udder Arch	Narrow	Wide	0.2
Udder Depth	Deep	Shallow	-1.8
Suspensory Ligament	Weak	Strong	0.7
Teat Placement, Rear	Wide	Close	0.4
Teat Diameter	Narrow	Wide	0.9



Production Evaluation For: BIG BUCK

Production Parameter	Value
SG	
Registry	PB
Herds	1
Daughters	6
Lactations	9
Milk PTA	128
Fat PTA	0.7
Fat % PTA	-0.20
Protein PTA	1.7
Protein % PTA	-0.11
Reliability	49
Percentile Rank	0



PTI/ETA Search

User: Guest Login | Join

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Home Pedigrees Planning PTI/ETA Production Type Help

Report Type: Proven Breed: All Alpine Sex: Buck List By: PTI 1:2

Your filter settings returned: 836 records (42 pages)

Name	SG	On File	Registration#	Herdbook	DOB	PTI21	PTI12	ETA21	ETA12
ARTEMISIA ALPS YUKON	SG	NA	A000695666	AM	1987.02.12	231	315	121	153
GOLD LOBO MYSTIC SHAMAN	SG	NA	A000683557	PB	1986.04.01	70	281	-11	70
TYKE'S-ROUND-TU-IT MS MESMERIZ	SG	C	A000919505	AM	1993.03.14	59	264		
SHAHENA'KO CROWN ROYAL	SG	I	A000635453	AM	1985.03.27	214	259	64	121
SUNSHINE ROSEMA REMEDY	SG	CI	A001338415	PB	2005.04.19	211	258		
MT. MAIDENS SOS SIROCCCO	SG	C	A000660663	AM	1986.04.05	137	256		
FOX SPRINGS FEZR AIR JORDAN	SG	NA	A000802550	AM	1989.04.20	121	248		
MUNCHIN HILL NAPOLEON	SGCH	NA	A000795524	PB	1990.03.17	127	239	46	101
SHAHENA'KO S WILD APACHE	SGCH	C	A000627318	AM	1985.03.15	120	236		
SODIUM OAKS ROYAL RISK	SGCH	NA	A000420754	AM	1981.02.13	115	233		
REDWOOD HILLS SASIN SUN	SGCH	NA	A000658152	AM	1986.02.05	106	229	24	92
STUMPHOLLOW B&B DANDY-LINE	SG	NA	A000961287	AM	1992.03.31	105	229		
WALNUT-FORK R. KATALYST	SGCH	C	A000981367	AM	1995.04.18	105	228		
VAN WYK ACRES WEEJUN	SG	NA	A000776088	AM	1989.02.21	117	223	71	166
MT ZION KHARTOUM KIEV	SG	C	A001371785	AM	2006.04.10	133	219	81	127
DASTAR RISKY BLUE	SG	NA	A000643086	AM	1985.03.29	85	218	87	174
REDWOOD HILLS ACLAIM PENDRAGON	SG	NA	A000566344	PB	1983.05.08	61	218		
CAPRIHERB SMP KENNEBECK	SG	C	A000787935	AM	1989.01.25	130	206		
MILK-N-HONEY TRI O'STRIPER	SG	C	A000931906	PB	1994.02.15	102	204		
LUIZ'S PHROSTY PHRISBEE	SGCH	NA	A000702455	AM	1987.03.15	164	199		

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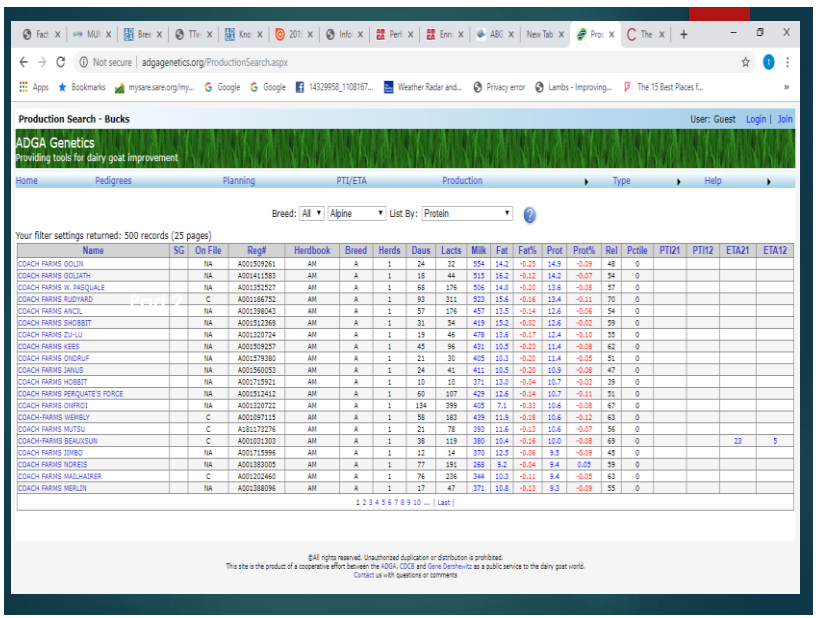

Production Search - Bucks

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ADGA Genetics
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Home Pedigrees Planning PTI/ETA Production Type Help

Breed: All Alpine List By: Protein

Your filter settings returned: 500 records (25 pages)

Name	SG	On File	Reg#	Herdbook	Breed	Herds	Daus	Lacts	Milk	Fat	Fat%	Prot	Prot%	Rel	Pctile	PTI21	PTI12	ETA21	ETA12
COACH FARMS GOLIN		NA	A001509261	AM	A	1	24	32	554	14.2	-0.25	14.9	-0.09	48	0				
COACH FARMS GOLIATH		NA	A001411583	AM	A	1	18	44	515	16.2	-0.12	14.2	-0.07	54	0				
COACH FARMS W. PASQUALE		NA	A001352527	AM	A	1	68	176	506	14.0	-0.20	13.6	-0.08	57	0				
COACH FARMS RUDYARD		C	A001186752	AM	A	1	93	311	523	15.6	-0.16	13.4	-0.11	70	0				
COACH FARMS ANCIL		NA	A001398043	AM	A	1	57	176	457	13.5	-0.14	12.6	-0.06	54	0				
COACH FARMS SHOBBIT		NA	A001512369	AM	A	1	31	54	419	15.2	-0.02	12.6	-0.02	59	0				
COACH FARMS ZU-LU		NA	A001320724	AM	A	1	19	46	478	13.6	-0.17	12.4	-0.10	55	0				
COACH FARMS KEES		NA	A001519257	AM	A	1	45	96	421	15.5	-0.23	11.4	-0.08	62	0				
COACH FARMS CINDRUF		NA	A001579380	AM	A	1	21	30	405	10.3	-0.20	11.4	-0.05	51	0				
COACH FARMS JANUS		NA	A001560053	AM	A	1	24	41	411	10.5	-0.20	10.9	-0.08	47	0				
COACH FARMS HOBBIT		NA	A001715921	AM	A	1	10	10	371	13.0	-0.04	10.7	-0.03	39	0				
COACH FARMS PERQUATE'S FORCE		NA	A001512412	AM	A	1	60	107	429	12.6	-0.14	10.7	-0.11	51	0				
COACH FARMS OWPRO1		NA	A001320722	AM	A	1	134	399	405	7.1	-0.33	10.6	-0.08	67	0				
COACH-FARMS WEMBLY		C	A001097115	AM	A	1	58	183	429	11.9	-0.18	10.6	-0.12	63	0				
COACH FARMS MUTSU		C	A181173276	AM	A	1	21	78	393	11.6	-0.13	10.6	-0.07	56	0				
COACH-FARMS BEAUXSUN		C	A001031303	AM	A	1	38	119	380	10.4	-0.16	10.0	-0.08	69	0			23	5
COACH FARMS JIMBO		NA	A001715996	AM	A	1	12	14	370	12.5	-0.06	9.5	-0.09	45	0				
COACH FARMS NORE'S		NA	A001383005	AM	A	1	77	191	268	9.2	-0.04	9.4	0.05	59	0				
COACH FARMS MALHAIRER		C	A001202460	AM	A	1	76	236	344	10.3	-0.11	9.4	-0.05	63	0				
COACH FARMS MERLIN		NA	A001388096	AM	A	1	17	47	371	10.8	-0.13	9.3	-0.09	55	0				

1 2 3 4 5 6 7 8 9 10 ... | Last |

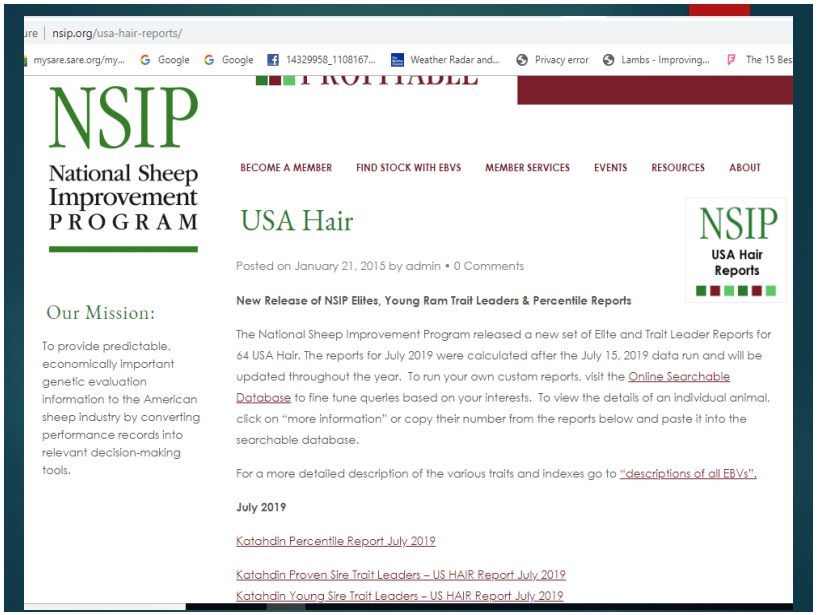
Part 3. Other Performance Evaluations

nsip.org

National Sheep Improvement Program – offers genetic evaluations programs for sheep and meat goats. Expresses as *Estimated Breeding Values (EBV)*

National Sheep Improvement Program Traits

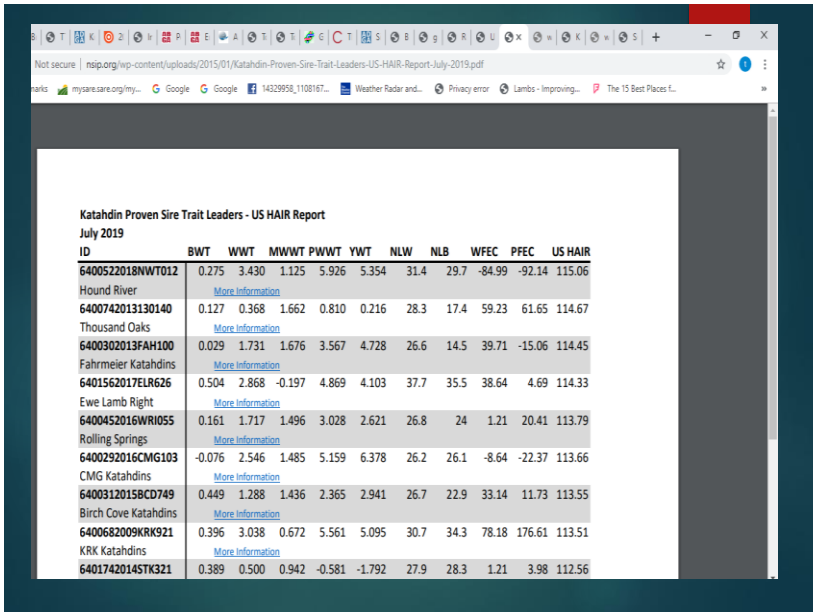
- **BWT (Birth Weight, kg)** - Direct genetic effects
- **WWT (Weaning Weight, kg)** – Direct genetic effects on preweaning growth
- **MWWT (Maternal Weaning Weight, kg)** – Genetic merit for mothering ability, mainly reflects differences in milk production
- **PWWT (Post Weaning Weight, kg)** – Genetic merit for growth to 120 days (can adjust to another standardized post weighing age)
- **PFAT (Post Weaning Fat Depth, mm)** – genetic effects on carcass fatness, determined by ultrasound of fat depth between 12th and 13th rib
- **PEMD (Post Weaning Loin Muscle Depth, mm)** – genetic effects on muscling, determined by ultrasound of loin muscle depth between 12th and 13th rib
- **WFEC (Worm Egg Count, %)** – genetic merit for strongyle worm resistance based on fecal egg counts at about 69 to 90 days of age (lower the count, higher the genetic merit)
- **PFEC (Post Weaning Worm Egg Count, %)** – generally taken 30 to 60 days after WFEC and at same time as PWWT
- **PSC (Post weaning Scrotal Circumference, cm)** – may be correlated with breeding capacity in males and reproductive performance in females
- **NLB (Number offspring born, %)** – genetic potential for prolificacy, expressed as number of lambs born per 100 ewes lambing
- **NLW (Number offspring weaned, %)** – combines genetic effects of ewe on prolificacy and of lamb survival to weaning, expressed as number of lambs weaned per 100 ewes lambing
- Also offer fiber trait selection such as Fleece Weight, Fiber Diameter, Staple Length, Fiber Curvature, etc.



SheepGenetics
Analysis : USA HAIR , Wednesday, 1 August 2018
Breed 64 Flock 0061 Year 2018

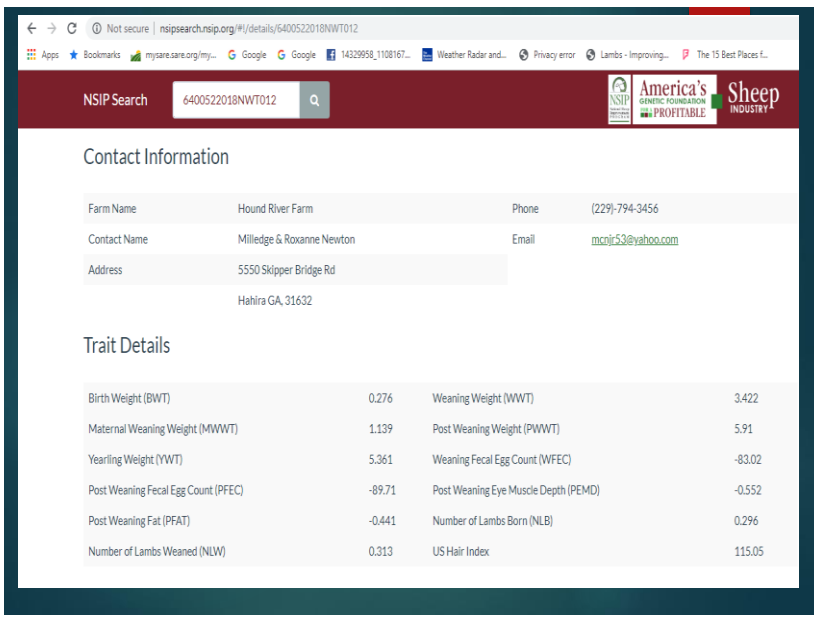
Sires Animal ID	Inbreeding	Prog:Flks	BWT kg	MWWT kg	WWT kg	PWWT kg	PFAT mm	PEMD mm	WFEC %	PFEC %	PSC cm	NLB %	NLW %	USA Hair	SRCS
640052-2016-NWT080	7.3%	73:1	-0.1	1.5	1.9	3.7	-0.3	-0.6	-100	-103	0.0	9	13	108.5	121.0
HOUND RIVER		Acc.:	89	58	88	91	62	55	86	94	82	54	49		58
640061-2014-USD155	0.7%	72:1	0.4	0.4	0.8	0.3	-0.4	-1.0	-100	-100	1.2	7	10	104.9	110.4
USDA-ARS BOONEVILLE		Acc.:	89	65	87	89	65	78	87	93	83	61	55		62
640061-2016-USD162	14.4%	8:1	-0.4	0.7	0.3	2.0	0.0	-0.1	-92	-99	1.5	6	10	105.7	116.1
USDA-ARS BOONEVILLE		Acc.:	70	46	70	73	48	50	76	83	63	44	40		48
640061-2016-USD194	0.3%	38:1	0.2	1.2	3.0	6.1	-0.5	-1.2	-54	-67	2.3	8	9	107.0	119.4
USDA-ARS BOONEVILLE		Acc.:	81	43	80	83	51	44	80	90	73	41	36		48
640061-2017-USD012	0.6%	39:1	0.1	1.3	1.7	3.0	-0.4	-0.5	-78	-91	-0.1	-1	6	105.7	114.3
USDA-ARS BOONEVILLE		Acc.:	82	42	82	85	54	51	81	91	78	44	38		49
640061-2017-USD080	0.5%	87:2	0.3	1.4	2.7	4.3	-0.3	-1.4	-93	-99	0.4	17	14	108.8	120.8
USDA-ARS BOONEVILLE		Acc.:	88	43	82	84	55	50	80	90	78	43	37		48

Farm trying to use rams with WFEC and PFEC of -90 or less while
Also selecting for MWWT (maternal weaning weight)



Katahdin Proven Sire Trait Leaders - US HAIR Report
July 2019

ID	BWT	WWT	MWWT	PWWT	YWT	NLW	NLB	WFEC	PFEC	US HAIR
6400522018NWT012	0.275	3.430	1.125	5.926	5.354	31.4	29.7	-84.99	-92.14	115.06
Hound River	More Information									
6400742013130140	0.127	0.368	1.662	0.810	0.216	28.3	17.4	59.23	61.65	114.67
Thousand Oaks	More Information									
6400302013FAH100	0.029	1.731	1.676	3.567	4.728	26.6	14.5	39.71	-15.06	114.45
Fahrmeier Katahdins	More Information									
6401562017ELR626	0.504	2.868	-0.197	4.869	4.103	37.7	35.5	38.64	4.69	114.33
Ewe Lamb Right	More Information									
6400452016WRI055	0.161	1.717	1.496	3.028	2.621	26.8	24	1.21	20.41	113.79
Rolling Springs	More Information									
6400292016CMG103	-0.076	2.546	1.485	5.159	6.378	26.2	26.1	-8.64	-22.37	113.66
CMG Katahdins	More Information									
6400312015BCD749	0.449	1.288	1.436	2.365	2.941	26.7	22.9	33.14	11.73	113.55
Birch Cove Katahdins	More Information									
6400682009KRK921	0.396	3.038	0.672	5.561	5.095	30.7	34.3	78.18	176.61	113.51
KRK Katahdins	More Information									
6401742014STK321	0.389	0.500	0.942	-0.581	-1.792	27.9	28.3	1.21	3.98	112.56



American Boer Goat Assoc. Ennoblement Program

- Gain points for ennoblement through performance at
  - ABGA sanctioned shows
  - ABGA National Show
  - Performance Tests (Average Daily Gains only)
- Visual Inspection + 80 points from an animal and its progeny.
  - At least 3 progeny earning a minimum of 5 points each with total points from progeny ≥30 points
  - Animal cannot contribute more than 50 points to its own ennoblement
- No inspection – need 100 points from the animal and its progeny.
  - At least 3 progeny earning a minimum of 5 points each with total points from progeny ≥30 points
  - Animal cannot contribute more than 70 points to its own ennoblement

Pennsylvania Department of Agriculture's Ram Lamb and Meat Goat Buck Performance Test

- Test runs for approximately 70 to 80 days with a 7-to-14-day adjustment period to introduce bucks and rams to the feed ration. Throughout the performance tests, animals are self-fed a textured 16% crude protein feed and a mixed grass/legume hay.
- 2. PERFORMANCE RECORDS Individual performance records are determined for each ram and buck. These records include:
  - a. Average Daily Gain – weight gained over course of test divided by days on test
  - b. Weight Per Day of Age – average weight gain per day since birth
  - c. Loin Area – ultrasonically scanned between the last two ribs, then adjusted based on finish weight specific to breed.
  - d. Fat – measured ultrasonically, and to some degree indicates composition of gain.
  - e. Ratio – The percent above or below average a ram or buck is within his own breed group for a particular trait. A ratio of 100 is average.
- 3. INDEX
- Ram Index = (.35 x average daily gain ratio) + (.35 x final weight per day of age ratio) + (.15 x adjusted fat thickness value) + (.15 x adjusted loin muscle area value)
- Buck Index = (.30 x average daily gain ratio) + (.30 x final weight per day of age ratio) + (.20 x adjusted loin muscle area) + (.20 x adjusted hind leg circumference measurement)
- Animal's index divided by the average animal index within a breed provides the index ratio.

Pennsylvania Meat Goat Buck Performance Test Sale- August 3, 2019
FULL BLOOD BOER SENIOR

Lot	1	Full Blood Boer Senior	NBFX NIX BESSER ROYAL MOUNT B81	Index	113
Tag		H-812	PA99-187	% Boer	100
Reg.	10803839				

Sire: AABG NBD BIG TIMBER
HBS ABSOLUTE (ENNOBLED)
AABG NBD DROP DEAD GORGEUOS

Dam: NBFX NIX BESSER EMILY B264
RBG3 ROSELEDGE SUPER DUTY
NBF NIX BESSER 603 HANNAH

Performance

Birth Type	Birth Date	Teat str.	St. Wt.	St. Wt/ DOA	Final Wt.	70 Day ADG	ADG Ratio	Wt/ DOA	Wt/ DOA Ratio	Act. Back Fat	Act LEA	ADJ LEA	Adj. Leg. (in.)	Leg Circ. (in.)	Scr. Cir. (cm)
TW	11/22/2018	3--2	107	0.70	157	0.71	129	0.71	117	0.12	2.58	2.29	16.6	18.8	32.0

Color: TRADITIONAL

Owner: Nix Besser Farm, Dr. Robert Herr- Narvon, PA- 717-354-5640, dcherr5909@gmail.com

Lot	2	Full Blood Boer Senior	LOB WARLOCKS'S MAVERICK	Index	110
Tag		H236	PA 3086-0746	% Boer	100
Reg.	10814927				

Sire: REHME SMOKIN WARLOCK
INTENSITY'S STONE COLD (ENNOBLED)
NBF1 COVER GIRL

Dam: LOB SUNDANCES JOLENE
NBFX NIX BESSER C353 SUNDANCE
NIXB NIX BESSER ZEBA

Performance

Birth Type	Birth Date	Teat str.	St. Wt.	St. Wt/ DOA	Final Wt.	70 Day ADG	ADG Ratio	Wt/ DOA	Wt/ DOA Ratio	Act. Back Fat	Act LEA	ADJ LEA	Adj. Leg. (in.)	Leg Circ. (in.)	Scr. Cir. (cm)
TW	12/9/2018	2--2	90	0.67	135	0.64	116	0.66	109	0.07	2.49	2.47	17.8	18.0	30.0

Part 4. What's in our Future?

GENOMICS

GENOMICS

DNA analysis now required for breeding bucks in most goat breed associations

Assays have been developed to genotype individual goats - based on identifying sites on the chromosomes where goats have different nucleic acids or polymorphisms.

Identifying these different alleles allows us to verify pedigrees and to determine some of the polymorphisms that result in different phenotypes for traits such as horn status, coat color, etc. or have a role in serious genetic defects → do not have to wait to estimate genes or breeding values from the appearance or performance of progeny. Instead, we can determine influential polymorphisms or SNPS (single nucleotide polymorphisms) of a buck or doe as soon as they have a DNA analysis.

Most U.S. goat DNA analyses are done through the UC Davis Veterinary Genetics Laboratory.

Alpha S1 Casein -
important for cheese makers

- Of the 4 casein proteins in goat milk, Alpha s1 Casein appears to be most influential for cheese making. The gene controlling this casein has several polymorphisms affecting the amount of protein and fat produced when making cheese. Higher levels of Alpha s1 Casein are associated with higher cheese yield. However, some research suggests that people with milk sensitivities may be more tolerant of goat milk that is low in Alpha s1 Casein.

- We now have genetic assays to identify different variants or polymorphisms for Alpha s1 Casein. Variants **E**, **F**, and **N** are associated with low levels of alpha s1 casein while Variants **A** and **B** are associated with high levels and higher cheese yield.

- Inheriting a "high" variant from one parent and a "low" variant from the other will produce intermediate amounts of alpha s1 casein.

Scrapie
fatal, infectious neurodegenerative prion disease

- Even though it is infectious, the susceptibility of a goat to the disease, depends on what alleles or polymorphisms the goat has inherited at specific locations on the prion protein gene.
- **Some of the polymorphisms with importance in U.S goats are:**
  - **N** = asparagine at position 146 (confers no additional resistance)
  - **S** = serine at position 146 (confers genetic resistance against classical scrapie)
  - **Q** = glutamine at position 222 (confers no additional resistance)
  - **K** = lysine at position 222 (confers genetic resistance against classical scrapie)

Therefore, a goat inheriting the N/N, Q/Q genotype will be more susceptible to Scrapie than a goat inheriting the S/S, K/K genotype

G-6-S Deficiency –

genetic disorder of Nubian goats and their crosses (mini-Nubians, etc.)

- Common signs of G-6-S Deficiency are impaired immune system and poor growth and muscle coordination → early death.
- Heparan sulfate is a substance within a cell that regulates many important biological functions. However, when heparan sulfate is allowed to accumulate within a cell rather than normally degrading, it results in impaired cell function and progressive degenerative disease.

- UC Davis has identified a polymorphism at one site that interferes with an enzyme that would normally be responsible for degrading heparan sulfate.
- Autosomal recessive - must be inherited from both parents to cause the disease. A study of ~550 Nubians from 20 herds identified 25% as carriers

ADGA offers discounted testing rates to encourage identification of carriers. **BUT** G6S testing results are included in the goat's pedigree and permanent record **ONLY upon the breeder's request**. Privacy issues are likely to limit the sharing of information on deleterious genomes in the future.

GENOMICS

- can also be used to identify single nucleotide polymorphisms (SNPs) influencing **economically important** traits

- Genetic merit for linear traits and milking performance in dairy cattle in the U.S. now combine genomic testing with progeny testing → Results in increased accuracy of young sire evaluations and drastically shortens the generation interval before an accurate genetic evaluation can be produced for a bull or cow.

- The rate of improvement in average net merit nearly doubled for Holstein bulls in 2014 compared to 2010 when genomic evaluation was first implemented (*Wiggans, et. al. Genetic Selection in Dairy Cattle: The USDA Experience*)

GENOMICS CONT.

- However, the development of economical genotype assays and reliable prediction factors in U.S. Holstein dairy cattle was dependent on linking the genotypes of **5000 heavily used bulls** with the performance of their numerous progeny.
- Each informative SNP site was compared to actual progeny results to develop prediction equations linking the polymorphisms at specific sites to actual performance.
- How likely are we to get enough genetic testing on economically important traits for dairy goats – few herds doing DHI milk testing. Situation probably a little better for linear appraisal traits.

The value of choosing a sire

- Depends in large part on:
  - the availability of accurate genotype information, and
  - the development of cheaper assays. Currently 50 – 60 K chips (look at >50,000 sites) available for goats. However, in dairy cattle further study of unique SNPs has allowed them to develop low density chips that greatly reduce the number of SNPs genotyped without sacrificing much accuracy → making it economical to genotype cows as well as bulls.

As an industry -

- How willing are we to share both negative and positive information on genetic defects in our goat and sheep pedigrees? Or at least to cull out carrier animals?
- How willing are we to invest in the costs of having dairy goat herds linear appraised **AND DHI tested** in order to develop accurate prediction equations to link alleles with actual milk and/or type performance? Are we willing to invest in on-farm performance testing for meat goats and fiber/meat sheep?

Future progress depends on us!