



Animal-free Mechanistic Inference for species-specific Risk Assessment

AMIRA: Animal-free Mechanistic Inference for Risk
Assessment

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AMIRA Platform

chlorpyrifos

Search

Compare Species Sensitivity

Compare toxicity endpoints across aquatic species for chemicals in AMIRA

Submit Data/ Comments

Contact AMIRA team

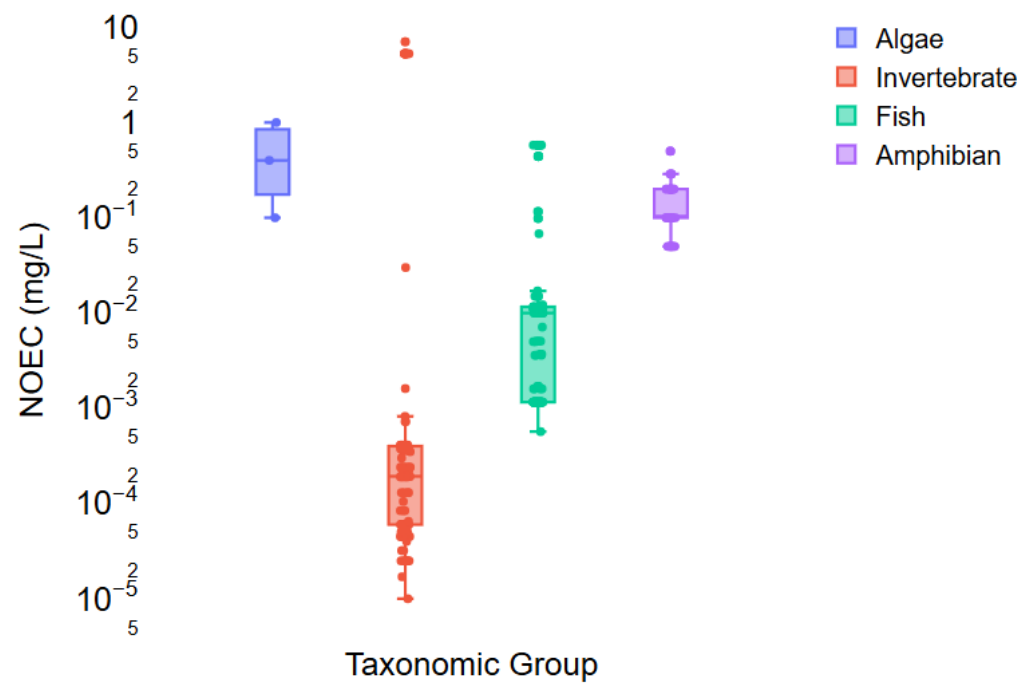
Download

Choose toxicity endpoint

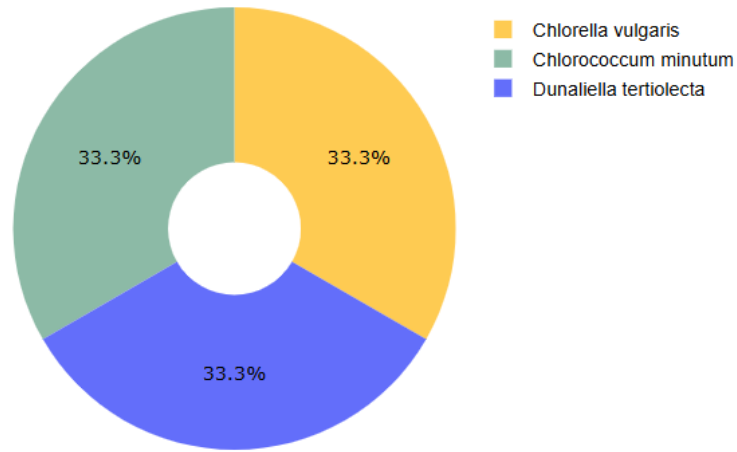
NOEC

Distribution of NOEC values

Chlorpyrifos



NOEC tests across algae species



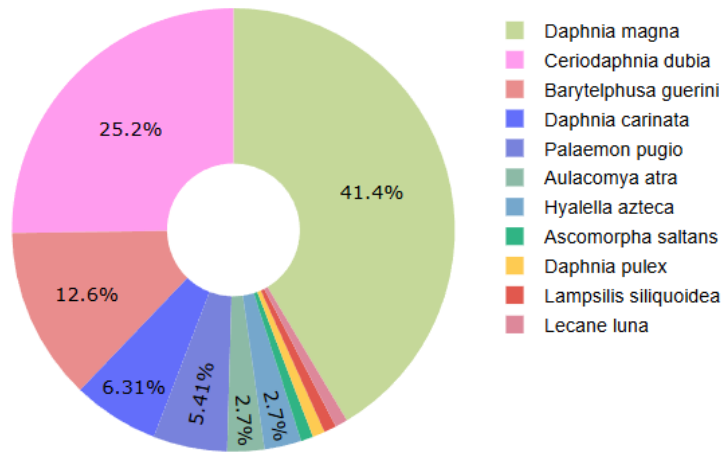
Ecotoxicity data (Algae)

result_id	test_id	obs_duration	obs_duration_unit	trend
2085752	2051430	5	Day(s)	Decreas
2085750	2051429	5	Day(s)	Decreas
712325	1260102	96	Hour(s)	Decreas

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NOEC tests across invertebrate species



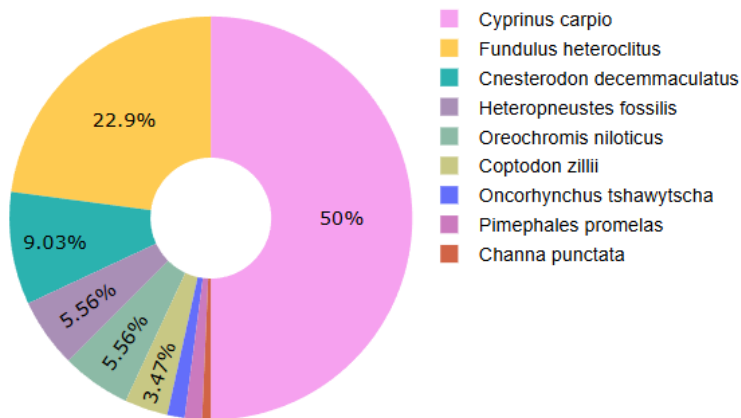
Ecotoxicity data (Invertebrates)

result_id	test_id	obs_duration	obs_duration_unit	effect
709576	1259441	21	Day(s)	Grow
710437	1260202	33	Day(s)	Reprc
712046	1261653	21	Day(s)	Mort.
710469	1260230	33	Day(s)	Reprc
712208	1261769	33	Day(s)	Reprc
712042	1261650	21	Day(s)	Reprc
716268	1264974	45	Day(s)	Bioch

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NOEC tests across fish species



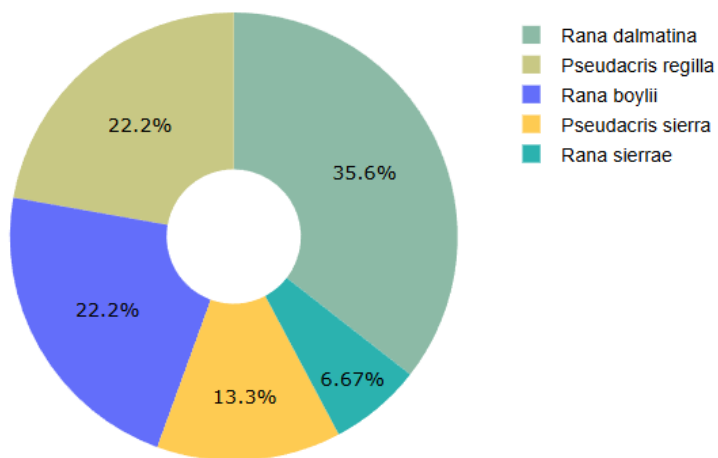
Ecotoxicity data (Fish)

result_id	test_id	obs_duration	obs_duration_unit	effect
2230687	2125643	4	Week(s)	Bioch
2225698	2123585	40	Day(s)	Gene
2195241	2106807	40	Day(s)	Bioch
2230773	2125681	4	Week(s)	Physi
2468892	2224151	42	Day(s)	Enzyr
709440	1259323	90	Day(s)	Reprc
2468897	2224151	42	Day(s)	Enzyr

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NOEC tests across amphibian species



Ecotoxicity data (Amphibians)

result_id	test_id	obs_duration	obs_duration_unit	trend
2082358	2049775	9	Day(s)	Decre
2086898	2051944	63	Day(s)	No et
2086940	2051965	30	Day(s)	Decre
2079523	2048425	54	Day(s)	Decre
2082355	2049775	54	Day(s)	Decre
2082342	2049775	57	Day(s)	Incre
2079507	2048424	45	Day(s)	Chan

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Source

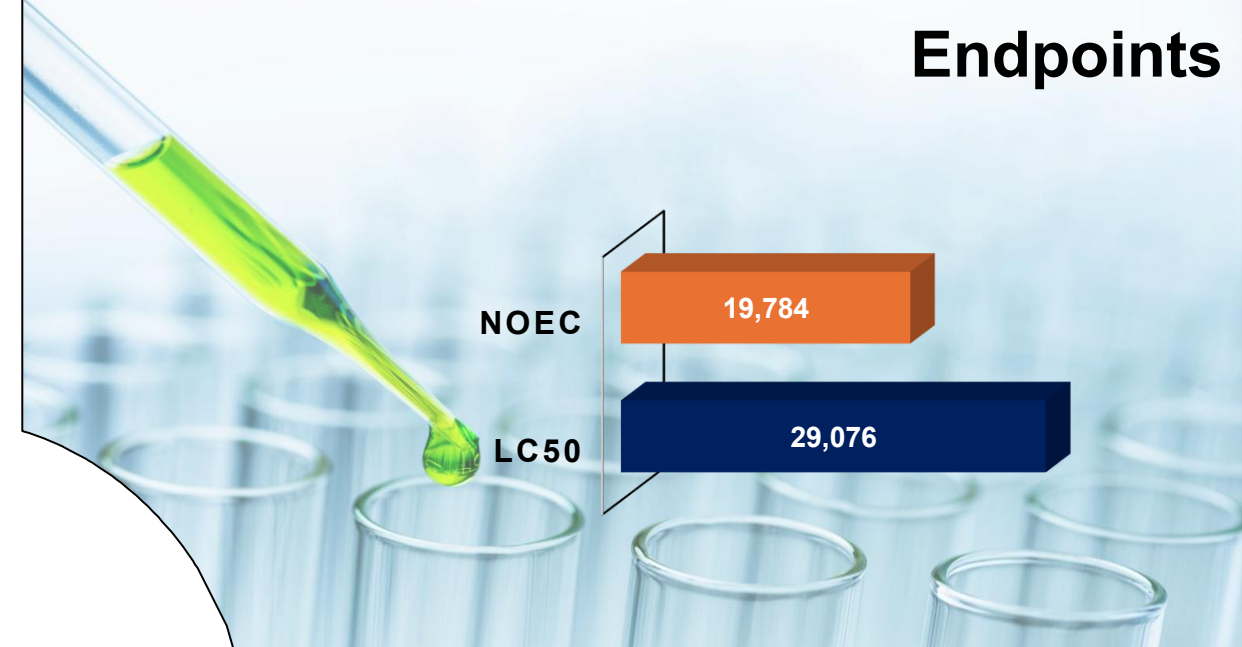


Pharmacology
and the patient –
Environmental
risks of human



ECOTOX
Gunnarsson et al.

Endpoints



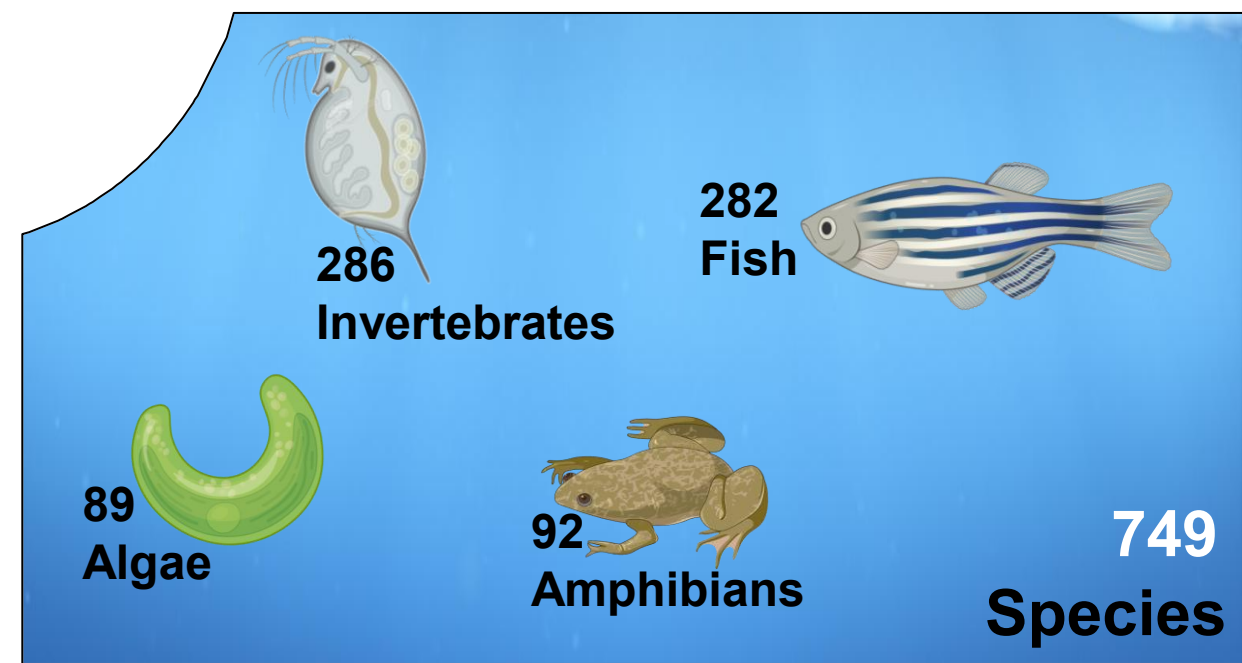
NOEC	19,784
LC50	29,076

AMIRA

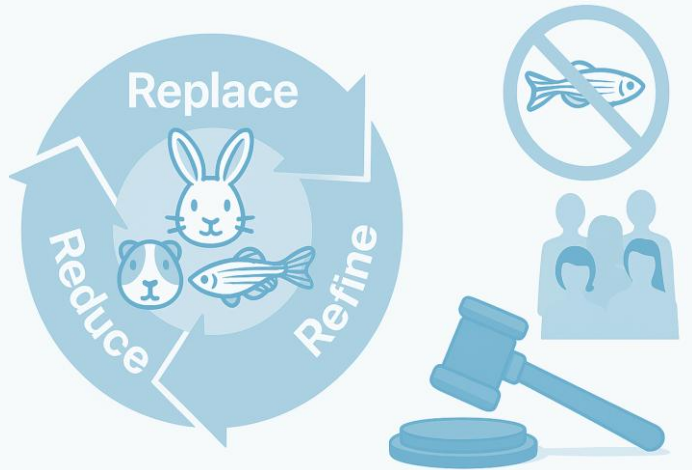
2,698



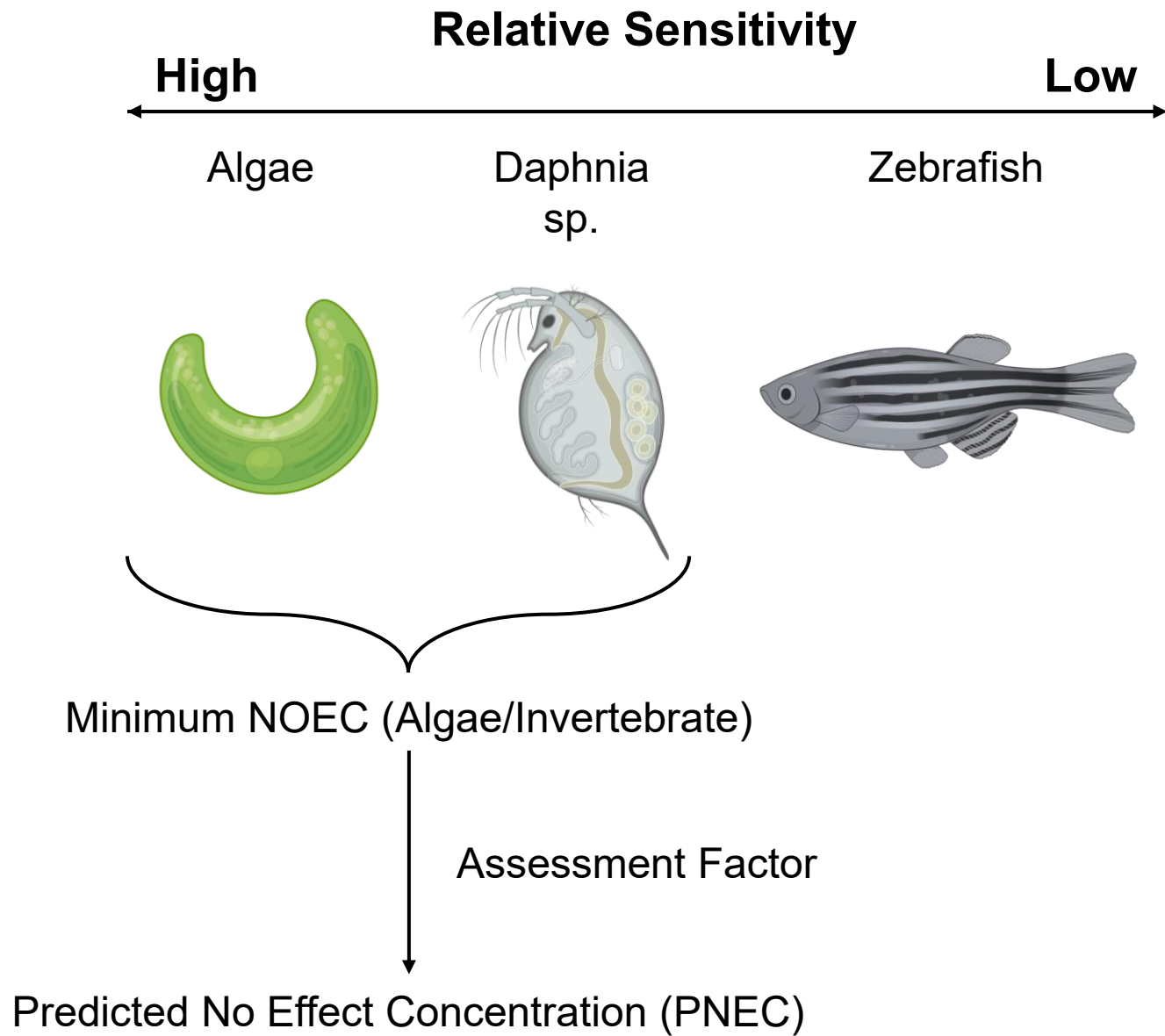
Chemicals



286 Invertebrates	282 Fish
89 Algae	92 Amphibians
749 Species	



Understanding Relative Species Sensitivity to Chemicals



AMIRA Platform

chlorpyrifos

Search

Compare Species Sensitivity

Compare toxicity endpoints across aquatic species for chemicals in AMIRA

Submit Data/ Comments

Contact AMIRA team

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Comparative Species Sensitivity Assessment

Choose taxonomic group (Numerator)

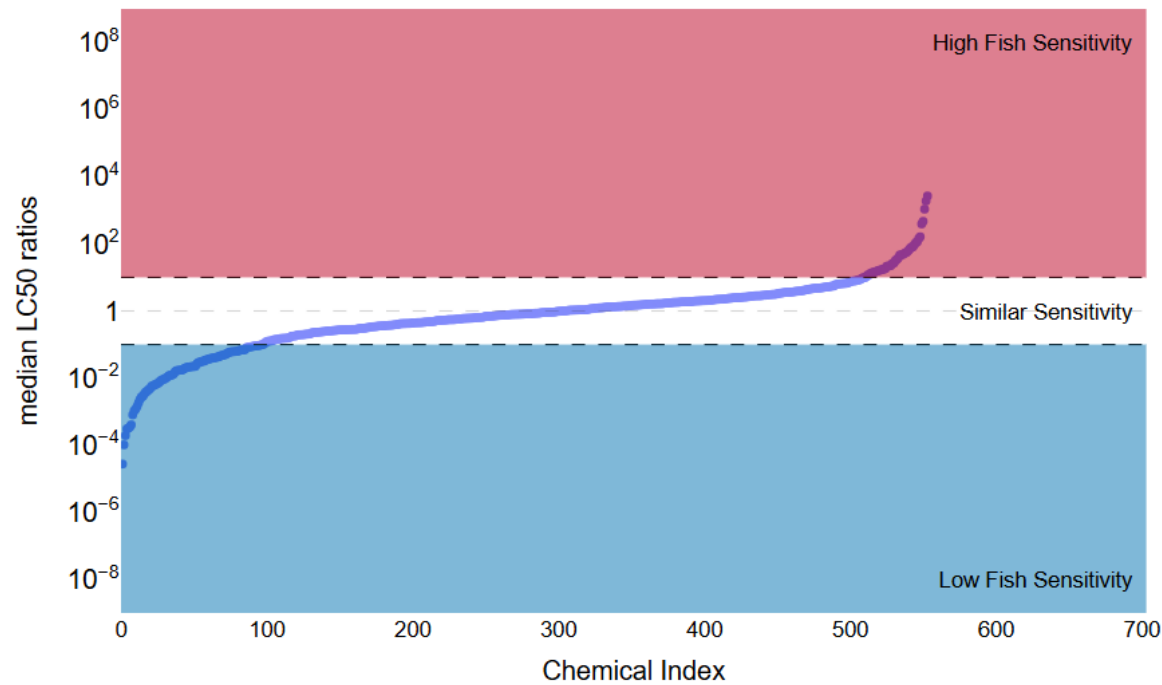
Invertebrates

vs

Choose taxonomic group (Denominator)

Fish

Distribution of median LC50 ratio (Invertebrate vs fish)



Select ECOTOX Endpoint

LC50

NOEC

Select measure of central tendency

mean

median

percentile_95

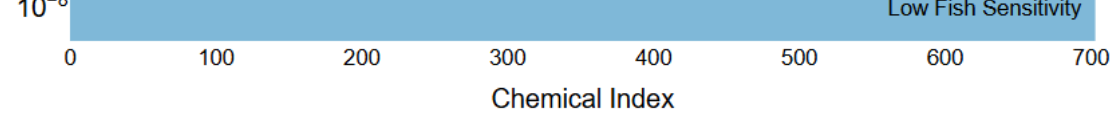
min

Select assessment factor (fold)

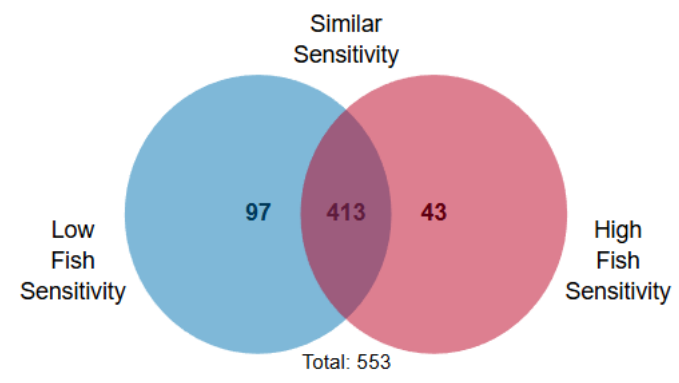


Number of chemicals across sensitivity ranges
Invertebrate vs fish

Similar
Sensitivity



Number of chemicals across sensitivity ranges
Invertebrate vs fish

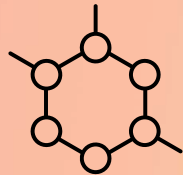


CAS Number	DTXSID	Chemical Name	Chemical Common Na...	Invertebrate_median
7722-84-1	DTXSID2020715	Hydrogen peroxide	Hydrogen peroxide	0.0039535
6515-38-4	DTXSID7038317	3,5,6-Trichloropyridin-2-ol	3,5,6-Trichloro-2-pyridinol	0.0002
96182-53-5	DTXSID1032482	O-(2-tert-Butylpyrimidin...	Tebupirimfos	0.000102
35367-38-5	DTXSID1024049	N-[(4-Chlorophenyl)carb...	Diflubenzuron	0.03255
333-41-5	DTXSID9020407	O,O-Diethyl O-[6-methyl...	Diazinon	0.0007750000000000
23103-98-2	DTXSID1032569	2-(Dimethylamino)-5,6-d...	Pirimicarb	0.0191
56-72-4	DTXSID2020347	O-(3-Chloro-4-methyl-2...	Coumaphos	0.0006000000000000
2255-17-6	DTXSID00177084	Dimethyl 3-methyl-4-nit...	Fenitrooxone	0.0064500000000000

Select range to filter table

- All
- Below 0.1 (Low Fish sensitivity)
- 0.1 to 10 (Similarly sensitive)
- Above 10 (High Fish sensitivity)

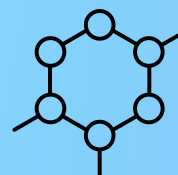
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557
chemicals

22,334
data points

High
vertebrate
sensitivity



528
chemicals

14,681
data points

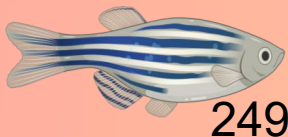
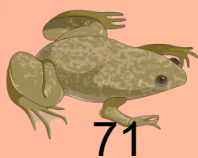
High
vertebrate
sensitivity

AMIRA

Algae/Invertebrates
vs
vertebrates

LC50s

9.5%
chemicals



538
Species



314
Species

15%
chemicals

NOECs

Version 2

Goals

Chemical substructures driving high fish sensitivity

Protein targets and biological pathways affected by chemicals that lead to high fish sensitivity



Supervisory Team



Prof Christer Hogstrand

Dr Luigi Margiotta-Casaluci



Dr Bruno Campos Dr Claudia Rivetti



Biotechnology and Biological Sciences Research Council

Acknowledgements

Team



Prof Peter Kille



UNIVERSITY OF EXETER
Prof Charles Tyler

