

附表 1 2019-2024 年间定位的抗赤霉病 QTL

QTL	抗性来源	染色体	连锁标记	参考文献
1A-1	DT696	1A	<i>Excalibur_c2389_361/BS00062869_51</i>	Berraies et al. 2024
1A-1	AGS2035	1A	<i>CAP7_c4833_141-wsnp_c24686_33942264</i>	Castro Aviles et al. 2020
1A-1	Yangmai12	1A	<i>AX89670922-AX110911618</i>	Hu et al. 2023a
1A-1	-	1A	<i>AX.95139456-AX.95079481</i>	Nannuru et al. 2022
1A-1	Ben	1A	<i>Xwpt7784-Xwpt6853</i>	Pirseyedi et al. 2019
1A-1	-	1A	<i>Tdurum_contig85467_208-Kukri_c4900_3100</i>	Semagn et al. 2023
1A-1	-	1A	<i>RAC875_c30632_374</i>	Semagn et al. 2023
1A-1	-	1A	<i>IWB24089-IWB20954</i>	Wu et al. 2019
1A-1	Yangmai158	1A	<i>AX-109436734 ~ AX-111149787</i>	Yan et al. 2021
1A-1	-	1AS	<i>IWB75039</i>	Zhu et al. 2020
1A-2	-	1A	<i>RAC875_c16391_426</i>	Cabral et al. 2023
1A-2	-	1A	<i>1A_499864143</i>	Gaire et al. 2021
1A-2	-	1A	<i>Ra_c4159_2716</i>	Haile et al. 2023
1A-2	-	1A	<i>TA003794-1077, Kukri-Ra_c5683-2584</i>	Haile et al. 2023
1A-2	-	1A	<i>AX.95159805-AX.94768180</i>	Nannuru et al. 2022
1A-2	-	1A	<i>514038125-551320074</i>	Serajazari et al. 2023
1B-1	Jamestown	1B	<i>IWA4557-IWB31716</i>	Carpenter et al. 2020
1B-1	Jamestown	1B	<i>IWA6259-BARC128</i>	Carpenter et al. 2020
1B-1	AGS2060	1B	<i>Excalibur_c21451_352-BS00064162_51</i>	Castro Aviles et al. 2020
1B-1	-	1B	<i>S1B_325985493</i>	Ghimire et al. 2022
1B-1	-	1B	<i>S1B_327027585</i>	Ghimire et al. 2022
1B-1	-	1B	<i>BS00029013_51</i>	Haile et al. 2023
1B-1	-	1B	<i>GENE-0293_154</i>	Hu et al. 2020
1B-1	-	1BL	<i>S1B_298191278</i>	Larkin et al. 2020
1B-1	Tunisian108	1B	<i>Xgwm264-Xwpt3451</i>	Pirseyedi et al. 2019
1B-1	Wheaton	1B	<i>S1B_432817546</i>	Poudel et al. 2022
1B-1	AC Barrie	1B	<i>BobWhite_c22266_315</i>	Thambugala et al. 2020
1B-2	Ben	1B	<i>Xwpt1818-Xwpt5061</i>	Pirseyedi et al. 2019
1B-2	-	1B	<i>566601144-646216331</i>	Serajazari et al. 2023
1B-2	AC Barrie	1B	<i>BS00087544_51</i>	Thambugala et al. 2020
1D-1	AGS2035	1DL	<i>Excalibur_c53900_86-Ra_c3045_2659</i>	Castro Aviles et al. 2020
1D-2	-	1D	<i>Kukri_c27717_316</i>	Cabral et al. 2023
1D-2	Yanzhan1	1D	<i>AX109873298-AX89479023</i>	Hu et al. 2023a
2A-1	AGS2060	2A	<i>BS00067792_51-BS00023052_51</i>	Castro Aviles et al. 2020
2A-1	-	2A	<i>Kukri_rep_c112814_700</i>	Semagn et al. 2023
2A-1	FL62R1	2AS	<i>Tdurum_contig11803_935-Tdurum_contig66015_346</i>	Zhang et al. 2020
2A-2	-	2A	<i>wsnp_BF145580A_Ta_2_2</i>	Haile et al. 2023
2A-2	Yangmai158	2A	<i>AX-109631196 ~ AX-110599729</i>	Yan et al. 2021
2A-3	-	2A	<i>BS00098033_51</i>	Haile et al. 2023
2A-3	-	2A	<i>BS00000209_51</i>	Haile et al. 2023

2A-3	-	2A	598942260	Serajazari et al. 2023
2A-3	AC Barrie	2A	RAC875_c1757_1183	Thambugala et al. 2020
2A-3	BKT9086-95	2A	RAC875_c29716_871	Varga-László et al. 2020
2B-1	-	2B	BobWhite_c12144_216	Haile et al. 2023
2B-1	-	2BS	S2B_35068159	Larkin et al. 2020
2B-1	Tunisian108	2B	Xgwm71-Xbarc297	Pirseyedi et al. 2019
2B-1	-	2B	65045380	Serajazari et al. 2023
2B-1	AC Barrie	2B	Kukri_c26288_419	Thambugala et al. 2020
2B-1	BKT9086-95	2B	AX-94393508-BobWhite_c16130_362	Varga-László et al. 2020
2B-1	FL62R1	2BS	BS00109268_51-RAC875_c26460_1040	Zhang et al. 2020
2B-2	-	2B	2B_547543336	Gaire et al. 2021
2B-2	-	2B	Kukri_c12804_620	Haile et al. 2023
2B-2	-	2BL	S2B_574225916	Larkin et al. 2020
2B-2	-	2BL	S2B_189749199	Larkin et al. 2020
2B-2	G8.06	2B	10517361 F 0-33:T > C-33:T > C	Ollier et al. 2020
2B-2	-	2B	383273739	Serajazari et al. 2023
2B-2	AC Barrie	2B	RAC875_c28185_91	Thambugala et al. 2020
2B-2	-	2B	IWB52433	Wu et al. 2019
2B-2	-	2B	IWB6480	Wu et al. 2019
2B-3	AGS2035	2B	RAC875_c35399_497-BobWhite_c15453_678	Castro Aviles et al. 2020
2B-3	-	2B	Ex_c55735_1012	Haile et al. 2023
2B-3	-	2B	Excalibur_c39451_68-Ku_c3479_1035	Haile et al. 2023
2B-3	-	2B	BS00016650_51-IAAV6424	Semagn et al. 2023
2B-3	-	2B	638519552	Serajazari et al. 2023
2D-1	-	2D	w SNP_Ex_c6400_11123059	Cabral et al. 2023
2D-1	Tenacious	2D	Ppd-D1	Dhariwal et al. 2020
2D-1	Yanzhan1	2D	AX108988107-Rht8_marker	Hu et al. 2023b
2D-1	Centrum	2DS	AQP-6	Ren et al. 2024
2D-1	-	2D	Excalibur_rep_c107523_281	Semagn et al. 2023
2D-1	Maxine	2D	1103191-988131	Tamburic-Ilincic et al. 2019
2D-1	AC Barrie	2D	w SNP_CAP12_c812_428290	Thambugala et al. 2020
2D-1	BKT9086-95	2D	AX-94908406-AX95124335	Varga-László et al. 2020
2D-1	Jingzhou66	2DS	AX-111561744-AX-89728114	Xu et al. 2020
2D-1	G97252W	2D	KASP2D58574820 and KASP-Ppd-D1	Xu et al. 2023
2D-1	Yangmai158	2DS	GBS2375	Zhang et al. 2021
2D-2	Yangmai13	2D	AX-110410377-AX-111538812	Chen et al. 2021
2D-2	Art	2D	snp364	Clinesmith et al. 2019
2D-2	Art	2D	snp2464-snp4036	Clinesmith et al. 2019
2D-2	Tenacious	2D	BobWhite_c17782_194	Dhariwal et al. 2020
2D-2	Yangmai12	2D	AX109059601-AX108767381	Hu et al. 2023a
2D-2	Yangmai4/5	2D	AX109875224-AX109041417	Hu et al. 2023C
2D-2	Ji5265	2D	GBS12056-GBS19302	Li et al. 2022
2D-2	AC Barrie	2D	RAC875_c12803_1620	Thambugala et al. 2020

2D-2	AC Barrie	2D	<i>Excalibur_c24307_739</i>	Thambugala et al. 2020
2D-2	Yangmai158	2D	<i>AX-110423675 ~ AX-111516380</i>	Yan et al. 2021
2D-2	Yangmai158	2DL	<i>GBS4532-GBS2791</i>	Zhang et al. 2021
2D-2	-	2DL	<i>GWM539</i>	Zhu et al. 2020
3A-1	-	3A	<i>RAC875_c4954_943 wsnp_Ex_c23633_32868822</i>	Haile et al. 2023
3A-1	Wheaton	3A	<i>SNPs S3A_64027637-S3A_516888164</i>	Poudel et al. 2022
3A-1	-	3A	<i>Kukri_rep_c69028_139-Kukri_rep_c101341_425</i>	Semagn et al. 2023
3A-1	-	3A	<i>525193805</i>	Serajazari et al. 2023
3A-1	-	3A	<i>IWB50548</i>	Wu et al. 2019
3A-1	Jingzhou66	3AS	<i>AX-110551014-AX-111652951</i>	Xu et al. 2020
3A-2	-	3AL	<i>S3A_661557724</i>	Ghimire et al. 2022
3A-2	-	3A	<i>RAC875_c10710_87</i>	Haile et al. 2023
3A-2	Yangmai5	3A	<i>AX110621643-AX109389053</i>	Hu et al. 2023b
3A-2	-	3A	<i>S3A_714306573</i>	Larkin et al. 2020
3A-2	-	3A	<i>RAC875_c15003_377-CAP11_c1022_66</i>	Nannuru et al. 2022
3A-2	-	3A	<i>700562556</i>	Serajazari et al. 2023
3A-2	Jingzhou66	3AL	<i>AX-110591324-AX-111465231</i>	Xu et al. 2020
3A-2	Yangmai158	3AL	<i>GBS20758-GBS781</i>	Zhang et al. 2021
3B-1	Carberry	3B	<i>BobWhite_c2453_340-BobWhite_c2453_282</i>	Berraies et al. 2023
3B-1	-	3B	<i>CAP7_c1576_371</i>	Cabral et al. 2023
3B-1	N553	3B	<i>AX-108836843</i>	Chen et al. 2021
3B-1	-	3B	<i>3B_10170821</i>	Gaire et al. 2021
3B-1	-	3B	<i>TA004185-0427-RAC875_c5966_1854</i>	Haile et al. 2023
3B-1	Ningmai9	3B	<i>BS00063443_51-BS00098868_51</i>	Jiang et al. 2020
3B-1	-	3B	<i>Excalibur_c94546_61-AX-94732796</i>	Nannuru et al. 2022
3B-1	G8.06	3B	<i>gwm533</i>	Ollier et al. 2020
3B-1	-	3B	<i>RAC875_c8459_1291-BS00039218_51</i>	Semagn et al. 2023
3B-1	-	3B	<i>7161649</i>	Serajazari et al. 2023
3B-1	AC Barrie	3B	<i>BobWhite_c27287_232</i>	Thambugala et al. 2020
3B-1	Reeder	3B	<i>BobWhite_c27287_232</i>	Thambugala et al. 2020
3B-1	-	3B	<i>IWB12053</i>	Wu et al. 2019
3B-1	-	3B	<i>IWB10842</i>	Wu et al. 2019
3B-1	FL62R1	3BS	<i>gwm533</i>	Zhang et al. 2020
3B-2	-	3B	<i>RAC875_rep_c109105_57, Excalibur_c15332_453, RAC875_rep_c115516_134, Excalibur_c62826_254</i>	Haile et al. 2023
3B-2	-	3BL	<i>S3B_749054930</i>	Larkin et al. 2020
3B-2	-	3BL	<i>S3B_783125543</i>	Larkin et al. 2020
3B-2	Tunisian108	3B	<i>Xwpt0384-Xbarc229</i>	Pirseyedi et al. 2019
3B-3	-	3BL	<i>S3B_790522562</i>	Ghimire et al. 2022
3B-3	-	3B	<i>BobWhite_c6462_373</i>	Haile et al. 2023
3B-3	-	3B	<i>750134355</i>	Serajazari et al. 2023
3B-3	Yangmai16	3BL	<i>AX-110917097-AX-110429468</i>	Zhu et al. 2021
3D-1	-	3D	<i>wsnp_Ex_rep_c67702_66370241-GENE-1579_18</i>	Semagn et al. 2023

3D-2	-	3D	<i>477547149</i>	Serajazari et al. 2023
3D-3	Jingzhou66	3DL	<i>AX-94528475-AX-111760688</i>	Xu et al. 2020
4A-1	-	4A	<i>Kukri_c53787_620</i>	Haile et al. 2023
4A-1	AC Barrie	4A	<i>RAC875_c14911_1282</i>	Thambugala et al. 2020
4A-1	Stettler	4AS	<i>BS00065863_51-wsnp_Ex_c54453_57331510</i>	Zhang et al. 2020
4A-1	Zhengmai9023	4AS	<i>GBS23031-GBS23630</i>	Zhang et al. 2021
4A-1	Zhongmai895	4AS	<i>AX-94796653-AX-111597067</i>	Zhu et al. 2021
4A-2	-	4A	<i>BS00011469_51-Excalibur_c687_886</i>	Hu et al. 2020
4A-2	-	4AL	<i>S4A_562577189</i>	Larkin et al. 2020
4A-2	-	4A	<i>AX-94514228-AX-95228002</i>	Nannuru et al. 2022
4A-2	-	4A	<i>713502645</i>	Serajazari et al. 2023
4A-2	FL62R1	4AL	<i>RAC875_c917_442-Ex_c1246_1162</i>	Zhang et al. 2020
4A-3	-	4AL	<i>S4A_715809044</i>	Ghimire et al. 2022
4A-3	-	4A	<i>AX-95208702-AX.94750815</i>	Nannuru et al. 2022
4B-1	AC Cadillac	4B	<i>BS00021984_51-wsnp_BF482960B-Ta_1_4</i>	Berraies et al. 2023
4B-1	Art	4B	<i>snp5422</i>	Clinesmith et al. 2019
4B-1	BR 18	4B	<i>AX-94399249</i>	Goddard et al. 2021
4B-1	-	4B	<i>wsnp_BF482960B-Ta_1_4, RAC875_c27536_611, BS00021984_51, Ex_c101685_711</i>	Haile et al. 2023
4B-1	-	4B	<i>Tdurum_contig12177_1367</i>	Haile et al. 2023
4B-1	-	4B	<i>Tdurum_contig14562_607</i>	Haile et al. 2023
4B-1	-	4B	<i>Ra_c41921_951</i>	Haile et al. 2023
4B-1	-	4BL	<i>S4B_577008759</i>	Larkin et al. 2020
4B-1	-	4BL	<i>S4B_577008759</i>	Larkin et al. 2020
4B-1	-	4B	<i>AX.94623317-BS00076033_51</i>	Nannuru et al. 2022
4B-1	-	4B	<i>488664809</i>	Serajazari et al. 2023
4B-1	Redeemer	4B	<i>1110761</i>	Tamburic-Ilincic et al. 2019
4B-1	AC Barrie	4B	<i>wsnp_BF482960B-Ta_1_4</i>	Thambugala et al. 2020
4B-1	FL62R1	4BS	<i>Tdurum_contig5427_314-RAC875_c75075_313</i>	Zhang et al. 2020
4B-1	Zhongmai895	4BS	<i>Rht-B1b-AX-111068079</i>	Zhu et al. 2021
4B-2	-	4B	<i>Kukri_c26905_392</i>	Haile et al. 2023
4D-1	Everest	4D	<i>snp5725</i>	Clinesmith et al. 2019
4D-1	YM4/YM5	4D	<i>Rht-D1_SNP-AX111027348</i>	Hu et al. 2023b
4D-1	AC Barrie	4D	<i>CAP8_rep_c5023_658</i>	Thambugala et al. 2020
4D-1	Jingzhou66	4DS	<i>AX-111475478-AX-8939851</i>	Xu et al. 2020
4D-1	Yangmai16	4DS	<i>Rht-D1b-AX-89421921</i>	Zhu et al. 2021
5A-1	DT696	5A	<i>Tdurum_contig5481_252/tplb0039m09_92</i>	Berraies et al. 2024
5A-1	Carberry	5A	<i>BobWhite_c8266_227</i>	Berraies et al. 2023
5A-1	AGS2035	5A	<i>Ra_c10762_1137-BS00023008_51</i>	Castro Aviles et al. 2020
5A-1	-	5AS	<i>S5A_18653369</i>	Ghimire et al. 2022
5A-1	Tunisian108	5A	<i>Xbarc2187-Xbarc141</i>	Pirseyedi et al. 2019
5A-1	Surpresa	5A	<i>S5A_419786980-S5A_5332941</i>	Poudel et al. 2022
5A-1	-	5A	<i>86663536</i>	Serajazari et al. 2023

5A-1	Cutler	5A	<i>BobWhite_c19985_446</i>	Thambugala et al. 2020
5A-1	FL62R1	5AS	<i>Kukri_c24642_426-BS00003696_51</i>	Zhang et al. 2020
5A-1	-	5AS	<i>IWB21456</i>	Zhu et al. 2020
5A-2	DT696	5A	<i>Excalibur_c64265_224</i>	Berraies et al. 2024
5A-2	AGS2035	5A	<i>tplb0044j06_689-Ku_c12469_837</i>	Castro Aviles et al. 2020
5A-2	Yangmai4	5A	<i>AX110016633-AX110973091</i>	Hu et al. 2023C
5A-2	Yangmai158	5A	<i>IAAV5294-BS00060445_51</i>	Jiang et al. 2020
5A-2	-	5A	<i>BS00100107_51-AX.94669191</i>	Nannuru et al. 2022
5A-2	-	5A	<i>BS00066127_51-Excalibur_c49597_398</i>	Semagn et al. 2023
5A-2	-	5A	<i>Tdurum_contig50175_875-Excalibur_c92705_94</i>	Semagn et al. 2023
5A-2	-	5A	<i>390365186</i>	Serajazari et al. 2023
5A-2	-	5A	<i>502289718</i>	Serajazari et al. 2023
5A-2	Reeder	5A	<i>Tdurum_contig71499_211</i>	Thambugala et al. 2020
5A-2	Yangmai158	5A	<i>AX-110918858 ~ AX-111091903</i>	Yan et al. 2021
5A-2	FL62R1	5AL	<i>Ku_c21587_754-CAP8_rep_c4852_130</i>	Zhang et al. 2020
5A-2	Yanzhan1	5A	<i>AX111153208-AX111102760</i>	Zhao et al. 2023
5A-2	-	5AL	<i>IWB42293</i>	Zhu et al. 2020
5A-2	Zhongmai895	5AL	<i>AX-111001072-AX-94955360</i>	Zhu et al. 2021
5A-3	-	5A	<i>BS00000006_51</i>	Cabral et al. 2023
5A-3	-	5A	<i>5A_702908675</i>	Gaire et al. 2021
			<i>IAAV3365, BS00075959_51, wsnp_AJ612027A_Ta_2_5,</i>	
		5A	<i>BobWhite_c21949_150, wsnp_BF293620A_Ta_2_1,</i>	
			<i>Kukri_c33022_198, RFL_Contig316_572,</i>	
5A-3	-		<i>Excalibur_c23354_306</i>	Haile et al. 2023
5A-3	-	5A	<i>Excalibur_c32414_861-BS00000054_51</i>	Semagn et al. 2023
5A-3	Cutler	5A	<i>BobWhite_c8266_227</i>	Thambugala et al. 2020
5A-3	BKT9086-95	5A	<i>wsnp_Ku_c38543_47157828-wsnp_Ex_c2171_4074003</i>	Varga-László et al. 2020
5B-1	AGS2060	5B	<i>BS00079166_51-CAP11_c7700_247</i>	Castro Aviles et al. 2020
5B-1	Centrum	5BS	<i>16K-13073</i>	Ren et al. 2024
5B-1	-	5B	<i>6650-65524924</i>	Serajazari et al. 2023
5B-2	AGS2060	5B	<i>BS00108020_51-ACX4548</i>	Castro Aviles et al. 2020
5B-2	-	5B	<i>wsnp_Ra_c24619_34168104</i>	Haile et al. 2023
5B-2	Tunisian108	5B	<i>Xwpt6902-Xwpt5514</i>	Pirseyedi et al. 2019
5B-2	-	5B	<i>531509793-669974686</i>	Serajazari et al. 2023
5B-2	Yangmai12	5B	<i>AX110581004-AX110942912</i>	Zhao et al. 2023
5B-3	-	5BL	<i>S5B_679045775</i>	Ghimire et al. 2022
5B-3	Anahuac 75	5B	<i>AX-94814963</i>	Goddard et al. 2021
5B-3	-	5B	<i>Ra_c2216_1442</i>	Haile et al. 2023
5B-3	Yanzhan1	5B	<i>AX109538290-Vrn-B1_SNP</i>	Hu et al. 2023b
5B-3	-	5BL	<i>S5B_673624297</i>	Larkin et al. 2020
5B-3	Ben	5B	<i>Xwpt5928-Xwpt5604</i>	Pirseyedi et al. 2019
5B-3	-	5B	<i>BS00022433_51</i>	Semagn et al. 2023
5B-3	AC Barrie	5B	<i>BS00011514_51</i>	Thambugala et al. 2020

5B-3	AC Barrie	5B	<i>wsnp_RFL_Contig2809_2587619</i>	Thambugala et al. 2020
5B-3	Stettler	5BL	<i>IAAV7207-BS00065128_51</i>	Zhang et al. 2020
5D-1	-	5D	<i>BobWhite_c13030_406-BS00011794_51</i>	Hu et al. 2020
5D-1	-	5DL	<i>S5D_548345563</i>	Larkin et al. 2020
5D-1	-	5DL	<i>S5D_133059272</i>	Larkin et al. 2020
5D-1	-	5DS	<i>S5D_74734312</i>	Larkin et al. 2020
5D-1	-	5D	<i>Excalibur_c41710_417</i>	Semagn et al. 2023
5D-1	-	5D	<i>437287566</i>	Serajazari et al. 2023
5D-1	Jingzhou66	5DL	<i>AX-111212888-AX-109381281</i>	Xu et al. 2020
5D-1	Yangmai158	5D	<i>AX-109537966 ~ AX-111461988</i>	Yan et al. 2021
6A-1	-	6A	<i>Ra_c29107_289</i>	Haile et al. 2023
6A-1	-	6AS	<i>S6A_5113561</i>	Larkin et al. 2020
6A-2	-	6A	<i>BS00062823_51-Excalibur_c9210_168</i>	Nannuru et al. 2022
6A-2	Surpresa	6A	<i>S6A_24773746-S6A_573400299</i>	Poudel et al. 2022
6A-2	-	6A	<i>Excalibur_c18632_1700-RAC875_c26158_929</i>	Semagn et al. 2023
6A-2	-	6A	<i>581419619-615684688</i>	Serajazari et al. 2023
6A-3	AGS2060	6A	<i>wsnp_CAP11_c1137_6650-CAP11_c7092_120</i>	Castro Aviles et al. 2020
6A-3	-	6A	<i>AX.95140962-AX.94384372</i>	Nannuru et al. 2022
6A-3	Yangmai16	6AL	<i>AX-109545207-AX-110449763</i>	Zhu et al. 2021
6B-1	-	6B	<i>BS00080544_51</i>	Cabral et al. 2023
6B-1	-	6B	<i>BobWhite_c47347_420</i>	Cabral et al. 2023
6B-1	Glenn	6BS	<i>wpt-6522-wpt7935</i>	Eldoliefy et al. 2020
			<i>Excalibur_c30648_924, RAC875_c12259_1892,</i>	
		6B	<i>RAC875_c20634_100, Kukri_c3009_267,</i>	
6B-1	-		<i>Excalibur_c30648_868</i>	Haile et al. 2023
6B-1	-	6B	<i>Kukri_c21995_1652</i>	Haile et al. 2023
			<i>Tdurum_contig45714_427, RAC875_c34994_183,</i>	
6B-1	-	6B	<i>Kukri_c75566_265</i>	Haile et al. 2023
6B-1	Yangmai4	6B	<i>AX109034125-AX108894929</i>	Hu et al. 2023b
6B-1	-	6B	<i>653183156-715777049</i>	Serajazari et al. 2023
6B-1	AC Barrie	6B	<i>Tdurum_contig6121_947</i>	Thambugala et al. 2020
6B-2	-	6B	<i>BS00104265_51</i>	Cabral et al. 2023
6B-2	AGS2035	6B	<i>BS00029434_51-BobWhite_c344_125</i>	Castro Aviles et al. 2020
6B-2	-	6B	<i>AX.94416085-AX.95630592</i>	Nannuru et al. 2022
6B-2	Yangmai16	6BS	<i>AX-89672885-AX-110924249</i>	Zhu et al. 2021
6D-1	-	6D	<i>Excalibur_c36398_69-RAC875_c19250_188</i>	Semagn et al. 2023
7A-1	-	7A	<i>BS00014126_51</i>	Cabral et al. 2023
7A-1	AGS2035	7A	<i>IAAV822-Tdurum_contig42424_291</i>	Castro Aviles et al. 2020
7A-1	-	7AS	<i>S7A_42268660</i>	Ghimire et al. 2022
7A-1	-	7AS	<i>S7A_251753588</i>	Ghimire et al. 2022
7A-1	BRS 179	7A	<i>AX-94496922</i>	Goddard et al. 2021
7A-1	-	7A	<i>AX.94534717-AX.94488714</i>	Nannuru et al. 2022
7A-1	-	7A	<i>Tdurum_contig16632_288-wsnp_Ex_c24376_33618864</i>	Semagn et al. 2023

7A-1	-	7A	4802969-68086983	Serajazari et al. 2023
7A-1	Reeder	7A	BobWhite_rep_c49916_325	Thambugala et al. 2020
7A-1	Yangmai158	7AS	GBS2713-GBS1161	Zhang et al. 2021
7A-2	-	7A	Ex_c24796_2499	Cabral et al. 2023
7A-2	-	7A	7A_727710655	Gaire et al. 2021
7A-2	-	7AL	S7A_545054062	Ghimire et al. 2022
7A-2	-	7A	BobWhite_c22875_239	Hu et al. 2020
7A-2	-	7A	Tdurum_contig46334_832-AX-94841408	Nannuru et al. 2022
7A-2	G8.06	7A	8514068	Ollier et al. 2020
7A-2	Wheaton	7A	SNPs S7A_64598458-S7A_496824831	Poudel et al. 2022
7A-2	-	7A	116018884-116145808	Serajazari et al. 2023
7A-2	Mv Magvas	7A	Ra_c8394_1381-BobWhite_c30461_131	Varga-László et al. 2020
7A-2	-	7A	IWA3423-IWA1339	Wu et al. 2019
7A-3	DT696	7A	TA006231-0789/Kukri_c19696_60	Berraies et al. 2024
7A-3	-	7A	Tdurum_contig69067_405	Haile et al. 2023
7A-3	-	7A	643414194	Serajazari et al. 2023
7B-1	-	7BS	S7B_62687743	Ghimire et al. 2022
7B-1	Tunisian108	7B	Xgpw1054-Xwpt0884	Pirseyedi et al. 2019
7B-2	-	7B	tplb0060b03_1008	Cabral et al. 2023
7B-2	-	7B	wsnp_RFL_Contig2136_1423367	Cabral et al. 2023
7B-2	AGS2035	7B	Kukri_rep_c79716_729-Tdurum_contig47854_142	Castro Aviles et al. 2020
7B-2	-	7B	7B_723092825	Gaire et al. 2021
7B-2	-	7B	Kukri_c51101_351	Haile et al. 2023
7B-2	-	7B	Excalibur_c49736_1197,	Haile et al. 2023
7B-2	-	7BL	S7B_716844038	Larkin et al. 2020
7D-1	-	7D	72914267	Serajazari et al. 2023
7D-1	-	7DS	IWB15569	Zhu et al. 2020
7D-2	-	7D	7D_592498391	Gaire et al. 2021
7D-2	-	7D	530349625	Serajazari et al. 2023
7D-2	AC Barrie	7D	RAC875_c16367_81	Thambugala et al. 2020
7D-2	Zhengmai9023	7D	GBS979-GBS20328	Zhang et al. 2021
-	-	5R	Xiac129	Ollier et al. 2020
-	Glenn	5BL	wpt-5737-wpt5185	Eldoliefy et al. 2020
-	Glenn	7AS	wpt740561-wpt0002	Eldoliefy et al. 2020
-	Tunisian108	2B	Xwmc96-Xbarc353	Pirseyedi et al. 2019
-	Ben	7B	Xwpt7975-Xwpt5846	Pirseyedi et al. 2019
-	Redeemer	4A	1126538	Tamburic-Ilincic et al. 2019

参考文献

Berraies S, Cuthbert R, Knox R, et al. High-density genetic mapping of Fusarium head blight resistance and agronomic traits in spring wheat. *Front Plant Sci*, 2023, 14:1134132

Berraies S, Ruan Y, Knox R, et al. Genetic mapping of deoxynivalenol and fusarium damaged kernel resistance in an adapted durum wheat population. *BMC Plant Biol*, 2024, **24**:183

Cabral AL, Ruan Y, Cuthbert RD, et al. Multi-locus genome-wide association study of fusarium head blight in relation to days to anthesis and plant height in a spring wheat association panel. *Front Plant Sci*, 2023 **14**:1166282

Carpenter NR, Wright E, Malla S, et al. Identification and validation of Fusarium head blight resistance QTL in the U.S. soft red winter wheat cultivar 'Jamestown'. *Crop Sci*, 2020, **60**:2919-2930

Castro Aviles A, Alan Harrison S, Joseph Arceneaux K, et al. Identification of QTLs for resistance to Fusarium head blight using a doubled haploid population derived from Southeastern United States soft red winter wheat varieties AGS 2060 and AGS 2035. *Genes*, 2020, **11**:699

Chen S, Zhang Z, Sun Y, et al. Identification of quantitative trait loci for Fusarium head blight (FHB) resistance in the cross between wheat landrace N553 and elite cultivar Yangmai 13. *Mol Breed*, 2021, **41**:24

Clinesmith MA, Fritz AK, Lemes da Silva C, et al. QTL mapping of fusarium head blight resistance in winter wheat cultivars 'Art' and 'Everest', *Crop Sci*, 2019, **59**:911

Dhariwal R, Henriquez MA, Hiebert C, et al. Mapping of major Fusarium Head Blight resistance from Canadian wheat cv. AAC Tenacious. *Int J Mol sci*, 2020, **21**:4497

Eldoliefy E, Kumar A, Anderson JA, et al. Genetic dissection of Fusarium head blight resistance in spring wheat cv. 'Glenn'. *Euphytica*, 2020, **216**:1-12.

Gaire R, Brown-Guedira G, Dong Y, et al. Genome-wide association studies for Fusarium head blight resistance and its trade-off with grain yield in soft red winter wheat. *Plant Dis*, 2021, **105**:2435

Ghimire B, Mergoum M, Martinez-Espinoza AD, et al. Genetics of Fusarium head blight resistance in soft red winter wheat using a genome-wide association study. *Plant Genome*, 2022, **15**: e20222

Goddard R, Steed A, Scheeren P L, et al. Identification of Fusarium head blight resistance loci in two Brazilian wheat mapping populations[J]. *PLoS ONE*, 2021, **16**(3):e0248184.

Haile JK, Sertse D, N'Diaye A, et al. Multi locus genome-wide association studies reveal the genetic architecture of Fusarium head blight resistance in durum wheat. *Front Plant Sci*, 2023, **14**:1182548.

Hu W, Jiang W, Shou L, et al. Molecular mapping of QTL for type I Fusarium head blight resistance in two recombinant inbred lines wheat populations. *Crop Sci*, 2023, **63**:2393-2404.

Hu W, Gao D, Liao S, et al. Identification of a pleiotropic QTL cluster for Fusarium head blight resistance, spikelet compactness, grain number per spike and thousand-grain weight in common wheat. *Crop J*, 2023, **11**:672-677

Hu W, Gao D, Wu H, et al. Genome-wide association mapping revealed syntenic loci QFhb-4AL and QFhb-5DL for Fusarium head blight resistance in common wheat (*Triticum aestivum* L.). *BMC Plant Biol*, 2020, **20**:29

Hu W, Gao D, Zhang Y, et al. Mapping quantitative trait loci for Type II Fusarium head blight resistance in two wheat recombinant inbred line populations derived from Yangmai 4 and Yangmai 5. *Plant Dis*, 2023, **107**:422-430

Jiang P, Zhang X, Wu L, et al. A novel QTL on chromosome 5AL of Yangmai158 increases resistance to Fusarium head blight in wheat. *Plant Pathol*, 2020, 69:249-258

Larkin DL, Holder AL, Mason RE, et al. Genome-wide analysis and prediction of Fusarium head blight resistance in soft red winter wheat. *Crop Sci*, 2020, 2020:1-19.

Li H, Zhang F, Zhao J, et al. Identification of a novel major QTL from Chinese wheat cultivar Ji5265 for Fusarium head blight resistance in greenhouse. *Theor Appl Genet*, 2022, 135:1867-1877

Nannuru VKR, Windju SS, Belova T, et al. Genetic architecture of fusarium head blight disease resistance and associated traits in Nordic spring wheat. *Theor Appl Genet*, 2022, 135:2247-2263

Ollier M, Talle V, Brisset AL, et al. QTL mapping and successful introgression of the spring wheat-derived QTL Fhb1 for Fusarium head blight resistance in three European triticale populations. *Theor Appl Genet*, 2020, 133:457-477

Pirseyedi SM, Kumar A, Ghavami F, et al. Mapping QTL for Fusarium head blight resistance in a tunisian-derived durum wheat population. *Cereal Res Commun*, 2019, 47:78-87

Poudel B, Mullins J, Puri KD, et al. Molecular mapping of quantitative trait loci for Fusarium head blight resistance in the Brazilian Spring wheat cultivar “Surpresa”. *Front Plant Sci*, 2022, 12:778472

Ren H, Zhang X, Zhang Y, et al. Identification of two novel QTL for Fusarium head blight resistance in German wheat cultivar Centrum. *Plant Dis*, 2024, doi: 10.1094/PDIS-01-24-0135-RE

Semagn K, Henriquez MA, Iqbal M, et al. Identification of Fusarium head blight sources of resistance and associated QTLs in historical and modern Canadian spring wheat. *Front Plant Sci*, 2023, 14:1190358

Serajazari M, Torkamaneh D, Gordon E, et al. Identification of fusarium head blight resistance markers in a genome-wide association study of CIMMYT spring synthetic hexaploid derived wheat lines. *BMC Plant Biol*, 2023, 23:290

Tamburic-Ilincic L, Rosa SB. QTL mapping of Fusarium head blight and Septoria tritici blotch in an elite hard red winter wheat population, *Mol Breed*, 2019, 39:94

Thambugala D, Brûlé-Babel AL, Blackwell BA, et al. Genetic analyses of native Fusarium head blight resistance in two spring wheat populations identifies QTL near the B1, Ppd-D1, Rht-1, Vrn-1, Fhb1, Fhb2, and Fhb5 loci. *Theor Appl Genet*, 2020, 133:2775-2796

Varga-László E, Puskás K, Varga B, et al. Analysis of genetic factors defining head blight resistance in an Old Hungarian Wheat Variety-Based mapping population. *Agronomy*, 2020, 10:1128

Wu L, Zhang Y, He Y, et al. Genome-wide association mapping of resistance to Fusarium head blight spread and deoxynivalenol accumulation in Chinese elite wheat germplasm. *Phytopathology*, 2019, 109:1208-1216

Xu Y, Li Y, Bian R, et al. Genetic architecture of quantitative trait loci (QTL) for FHB resistance and agronomic traits in a hard winter wheat population. *Crop J*, 2023, 11:1836

Xu Q, Xu F, Qin D, et al. Molecular mapping of QTLs conferring Fusarium head blight resistance in Chinese wheat cultivar Jingzhou 66. *Plants (Basel)*, 2020, 9:1021

Yan H, Li G, Shi J, et al. Genetic control of Fusarium head blight resistance in two Yangmai 158-derived recombinant inbred line populations. *Theor Appl Genet*, 2021, 134:3037-3049

- Zhang P, Guo C, Liu Z, et al. Quantitative trait loci for Fusarium head blight resistance in wheat cultivars Yangmai 158 and Zhengmai 9023. *Crop J*, 2021, 9:143
- Zhang W, Boyle K, Brûlé-Babel AL, et al. Genetic characterization of multiple components contributing to fusarium head blight resistance of FL62R1, a Canadian bread wheat developed using systemic breeding. *Front Plant Sci*, 2020, 11:580833
- Zhao D, Hu W, Fang Z, et al. Two QTL regions for spike length showing pleiotropic effects on Fusarium head blight resistance and thousand-grain weight in bread wheat (*Triticum aestivum* L.). *Mol Breed*, 2023, 43:82
- Zhu Z, Xu X, Fu L, et al. Molecular mapping of quantitative trait loci for Fusarium head blight resistance in a doubled haploid population of Chinese bread wheat. *Plant Dis*, 2021, 105:1339–1345
- Zhu Z, Chen L, Zhang W, et al. Genome-wide association analysis of Fusarium head blight resistance in Chinese elite wheat lines. *Front Plant Sci*, 2020, 11:206