

Supporting information

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This document contains supporting tables and figures for the manuscript “Life-history tradeoffs, and the genetic basis of fitness in *Arabidopsis thaliana*” by Thomas James Ellis, Froukje M. Postma, Christopher G. Oakley and Jon Ågren.

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Table 1: QTL for number of seeds per fruit identified in individual experiments. QTL positions are shown with their 95% Bayesian credible intervals. Effect sizes are given as absolute values and as a percentage of variance among RIL means.

Name	Site	Year	Chr.	Position (cM)	LOD	Effect size	% var. explained
1@9.5	Italy	2010	1	9.5 (7.3-12.6)	9.2	-1.372	8.5
2@56.0	Italy	2010	2	56.0 (32.6-60.9)	4.2	-0.918	3.8
3@18.0	Italy	2010	3	18.0 (14.7-19.7)	6.6	-1.163	6.0
5@56.6	Italy	2010	5	56.6 (50.5-58.6)	8.6	-1.316	7.9
1@5.3	Italy	2011	1	5.3 (3.9-14.5)	5.1	-0.630	4.1
1@60.2	Italy	2011	1	60.2 (53.3-62.5)	6.0	-1.089	4.9
2@32.6	Italy	2011	2	32.6 (30.7-45.6)	7.1	-1.194	5.8
5@15.0	Italy	2011	5	15.0 (10.4-20.4)	6.8	-0.921	5.5
5@50.2	Italy	2011	5	50.2 (40.1-51.6)	3.3	-1.121	2.6
5@60.1	Italy	2011	5	60.1 (56.6-78.2)	2.9	-1.041	2.3
1@22.7	Sweden	2010	1	22.7 (16.1-32.4)	2.8	0.808	2.5
1@75.4	Sweden	2010	1	75.4 (74.4-75.4)	8.9	1.478	8.4
4@41.0	Sweden	2010	4	41.0 (39.1-42.3)	9.1	1.497	8.6
5@70.1	Sweden	2010	5	70.1 (67.7-78.2)	4.3	1.007	4.0
1@61.0	Sweden	2011	1	61.0 (58.6-61.1)	9.6	-0.552	9.4
1@77.9	Sweden	2011	1	77.9 (75.4-80.9)	3.5	0.971	3.3
3@21.0	Sweden	2011	3	21.0 (18.0-22.3)	13.5	-1.274	13.5
4@42.3	Sweden	2011	4	42.3 (35.8-50.2)	10.6	1.588	10.4
5@74.5	Sweden	2011	5	74.5 (70.1-78.2)	8.6	1.433	8.3

Table 2: QTL for number of seeds per reproductive plant identified in individual experiments. QTL positions are shown with their 95% Bayesian credible intervals. Effect sizes are given as absolute values and as a percentage of variance among RIL means.

Name	Site	Year	Chr.	Position (cM)	LOD	Effect size	% var. explained
1@10.3	Italy	2010	1	10.3 (8.8-12.6)	11.8	-58.519	9.5
1@57.3	Italy	2010	1	57.3 (55.9-61.0)	6.4	-42.302	5.0
2@56.0	Italy	2010	2	56.0 (45.6-56.9)	3.5	-30.627	2.7
4@20.7	Italy	2010	4	20.7 (17.1-31.0)	4.9	-37.512	3.8
5@2.6	Italy	2010	5	2.6 (0.0-15.0)	3.2	-29.715	2.4
5@58.6	Italy	2010	5	58.6 (54.8-61.3)	8.4	-48.165	6.7
1@60.2	Italy	2011	1	60.2 (57.3-61.0)	10.9	-34.350	6.5
1@83.8	Italy	2011	1	83.8 (77.0-83.8)	4.2	-20.492	2.4
2@39.8	Italy	2011	2	39.8 (31.7-48.0)	7.2	-25.714	4.2
3@5.1	Italy	2011	3	5.1 (3.5- 6.3)	3.7	25.012	2.1
3@14.7	Italy	2011	3	14.7 (13.5-19.7)	2.1	-19.143	1.2
3@64.9	Italy	2011	3	64.9 (53.3-65.9)	7.4	-25.797	4.3
4@52.8	Italy	2011	4	52.8 (50.0-56.3)	4.9	-21.800	2.8
5@18.5	Italy	2011	5	18.5 (5.7-43.0)	2.7	-15.873	1.5
5@56.6	Italy	2011	5	56.6 (54.3-61.3)	9.5	-33.015	5.6
5@78.2	Italy	2011	5	78.2 (72.1-78.2)	6.1	-26.323	3.5
1@13.5	Sweden	2010	1	13.5 (0.0-20.8)	3.4	-145.367	3.8
1@22.7	Sweden	2010	1	22.7 (21.9-23.7)	5.8	188.983	6.5
3@30.5	Sweden	2010	3	30.5 (8.2-47.5)	3.5	111.560	3.9
1@61.1	Sweden	2011	1	61.1 (61.0-62.5)	11.0	-41.342	11.2
2@58.3	Sweden	2011	2	58.3 (0.0-60.9)	2.8	69.157	2.7
3@24.4	Sweden	2011	3	24.4 (18.0-26.7)	13.4	-96.940	13.9
4@42.3	Sweden	2011	4	42.3 (37.4-47.8)	7.8	118.161	7.8
5@74.5	Sweden	2011	5	74.5 (74.5-74.5)	8.1	120.843	8.1

Table 3: QTL for number of fruits per reproductive plant identified in individual experiments. QTL positions are shown with their 95% Bayesian credible intervals. Effect sizes are given as absolute values and as a percentage of variance among RIL means.

Name	Site	Year	Chr.	Position (cM)	LOD	Effect size	% var. explained
1@10.3	Italy	2010	1	10.3 (9.5-13.5)	11.9	-1.506	8.3
1@57.3	Italy	2010	1	57.3 (55.9-57.3)	8.5	-1.259	5.8
2@53.4	Italy	2010	2	53.4 (44.3-56.9)	2.1	-0.613	1.4
3@3.5	Italy	2010	3	3.5 (1.7- 9.6)	3.2	0.748	2.1
3@54.1	Italy	2010	3	54.1 (18.0-59.2)	5.8	-1.028	3.9
4@18.3	Italy	2010	4	18.3 (12.9-31.0)	2.6	-0.706	1.7
4@50.6	Italy	2010	4	50.6 (42.3-60.7)	3.6	-0.893	2.4
5@7.5	Italy	2010	5	7.5 (0.0-12.0)	3.5	-0.851	2.3
5@54.8	Italy	2010	5	54.8 (52.4-71.4)	2.4	-0.708	1.6
5@78.2	Italy	2010	5	78.2 (70.6-78.2)	3.4	-0.847	2.3
1@58.6	Italy	2011	1	58.6 (57.3-61.0)	14.5	-0.952	8.6
1@83.8	Italy	2011	1	83.8 (77.0-83.8)	4.1	-0.537	2.3
2@38.2	Italy	2011	2	38.2 (34.3-49.7)	7.2	-0.676	4.1
3@5.1	Italy	2011	3	5.1 (2.5- 7.3)	5.5	0.589	3.1
3@57.1	Italy	2011	3	57.1 (53.3-63.1)	12.3	-0.898	7.2
4@52.8	Italy	2011	4	52.8 (52.4-55.2)	13.6	-0.973	8.0
5@56.6	Italy	2011	5	56.6 (54.3-61.3)	5.3	-0.647	3.0
5@75.8	Italy	2011	5	75.8 (72.9-78.2)	12.0	-0.720	7.0
3@30.5	Sweden	2010	3	30.5 (8.2-42.6)	3.5	2.710	4.2
1@61.8	Sweden	2011	1	61.8 (61.0-62.5)	10.4	-1.701	11.3
2@58.3	Sweden	2011	2	58.3 (3.1-60.9)	4.1	2.320	4.3
3@26.7	Sweden	2011	3	26.7 (24.4-29.5)	9.9	-2.094	10.7
4@42.3	Sweden	2011	4	42.3 (37.4-56.3)	5.0	2.563	5.2
5@74.5	Sweden	2011	5	74.5 (74.5-75.8)	6.0	2.823	6.4

Table 4: QTL for number of fruits per seedling planted identified in individual experiments. QTL positions are shown with their 95% Bayesian credible intervals. Effect sizes are given as absolute values, as a percentage of variance among RIL means, and as a percentage of the difference between parental means.

Name	Site	Year	Chr.	Position (cM)	LOD	Effect size	% var. explained
1@10.3	Italy	2010	1	10.3 (7.3-12.6)	10.0	-0.782	6.4
1@57.3	Italy	2010	1	57.3 (57.3-57.3)	11.0	-0.823	7.1
2@53.4	Italy	2010	2	53.4 (48.7-56.0)	7.3	-0.658	4.6
3@54.1	Italy	2010	3	54.1 (52.0-59.2)	7.0	-0.639	4.4
4@50.0	Italy	2010	4	50.0 (50.0-52.8)	5.1	-0.511	3.2
5@7.5	Italy	2010	5	7.5 (2.6- 8.5)	7.1	-0.698	4.5
5@54.8	Italy	2010	5	54.8 (41.4-61.3)	3.6	-0.495	2.2
5@77.4	Italy	2010	5	77.4 (70.1-78.2)	5.8	-0.643	3.6
1@61.8	Italy	2011	1	61.8 (57.3-61.8)	15.3	-0.786	8.3
1@83.8	Italy	2011	1	83.8 (77.0-83.8)	4.5	-0.412	2.3
2@49.5	Italy	2011	2	49.5 (44.3-49.7)	13.1	-0.659	7.0
3@2.2	Italy	2011	3	2.2 (0.0- 8.2)	3.7	0.344	1.9
3@64.9	Italy	2011	3	64.9 (63.1-65.9)	15.5	-0.725	8.4
4@55.2	Italy	2011	4	55.2 (51.1-56.6)	11.2	-0.625	5.9
5@56.6	Italy	2011	5	56.6 (56.6-57.7)	8.6	-0.632	4.5
5@71.4	Italy	2011	5	71.4 (70.1-78.2)	6.4	-0.548	3.3
3@9.6	Sweden	2010	3	9.6 (8.2-34.4)	3.1	0.334	3.7
1@62.5	Sweden	2011	1	62.5 (61.0-62.5)	9.5	-0.652	8.9
2@56.9	Sweden	2011	2	56.9 (35.6-60.9)	2.9	0.679	2.6
3@29.5	Sweden	2011	3	29.5 (23.3-29.5)	9.3	-0.752	8.6
4@42.3	Sweden	2011	4	42.3 (37.4-56.6)	6.7	1.059	6.2
5@1.4	Sweden	2011	5	1.4 (0.0-25.4)	3.7	0.784	3.3
5@74.5	Sweden	2011	5	74.5 (74.5-74.5)	14.3	1.561	13.9

Table 5: QTL for number of seeds per seedling planted identified in individual experiments. QTL positions are shown with their 95% Bayesian credible intervals. Effect sizes are given as absolute values and as a percentage of variance among RIL means.

Name	Site	Year	Chr.	Position (cM)	LOD	Effect size	% var. explained
1@10.3	Italy	2010	1	10.3 (8.4-12.6)	12.8	-34.186	9.1
1@58.8	Italy	2010	1	58.8 (55.9-61.1)	8.5	-27.523	5.9
2@53.4	Italy	2010	2	53.4 (53.4-56.4)	7.1	-24.759	4.9
3@18.0	Italy	2010	3	18.0 (15.6-21.0)	3.4	-13.747	2.3
4@20.7	Italy	2010	4	20.7 (11.1-44.3)	2.6	-15.314	1.8
5@12.0	Italy	2010	5	12.0 (11.4-13.1)	6.2	-21.232	4.2
5@58.6	Italy	2010	5	58.6 (54.8-60.6)	3.5	-21.692	2.4
5@71.4	Italy	2010	5	71.4 (70.1-78.2)	2.5	-18.275	1.7
1@13.5	Italy	2011	1	13.5 (0.0-28.1)	2.9	-12.058	1.5
1@60.2	Italy	2011	1	60.2 (57.3-61.8)	11.3	-26.326	6.1
1@83.8	Italy	2011	1	83.8 (77.0-83.8)	4.7	-16.502	2.5
2@45.6	Italy	2011	2	45.6 (44.3-49.5)	14.7	-28.565	8.2
3@64.9	Italy	2011	3	64.9 (53.3-66.8)	7.1	-18.862	3.8
4@52.0	Italy	2011	4	52.0 (50.0-53.9)	7.5	-19.907	4.0
5@56.6	Italy	2011	5	56.6 (56.6-56.6)	12.7	-30.653	7.0
5@71.4	Italy	2011	5	71.4 (70.1-78.2)	6.3	-21.562	3.3
1@22.7	Sweden	2010	1	22.7 (21.9-32.4)	3.9	28.287	4.1
1@75.4	Sweden	2010	1	75.4 (70.4-80.9)	3.7	27.572	3.9
4@41.0	Sweden	2010	4	41.0 (37.4-41.0)	5.9	35.107	6.3
1@61.0	Sweden	2011	1	61.0 (61.0-61.1)	10.0	-17.519	9.1
3@23.3	Sweden	2011	3	23.3 (18.0-24.4)	13.3	-41.302	12.3
4@42.3	Sweden	2011	4	42.3 (35.8-45.5)	8.9	50.210	8.0
5@1.4	Sweden	2011	5	1.4 (0.0-31.2)	2.6	27.148	2.3
5@74.5	Sweden	2011	5	74.5 (74.5-74.5)	15.3	67.150	14.3

Table 6: QTL for seed mass identified in individual experiments. QTL positions are shown with their 95% Bayesian credible intervals. Effect sizes are given as absolute values and as a percentage of variance among RIL means.

Name	Site	Year	Chr.	Position (cM)	LOD	Effect size	% var. explained
1@48.9	Italy	2010	1	48.9 (39.9-61.1)	3.8	-0.606	4.2
3@57.1	Italy	2010	3	57.1 (53.3-65.5)	5.2	-0.706	5.7
1@14.1	Italy	2011	1	14.1 (7.3-17.1)	4.4	0.763	4.5
1@29.5	Italy	2011	1	29.5 (22.7-64.9)	3.6	-0.691	3.7
3@53.3	Italy	2011	3	53.3 (7.3-57.1)	4.3	-0.645	4.5
4@9.3	Italy	2011	4	9.3 (6.1- 9.3)	5.5	-0.731	5.7
5@7.7	Italy	2011	5	7.7 (6.7-10.0)	4.5	0.665	4.7
1@3.4	Sweden	2010	1	3.4 (1.4- 6.1)	8.3	0.704	7.9
1@43.5	Sweden	2010	1	43.5 (21.9-51.5)	2.9	-0.409	2.6
2@58.0	Sweden	2010	2	58.0 (19.3-60.9)	3.0	-0.413	2.8
3@65.9	Sweden	2010	3	65.9 (47.5-70.5)	4.9	-0.527	4.6
5@7.7	Sweden	2010	5	7.7 (2.6- 7.7)	9.7	0.762	9.3
1@9.9	Sweden	2011	1	9.9 (6.1-12.0)	5.3	0.847	5.9
1@21.9	Sweden	2011	1	21.9 (18.9-22.7)	3.8	-0.705	4.1
5@2.6	Sweden	2011	5	2.6 (0.0- 4.6)	3.7	0.692	4.1
5@16.8	Sweden	2011	5	16.8 (11.4-18.5)	2.1	0.506	2.3
5@71.4	Sweden	2011	5	71.4 (52.4-78.2)	1.9	0.399	2.0

Table 7: QTL for survival to reproduction identified in individual experiments. QTL positions are shown with their 95% Bayesian credible intervals. Effect sizes are given as absolute values, as a percentage of variance among RIL means, and as a percentage of the difference between parental means.

Name	Site	Year	Chr.	Position (cM)	LOD	Effect size	% var. explained
1@40.6	Italy	2010	1	40.6 (0.0-45.1)	2.7	-0.023	2.0
1@62.5	Italy	2010	1	62.5 (57.3-64.9)	4.9	-0.031	3.6
2@53.4	Italy	2010	2	53.4 (49.4-55.3)	12.8	-0.046	9.8
3@59.2	Italy	2010	3	59.2 (37.9-65.9)	4.5	-0.027	3.3
5@9.4	Italy	2010	5	9.4 (5.7-12.0)	9.1	-0.039	6.7
5@66.1	Italy	2010	5	66.1 (64.1-74.5)	9.6	-0.040	7.2
1@39.9	Italy	2011	1	39.9 (36.7-53.3)	5.1	-0.023	4.9
1@83.8	Italy	2011	1	83.8 (74.4-83.8)	3.8	-0.020	3.6
2@49.5	Italy	2011	2	49.5 (44.3-51.0)	9.1	-0.031	9.0
5@57.5	Italy	2011	5	57.5 (52.4-68.7)	8.4	-0.030	8.2
4@50.0	Sweden	2011	4	50.0 (34.5-56.6)	4.3	0.031	4.6
5@1.4	Sweden	2011	5	1.4 (0.0-32.5)	4.9	0.034	5.3
5@74.5	Sweden	2011	5	74.5 (73.6-75.8)	12.3	0.054	14.0

Table 8: Pairs of significant epistatic QTL detected across traits.

Trait	Site	Year	QTL	LOD	% var. explained
Seeds per fruit	Italy	2011	1@5.3:5@15.0	3.45	2.73
Seeds per fruit	Sweden	2011	1@61.0:3@21.0	8.24	7.97
Seeds per reproductive plant	Sweden	2011	1@61.1:3@24.4	9.21	9.28
Seeds per seedling planted	Italy	2010	3@18.0:5@12.0	0.88	0.58
Seeds per seedling planted	Sweden	2011	1@61.0:3@23.3	8.18	7.28

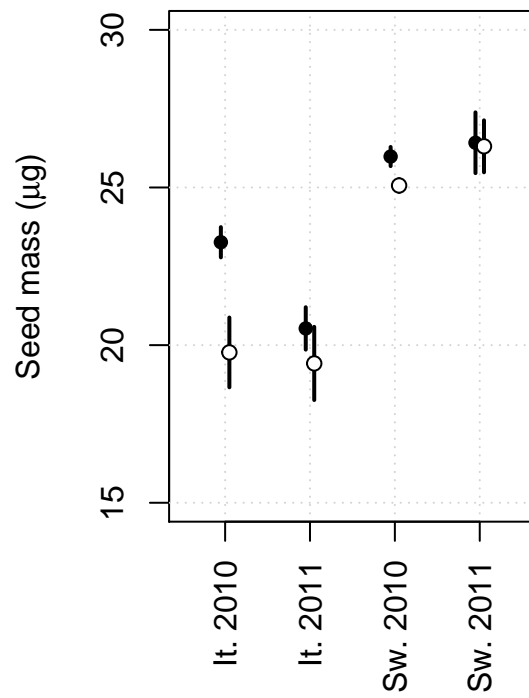


Figure 1: Mean seed mass of the Italian (closed symbols) and Swedish (open symbols) parental ecotypes at the field sites in Italy (It.) and Sweden (Sw.) in 2010 and 2011. Bars indicate standard error.

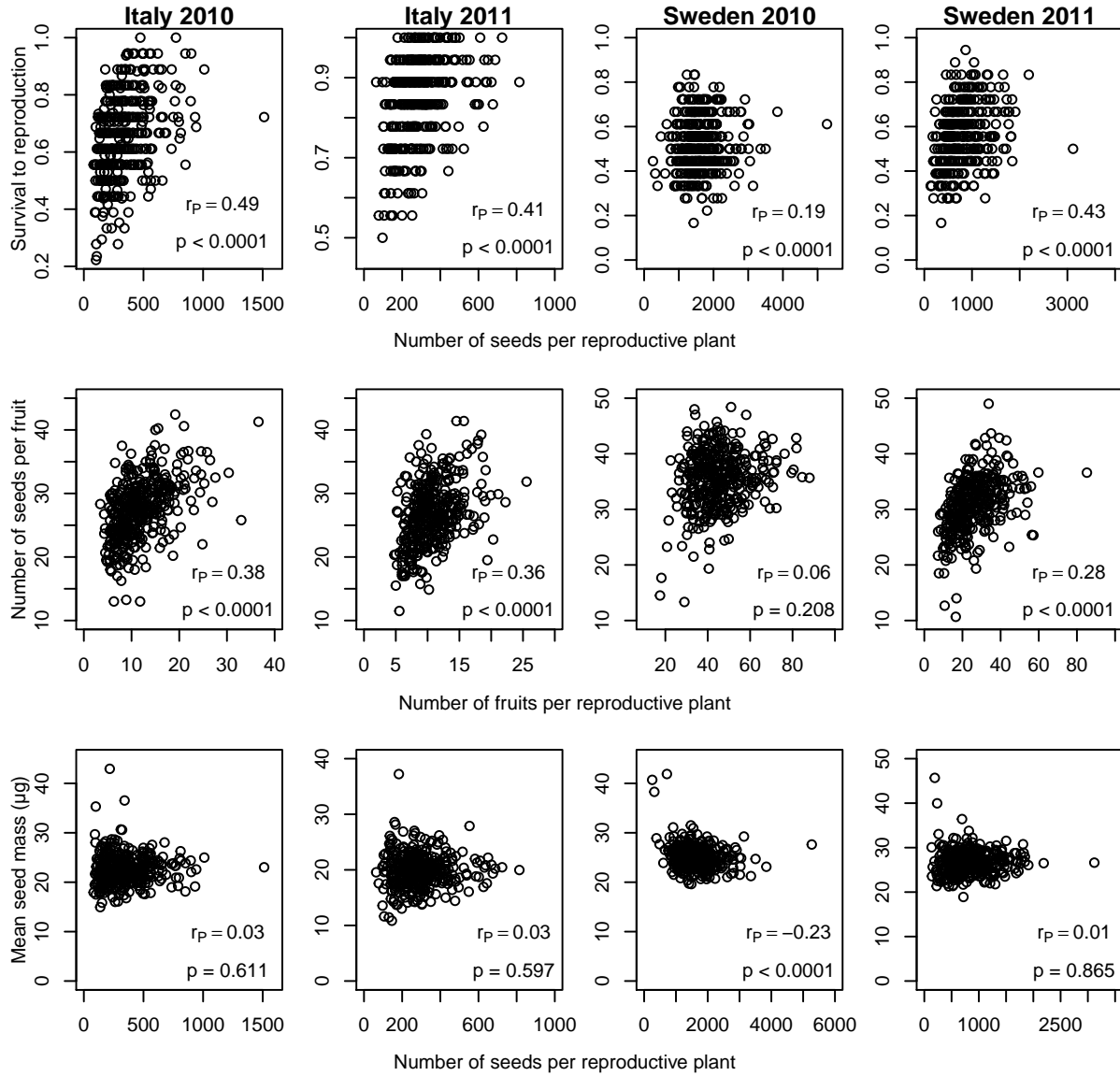


Figure 2: Relationships between RIL-means for survival and fecundity (top), components of fecundity (middle), and between overall fecundity and seed mass (bottom). Pearson correlation coefficients (r_P) and associated p -values are indicated.

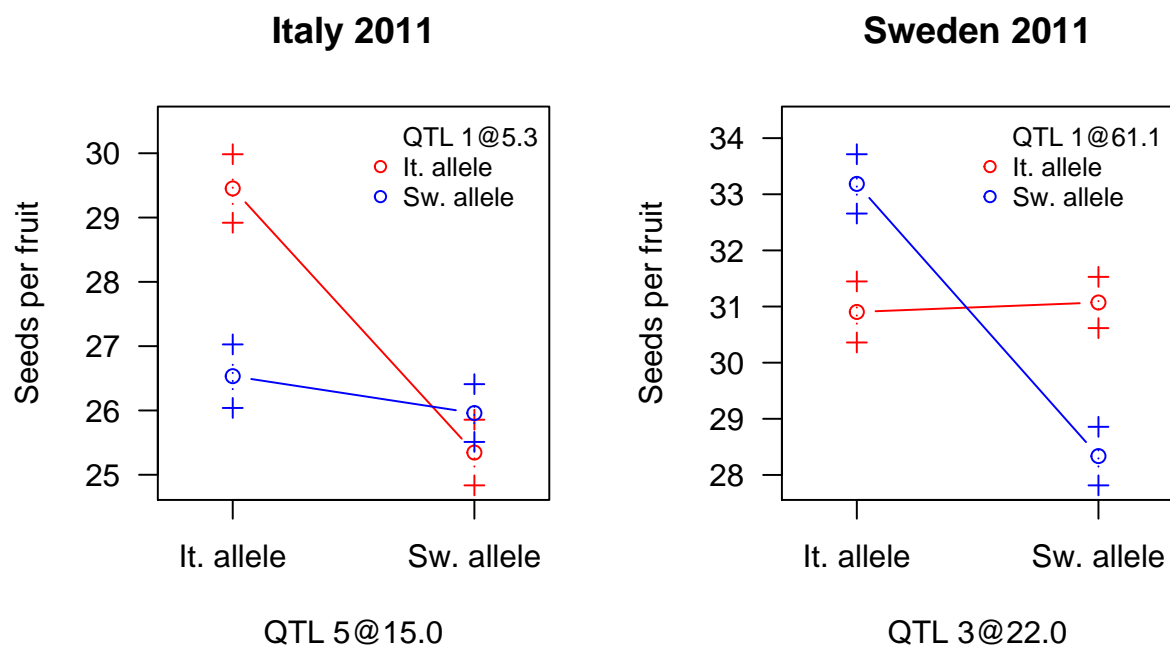


Figure 3: Interaction plots for epistatic interactions detected for number of seeds per fruit, showing mean and standard errors for each genotype-by-genotype combination.

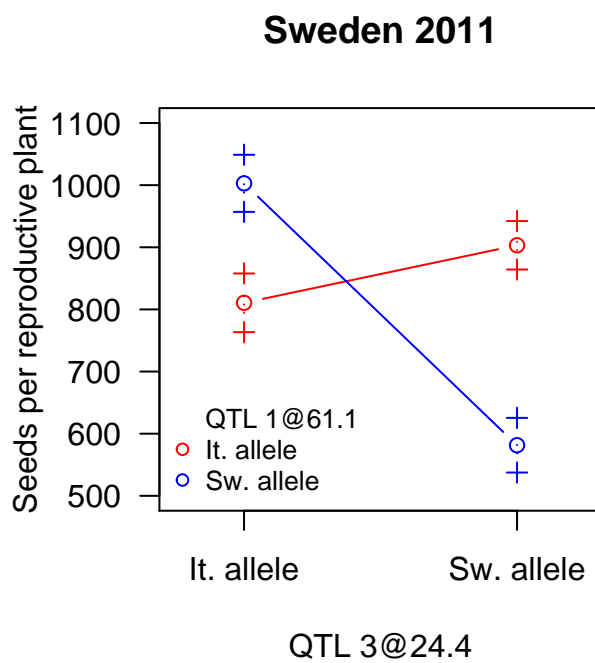


Figure 4: Interaction plots for epistatic interactions detected for number of seeds per reproductive plant, showing mean and standard errors for each genotype-by-genotype combination.

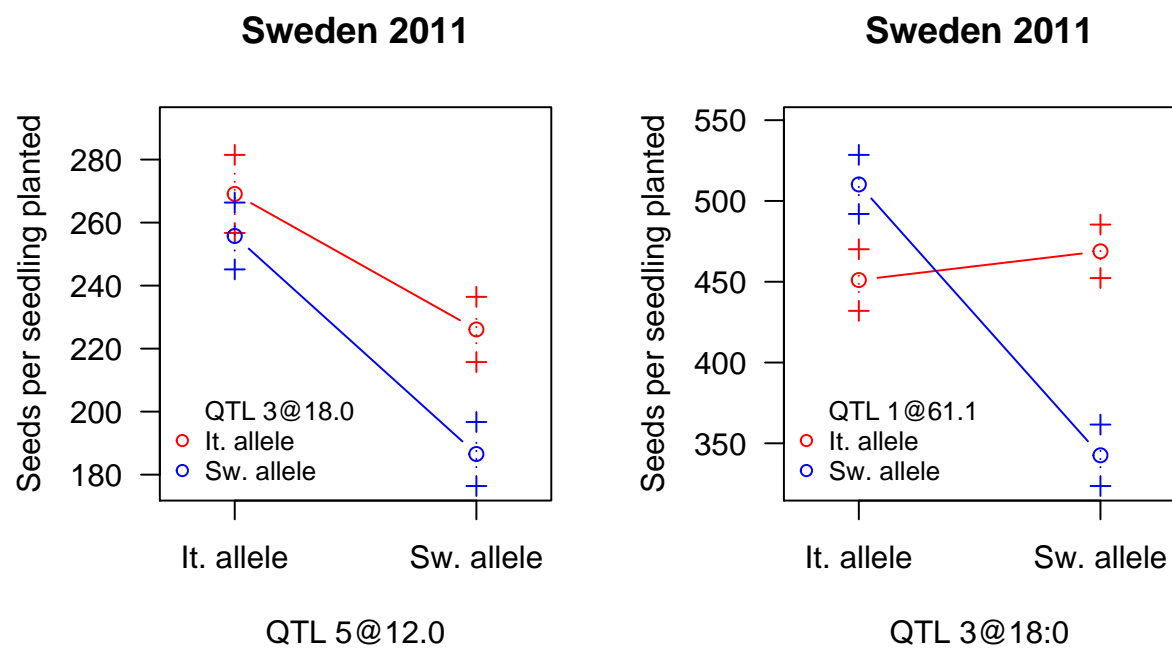


Figure 5: Interaction plots for epistatic interactions detected for number of seeds per seedling planted, showing mean and standard errors for each genotype-by-genotype combination.

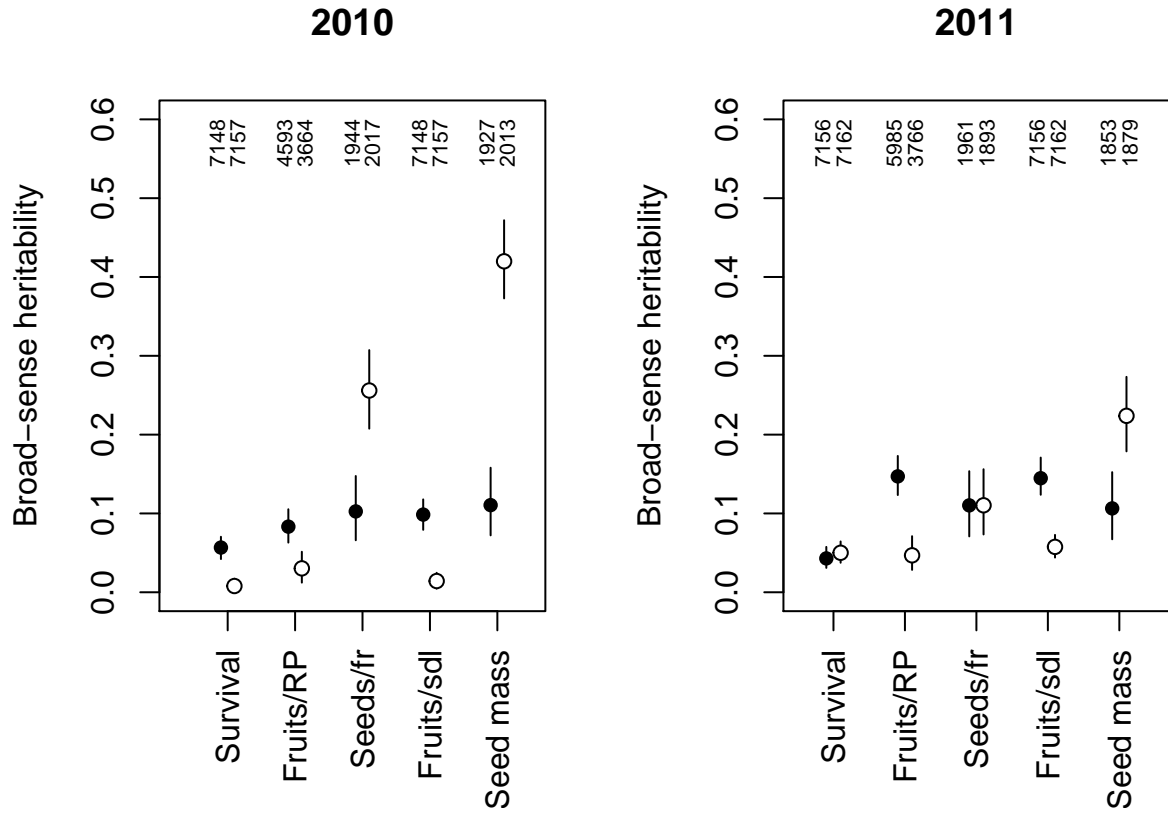


Figure 6: Broad-sense heritability estimates for survival to reproduction, number of fruits per reproductive plant (Fruits/RP), number of seeds per fruit (Seeds/fr), number of fruits per seedling planted (Fruits/sdl), and seed mass. Closed and open symbols show values in Italy and Sweden respectively. Error bars show 95% parametric bootstrap confidence intervals. Numbers indicate the number of individuals each estimate is based on.