

Supplemental Table 1 Markers used in the genotyping of BC₂F₄ generation

chr.	Marker Name	Forward	Reverse
1	RM8068	AAACCTCTCGCTGTAATTAG	TGAACATTTATTGATATGGTAAA
1	RM6451	TATGACATTGACCGTGGGC	TCTCCCCATGTTTGATCCTC
1	RM6740	GATGGGATAGACAAGCGCAC	CCATCTAGGAGTACTAGTCTTCGC
1	RM8003	ATCATGTTAATTAATGTCTAGAA	TGCTAAAAGGTTATTTTTAC
1	RM5638	CTGAGCAGCATTCCAGTCTG	TCTTGCAGAAGTTCACGTA CTG
1	RM3475	GTTTGCCTAGTTGAGCTGACAG	TTGGATGCACACTAGTCACAAC
1	RM7202	AACGTGGAGGCTCCTTTTTTC	TTGCTATTAGTTGGTGGGGC
1	RM246	GAGCTCCATCAGCCATT CAG	CTGAGTGCTGCTGCGACT
1	RM8085	TGCGTTTTCGATTTCTTTTTA	GGAAAGTTGTGTTCTTTGGC
1	RM5448	GGGGCCCTTAGAGTTTTTAC	CTGCTACAGGACAAAACCAG
1	RM1339	ATCAAAGCATGTAAACCAGC	CGTAAGATCTCCCTACCACC
1	RM3482	TTGTTGTCAAGCTACGGTGG	CTGCTTCGTGATGTTGTTGG
1	RM3523	TCGATCGCTCGCTCTCTC	GGATATGGAGCGCAAGAGAG
1	RM8136	ATGTAAGCTAGGTAGAGCTG	GCGTACGTACGTAAGTAATA
2	RM5345	CAGATACCTCGCAAAAAGG	CGGACCCCAAAGAAAAGAAAG
2	RM1313	TGTGTCTGAAAACCAAGGGG	CGTCCAAGCTGTTTCGTTCTC
2	RM3762	GACGGGTCAGCTACCGTAAG	TCCCCCTCTAAAACCCTAG
2	RM5651	AAGAGAACATTTGGAATCCT	TAACCTGTGCCTTGTTTG
2	RM5470	TTCTAGTAGCTGGACAGTGG	ATAAATCTCTTTGCCTTGGT
2	RM1342	AGAAACCAAAGATGGGAGGG	CTAGCCAGCTCTCCCTTTTG
2	RM530	GCACTGACCACGACTGTTTG	ACCGTAACCCGGATCTATCC
2	RM5472	CACTCAAGACCAGACCTGTACG	CGGCACGTCATTGTAGTGAC
2	RM3542	CTCCATGGAAAGCTAGCCAG	AATCACCTTTTCAGTGCCTC
3	RM3864	AGTCAACCTTGGGGGTAAGG	AGATACTGCCCGTGTCTATCC
3	RM3029	CGGTATAAACGTAAATATTC	GGAGGTA CTTTTAAGCTAGT
3	RM3766	TTATAGAGCCAACACAACGG	ATCGATCTCTCTCCTGGAAA
3	RM3461	AAAGTCTCCCTGTTGTAGCC	CATGAACGTAAAGCAAACG
3	RM1338	AGAGGGAATTAGATTGGATT	GGTCCACTTCTTCTTCTAT
3	RM218	TGGTCAAACCAAGGTCCTTC	GACATACATTCTACCCCCGG
3	RM3513	TACTCCTATCCTGCCATGGC	TGTAGTAGACGAGAGGCCGG
3	RM6329	GTGCATTTCTCTTTTAATAG	AACGACACATTAGTAGATGA
3	Hd6_FNP ^a	ACCTGGCAGCATGTTATGAC	CTACAGATCCACAGAACAGG
3	RM1038	TGGTTCGATTTCGATTTC	AAGCTATTACAAGCAGCTC
3	Hd16_FNP ^b	CGACATTTTACAGGGGAACAATTAGATCCG	TACGACCTAAGTGGGCATGGACGCTCGT
		TGGAAAGAAGCATCATCTGGT CAGCATG	ACCTGATACCCTTGCCAAGGTAATCTCCCT
3	RM2187	GTCATTTGAAGTAAATCCGT	GGTCTACTTGCGAAATAAGT
4	d4a0559 ^c	AAACCTAACCTAGGCCCTGGATTACGGGCG	CATTCTTTCAGTTACCTTCAGAAGAGCAGC
4	4a0516 ^a	GCCTATGGTCTAGTAGCCACC	CCGTGAAGCTGAGATCATGGT
4	RM1359	CAAAGGTCAACGAATTCTA	CGGCTGGTTAATTAATCAAA
4	RM3524	CGGAGCTGGTCTAGCCATC	GTCTCCGTCTTCTCCTACTCG
4	RM3866	AGTTGGTCATCTACCAGAGC	GATCTTCTGCCTCAGAAAG
4	RM1388	TTCAATGAGGCAAAGGTAAG	ATTGTAGCTTGGACTAGGGG
4	RM5503	GGGAAGAAGATAGGAGATGG	CTCTGGGTACACTTCACGAG
4	RM5473	ACACGGAGATAAGACACGAG	CGAGATTAACGTCGTCCTC
4	RM5709	CTGAATTTATTATAGGACGGAAG	CATAGTATTGGATTGGACACG
4	RM349	TTGCCATTCGCGTGGAGGCG	GTCCATCATCCCTATGGTTCG
4	RM2275	ACTACTTAGGCATATTTGAA	AACACTAATACGTCGATACA
4	RM3648	TACCCTTTCTTCCCCAAACC	ACCTCCTCCTCCACTTCTCC
4	RM1272	TCTATGGATCTGCATGCTGG	CTGCCCTGTCCTTTTAATCG
5	RM1248	ACAAGCAGCTAATGGTTGGG	GTGATTTTGGCTCAGGTCAG
5	RM3529	CGCGCCACCTCGATATATAC	GCTCAGGTTAACCAAGGTGG
5	RM8039	CGTACGTACTTATATCTCAT	AAATCTAATGTATCTGAGGT
5	RM430	AAACAACGACGTCCCTGATC	GTGCCTCCGTGGTTATGAAC
5	RM164	TCTTGCCCGTCACTGCAGATATCC	GCAGCCCTAATGCTACAATTCTTC
5	RM5592	GTAACGCTTATTAACGATAA	ATATTCTAGAACGAGGGTAG
5	RM3476	GATTCTCGTCGTAATCAAGA	ATCCACGGTTAAGATAAATG
6	RM1369	CAATTGGCCCAAGGTCTGT	GCGGATTCAAGATCATGTTGGT

6	Hd17_FNP ^c	ATGGCTTGTCCCTGTCACCACTCCTT	CCCATATGTTGGGCTGATG
6	RM2615	CAGAGTGCTTTAGACAATCA	AAATTGGTAAGAGATTCTGC
6	RM276	CTCAACGTTGACACCTCGTG	TCTCCATCGAGCAGTATCA
6	RM5585	TCAGAGGTGGCAGCTTATTTTATACC	ATGTAAATGGTCACACACACACAC
6	RM2523	CCGTAGGTCTTCAAGTGATA	GCAAAACCGAACTAAAATTA
6	RM1340	TCCAAACTAGTGGGAACGC	CTCAACGCCATGAACCTC
6	RM1370	AAACGAGAACCAACCGACAC	GGAGGGAGGAATGGGTACAC
7	RM8010	GAGCCACTGCTATATAAAGC	ACCAAAATCCAAACTTTGTA
7	RM6872	GGATGAACACTGATGATGGC	ACCTCCACCACGATATCCAC
7	RM8006	TGCCGGTTCTTAATTTTATC	AATGGTCCACATTACTCCAC
7	RM8036	AGCAGAGCAATTTAACTAAG	GCCTATCATAATATCCATCA
7	RM320	CAACGTGATCGAGGATAGATC	GGATTTGCTTACCACAGCTC
7	RM1279	GGGTATAAAATGCGTGGCAC	ATGGATGGTACGAGGACGAG
7	RM1364	AAGAAATTCAAAACACATGA	AAAACATCTACTTTGATCCA
7	RM5720	CCTGATAAATTGACAGTTAC	GAGAGTAGGAGTTGATAACA
7	RM1306	TGCCAATTACCTTCCCCTAC	TGCTCCGTATTGCTGCTATG
8	RM3819	ACCTCACCTGTGGATCTTGG	CAATCCCCTTCTCTCCTTCC
8	RM5556	ATCTCCCTCCCTCTCCTCAC	TCCACACCTTCACAGTTGAC
8	RM3374	ATGAACTAGTGAACCCCCC	GTAGCGGTAGCTGCAAAAGC
8	RM2910	CAGCTGCTCATATTCATATA	ATAAGGTACTIONCATCCGTTA
8	RM7049	AACCTAGATCTAATCCGTGG	CATCTCTGAGTTGAGCAAAAC
8	RM5485	CTTCCACAAGCTTGGCTAGG	AATGCCATCCCCTACTCATG
8	RM80	TTGAAGGCGCTGAAGGAG	CATCAACCTCGTCTTCACCG
8	RM281	ACCAAGCATCCAGTGACCAG	GTTCTTCATACAGTCCACATG
8	RM3155	AATCCACATTTGGCTTCTC	CGTGTAACCTGTTTCGCTTG
9	RM2855	GGAGCTTAGAATCTCACCTA	CGCATTTTCTTATACATACA
9	RM257	CAGTTCCGAGCAAGAGTACTC	GGATCGGACGTGGCATATG
9	RM160	AGCTAGCAGCTATAGCTTAGCTGGAGATCG	TCTCATCGCCATGCGAGGCCTC
9	RM215	CAAAATGGAGCAGCAAGAGC	TGAGCACCTCCTTCTCTGTAG
9	RM2144	ACATTATGAAACGGAGGAAG	GAAATGATGCATCAGCATT
10	RM5271	CGGTGTAGATTGTAGGTACA	GTAGTTTAGTTATTGCGCAC
10	RM4455	CTCTCAAAGAACTAGGACTC	GAGAAGGTATGATAACCAAT
10	RM1083	CCTTGATTGCAGCATCCG	TTGAGCCTTTTACGAGACGG
10	RM6704	AATCGAATCTGGATATCTTG	CTTCTACCTAGTACCGAGA
10	RM4477	AGTAAACATGTCTTCGGGAT	CAGTGCATATTCCTACTGGTA
10	RM5352	GGAACATAACATGGTGCAAG	ACCAGATCACATGAAGAGGA
11	RM1761	ACGCTTAAAGAACATTTGAT	GCGATTAACCTTTTAAACCATT
11	RM5704	AACGAATGATTAAACATCTA	AAGCAGAGTCAACATATTTA
11	RM6894	AATCTCCACTGCAGCGATTC	CGAATGGTCAAACGTAGGTG
11	RM3625	CTTGCAATTCAATTGCTTAC	GGTGGCCTAGTGAAACTAAA
11	RM1341	AACCTGGAGGTGCTGGTCTC	TTTCTCCCCCACCAC
11	RM4844	TACATTCTCAAATGTAGCTG	AGTCCACAGTACTGTTTCATC
12	RM1880	ACCACTAAATAAGCACATAC	GGCATCATACATTAATAATAC
12	RM3747	AGCAATGCACTCCCTTGATC	TGCTTCCTCCTTGGTTTGG
12	RM3455	TGAATCCACACTCGCAGATC	GCCAGTCCACGATTGGTC
12	RM2529	CATTAAAATCAGTGGGACTG	AGGCATTTCTGATATGATC
12	RM101	GTGAATGGTCAAGTGACTIONTAGGTGGC	ACACAACATGTTCCCTCCCATGC
12	RM2972	GAGCCAATATGTTGTCTTGA	GTTCAGATCATGATGCCTAC
12	RM1986	TAACGGAGGGAGTAGTTTTTC	GAACCTACATATCGAGAGCA
12	RM2197	ACTGAGAACTTTAATCATCG	GAACAACCTTTGAAGAGAAAC

^a CAPS markars.

^b PCR-CTPP marker.

^c dCAPS markars.

These markars (a, b and c) were reacted according to Okada et al. (2017) and Okada et al. (2018a).

Supplemental Table 2 Information of insertion/deletion (INDEL) between Koshihikari and Yamdanishiki searched by rice TASUKE

Position on chr.6 (bp)	Type ^b	Ref ^c	Alt ^d
2,002,736	DEL	AGCAAACACAACAGGGCG	A
2,022,644	DEL	CGCGCGGCCGCTTCTCTCCTCTCCGGCCGACGCC	G
2,042,217	DEL	TTGTAGTAATATAAACT	C
2,112,828	DEL	AGGCCACAGAGAT	G
2,118,185	DEL	GGCCTCCTC	A
2119081	INS	T	TGCATTTTCAGG
2,214,400	INS	A	ACTTTAAGTAATCCATAGT
2,292,886	INS	C	CTTCTT
2,376,346	INS	t	CAAGCCAGCAGTCTAGCACACAAGTCACAAAGCAATTTAAACGCTGCCTCACAAAGCCAAGCCAGCAGTCTAA
3,468,189	INS	c	TGGAAAAT
3,475,155	INS	T	TGCATTACTGGGAAAGAAAA
3483458	DEL	CTCCGCAGCCGTTGT	C
3,632,612	DEL	AGCTGTTTAAAA	A
3,652,851	INS	c	CACGAAACATATCTCGCATCCCT
3,652,857	INS	a	CCAGATATCTCGCGTCCCTTAATTAATTAACCGGTC

^a IRGSP1.0 position.

^b INS or DEL indicated insertion or deletion from Koshihikari to Yamadanishiki.

^c Koshihikari allele.

^d Yamadanishiki allele.

Their INDEL were searched by conditions that we compared Koshihikari (ID: SAMD00045947) and Yamadanishiki (ID: SAMD00010633) and INDEL site were depth > 5 using rice TASUKE (Kumagai et al. 2013, <https://ricegenomes.dna.affrc.go.jp/>).

Supplemental Table 3 Chalky grain rate out of WCE for validation lines and parents

	White-belly grain rate (%)		White-back grain rate (%)		Basal-white grain rate (%)		Milky-white grain rate (%)	
	2013	2014	2013	2014	2013	2014	2013	2014
VL_E	28 ± 11	20 ± 8	49 ± 23	15 ± 7	9 ± 3	3 ± 1	11 ± 6	13 ± 3
VL_L	3 ± 1	3 ± 1	0 ± 0	0 ± 0	0 ± 0	0 ± 0	1 ± 1	0 ± 0
Koshihikari	11 ± 4	1 ± 1	29 ± 10	24 ± 9	6 ± 2	16 ± 9	16 ± 6	10 ± 5
Yamadanishiki	9 ± 1	9 ± 2	0 ± 0	0 ± 0	0 ± 0	0 ± 0	1 ± 1	0 ± 0