

File S7. Supplemental Tables and Figures

Table S1. Sources for historical data

Agrico_Research	https://www.europotato.org/
Agrico_Research_website	https://www.agricopotatoes.com/overview
Agroplant	https://www.agroplant.nl/en/varieties/
AHDB	https://potatoes.agricrops.org/
Allotment_&_Gardens	https://www.allotment-garden.org/vegetable/potatoes/potato-scab-common/
Averis_2019-23	https://www.averis.nl/friksbeheer/wp-content/uploads/2019/05/Averis-lijst-zetmeelaardappelen-voorjaar-2019.pdf https://www.averis.nl/friksbeheer/wp-content/uploads/2020/05/Formulier-Averis-lijst-zetmeelaardappelen-2020.pdf https://www.averis.nl/friksbeheer/wp-content/uploads/2021/02/Averis-lijst-zetmeelaardappelen-2021.pdf https://www.averis.nl/friksbeheer/wp-content/uploads/2022/02/Averis-lijst-zetmeelaardappelen-2022.pdf https://www.averis.nl/friksbeheer/wp-content/uploads/2023/03/Averis-lijst-zetmeelaardappelen-2023.pdf
Bavaria_Saat	https://bavaria-saat.de/kartoffelsorten/?lang=en ; https://bavaria-saat.de/kartoffelsorten/
Beschrijvende_Rassenlijst	Germinate website_Beschrijvende Rassenlijst (unknown year)
Binst	https://www.binst.be/en/varieties
Canadian	https://inspection.canada.ca/plant-health/potatoes/potato-varieties/eng/1299172436155/1299172577580
Cebeco_Seed_Innovations	https://www.europotato.org/
Danespo	https://www.danespo.com/english/varieties/varieties/all-varieties
De_Ninjs_potatoes	https://denijspotatoes.com/pootaardappelen/
Den_Hartigh_BV_website	https://www.europotato.org/
Dick_Bedlington_Farms	https://bedlingtonfarms.com/varieties/
Eurogrow	https://www.eurogrow.co.nz/varieties
Europlant	https://www.europlant.biz/en/list-of-varieties/
Fobek_BV	https://www.europotato.org/

Geniteurslijst_1954-85	https://edepot.wur.nl/338199 https://edepot.wur.nl/338200 https://edepot.wur.nl/338201 Physical booklet WUR library
Germicopa_netted_scab	https://www.germicopa.com/en/
Germicopa_pitted_scab	https://www.germicopa.com/en/
Gopex_netted_scab	https://www.gopex-seedpotatoes.com/en/our-potato-varieties/
Gopex_pitted_scab	https://www.gopex-seedpotatoes.com/en/our-potato-varieties/
GRIN_Czech	https://grinczech.vurv.cz/gringlobal/search.aspx
Henry_Doubleday_(HDRA)	https://www.europotato.org/
HZPC_Holland	https://www.europotato.org/
HZPC_Holland_website	https://www.hzpc.com/our-potato-varieties
IHAR	https://www.europotato.org/
INRA	https://www.europotato.org/
Interseed_Potatoes_Website	https://www.interseed.de/en/our-varieties
IPK	https://www.europotato.org/
IPM	https://ipmpotato.com/nl/varieties/?project_id=1&orderby_1=name&order_1=ASC&paged_1=1
Kweekinstituut_Karna	https://www.europotato.org/
Meijer_Potato	https://www.europotato.org/
Meijer_Potato_website	https://www.meijerpotato.com/en/varieties/
MIM	http://www.mimbg.com/en/kartofi/#3
Vavilov_All-Russian	https://www.europotato.org/
Nederlandse_catalogus_1994	https://www.europotato.org/
NEIKER	https://library.wur.nl/WebQuery/edepot/466400
NIVAP	https://www.europotato.org/
Nordic_Genetic_Resource	https://www.europotato.org/
North_American	https://cucurbitbreeding.wordpress.ncsu.edu/2016/06/03/potato/
Parkland	https://www.agricopotatoes.com/en-ca
Potato_Research_Institute	https://www.europotato.org/

SASA	https://www.europotato.org/
Semagri	https://www.semagri.nl/starch-varieties/
Semena	http://semenaopt.com/en/Potato/Amadeus/600742/
Solana	https://www.solana.de/list-of-varieties.html?filter=
Stet_2022-23	https://holland.stet-potato.com/en/ https://holland.stet-potato.com/en/
The_french_seed_potato	https://www.plantdepommedeterre.org/en/la-base-des-varietes-en/
The_potato_company	https://www.tpc.nl/en/varieties/
University_of_Pannonia	https://www.europotato.org/

Table S2. Scoring scale of the sources with quantitative data.

Source	Qualitative scale ^a	Quantitative scale
AHDB	Very low resistance	1
		2
		3
		4
		5
		6
		7
		8
	Very high resistant	9
Beschrijvende Rassenlijst	Very susceptible	3
		4
		5
		6
		7
		8
	Very good resistance	9
Den Hartigh BV website	Susceptible	4.7
		6.7
	Strong resistance	6.9
Geniteurslijst 1954-1985 and Nederlandse catalogus 1994	Very susceptible	3
		4
	Somewhat or quite	5
	Moderate	6
	Somewhat	7
	Mild	8
	Very little susceptible	9
Agrico Research website	Very susceptible	2 to 4.5
	Susceptible	5 to 5.5

	Slightly susceptible	6 to 7.5
	Slightly to not susceptible	8 to 9
Meijer Potato website	Very susceptible	1
		2
		3
		4
		5
		6
		7
		8
	Highly resistant	9
Agroplant	Very susceptible	3
		4
		5
		6
		7
		8
	Very resistance	9
MIM	Susceptible	5
	Slightly susceptible	5.5
	Slightly susceptible	6
	Slightly susceptible	6.5
	Resistant	7
Nederlands Potato Consultative Foundation (NIVAP) 2007 and 2011	Very susceptible	3
	Susceptible	4
	Fairly susceptible	5
	Moderately resistant	6
	Fairly good resistance	7
	Good resistance	8
	Very good resistance	9
	Resistant	r

De Ninjs potatoes	Susceptible	4.5
	Susceptible	5
	Slightly susceptible	5.5
	Slightly susceptible	6
	Slightly susceptible	6.5
	Resistant	7
IPM	Very low resistance	1
		2
		3
		4
		5
		6
		7
		8
	Very high resistant	9
The potato company	Susceptible	5
	Slightly susceptible	5.5
	Slightly susceptible	6
	Slightly susceptible	6.5
	Resistant	7
	Resistant	7.5
	Very resistant	8
Semagri	Susceptible	4
	Moderately susceptible	5
	Slightly susceptible	6
	Low susceptibility	7
	Very low susceptibility	8
	Not susceptible / resistant	9
	Relative susceptibility	RV

^a The qualitative scale is defined by the source to clarify the direction of resistance represented on the quantitative scale.

Table S3. Scoring scale transformation of the sources with qualitative data.

Source	Qualitative scale	Transformed scale
Eurogrow	Susceptible	4
	Moderate susceptibility	5
	Average resistance	
	Low to medium resistance	
	Medium resistance	6
	Moderate resistance	
	Medium to high resistance	6 to 7
	High resistance	7
	Slightly susceptible	
	Good resistance	
	Good tolerance	
	Strong resistance	8
Semena	Highly susceptible	1 to 2
	Strongly susceptible	
	Susceptible	3
	Above average susceptibility	3 to 4
	Average susceptible	4
	Moderately susceptible	
	Medium susceptible	4 to 5
	Average resistance	5
	Above average resistance	5 to 6
	Relatively resistant	6
	Fairly resistant	
	Increased resistance	
	Resistant	7

	Very resistant	8 to 9
	Highly resistant	
GRIN Czech	Very low resistance	1
	Very low to low	2
	Low	3
	Low to medium	4
	Medium	5
	Medium to high	6
	High	7
	High to very high	8
	Very high resistant	9
Europlant	High sensitivity	3
	Medium - high sensitivity	4
	Medium sensitivity	5
	Low - medium sensitivity	6
	Low sensitivity	7
	Very low - low sensitivity	8 to 9
Stet 2022-2023	Very susceptible	1 to 3
	Susceptible	4
	Slightly susceptible	7
	Resistant	
Dick Bedlington Farms	Susceptible	3
	Resistant	7
	Good resistance	
	High resistance	8
	High tolerance	
Interseed Potatoes website	High tolerance	7
	Low susceptibility	
	High resistance	
	High	

Allotment & Gardens	Very susceptible	3
	Resistant	7
Averis 2019-2023	very bad (---)	1 to 2
	bad (--)	3
	quite bad (-)	4
	Average (+/-)	5
	quite good (+)	6
	good (++)	7
	very good (+++)	8 to 9
Binst	Very susceptible	1 to 3
	Medium resistant	6
	Slightly susceptible	7
	Very resistant	8 to 9
Germicopa and Gopex	Low	3
	Fairly low	4
	Moderate	5
	Fairly high	6
	High	7
	Very high	8
	Exceptional	9
Parkland	Sensitive	4
	Moderate resistance	5
	Slightly resistant	
	Quite resistant	6
	Good resistance	7
	Slightly susceptible	
	Somewhat susceptible	
	Very good resistance	8
The french seed potato	Very susceptible	1 to 2
	Susceptible	3
	Fairly susceptible	4

	Average susceptibility	5
	Moderately susceptible	
	Fairly resistant	6
	Fairly low susceptible	7
	Slightly susceptible	
	Rather slightly susceptible	
	Fairly slight susceptible	
	Low susceptible	8 to 9
Canadian	Highly susceptible	1 to 3
	Susceptible	4
	Moderately susceptible	5
	Some resistance	5 to 6
	Moderately resistant / Moderate resistance	6
	Good resistance	7
	Very resistant / Highly resistant / Extremely resistant	8 to 9
Danespo	Low resistance	1 to 3
	Rather susceptible	
	Average susceptibility	
	Susceptible	4
	Average resistance	5
	Medium resistance	6
	Good resistance	7
	Rather good	7 to 8
	Very good resistance	8
	High resistance	9
Bavaria Saat	Medium	5
	Medium to high	6
	High	7

	Very high resistant	9
Solana	Low, Medium	4
	Medium	5
	Medium, High	6
	High	7
	High, Very high	8
	Very high	9
North American	Moderate resistance	6
	Resistant	7
	Tolerant	
Europotato.org sources: SASA, IPK, N.I. Vavilov All-Russian Scientific Research, University of Pannonia, NEIKER, Agrico Research, Meijer Potato, HZPC Holland, Kweekinstituut Karna, IHAR, INRA, NIVAP, Cebeco Seed Innovations Ltd, Fobek BV, Henry Doubleday Research Association (HDRA), Nordic Genetic Resource Center	Very low resistance	1
	Very low to low	2
	Low	3
	Low to medium	4
	Medium	5
	Medium to high	6
	High	7
	High to very high	8
	Very high resistant	9
HZPC Holland website	10%	1
	20%	2
	30%	3
	40%	4
	50%	5
	60%	6
	70%	7
	80%	8
	90%	9

Table S4. Coefficient of variation (CV) of each source.

Source	CV
NEIKER	0.22
Germicopa_netted_scab	0.18
Danespo	0.18
Potato_Research_Institute	0.17
Nordic_Genetic_Resource_Center	0.16
University_of_Pannonia	0.15
Semena	0.15
SASA	0.15
Vavilov_All-Russian	0.15
The_french_seed_potato	0.15
Germicopa_pitted_scab	0.15
INRA	0.14
IPK	0.14
Allotment_&_Gardens	0.14
AHDB	0.14
Henry_Doubleday_(HDRA)	0.14
Binst	0.13
GRIN_Czech	0.13
Agrico_Research	0.13
IHAR	0.13
Stet_2022-23	0.13
Canadian	0.12
Europlant	0.11
Parkland	0.11
Semagri	0.11
Dick_Bedlington_Farms	0.11
Kweekinstituut_Karna	0.11

Gopex_pitted_scab	0.10
Solana	0.10
Geniteurslijst_1954-85	0.10
Eurogrow	0.10
Bavaria_Saat	0.10
HZPC_Holland	0.10
Averis_2019-23	0.10
IPM	0.09
Meijer_Potato	0.09
NIVAP	0.09
Agroplant	0.09
Den_Hartigh_BV_website	0.08
Agrico_Research_website	0.08
De_Ninjs_potatoes	0.08
North_American	0.07
Meijer_Potato_website	0.07
HZPC_Holland_website	0.07
Gopex_netted_scab	0.07
Beschrijvende_Rassenlijst	0.07
Nederlandse_catalogus_1994	0.07
MIM	0.06
Cebeco_Seed_Innovations	0.06
Interseed_Potatoes_Website	0.06
The_potato_company	0.05
Fobek_BV	0.04

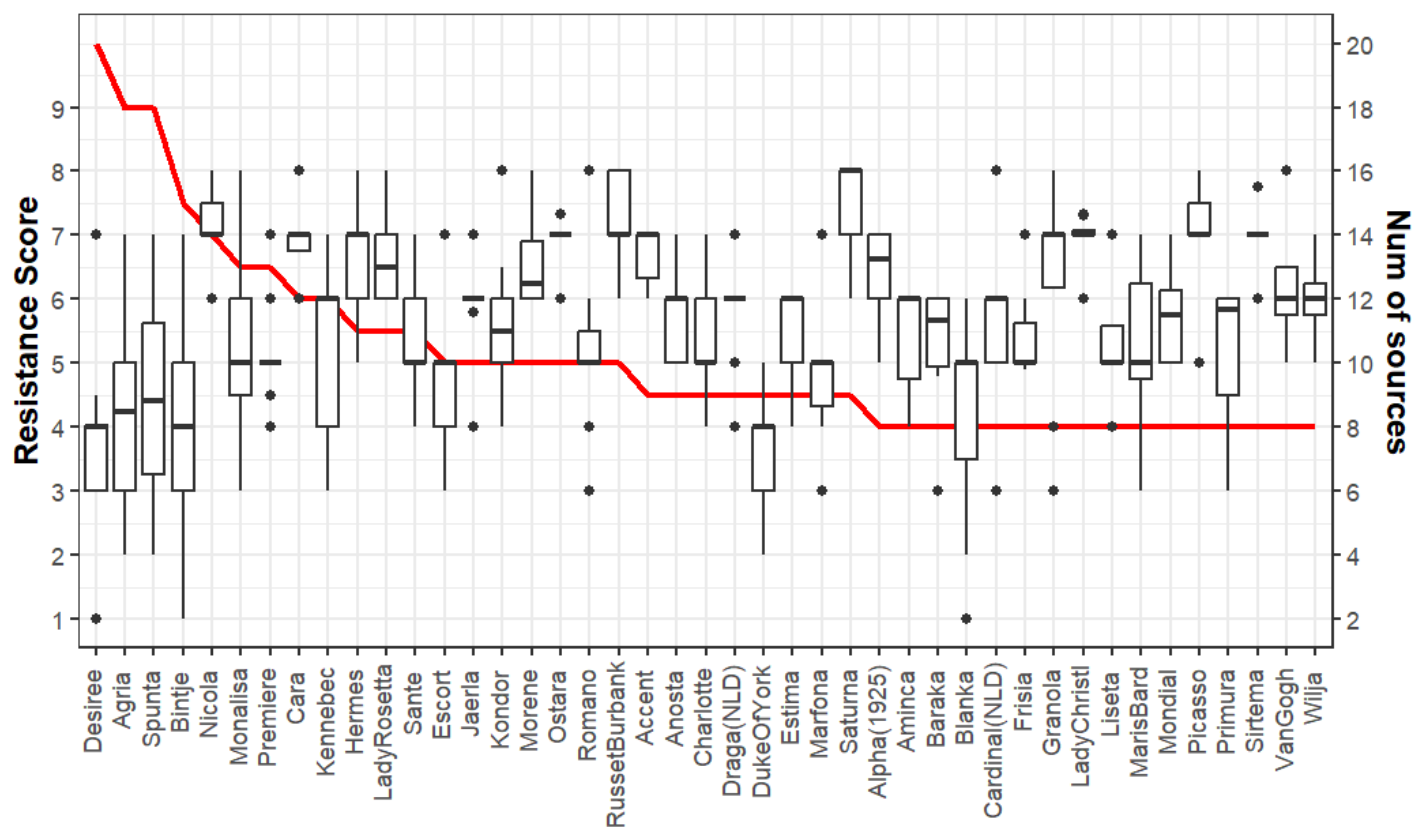


Figure S1. Boxplot of the 43 varieties most replicated across different sources in historical dataset. The Y axis on the right indicates the number of sources with a red continuous line, and the Y axis on the left indicates the resistance score across sources (1-susceptible and 9-resistant). Varieties on x-axis are sorted left to right in decreasing order for the total number of sources.

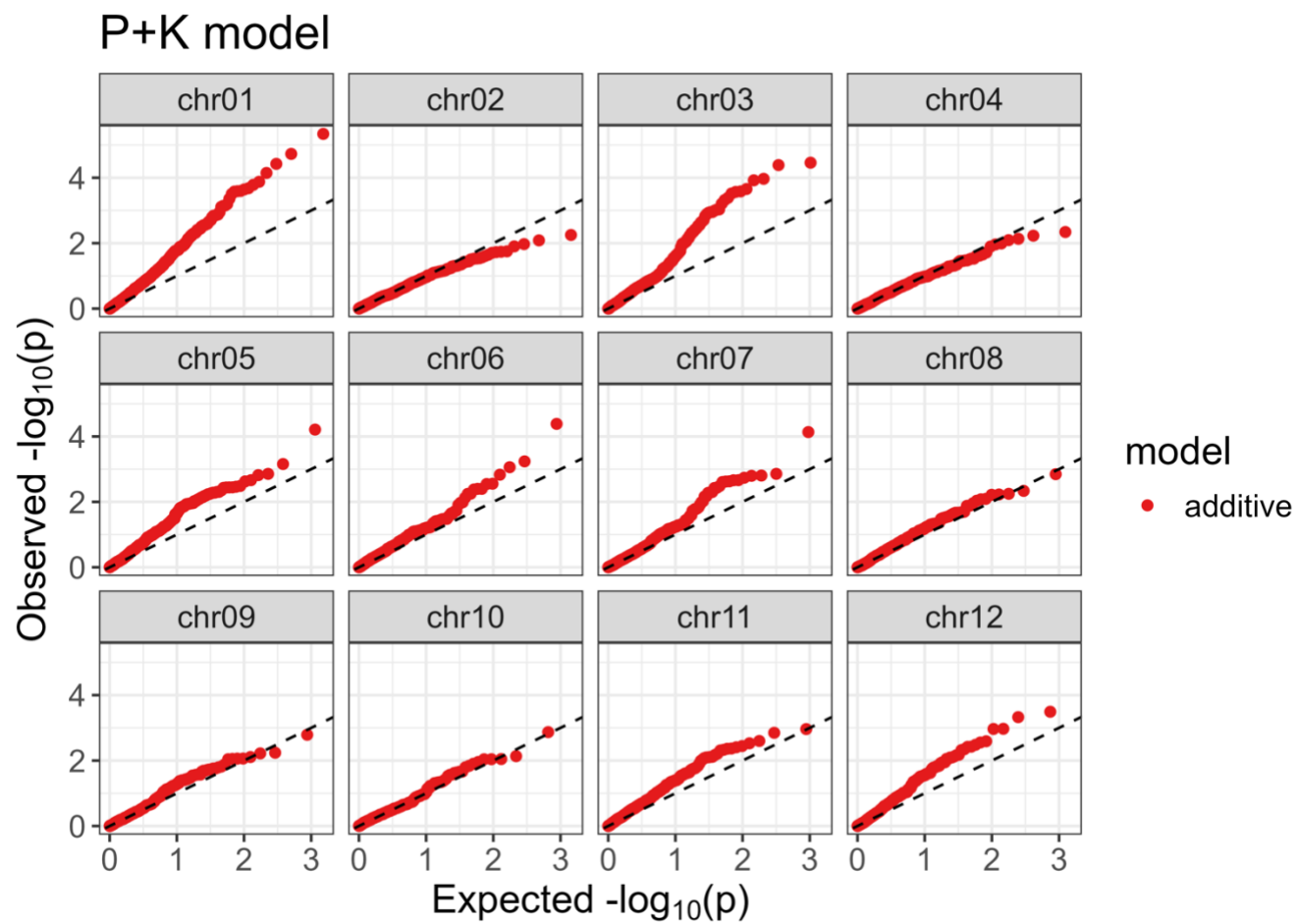


Figure S2.1. QQplots for the additive model for the integrated dataset.

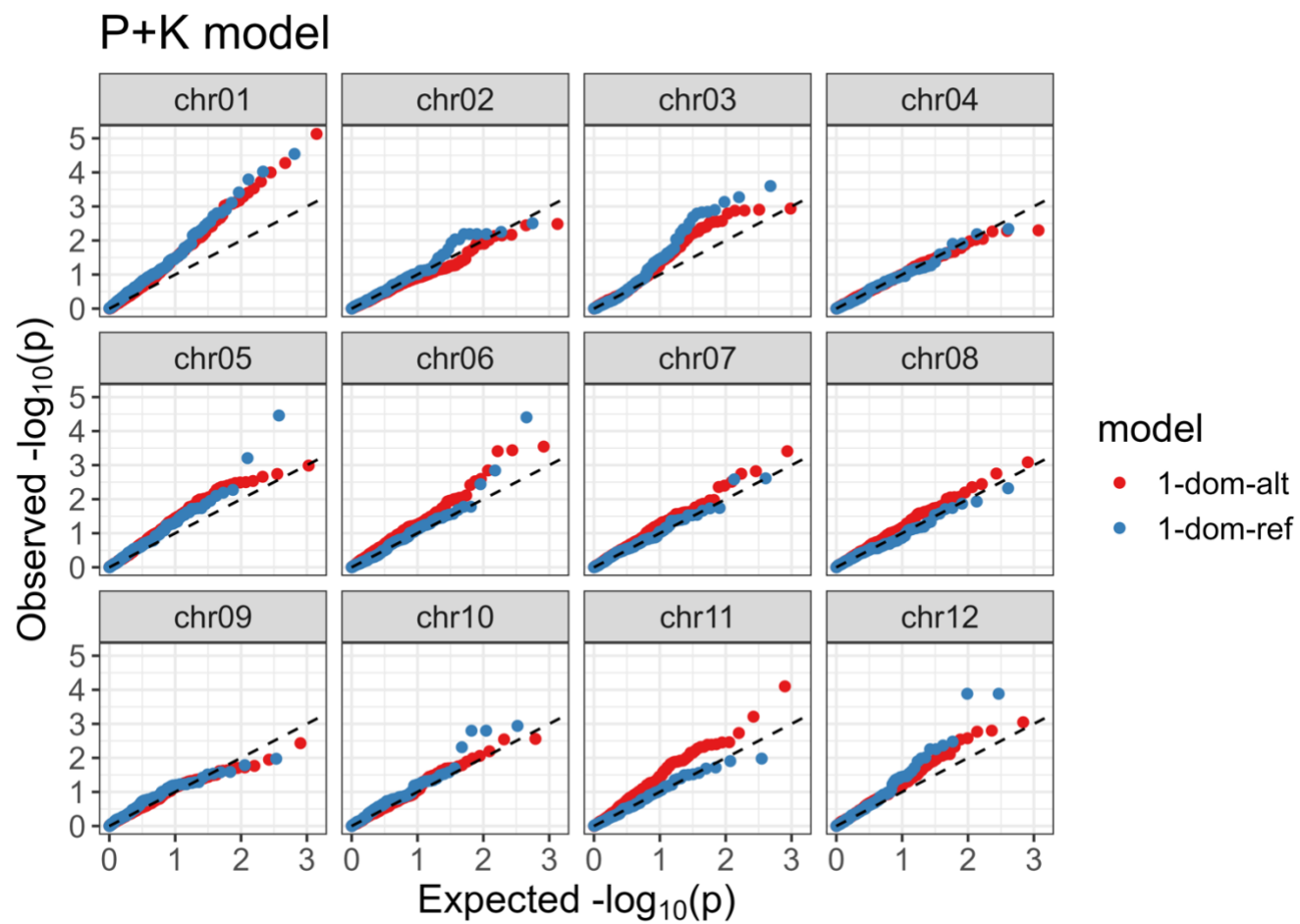


Figure S2.2. QQplots for the 1-dom model for the integrated dataset.

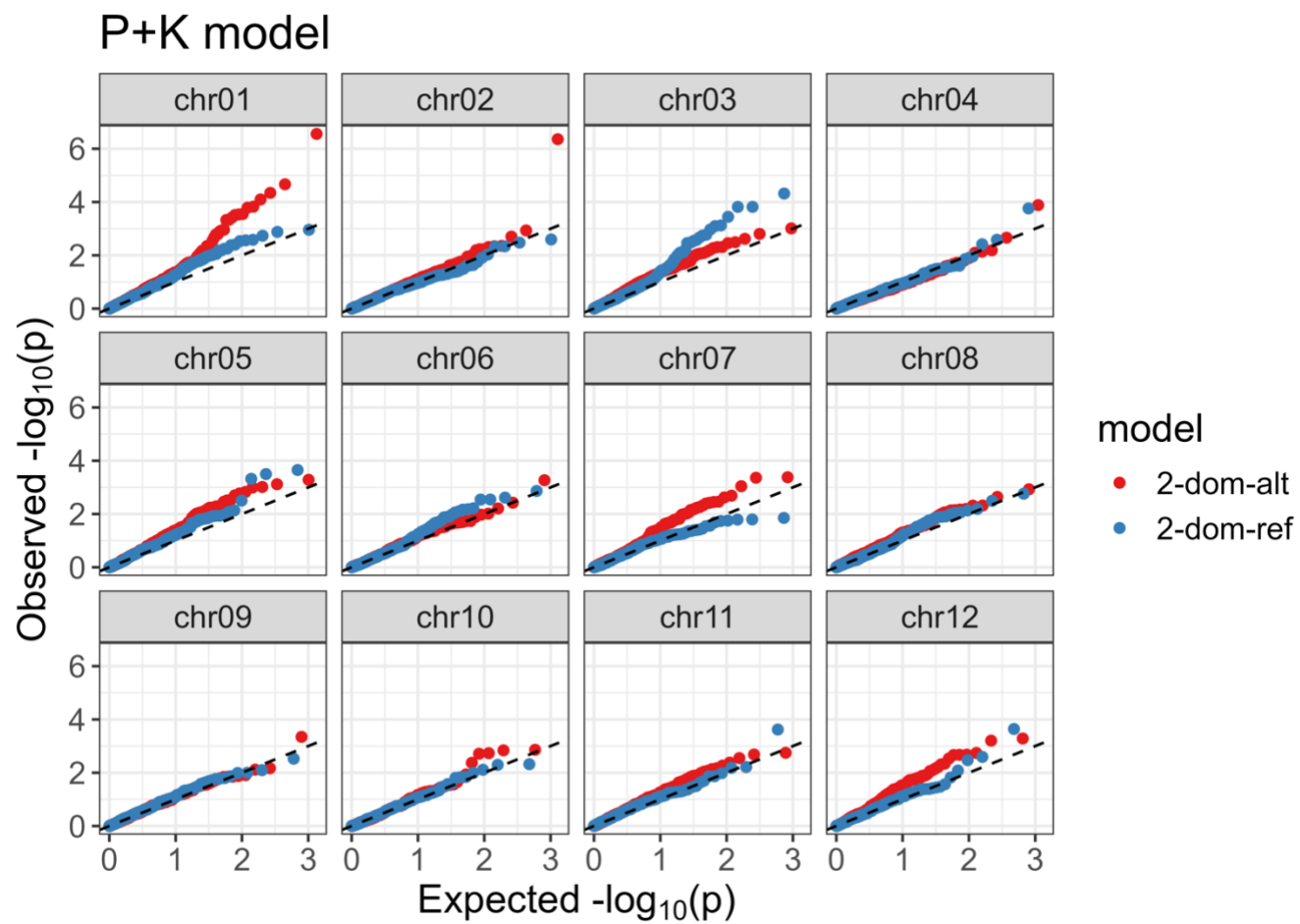


Figure S2.3. QQplots for the 2-dom model for the integrated dataset.

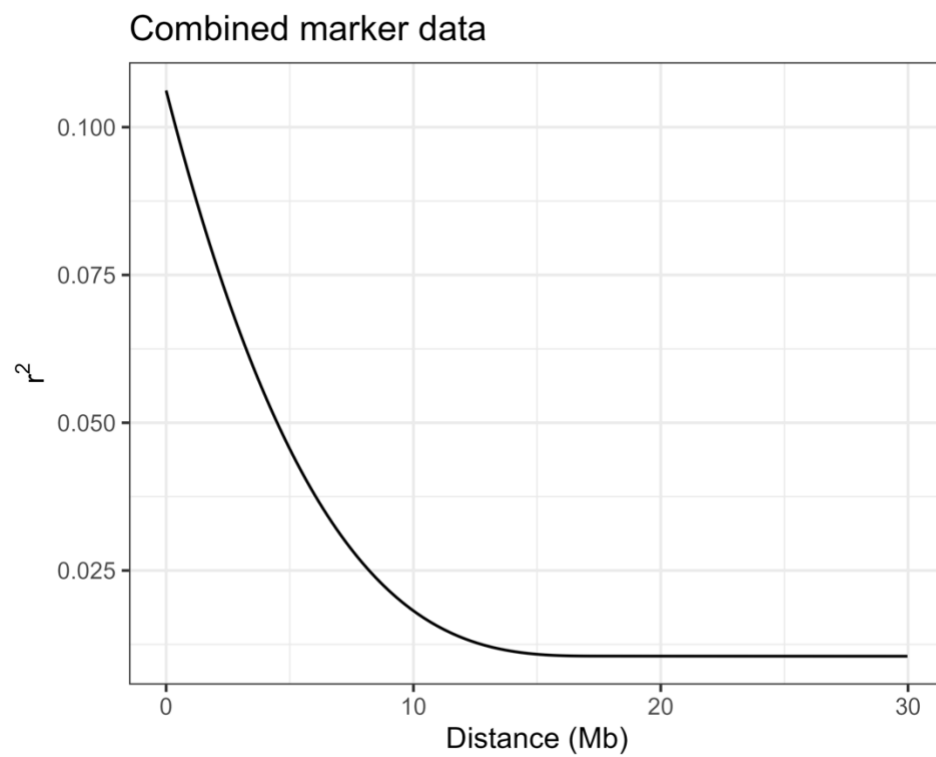


Figure S3. Linkage disequilibrium (LD) decay plot of combined marker set.