

***S*-haplotypes and *S*-*RNase* alleles of apple cultivars and species**

Proposed <i>S</i> -haplotype	Proposed <i>S</i> - <i>RNase</i> allele	Former <i>S</i> - <i>RNase</i> allele	Cultivar / Species	<i>S</i> - <i>RNase</i> allele		Database Accession #	Reference
1	1	1, f	Fuji	1	9b	D50837	Sassa et al., 1996
2	2	2, a	Golden Delicious	2	3	U12199	Broothaerts et al., 1995 Komori et al., 1998
3	3	3, b	Golden Delicious	2	3	U12200	Broothaerts et al., 1995 Komori et al., 1998
4	4	4	Gravenstein	4	11 20	AF327223	Kobel et. al., 1939 Boskovic and Tobutt, 1999 Van Nerum et al., 2001
5	5	5	Queen's Cox	5	9a	U19791	Janssens et al., 1995
6	6a	6	Oetwiler Reinette	3	6a	AB094495	Kobel et. al., 1939 Matsumoto et al., 2003
		12	Citron d'Hiver	3	5 6a	AB105061	Boskovic and Tobutt, 1999 Matsumoto et al., 2003
7	7a	7	Idared	3	7a	U19792	Janssens et al., 1995
	7b	d, e ^z	Akane	7b	24	AB032246	Kitahara et al., 2000
8	8	8	Ontario Reinette	1	8		Kobel et. al., 1939
9	9a	9	Queen's Cox	5	9a	U19793	Janssens et al., 1995
	9b	c	Fuji	1	9b	D50836	Sassa et al., 1996
10	10a	10, 25 ^y	Prima	2	10a	D50836	Van Nerum et al., 2001
	10b	i	McIntosh	10b	25	AB052683	Kitahara and Matsumoto 2002
11	11	10/11, 13	Gravenstein	4	11 20	AB105060	Kobel et. al., 1939 Boskovic and Tobutt, 1999 Matsumoto et al., 2003
		14	Jacques Lebel	1	3 11	AB094492	Kobel et. al., 1939 Boskovic and Tobutt, 1999 Matsumoto et al., 2003
15	15	15	Kaiserapfel	1	10 15		Boskovic and Tobutt, 1999
16	16a	27, 27a	Basketong	16a	26	AF016919	Verdoodt et al., 1998 Van Nerum et al., 2001
	16b	22, 27b	Alkmene	5	16b	AF327222	Boskovic and Tobutt, 1999 Van Nerum et al., 2001
		23, 27b	Delbard Jubile	2	16b	AF327222	Boskovic and Tobutt, 1999 Van Nerum et al., 2001
		25 ^x , 27b	Merlijin	3	16b	AF327222	Boskovic and Tobutt, 1999 Van Nerum et al., 2001
	16c	16, 27a ^w	Bohnappel	9	16c 17	AB126322	Boskovic and Tobutt, 1999 Broothaerts, 2003
17	17	17	Blenheim Orange	1	3 17	AB105062	Boskovic and Tobutt, 1999 Matsumoto et al., 2003
		6b	Heta	16b	17	MG598499	De Franceschi et al., 2018
			Maikki	10	17	MG598499	De Franceschi et al., 2018
		19	Bohnappel	9	16c 17	AB094493	Boskovic and Tobutt, 1999 Matsumoto et al., 2003
18	18	18	Menzauer Jagerapfel	3	5 18		Boskovic and Tobutt, 1999
20	20a	g, d ^v	Indo	7	20a	AB019184	Matsumoto et al., 1999
	20b	g ^v	<i>Malus transitoria</i>	20b	30 ?	AB096138	Matsumoto et al., 2001
21	21	21	Ribston Pippin	1	9 21	AB094494	Boskovic and Tobutt, 1999 Matsumoto et al., 2003
23	23	10 ^u	Granny Smith	3	23	AF239809	Schneider et al., 2001
24	24a	24	Braeburn	9	24a	AF016920	Verdoodt et al., 1998
	24b	h	Akane	7	24b	AB032247	Kitahara et al., 2000
25	25	25, z	McIntosh	10b	25	AB062100	Kitahara and Matsumoto, 2002
26	26	26	Basketong	16	26	AF016918	Verdoodt et al., 1998
28	28	19, 30, e, d ^t , de ^t , g ^t	Delicious	9	28	AB035273	Matsumoto and Kitahara, 2000 Broothaerts et al., 2003
		28, 30	Red Delicious	9	28	AF201748	Schneider et al., 2001
29	29	29	Anna	3	29	AY039702	Matityahu et al., 2005
30	30	t	<i>Malus transitoria</i>	20b	30	AB035928	Matsumoto et al., 2000 Matsumoto et al., 2001
31	31	31	York Imperial	2	31	DQ135990	Kim et al., 2008
32	32	32	Burgundy	20	32	DQ135991	Kim et al., 2008
33	33	S _{sis}	<i>Malus siebersii</i>	20	33	AB540121	Matsumoto et al., 2010
34	34	S _{ad5}	Adersleber calville	3	34	AB540122	Matsumoto et al., 2010

Note: ^zS_e-allele in 'Hokuto', 'Toko' and 'Jonathan', ^yS₂₅-allele in 'Telamon', ^xS₂₅-allele in 'Merlijin', ^wS_{27a}-allele in 'Bohnappel', ^vS_d-allele in 'Mutsu', ^uS₁₀-allele in 'Granny Smith', ^tS_d-, S_{de}- and S_g-allele in 'Delicious' etc.