Supplementary figures and tables

Variation in stress tolerance in the Queensland fruit fly

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Contents

List of Tables

List of Figures

Table S 1: Climatic variables for the Qfly collection sites

Population	mean.max	mean.min	mean.rain	mean.solar	annual.temp	max.high.temp	low.high.temp	low.min.temp	high.min.temp	min.dry.month	max.wet.month
Darwin	32.78	23.46	1720.52	21.14	28.12	38.9	33.3	24.4	29.7	0.0	1110.2
Cape Tribulation	29.80	22.32	1498.54	20.72	26.06	41.4	32.1	23.8	27.7	0.0	915.0
Mareeba	28.50	17.08	850.88	20.58	22.74	39.8	29.6	20.5	25.6	0.0	894.1
Utchee Creek	28.60	20.10	2947.60	19.14	24.35	40.4	31.0	22.5	29.2	0.0	2748.6
Alice Springs	29.96	13.42	237.95	21.16	21.69	45.2	37.2	23.1	32.8	0.0	356.8
Brisbane	26.92	16.80	1115.73	18.10	21.86	41.7	29.4	20.5	28.0	0.2	479.8
Narrabri	27.20	12.34	585.64	19.20	19.77	47.8	34.3	18.7	30.9	0.0	247.4
Sydney	23.86	15.08	1094.40	16.22	19.47	46.4	23.7	18.6	27.5	0.0	596.9
Griffith	24.84	10.68	417.72	18.10	17.76	46.0	32.0	15.2	30.0	0.0	257.1
Canberra	21.44	6.70	584.44	16.74	14.07	41.6	24.5	10.2	24.4	2.4	198.4
Batemans Bay	22.32	10.18	964.40	15.20	16.25	45.6	23.5	14.4	23.1	1.8	458.4
Bega Valley	21.32	10.32	826.92	15.04	15.82	44.2	23.0	14.0	22.7	0.0	358.0

Note: Variables names are indicative of the following weather variables: *mean.max*= Annual max temperature; *mean.min* = Annual mim temperature; *mean.rain* = Annual rainfall; *mean.solar*= Annual solar exposure; *annual.temp* = Annual temperature; *max.high.temp* = Maximum temperature of the warmest month; *low.high.temp* = Mimimum temperature of the warmest month; *low.min.temp* = Minimum temperature of the coldest month; *high.min.temp* = Minimum temperature of the coldest month; *min.dry.month*= Precipitation of the driest month; *max.wet.month* = Precipitation of the wettest month.

Table S 2: **Methodological differences between the standard desiccation tolerance assay and that used for the resampled 2017/2018 collection.**

Difference in protocol	First collection	Resampled collection
Egg collection	Egging device	Baby (vine) capsicum
Larvae rearing	Gel diet (Mohadeli et al., 2017)	Gel diet and baby (vine) capsicum
Tubes	5 mL	10 mL
Desiccant	8 silica gel beads	0.5g silica gel packet
Scoring after 16 hours	Every 2 hours	Every 3 hours

Table S 3: Euclidean distance between sites' geographical coordinates

	Alice Springs	Darwin	Sydney	Batemans Bay	Bega Valley	Canberra	Griffith	Mareeba	Brisbane	Cape Tribulation	Narrabri	Utchee Creek
Alice Springs	0.00	11.67	20.05	20.25	20.59	19.12	16.12	13.33	19.37	13.84	17.22	13.55
Darwin	11.67	0.00	29.55	30.27	30.85	29.25	26.63	15.29	26.66	15.06	26.06	16.00
Sydney	20.05	29.55	0.00	2.04	3.18	2.45	5.11	17.83	6.72	18.69	3.82	17.09
Batemans Bay	20.25	30.27	2.04	0.00	1.16	1.16	4.38	19.29	8.72	20.17	5.39	18.58
Bega Valley	20.59	30.85	3.18	1.16	0.00	1.65	4.49	20.24	9.88	21.14	6.45	19.55
Canberra	19.12	29.25	2.45	1.16	1.65	0.00	3.22	18.63	8.73	19.52	4.99	17.94
Griffith	16.12	26.63	5.11	4.38	4.49	3.22	0.00	17.29	9.72	18.21	5.45	16.69
Mareeba	13.33	15.29	17.83	19.29	20.24	18.63	17.29	0.00	12.80	0.92	14.01	0.81
Brisbane	19.37	26.66	6.72	8.72	9.88	8.73	9.72	12.80	0.00	13.55	4.27	12.00
Cape Tribulation	13.84	15.06	18.69	20.17	21.14	19.52	18.21	0.92	13.55	0.00	14.88	1.60
Narrabri	17.22	26.06	3.82	5.39	6.45	4.99	5.45	14.01	4.27	14.88	0.00	13.28
Utchee Creek	13.55	16.00	17.09	18.58	19.55	17.94	16.69	0.81	12.00	1.60	13.28	0.00

Table S 4: **Individal populations for which the wild (G2/G3) and domesticated (G10-15) bioassay results differed signficantly.** Contrast are calculated for the estimated mean response variable for each population by looking at the differences of the domesticated over the wild populations. The estimated mean of teh contrast are calculated on the log transformed data for the response variables.

Population	ratio	SE	z.ratio	p.value
Heat				
Alice Springs	1.09	0.09	1.11	0.27
Batemans Bay	1.17	0.09	2.07	0.04
Bega Valley	NA	NA	NA	NA
Brisbane	1.17	0.09	2.03	0.04
Canberra	NA	NA	NA	NA
Cape Tribulation	NA	NA	NA	NA
Darwin	1.10	0.08	1.23	0.22
Griffith	1.21	0.09	2.49	0.01
Mareeba	1.20	0.10	2.28	0.02
Desiccation				
Narrabri	1.10	0.09	1.23	0.22
Sydney	1.09	0.08	1.08	0.28
Utchee Creek	1.14	0.09	1.71	0.09
Alice Springs	0.68	0.05	-5.74	0.00
Batemans Bay	1.02	0.07	0.27	0.79
Brisbane	1.07	0.07	1.05	0.29
Griffith	0.90	0.06	-1.56	0.12
Mareeba	0.94	0.06	-0.93	0.35
Starvation				
Narrabri	1.23	0.08	3.04	0.00
Sydney	0.54	0.04	-9.37	0.00
Utchee Creek	1.04	0.07	0.59	0.55
Alice Springs	0.79	0.07	-2.70	0.01
Batemans Bay	0.92	0.09	-0.86	0.39
Brisbane	0.94	0.09	-0.71	0.48
Griffith	0.83	0.08	-2.10	0.04
Mareeba	0.95	0.09	-0.59	0.56
Narrabri	0.91	0.08	-1.05	0.29
Sydney	0.57	0.05	-6.37	0.00
Utchee Creek	0.89	0.08	-1.31	0.19

Figure S 1: Egging device used in present study.

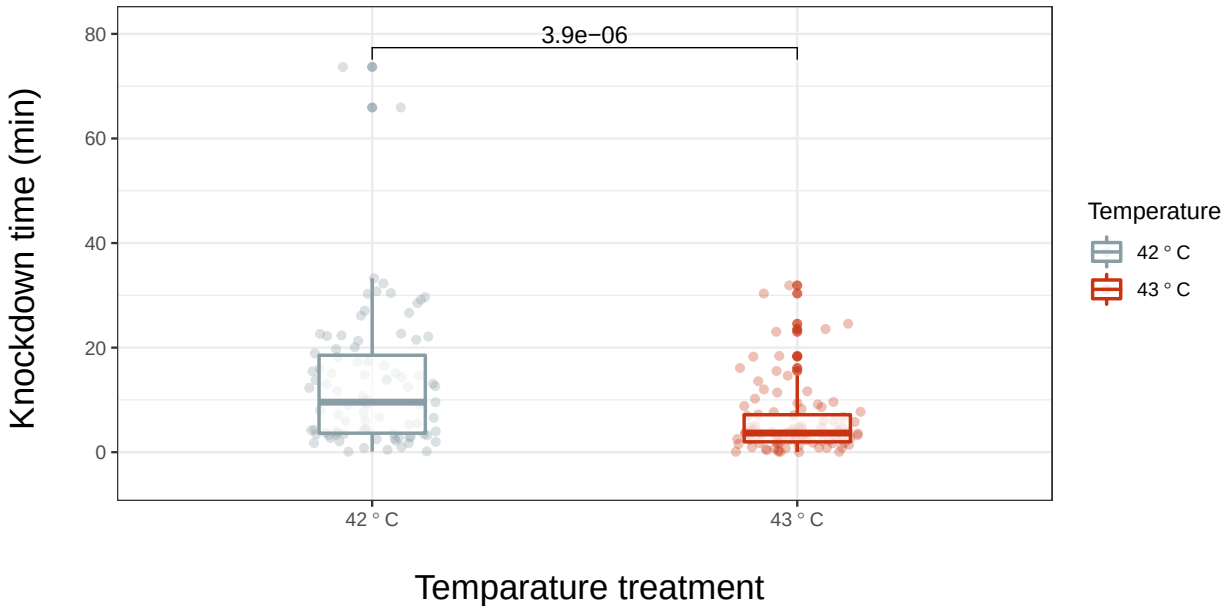

Figure S 2: Results of pilot experiment on heat knock down recovery time. Data are presented as knockdown time in minutes on two different exposure temperature for S06 flies. Significance differences of means between temperatures are reported with Wilcox test P-value.

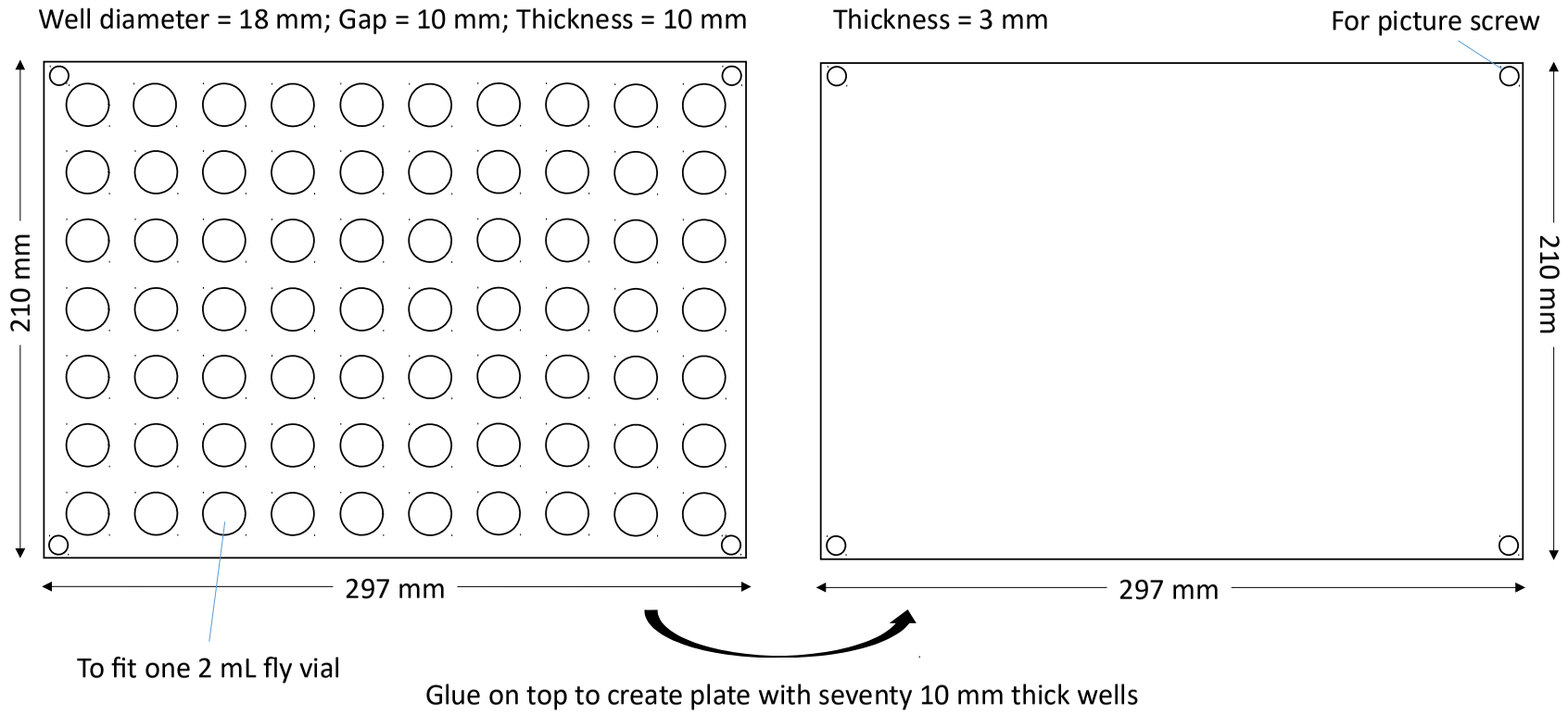

Figure S 3: Cold tolerance apparatus used in present study.

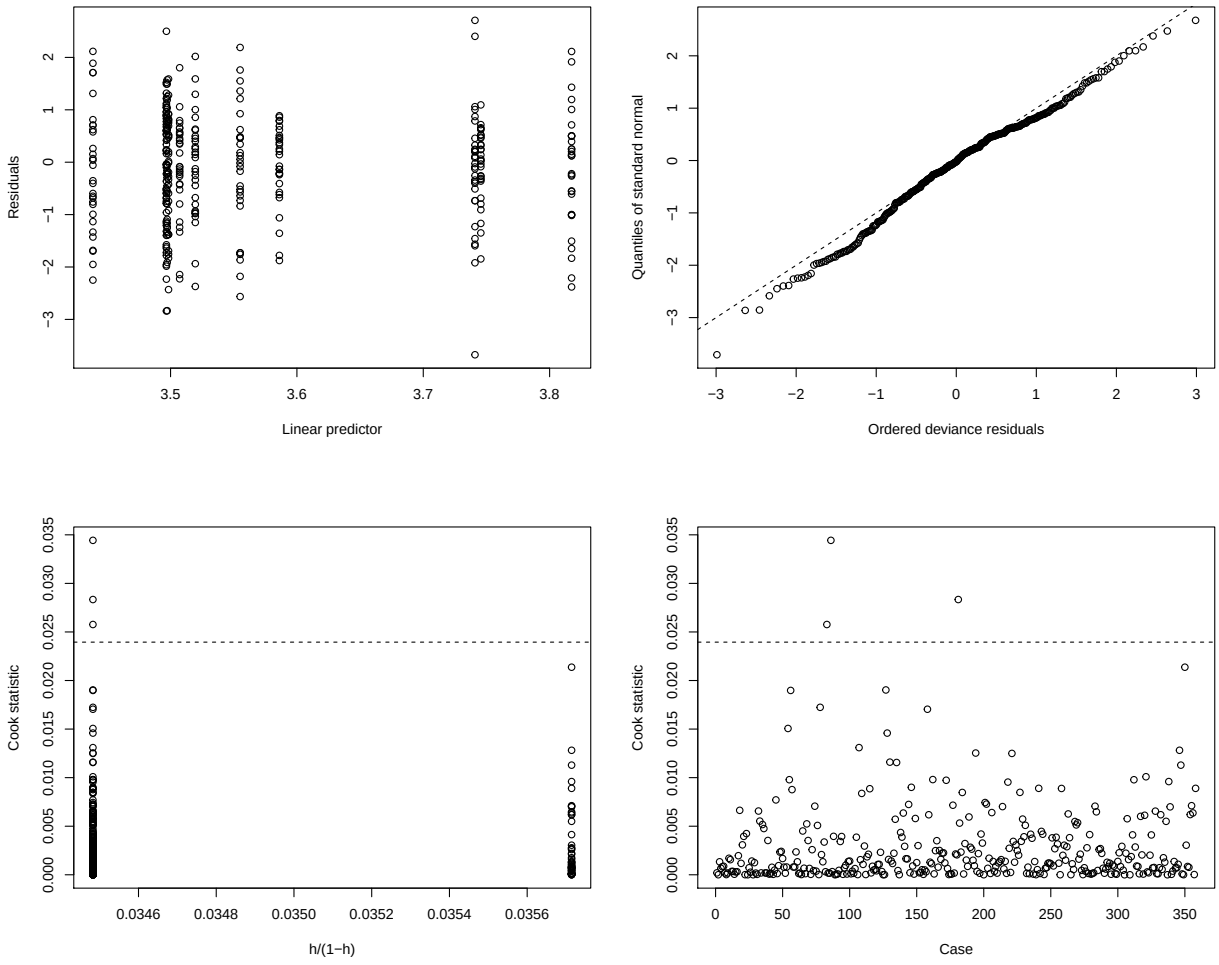

Figure S 4: Diagnostic plots Gamma-GLM heat tolerance in wild populations of the Queensland fruit fly.

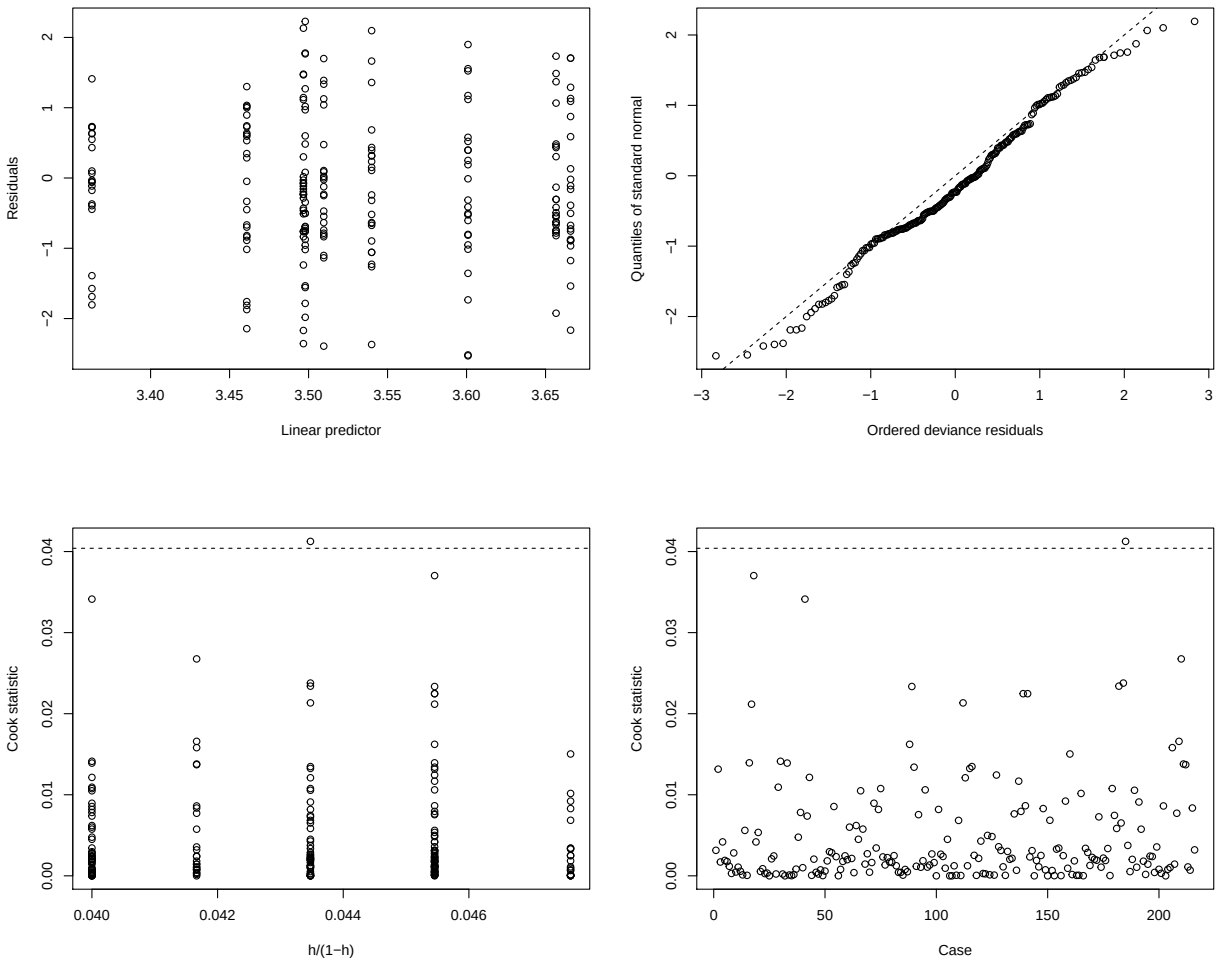

Figure S 5: Diagnostic plots Gamma-GLM heat tolerance in domesticated populations of the Queensland fruit fly.

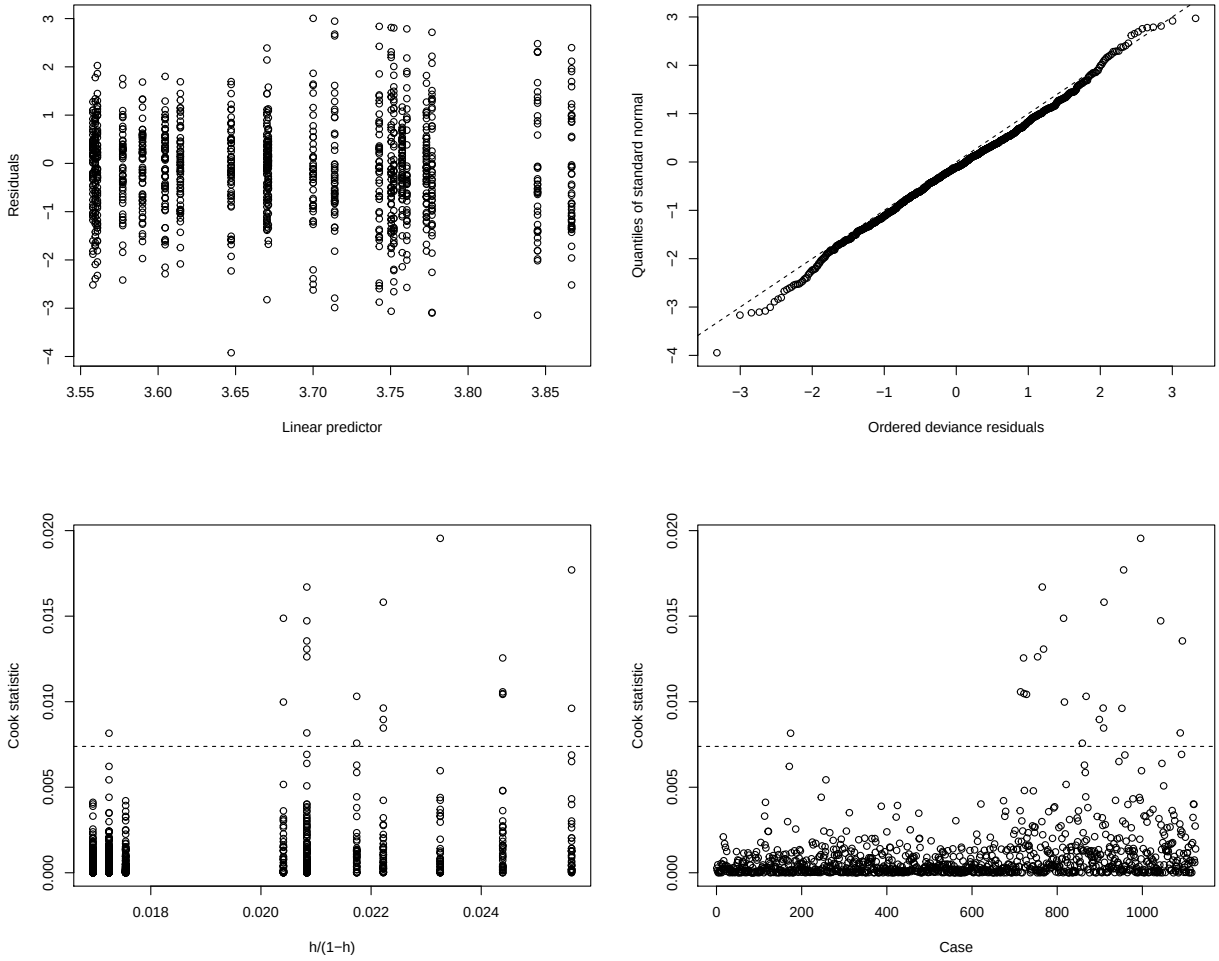

Figure S 6: Diagnostic plots Gamma-GLM heat tolerance change during domestication.

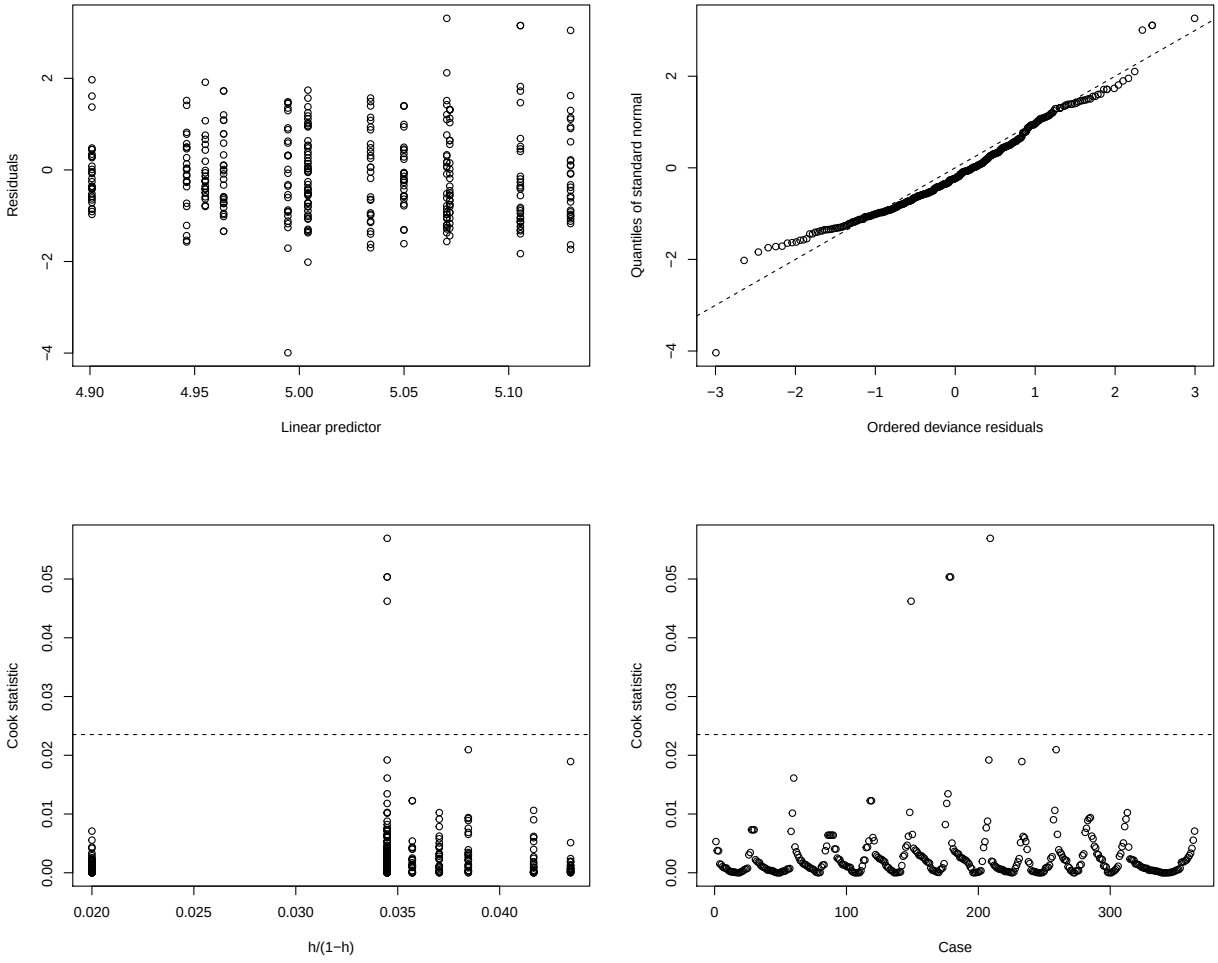

Figure S 7: Diagnostic plots Gamma-GLM cold tolerance in wild populations of the Queensland fruit fly.

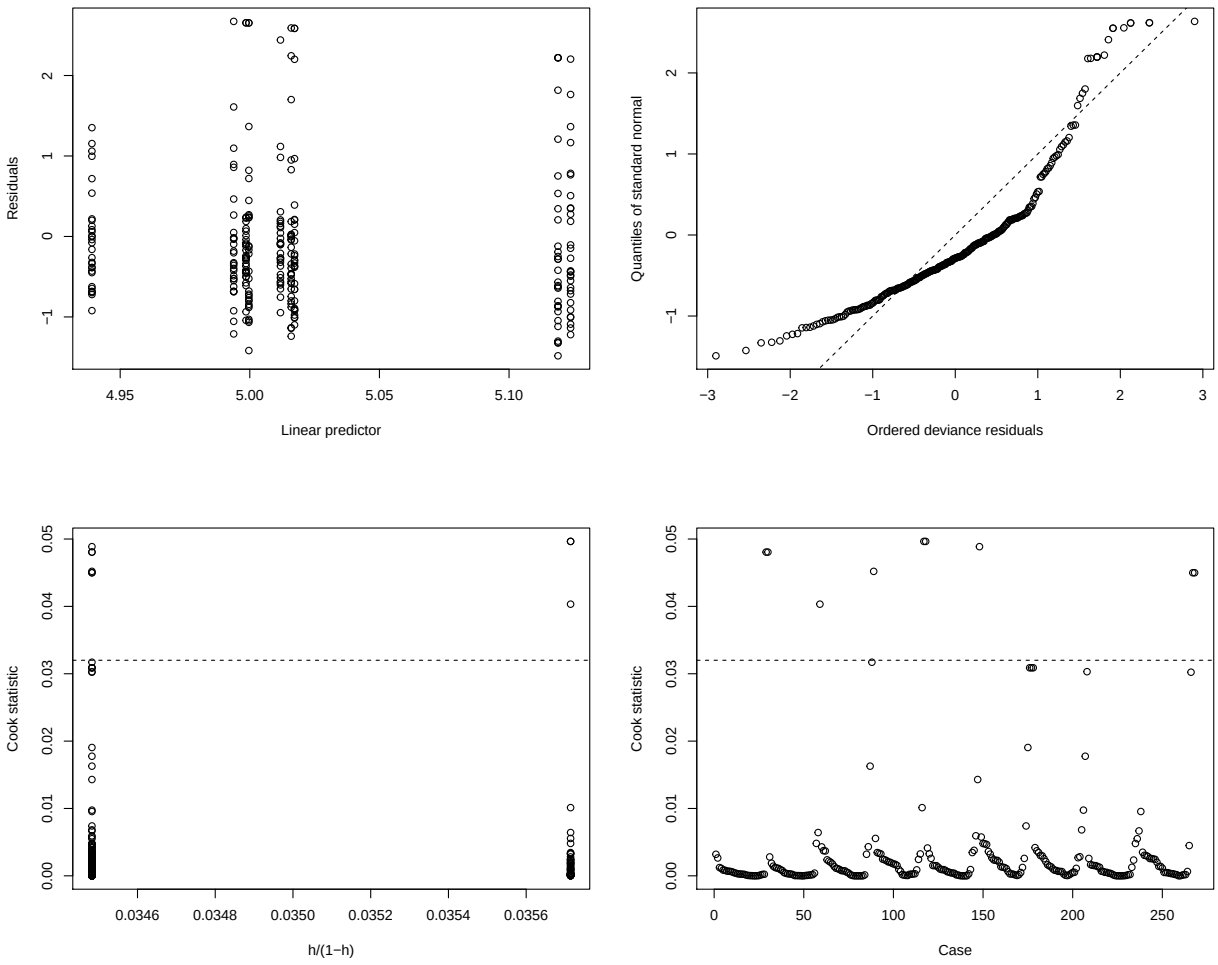

Figure S 8: Diagnostic plots Gamma-GLM heat tolerance in domesticated populations of the Queensland fruit fly.

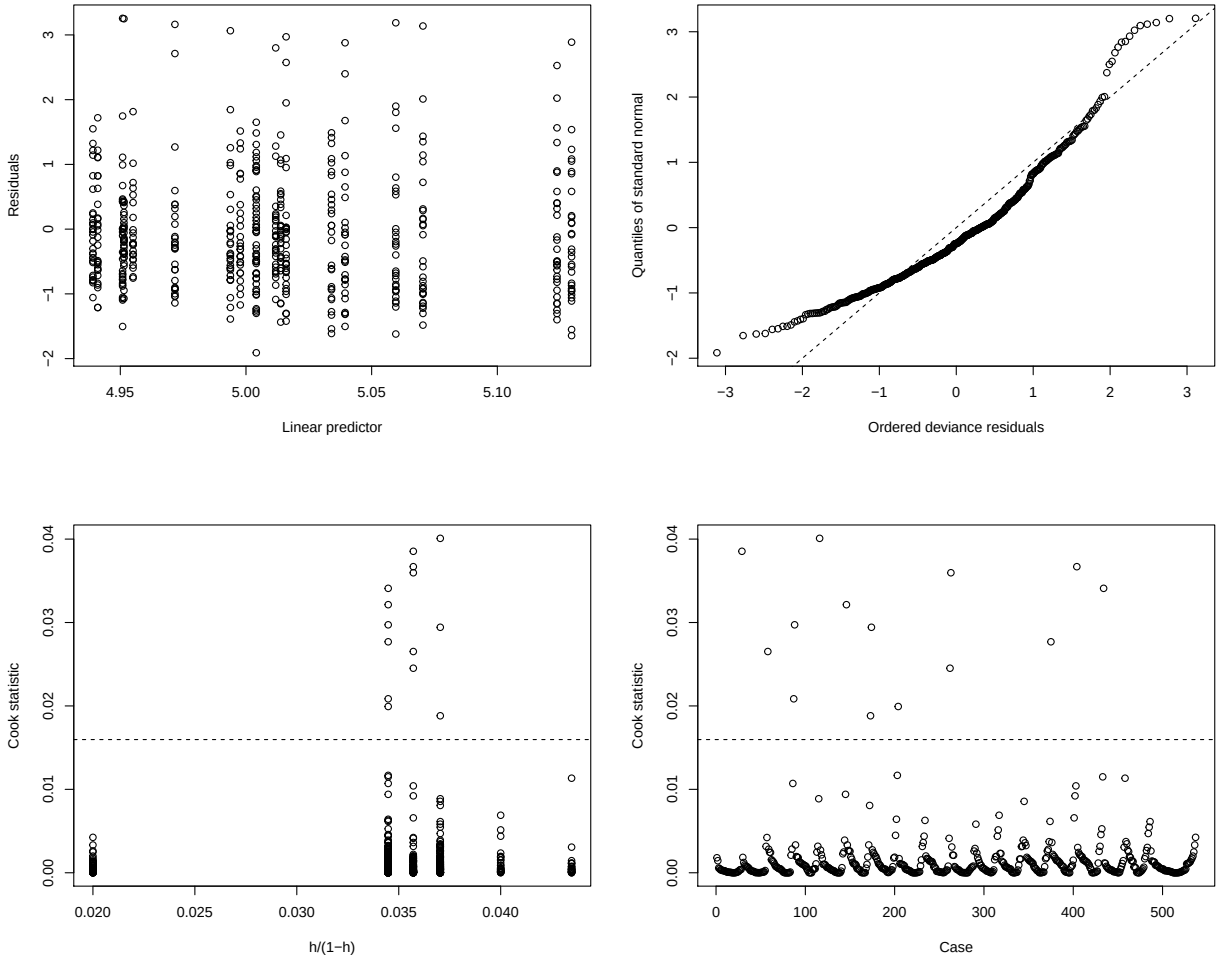

Figure S 9: Diagnostic plots Gamma-GLM cold tolerance change during domestication.

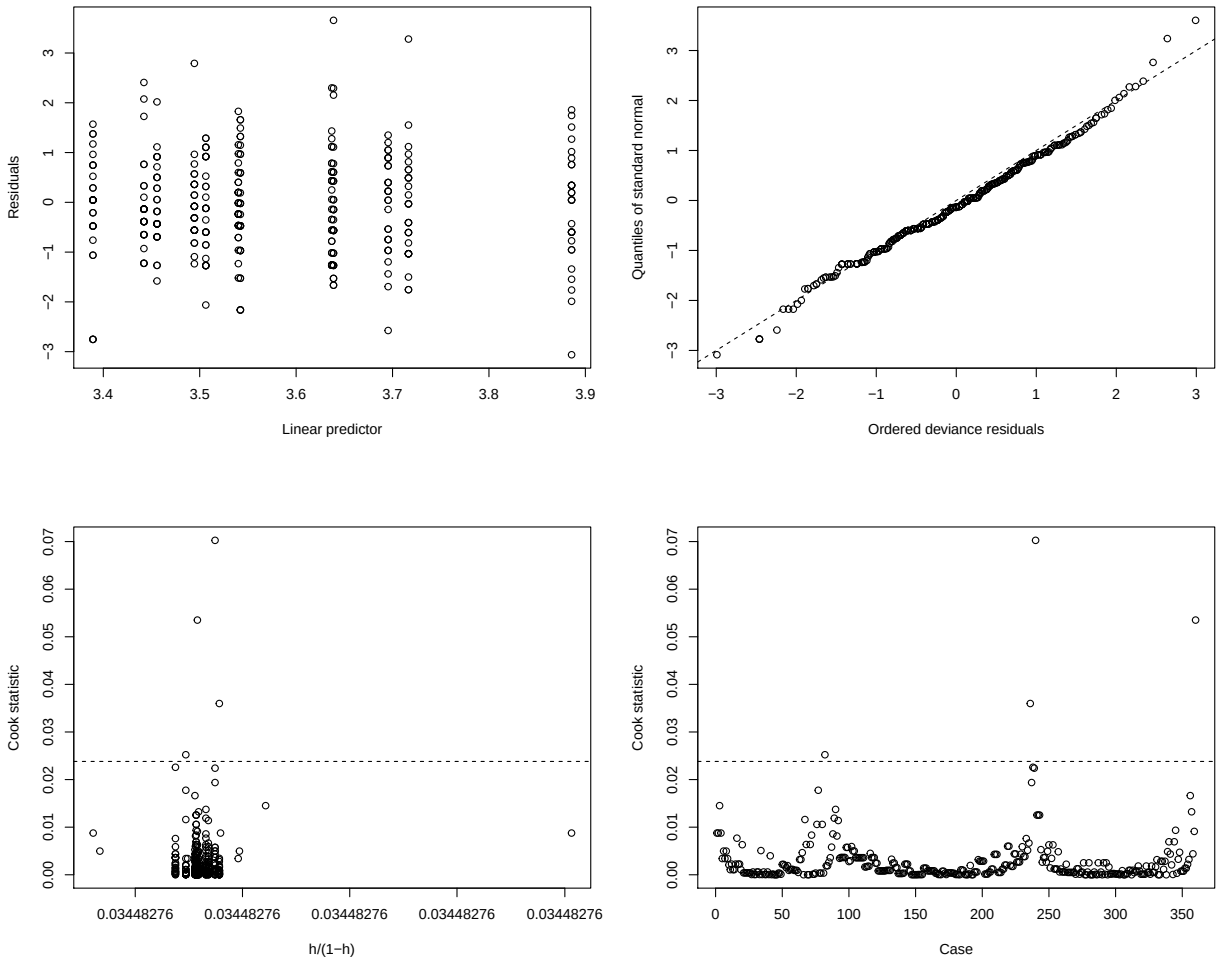

Figure S 10: Diagnostic plots Gamma-GLM desiccation tolerance in wild Qfly populations.

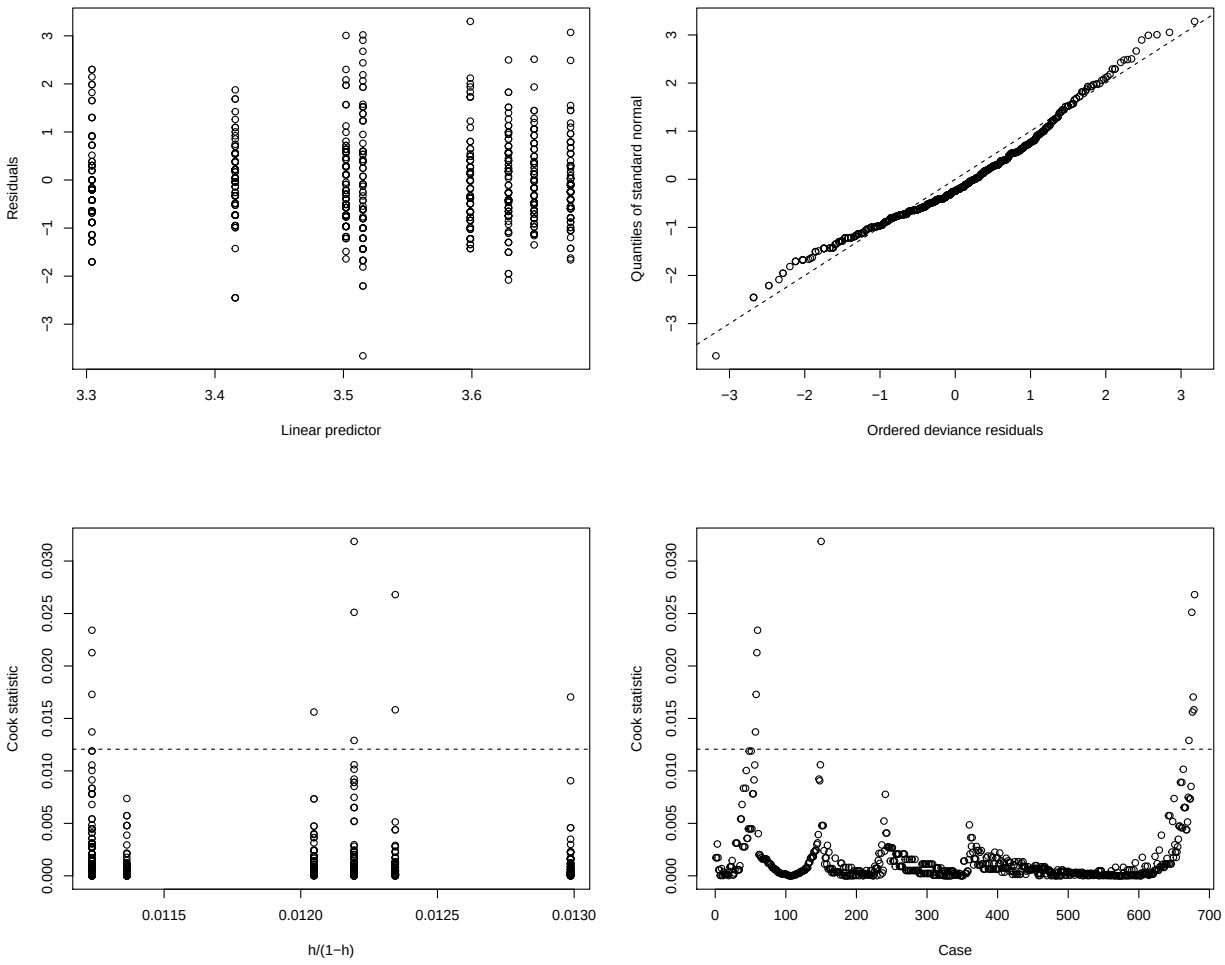

Figure S 11: Diagnostic plots Gamma-GLM desiccation tolerance in domesticated populations of the Queensland fruit fly.

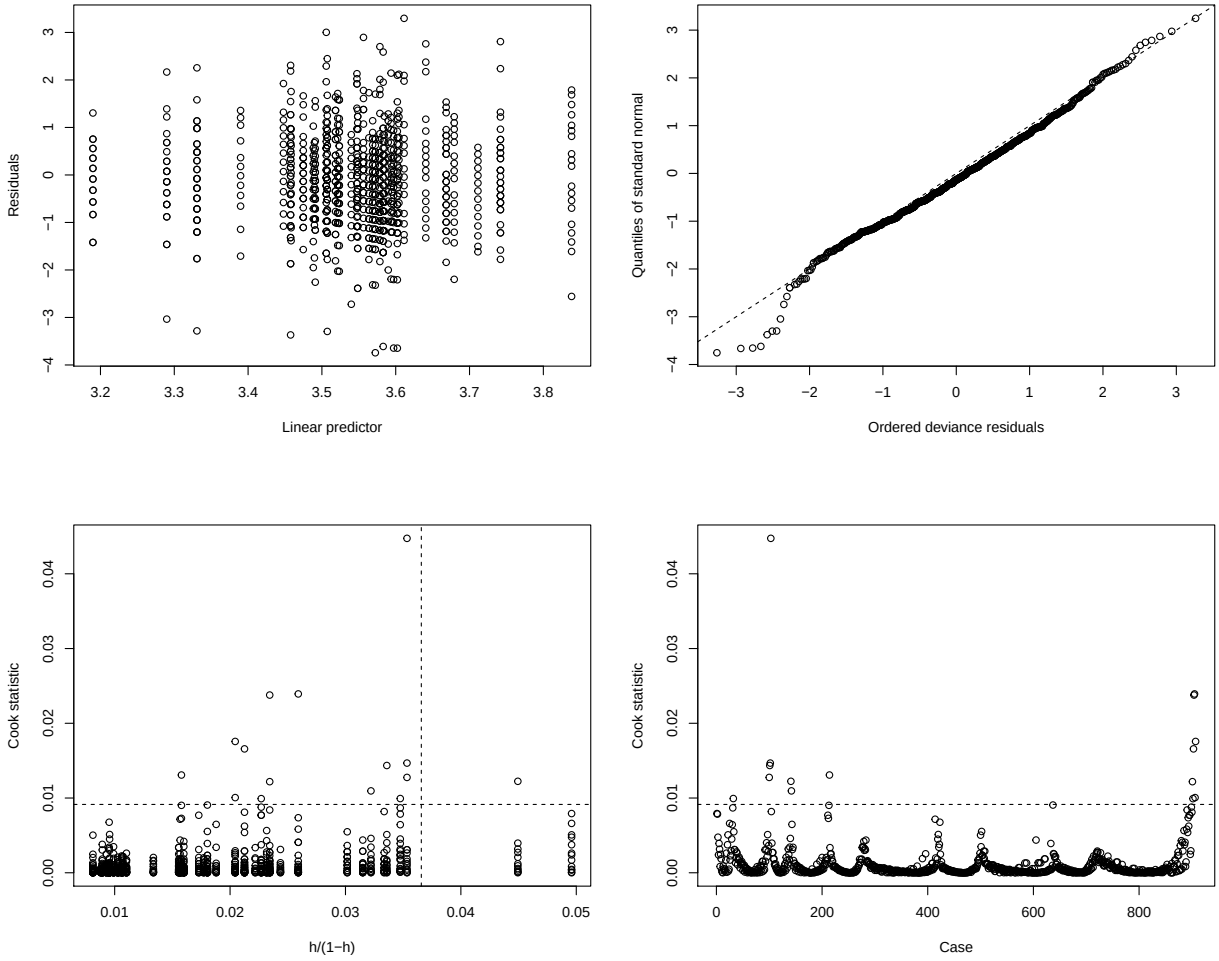

Figure S 12: Diagnostic plots Gamma-GLM desiccation tolerance change during domestication.

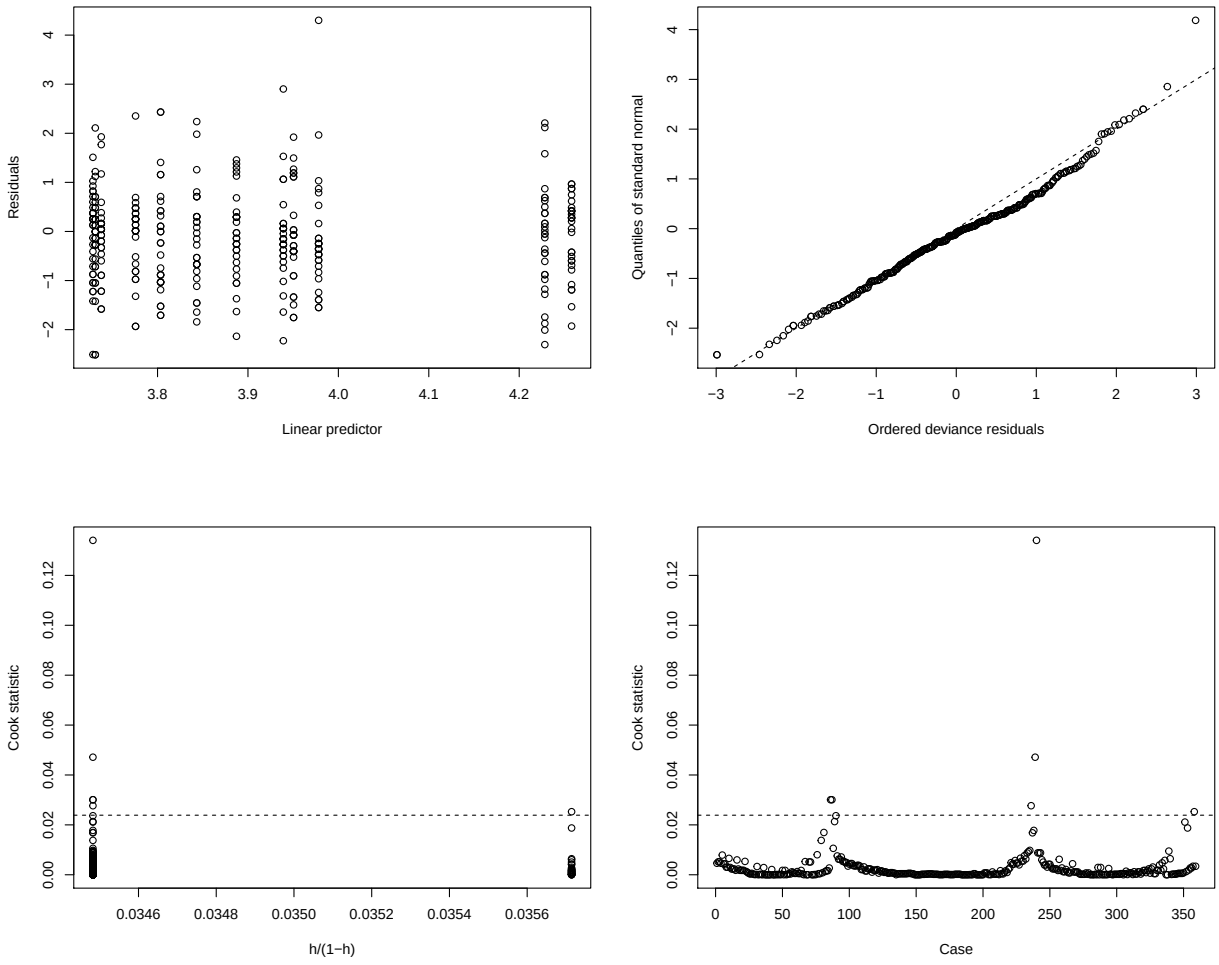

Figure S 13: Diagnostic plots Gamma-GLM starvation tolerance in wild Qfly populations.

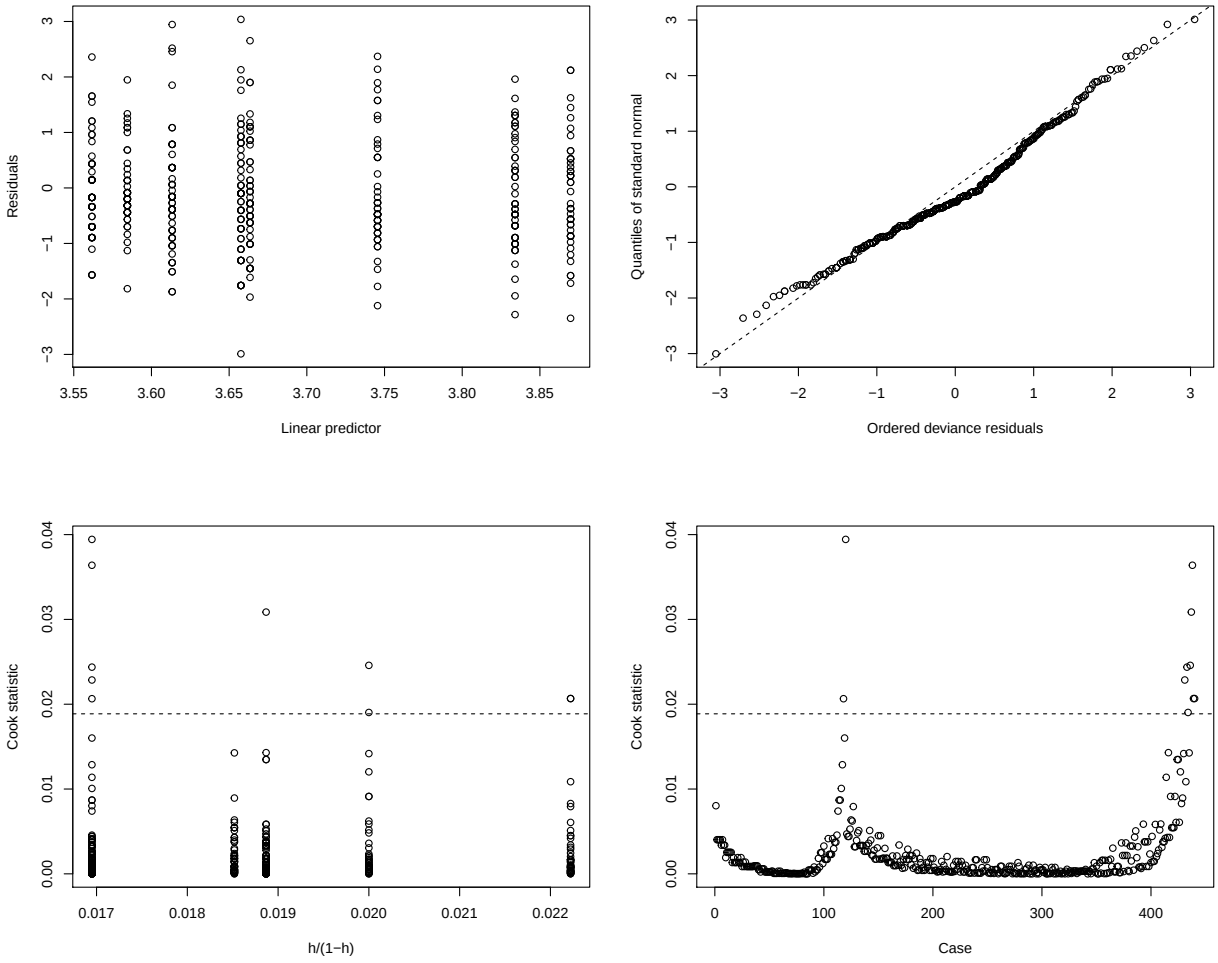

Figure S 14: Diagnostic plots Gamma-GLM starvation tolerance in domesticated populations of the Queensland fruit fly.

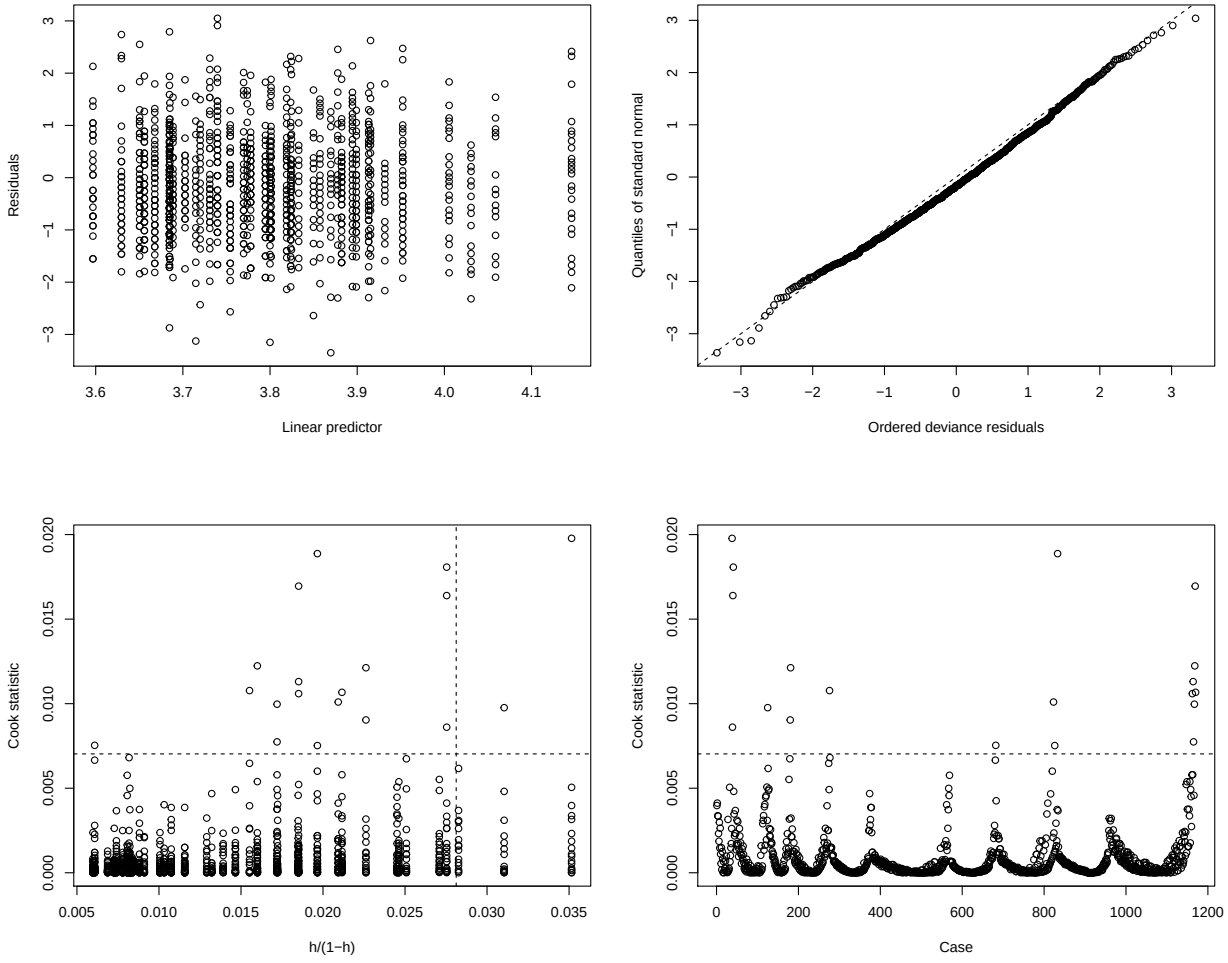

Figure S 15: Diagnostic plots Gamma-GLM starvation tolerance change during domestication.

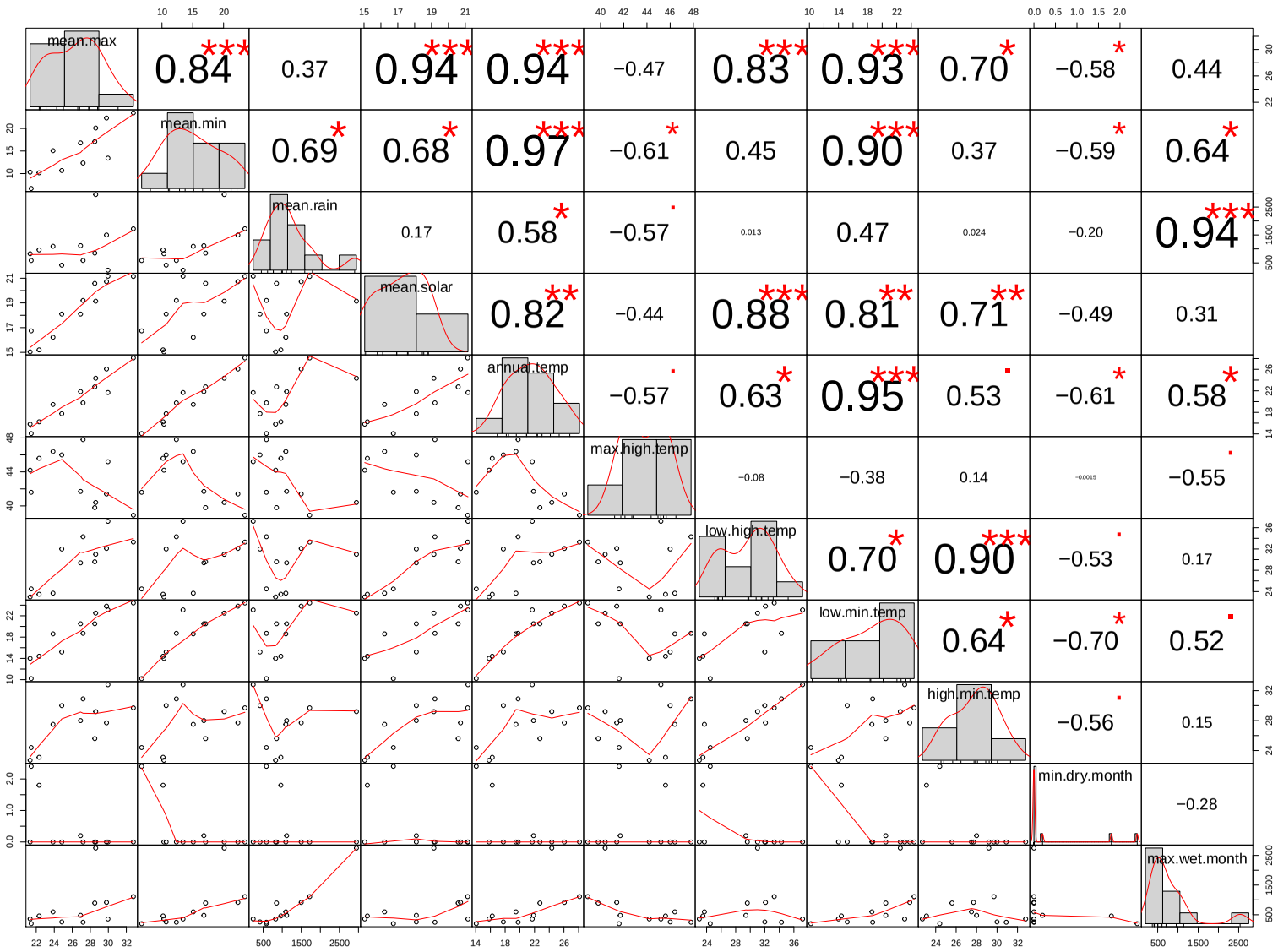

Figure S 16: **Correlation among 11 climatic variables**. Correlation values are presented together with asterisks indicating significance values for each correlation. '*' $p < 0.05$; . '**' $p < 0.01$; '**' $p < 0.001$. **mean.max**= Annual max temperature; **mean.min** = Annual mim temperature; **mean.rain** = Annual rainfall; **mean.solar**= Annual solar exposure; **annual**.temp = Annual temperature; **max.high.temp** = Maximum temperature of the warmest month; **low.high.temp** = Mimimum temperature of the warmest month; **low.min.temp** = Minimum temperature of the coldest month; **high.min.temp** = Minimum temperature of the coldest month; **min.dry.month**= Precipitation of the driest month; **max.wet.month** = Precipitation of the wettest month.

R packages used in the statistical analyses.

R version 3.6.1 (2019-07-05)

Platform: x86_64-w64-mingw32/x64 (64-bit)

attached base packages: *grid*, *stats*, *graphics*, *grDevices*, *utils*, *datasets*, *methods* and *base*

other attached packages: *raster(v.2.9-5)*, *rgdal(v.1.4-4)*, *ggrepel(v.0.8.1)*, *pander(v.0.6.3)*, *PerformanceAnalytics(v.1.5.3)*, *xts(v.0.11-2)*, *zoo(v.1.8-6)*, *vegan(v.2.5-5)*, *permute(v.0.9-5)*, *emmeans(v.1.3.5)*, *boot(v.1.3-22)*, *nortest(v.1.0-4)*, *jtrans(v.0.2.1)*, *Hmisc(v.4.2-0)*, *Formula(v.1.2-3)*, *survival(v.2.44-1.1)*, *lattice(v.0.20-38)*, *xtable(v.1.8-4)*, *psych(v.1.8.12)*, *egg(v.0.4.2)*, *gridExtra(v.2.3)*, *sp(v.1.3-1)*, *cowplot(v.1.0.0)*, *ggpubr(v.0.2)*, *magrittr(v.1.5)*, *ggridges(v.0.5.1)*, *forcats(v.0.4.0)*, *stringr(v.1.4.0)*, *dplyr(v.0.8.3)*, *purrr(v.0.3.2)*, *readr(v.1.3.1)*, *tidyr(v.0.8.3)*, *tibble(v.2.1.3)*, *ggplot2(v.3.2.1)*, *tidyverse(v.1.2.1)* and *wesanderson(v.0.3.6)*

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