



**NATIONAL
DAIRY
DEVELOPMENT
BOARD**



BHARAT BOVINE GENETICS

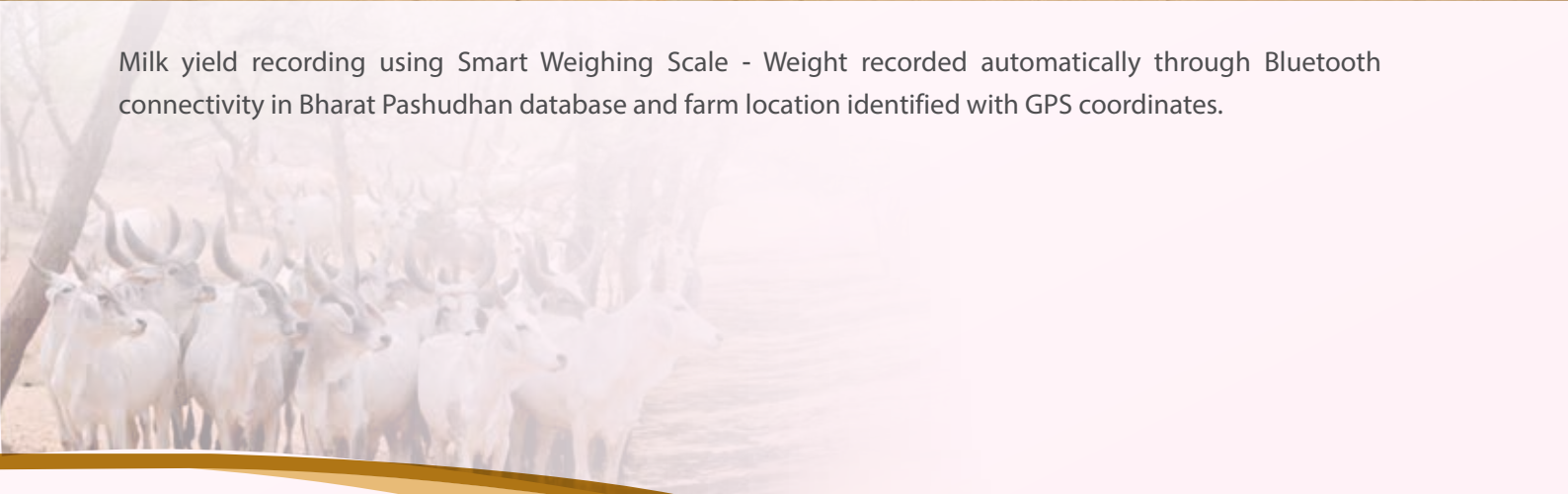


Issue -1

05 March 2026



Milk yield recording using Smart Weighing Scale - Weight recorded automatically through Bluetooth connectivity in Bharat Pashudhan database and farm location identified with GPS coordinates.



Contents

1.	Indian Dairy Sector - Overview	1
2.	Breeding Values Estimation Process	2-5
3.	Genomic Breeding Values	
	• Sahiwal	8-9
	• Gir	10-11
	• HF Crossbred	12-13
	• Jersey Crossbred	14-15
	• Murrah	18-19
	• Mehsana	20-21





BHARAT BOVINE GENETICS

Indian Dairy Sector: Economic Significance and Genetic Resources

India is the world's largest milk producer, accounting for over 25% of global production. India has a rich repository of bovine genetic resources,

Purebred Cattle: 55 breeds; major milk-producing breeds are: Sahiwal, Gir, Red Sindhi, Tharparkar, Rathi, known for high milk yield and adaptability.

Buffalo: 22 breeds; major milk-producing breeds are: Murrah, Mehsana, Jaffarabadi, Banni, Nili-Ravi – these breeds produce milk with high fat content.

Crossbred cattle: Holstein Friesian X Indigenous breeds (HF CB), Jersey X Indigenous breeds (JCB), Sunandini- a mosaic crossbred.

The economic value of milk produced in the country is estimated at over ₹12.2 lakh crore - 31% of Gross Value Added (GVA) to Agriculture and allied sectors.

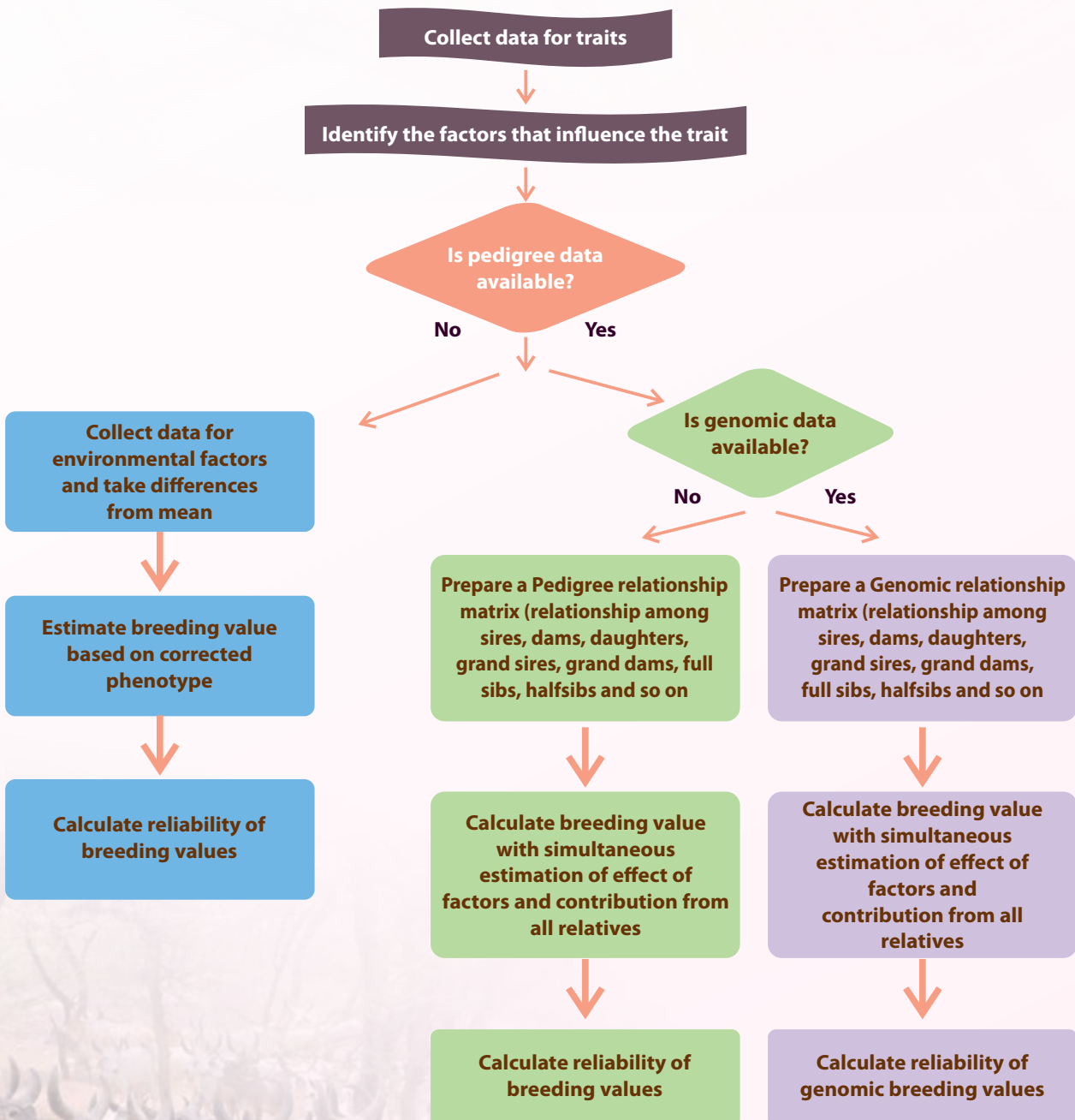
Genetic improvement and bull selection

- India has a very large bovine population, but per-animal milk productivity is low, making many breeds uneconomical, creating a strong need for enhancing their genetic potential for productivity, profitability, and sustainability.
- Artificial Insemination (AI), used since the 1950s, has evolved from being a crossbreeding tool to a widely accepted method for genetic improvement across all cattle and buffalo breeds.
- Since a superior bull can produce tens of thousands of semen doses and thousands of daughters each year, accurate selection of genetically superior bulls is essential for faster genetic progress.
- However, because of late maturity, long calving intervals, and production challenges, proving bulls through conventional progeny testing can take nearly 10 years, making the use of proven bulls impractical for large-scale AI in India.
- Earlier selection of bulls was based only on dam performance, which lacked accuracy, but the launch and expansion of systematic progeny testing programs since the 1990s have enabled reliable recording, genetic evaluation, and estimation of breeding values for better bull and heifer selection.

Breeding Value Estimation Process

The genetic worth of an animal for a particular trait can be expressed in terms of Breeding Value (BV). This is the genetic superiority that an animal has above the average of the population. Phenotypic expression of a trait is function of genetic capacity of an animal and environment in which the animal performs. Therefore, instead of raw production records, ranking of animals based on BV is more accurate. BV estimation process uses all available information. More information used while estimation of BV, more accurate will be the BV.

PROCESS OF ESTIMATING BREEDING VALUES



The BV estimation process was further strengthened by adding genomic information from the year 2020 onwards. This led to a more accurate ranking of bull calves and heifers compared to when only pedigree records were used.

Genomic Selection is a process of using DNA level information (Genotypes) of an animal along with other production and pedigree records for genetic ranking of an animal. It has been proven that ranking of an animal at early age based on Genomic Breeding Values (GBV), will be more accurate compared to pedigree-based ranking.

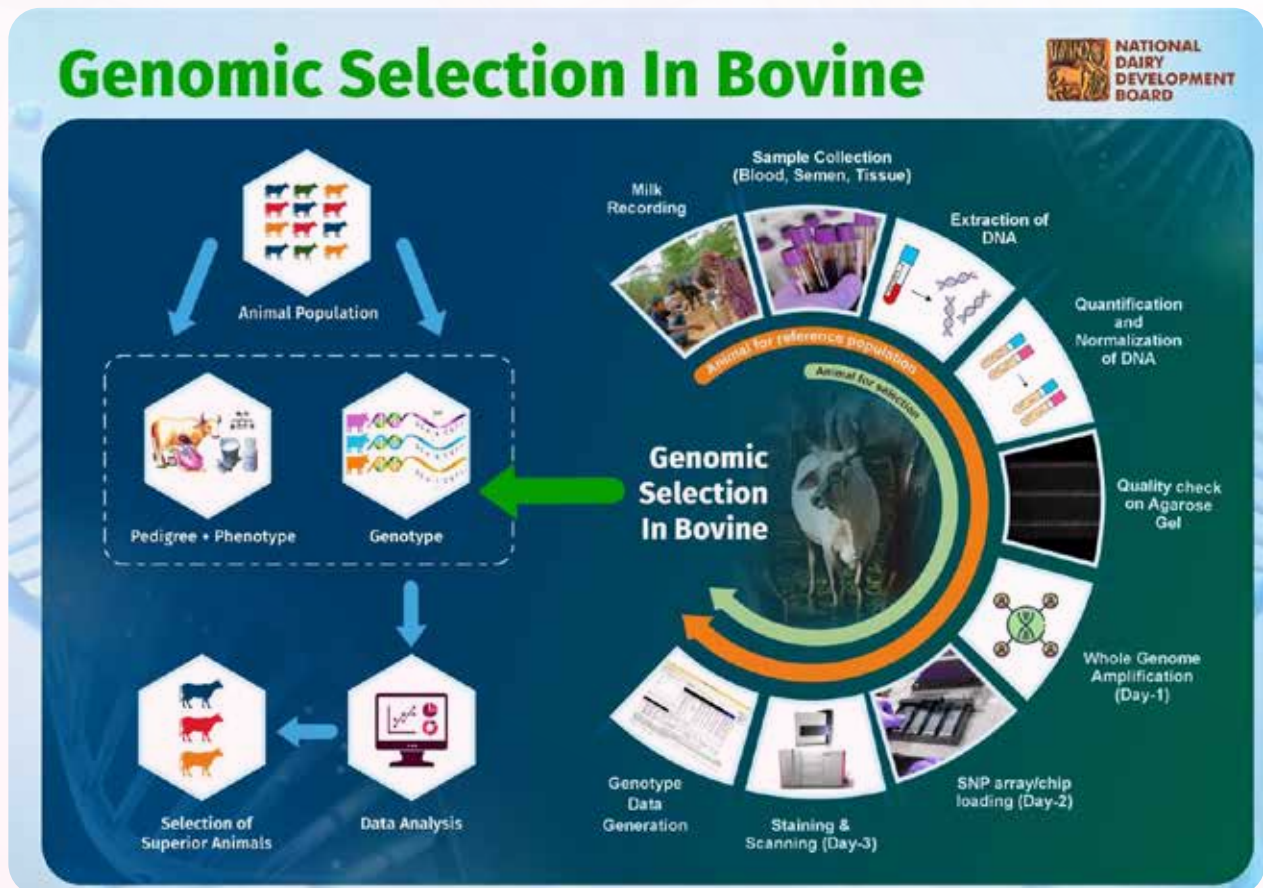


Table: Increase in accuracy of ranking based on information used assuming heritability of trait at 0.25 – for sex limited trait expressed late in life (e.g. Milk Production)

Information used for bull (Heifer/cow) ranking	Accuracy of Ranking at genetic level	Feasibility of evaluation
Bull's Mother's production based on single-day milk yield (as done in milk yield competition)	15%	Only when mother starts milk production
Bull's Mother's production record arrived based on 10 monthly records (uncorrected)	20%	On completion of first lactation
Bull's (or Heifer's) Mother's production record arrived based on 10 monthly records (corrected based on large number of animals recorded) = A	25%	On completion of first lactation
The animal's own performance based on 10 monthly records.	60-65%	On completion of first lactation – can be used for selecting cows or bull mothers
A + Sire's Breeding Value (when sire is proven) = B	55%	At birth- Was used for young bull selection when genomics was not available
Genotype information of bull calf (or Heifer) – Animal with GBV = C	55-65%	At birth – can be used for bull calf/ young Heifer selection
B + C Animal with GBV = D	60-70%	Used for young bull or heifer selection at birth all over the world
A/B + Bull's Daughters records (around 30 daughters recorded systematically) – Proven bull = E	85%	At around 8-10 years of bull's age
D + E or E + More records from daughters	> 90%	At around 10 years of bull's age

Under the Rashtriya Gokul Mission Scheme, Progeny Testing and Pedigree Selection projects are being implemented by various agencies. These agencies are recording a large number of animals for their milk production performance and pedigree details. The projects are being monitored by the National Dairy Development Board, Anand (NDDB). The Government of India has notified a Breeding Value Estimation Committee (BVEC)-

The committee comprises experts from ICAR, State Agri. Universities, State AH, Departments, DAHD, Govt. of India, NDDB, and some Independent experts. This committee advises on scientific methods and models to be used for estimating BV and ranking of bulls, as well as for estimating BV of recorded animals in the country for various breeds. Large reference populations are created by genotyping recorded animals, and GBVs are

estimated for important cattle and buffalo breeds. The NDDDB team, based on the guidelines provided by the BVEC have estimated GBV/BV for bulls that have been tested in progeny testing projects or

that have been genotyped at NDDDB. The following section provides a list of the top bulls that were evaluated by this process.

Information used for GBV estimation

- Production records of cows recorded in the programs
- Genotype data using GAUCHIP (for cattle) /MAHISHCHIP (for buffaloes)
- Non- Genetic factors
 - o Age at First Calving classes
 - o Season of Calving
 - o Herd (Village/Tehsil)
 - o Month of Recording
 - o Owner
- Statistical method used (any one based on information available)
 - o ssGBLUP
 - o GBLUP



CATTLE BREEDS



SAHIWAL

Top Sahiwal bulls for Milk Production potential:

Sr. No.	Bull ID	Semen station (Source)	Date of birth	GBV 305 days MY (Kgs)	Genotype status (Y/N)
1	KMF-SH-813	KMF, Nandini Sperm Station	02-06-2019	637	Y
2	ABC-SH-21286	Animal Breeding Centre, Salon	12-10-2019	508	Y
3	NBH-SURAT	PLDB, Nabha	27-05-2010	492	Y
4	SAG-SL-10065	Sabarmati Ashram Gaushala, Bidaj	12-04-2016	465	Y
5	SAG-SL-10047	Sabarmati Ashram Gaushala, Bidaj	23-09-2014	447	Y
6	HIS-S-008777	Frozen Semen Bank, Hissar (HLDB)	06-04-2018	440	Y
7	SAG-SL-10072	Sabarmati Ashram Gaushala, Bidaj	31-01-2017	439	Y
8	ABC-SL-21295	Animal Breeding Centre, Salon	26-11-2019	437	Y
9	SAG-SL-10071	Sabarmati Ashram Gaushala, Bidaj	11-08-2016	434	Y
10	NBH-SAH-012	PLDB, Nabha	04-08-2017	417	Y



KMF-SH-813



ABC-SH-21286



NBH-SURAT



SAG-SL-10065



SAG-SL-10047



HIS-S-008777



SAG-SL-10072



ABC-SL-21295



SAG-SL-10071



NBH-SAH-012

Equating GBV for 305D Milk Yield with average performance of Sahiwal animals in average management conditions:

GBV range	Average Std Lactation Milk Yield (ME) Kgs
-500 to -400	1493
-400 to -300	1886
-300 to -200	2194
-200 to -100	2577
-100 to 0	2922
0 to 100	3236

GBV range	Average Std Lactation Milk Yield (ME) Kgs
100 to 200	3473
200 to 300	3746
300 to 400	3935
400 to 500	4127
500 to 600	4600

Breed average for GBV estimation: 2735 kgs

GIR

Top Gir bulls for Milk Production related traits:

Sr. No.	Bull ID	Semen station (Source)	Date of birth	GBV 305 days MY (Kgs)	Genotype status (Y/N)
1	PAT-Bhadresh	GLDB, Patan	05-05-2012	663	Y
2	AMU-GR-0633	AMUL, ODE	NA	585	Y
3	PAT-Pritam	GLDB, Patan	26-05-2011	524	Y
4	BHO-GR-12419	MPL&PDC, Bhopal	21-07-2019	483	Y
5	SAG-GR-10073	Sabarmati Ashram Gaushala, Bidaj	25-02-2016	479	Y
6	SAG-GR-10110	Sabarmati Ashram Gaushala, Bidaj	30-12-2017	471	Y
7	SAG-GR-10038	Sabarmati Ashram Gaushala, Bidaj	09-08-2014	466	Y
8	SAG-GR-10094	Sabarmati Ashram Gaushala, Bidaj	09-06-2016	457	Y
9	ABC-GR-21241	Animal Breeding Centre, Salon	26-04-2019	456	Y
10	SAG-GR-10100	Sabarmati Ashram Gaushala, Bidaj	24-07-2017	450	Y



PAT-Bhadresh



AMU-GR-0633



PAT-Pritam



BHO-GR-12419



SAG-GR-10110



SAG-GR-10073



SAG-GR-10038



SAG-GR-10094



ABC-GR-21241

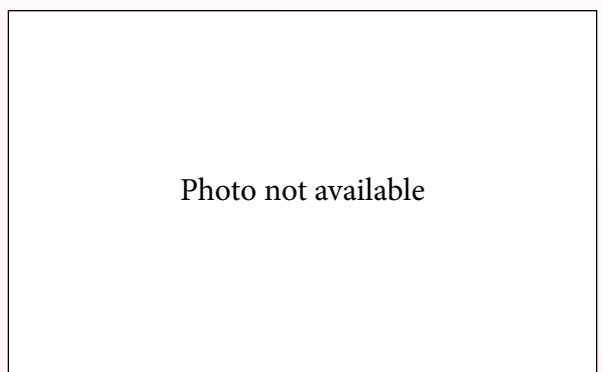


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SAG-GR-10100

Equating GBV for 305D Milk Yield with average performance of Gir animals in average management conditions:

GBV range	Average Std Lactation Milk Yield (ME) Kgs
-500 to -400	1270
-400 to -300	1487
-300 to -200	1559
-200 to -100	1780
-100 to 0	2014
0 to 100	2286

GBV range	Average Std Lactation Milk Yield (ME) Kgs
100 to 200	2567
200 to 300	2962
300 to 400	3368
400 to 500	3818
500 to 600	4249

Breed average for GBV estimation: 2130 kgs

HF CROSSBRED

Top HFCB bulls for Milk Production related traits:

Sr. No.	Bull ID	Semen station (Source)	Date of birth	GBV 305 D MY (Kgs)	GBV Fat %	SNF % GBV	Prot % GBV	Geno. status (Y/N)
1	SAG-HX-10062	SABARMATI ASHRAM GAUSHALA, BIDAJ	12-07-2016	1018	0.020	-1.30	-0.36	Y
2	MUT-KA11905	KLDB, FSS, MATTUPATTY	30-11-2010	966	-0.951	-3.73	-1.15	Y
3	SAG-HX-10032	SABARMATI ASHRAM GAUSHALA, BIDAJ	05-01-2015	938	-0.195	-1.75	-0.45	Y
4	SAG-HX-10017	SABARMATI ASHRAM GAUSHALA, BIDAJ	12-04-2013	936	-0.120	-1.69	-0.41	Y
5	SAG-HX-10040	SABARMATI ASHRAM GAUSHALA, BIDAJ	25-10-2015	895	-0.101	-1.48	-0.39	Y
6	NBH-CONOR	PLDB, FSBS, NABHA	26-06-2014	876	NA	NA	NA	Y
7	SAG-HX-10064	SABARMATI ASHRAM GAUSHALA, BIDAJ	15-01-2017	848	-0.446	-2.11	-0.52	Y
8	SAG-HX-10025	SABARMATI ASHRAM GAUSHALA, BIDAJ	22-02-2014	844	-0.163	-1.48	-0.36	Y
9	PNE-943	MLDB, FSL, PUNE	13-02-2012	842	NA	NA	NA	Y
10	SAG-HX-10049	SABARMATI ASHRAM GAUSHALA, BIDAJ	09-01-2016	839	-0.136	-1.56	-0.44	Y



SAG-HX-10062

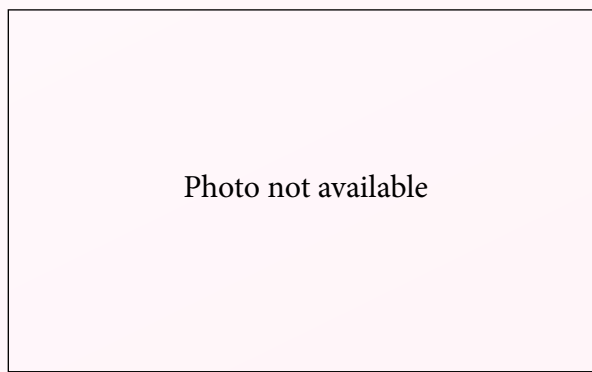


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MUT-KA11905



SAG-HX-10032



SAG-HX-10017



SAG-HX-10040



NBH-CONOR



SAG-HX-10064



SAG-HX-10025

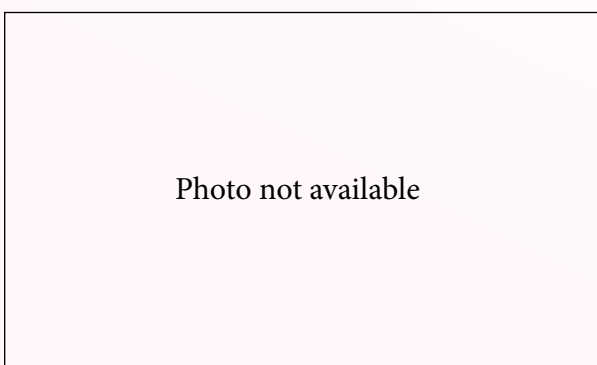


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PNE-943



SAG-HX-10049

Equating GBV for 305D Milk Yield with average performance of HFCB animals in average management conditions

GBV range	Average Std Lactation Milk Yield (ME) Kgs
-900 to -800	2091
-800 to -700	2364
-700 to -600	2436
-600 to -500	2553
-500 to -400	2523
-400 to -300	2683
-300 to -200	2890
-200 to -100	3153
-100 to 0	3416
0 to 100	3701

GBV range	Average Std Lactation Milk Yield (ME) Kgs
100 to 200	3965
200 to 300	4240
300 to 400	4516
400 to 500	4763
500 to 600	5165
600 to 700	5360
700 to 800	5868
800 to 900	6075
900 to 1000	6161
1000 to 1100	6751

Breed average for GBV estimation: 3321 kgs

JERSEY CROSSBRED

Top JCB bulls for Milk Production related traits:

Sr. No.	Bull ID	Semen station (Source)	Date of birth	GBV 305 days MY (Kgs)	GBV Fat %	SNF % GBV	Prot % GBV	Geno. status (Y/N)
1	HOS-HJX-147	DLF, HOSUR	21-05-2016	424	NA	NA	NA	Y
2	SAG-JS-10085	SABARMATI ASHRAM GAUSHALA, BIDAJ	01-10-2015	422	-0.442	-0.89	-0.32	Y
3	BAF-MARICH	BAIF, FSL, PUNE	10-06-2015	366	-0.286	-0.66	-0.24	Y
4	AMU-CBJY-0107	AMUL, ODE	10-11-2017	335	NA	NA	NA	Y
5	BNV-JYSH-4324	APLDA, FSBS, BANAVASI.	24-06-2015	315	-0.266	-0.55	-0.23	Y
6	SAG-JS-10089	SABARMATI ASHRAM GAUSHALA, BIDAJ	20-09-2015	315	-0.242	-0.76	-0.29	Y
7	AMU-CBJY-0104	AMUL, ODE	22-07-2017	314	NA	NA	NA	Y
8	DHO-KA17264	KLDB, FSS, DHONI	12-02-2016	314	-0.347	-0.76	-0.24	Y
9	EKT-1178	ECBF, EACHENKOTTAI	01-02-2016	311	NA	NA	NA	Y
10	EKT-1286	ECBF, EACHENKOTTAI	30-01-2017	305	NA	NA	NA	Y



HOS-HJX-147



SAG-JS-10085



BAF-MARICH



AMU-CBJY-0107



BNV-JYSH-4324



SAG-JS-10089



AMU-CBJY-0104



DHO-KA17264



EKT-1178



EKT-1286

Equating GBV for 305D Milk Yield with average performance of JCB animals in average management conditions

GBV range	Average Std Lactation Milk Yield (ME) Kgs
-600 to -500	1459
-500 to -400	1563
-400 to -300	1769
-300 to -200	1958
-200 to -100	2211
-100 to 0	2496
0 to 100	2791

GBV range	Average Std Lactation Milk Yield (ME) Kgs
100 to 200	3091
200 to 300	3384
300 to 400	3685
400 to 500	4006
500 to 600	4413
600 to 700	4750

Breed average for GBV estimation: 2611 kgs



BUFFALO BREEDS



MURRAH

Top Murrah bulls for Milk Production related traits:

Sr. No.	Bull ID	Semen station (Source)	Date of birth	GBV 305 days MY (Kgs)	GBV Fat %	SNF % GBV	Prot % GBV	Genotype status (Y/N)
1	ABC-SM-914	ANIMAL BREEDING CENTRE, SALON	04-03-2015	651	-0.697	-2.63	-0.82	Y
2	SAG-MR-10530	SABARMATI ASHRAM GAUSHALA, BIDAJ	08-05-2015	551	-0.179	-1.90	-0.52	Y
3	SAG-MR-10535	SABARMATI ASHRAM GAUSHALA, BIDAJ	09-10-2015	517	-0.514	-2.09	-0.62	Y
4	ABC-MR-21171	ANIMAL BREEDING CENTRE, SALON	25-10-2016	500	NA	NA	NA	Y
5	RHR-MR-50138	RAHURI SEMEN STATION, AHMEDNAGAR	19-07-2015	498	-0.417	-2.09	-0.60	Y
6	SAG-MR-10604	SABARMATI ASHRAM GAUSHALA, BIDAJ	08-11-2017	493	NA	NA	NA	Y
7	ABC-SM-639	ANIMAL BREEDING CENTRE, SALON	16-03-2013	471	-0.140	-1.69	-0.38	Y
8	SAG-MR-10606	SABARMATI ASHRAM GAUSHALA, BIDAJ	27-01-2017	464	NA	NA	NA	Y
9	HIS-M-319831	HLDB, FSB, HISSAR	08-10-2016	434	0.259	-0.32	-0.12	Y
10	HIS-M-416	HLDB, FSB, HISSAR	29-04-2014	425	-0.490	-2.07	-0.60	Y



ABC-SM-914



SAG-MR-10530



SAG-MR-10535



ABC-MR-21171



RHR-MR-50138



SAG-MR-10604

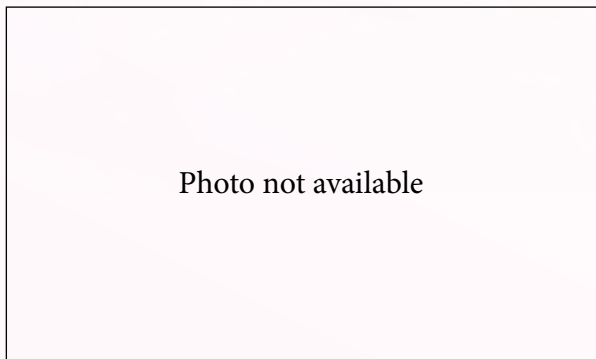


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ABC-SM-639



SAG-MR-10606



HIS-M-319831



HIS-M-416

Equating GBV for 305D Milk Yield with average performance of Murrah animals in average management conditions

GBV range	Average Std Lactation Milk Yield (ME) Kgs
-500 to -400	1588
-400 to -300	1859
-300 to -200	1949
-200 to -100	2225
-100 to 0	2518
0 to 100	2858

GBV range	Average Std Lactation Milk Yield (ME) Kgs
100 to 200	3209
200 to 300	3703
300 to 400	4210
400 to 500	4773
500 to 600	5311

Breed average for GBV estimation: 2573 kgs

MEHSANA

Top Mehsana bulls for Milk Production related traits:

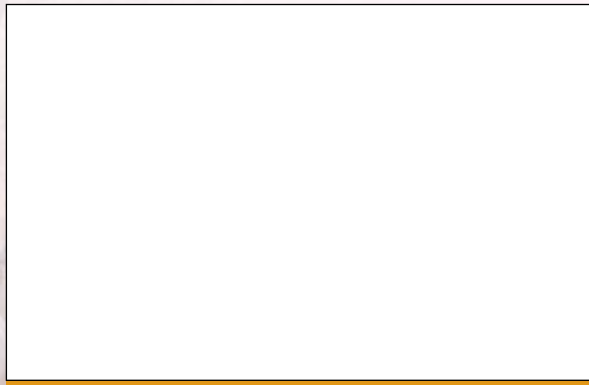
Sr. No.	Bull ID	Semen station (Source)	Date of birth	GBV 305 days MY (Kgs)	GBV Fat %	SNF % GBV	Prot % GBV	Genotype status (Y/N)
1	DUR-MH-466	Mehsana Union, PSK, Jagudan	31-03-2014	415	-0.602	-1.73	-0.41	Y
2	DUR-MH-518	Mehsana Union, PSK, Jagudan	10-08-2016	338	-0.379	-1.34	-0.30	Y
3	DUR-MHBF-441	Mehsana Union, PSK, Jagudan	13-09-2012	330	-0.436	-1.43	-0.39	Y
4	DUR-MH-480	Mehsana Union, PSK, Jagudan	02-01-2015	321	-0.420	-1.47	-0.44	Y
5	PAT-DEV	GLDB, SFSPTI, PATAN	22-11-2013	306	NA	NA	NA	Y
6	DUR-MH-522	Mehsana Union, PSK, Jagudan	05-12-2016	306	-0.156	-0.72	-0.26	Y
7	DUR-MH-486	Mehsana Union, PSK, Jagudan	10-08-2015	300	-0.490	-1.00	-0.26	Y
8	DUR-MH-489	Mehsana Union, PSK, Jagudan	26-06-2015	287	-0.602	-1.13	-0.38	Y
9	DUR-MH-456	Mehsana Union, PSK, Jagudan	26-10-2013	279	-0.289	-1.20	-0.27	Y
10	DUR-MH-521	Mehsana Union, PSK, Jagudan	30-10-2016	277	-0.469	-1.19	-0.21	Y



DUR-MH-466



DUR-MH-518



DUR-MHBF-441



DUR-MH-480



PAT-DEV



DUR-MH-522

Bull No. B 522
 Tag No. 340022814376
 D.O.B - 05/12/2016
 DMY - 3411 K.g. [3rd Lact.]
 Sire - B 344
 SDMY - 4477 K.g.



DUR-MH-486

B- 486
 340077911578



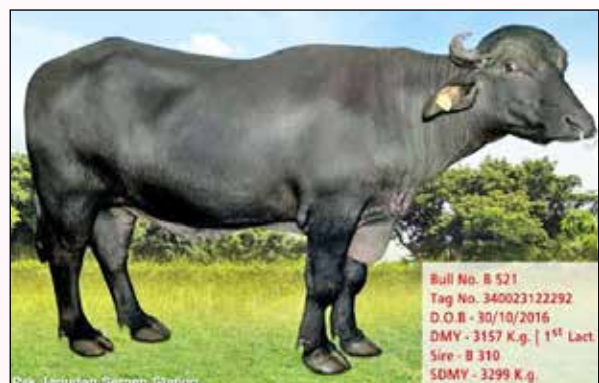
DUR-MH-489

B- 489
 340031723076



DUR-MH-456

B - 456
 340021216065



DUR-MH-521

Bull No. B 521
 Tag No. 340023122292
 D.O.B - 30/10/2016
 DMY - 3157 K.g. [1st Lact]
 Sire - B 310
 SDMY - 3299 K.g.

Equating GBV for 305D Milk Yield with average performance of Mehsana animals in average management conditions

GBV range	Average Std First Lactation Milk Yield (ME) Kgs
-400 to -300	1621
-300 to -200	1869
-200 to -100	2150
-100 to 0	2484
0 to 100	2828

GBV range	Average Std First Lactation Milk Yield (ME) Kgs
100 to 200	3149
200 to 300	3493
300 to 400	3943
400 to 500	4344

Breed average for GBV estimation: 2488 kgs





National Dairy Development Board

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For latest BV visit:

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