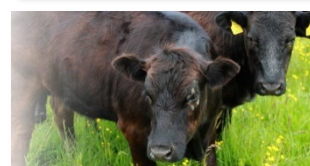


# Weatherbys Scientific Bovine VersaSNP 50K

## *The Versatile SNP chip for Beef and Dairy genotyping*

The new Weatherbys Scientific Bovine VersaSNP 50K is the result of our experience developing and running high capacity Bovine Genotyping for more than 8 years. The content and density of this highly versatile SNP chip has been optimised to contain markers of most economic interest for both Dairy and Beef breeders. The versatility goes beyond genetic markers, the Bovine VersaSNP 50K is integral to Weatherbys Scientific Parental Verification algorithm, delivering the most accurate and precise Parental Verification available. Changing to Weatherbys Scientific Bovine VersaSNP 50K is simple. The data is reverse compatible with other 50K SNP chips, including the IDBv3 and Illumina 50K SNP chips.



### Compatible with your existing SNP data assets

Moving to the Weatherbys Scientific Bovine VersaSNP 50K has many advantages and the data is also reverse compatible with data you may already have.

SNP chip	Number of SNPs in common	Compatibility
IDBv3	44,969	Fully reverse compatible
Illumina 54K	42,606	Direct compatible high accuracy imputation to the full 54K
Illumina 8K LD2	7,898	Reverse compatible and meets CDCB minimum requirements for evaluations
Illumina 777K HD	46,091	Allows data generated by the research community to be used

### Parental Verification

Weatherbys Scientific Bovine VersaSNP 50K is different; We designed the content of the chip to use over 45,000 data points in Parental Verification far exceeding the ISAG standard of 100 SNPs and the proposed additional 100 SNPs (that increases the panel to 200 SNPs) or the ICAR recommendation of 554 SNPs required for parentage discovery. Parental Verification is performed using proprietary algorithms on dedicated computing hardware.

Weatherbys Scientific has ICAR Parentage Analysis Accreditation for DNA Data Interpretation Centres. Accreditation verifies that Weatherbys Scientific can proficiently perform SNP based Parentage Verification using ICAR's recommended 200 SNP verification panel.



### Parental Discovery

Weatherbys Scientific Bovine VersaSNP 50K offers new possibilities such as Sire or Dam discovery for parental assignment. By searching our database, we can discover the parents, removing the guesswork of nominating Sires or Dams and producing a high accurate result beyond dispute.



## Fast and Efficient

Weatherbys Scientific Bovine VersaSNP 50K offers fast turnaround times, routinely 10 working days. The chip utilizes Illumina XT chemistry which is processed within a robust proprietary workflow which we have used to deliver over 2 million high quality genotypes in 5 years. We have the capacity and expertise to support your SNP genotyping project providing rapid genotype delivery and additional values adds including parental verification, breed composition and genetic traits all delivered within 5 days of genotypes, to answer all your questions and drive precision breeding.

## Genetic Diseases and Traits of Importance

Weatherbys Scientific Bovine VersaSNP 50K contains specifically designed probes to accurately genotype 100 genetic markers of economic importance. Trait categories cover; beneficial, colour, lethal, lethal-embryo, unwanted and specific beef and milk related traits. To help breeders select the markets of interest we have mapped all validated traits to 41 cattle breeds.

In addition to the 100 validated genetic traits on Version 1, further traits are scheduled for release, providing additional value to choosing Weatherbys Scientific Bovine VersaSNP 50K.

## Precision Breeding and integration with Genomic Evaluation Centres

Improve the profitability, replacement indexes, carbon efficiency and speed of advancement of your herd. Weatherbys Scientific collaborates with leading genomic evaluators including CDCB, EGENES, Breedplan, ICBF, CDN and we are constantly working to expand the list of Evaluators. Using Weatherbys Scientific Bovine VersaSNP 50K genotypes we can make nominations to these evaluators. Results can be sent directly to you or we can consolidate evaluations with parental verification and genetic trait analysis into single reports.

- Decide which stock to keep for breeding
- Predict herd and individual performance
- Identify elite bulls and females for breeding and AI



## Bos Indicus content

Weatherbys Scientific Bovine VersaSNP 50K contains over 10,000 *Bos Indicus* SNPs that have been shown to be highly informative within a number of *Bos Indicus* breeds.

## Future proof your investment in SNP genotyping

Performing SNP based genotyping is more than just answering immediate questions, it is a valuable asset acting as a long-term investment for your breeding program. When we designed the Weatherbys Scientific Bovine VersaSNP 50K it was with one eye to the future, based on trends and what our customers have told us.

The Weatherbys Scientific Bovine VersaSNP 50K has available space for nearly 5000 SNPs that can be used for customer specific content on future chip versions and for new Weatherbys Scientific developed content as new SNPs of importance are discovered.

Choose the Weatherbys Scientific Bovine VersaSNP 50K with confidence that it will grow and adapt to your needs for many years.

## Breed specific trait packages

Angus  
Ayrshire  
Belgian Blue  
Belted Galloway  
Blonde d'Aquitaine  
Brangus  
Brown Swiss  
Charolais  
Chianina  
Dahomey  
Devon  
Dexter  
Dutch Improved Red and White  
Finnish Ayrshire  
Fleckvieh  
Friesian  
Gelbvieh  
Glanrind  
Hereford  
Highland  
Holstein  
Japanese Black  
Jersey  
Limousin  
Limpurger  
Montbéliarde  
Multiple breeds  
Murray Grey  
Nordic Red dairy  
Pezzata Rossa  
Red Angus  
Red Danish Dairy  
Romagnola  
Rotes Hohenvieh  
Salers  
Shorthorn  
Simmental  
Swedish Red and White  
Tyrolean Grey  
Vorderwald  
Wagyu

## Summary of trait types

Unwanted	39
Milk	21
Meat	20
Lethal	17
Lethal-Embryo	16
Beneficial	9
Colour	8
Disease	1
Unwanted/Milk	1
Coat Colour	1
<b>Total</b>	<b>133</b>

## Technical Specifications

<b>Chip Name:</b>	Weatherbys Scientific Bovine VersaSNP 50K™
<b>Product Code:</b>	GXL018801
<b>Chip Version:</b>	1.0
<b>Species:</b>	Bovine
<b>Manufacturer:</b>	Weatherbys Scientific
<b>Technology Platform:</b>	Illumina
<b>Chemistry:</b>	XT
<b>Chip Format:</b>	96
<b>Base Reporting Content (Illumina SNPs):</b>	49,629 (SNP map available on request)
<b>Average spacing between SNPs:</b>	~53.4kb
<b>Recommended ISAG 200 SNPs on VersaSNP 50K:</b>	200
<b>Recommended ICAR 554 SNPs on VersaSNP 50K:</b>	554
<b>Recommended Microsatellite Imputation 980 SNPs:</b>	966
<b>Validated Diagnostic Test Designs:</b>	133
<b>Applications:</b>	Genomic Evaluations, GWAS studies, Parentage Verification (Weatherbys Scientific Parentage Verification, ISAG and ICAR SNPs), Microsatellite Imputation, Breed Assignment, Sex Determination.

## Content Overlap Across Range of Bovine SNP Chips

Common Illumina SNP Content Across a Selection of Bovine Chips

	Illumina LD2	Illumina 54K	Illumina HD	Versa Chip 50K	IDBv3
<b>Illumina LD2</b>	7931	6900	7757	<b>7916</b>	7729
<b>Illumina 54K</b>		54609	49345	<b>42779</b>	40865
<b>Illumina HD</b>			777962	<b>46225</b>	41529
<b>Versa Chip 50K</b>				<b>50345</b>	<b>44969</b>
<b>IDBv3</b>					45080

## Chromosomal SNP Coverage: 29 Autosomal, X, Y and MT

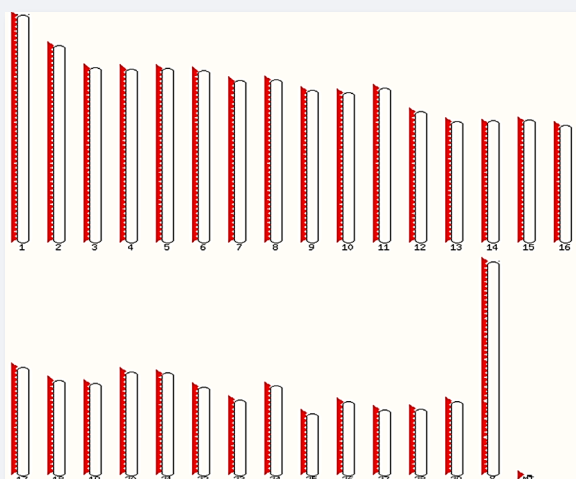


Figure 1: Bovine Karyotype SNP coverage map for 49,922 Illumina SNPs on Weatherbys Scientific Bovine VersaSNP 50K™. Red arrows indicate regions of overlapping SNP coverage, portraying uniform genome wide SNP coverage. 21 Y chromosome SNPs and 97 unmapped Illumina SNPs not shown.

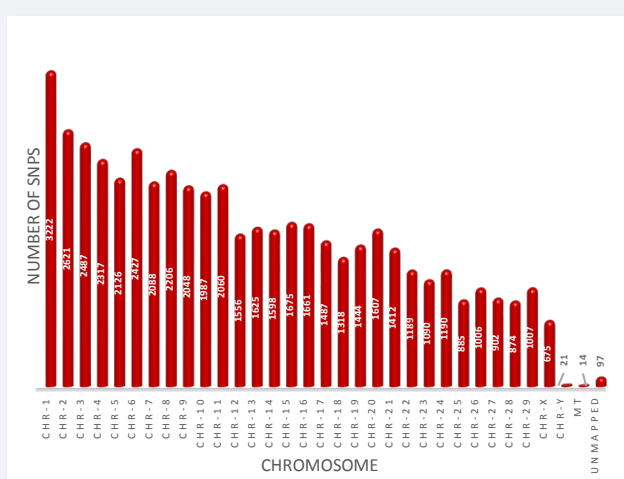


Figure 2: Number of SNPs per chromosome for 49,922 Weatherbys Scientific Bovine VersaSNP 50K™ Illumina SNP Content

Contact us:

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## Validated Diagnostic Tests (new for Version 1.2 in bold)

Beneficial	Polled Celtic	Meat	Myostatin nt419
Beneficial	Polled Friesian_1909396D2	Meat	Myostatin nt748_78
Beneficial	Polled Friesian_51D	Meat	Myostatin nt821DEL11
Beneficial	Polled Friesian_C1655463T	Meat	Myostatin Q204X
Beneficial	Polled Friesian_G1654405A	Meat	Myostatin S105C
Beneficial	<b>SLICK 39136558</b>	Milk	<b>A2 Corporation A1/A2 Test</b>
Beneficial	<b>SLICK 39263696</b>	Milk	ABCG2
Beneficial	<b>SLICK 39339348</b>	Milk	AcylCoA:Diacylglycerol Acyltransferase
Coat Colour	<b>Telstar</b>	Milk	<b>Beta Casein Sub Variant X14711_6690</b>
Colour	Coat colour Black gene E, extension	Milk	<b>Beta Casein Sub Variant X14711_8101</b>
Colour	Coat colour Red factor e	Milk	<b>Beta Casein Sub Variant X14711_8178</b>
Colour	Dominant_red	Milk	<b>Beta Casein Sub Variant X14711_8219</b>
Colour	<b>Dun Dexter</b>	Milk	<b>Beta Casein Sub Variant X14711_8267</b>
Colour	PMEL17_1835C_A	Milk	<b>Beta Casein Sub Variant X14711_8356</b>
Colour	PMEL17_delTTC	Milk	Growth Hormone Receptor F279Y
Colour	Silver Char Dilutor_1	Milk	Growth Hormone_2141
Colour	White Heifer Disease/Roan_coat_colour	Milk	Growth Hormone_2291
Disease	Bovine Spinal Dysmyelination	Milk	<b>Kappa Casein Sub Variant AY380228_12951</b>
Lethal	Alpha Mannosidosis_662	Milk	<b>Kappa Casein Sub Variant AY380228_12971</b>
Lethal	Arachnomelia Syndrome_MOCS1	Milk	<b>Kappa Casein Sub Variant AY380228_13065</b>
Lethal	Arachnomelia Syndrome_SUOX	Milk	<b>Kappa Casein Sub Variant AY380228_13068</b>
Lethal	Arthrogyposis with Cleft Palate	Milk	<b>Kappa Casein Sub Variant AY380228_13104</b>
Lethal	<b>Cardiomyopathy and Woolly Hair Syndrome</b>	Milk	<b>Kappa Casein Sub Variant AY380228_13111</b>
Lethal	Citrullinaemia	Milk	<b>Kappa Casein Sub Variant AY380228_13124</b>
Lethal	Congenital Muscular Dystonia 1	Milk	<b>Kappa Casein Sub Variant AY380228_13165</b>
Lethal	Congenital Muscular Dystonia 2	Milk	Yellow milk fat
Lethal	<b>Holstein Cholesterol Deficiency</b>	Unwanted	<b>Alpha Mannosidosis_961</b>
Lethal	Idiopathic Epilepsy	Unwanted	Axonopathy
Lethal	Maple Syrup Urine Disease_Hereford	Unwanted	Bovine Hereditary Zinc Deficiency
Lethal	Maple Syrup Urine Disease_Shorthorn	Unwanted	Bovine Leukocyte Adhesion Deficiency
Lethal	Neuronal ceroid lipofuscinosis	Unwanted	<b>Cardiomyopathy Dilated</b>
Lethal	Paunch Calf Syndrome	Unwanted	Chediak_Higashi syndrome
Lethal	Perinatal weak calf syndrome	Unwanted	Congenital Myoclonus
Lethal	Ptosis, intellectual disability, retarded growth and mortality	Unwanted	Crooked Tail Syndrome delAG
Lethal	Tibial Hemimelia_Improver	Unwanted	Developmental_Duplication
Lethal-Embryo	Brachyspina	Unwanted	Dwarfism, Belgian Blue
Lethal-Embryo	<b>Braunvieh Haplotype 2</b>	Unwanted	<b>Dystrophic Epidermolysis Bullosa</b>
Lethal-Embryo	Bulldog Dwarfism 1	Unwanted	Ehlers Danlos Syndrome-Holstein Variant
Lethal-Embryo	Complex Vertebral Malformation	Unwanted	Factor XI deficiency Wagyu
Lethal-Embryo	Deficiency of Uridine Monophosphate Synthase	Unwanted	Hypotrichosis Streaked_ERCC6L
Lethal-Embryo	Fleckvieh Haplotype 4 (embryonic loss),	Unwanted	Hypotrichosis Streaked_TSR2
Lethal-Embryo	Holstein Haplotype 1	Unwanted	Hypotrichosis_HEPHL1
Lethal-Embryo	Holstein Haplotype 3	Unwanted	Hypotrichosis_KRT71
Lethal-Embryo	Holstein Haplotype 4	Unwanted	Idiopathic Male subfertility
Lethal-Embryo	Holstein Haplotype 5	Unwanted	Mulefoot G1199S
Lethal-Embryo	<b>Holstein Haplotype 6</b>	Unwanted	<b>Mulefoot G907R</b>
Lethal-Embryo	<b>Holstein Haplotype 7</b>	Unwanted	Mulefoot NG1621KC
Lethal-Embryo	Jersey Haplotype 1	Unwanted	<b>Pompes GSD E7</b>
Lethal-Embryo	Montbeliarde Haplotype 2	Unwanted	<b>Pompes GSD E13</b>
Lethal-Embryo	Neuropathic hydrocephalus	Unwanted	<b>Pompes GSD E18</b>
Lethal-Embryo	RNASEH2B_del	Unwanted	Protoporphyrria
Meat	Calpain1 316	Unwanted	Pseudomyotonia_c491G>A
Meat	Calpain1 4751	Unwanted	Pseudomyotonia_c632G>T
Meat	Calpain1 530	Unwanted	Pseudomyotonia_c857G>T
Meat	Calpastain 282	Unwanted	<b>Pulmonary Hypoplasia with Anasarca 1</b>
Meat	Calpastain 2870	Unwanted	Spherocytosis
Meat	Calpastain 2959	Unwanted	<b>Spinal Muscular Atrophy</b>
Meat	Myostatin C313Y	Unwanted	STAT1
Meat	Myostatin D182N	Unwanted	STAT3_19069
Meat	Myostatin E226X	Unwanted	STAT3_25402
Meat	Myostatin E291X	Unwanted	STAT5_13244
Meat	Myostatin F94L	Unwanted	STAT5_13319
Meat	Myostatin L64P	Unwanted	STAT5_13516
Meat	Myostatin nt267	Unwanted	Thrombopathia
Meat	Myostatin nt324	Unwanted	<b>Xanthinuria Tyrolean Grey</b>
Meat	Myostatin nt414	Unwanted/Milk	Trimethylaminuria

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