Supplementary Information for

Autoimmunity as a mechanism for hybrid necrosis, a genetic incompatibility syndrome in plants

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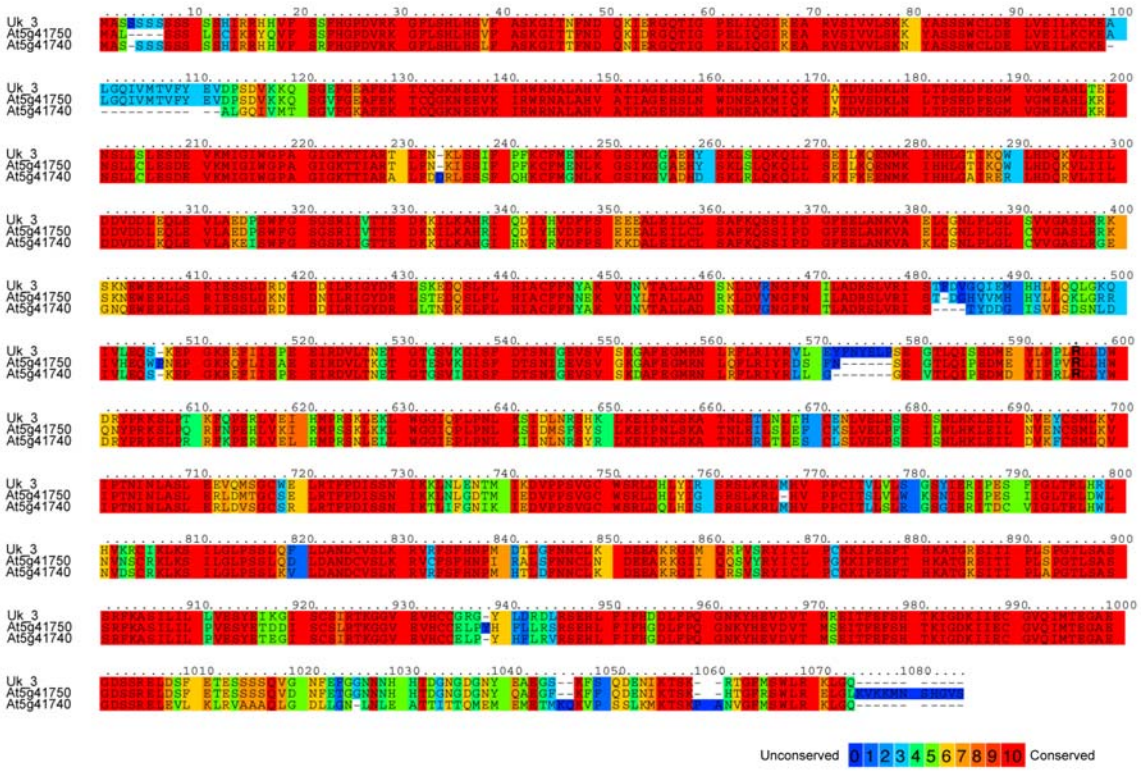

Figure S1 Alignment of Uk-3 *DM1* allele with Col-0 At5g41740 and At5g41750 color-coded for conservation.

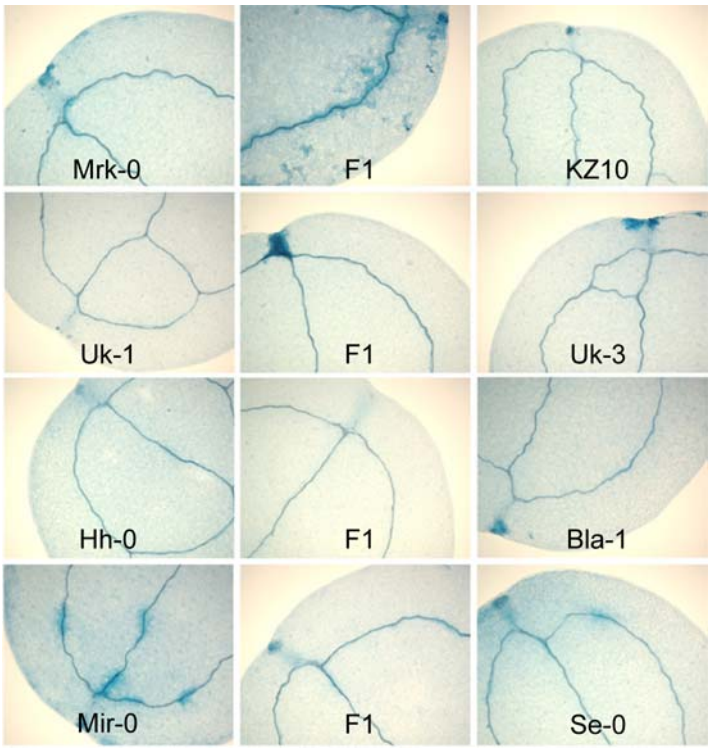

Figure S2 Trypan Blue staining of seedlings.

Untreated, ten day old seedlings of the indicated accessions were grown at 23°C and cotyledons were stained with Trypan Blue to visualize ectopic cell death.

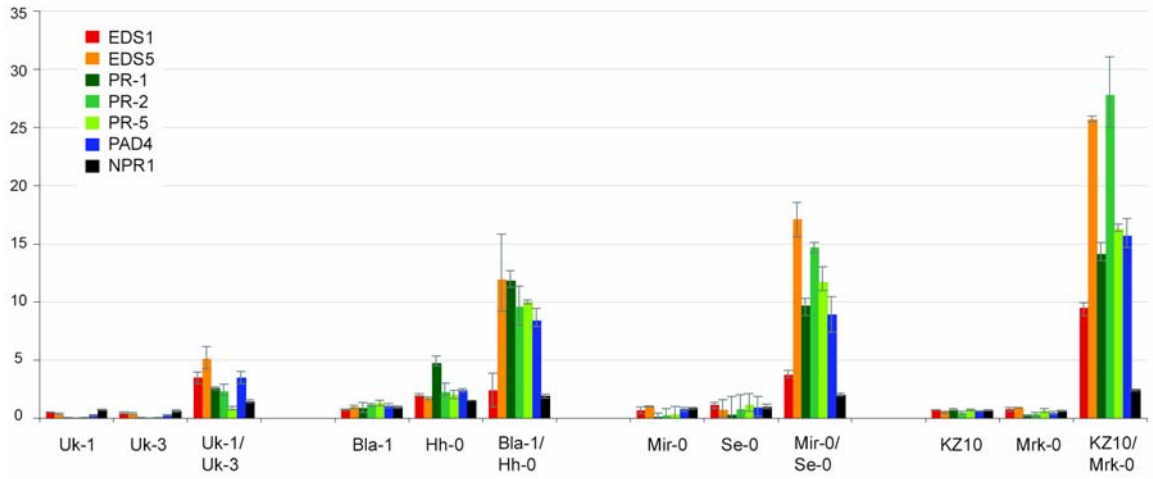

Figure S3 Expression on microarrays of common pathogen response marker genes. Normalized expression of several common pathogen response marker genes for each parent and hybrid combination analyzed.

Table S1A Significantly over-represented GO terms (among genes different in Uk-1/Uk-3 F_1 versus parents, but not between parents).

GO process	# genes Uk F_1 list	# in *At* genome	P-value
Systemic acquired resistance (SAR)	3	5	0.002
response to biotic stimulus	15	411	0.002
response to pathogen	8	131	0.003
response to other organism	9	182	0.004
response to pest, pathogen or parasite	8	147	0.005
response to stimulus	21	953	0.007
defense response	11	327	0.013
anthocyanin biosynthesis	2	5	0.016
protein targeting to vacuole	2	5	0.016
flavonoid biosynthesis	3	20	0.016
flavonoid metabolism	3	20	0.016
response to stress	12	420	0.016
defense response, response to pathogen, incompatible interaction	5	78	0.016
defense response to pathogen	5	85	0.022

Notes: Statistically significant over-representation of gene ontology (GO) term categories was calculated in GoStat (http://gostat.wehi.edu.au). P-values are Fisher's Exact test p-values corrected for multiple testing with Benjamini correction as implemented in GoStat. GO term annotation was based on the latest TAIR release (http://www.arabidopsis.org).

Table S1B Representation of gene categories in list of genes differentially regulated in at least one hybrid versus its parents.

Category	on array	in list	expected	fold-excess
Total	**22747**	**1080**		
chitinase	8	6	0.4	15.8
BON1/copine	10	4	0.5	8.4
trypsin inhibitor	10	3	0.5	6.3
tropinone reductase	14	4	0.7	6.0
harpin-induced family	15	4	0.7	5.6
glutamate receptor	19	5	0.9	5.5
WRKY transcription factor	62	16	2.9	5.4
glutathione S-transferase, putative	46	11	2.2	5.0
receptor-like kinase	20	4	0.9	4.2
MutT/nudix	21	4	1.0	4.0
heavy-metal associated	39	7	1.9	3.8
FAD binding domain	38	6	1.8	3.3
xyloglucan	32	5	1.5	3.3
flavin-containing monooxygenase family protein / FMO family protein	26	4	1.2	3.2
peroxidase	65	10	3.1	3.2
NAM	87	13	4.1	3.1
Oxidoreductase, 2OG-Fe(II) oxygenase family protein	60	8	2.8	2.8
pathogenesis-related	30	4	1.4	2.8
calcium/calmodulin	203	27	9.6	2.8
lipase	39	4	1.9	2.2
cytochrome P450	213	21	10.1	2.1
glycosyl hydrolase	176	17	8.4	2.0
S-locus protein kinase	32	3	1.5	2.0
disease resistance family	206	19	9.8	1.9
plant defensin	11	1	0.5	1.9

leucine-rich repeat	295	23	14.0	1.6
GDSL-motif lipase/hydrolase family protein	77	6	3.7	1.6
protein kinase	467	35	22.2	1.6
nodulin	69	5	3.3	1.5
heat shock	57	4	2.7	1.5
Senescence-associated (SAG)	43	3	2.0	1.5
glycoside hydrolase	46	3	2.2	1.4
LEA	36	2	1.7	1.2
glycine-rich protein	90	4	4.3	0.9
expressed protein	4256	172	202.1	0.9
AP2 domain	78	3	3.7	0.8
DEAD-box	54	2	2.6	0.8
zinc finger protein	547	20	26.0	0.8
bHLH	83	2	3.9	0.5
glycosyl transferase	104	2	4.9	0.4
DnaJ	96	1	4.6	0.2
transducin-related	109	1	5.2	0.2
F-box	321	2	15.2	0.1
ethylene-responsive	36	0	1.7	0.0
MADS	65	0	3.1	0.0
B3 family transcription factor	41	0	1.9	0.0

Note: The gene list consists of 1,080 genes (4.7% of genes on the microarray), which are differentially expressed in at least one of the four hybrids tested with respect to its parents.

Table S2 Accession numbers of lines used.

Name	NASC	ABRC
Aa-0	N935	
Ak-1	N939	
ANH1	N6607	
Ba-1	N952	
Bay-0		CS22676
Bch-3	N959	
Bch-4	N961	
Bd-0	N963	
Be-1	N967	
BG1	N22341	
BG2	N22342	
BG5	N22345	
BG7	N22347	
BG9	N22349	
Bl-1	N969	
Bla-1	N971	
Bla-11	N985	
Bla-12	N987	
Bla-14	N989	
Bla-2	N973	
Bla-3	N975	
Bla-4	N977	
Bla-5	N978	
Bla-6	N980	
Blh-1	N6645	
Blh-2	N6657	
Bor-4		CS22677
Br-0	N995	
Bs-1	N997	
Bs-2	N6628	
Bs-5	N1001	
Bsch-0	N1003	
Bsch-1		
Bsch-2	N1005	
Bu-0	N1007	
Bu-11	N1025	
Bu-13	N1027	
Bur-0	N1029	
C24		CS22680
Ca-0	N1061	
Cal-0	N1063	
Can-0	N1065	
Cen-0	N1067	
Cha-0	N1069	
Chi-0	N1073	
Chi-1	N1075	
Chi-2	N1077	
CIBC1	N22220	
CIBC10	N22229	
Cit-0	N1081	
Cnt-1	N6921	
Co-1	N1085	
Co-3	N1089	
Co-4	N1091	
Col-0	N1093	
CSHL1	N22419	
Ct-1	N1095	
Cvi-0		CS22682
Db-0	N1101	
Db-1	N1103	
Db-2	N6679	
Di-2	N1111	
Dr-0	N1115	
Dra-0	N1117	
Dra-1	N1119	
Edi-0	N1123	
Ei-2	N1125	
Ei-4	N1127	
Ei-5	N6691	
Ei-6	N1131	
Eil-0	N1133	
El-0	N1135	
Ema-1	N1681	
En-1	N1137	
En-2	N1139	
Enk-T	N6176	
Ep-0	N1141	
Er-0	N1143	
Est-0	N1149	
Est-1	N1151	
Estland	N6173	
Et-0	N1153	
Fe-1	N1155	
Fei-0		CS22684
Fi-0	N1157	
Fi-1	N1159	
FM11	N22392	
Fr-2	N1169	
Fr-3	N1171	
Fr-4	N1173	
Fr-5	N1175	
Fr-6	N1177	
Fr-7	N1179	
Ga-0	N1181	
Ga-2	N1183	

Gd-1	N1185	
Ge-1	N1189	
Ge-2	N1191	
Gie-0	N1193	
Gö-0	N1195	
Gö-2	N1197	
GOT1	N22277	
GOT10	N22286	
GOT7		CS22685
Gr-1	N1199	
Gr-2	N1201	
Gr-3	N1203	
Gr-5	N1207	
Gr-6	N6728	
Gre-0	N1211	
Gü-0	N1213	
Gü-1	N1215	
Gy-0	N1217	
Ha-0	N1219	
Hau-0	N1221	
Hh-0	N1225	
Hi-0	N1227	
Hl-0	N1229	
Hl-2	N1231	
Hl-3	N1233	
Hn-0	N1235	
Hodja-Obi	N6178	
HR14	N22213	
HR15	N22214	
HR5	N22205	
HR8	N22208	
Hs-0	N1237	
HS1	N22351	
In-0	N1239	
Is-0	N1241	
Is-1	N1243	
Je-0	N1247	
Jl-1	N1249	
Jl-2	N1251	
Jm-1	N1261	
Js-0	N1671	
Kb-0	N1269	
Kil-0	N1271	
Kin-0	N1273	
Kl-0	N1275	
Kl-1	N1277	
Kn-0	N1287	
KNO1	N22401	
Kondara	N6175	
Kro-0	N1301	

KZ10	N22442	
KZ11	N22443	
La-1	N1303	
Lan-0	N1305	
Le-0	N1309	
Ler-1	N6928	
4nLer	N3900	
Li-10	N6911	
Li-2	N6908	
Li2:1	N1315	
Lip-0	N1337	
Ll-0	N1339	
Ll-11	N1651	
Ll-2	N1343	
Lm-2	N1345	
Lö-1	N1347	
Lö-2	N1349	
Lov-5		CS22695
M7943S	N6186	
Ma-0	N1357	
Mc-0	N1363	
Me-0	N1365	
Mh-1	N1369	
Mir-0	N1379	
Mnz-0	N1371	
Mr-0	N1373	
Mrk-0	N1375	
Ms-0	N1377	
Mt-0	N1381	
Mv-0	N1387	
Mz-0	N1383	
Na-1	N1385	
Nc-1	N1389	
Nd-0	N1391	
Nd-1	N1680	
NFA8		CS22687
NFC10	N22191	
NFE1	N22163	
NFE10	N22172	
Nie-0	N1393	
Nok-0	N1399	
Nok-1	N1401	
Nok-2	N1403	
Nok-3	N1405	
Np-0	N1397	
Nw-0	N1409	
Nw-1	N1411	
Nw-2	N1413	
Nw-3	N1415	
Ob-0	N1419	

Ob-1	N1421	
Ob-2	N1423	
Ob-3	N1425	
Old-1	N1427	
Old-2	N1429	
Or-0	N1433	
Ost-0	N1431	
Ove-0	N1435	
Oy-1	N6929	
Pa-2	N1441	
Pa-3	N1443	
Per-2	N1449	
Per-3	N1451	
Pf-0	N1453	
Pi-0	N1455	
Pi-2	N1457	
Pla-0	N1459	
Pla-1	N1461	
Pla-2	N1463	
Po-1	N1473	
Pog-0	N1477	
Pr-0	N1475	
PUZ16	N22451	
Ra-0	N1481	
Rd-0	N1482	
REN11	N22263	
Ri-0	N1493	
RLD1	N913	
Rou-0	N1489	
RP1	N22362	
RP10	N22371	
RRS10		CS22689
RRS7		CS22688
Rsch-0	N1491	
Rsch-4	N1495	
Sav-0	N1515	
Se-0	N1503	
Sf-2	N1517	
Sg-1	N1519	
Sg-2	N1521	
Shahdara	N6180	CS22690
Shokei	N1676	
Sp-0	N1531	
SQ4	N22243	
St-0	N1535	
Ste-0	N1537	
Stw-0	N1539	
Su-0	N1541	
Ta-0	N1549	
Tamm-2		CS22691
Te-0	N1551	
Ts-1	N1553	
Ts-5	N6871	
Ts-6	N1561	
Ts-7	N1563	
Tsu-1		CS22693
Tu-1	N1569	
Ty-0	N1573	
Uk-1	N1575	
Uk-10	New collection	
Uk-11	New collection	
Uk-12	New collection	
Uk-13	New collection	
Uk-14	New collection	
Uk-2	N1579	
Uk-3	N1577	
Uk-4	N1581	
Uk-5	New collection	
Uk-6	New collection	
Uk-7	New collection	
Uk-8	New collection	
Uk-9	New collection	
Van-0	N1585	
Wa-1	N1587	
Wc-1	N1589	
Wc-2	N1591	
Wei-0	N6182	
Wei-1	N1683	
Wil-1	N1595	
Wil-3	N1599	
Wl-0	N1631	
Wt-1	N1605	
Wt-4	N1611	
Wt-5	N1613	
Yo-0	N1622	
Zü-0	N1627	

ABRC = Arabidopsis Biological Resources Center;

NASC = Nottingham Arabidopsis Stock Centre.

Table S3 Crosses performed and hybrid phenotypes.

Female	Male	F_1 phenotype	Comment
2n Ler	Blh-1	Normal	
4n Ler	Bla-5	Normal	
4n Ler	Wa-1	Normal	
Aa-0	Ga-0	Normal	
Aa-0	HR15	Normal	
Aa-0	Uk-1	Normal	
Ak-1	Uk-1	Normal	
Ak-1	Uk-3	Normal	
ANH1	Gr-1	Normal	
ANH1	Kro-0	Normal	
Ba-1	Chi-1	Normal	
Ba-1	Lov-5	Normal	
Ba-1	Shokei	Normal	
Bay-0	Br-0	Normal	
Bay-0	C24	Normal	
Bay-0	Col-0	Normal	
Bay-0	Fei-0	Normal	
Bay-0	Tamm2	Normal	
Bay-0	Ts-1	Normal	
Bch-3	BG9	Normal	
Bch-4	Ei-6	Normal	
Bch-4	Pr-0	Normal	
Bd-0	Ep-0	Normal	
Be-1	Bu-13	Normal	
Be-1	Di-2	Normal	
Be-1	Ga-2	Normal	
Be-1	Hi-0	Normal	
Be-1	Nie-0	Normal	
BG1	Rsch-0	Normal	
BG1	Uk-3	Normal	
BG2	BG7	Normal	
BG2	Bsch-0	Normal	
BG5	Kro-0	Normal	
BG5	Ra-0	Normal	
BG7	Po-1	Normal	
Bla-1	Bla-11	Normal	
Bla-1	Bla-12	Normal	
Bla-1	Bla14n	Normal	
Bla-1	Bla-2	Normal	
Bla-1	Bla-3	Normal	
Bla-1	Bla-4	Normal	
Bla-1	Bla-6	Normal	
Bla-1	**Hh-0**	**Class 2 necrosis**	
Bla-1	KZ10	Normal	
Bla-1	Mir-0	Normal	
Bla-1	Pla-0	Normal	
Bla-1	Pla-2	Normal	
Bla-1	Ts-5	Normal	
Bla-1	Ts-7	Normal	
Bla-1	Uk-1	Normal	
Bla-1	Uk-3	Normal	
Bla-1	**Sha.**	**Class 2 necrosis**	
Bla-11	Mir-0	Normal	
Bla-11	Se-0	Normal	
Bla-12	Bla-11	Normal	
Bla-12	Bla-14	Normal	
Bla-12	Bla-2	Normal	
Bla-12	Bla-3	Normal	
Bla-12	Hh-0	Normal	
Bla-12	Mir-0	Normal	
Bla-12	Se-0	Normal	
Bla-12	Sha.	Normal	
Bla-12	Ts-6	Normal	
Bla-14	Bla-11	Normal	
Bla-14	Bla-2	Normal	
Bla-14	Bla-3	Normal	
Bla-14	Bla-4	Normal	
Bla-14	Ll-0	Normal	
Bla-14	Mir-0	Normal	
Bla-14	Mt-0	Normal	
Bla-14	Pi-2	Normal	
Bla-14	Pla-0	Normal	
Bla-14	Se-0	Normal	
Bla-14	Sha.	Normal	
Bla-14	Ts-7	Normal	
Bla14n	Ep-0	Normal	
Bla14n	Est-0	Normal	
Bla14n	Ga-0	Normal	
Bla14p	Per-3	Normal	
Bla-2	Bla-11	Normal	
Bla-2	Bla-3	Normal	
Bla-2	Bla-6	Normal	
Bla-2	Ll-11	Normal	
Bla-2	Mir-0	Normal	
Bla-2	Se-0	Normal	
Bla-2	**Sha.**	**Class 2 necrosis**	
Bla-2	Ts-7	Normal	
Bla-2	Uk-1	Normal	
Bla-2	Uk-3	Normal	
Bla-3	Bla-11	Normal	
Bla-3	Bla-4	Normal	
Bla-3	Bla-6	Normal	
Bla-3	Hh-0	Normal	
Bla-3	Ll-11	Normal	

Bla-3	Mir-0	Normal	
Bla-3	Pla-0	Normal	
Bla-3	Pla-2	Normal	
Bla-3	**Se-0**	**Class 1 necrosis**	
Bla-3	Sha.	Normal	
Bla-3	Ts-5	Normal	
Bla-3	Ts-6	Normal	
Bla-3	Ts-7	Normal	
Bla-3	Uk-1	Normal	
Bla-3	Uk-3	Normal	
Bla-4	Bla-11	Normal	
Bla-4	Bla-12	Normal	
Bla-4	Bla-2	Normal	
Bla-4	Bla-6	Normal	
Bla-4	Hh-0	Normal	
Bla-4	**Ll-0**	**Class 1 necrosis Mild**	
Bla-4	Ll-11	Normal	
Bla-4	Mir-0	Normal	
Bla-4	Pla-1	Normal	
Bla-4	Pla-2	Normal	
Bla-4	Se-0	Normal	
Bla-4	Shah-dara	Normal	
Bla-5	4nLer	Normal	RC
Bla-5	Bla-14	HSL	Ploidy
Bla-5	Blh-1	HSL	Ploidy
Bla-5	**Hh-0**	**Class 2 necrosis (also ploidy)**	
Bla-5	Wa-1	Normal	
Bla-6	Bla-11	Normal	
Bla-6	Bla-12	Normal	
Bla-6	Bla-14	Normal	
Bla-6	Mir-0	Normal	
Bla-6	Se-0	Normal	
Bla-6	Ts-7	Normal	
Blh-1	2nLer	Normal	
Blh-1	Bla-5	HSL	Ploidy;RC
Blh-1	Hh-0	Normal	
Blh-1	Wa-1	HSL	Ploidy
Blh-2	Bla-5	HSL	Ploidy
Blh-2	Blh-1	Normal	
Bor-4	Bay-0	Normal	
Bor-4	Br-0	Normal	
Bor-4	C24	Normal	
Bor-4	Cvi-0	Normal	
Bor-4	Fei-0	Normal	
Bor-4	NFA8	Normal	
Br-0	C24	Normal	
Br-0	Col-0	Normal	
Br-0	Fei-0	Normal	
Br-0	St-0	Normal	
Br-0	Wil-3	Normal	
Bs-1	Bs-2	Normal	
Bs-1	Uk-1	Normal	
Bs-1	Uk-3	Normal	
Bs-2	Lö-2	Normal	
Bs-2	Uk-1	Normal	
Bs-2	Uk-3	Normal	
Bs-5	Bs-2	Normal	
Bs-5	Bs-2.2	Normal	
Bs-5	Kn-0	Normal	
Bs-5	Lö-1	Normal	
Bs-5	Lö-2	Normal	
Bs-5	Uk-1	Normal	
Bs-5	Uk-3	Normal	
Bsch-0	HR5	Normal	
Bsch-0	HR8	Normal	
Bsch-0	NFE10	Normal	
Bsch-1	GOT10	Normal	
Bu-0	Bsch-2	Normal	
Bu-0	NFE10	Normal	
Bu-11	Po-1	Normal	
Bur-0	Bay-0	Normal	
Bur-0	Br-0	Normal	
Bur-0	C24	Normal	
Bur-0	Col-0	Normal	
Bur-0	Est-1	Normal	
Bur-0	Lov-5	Normal	
Bur-0	Pf-0	Normal	
Bur-0	Ts-1	Normal	
Ca-0	Bu-11	Normal	
Cal-0	Bur-0	Normal	
Cal-0	Ei-5	Normal	
Cal-0	Lm-2	Normal	
Cal-0	Wil-1	Normal	
Can-0	Bla-1	Normal	
Can-0	Mt-0	Normal	
Can-0	St-0	Normal	
Cen-0	Dr-0	Normal	
Cen-0	Hl-2	Normal	
Cen-0	Ost-0	Normal	
Cen-0	Se-0	Normal	
Cha-0	Pla-0	Normal	
Cha-0	Se-0	Normal	
Chi-0	Ak-1	Normal	
Chi-0	Bla-1	Normal	
Chi-0	Uk-1	Normal	
Chi-0	Uk-3	Normal	
Chi-2	Chi-0	Normal	
Chi-2	KZ10	Normal	

CIBC1	Bu-11	Normal	
CIBC1	Chi-1	Normal	
CIBC10	Bl-1	Normal	
CIBC10	Hodja-Obi	Normal	
Cit-0	CIBC10	Normal	
Cit-0	Ei-6	Normal	
Cit-0	Gy-0	Normal	
Cnt-1	Gr-1	Normal	
Co-1	Co-3	Normal	
Co-1	Oy-1	Normal	
Co-3	Te-0	Normal	
Co-4	Co-3	Normal	
Co-4	Wil-1	Normal	
Col-0	Bla-5	HSL	Ploidy
Col-0	Blh-1	Normal	
Col-0	C24	Normal	
Col-0	Chi-2	Normal	
Col-0	Fei-0	Normal	
Col-0	GOT7	Normal	
Col-0	NFA8	Normal	
Col-0	Nie-0	Normal	
Col-0	Tamm2	Normal	
Col-0	Ts-1	Normal	
Ct-1	St-0	Normal	
Cvi-0	Bur-0	Normal	
Cvi-0	RRS7	Normal	
Cvi-0	Uk-1	Normal	
Cvi-0	Uk-3	Normal	
Db-1	Db-0	Normal	
Di-2	Ra-0	Normal	
Dra-1	Dra-0	Normal	
Edi-0	En-2	Normal	
Ei-2	Lm-2	Normal	
Ei-2	Na-1	Normal	
Ei-2	Ove-0	Normal	
Ei-4	CIBC1	Normal	
Ei-5	Ei-2	Normal	
Ei-5	Oy-1	Normal	
Eil-0	El-0	Normal	
El-0	Eil-0	Normal	RC
Ema-1	Estland	Normal	
En-1	Uk-3	Normal	
En-2	RLD1	Normal	
Er-0	Ang-1	Normal	
Er-0	Dra-1	Normal	
Est-0	Hau-0	Normal	
Est-0	Wa-1	HSL	Ploidy
Est-1	Br-0	Normal	
Est-1	Cvi-0	Normal	

Est-1	Est-0	Normal	
Est-1	Fei-0	Normal	
Est-1	Mt-0	Normal	
Est-1	RRS10	Normal	
Est-1	Ts-1	Normal	
Et-0	Bla-1	Normal	
Et-0	Fe-1	Normal	
Fe-1	Ge-2	Normal	
Fe-1	Uk-1	Normal	
Fe-1	Uk-3	Normal	
Fei-0	NFA8	Normal	
Fei-0	Ts-1	Normal	
Fi-0	Gr-3	Normal	
FM11	KZ10	Normal	
FM11	Pa-2	Normal	
Fr-3	Hodja-Obi	Normal	
Fr-4	Fr-2	Normal	
Fr-5	Fr-4	Normal	
Fr-6	RLD1	Normal	
Fr-6	Uk-1	Normal	
Fr-6	Uk-3	Normal	
Fr-7	ENK-T	Normal	
Fr-7	Uk-1	Normal	
Fr-7	Uk-3	Normal	
Gd-1	BG5	Normal	
Gd-1	Bu-13	Normal	
Gd-1	NFC10	Normal	
Gd-1	Ste-0	Normal	
Ge-1	Li-2:1	Normal	
Ge-2	Cha-0	Normal	
Gie-0	Fi-1	Normal	
Gö-0	Gö-2	Normal	
GOT1	Chi-2	Normal	
GOT1	Gr-2	Normal	
GOT1	Gy-0	Normal	
GOT1	Nok-3	Normal	
GOT7	Bur-0	Normal	
GOT7	C24	Normal	
GOT7	Cvi-0	Normal	
GOT7	Est-1	Normal	
GOT7	Sha.	Normal	
GOT7	Ts-1	Normal	
Gr-1	M7943S	Normal	
Gr-2	Can-0	Normal	
Gr-2	GOT1	Normal	RC
Gr-2	Gr-6	Normal	
Gr-2	In-0	Normal	
Gr-3	Fi-0	Normal	RC
Gr-3	Gr-5	Normal	

Gr-3	Gr-6	Normal	
Gr-3	Per-3	Normal	
Gr-6	Co-4	Normal	
Gr-6	Gr-3	Normal	RC
Gr-6	Hl-0	Normal	
Gr-6	Oy-1	Normal	
Gr-6	Rsch-4	Normal	
Gr-6	Wa-1	HSL	Ploidy
Gre-0	Bla-5	HSL	Ploidy
Gre-0	Chi-0	Normal	
Gü-0	Gü-1	Normal	
Ha-0	Db-2	Normal	
Hau-0	Est-0	Normal	RC
Hau-0	Sha.	Normal	
Hau-0	Wa-1	HSL	Ploidy
Hh-0	**Bla-1**	**Class 2 necrosis**; RC	
Hh-0	Bla-11	Normal	
Hh-0	Bla-14	Normal	
Hh-0	**Bla-2**	**Class 2 necrosis**	
Hh-0	Bla-6	Normal	
Hh-0	Col-0	Normal	
Hh-0	Mir-0	Normal	
Hh-0	Nc-1	Normal	
Hh-0	**Se-0**	**Class 1 necrosis**	
Hh-0	Ts-7	Normal	
Hh-0	Uk-1	Normal	
Hh-0	Uk-3	Normal	
Hi-0	Be-1	Normal	RC
Hi-0	Pr-0	Normal	
Hl-0	Bla-1	Normal	
Hl-0	Gie-0	Normal	
Hl-0	Pi-0	Normal	
Hl-2	Et-0	Normal	
Hl-2	Mt-0	Normal	
Hl-3	Sha.	Normal	
Hl-3	Wa-1	HSL	Ploidy
Hn-0	Bch-4	Normal	
Hn-0	Ra-0	Normal	
Hodja-Obi	Bu-13	Normal	
Hodja-Obi	Mz-0	Normal	
HR15	Aa-0	Normal	RC
HR15	Bs-1	Normal	
HR15	Gr-6	Normal	
HR15	Te-0	Normal	
HR5	Bu-13	Normal	
Hs-0	Hl-0	Normal	
Hs-1	ENK-T	Normal	
Hs-1	Mz-0	Normal	
Is-0	Is-1	Normal	

Is-1	Nd-0	Normal	
Je-0	Gie-0	Normal	
Je-0	Pa-3	Normal	
Jl-1	Eil-0	Normal	
Jl-1	Sha.	Normal	
Jl-1	Uk-1	Normal	
Jl-1	Uk-3	Normal	
Jl-2	Aa-0	Normal	
Jl-2	Jl-1	Normal	
Jl-2	Mt-0	Normal	
Jl-2	Uk-1	Normal	
Jl-2	Uk-3	Normal	
Js-0	Bu-13	Normal	
Kb-0	M7943S	Normal	
Kil-0	An-1	Normal	
Kl-0	Kl-1	Normal	
Kn-0	Uk-3	Normal	
KNO1	M7943S	Normal	
Kondara	NFE1	Normal	
Kondara	YGAP1	Normal	
Kro-0	Sf-2	Normal	
KZ10	Gie-0	Normal	
KZ10	Hh-0	Normal	
KZ10	Mir-0	Normal	
KZ10	**Mrk-0**	**Class 3 necrosis**	
KZ10	Uk-1	Normal	
KZ10	Uk-3	Normal	
KZ11	Ei-4	Normal	
KZ11	HR14	Normal	
KZ11	**Mrk-0**	**Class 3 necrosis**	
KZ11	NFC1	Normal	
KZ11	Ob-0	Normal	
KZ11	YGAP1	Normal	
La-1	ENK-T	Normal	
La-1	Fr-6	Normal	
La-1	YGAP1	Normal	
Lan-0	Ll-2	Normal	
Le-0	GOT1	Normal	
Le-0	Ll-0	Normal	
Le-0	Ost-0	Normal	
Le-0	Pf-0	Normal	
Ler-1	Br-0	Normal	
Ler-1	Fei-0	Normal	
Ler-1	Ts-1	Normal	
Ler-1	Van-0	Normal	
Li-10	Kin-0	Normal	
Li-2	Hodja-Obi	Normal	
Li-2	HR5	Normal	
Li-2:1	Bla-5	HSL	Ploidy

Li-2:1	Chi-2	Normal	
Li-2:1	Wa-1	HSL	Ploidy
Li-2:1	Wil-3	Normal	
Lip-0	Ei-6	Normal	
Lip-0	Kn-0	Normal	
Lip-0	Uk-1	Normal	
Lip-0	Uk-3	Normal	
Ll-0	Bla-1	Normal	
Ll-0	Bla-11	Normal	
Ll-0	Bla-12	Normal	
Ll-0	Bla-2	Normal	
Ll-0	Bla-3	Normal	
Ll-0	Bla-6	Normal	
Ll-0	Br-0	Normal	
Ll-0	Fr-2	Normal	
Ll-0	Hh-0	Normal	
Ll-0	Ll-11	Normal	
Ll-0	Ll-2	Normal	
Ll-0	Mir-0	Normal	
Ll-0	Se-0	Normal	
Ll-0	Ts-5	Normal	
Ll-0	Ts-7	Normal	
Ll-11	Bla-1	Normal	
Ll-11	Bla-11	Normal	
Ll-11	Bla-12	Normal	
Ll-11	Bla-14	Normal	
Ll-11	Bla-6	Normal	
Ll-11	Cha-0	Normal	
Ll-11	Hh-0	Normal	
Ll-11	Ll-0	Normal	RC
Ll-11	Mir-0	Normal	
Ll-11	Ove-0	Normal	
Ll-11	Ts-1	Normal	
Ll-11	**Ts-6**	**Class 2 necrosis (transient)**	
Ll-11	Ts-7	Normal	
Ll-2	Bla-1	Normal	
Ll-2	Bla-11	Normal	
Ll-2	Bla-12	Normal	
Ll-2	Bla-14	Normal	
Ll-2	Bla-2	Normal	
Ll-2	Bla-3	Normal	
Ll-2	Bla-4	Normal	
Ll-2	Bla-6	Normal	
Ll-2	Hh-0	Normal	
Ll-2	Ll-11	Normal	
Ll-2	Mir-0	Normal	
Ll-2	Se-0	Normal	
Ll-2	Ts-1	Normal	
Ll-2	Ts-5	Normal	

Ll-2	Ts-7	Normal	
Lm-2	Ei-2	Normal	RC
Lö-1	Bs-1	Normal	
Lö-1	Bs-2	Normal	
Lö-1	Ost-0	Normal	
Lö-1	Uk-1	Normal	
Lö-1	Uk-3	Normal	
Lö-1	Uk-4	Normal	
Lö-2	Bs-1	Normal	
Lö-2	Lö-1	Normal	
Lö-2	Shokei	Normal	
Lö-2	Uk-1	Normal	
Lö-2	Uk-3	Normal	
Lö-2	Yo-0	Normal	
Lov-5	Bay-0	Normal	
Lov-5	Col-0	Normal	
Lov-5	Est-1	Normal	
Lov-5	Fei-0	Normal	
Lov-5	GOT7	Normal	
Lov-5	Ts-1	Normal	
Ma-0	Jm-1	Normal	
Me-0	Hn-0	Normal	
Me-0	Kro-0	Normal	
Mh-1	M78845	Normal	
Mir-0	Hau-0	Normal	
Mir-0	**Se-0**	**Class 1 necrosis**	
Mir-0	Uk-3	Normal	
Mir-0	Wil-3	Normal	
Mnz-0	BG7	Normal	
Mnz-0	Hl-0	Normal	
Mrk-0	Bla-1	Normal	
Mrk-0	Bla-1	Normal	
Mrk-0	Co-4	Normal	
Mrk-0	Hh-0	Normal	
Mrk-0	**KZ10**	**Class 3 necrosis**; RC	
Mrk-0	Mir-0	Normal	
Mrk-0	Sha.	Normal	
Mrk-0	Uk-1	Normal	
Mrk-0	Uk-3	Normal	
Ms-0	Lm-2	Normal	
Ms-0	Pa-2	Normal	
Mt-0	Aa-0	Normal	
Mt-0	Jl-2	Normal	RC
Mt-0	Nw-2	Normal	
Mt-0	Pi-2	Normal	
Mt-0	Uk-1	Normal	
Mv-0	Br-0	Normal	
Mv-0	Uk-2	Normal	
Mz-0	BG5	Normal	
Mz-0	Bu-13	Normal	

Na-1	Hl-3	Normal	
Na-1	Ove-0	Normal	
Na-1	Uk-1	Normal	
Na-1	Uk-3	Normal	
Nd-0	Nd-1	Normal	
Nd-0	Uk-1	Normal	
NFA8	Br-0	Normal	
NFA8	Est-1	Normal	
NFA8	Ts-1	Normal	
NFA8	Van-0	Normal	
NFC1	Be-1	Normal	
NFC1	FM11	Normal	
NFC1	Hh-0	Normal	
NFC1	Np-0	Normal	
NFC10	Kb-0	Normal	
NFE10	Me-0	Normal	
Nie-0	BG5	Normal	
Nie-0	Cen-0	Normal	
Nie-0	Chi-2	Normal	
Nie-0	Fr-6	Normal	
Nie-0	HR5	Normal	
Nie-0	Li-10	Normal	
Nie-0	Sp-0	Normal	
Nok-0	Nok-1	Normal	
Nok-0	Uk-1	Normal	
Nok-0	Uk-3	Normal	
Nok-2	Nok-0	Normal	
Nok-2	Nok-1	Normal	
Nok-2	Nok-3	Normal	
Nok-2	Pla-0	Normal	
Nok-3	Nok-0	Normal	
Nok-3	Nok-1	Normal	
Nw-1	Nw-0	Normal	
Nw-1	Uk-1	Normal	
Nw-1	Uk-3	Normal	
Nw-2	Aa-0	Normal	
Nw-2	Jl-2	Normal	
Nw-2	Mt-0	Normal	RC
Nw-2	Nw-3	Normal	
Nw-2	Uk-1	Normal	
Nw-2	Uk-3	Normal	
Ob-0	BG5	Normal	
Ob-0	Chi-1	Normal	
Ob-0	Hodja-Obi	Normal	
Ob-1	En-1	Normal	
Ob-2	Ob-1	Normal	
Old-1	Fr-6	Normal	
Old-2	Db-2	Normal	
Or-0	Gy-0	Normal	

Ost-0	Chi-2	Normal	
Ost-0	Per-2	Normal	
Ove-0	Lm-2	Normal	
Oy-1	Nok-0	Normal	
Oy-1	Pla-2	Normal	
Oy-1	Uk-1	Normal	
Oy-1	Uk-3	Normal	
Pa-2	Pa-3	Normal	
Per-2	NFC1	Normal	
Per-2	Uk-1	Normal	
Per-3	Gr-3	Normal	RC
Per-3	Pi-2	Normal	
Per-3	Rd-0	Normal	
Pf-0	Uk-1	Normal	
Pf-0	Uk-3	Normal	
Pi-0	Bur-0	Normal	
Pla-0	Bla-1	Normal	RC
Pla-0	Bla-11	Normal	
Pla-0	Bla-12	Normal	
Pla-0	Bla-2	Normal	
Pla-0	Bla-4	Normal	
Pla-0	Bla-6	Normal	
Pla-0	Ge-2	Normal	
Pla-0	Hh-0	Normal	
Pla-0	Ll-0	Normal	
Pla-0	Ll-11	Normal	
Pla-0	Ll-2	Normal	
Pla-0	Mir-0	Normal	
Pla-0	Pla-1	Normal	
Pla-0	Se-0	Normal	
Pla-0	Sha.	Normal	
Pla-0	Ts-5	Normal	
Pla-0	Ts-6	Normal	
Pla-1	Bla-1	Normal	
Pla-1	Bla-11	Normal	
Pla-1	Bla-12	Normal	
Pla-1	Bla-14	Normal	
Pla-1	Bla-2	Normal	
Pla-1	**Bla-3**	**Class 1 necrosis**	
Pla-1	Bla-6	Normal	
Pla-1	**Hh-0**	**Class 1 necrosis**	
Pla-1	Ll-0	Normal	
Pla-1	Ll-11	Normal	
Pla-1	Ll-2	Normal	
Pla-1	**Mir-0**	**Class 1 necrosis**	
Pla-1	Pla-2	Normal	
Pla-1	Se-0	Normal	
Pla-1	Ts-7	Normal	
Pla-2	Bla-11	Normal	
Pla-2	Bla-12	Normal	

Pla-2	Bla-14	Normal	
Pla-2	Bla-2	Normal	
Pla-2	Bla-6	Normal	
Pla-2	Hh-0	Normal	
Pla-2	Ll-0	Normal	
Pla-2	Ll-11	Normal	
Pla-2	Ll-2	Normal	
Pla-2	Mir-0	Normal	
Pla-2	Pla-0	Normal	
Pla-2	Sha.	Normal	
Pla-2	Ts-7	Normal	
Po-1	Wei-0	Normal	
Pog-0	Uk-1	Normal	
Pog-0	Uk-3	Normal	
PUZ16	CSHL1	Normal	
PUZ16	Fr-2	Normal	
PUZ16	Pog-0	Normal	
Rd-0	Rou-0	Normal	
Rd-0	Uk-1	Normal	
REN11	**Wei-1**	**Class 3 necrosis**	
Ri-0	Rd-0	Normal	
RLD1	NFC10	Normal	
RLD2	Me-0	Normal	
Rou-0	Rd-0	Normal	RC
Rou-0	Wt-5	Normal	
RP1	Blh-2	Normal	
RP1	RP10	Normal	
RP-1	Mv-0	Normal	
RP10	Blh-1	Normal	
RP10	Fe-1	Normal	
RRS10	Bor-4	Normal	
RRS10	Br-0	Normal	
RRS10	Col-0	Normal	
RRS10	Fei-0	Normal	
RRS10	NFA8	Normal	
RRS10	RRS7	Normal	
RRS10	Ts-1	Normal	
RRS7	Bur-0	Normal	
RRS7	Bay-0	Normal	
RRS7	Col-0	Normal	
RRS7	Est-1	Normal	
RRS7	Tamm2	Normal	
Rsch-0	BG1	Normal	RC
Rsch-0	Pog-0	Normal	
Rsch-4	Wl-0	Normal	
Se-0	Bla-1	Normal	
Se-0	KZ10	Normal	
Se-0	**Mir-0**	**Class 1 necrosis**; RC	
Se-0	Mrk-0	Normal	
Se-0	Uk-3	Normal	

Sg-1	Bs-1	Normal	
Sg-1	Sg-2	Normal	
Sg-1	Uk-1	Normal	
Sg-1	Uk-3	Normal	
Sg-2	Lö-2	Normal	
Sg-2	Sg-1	Normal	
Sg-2	Uk-1	Normal	
Sg-2	Uk-3	Normal	
Sha.	**Bla-1**	**Class 2 necrosis**; RC	
Sha.	Bla-11	Normal	
Sha.	Bla-6	Normal	
Sha.	Br-0	Normal	
Sha.	C24	Normal	
Sha.	Col-0	Normal	
Sha.	Est-1	Normal	
Sha.	Fei-0	Normal	
Sha.	Hh-0	Normal	
Sha.	KZ10	Normal	
Sha.	**Ll-0**	**Class 2 necrosis; mild**	
Sha.	Ll-11	Normal	
Sha.	Ll-2	Normal	
Sha.	Lov-5	Normal	
Sha.	Mir-0	Normal	
Sha.	Pla-1	Normal	
Sha.	RRS7	Normal	
Sha.	Se-0	Normal	
Sha.	Ts-7	Normal	
Sha.	Uk-1	Normal	
Sha.	Uk-3	Normal	
Sha.	Hl-3	Normal	RC
Sha.	Kondara	Normal	
Sp-0	Gr-1	Normal	
Sp-0	Li-10	Normal	
SQ4	Uk-2	Normal	
Ste-0	Bu-0	Normal	
Ste-0	Sf-2	Normal	
Stw-0	Jl-1	Normal	
Su-0	Ak-1	Normal	
Su-0	Blh-1	Normal	
Su-0	Chi-0	Normal	
Su-0	Col-0	Normal	
Su-0	Hh-0	Normal	
Su-0	Tsu-1	Normal	
Ta-0	SQ4	Normal	
Tamm-2	Bor-4	Normal	
Tamm-2	Br-0	Normal	
Tamm-2	Cvi-0	Normal	
Tamm-2	Est-1	Normal	
Tamm-2	Fei-0	Normal	

Tamm-2	Lov-5	Normal	
Tamm-2	RRS10	Normal	
Tamm-2	Ts-1	Normal	
Te-0	Bla-1	Normal	
Te-0	Je-0	Normal	
Te-0	Pf-0	Normal	
Te-0	Uk-1	Normal	
Te-0	Uk-3	Normal	
Te-0	Wil-1	Normal	
Ts-1	Bla-1	Normal	
Ts-1	Bla-11	Normal	
Ts-1	Bla-12	Normal	
Ts-1	Bla-14	Normal	
Ts-1	Bla-2	Normal	
Ts-1	Bla-3	Normal	
Ts-1	Bla-4	Normal	
Ts-1	Bla-6	Normal	
Ts-1	Cvi-0	Normal	
Ts-1	Hh-0	Normal	
Ts-1	Ll-0	Normal	
Ts-1	Mir-0	Normal	
Ts-1	Pla-0	Normal	
Ts-1	Pla-1	Normal	
Ts-1	Pla-2	Normal	
Ts-1	Se-0	Normal	
Ts-1	**Sha.**	**Class 2 necrosis (transient); RC**	
Ts-1	Ts-7	Normal	
Ts-1	Uk-1	Normal	
Ts-1	Uk-3	Normal	
Ts-5	Bla-11	Normal	
Ts-5	Bla-12	Normal	
Ts-5	Bla-14	Normal	
Ts-5	Bla-2	Normal	
Ts-5	Bla-4	Normal	
Ts-5	Bla-6	Normal	
Ts-5	Hh-0	Normal	
Ts-5	Ll-0	Normal	RC
Ts-5	Ll-11	Normal	
Ts-5	Mir-0	Normal	
Ts-5	Pla-1	Normal	
Ts-5	Pla-2	Normal	
Ts-5	Se-0	Normal	
Ts-5	Sha.	Normal	
Ts-5	Ts-1	Normal	
Ts-5	Ts-6	Normal	
Ts-5	Ts-7	Normal	
Ts-5	Uk-1	Normal	
Ts-6	Bla-1	Normal	
Ts-6	Bla-11	Normal	
Ts-6	Bla-12	Normal	RC
Ts-6	Bla-14	Normal	
Ts-6	Bla-2	Normal	
Ts-6	Bla-4	Normal	
Ts-6	Bla-6	Normal	
Ts-6	Hh-0	Normal	
Ts-6	Ll-0	Normal	
Ts-6	Ll-2	Normal	
Ts-6	Mir-0	Normal	
Ts-6	Pla-1	Normal	
Ts-6	Pla-2	Normal	
Ts-6	Se-0	Normal	
Ts-6	Sha.	Normal	
Ts-6	Ts-1	Normal	
Ts-6	Ts-7	Normal	
Ts-6	Uk-1	Normal	
Ts-6	Uk-3	Normal	
Ts-7	Bla-1	Normal	RC
Ts-7	Bla-12	Normal	
Ts-7	Bla-4	Normal	
Ts-7	Hh-0	Normal	RC
Ts-7	Mir-0	Normal	
Ts-7	Nw-1	Normal	
Ts-7	Pa-3	Normal	
Ts-7	Pla-0	Normal	
Ts-7	Se-0	Normal	
Tsu-1	Bay-0	Normal	
Tsu-1	C24	Normal	
Tsu-1	Col-0	Normal	
Tsu-1	Est-1	Normal	
Tsu-1	RRS10	Normal	
Tsu-1	Tamm2	Normal	
Tu-1	Pa-3	Normal	
Tu-1	Ts-7	Normal	
Ty-0	Mc-0	Normal	
Ty-0	NFC1	Normal	
Ty-0	Tsu-1	Normal	
Uk-1	Bd-0	Normal	
Uk-1	BG1	Normal	
Uk-1	Col-0	Normal	
Uk-1	En-1	Normal	
Uk-1	Er-0	Normal	
Uk-1	Kn-0	Normal	
Uk-1	Mir-0	Normal	
Uk-1	**Nc-1**	**Class 3 necrosis**	
Uk-1	Np-0	Normal	
Uk-1	Se-0	Normal	
Uk-1	Uk-10	Normal	
Uk-1	Uk-11	Normal	
Uk-1	Uk-12	Normal	

Uk-1	Uk-13	Normal	
Uk-1	Uk-2	Normal	
Uk-1	**Uk-3**	**Class 3 necrosis**	
Uk-1	Uk-5	Normal	
Uk-1	Uk-7	Normal	
Uk-1	Uk-8	Normal	
Uk-1	Uk-9	Normal	
Uk-1	Wt-4	Normal	
Uk-10	Uk-11	Normal	
Uk-10	Uk-9	Normal	
Uk-11	Uk-12	Normal	
Uk-11	Uk-14	Normal	
Uk-11	Uk-5	Normal	
Uk-11	Uk-7	Normal	
Uk-11	Uk-9	Normal	
Uk-13	Uk-10	Normal	
Uk-13	Uk-11	Normal	
Uk-13	Uk-12	Normal	
Uk-13	Uk-7	Normal	
Uk-14	Uk-1	Normal	
Uk-14	Uk-10	Normal	
Uk-14	Uk-12	Normal	
Uk-14	Uk-13	Normal	
Uk-14	Uk-7	Normal	
Uk-3	Aa-0	Normal	
Uk-3	Bd-0	Normal	
Uk-3	Col-0	Normal	
Uk-3	Er-0	Normal	
Uk-3	Mt-0	Normal	
Uk-3	Nc-1	Normal	
Uk-3	Np-0	Normal	
Uk-3	**Uk-1**	**Class 3 necrosis**; RC	
Uk-3	Uk-10	Normal	
Uk-3	Uk-11	Normal	
Uk-3	Uk-12	Normal	
Uk-3	Uk-13	Normal	
Uk-3	Uk-14	Normal	
Uk-3	Uk-2	Normal	
Uk-3	Uk-5	Normal	
Uk-3	Uk-6	Normal	
Uk-3	Uk-7	Normal	
Uk-3	Uk-8	Normal	
Uk-3	Uk-9	Normal	
Uk-3	Wt-4	Normal	
Uk-4	Pa-3	Normal	
Uk-4	Uk-1	Normal	
Uk-4	Uk-3	Normal	
Uk-5	Uk-10	Normal	
Uk-5	Uk-12	Normal	
Uk-5	Uk-13	Normal	

Uk-5	Uk-14	Normal	
Uk-5	Uk-6	Normal	
Uk-5	Uk-9	Normal	
Uk-6	**Uk-1**	**Class 3 necrosis**	
Uk-6	Uk-10	Normal	
Uk-6	Uk-11	Normal	
Uk-6	Uk-12	Normal	
Uk-6	Uk-13	Normal	
Uk-6	Uk-14	Normal	
Uk-6	Uk-7	Normal	
Uk-6	Uk-8	Normal	
Uk-6	Uk-9	Normal	
Uk-7	Uk-10	Normal	
Uk-7	Uk-12	Normal	
Uk-7	Uk-5	Normal	
Uk-7	Uk-8	Normal	
Uk-7	Uk-9	Normal	
Uk-8	Uk-10	Normal	
Uk-8	Uk-11	Normal	
Uk-8	Uk-12	Normal	
Uk-8	Uk-13	Normal	
Uk-8	Uk-14	Normal	
Uk-8	Uk-5	Normal	
Uk-8	Uk-9	Normal	
Uk-9	Uk-12	Normal	
Uk-9	Uk-13	Normal	
Uk-9	Uk-14	Normal	
Van-0	Bay-0	Normal	
Van-0	Bor-4	Normal	
Van-0	Br-0	Normal	
Van-0	C24	Normal	
Van-0	Fei-0	Normal	
Van-0	Ts-1	Normal	
Wa-1	4nLer	Normal	
Wa-1	Bla-5	Normal	
Wa-1	Blh-1	HSL	Ploidy
Wa-1	Ob-3	HSL	Ploidy
Wc-2	Tu-1	Normal	
Wc-2	Wc-1	Normal	
Wei-0	Be-1	Normal	
Wei-1	**REN11**	**Class 3 necrosis**; RC	
Wil-1	Mir-0	Normal	
Wil-1	Pla-0	Normal	
Wil-1	Wil-3	Normal	
Wil-3	Br-0	Normal	RC
Wil-3	Col-0	Normal	
Wl-0	Bur-0	Normal	
Wt-1	Wt-4	Normal	RC
Wt-4	Gr-3	Normal	
Wt-4	Per-3	Normal	

Wt-4	Wt-1	Normal	
Wt-5	Rou-0	Normal	RC
Yo-0	Ba-1	Normal	
Yo-0	Mr-0	Normal	
Zü-0	Li-2	Normal	
Zü-0	Sav-0	Normal	
Zü-1	Be-1	Normal	

Sha. = Shahdara

RC = Reciprocal cross;

HSL = high seed lethality;

Ploidy = Ploidy difference between parents.

Table S4 Intercrossability of parents of several incompatibilities.

	Uk-1	Uk-3	Mir-0	Se-0	Bla-1	Hh-0	Shahdara	KZ10	Mrk-0
Uk-1		I (III)	C	C	C	C	C	C	C
Uk-3			C	C	C	C	C	C	C
Mir-0				I (I)	C	C	C	C	C
Se-0					C	I (I)	C	C	C
Bla-1						I (II)	I (II)	C	C
Hh-0							C	C	C
Shahdara								C	C
KZ10									I (III)
Mrk-0									

C = compatible, I = incompatible ("class" in parentheses).

Table S5 *H. parasitica* resistance of hybrids and parents.

	Cala2	**Emco5**	**Noco2**	**Emwa1**
Uk-1	R	S	nd	nd
Uk-3	R	S	nd	nd
Uk-1/Uk-3	nd	R	nd	nd
Bla-1	R	R	R	S
Hh-0	R	R	R	S
Bla-1/Hh-0	nd	nd	nd	S
Mrk-0	S	S	nd	nd
KZ10	S	R	nd	nd
Mrk-0/KZ10	R	nd	nd	nd
Se-0	S	R	S[1]	S
Mir-0	R	R	S[1]	R
Se-0/Mir-0	nd	nd	R	nd

[1]weak sporulator (approx. 2 sporangiophores/cotyledon)