Germplasm Evaluation Project

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SIRE BREEDS USED IN THE GERMPLASM EVALUATION PROGRAM (GPE) AT THE USMARC

Cycle I 70-72	Cycle II 73-74	Cycle III 75-76	Cycle IV 86-90	Cycle V 92-94	Cycle VI 97-98	Cycle VII 99-00	Cycle VIII 01-02
F_1 Crosses (Hereford or Angus dams) [a]							
Hereford	Hereford	Hereford	Hereford	Hereford	Hereford	Hereford	Hereford
Angus	Angus	Angus	Angus	Angus	Angus	Angus	Angus
Jersey	Red Poll	Brahman	Longhorn	Tuli	Wagyu	Red Angus	Beefmaster
S. Devon	Braunvieh	Sahiwal	Salers	Boran	Norweg. Red	Limousin	Brangus
Limousin	Gelbvieh	Pinzgauer	Galloway	Belg. Blue	Sw. Red&Wh.	Charolais	Bonsmara
Simmental	Maine Anj.	Tarentaise	Nellore	Brahman	Friesian	Simmental	Romosinuano
Charolais	Chianina		Shorthorn	Piedmontese		Gelbvieh	
			Piedmontese				
3-way crosses			Charolais				
Hereford	Hereford		Gelbvieh				
Angus	Angus		Pinzgauer				
Brahman	Brangus						
Devon	Santa Gertrudis						
Holstein							

Evaluated 37 breeds over 40 years

a Sire breeds mated to Angus and Hereford females, and Composite MARC III (1/4 Angus, Hereford, Red Poll and Pinzgauer) cows in Cycles V, VI, VII and VIII.

Current Primary GPE Objectives

- Characterization of Genomic Variation in Germplasm Representative of the Beef Industry
  - Linkage Disequilibrium
  - Linkage

- Estimation of Differences Among Breeds Used by the U.S. Beef Industry
  - Multi-breed Genetic Evaluation
  - Breed Differences for New Traits

- Evaluation of Exotic Germplasm

Germplasm Evaluation Project Population Structure

About 3800 cows are allocated to this project

×

PB, BC & F_1 Steers

PB Bulls

×

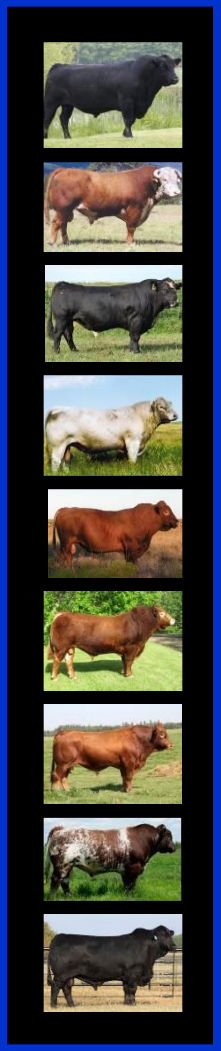
PB, BC & F_1 Heifers

Natural Service PB, BC, & F_1 Steers & Heifers

Sire Sampling Process

- Aim is to sample high accuracy sires that are as influential in their breeds as possible.
- We greatly appreciate the cooperation, support, and patience of the breed associations, bull owners, and AI industry.
- We do our best to sample each breed as fairly as possible.
- And then, we do our best to adjust out any remaining sampling differences in the analyses.
- We produce roughly 10 progeny per bull sampled.

AI Sires Sampled Since 2006



131 Angus
93 Hereford
79 Simmental
67 Charolais
63 Red Angus
67 Limousin
61 Gelbvieh
49 Shorthorn
46 Brangus

44 Beefmaster
44 Maine-Anjou
38 Brahman
32 Santa Gertrudis
34 ChiAngus
34 Salers
31 Braunvieh
16 South Devon
10 Tarentaise

939 Total

Shorthorn bulls sampled since 2006

Fall 2006/Spring 2007		Fall 2008
MEL-BAR RODEO DRIVE 347	NPS DURANGO 774 CBH	HOMEDALE BLIZZARD
MSF EQUITY 43	DEERHORN MEDICINE MAN 826	DEFS RED RIDER 844
HHFS DREAM WEAVER	JR LEGEND 78H	WOLF RIDGE SAMSON POC 35
JG RED CLOUD	SHADYBROOK SCOTTY 83K	OAKVIEW TRUMP CARD
RB EAGLE 148TH	RS ST269 832 00	KEY RIDGE EXPLORER
GFS CREOLE 9590	RT GOLD LINK 57K	AF SL SIN CITY
BYLAND GOLD SPEAR	DF GOLD EAGLE 0019	JSF MINER 0415E X
WAUKARU COPPERFIELD	K-KIM CABELA 09M	
KL DOUBLE DUTY 6294		

Shorthorn bulls sampled since 2006

Spring 2011	Spring 2015
WAUKARU GOLD MINE 2109	AR SU LU SPEAR 320
WAUKARU COPPERTOP 464	STUDER'S CONTROLER 31R
WAUKARU GOLD CARD 5042	SHO ME GOLD STONE 7C15V ET
JSF TOP HAND 34R	JAKE'S PRINCE OF JAZZ 236P
MJH FRAZIER C806	STUDER'S JAZZ MAN 10U
SULL GNCC SALUTE 532R ET	HD SWAGGER 802 ET
CF POTION X ET	KAPER 4508
TM GUS 36S ET	WAUKARU PATENT 8161 ET
A&T CAPTAIN OBVIOUS 606S	ASH VALLEY DUTY 7155
ASH VALLEY DUTY 5323	GLENELL IMF B90
WOLF WILLOW MAJOR LEROY 1M	SASKVALLEY STAMPEDE 128S
SASKVALLEY BONANZA 219M	JSF GAUGE 137W

Calves Produced by Year

Birth	AI					Nat.	
Year	1/2	3/4	7/8	15/16	PB	Serv.	Total
2007	562	37	1	1	96	1407	2104
2008	650	179		1	41	1383	2254
2009	350	222	6	2	121	1548	2249
2010	418	205	27	2	123	1587	2362
2011	441	310	82	3	112	1362	2310
2012	534	232	114	8	121	1282	2291
2013	389	225	148	36	135	1548	2481
2014	627	190	137	35	89	1822	2900
2015	712	221	139	72	89	1928	3161
2016	508	313	117	72	72	1854	2936
2017	318	228	97	55	35	1336	2069
Spring	3675	1621	584	197	768	13487	20332
Fall	1834	741	284	90	266	3570	6785
Total	**5509**	**2362**	**868**	**287**	**1034**	**17057**	**27117**

AI-sired Calves Produced Since 2007

Breed	1/2	3/4	7/8	15/16	PB	Total
Angus	737	234	52	7	252	**1282**
Beefmaster	272	128	43	4		**447**
Brahman	242	71	2			**315**
Brangus	281	143	37	2	2	**465**
Braunvieh	218	83	35	8		**344**
Charolais	330	110	36	24	275	**775**
Chiangus	232	113	51	10	4	**410**
Gelbvieh	303	202	107	43		**655**
Hereford	555	123	39	12	278	**1007**
Limousin	354	214	100	58		**726**
Maine Anjou	271	122	51	11		**455**
Red Angus	353	225	89	46		**713**
Salers	220	116	52	9		**397**
Santa Gertrudis	229	97	42	19		**387**
Shorthorn	300	151	66	12		**529**
Simmental	477	161	40	22	223	**923**
South Devon	65	31	14			**110**
Tarentaise	70	38	12			**120**
Total	**5509**	**2362**	**868**	**287**	**1034**	**10060**

Cow Weights (at Palpation)

Breed	1.5 yr old (kg)	2.5 yr old (kg)	3.5 yr old (kg)
Angus	432	523	568
Hereford	411	502	563
Red Angus	418	497	566
Shorthorn	412	480	531
Brahman	428	515	552
Santa Gertrudis	428	502	549
Braunvieh	373	432	470
Charolais	436	539	592
Chiangus	403	490	525
Gelbvieh	440	513	563
Limousin	415	492	548
Maine Anjou	399	494	550
Salers	402	490	546
Simmental	428	510	557

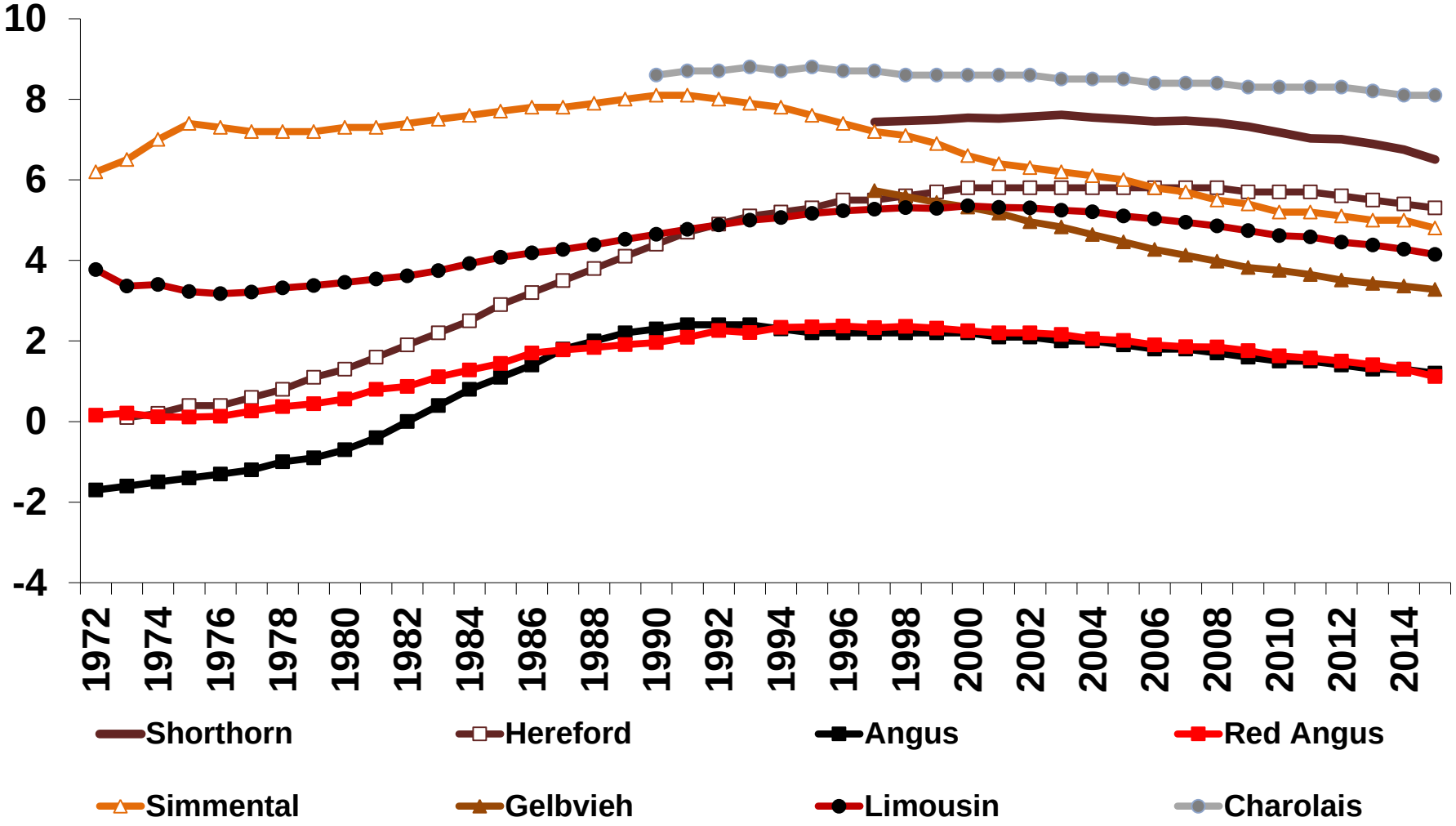
Feed Intake and Gain

Breed	Steer ADFI (g)	Steer TESTADG (g)	Heifer ADFI (g)	Heifer TESTADG (g)
Angus	0	0	0	0
Hereford	-788 (286)	-35 (55)	-962 (266)	-21 (44)
Red Angus	-310 (275)	-66 (52)	-684 (255)	-86 (42)
Shorthorn	-997 (320)	-100 (61)	-1021 (298)	-98 (49)
South Devon	-1856 (666)	-274 (134)	-1576 (641)	13 (109)
Beefmaster	-771 (346)	72 (68)	-1556 (334)	-91 (56)
Brahman	-1321 (350)	-124 (68)	-1351 (319)	-185 (53)
Brangus	-173 (335)	-31 (65)	-585 (317)	-120 (53)
Santa Gertrudis	-569 (334)	22 (63)	-1039 (306)	-113 (50)
Braunvieh	-1488 (351)	-180 (68)	-1841 (305)	-299 (50)
Charolais	-521 (289)	-18 (55)	-876 (270)	-75 (45)
Chiangus	-1245 (334)	-81 (64)	-1049 (296)	-118 (49)
Gelbvieh	-1051 (278)	-72 (53)	-723 (253)	-114 (42)
Limousin	-1238 (281)	-5 (53)	-1471 (255)	-160 (42)
Maine Anjou	-1646 (334)	-150 (64)	-1101 (302)	-102 (50)
Salers	-1211 (333)	-136 (63)	-1176 (306)	-139 (51)
Simmental	-43 (288)	-19 (55)	-530 (275)	-68 (45)
Tarentaise	-1178 (678)	-150 (136)	-1926 (566)	-312 (96)

Feed Efficiency Indices

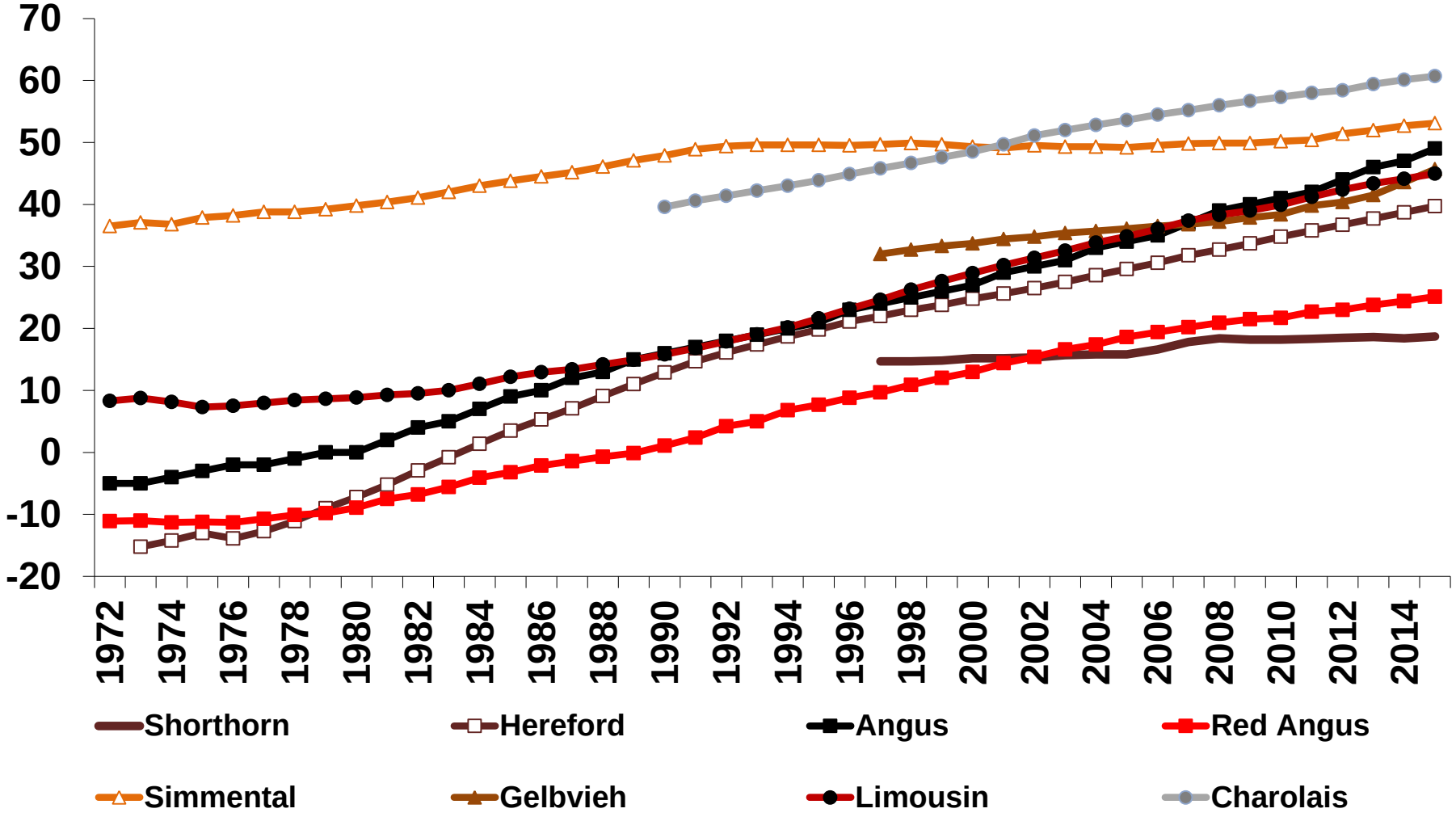
Breed	Steer Unrestricted	Steer Restricted	Heifer Unrestricted	Heifer Restricted
Angus	0.000	0.000	0.000	0.000
Hereford	0.099 (0.051)	0.004 (0.049)	0.094 (0.037)	0.075 (0.036)
Red Angus	-0.014 (0.050)	-0.051 (0.047)	-0.004 (0.035)	-0.018 (0.035)
Shorthorn	0.070 (0.057)	-0.050 (0.055)	0.025 (0.041)	0.005 (0.040)
South Devon	-0.041 (0.118)	-0.182 (0.119)	0.203 (0.094)	0.171 (0.092)
Beefmaster	0.203 (0.062)	0.110 (0.060)	0.096 (0.047)	0.065 (0.047)
Brahman	0.100 (0.063)	-0.058 (0.060)	-0.023 (0.045)	-0.050 (0.044)
Brangus	-0.002 (0.060)	-0.023 (0.058)	-0.049 (0.045)	-0.061 (0.044)
Santa Gertrudis	0.119 (0.060)	0.051 (0.057)	0.012 (0.042)	-0.009 (0.042)
Braunvieh	0.073 (0.063)	-0.105 (0.060)	-0.078 (0.042)	-0.115 (0.042)
Charolais	0.070 (0.052)	0.008 (0.049)	0.030 (0.037)	0.013 (0.037)
Chiangus	0.130 (0.060)	-0.019 (0.057)	0.008 (0.041)	-0.013 (0.040)
Gelbvieh	0.107 (0.050)	-0.019 (0.047)	-0.027 (0.035)	-0.042 (0.034)
Limousin	0.206 (0.051)	0.057 (0.048)	0.017 (0.035)	-0.013 (0.035)
Maine Anjou	0.130 (0.060)	-0.067 (0.057)	0.031 (0.042)	0.009 (0.041)
Salers	0.070 (0.060)	-0.075 (0.057)	0.002 (0.042	-0.021 (0.042)
Simmental	0.027 (0.052)	0.022 (0.049)	-0.004 (0.038)	-0.015 (0.038)
Tarentaise	0.050 (0.120)	-0.091 (0.121)	-0.081 (0.081)	-0.119 (0.080)

Genetic Trends for Birth Weight, lb



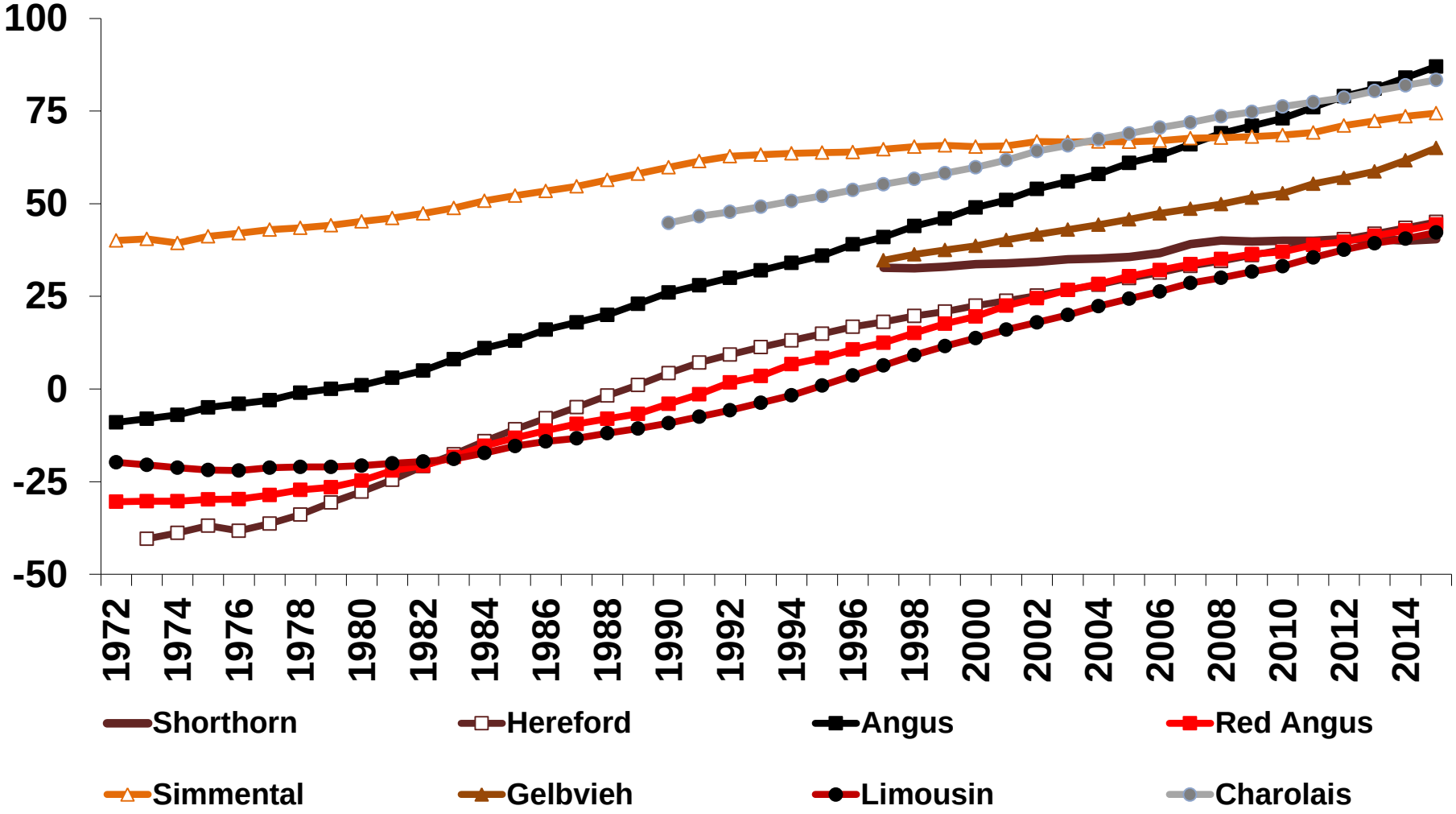
Adapted from Spring 2017 Genetic Trends from Breed Associations and 2017 AB-EPD factors

Genetic Trends for Weaning Weight, lb



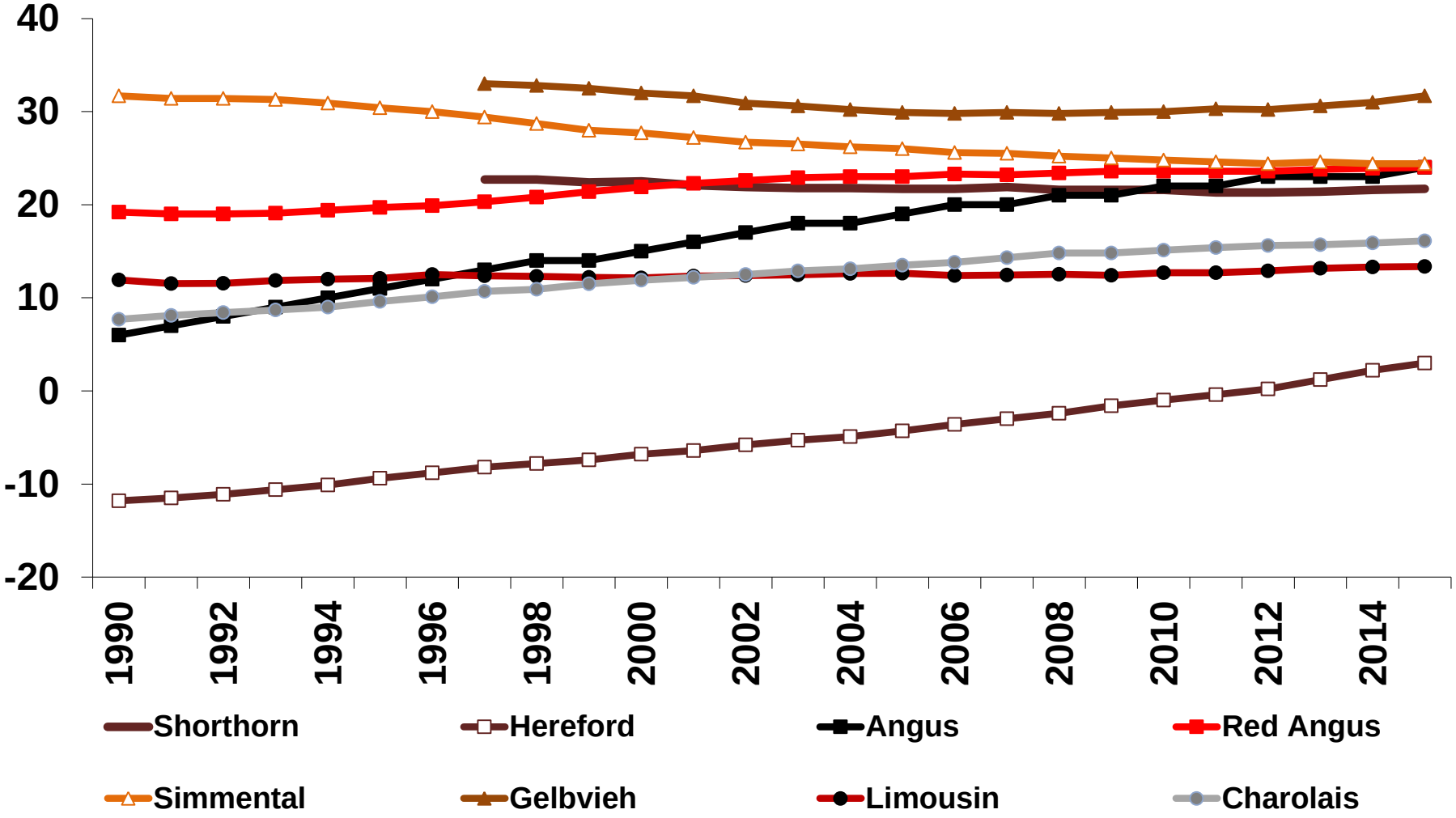
Adapted from Spring 2017 Genetic Trends from Breed Associations and 2017 AB-EPD factors

Genetic Trends for Yearling Weight, lb



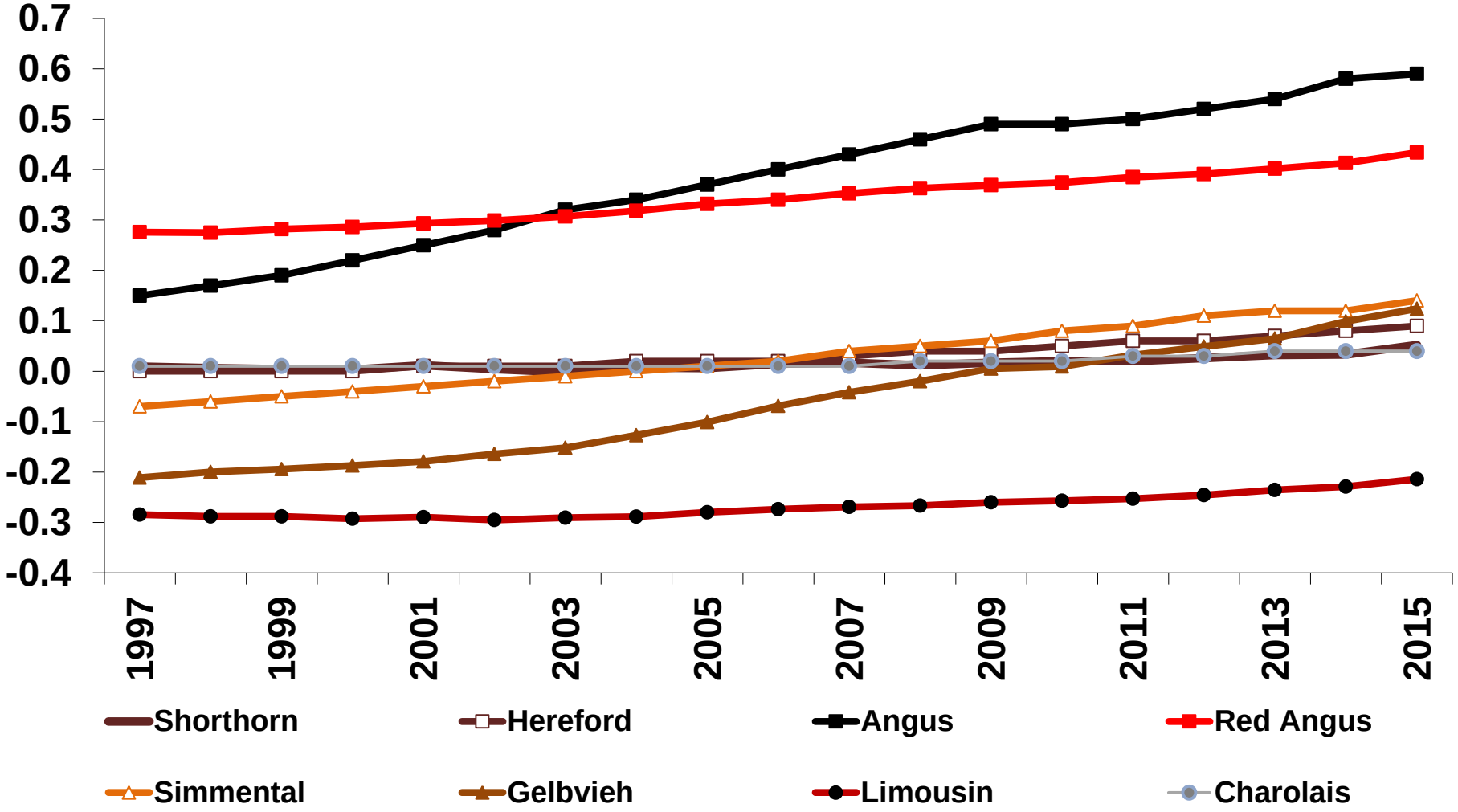
Adapted from Spring 2017 Genetic Trends from Breed Associations and 2017 AB-EPD factors

Genetic Trends for Maternal Milk, lb



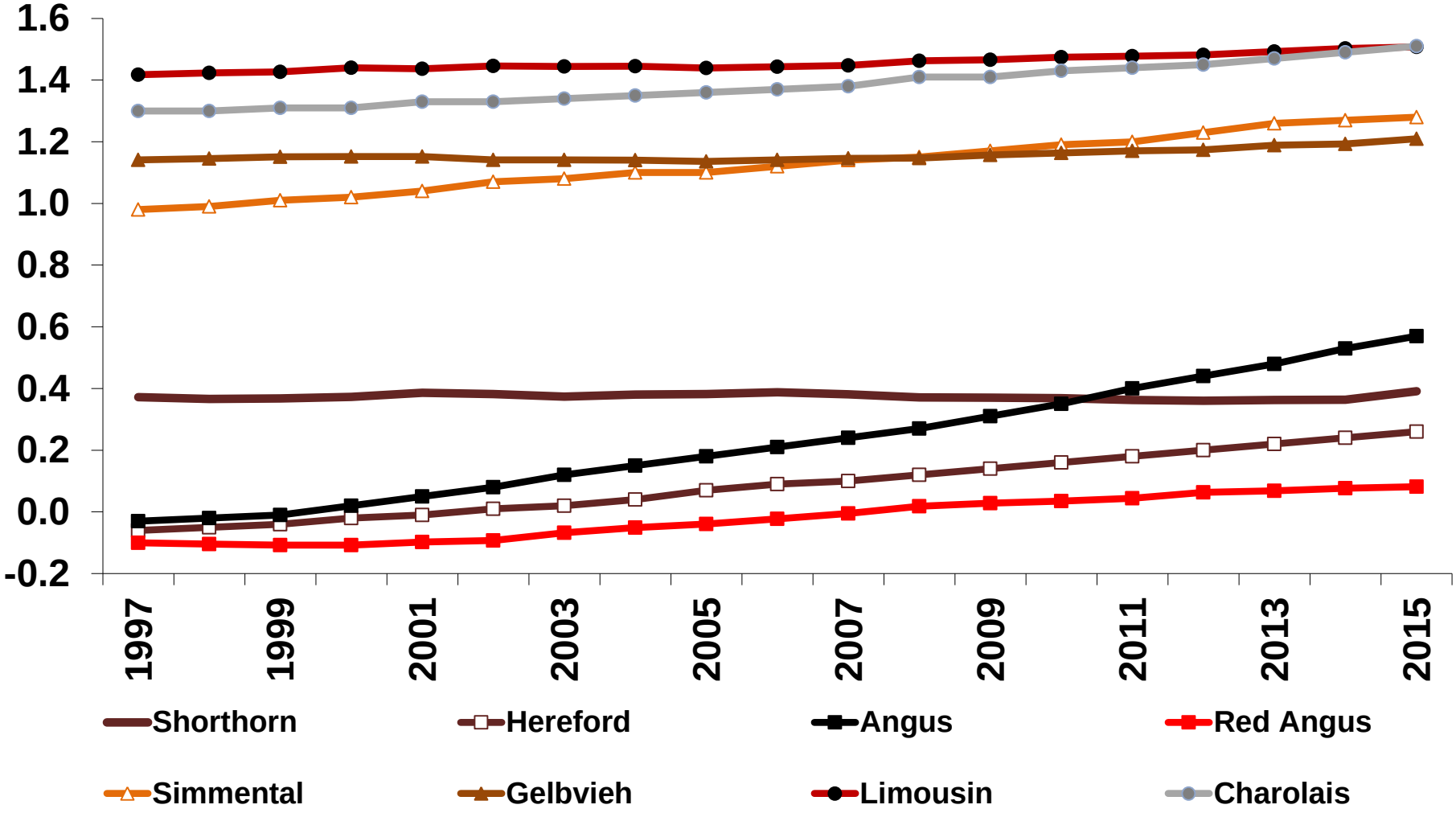
Adapted from Spring 2017 Genetic Trends from Breed Associations and 2017 AB-EPD factors

Genetic Trends for Marbling Score



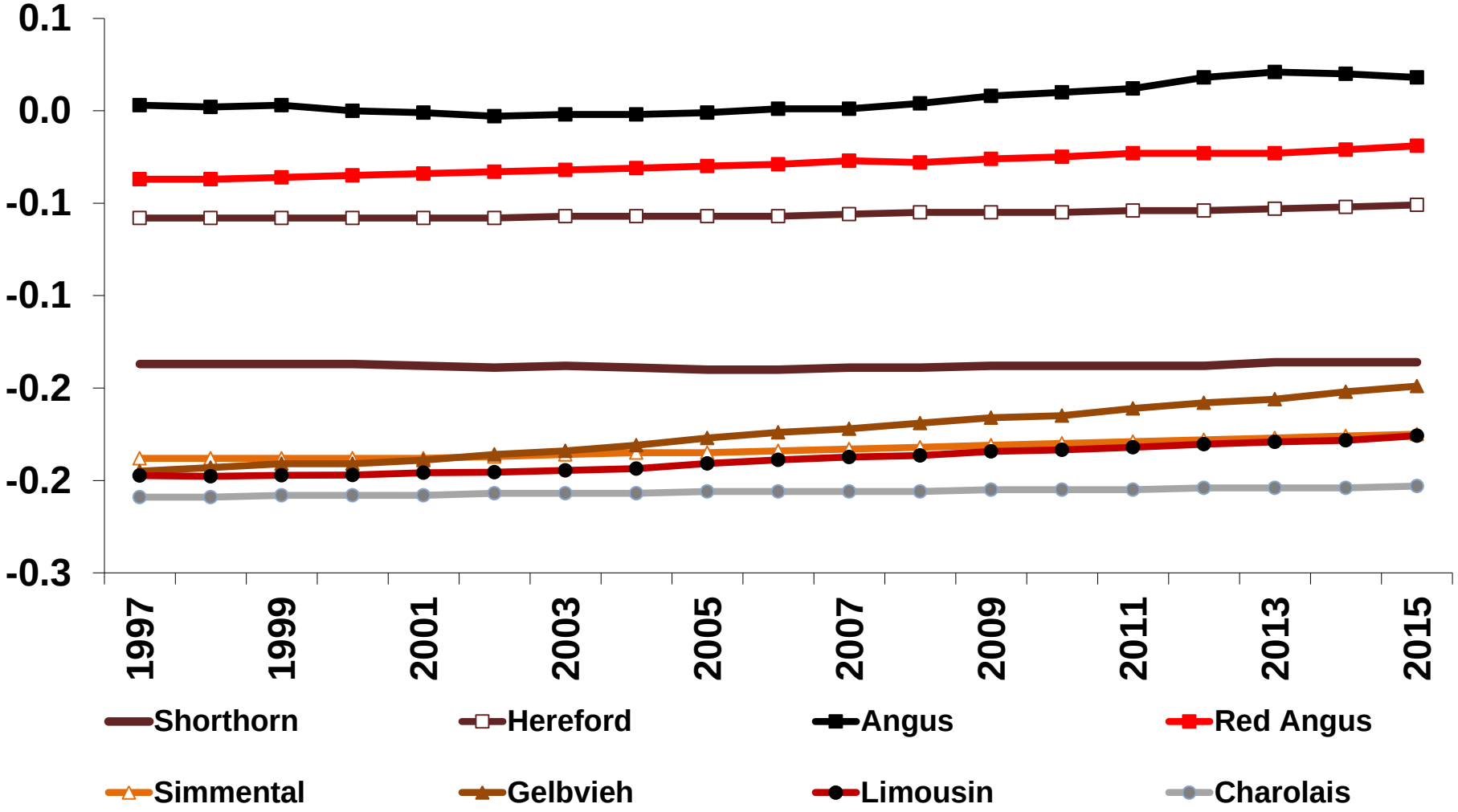
Adapted from Spring 2017 Genetic Trends from Breed Associations and 2017 AB-EPD factors

Genetic Trends for Ribeye Area, sq in



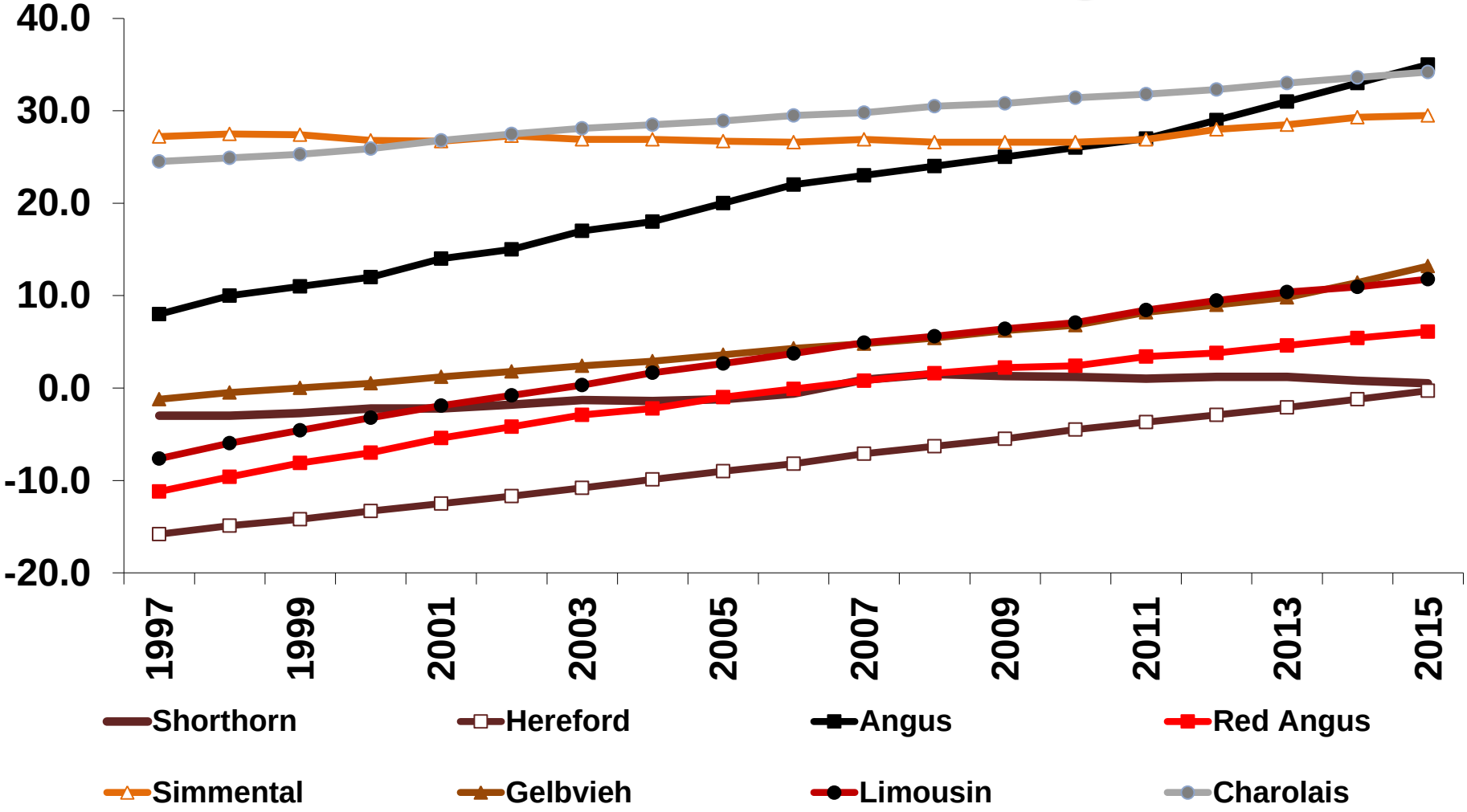
Adapted from Spring 2017 Genetic Trends from Breed Associations and 2017 AB-EPD factors

Genetic Trends for Backfat Depth, In



Adapted from Spring 2017 Genetic Trends from Breed Associations and 2017 AB-EPD factors

Genetic Trends for Carcass Weight, lb



Adapted from Spring 2017 Genetic Trends from Breed Associations and 2017 AB-EPD factors

TABLE 1: ADJUSTMENT FACTORS TO ADD TO EPDs OF EIGHTEEN DIFFERENT BREEDS TO ESTIMATE ACROSS BREED EPDs

Breed	Birth Wt. (lb)	Weaning Wt. (lb)	Yearling Wt. (lb)	Maternal Milk (lb)	Marbling Score[a]	Ribeye Area (in^2)	Fat Thickness (in)	Carcass Wt.(lb)
Angus	0.0	0.0	0.0	0.0	0.00	0.00	0.000	0.0
Hereford	2.3	-7.8	-28.6	-17.3	-0.31	-0.07	-0.056	-59.0
Red Angus	2.5	-31.4	-34.6	3.3	-0.27	0.01	-0.016	-9.0
Shorthorn	4.7	-36.6	-17.3	4.1	-0.14	0.37	-0.105	-7.1
South Devon	3.3	-11.4	-27.1	3.9	-0.08	0.29	-0.133	-24.8
Beefmaster	4.7	17.9	0.5	5.9				
Brahman	10.3	45.1	6.6	23.8	-0.78	-0.05	-0.145	-27.8
Brangus	3.3	12.0	4.0	6.3				
Santa Gertrudis	5.7	36.3	43.0	17.0	-0.54	-0.09	-0.080	2.2
Braunvieh	1.9	-25.5	-50.0	-0.8	-0.70	0.78	-0.092	
Charolais	8.0	34.6	40.4	8.2	-0.33	1.01	-0.208	13.0
Chiangus	3.2	-27.0	-40.5	-1.7	-0.34	0.34	-0.093	-18.1
Gelbvieh	2.8	-22.6	-29.3	2.3	-0.27	0.75		-15.0
Limousin	2.3	-18.2	-41.3	-13.7	-0.43	1.01	-0.132	-12.0
Maine-Anjou	4.2	-30.5	-38.7	-6.2	-0.57	0.97	-0.187	-15.9
Salers	1.8	-7.3	-25.7	5.9	-0.09	0.94	-0.196	-23.5
Simmental	3.2	-9.4	-12.1	4.4	-0.34	0.49	-0.129	4.4
Tarentaise	3.4	25.1	5.6	24.2				

[a]Marbling score units: 4.00 = Sl^{00}; 5.00 = Sm^{00}

TABLE 2: BREED OF SIRE MEANS FOR 2014 BORN ANIMALS UNDER CONDITIONS SIMILAR TO USMARC

Breed	Birth Wt. (lb)	Weaning Wt. (lb)	Yearling Wt. (lb)	Maternal Milk (lb)	Marbling Score[a]	Ribeye Area (in^2)	Fat Thickness (in)	Carcass Wt.(lb)
Angus	86.3	570.7	1057.4	555.7	5.88	13.57	0.677	913.7
Hereford	90.6	560.1	1016.1	535.7	5.07	13.28	0.607	882.7
Red Angus	86.2	545.4	1019.8	555.9	5.47	13.19	0.637	891.7
Shorthorn	92.1	538.1	1015.1	554.8	5.20	13.35	0.522	885.2
South Devon	90.6	552.0	1021.0	561.7	5.61	13.56	0.537	884.2
Beefmaster	90.3	560.6	1011.9	547.6				
Brahman	97.1	580.8	998.6	562.1	4.51	13.01	0.515	854.4
Brangus	89.6	556.1	1016.7	548.5				
Santa Gertrudis	90.9	559.8	1014.6	550.2	4.73	13.00	0.582	886.2
Braunvieh	89.7	538.6	984.4	566.5	5.14	14.17	0.478	
Charolais	93.5	581.0	1055.5	549.6	5.00	14.38	0.457	910.5
Chiangus	90.5	536.0	989.0	546.3	5.05	13.70	0.507	873.5
Gelbvieh	88.3	562.8	1033.9	561.8	5.10	14.24		893.4
Limousin	88.6	564.2	1017.4	545.7	4.85	14.54	0.488	895.1
Maine-Anjou	90.9	536.5	990.3	545.5	4.77	14.22	0.433	873.8
Salers	88.6	553.4	1019.0	557.6	5.40	14.00	0.464	877.8
Simmental	90.1	573.7	1046.8	558.7	5.09	14.33	0.475	912.8
Tarentaise	89.7	562.4	1002.8	557.6				

[a]Marbling score units: 4.00 = Sl^{00}; 5.00 = Sm^{00}

For More Information:

www.ars.usda.gov/Main/docs.htm?docid=6238

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