

Additional file 1

**Table S1.** *C. elegans* life-history variation among PQ levels at 20 °C on live *E. coli*

Trait	PQ Treatment	Mean (SEM)	n	F	P
<b>Total Reproduction</b>					
A	Control	237.32 (7.95)	50	$\chi^2 = 7.980$	0.046
B	Low	258.51 (8.57)	43		
AB	Medium	249.58 (8.38)	45		
AB	High	260.92 (8.11)	48		
<b>Early Reproduction</b>					
A	Control	151.98 (5.75)	50	$\chi^2 = 55.03$	<0.0001
B	Low	163.56 (6.20)	43		
A	Medium	141.71 (6.06)	45		
C	High	101.52 (5.87)	48		
<b>Late Reproduction</b>					
A	Control	85.34 (5.72)	50	$\chi^2 = 58.98$	<0.0001
AB	Low	94.95 (6.17)	43		
B	Medium	107.9 (6.03)	45		
C	High	159.4 (5.84)	48		
<b>Lifespan</b>					
A	Control	16.82 (0.80)	50	8.371	<0.0001
AB	Low	17.79 (0.86)	43		
B	Medium	19.71 (0.85)	45		
B	High	22.19 (0.82)	48		
<b>Relative Fitness</b>					
A	Control	1.114 (0.04)	50	15.204	<0.0001
A	Low	1.195 (0.05)	43		
A	Medium	1.080 (0.05)	45		
B	High	0.800 (0.04)	48		

Trait means, their standard errors (SEM), and sample sizes (n) are reported for each PQ treatment level.

Note Total Reproduction and Early Reproduction were analyzed using Wilcoxon/ Kruskal – Wallis rank sum test with one-way chi-square approximation (see text). Initial sample sizes were n = 50 per PQ treatment; departures from this number reflect missing data from worms that died from desiccation after crawling up the sides of Petri plates. df = 3 for all traits. Letters beneath each trait name show groups statistically indistinguishable in post-hoc comparisons.

**Table S2.** *C. elegans* life-history variation among PQ levels at 25 °C on live *E. coli*

Trait	PQ Treatment	Mean (SEM)	n	F	P
<b>Total Reproduction</b>					
A	Control	176.5 (6.14)	56	5.422	0.001
B	Low	205.7 (6.25)	54		
AB	Medium	198.9 (6.31)	53		
A	High	178.7 (6.37)	52		
<b>Early Reproduction</b>					
A	Control	143.0 (4.84)	56	41.48	<0.0001
A	Low	160.5 (4.93)	54		
A	Medium	150.0 (4.98)	53		
B	High	88.39 (5.02)	52		
<b>Late Reproduction</b>					
A	Control	34.22 (4.65)	54	26.91	<0.0001
A	Low	48.32 (4.83)	50		
A	Medium	49.35 (4.74)	52		
B	High	91.27 (4.79)	52		
<b>Lifespan</b>					
	Control	12.71 (0.53)	56	0.491	0.689
	Low	13.19 (0.54)	54		
	Medium	13.19 (0.55)	53		
	High	12.40 (0.55)	52		
<b>Relative Fitness</b>					
A	Control	1.019 (0.03)	56	39.76	<0.0001
A	Low	1.115 (0.03)	54		
A	Medium	1.001 (0.03)	53		
B	High	0.660 (0.03)	52		

Trait means, their standard errors (SEM), and sample sizes (n) are reported for each PQ treatment level.

Initial sample sizes were n = 60 per PQ treatment; departures from this number reflect missing data from worms that died from desiccation after crawling up the sides of Petri plates. df = 3 for all traits. Letters beneath each trait name show groups statistically indistinguishable in post-hoc comparisons.

**Table S3.** *C. elegans* life-history variation among PQ levels at 20 °C on UV-killed *E. coli*

Trait	PQ Treatment	Mean (SEM)	n	F	P
<b>Total Reproduction</b>					
A	Control	223.9 (7.32)	39	65.78	<0.0001
A	Low	209.4 (7.42)	38		
B	Medium	148.3 (7.52)	37		
C	High	71.04 (9.54)	23		
<b>Early Reproduction</b>					
A	Control	59.87 (4.37)	39	66.59	<0.0001
B	Low	44.84 (3.02)	38		
C	Medium	14.97 (3.07)	37		
D	High	0.700 (3.89)	23		
<b>Late Reproduction</b>					
A	Control	164.0 (6.68)	39	30.41	<0.0001
A	Low	164.5 (6.76)	38		
B	Medium	133.4 (6.85)	37		
C	High	70.35 (8.69)	23		
<b>Lifespan</b>					
	Control	23.62 (1.09)	39	0.688	0.561
	Low	22.13 (1.11)	38		
	Medium	24.30 (1.12)	37		
	High	22.91 (1.42)	23		
<b>Relative Fitness</b>					
A	Control	1.048 (0.04)	39	77.84	<0.0001
B	Low	0.848 (0.05)	38		
C	Medium	0.389 (0.05)	37		
D	High	0.079 (0.06)	23		

Trait means, their standard errors (SEM), and sample sizes (n) are reported for each PQ treatment level.

Initial sample sizes were n = 50 per PQ treatment; departures from this number reflect missing data from worms that died from desiccation after crawling up the sides of Petri plates. df = 3 for all traits. Letters beneath each trait name show groups statistically indistinguishable in post-hoc comparisons.

**Table S4.** Phenotypic variances, covariances, and correlations for *C. elegans* at 20 °C on live *E. coli*

n		Total	Early	Late	Lifespan	Fitness
Control (50)	Total	2583 (1195)	1496	1088	114.7	11.66
	Early	<b>0.870</b>	1486 (476.1)	10.81	66.01	10.82
	Late	<b>0.724</b>	0.009	1081 (208.9)	48.37	0.787
	Lifespan	<b>0.535</b>	0.386	0.323	21.91 (4.094)	0.531
	Fitness	<b>0.901</b>	<b>1</b>	0.087	0.412	0.084 (0.026)
Low (43)	Total	3766 (1441)	2311	1458	94.04	17.87
	Early	<b>0.979</b>	1905 (704.2)	400.3	57.61	13.57
	Late	<b>0.789</b>	0.304	1060 (192.8)	36.75	4.370
	Lifespan	<b>0.394</b>	0.338	0.275	17.78 (3.464)	0.423
	Fitness	<b>1</b>	<b>1</b>	<b>0.448</b>	0.336	0.103 (0.036)
Medium (45)	Total	2944 (901.5)	1691	1238	63.09	14.84
	Early	<b>0.768</b>	1834 (371.1)	-143.2	20.22	13.43
	Late	<b>0.652</b>	-0.094	1382 (338.5)	42.57	1.413
	Lifespan	0.188	0.075	0.182	42.76 (9.178)	0.123
	Fitness	<b>0.880</b>	<b>0.987</b>	0.120	0.059	0.109 (0.025)
High (48)	Total	3180 (836.0)	816.3	2359	-10.55	8.532
	Early	<b>0.417</b>	1298 (218.4)	-479.8	18.59	8.480
	Late	<b>0.821</b>	-0.257	2837 (593.2)	-29.07	0.051
	Lifespan	-0.030	0.081	-0.086	43.10 (8.863)	0.148
	Fitness	<b>0.634</b>	<b>0.969</b>	0.004	0.093	0.062 (0.012)

Phenotypic variances appear on the diagonal, covariances above diagonal, and correlations below diagonal. PQ treatment groupings are shown on the left with sample sizes in parentheses. Standard errors for phenotypic variances are shown in parentheses. Correlations statistically different from zero are in bold.

**Table S5.** Phenotypic variances, covariances, and correlations for *C. elegans* at 25 °C on live *E. coli*

n		Total	Early	Late	Lifespan	Fitness
Control (56)	Total	1229 (237.1)	806.9	380.0	-11.17	5.381
	Early	<b>0.835</b>	804.5 (148.3)	-31.40	0.383	5.281
	Late	<b>0.551</b>	-0.056	411.5 (84.75)	-17.95	-0.042
	Lifespan	-0.081	0.003	-0.224	16.78 (3.894)	-0.028
	Fitness	<b>0.808</b>	<b>0.979</b>	-0.011	-0.036	0.038 (0.007)
Low (54)	Total	1880 (472.5)	909.5	839.4	-28.66	6.511
	Early	<b>0.811</b>	739.0 (183.6)	128.3	-15.63	4.896
	Late	<b>0.759</b>	0.185	711.5 (158.1)	-42.60	1.378
	Lifespan	-0.155	-0.135	<b>-0.372</b>	19.60 (3.344)	-0.155
	Fitness	<b>0.819</b>	<b>0.980</b>	0.274	-0.188	0.037 (0.009)
Medium (53)	Total	2750 (632.2)	1733	1028	-68.36	12.98
	Early	<b>0.770</b>	1979 (394.6)	-219.1	-63.77	12.64
	Late	<b>0.589</b>	-0.147	1243 (388.6)	-12.38	0.433
	Lifespan	<b>-0.348</b>	<b>-0.380</b>	-0.095	15.14 (3.081)	-0.453
	Fitness	<b>0.867</b>	<b>0.990</b>	0.044	<b>-0.406</b>	0.088 (0.018)
High (52)	Total	2491 (757.8)	858.1	1320	31.26	7.544
	Early	<b>0.442</b>	1673 (312.2)	-966.43	47.79	7.819
	Late	<b>0.584</b>	<b>-0.510</b>	2250 (358.0)	-26.98	-1.417
	Lifespan	0.204	<b>0.372</b>	-0.181	10.61 (2.637)	0.257
	Fitness	<b>0.770</b>	<b>0.951</b>	-0.148	<b>0.396</b>	0.043 (0.011)

Phenotypic variances appear on the diagonal, covariances above diagonal, and correlations below diagonal. PQ treatment groupings are shown on the left with sample sizes in parentheses. Standard errors for phenotypic variances are shown in parentheses. Correlations statistically different from zero are in bold.

**Table S6.** Phenotypic variances, covariances, and correlations for *C. elegans* at 20 °C on UV-killed *E. coli*

n		Total	Early	Late	Lifespan	Fitness
Control (39)	Total	1521 (281.3)	540.2	978.5	-14.11	9.441
	Early	<b>0.587</b>	593.6 (126.6)	-52.99	-52.76	8.471
	Late	<b>0.802</b>	-0.070	1032 (186.3)	38.79	0.964
	Lifespan	-0.056	<b>-0.339</b>	0.188	44.18 (10.01)	-0.783
	Fitness	<b>0.696</b>	<b>1</b>	0.086	<b>-0.341</b>	0.129 (0.027)
Low (38)	Total	2204 (958.6)	436.3	1769	107.9	8.454
	Early	<b>0.486</b>	434.9 (80.34)	1.255	-0.972	6.070
	Late	<b>1</b>	0.002	1770 (590.0)	109.3	2.335
	Lifespan	<b>0.351</b>	-0.007	<b>0.385</b>	50.98 (9.305)	0.098
	Fitness	<b>0.655</b>	<b>0.997</b>	0.196	0.047	0.091 (0.022)
Medium (37)	Total	2095 (505.1)	219.5	1883.2	-42.32	6.530
	Early	<b>0.381</b>	171.4 (34.13)	48.80	-9.580	2.192
	Late	<b>1</b>	0.090	1832 (453.0)	-33.46	4.331
	Lifespan	-0.143	-0.113	-0.121	45.52 (10.70)	-0.182
	Fitness	<b>0.759</b>	<b>0.884</b>	<b>0.538</b>	-0.143	0.038 (0.006)
High (23)	Total	2493 (537.3)	39.07	2451	158.2	3.400
	Early	0.208	10.61 (9.939)	28.33	7.711	0.195
	Late	<b>1</b>	0.154	2424 (539.9)	150.3	3.207
	Lifespan	<b>0.551</b>	0.346	<b>0.532</b>	36.31 (9.558)	0.303
	Fitness	<b>0.867</b>	0.637	<b>0.833</b>	<b>0.647</b>	0.008 (0.003)

Phenotypic variances appear on the diagonal, covariances above diagonal, and correlations below diagonal. PQ treatment groupings are shown on the left with sample sizes in parentheses. Standard errors for phenotypic variances are shown in parentheses. Correlations statistically different from zero are in bold.

**Table S7.** Treatment-specific estimates of demographic aging parameters.

<b>PQ level</b>	<b>IMR (days<sup>-1</sup>)</b>	<b>ROA</b>	<b>MRDT (days)</b>	<b>Median</b>
<b>20 °C, live <i>E. coli</i></b>				
Control	0.005216	0.2217	3.12651	16
Low	0.004538	0.2061	3.36316	16
Medium	0.01263	0.1214	5.709614	19
High	0.011251	0.1053	6.582594	21
<b>25 °C, live <i>E. coli</i></b>				
Control	0.015227	0.1908	3.632847	11
Low	0.014162	0.1781	3.891899	11
Medium	0.014997	0.1943	3.567407	12
High	0.013801	0.2271	3.052167	11
<b>20 °C, UV-killed <i>E. coli</i></b>				
Control	0.007965	0.1157	5.9909	23
Low	0.009262	0.1242	5.580895	23
Medium	0.010635	0.1069	6.484071	24
High	0.009503	0.1333	5.199904	23

For each assay and PQ treatment, point estimates of initial adult mortality (IMR), rate of aging (ROA), mortality rate doubling time (MRDT) and the median age at which survival = 0.5 (Median) are reported.

IMR =  $e^{\text{intercept of regression of } \ln u_x \text{ on age class}}$ ; RoA = slope of the same regression. MRDT =  $(\ln(2)/\text{RoA})$ , and Median = age at which survival or  $l_x = 0.5$ . Sample sizes for each treatment are the same as those in Tables S4-S6.