**Supplementary File: Svanbäck and Johansson**

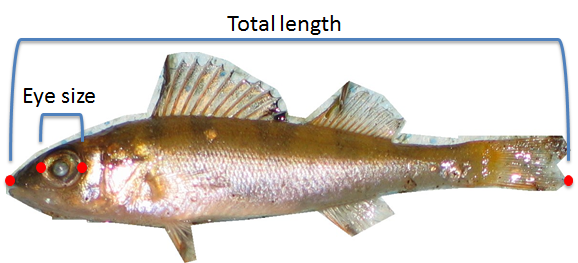


Figure S1. Landmarks digitized for measuring Eye size and Total length.



Figure S2. Relationship between eye size and total length for the fish in the open water trials in the predation experiment. Red symbols represent individuals that were eaten during the trial and green symbols, individuals surviving. The number above each plot represent the trial number.



Figure S3. Relationship between eye size and total length for the fish in the vegetation trials in the predation experiment. Red symbols represent individuals that were eaten during the trial and green symbols, individuals surviving. The number above each plot represent the trial number.



Figure S4. Box plots of selection differential on standardized relative eye size for the fish in the vegetation trials in the predation experiment. Points show individual trials’ (experimental tanks) selection differentials. P-values inside a box shows whether the average selection gradient is different from zero and p-values between the boxes shows whether there were differences in selection between the environments.



Figure S5. Visualizations of the two significant three-way interactions in the plasticity experiment from the nested anova on eye size (see Table S4). Top row shows the significant sex × ration × length interaction (p = 0.0233), divided by males (top left) and females (top right). Bottom row shows the marginally insignificant pike × sex × length interaction (p = 0.0520) divided by with pike treatments (bottom left) and without pike treatments (bottom right). Open symbols and dotted lines represent low food ration treatments, grey symbols and hatched lines represent medium ration treatments and black symbols and full drawn lines represent high food ration treatments.



Figure S6. Differences in eye size from the plasticity experiment in relation to body size between males (blue symbols and lines) and females (red symbols and lines) raised with predators (filled symbols and full drawn lines) and without (open symbols and dotted lines).

Table S1. Estimated standard errors for the slope of from the logistic regression analyses of natural selection for each trial in the predator selection experiment for eye size (E) and length (L), and the quadratic (E × E, and L × L) and correlational (E × L) selection gradients for each experimental replicate for trials done in open water and vegetation.

Environment E L E×E L×L E×L

**Open water**

Trial #6 0.537 0.589 0.655 0.660 1.115

Trial #8 0.568 0.624 0.633 0.750 1.033

Trial #10 1.005 0.944 0.798 0.840 1.339

Trial #12 0.638 0.511 0.669 0.685 0.891

Trial #14 0.746 0.881 0.904 1.137 1.930

Trial #16 0.553 0.670 0.503 0.910 0.888

Trial #21 0.659 0.551 0.578 0.518 0.851

Trial #23 0.697 0.642 0.717 0.738 1.506

Trial #24 0.944 0.845 1.379 1.473 2.502

Trial #27 1.222 1.271 2.894 3.268 6.029

Trial #28 1.003 0.984 2.059 2.139 4.007

**Vegetation**

Trial #5 0.621 0.570 0.624 0.480 0.628

Trial #11 1.159 1.146 1.881 2.193 3.443

Trial #13 0.635 0.852 0.667 0.838 1.424

Trial #19 0.557 0.543 0.537 0.737 0.998

Trial #22 0.556 0.522 0.775 0.819 1.358

Trial #25 0.856 0.880 1.481 1.182 2.758

Table S2. Summary statistics from mixed effect logistic regression models testing the effects of eye size and fish length on survival in open water and in vegetation, and if the effects are different between the two environments (open water and vegetation).

Factor Chi-sq Df P

**Open water**

Eye size (E) 27.20 1 <0.001

Length (L) 13.55 1 <0.001

E × E 0.65 1 0.420

L × L 0.31 1 0.580

E × L 0.02 1 0.898

**Vegetation**

E 4.45 1 0.035

L 0.48 1 0.487

E × E 0.67 1 0.413

L × L 0.79 1 0.372

E × L 0.31 1 0.578

**Open water vs Vegetation**

E 31.60 2 <0.001

L 13.77 2 0.001

E × E 2.65 2 0.263

L × L 1.06 2 0.588

E × L 0.41 2 0.814

Table S3. Summary statistic from selection experiment of mean ± SE of A) relative eye size and B) Body size at the beginning of the experiment (before selection) and for the surviving and dead individuals at the end of the experiment (after selection).

Environment Before selection After selection

Alive Dead

Mean SE Mean SE Mean SE

1. **Relative Eye Size (to body size)**

**Open water**

Trial #6 0.08374 0.00068 0.08269 0.00098 0.08445 0.00091

Trial #8 0.08274 0.00074 0.08151 0.00101 0.08432 0.00099

Trial #10 0.08403 0.00084 0.08204 0.00069 0.08627 0.00144

Trial #12 0.08232 0.00063 0.08089 0.00113 0.08324 0.00068

Trial #14 0.08496 0.00059 0.08380 0.00086 0.08612 0.00074

Trial #16 0.08518 0.00073 0.08457 0.00112 0.08572 0.00097

Trial #21 0.08240 0.00067 0.08168 0.00075 0.08316 0.00114

Trial #23 0.08550 0.00068 0.08434 0.00101 0.08653 0.00086

Trial #24 0.08718 0.00090 0.08509 0.00141 0.08905 0.00100

Trial #27 0.08339 0.00054 0.08288 0.00064 0.08380 0.00083

Trial #28 0.08454 0.00058 0.08396 0.00108 0.08494 0.00066

**Vegetation**

Trial #5 0.07814 0.00095 0.07706 0.00183 0.07863 0.00112

Trial #11 0.08089 0.00055 0.08070 0.00074 0.08136 0.00057

Trial #13 0.08415 0.00065 0.08323 0.00076 0.08502 0.00102

Trial #19 0.08234 0.00074 0.08192 0.00087 0.08301 0.00133

Trial #22 0.08468 0.00068 0.08485 0.00098 0.08446 0.00094

Trial #25 0.08486 0.00055 0.08453 0.00062 0.08562 0.00117

1. **Body size (Length, mm)**

**Open water**

Trial #6 49.17 0.48 49.42 0.56 49.00 0.72

Trial #8 48.81 0.45 49.72 0.59 47.64 0.59

Trial #10 47.82 0.37 48.22 0.56 47.37 0.47

Trial #12 49.33 0.40 50.07 0.62 48.85 0.52

Trial #14 51.05 0.51 52.22 0.60 49.88 0.75

Trial #16 47.82 0.41 47.81 0.45 47.83 0.68

Trial #21 53.80 0.54 53.83 0.71 53.76 0.85

Trial #23 52.88 0.62 53.70 0.93 52.15 0.83

Trial #24 47.50 0.70 49.29 1.22 45.89 0.58

Trial #27 51.11 0.80 51.75 1.14 50.60 1.12

Trial #28 52.61 0.74 53.57 1.42 51.95 0.78

**Vegetation**

Trial #5 49.56 0.46 50.20 1.16 49.27 0.44

Trial #11 50.11 0.38 50.12 0.49 50.10 0.56

Trial #13 47.78 0.38 48.68 0.49 46.94 0.50

Trial #19 53.44 0.66 53.50 0.88 53.35 1.05

Trial #22 53.85 0.55 54.05 0.67 53.60 0.95

Trial #25 54.02 0.65 54.64 0.78 52.63 1.15

Table S4. Results from Nested ANCOVA on the effects on raw eye size from the plasticity experiment using length as a covariate.

Treatment Df F-value p-value

pike 1,30 0.33 0.5690

sex 1,28 2.66 0.1141

ration 2,30 2.25 0.1229

length 1,28 35.69 <.0001

pike × sex 1,28 3.64 0.0667

pike × ration 2,30 0.31 0.7361

sex × ration 2,28 1.30 0.2888

pike × length 1,28 0.12 0.7269

sex × length 1,28 0.00 0.9737

ration × length 2,28 1.07 0.3572

pike × sex × ration 2,28 0.44 0.6476

pike × sex × length 1,28 0.37 0.5485

pike × ration × length 2,28 3.29 0.0520

sex × ration × length 2,28 4.31 0.0233