

IMPROVE GENETIC SELECTION By understanding traits and indexes

There are many things to look at in terms of data when it comes to selecting genetics. Traits, indexes, milk proteins, fertility, and... What do they all mean and how do you use them within your dairy? Use this as a resource to help you better understand what each trait, index, or other selection factors describe. Then, use it to understand the meaning of the values given on a bull proof as seen on ABS Bull Search or a female genomic evaluation result.

Today's U.S. dairy genetic evaluations are computed in April, August, and December by the Council on Dairy Cattle Breeding (CDCB) and Holstein Association USA. For Holstein and Jersey sires, evaluations are genomically enhanced and represent a blending of genomic data, pedigree information, and results from progeny.

INDUSTRY TRAITS

	TRAIT	TRAIT NAME	DESCRIPTION	EFFECT OF POSITIVE/ HIGHER VALUE	
7	MILK	Milk LBS	Expected second-lactation milk production in pounds com-pared to breed average.	Increased Milk LBS	
PRODUCTIO	FAT	Fat LBS	Expected second-lactation fat production in pounds com-pared to breed average.	Increased Fat LBS	
	PRO	Protein LBS	Expected second-lactation protein production in pounds compared to breed average	Increased Protein LBS	
	PL	Productive Life	Expressed as additional months of life in the milking string.	Increase Lifetime Days in Milk	
	LIV	Livability	Represents the additional percentage of cows that avoid dying on the farm, permitting producers to recoup disposal income.	Decrease Mortality Rate	
	DPR Daughter Pregnancy Rate Percentage of non pregnant cows that become pregnant during each compared to breed average. Trait using a 50-day voluntary wait perior daughters from the bull will on average 4 fewer days open in their lact		Percentage of non pregnant cows that become pregnant during each 21-day period, compared to breed average. Trait using a 50-day voluntary wait period. A DPR of 1 implies daughters from the bull will on average 4 fewer days open in their lactation.	Decrease Days Open	
	SCS	Somatic Cell Score	Somatic Lell Score Uses somatic cell score data from the first five lactations as an indicator of mastitis resistance.		
	HCR Heifer Conception Rate		Percentage of inseminated heifers that become pregnant at each service; shown as a deviation in percentage.	Increase Conception Rate	
HEALTH AND FERTILITY	CCR	Cow Conception Rate	Percentage of inseminated cows that become pregnant at each service; shown as a deviation in percentage. For example, a bull with a CCR value of 1 implies that the conception rate for his daughters will likely be 1% higher during the lactation than daughters of a bull with an evaluation of 0.	Increase Conception Rate	
	FS	Feed Saved	The expected pounds of feed saved per lactation based on body weight composite (BWC) and residual feed intake (RFI) evaluations. Larger, positive values are more favorable. This composite trait favors animals with lower BWC.	Increase Feed Efficiency	
	RFI	Residual Feed Intake	The difference between the actual and expected feed in-take expressed in pounds of dry matter consumed per lactation. Lower values are considered desirable.	Increase Feed Consumed	
	CDN MSP	Canadian Milking Speed	First lactation daughters expected to be appraised as "Average" or "Fast" for milking speed. Average=100, standard deviation=5	Increase milking speed efficiency without reducing udder health	
	CDN MT	Canadian Milking Temperament	The temperament of first lactation cows at milking time. Average=100, standard deviation=5	Increase the number of cows that are "Calm" or "Very Calm" while being milked	
	AHI	A composite index that includes mastitis, metritis, ketosis, displaced abomasum, ABS Health Index Average = 100, standard deviation = 5.		Decrease Health Issues	
	SCE	Sire Calving Ease	Percentage of difficult births expected in first calf heifers.	Direct Estimate of Difficult Calvings	

INDUSTRY TRAITS (CONTINUED)

	TRAIT	TRAIT NAME	DESCRIPTION	EFFECT OF POSITIVE/ HIGHER VALUE		
S	DCE	Daughter Calving Ease	Percentage of difficult births expected for daughters sired by the bull.	Increase Difficult Calvings		
ALVING TRAI	SSB	Sire Stillbirth	Percentage of stillborn calves expected for a sire.	Increase Stillbirths		
	DSB	Daughter Still-birth	Percentage of stillborn calves expected for a sire's daughters.	Increase Stillbirths		
0	PTAT	Туре	The difference in final score classification points compared to the base population.	Improve Classification Score		
	UDC	Udder Composite	A composite index that incorporates fore and rear attachments, udder depth, cleft, teat placement, and stature.	Improve Udder Con-formation		
	FLC	Feet and Leg Composite	A composite index based on rear legs-rear view, foot angle, feet and legs score, and stature.	Improve Leg Conformation		
	BWC	Body Weight Composite	A composite index that incorporates strength, body depth, rump width, dairy form and positive stature.	Increase Weight		
	STA	Stature	Height at the hips.	Increase Height		
	STR	Strength	Evaluation of strength and substance, including width of chest.	Increase Strength		
	BD	Body Depth	Evaluation of depth of barrel.	Increase Body Depth		
	DF	Dairy Form	Evaluation of openness and angularity.	Reduce Body Condition		
	RA	Rump Angle	The slope from the hips to the pins, measured in inches.	Reduce Pin Height		
	тw	Rump Width/ Thurl Width	Distance between the pins, measured in inches.	Widen Thurl		
TION	RLS	Rear Legs: Side View	The angle of the set to the hock.	Increase Leg Set		
FORMA	RLR	Rear Legs: Rear View	Evaluation of the rear legs ability to stand straight, wide apart with feet squarely placed.	Straighten Leg		
CON	FA	Foot Angle	The angle the front of the toes makes with the ground.	Increase Steepness		
	FLS	Feet & Legs Score	Classification score based on the cumulative evaluation of feet and leg traits including evidence of mobility/	Increase Leg Classification Score		
	FUA	Fore Udder Attachment	Evaluation of the strength, length and capacity of the fore udder attachment.	Strengthen Fore Udder		
	RUH	Rear Udder Height	Distance between the bottom of the vulva and the top of the milk secreting tissue, measured in inches.	Reduce Distance Between Udder and Vulva		
	RUW	Rear Udder Width	The width of the rear udder where the udder attaches to the body, measured in inches.	Widen Udder		
	UC	Udder Cleft	Depth of cleft between the rear quarters, measured in inches, the trait has an intermediate optimum of 0, cleft stronger or weaker will be penalized.	Strengthen Cleft		
	UD	Udder Depth	The distance between the low-est point of the udder floor and the point of the hock, measured in inches.	Raise Udder Floor		
	FTP	Front Teat Placement	The distance between the front teats, measured in inches.	Reduce Distance Between Front Teats		
	RTP	Rear Teat Placement	Distance between the rear teats, the trait has intermediate optimum of -1 (equal to 1.8 inches), teats closer or wider will be penalized.	Reduce Distance Between Front Teats		
	TL	Teat Length	The length of the longest teat, measured in inches. For Holsteins, 0 represents the aver-age teat length of 2.4 inches3 represents the teat length of 2.2 inches, and +3 represents the teat of length 2.6 inches.	Lengthen Teats		

INDUSTRY INDEXES

While understanding industry indexes is important, ABS recommends using a **Custom Index to maximize genetic progress**. It gives you the power to include the traits and weightings that matter to you. Customize and prioritize trait selection based on your milk market, facilities, and business style by building a Custom Index.

INDEX	INDEX NAME	DESCRIPTION
TPI®	Total Performance Index	An industry index created by Holstein Association USA with the goal to offer a balanced approach to selection for production, health, and conformation.
NM\$	Net Merit Dollars	An industry index created by USDA that combines 39 individual traits for the NM\$ Holstein Index. Describes expected life-time profit per cow as compared to the base population born in 2015. *Please note that Holstein and Jersey values are calculated slightly different.
CM\$	Cheese Merit Dollars	An industry index created by USDA that combines 39 individual traits more focused on components than NM\$. Describes expected lifetime profit per cow as compared to the base population born in 2015. *Please note that Holstein and Jersey values are calculated slightly different.
JPI™	Jersey Performance Index	An industry created by the American Jersey Cattle Association with the goal to offer a balanced approach to selection for production, health, and conformation.
JUI™	Jersey Udder Index	An industry created by American Jersey Cattle Association with the goal to identify high-performing, long-lived cows with durable udders.

RELATIVE EMPHASIS (%) OF TPI, NM\$, AND CM\$ FOR HOLSTEINS



TPI AND NM\$ INDEX WEIGHTINGS FOR HOLSTEINS

	PRO	FAT	MILK	Feed Efficency	TYPE	UDC	FLC	BWC	RFI	LIV	Ы	scs	Health Index	DPR	CCR	HCR	EFC	ни	CA\$	Fertility Index	DCE	DSB
TPI	19.0	19.0		8.0	8.0	11.0	6.0			3.0	5.0	-4.0	2.0							13.0	-0.5	-1.5
NM\$	17.0	21.8	0.3			3.1	0.5	-9.4	-12.4	4.3	15.1	-2.9	1.7	5.0	1.2	0.5	1.1	0.8	2.8			

MILK PROTEIN

MILK PROTEIN GENOTYPE	PROTEIN TYPE	DESCRIPTION
A1/A1 A1/A2 A2/A2	Beta Casein	One of the caseins in milk protein.
AA, AB, AE, BE, BB or EE	Kappa Casein	One of the casein in milk protein. This is beneficial in cheese making as cows with the BB genotype for Kappa Casein have a slightly higher Kappa Casein content in their milk.

REAL WORLD DATA® (RWD®) TRAITS

TRAIT	DESCRIPTION	MEANING OF STARS
RWD [®] Bull Fertility	Use to provide ABS customers with an easy-to-use ranking of fertility for conventional for ABS sires.	Increase in conception rate.
TransitionRight [®]	Used to strategically choose ABS sires to enhance the transition health of your herd by making cows more genetically resistant to disorders including mastitis, metritis, and ketosis.	Reduce incidences of transition-related challenges.

POLLED versus HORNED

GENOTYPE	RESLUTION PHENOTYPE	DESCRIPTION			
РР	Homozygous Polled	Animals will have no horns and all offspring will be born without horns.			
Рр	Heterozygous Polled	Animals will not have horns, but offspring may or may not have horns depending on the sire they are mated to.			
рр	Recessive Horned	Animals will be born with horns.			

