Electronic supplementary material

Negative associations between parasite avoidance, resistance and tolerance predict host health in salmonid fish populations

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Supplementary tables

Table S1 Coordinates of the rivers of origin of 10 salmonid populations used in the experiment.

River	Basin	Coordinates
Ii	Gulf of Bothnia	65°19'23"N, 25°21'30"E
Ingarskila	Gulf of Finland	60°02'45"N, 24°00'20"E
Iso	Gulf of Bothnia	62°12'56"N, 21°25'27"E
Lesti	Gulf of Bothnia	64°04'22"N, 23°37'39"E
Musta	Gulf of Finland	60°48'19"N, 28°43'54"E
Neva	Gulf of Finland	59°57'50"N, 30°13'20"E
Oulu	Gulf of Bothnia	65°01'00"N, 25°27'00"E
Simo	Gulf of Bothnia	65°37'00"N, 25°03'00"E
Tornio	Gulf of Bothnia	65°48'30"N, 24°08'45"E

Table S2 Sample sizes for all measured traits. Fish originated from two species and 10 genetically different populations.

Species	Population	Indirect avoidance	Direct avoidance	Resistance	Tolerance
Atlantic salmon	Ii	40	24	89	86
	Neva	17	15	92	87
	Oulu	43	26	91	85
	Simo	32	27	92	87
	Tornio	37	30	95	94
Sea trout	Ii	36	29	91	85
	Ingarskila	29	29	85	78
	Iso	36	30	88	80
	Lesti	30	27	89	79
	Musta	30	28	89	83

Table S3 Setup of experimental exposures. Fish from two species and altogether 10 populations were exposed to seven parasite genotypes in 2-3 blocks per genotype. Each block contained the same number of fish from each population.

Genotype	Block	Fish per population	Total no. of fish
1	1	6	60
	2	6	60
	3	4	40
2	1	6	60
	2	6	60
	3	4	40
3	1	6	60
	2	6	60
	3	6	60
4	1	6	60
	2	2	20
5	1	6	60
	2	6	60
6	1	6	60
	2	6	60
7	1	6	60
	2	6	60

Table S4 Loadings, eigenvalues and explained variance of the principal component analysis on boldness (latency to emergence from shelter) and exploration (number of grid crosses) for two rounds of personality tests.

| Variable	Round 1	Round 2
	PC 1	PC 1
Boldness	-0.838	-0.835
Exploration	0.838	0.835
Eigenvalue	1.40	1.39
% of variance	70.22	69.66

Supplementary figures

Figure S1
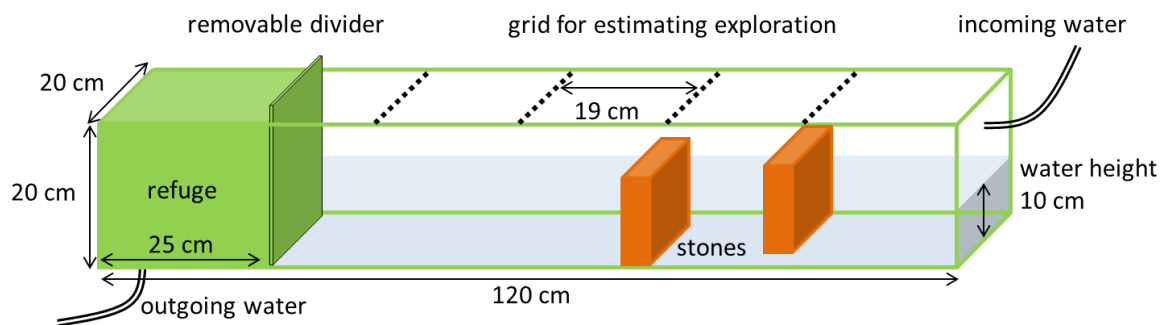
Experimental tank used for personality tests. Tanks consisted of a closed refuge at one end, while the rest of the tank was illuminated (800 lux). The open area contained two large stones in the opposite end of the refuge, which did not hinder fish movement, but prevented the view to the end of the tank. The open area was divided into five 19 cm zones using markings on the mesh lid covering the tank. Note that the whole tank was made of green opaque plastic and is presented transparent only for illustration purposes.

Figure S2
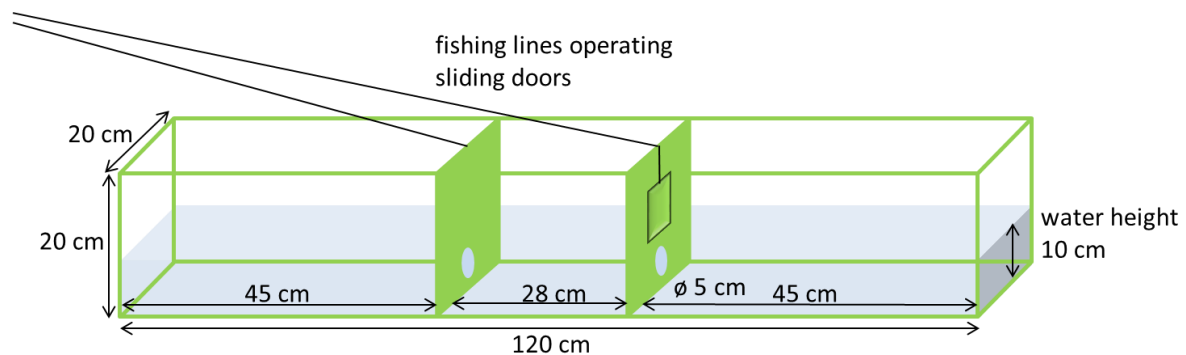
Experimental tank used for parasite avoidance tests. Note that the whole tank was made of green opaque plastic and is presented transparent only for illustration purposes.

Figure S3
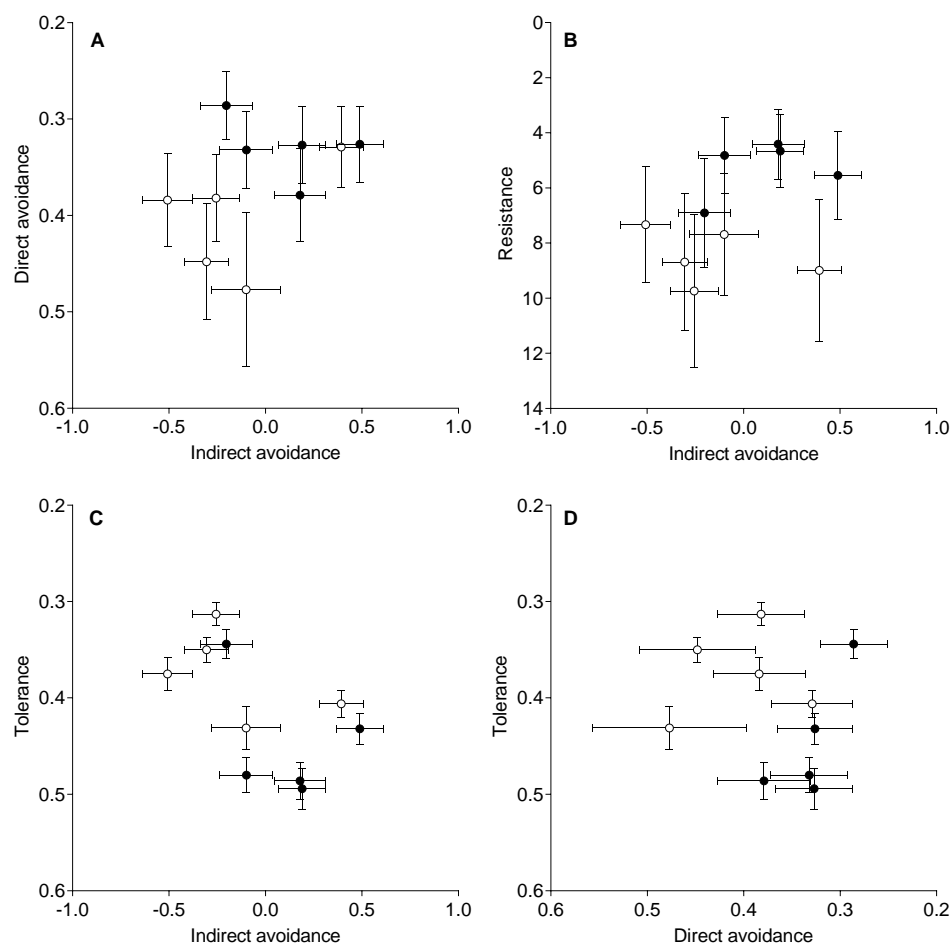
Associations between (A) indirect avoidance and direct avoidance, (B) indirect avoidance and resistance, (C) indirect avoidance and tolerance and (D) direct avoidance and tolerance in five populations of Atlantic salmon (open circles) and five populations of sea trout (filled circles). Note that the axes have been reversed for direct avoidance, resistance and tolerance to facilitate interpretation, i.e. for direct avoidance (proportion of time spent in the parasite compartment), resistance (parasite load) and tolerance (slope of cataract volume against parasite load) lower values indicate higher performance. For indirect avoidance (personality score) negative values represent relatively bold and fast exploring individuals and positive values relatively shy and slow exploring individuals.