A genome scan revealed significant associations of growth traits with a major QTL and GHR2 in tilapia

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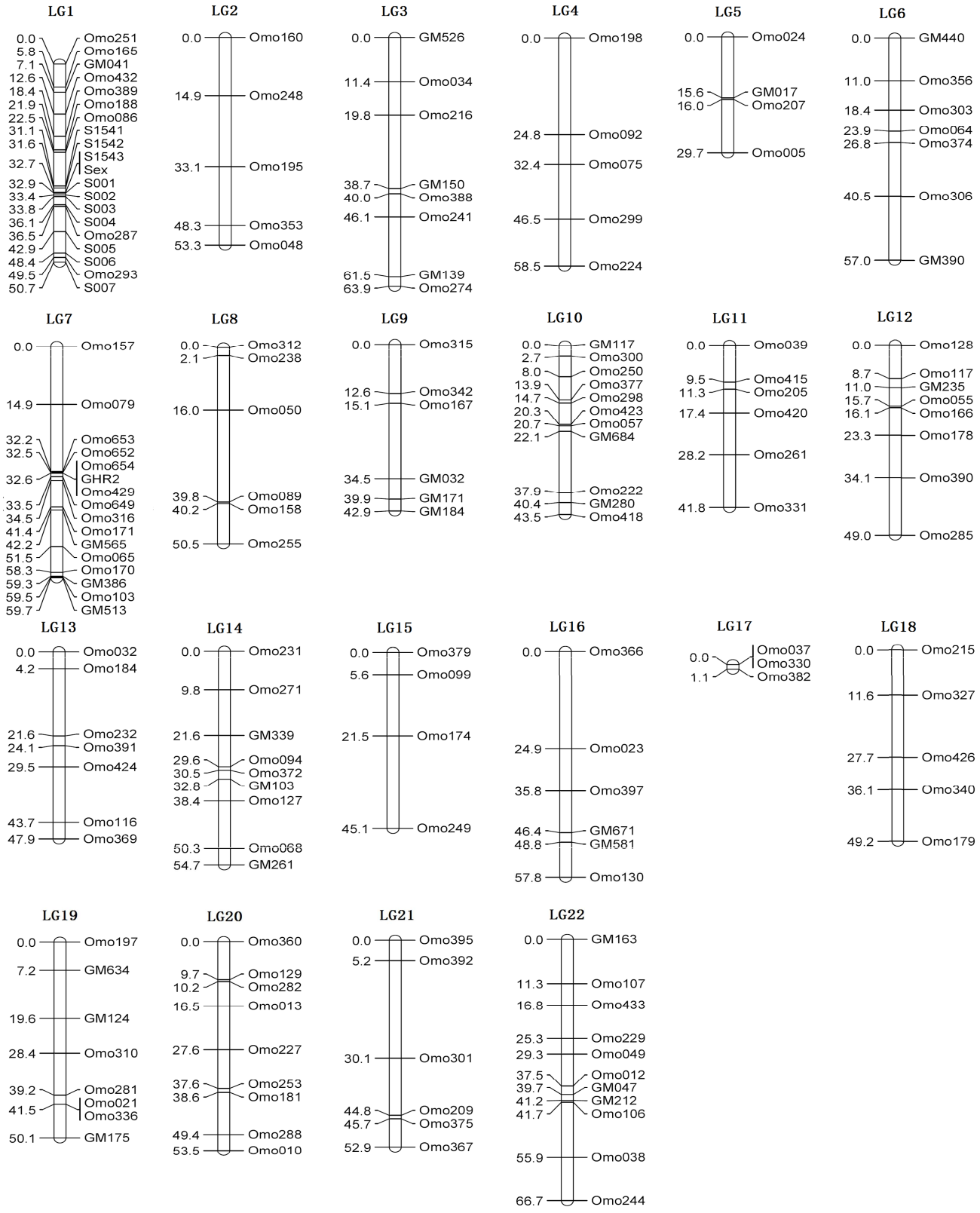

Figure S1. A linkage map of tilapia (Oreochromis spp.) based on reference family OmR1

The location of each marker is indicated on the left side of linkage groups in Kosambi centimorgans, and names of the markers are indicated on the right side of linkage groups.

Figure S2. Alignment of cDNA between GHR2^{red1} and GHR2^{red2}

The green and red underlines indicate the start codon and the stop codon, respectively. The red boxes indicate the differences between GHR2^{red1} and GHR2^{red2}. The pink blocks indicate the nucleotide differences causing missense mutations.

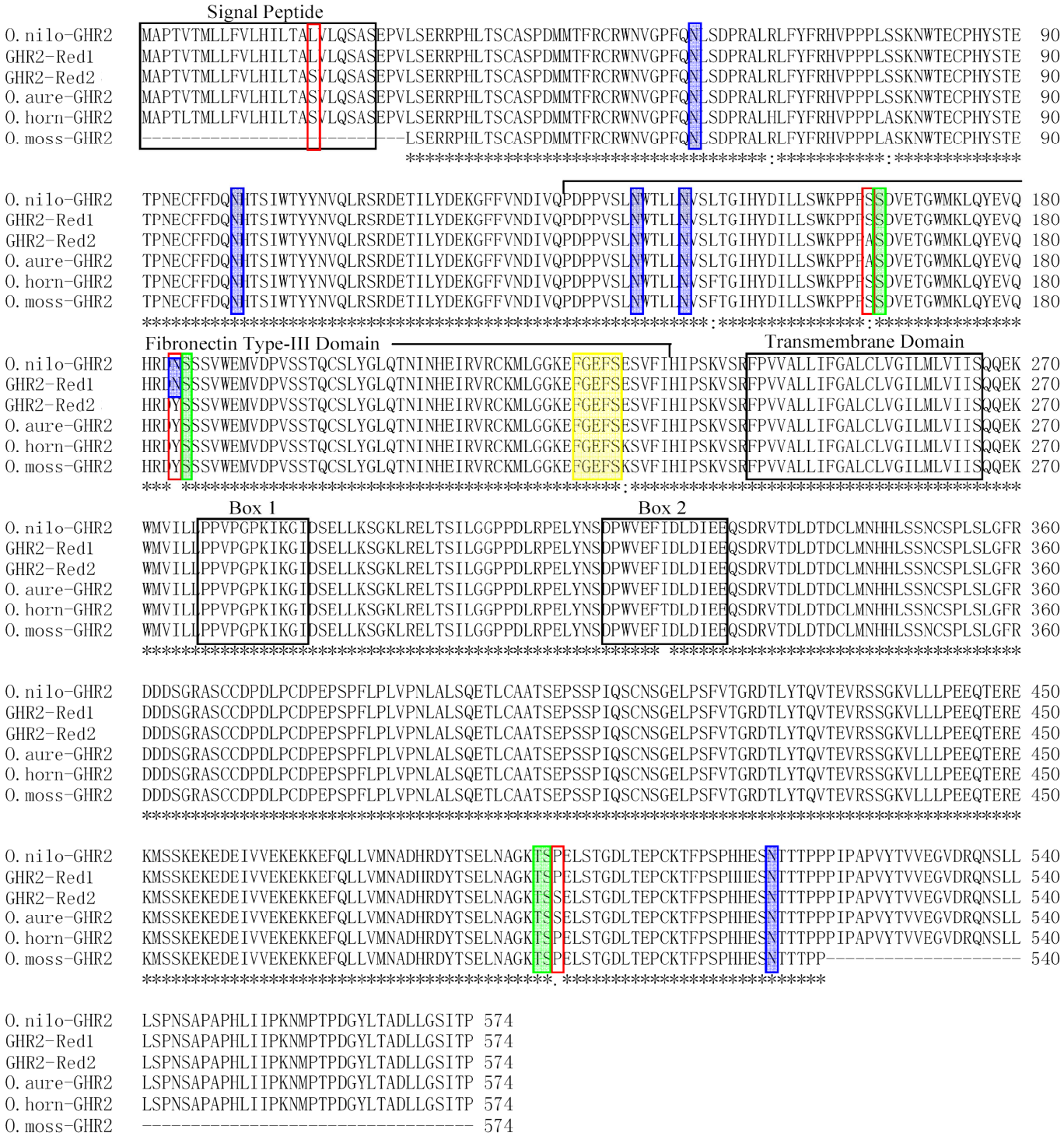

Figure S3. Alignment of GHR2s in different tilapia species

The blue, green and yellow blocks indicate the N-glycosylated sites, phosphorylation and “FGEFS” motif, respectively. The red boxes indicate the differences of GHR2 between Nile tilapia and blue tilapia. The GHR2 sequences are from *O. mossambicus* (EF452496), *O.aureus* (KJ845729), *O. niloticus* (NM_001279455), *O. hornorum* (EF371467) and two alleles of red tilapia identified in this study (KJ845730, KJ845731).

Table S1 Genes predicted in QTL mbw-c

Location in LG7	GenBank Accession No.	Annotations
30484293-30487181	XM_003440089	Sjoegren syndrome nuclear autoantigen 1 homolog
30525829-30528309	XM_003440088	transmembrane protein 203-like
30528566-30539060	XM_003440087	delta-aminolevulinic acid dehydratase-like
30637905-30642465	XM_003440086	hypothetical protein
30657974-30658456	XM_003440085	pro-MCH-like
30697875-30701731	XM_003440084	G2/mitotic-specific cyclin-B1-like
30724707-30735774	XM_003440215	transmembrane channel-like protein 2-like
30737985-30744044	XM_003440078	annexin A1-like
30745448-30756091	XM_003440077	zinc transporter 5-like
30831164-30855206	XM_003440212	tight junction protein 2
30877919-30892123	XM_003440211	phosphatidylinositol-4-phosphate 5-kinase type-1 beta-like
31093184-31173736	XM_003440076	ephrin-A5b-like
31277417-31278051	XM_003440075	growth arrest and DNA damage-inducible protein GADD45 gamma-like
31282154-31282845	XM_003440074	growth arrest and DNA damage-inducible protein GADD45 gamma-like
31300107-31327029	NM_001279455	growth hormone receptor II (GHR2)
31340186-31350781	XM_003440072	complement component C6-like
31358181-31363191	XM_003440071	regulator of G-protein signaling 7-binding protein B-like
31365072-31367509	XM_003440070	E3 ubiquitin-protein ligase RNF180-like
31482856-31485090	XM_003440066	hypothetical protein
31492181-31495804	XM_003440065	hypothetical protein
31584436-31589859	XM_003440207	hypothetical protein
31602497-31663545	XM_003440064	very low density lipoprotein receptor (VLDLR)
31689361-31712577	XM_003440204	hypothetical protein
31721737-31723359	XM_003440063	tripartite motif-containing protein 16-like
31744562-31746238	XM_003440201	E3 ubiquitin-protein ligase TRIM41-like
31757342-31759039	XM_003440200	tripartite motif-containing protein 16-like
31762567-31763484	XM_003440062	lys-63-specific deubiquitinase
31928588-32154070	XM_003440197	transcription factor 4-like
32303753-32311072	XM_003440060	thioredoxin-like protein 1-like
32313094-32321315	XM_003440194	hypothetical protein
32336913-32340064	XR_134819	hypothetical protein
32390621-32399281	XM_003440059	asparaginyl-tRNA synthetase
32402431-32421586	XM_003440191	ferrochelatase

"Locations in LG7" represents the locations in LG7 of whole genome sequences of Nile tilapia Orenil1.1.

Table S2 Average body weight(g) of individuals with different GHR2 genotypes in four families

Genotypes	Sex	OmR1	ROm1	ROm2	OmR2
Nile/Moza	Male	170.21±27.22	61.56±12.87	75.63±10.68	76.1±9.91
Blue/Moza	Male	155.8±27.11	54.35±22.24	73.22±12.56	57.72±13.94
Nile/Moza	Female	82.65±24.97	60.91±12.28	56.84±9.33	47.24±15.31
Blue/Moza	Female	75.71±23.08	59.18±16.16	53.22±7.86	43.98±15.87

The family OmR1 was 140 dph and others were 90 dph.

Table S3 Primer information for microsatellite markers used in QTL mapping

Marker name	Genbank No.	Linkage group	Primer sequence (forward)	Primer sequence (reverse)	Product length (bp)	Motif	Annealing temperature	Application
GM041	BV005284.1	1	TGGTGTTGCAGCTACACGAGA	CCAGGACCGATGTGAACTTT	245	(CA)27	55	1st QTL analysis
Omo086	JX204884	1	AAACGCACGCACGCAAACA	GGTGCCTCAAAAGCCATACATCC	302	(CA)8	60	1st QTL analysis
Omo165	JX204926	1	AAAGCGAGGATCAGCCAGAGTTAC	TGACGGGGTGAACAAAATAAAAGA	287	(CA)10	60	1st QTL analysis
Omo188	JX204944	1	ACATATTCGCCTTGTTCTCACCAG	GAAGTGTGCGTTCAAAGTATGATT	163	(CA)16	55	1st QTL analysis
Omo251	JX204990	1	CTCGCCCAGTCCTTTCACTCATC	GACCCAACATGTCTGCTGAACTAA	198	(CA)22	60	1st QTL analysis
Omo287	JX205012	1	AACCTGGTTAGTCTCTGGCTGCTC	ATGGCATGGTTTGCAACATAATCC	280	(GT)17	60	1st QTL analysis
Omo293	JX205016	1	CTATCTGCCCCGGTTTCTTTGT	ATGCCGCATTTTTAGTTTCCATA	435	(GA)23	60	1st QTL analysis
Omo389	GR694351.1	1	ACCACAATTCACCACCTCAGTCAG	TAAAGGGGCGATATCGTTGTCTCT	265	(GA)7	60	1st QTL analysis
Omo432	GR691476.1	1	AGTAGTTTTTGTTCATTAGAGACG	TAGTCACACTGATAATTTTTCTTG	224	(ATAG)15	50	1st QTL analysis
S1541	KJ812102	1	GGACAGATTCCATCCACCAGTAA	TTCAAGCACATACAAAGCCTACAA	283	(GT)12	55	Fine mapping
S1542	KJ812101	1	TTGCATATTCCTCTATCCTCCTAA	GATAGAAATACGCATGCAGAGTCC	355	(CA)15	55	Fine mapping
S1543	KJ812100	1	ACCGCGCTCTCAGCCTTCAT	TGAGCGTCAGCGTCTCCATC	406	(CA)18	55	Fine mapping
S001	KJ812093	1	TCTGGTGCATAGACATTCAACTG	TTTTCTCCCCAAATTCATAAAGT	323	(CA)16	55	Fine mapping
S002	KJ812094	1	TTTCTCCCCAGCTTGTGTAACTCT	TTGGACCTGGATTGCTGTTGATTA	384	(CA)22	55	Fine mapping
S003	KJ812095	1	AGGCCTGCAGAAAAGAGGGATACA	GAGAGGCTGAGGGCGAACAGTG	405	(GT)16	55	Fine mapping
S004	KJ812096	1	ATAAGCCCACAAGAACACAGTTGC	CAGGGGGAAGATCCTAAAGAGATT	464	(GT)14	55	Fine mapping
S005	KJ812097	1	ACGTAGAGCCAGAAACCAAACCTA	CAGAGCCGAACTAGATGCGTAAAG	208	(CA)14	55	Fine mapping
S006	KJ812098	1	TGATCTTGGGACTATATGGACTGC	GTGGCTTTGAGACTTGTGTATGGT	199	(CA)14	55	Fine mapping
S007	KJ812099	1	TGTTCGGACTTTAAAGGGAGAGGT	TGCATACACGCACAAAGGAATG	236	(GT)16	55	Fine mapping
Omo048	JX204859	2	TCCCCACACCTCCTGCTCCTC	AGCCCAAGCCAGTCCCATAGC	336	(CA)18	60	1st QTL analysis
Omo160	JX204923	2	AGGATTTCCTGAAAGTGTTTTT	ACTCTACGTGACCTCTGACAATAG	210	(GT)10	55	1st QTL analysis
Omo195	JX204950	2	TTCACAAAGCCCTGGAGAGGAGAG	CAGCCCCCAGTGGACATAAGAAAC	469	(GT)15	60	1st QTL analysis
Omo248	JX204987	2	AAAGACACAAAGAGAAACTAATCA	GGATGAATATTTAAAATCAGTCAG	381	(TCA)9	55	1st QTL analysis
Omo353	JX205063	2	GGGCTAGTCACAGATGCGTTCAAG	GACCGAAGGTGCCGTTTCTAACA	437	(GT)15	60	1st QTL analysis
GM139	BV005327.1	3	TTTGAGTAACCACCCTAACAC	GTGGGATCTACCAAGAAGAG	255	(GT)17	55	1st QTL analysis
GM150	BV005333.1	3	AGGTGATTGGCTTAGATGAT	GTCTCAGTTTGTTTGGCTTA	177	(CA)30	55	1st QTL analysis
GM526	BV005475.1	3	CAACTGTTGGCAGTGACAGG	TCTTCCTCAGCCCATCTGTT	266	(CA)8	55	1st QTL analysis
Omo034	GR700139.1	3	CAGGGTTAGTAGCAGAAAGTGG	CTGATTGCTCACCAGCTTTAC	155	(CA)9	60	1st QTL analysis
Omo216	JX204961	3	CGCCAGCAGAGGGCTAAGGAG	AAGCAGAGTTCAGCCTCGCAGACT	418	(GT)16	55	1st QTL analysis
Omo241	JX204982	3	AGAGTACGACCCTGCACACTTCAC	TGATCAACAATCTGGCTTATTCTG	219	(CA)23	50	1st QTL analysis
Omo274	JX205003	3	TCAGCTGGATCTGCTCAGTGTGAC	ACAGAACGCAGTGCTTTCATTTTG	401	(CA)9	60	1st QTL analysis
Omo388	GR694421.1	3	GGGATTTGTTTTCCTCCTTAGCA	CAGCCATTGTTGTGTATTTGTGAC	143	(GT)7	55	1st QTL analysis
Omo075	JX204879	4	CGGCTCGGCCTCCTCATCT	TAGGCACAAAGTGGGTGGAAGGT	464	(CA)13	55	1st QTL analysis
Omo092	JX204890	4	GCACGCTGAAACTTACACAGTGA	GAGGCTTAGTTGGGCTGATTGATT	185	(CT)12	60	1st QTL analysis
Omo198	JX204952	4	TGTCTCATCTCCGTTAACTGTTTG	AGACTAGAGGAACCCGACACAATA	302	(GT)9	55	1st QTL analysis

Table S3 Primer information for microsatellite markers used in QTL mapping (Continued)

Marker name	Genbank No.	Linkage group	Primer sequence (forward)	Primer sequence (reverse)	Product length (bp)	Motif	Annealing temperature	Application
Omo224	JX204968	4	TTCCCGGAGTACAGAATGTTAGAC	GAGGCTGCATTAGCTAGTGGATAC	260	(GT)13	55	1st QTL analysis
Omo299	JX205021	4	GTTGGACAACATCGCCTACATCAT	CACGCAATTAACGTCCCACTGAA	365	(GT)10	60	1st QTL analysis
GM017	BV005269.1	5	GATACCTGTCCATACCTCCTC	CCCTCTGTTTCCATCTCA	160	(CA)26	55	1st QTL analysis
Omo005	GR704204.1	5	TTGGGGGAATTTTGGGGTCTG	AAGCCCTGGAAAAAGCAACCTCT	255	(CA)10	55	1st QTL analysis
Omo024	JX204850	5	AGTTTCTGCTGCTATTCATTAC	GGCTCAAGATACCCATACAA	403	(CA)27	60	1st QTL analysis
Omo207	JX204956	5	GAGGGGTGGCTCAAGACTTTT	ACTGCTGGGTTAACACCATACTTT	153	(CA)25	55	1st QTL analysis
GM390	BV005377.1	6	ACAGAGCCCTGTGGGAAAAGT	TCTGTAGCAGCGGCATTCAC	211	(CA)30	55	1st QTL analysis
GM440	BV005452.1	6	CTGCACTTTTACTGAGGG	TGGGAGATTAACAGAATAAC	264	(CA)21	55	1st QTL analysis
Omo064	JX204871	6	CTTCCCCTCTGTCTCCACTGTCTG	CCAAAAGCCCGTCAGCGTAAT	300	(CT)18	55	1st QTL analysis
Omo303	JX205025	6	CTCACCCGAGCAGGCAGGAG	GCTGATGTTCTGGGGGATAATGG	181	(CAG)7(CA	55	1st QTL analysis
Omo306	JX205028	6	AATGCGAAGGCGAGTGGAGTG	AGCAGGTGATTAGGAGAGGCTGAT	182	(GT)10	60	1st QTL analysis
Omo356	JX205066	6	CAGTCTGCCTGTCTGAAAAGTGT	AAGCCTTCTTGCTCAGTGACCTA	467	(CA)14	60	1st QTL analysis
Omo374	JX205080	6	GTAAGCGCAATGATATGAATGAAT	TTGCCAAGATATTAGAACCAGATG	409	(CA)12	60	1st QTL analysis
GM386	BV005435.1	7	CCTAACAAGCGTCTTTTCAGC	TGGCAAACAGTCAGTCAGTG	120	(CA)18	55	1st QTL analysis
GM513	BV005467.1	7	TTGGAATTGGTCATCCAACA	ATTACACTTCCTGCCCACCA	171	(CA)17	55	1st QTL analysis
GM565	BV005501.1	7	AGCCTCTGTGTTCAGCTTGG	GGTTGGATGCCTATGATGTG	166	(CA)9	55	1st QTL analysis
Omo065	JX204872	7	AACGGTTTAACAGTCACGCACATC	TGCTTACTCGCCATTGACATTCTT	240	(GT)9	60	1st QTL analysis
Omo079	JX204880	7	TCACAGCTGTGCAGATTTCTCACG	TGGCTGTAGCAAATATGATACCAA	423	(CA)19	60	1st QTL analysis
Omo103	JX204898	7	CTGGGTCGGCATCACAGAAACTT	GAGCCCATCCCTGATCGCTATTA	371	(CA)11	60	1st QTL analysis
Omo157	JX204920	7	TAAGGCGGCTGTCATTTGTGATTA	GCTGCTCTGTCATGCCTCTTTCA	195	(GT)14	55	1st QTL analysis
Omo170	JX204929	7	AGGGCAGCACTCTTTCACAGATTT	AGGAGCAGGCCGAAAGGACAAT	237	(GT)10	55	1st QTL analysis
Omo171	JX204930	7	AGCCTCGGGAAGAGTGAAGTCAAC	TTTTTGCTAACCCATCTCCTGTGA	153	(CT)9	55	1st QTL analysis
Omo316	JX205037	7	GGGGATTCAATAAGAGCTGCTTCT	ATAGGAGTTTAAGGTCAGGCTTCA	287	(GT)12	60	1st QTL analysis
Omo429	GR685641.1	7	GCTGTGAGGTTTCTTTTTCGTGAC	CTGGGCCTTAGCTGTCCACTGTA	378	(GT)12	55	1st QTL analysis
Omo653	KJ871683	7	CAGCATACGTTTAGGGGTCAACAC	CAAAGGCAATCATGAAAATGTCTC	413	(GT)17	55	Fine mapping
Omo652	KJ871682	7	CAGAAGTGATGGGTGGGTGAAGC	CTGCCAAGCCAAGTGGTCGTC	275	(GT)17	55	Fine mapping
Omo649	KJ871681	7	TGTGTCCGTGTGACCAAAATAACT	ACCCGTTGTGTAATGCAGTGATAA	263	(AC)18	55	Fine mapping
Omo654	KJ871684	7	ACAACCTGCAGCCGAAGTAAAATC	AGAACATCACCCCCTCCCTTCAA	333	(GT)19	55	Fine mapping
Omo050	JX204861	8	GCTTTCGCCCCCTTTCTTCTT	TCATTCCCTCTGATTACGAGTGTG	410	(TGA)13	60	1st QTL analysis
Omo089	JX204887	8	CTCCCGCCCCTCAAGTGTCT	TCCATTGGCCTCAAAGTAAGAACA	234	(GT)10	60	1st QTL analysis
Omo158	JX204921	8	CTTGCAGACGGTTCATTTCACGAG	TCCGGTTAATCGCTCTCACTCTCA	425	(GT)18	55	1st QTL analysis
Omo238	JX204981	8	ATATTACGTCCAAACATCCAGAGC	GAGCCAAAGGCAGAAGTAAACAGT	208	(CT)11	55	1st QTL analysis
Omo255	JX204992	8	GAGTTTTGAGCCAGCATGATTTCA	AAAAGGGGACAGGTCACTGGATTC	356	(AT)7	60	1st QTL analysis
Omo312	JX205034	8	ATAGTTTGGCAGGTCATTTTCAGA	GGGGTAGTTTTGTTGTGCTTTTT	345	(GT)30	55	1st QTL analysis
GM032	BV005279.1	9	TTTCGACAAGAAGGCGTTGA	CGCAGAGATTTTGGCTCATT	244	(CA)15	55	1st QTL analysis

Table S3 Primer information for microsatellite markers used in QTL mapping (Continued)

Marker name	Genbank No.	Linkage group	Primer sequence (forward)	Primer sequence (reverse)	Product length (bp)	Motif	Annealing temperature	Application
GM171	BV005343.1	9	GAGTTAGGGCAGAGGTTATGT	GCCATCACCTCTTGCTT	280	(CA)22	55	1st QTL analysis
GM184	BV005348.1	9	GGAGAACAGGGCTTATTG	CACTTCCACCTTTACTTTGA	209	(CA)22	55	1st QTL analysis
Omo167	JX204928	9	TCACGGACACTGAACAAAGAGGA	TGGCCATGGAGATTTAAAGAACAC	393	(CA)23	60	1st QTL analysis
Omo315	JX205036	9	TGCTCGCGTGTGGATAAACTACTA	GACCGTGTTATTGTGCAAAAGTGA	400	(GT)13	60	1st QTL analysis
Omo342	JX205055	9	TCGGTTAACGGTGGTTTCTTTGTG	GGTGAGAGTAACAGGGGGCTGAAT	382	(TA)8	60	1st QTL analysis
GM117	BV005316.1	10	CCTCCCTCCGCTTACCAC	GTCCCTCACATGAAAGCAGA	273	(CA)27	55	1st QTL analysis
GM280	BV005392.1	10	GTTAATAGGGGGTGGGTGAA	AAACCGCAACCTCTTCTTTT	159	(CA)24	55	1st QTL analysis
GM684	BV005558.1	10	TGGGTGACCAAACTGACAAA	ACTTATGGCGCGTGTGAGAT	201	(CA)23	55	1st QTL analysis
Omo057	JX204867	10	ATTGGCGACACTCTGGTTTATCTG	AAGCCATCATTTCAGGACCAACTA	123	(CA)7	60	1st QTL analysis
Omo222	JX204966	10	AAGCGATAACGGAGATTCTTCTGA	TAAAGGGTGCCGGTAAATGTAAAT	178	(GT)9	55	1st QTL analysis
Omo250	JX204989	10	TCCGGCTGCTCCAGTGTGC	GGCTGACGGAAAAATGGCTCAT	428	(GT)15	60	1st QTL analysis
Omo298	JX205020	10	GTGCCTGTCTTTAACCCTCTGTGT	CTATTATGCCTTTTGGGTTCTTCC	248	(AT)9	60	1st QTL analysis
Omo300	JX205022	10	TTTGCACCCTGTACTCTCACTGTA	ATATCGGGTAACATTCGCTCCACT	399	(CA)17	60	1st QTL analysis
Omo377	JX205083	10	CTGACCCAGTGCACCATCTT	TGAATTTAGAGGCTGTTTTGACAT	304	(CA)12	60	1st QTL analysis
Omo418	GR692221.1	10	TGCTGCTTATCTGAATCTGGTGTT	GGTCCCATTTATGTGACTGAGGTG	333	(GT)9	55	1st QTL analysis
Omo423	GR691841.1	10	AACCTCAAGAGGGGGCAAGAATA	CACCGCAATCCTATAATCCAGACC	331	(CA)11	60	1st QTL analysis
Omo039	JX204854	11	CTGGCTGCCTCAGGACTCATCA	GCACGGCCGCAGGTAAATG	327	(ATT)8	60	1st QTL analysis
Omo205	JX204955	11	GAGAGGGAGGGATGCTTGTT	TTTGAAATTCCCACATTACATCTT	269	(GT)11	55	1st QTL analysis
Omo261	JX204994	11	GCACCGATTAGTTTGCTTCATT	CAACTGCTTTGGGGTTTATTTTAC	107	(CT)24	60	1st QTL analysis
Omo331	JX205048	11	CCGCCACGCAGCTCATTATT	CGAAGGCATCGGAGTATTCTACAT	451	(AC)11	60	1st QTL analysis
Omo415	GR692489.1	11	AGCGGCAATAGCAGCAAAGGAC	GACCCACTGGCATTAATCAACAGC	202	(GT)15	60	1st QTL analysis
Omo420	GR692153.1	11	TCCATTAAGTTTGCAGGGCTTGTT	CCGTGGGTTTGGTTTCCTCTC	331	(AGAT)15	55	1st QTL analysis
GM235	BV005372.1	12	CACAGCGTGTCACCACT	TGCCCTTTGTATTGTTTATT	158	(CA)26	55	1st QTL analysis
Omo055	JX204865	12	TCCTCGTCATCATCCTCGTCAAAC	CACGGCCCCCTCCTCAGTC	234	(AAG)7	60	1st QTL analysis
Omo117	JX204908	12	GGGCCTATTTTTACTGCTTTTTAG	ACAGCTCATCAGTATCAGAGACTC	237	(GT)8	55	1st QTL analysis
Omo128	JX204913	12	TCGCTGCGGCCTTCCATC	AGCGCCTCCTTAACACCTCCTTC	366	(GT)9	60	1st QTL analysis
Omo166	JX204927	12	CACCTCATCGGGAGACAGACAAG	TGATGGCCACTAACTCGTGAAAAA	307	(CA)15	60	1st QTL analysis
Omo178	JX204936	12	TCCGACACCTCCGCTGTAATACTA	GCAGGCTTCCAGGTCTACTGATGT	440	(GA)13	55	1st QTL analysis
Omo285	JX205011	12	GACAATCACTCCTCCAGCCTTACC	CAGACGCTCAACTCACAGGAAAAA	285	(CA)10	60	1st QTL analysis
Omo390	GR697093.1	12	CGCAGGGTTAATCGCACTGTCAT	ATTTGTTTGAGGATCGCCGTCAT	288	(TA)7	60	1st QTL analysis
Omo032	GR695143.1	13	GGTAAGCGGTGCAAAGTTCA	GTTGGCTAACCTCTGTTCACTCC	313	(GAAAA)1	55	1st QTL analysis
Omo116	JX204907	13	TGAAAATCAGCAGCACTTCGTT	TTGGGGTATTTTATGTTGGCATCT	365	(CA)9	60	1st QTL analysis
Omo184	JX204942	13	GGGGGCATGATTTACTTCTGAGGT	AAGGCTGGAGCACAGGGACTTT	182	(CA)12	60	1st QTL analysis
Omo232	JX204976	13	CATGAGCAAACAACAAACAGTGAA	GAGGCAAAGGAAGCAAGGTGAAG	470	(GAAA)9	60	1st QTL analysis
Omo369	JX205076	13	GAGTCCCAGGACCCTCTCAACC	TCATAGTGCAGCCCAATAGTGTCA	466	(CA)9	60	1st QTL analysis

Table S3 Primer information for microsatellite markers used in QTL mapping (Continued)

Marker name	Genbank No.	Linkage group	Primer sequence (forward)	Primer sequence (reverse)	Product length (bp)	Motif	Annealing temperature	Application
Omo391	GR699257.1	13	AGACATCTGTACGCTCTTTACGAA	AGTGCTAGAGGGAAGGGGCTGTA	290	(GAT)9	60	1st QTL analysis
Omo424	GR687536.1	13	GTCGGCTGATGGGTGTAGTGGAG	AAAGGCCGTGGGGAGGTGAG	146	(CA)13	60	1st QTL analysis
GM103	BV005308.1	14	CCACCAATATAGAGTTTAGCC	CCCAGAGCTTTCATTACC	255	(GT)14	55	1st QTL analysis
GM261	BV005381.1	14	GCTGTAGTTACCACGAGGTGA	GTTTGGCAGCGTGTCAG	131	(GT)33	55	1st QTL analysis
GM339	BV005412.1	14	CTCTCCAAATACGCCCTTATG	GCCTCAGCCTCACCTCTT	131	(CA)40	55	1st QTL analysis
Omo068	JX204874	14	TGGGATTTTGGCACTGGGACAT	AAGCCGTTTGGGTGCATAGTGAG	429	(AT)8	55	1st QTL analysis
Omo094	JX204892	14	TTCCGCTTATTTATAGGTGCTGTA	CTGCCGAGCGGTAGTGTTGG	447	(CA)10	60	1st QTL analysis
Omo127	JX204912	14	ATTTGGGTCATGAATTGGGTTTG	TGGACTGTTGCCCTTTAAGTGTTT	359	(GT)15	60	1st QTL analysis
Omo231	JX204975	14	GTCTAGCGTTAGCGGTCTGTCTCT	TGTATCAGCGAATAATCCACCTCA	257	(GT)11	60	1st QTL analysis
Omo271	JX205001	14	GATCCCAGGTATCTCCAGAGTCAT	CCAGCCCTCACTGATATCTATTGT	191	(CA)21	60	1st QTL analysis
Omo372	JX205078	14	ATGGGATATTTTTGTCAATGAAGA	CAAGTGGCGTTAAGGTGTCAGTAG	304	(AT)9	60	1st QTL analysis
Omo099	JX204894	15	TTCCAGAATGGCAACAATAATGTA	AATAAATGTGTTCGCCACTGTAAT	234	(GT)15	60	1st QTL analysis
Omo174	JX204933	15	TTCGCTTAAACGTGGTGCTTATTC	TGCTGGTTTTTACAATGCCTGACT	467	(AT)9	55	1st QTL analysis
Omo249	JX204988	15	CTGCCGACCCACTCCTCCAT	GCGGCGAGCTCTGTGATGTTA	389	(CA)19	60	1st QTL analysis
Omo379	JX205085	15	ATCCTCGCTGTCATCATCTCACTC	GAAACCAGCTTCACTGATAACAAA	395	(GT)13	60	1st QTL analysis
GM581	BV005506.1	16	CAAAAGCAGCCACAAGTCAA	ACCTATGTGGGCTGAATGCT	150	(CA)34	55	1st QTL analysis
GM671	BV005551.1	16	CTCCGTGTGTGAGTGCAAGT	CGAGGAGCGAGCAGAGTAAT	194	(GT)12	55	1st QTL analysis
Omo023	JX204849	16	CCCTCCTACTTTAACCTCAC	TTGTAATACCTGGACACCTC	395	(GT)10	55	1st QTL analysis
Omo130	JX204915	16	CTTGCTCTAGGATGATCTTCTGTG	TGAATGCAGCTGTGGTACAACTCC	140	(GT)11	55	1st QTL analysis
Omo366	JX205073	16	TGCTATGCTTGCTCAACCTTAGAT	ATGGCACTTGACAGAAACCTTTTA	271	(GT)20	60	1st QTL analysis
Omo397	GR693794.1	16	ACGCGTGTTTGAGATATTTAGATT	GAACAAACAAGGGGAGTGG	222	(GATT)7	60	1st QTL analysis
Omo037	JX204852	17	GTCGGGCATATTCCACTTCTGTTA	ACACTTCCTCCTGGGCTGTTCTAC	148	(GT)14	50	1st QTL analysis
Omo330	JX205047	17	TCAGAAGCAGCTTGAAAAATCA	TTTATTCCATGGTGAAAACATTCC	424	(GT)14	60	1st QTL analysis
Omo382	JX205088	17	CCATCCGCAGCTTCATTTTCATAC	AGCCAGAGCTGGAGGGACGATA	417	(CT)9	60	1st QTL analysis
Omo179	JX204937	18	AACTGTTTTGGGTTTCACGGAAGT	GTTGAGGGGGAAGAGGAGGAGAG	350	(GT)23	55	1st QTL analysis
Omo215	JX204960	18	AGTCGAGTGCAGCGAAAAAGTCA	AGTTGGGGCTCTAATCTGTTCCTC	130	(AC)17	55	1st QTL analysis
Omo327	JX205045	18	TTATTTTTCAAACCCAAACTCAGC	CATGGGGTGTTATCAGATGTGC	272	(GT)12	55	1st QTL analysis
Omo340	JX205053	18	TTTTTCTCCAGTTGCCACAGC	TTATTCCATTTTCAAACTTCGTCA	148	(GT)16	60	1st QTL analysis
Omo426	GR689482.1	18	ATGCGTGGTTATTAGGTGTGGTAT	TAATAGGATCGGTGACTTCAAACA	143	(AAGG)8	55	1st QTL analysis
GM124	BV005320.1	19	GTATCTGGGCAGTCATTTTCT	TCATATTCTGATGGAGTGGG	290	(CA)11	55	1st QTL analysis
GM175	BV005344.1	19	GGGGCTGTAAGTGTCTGTATG	GCAAACTGACCAAATGACC	192	(CA)27	55	1st QTL analysis
GM634	BV005531.1	19	CCCGACATTAAACTTTCAGCA	CTGAAACATGACTGCAGGAG	193	(GT)26	55	1st QTL analysis
Omo021	JX204848	19	TCTACAGCAGTGCAGTAACATTCA	AAAAACACGGCTATCAAACAGTTG	246	(AAGT)11	60	1st QTL analysis
Omo197	JX204951	19	GTGGGCATCAGTACGATAAAAACC	TTCTGTACAAACGATGCTGTGGAG	460	(AC)13	60	1st QTL analysis
Omo281	JX205008	19	TCTTCACCGCTTGTATCTGTCACG	AAGGCTTGAAGCACATGAGTGGAT	293	(GT)25	60	1st QTL analysis

Table S3 Primer information for microsatellite markers used in QTL mapping (Continued)

Marker name	Genbank No.	Linkage group	Primer sequence (forward)	Primer sequence (reverse)	Product length (bp)	Motif	Annealing temperature	Application
Omo310	JX205032	19	CAGTTAACTGGTAATTGCCTTTTG	ATTCTGCGTTGGTTTCTACTTTTT	151	(GA)13	60	1st QTL analysis
Omo336	JX205051	19	AGTGCCTGAGACACCAGTTTATCG	CCTTCCCTGATCACTGCTACCATA	388	(TA)8	60	1st QTL analysis
Omo010	GR695213.1	20	GTGGGTGCCATGGGATCTTGATA	GGGCAAACCCCTTAAGTGGAGAG	198	(CA)14	55	1st QTL analysis
Omo013	JX204845	20	CTGACACAGTCTCCCTGCGTATTA	TAGGCATCCCTGGGCTAACTTC	144	(CTTT)15	50	1st QTL analysis
Omo129	JX204914	20	TTGGCAGGCTAAGTACTATTTCAT	GAGCGAATGGTTGTCTGTCTCT	267	(CCAT)9	55	1st QTL analysis
Omo181	JX204939	20	TGTCTGTACACGTGTGGATGAGT	TTCAAATTAACGTTTTCTGTTGGT	431	(GT)9	55	1st QTL analysis
Omo227	JX204971	20	TTATGAGTGTGATGGCAGATGGAG	CCTGGGTCATGACTGAAGTGAATA	260	(CA)9	55	1st QTL analysis
Omo253	JX204991	20	GGGTGGCGATCACATACTTTTCTA	CTCAAACAGTATGGTGGTGGATGG	243	(TA)8	55	1st QTL analysis
Omo282	JX205009	20	AGAAGCCAAAGGAAAGGGAAAAT	TTGGGGGTGACTCTTGAAAAGTAG	430	(GT)11	60	1st QTL analysis
Omo288	JX205013	20	GTCCGGGCCCCTGACTCTAAC	GTCGTGCCAATGCTGTCACACTT	142	(GT)8	60	1st QTL analysis
Omo360	JX205068	20	TGAATCCGGGCTAATTTACCTGTA	GTATTATTGGCCAACAACGCACAC	374	(CA)23	60	1st QTL analysis
Omo209	JX204957	21	GCGGCACTTCTTTACATCTTACGA	AGGCGCAAAGCAGCATCAAA	247	(CA)27	55	1st QTL analysis
Omo301	JX205023	21	AGCCATTCCTCATTGATTGTCGTG	GGGGAGGGAGGGGGTTAGC	193	(CA)10	55	1st QTL analysis
Omo367	JX205074	21	CAGGCCAGAAAACAGCAAAACC	TGACCCTCATGTTCAGTTCAAAGA	346	(AAT)10(C	60	1st QTL analysis
Omo375	JX205081	21	TGGCTAAATTTAGAGCTCACTGTT	GAAGGCAGGTAATCTAGCAAAAAG	367	(GT)11	60	1st QTL analysis
Omo392	GR698887.1	21	CTGGCTTAACTTCTCTACTGGACA	TCTACTCAAAACTGGCAACAAAAC	444	(GAATA)7	60	1st QTL analysis
Omo395	GR701233.1	21	AGATGCCTGAGCTGGAAAAGAGAT	TAAGCACCTGGATGGCATTATCAC	334	(CA)21	60	1st QTL analysis
GM047	BV005287.1	22	TCTTGGGGACAGAAGTGTATT	GTCGCAGGTAGACTGAAGG	189	(CA)23	55	1st QTL analysis
GM163	BV005338.1	22	AGAATACAAGCGCCACACAT	TATAGAGGGGTGAGGGGAGA	165	(CA)18	55	1st QTL analysis
GM212	BV005363.1	22	CCTTCAGCTCACTGGGTCTC	CATCCTTCATCATCCTCCCT	303	(CA)25	55	1st QTL analysis
Omo012	JX204844	22	TATTCTGCCCTCACCTTGCTCAAA	CTCCCCCTCTTTTCAAGTTGTAGC	266	(TA)9	55	1st QTL analysis
Omo038	JX204853	22	ATACGCAGGAAATCTTCAAACACC	TTGCCCACTAGTGGTAAGAATCAA	351	(CAA)7	55	1st QTL analysis
Omo049	JX204860	22	AGCCAGCGGAGACCAACAAAAT	TCTCATGGGAGGCTCACTCACTCT	224	(GGAA)9	60	1st QTL analysis
Omo106	JX204901	22	CCGTTAAAGGAGCAGTCCAC	TTAGTGTTTCAATGCACAAATGAT	350	(CA)15	60	1st QTL analysis
Omo107	JX204902	22	AGCCCAAAACATCCCCTCTGTAA	CATGGGGTTTCTGTGACTCTTCCT	434	(CA)10	60	1st QTL analysis
Omo229	JX204973	22	GCGACTTTTTCTTTGCACATTTTT	AACTGAACCGCCATCATAATCATC	159	(GTT)9	60	1st QTL analysis
Omo244	JX204984	22	TTTGCGTGTTCCCATCGTTTCTC	CTCCACATGCCGCCACAGC	434	(CT)10	55	1st QTL analysis
Omo433	GR683132.1	22	ATGTAGCGCTATCCACCTTCCATT	AAAAAGAGGCAGGCGAGTTCATAC	284	(CA)18	60	1st QTL analysis

Table S4 Primers for amplification and expression analysis of GHR2, IGF-1 and IGF-2 genes

Primers	Sequences (5′ - 3′)	Applications	Lengths of products (bp)	Annealing temperature (℃)
GHR2-1F	TCTAACGCTAACCCAGAAGGAA	Amplification of exon 1 of GHR2	1296	58
GHR2-1R	AAAGCCAAACCAGCTCAGTAAG			
GHR2-2F	TGCTGATACTCGCCTTGTG	Amplification of exon 2 of GHR2	442	55
GHR2-2R	AACAGGCACCTATCACCCAT			
GHR2-3F	TGAATCCTTTGGCTGTATGTG	Amplification of exon 3 of GHR2	1043	55
GHR2-3R	CCCTGACCATGTAAGCAAGT			
GHR2-4F	GACTAAAGGCTTGATGTCAGGTT	Amplification of exon 4 of GHR2	870	57
GHR2-4R	TCGGCAGTGCTCATCTTGTA			
GHR2-5F	TCAGCCCTCTGTAGGTTGATC	Amplification of exon 5-7 of GHR2	1072	56
GHR2-5R	CGCCATTTGTGAGTACAACTTTA			
GHR2-6F	GTTGGTGAAATCACTCTACAGGTT	Amplification of exon 8 of GHR2	1356	57
GHR2-6R	GTCCTTGTTTGGCTTACAGCA			
GHR2-R1F	TACAGCACTGAGACGCCAAACG	Realtime analysis of GHR2	265	60
GHR2-R1R	GCTTCATCCACCCTGTCTCCAC			
Actin-R1F	TGACCCAGATCATGTTCGAGAC	Realtime analysis of β-Actin	254	60
Actin-R1R	TGTGGTGGTGAAGGAGTAGCC			
IGF1-R1F	CAGTGCGATGTGCTGTATCTCCT	Realtime analysis of IGF-1	284	60
IGF1-R1R	TCTTGGGAGTCTTGACAGGTGC			
IGF2-R1F	GCAGAACAGCAGAATGAAGGTC	Realtime analysis of IGF-2	264	60
IGF2-R1R	TCCAGTAGGTTGAGGTCACAGC			