United States Environmental Protection Agency

EPA Center for Computational Toxicology and Exposure

ECOTOXicology Knowledgebase Virtual Training

Jennifer H. Olker
US EPA Office of Research and Development

May 17, 2022

EPA NAMs Pilot Training Program

- New Approach Methodologies (NAMs) Training Program is a deliverable in the Agency's Work Plan, first released in 2019 and updated in 2021.
  - First topic: Today's ECOTOX Knowledgebase training
- **Goal: Develop, implement and maintain an engaging training program.**
  - Interactive case studies to encourage active learning
  - Train the trainer
  - Obtain feedback
- More virtual and in-person trainings are being planned.
- The EPA NAMs training website includes existing training resources, including recordings and guidance documents.

EPA NAMs Training: www.epa.gov/chemical-research/new-approach-methods-nams-training

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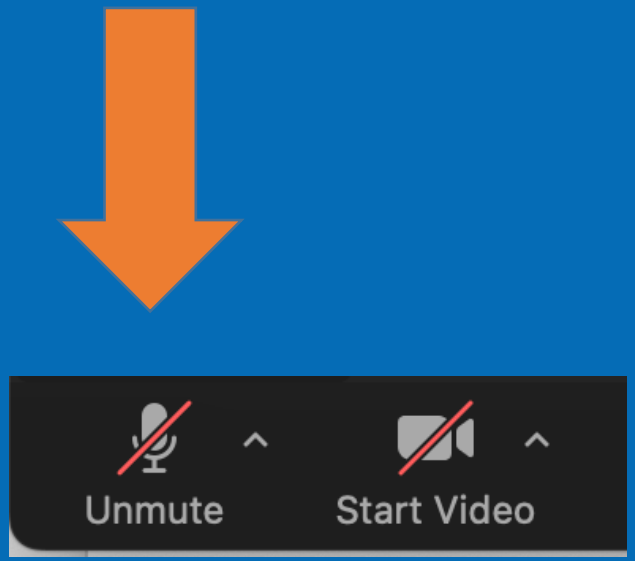
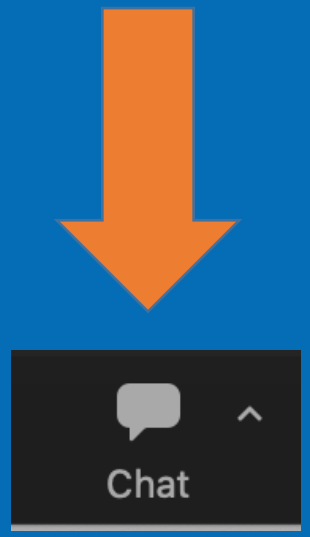
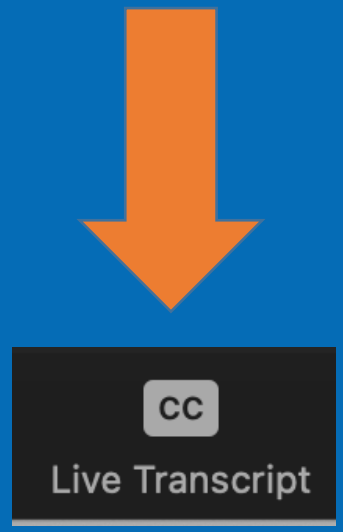
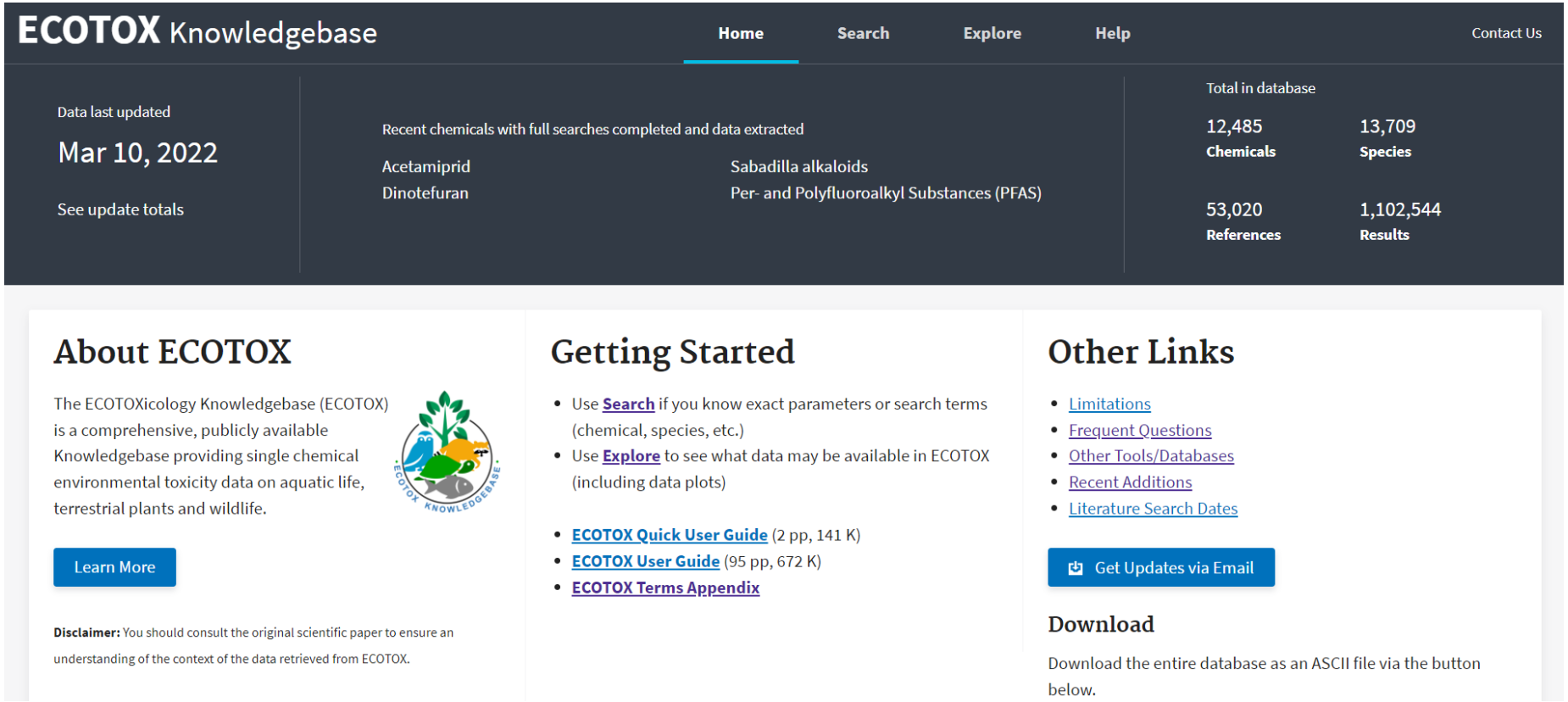






Agenda

- Welcome and Introductions
- Background of ECOTOX
- Basic Features
- Demonstration
- Case Studies
- Summary



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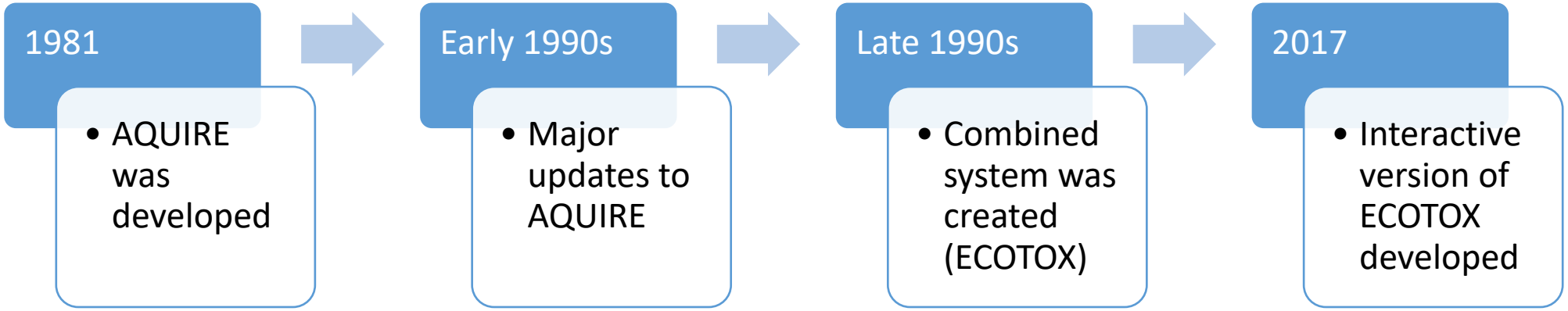
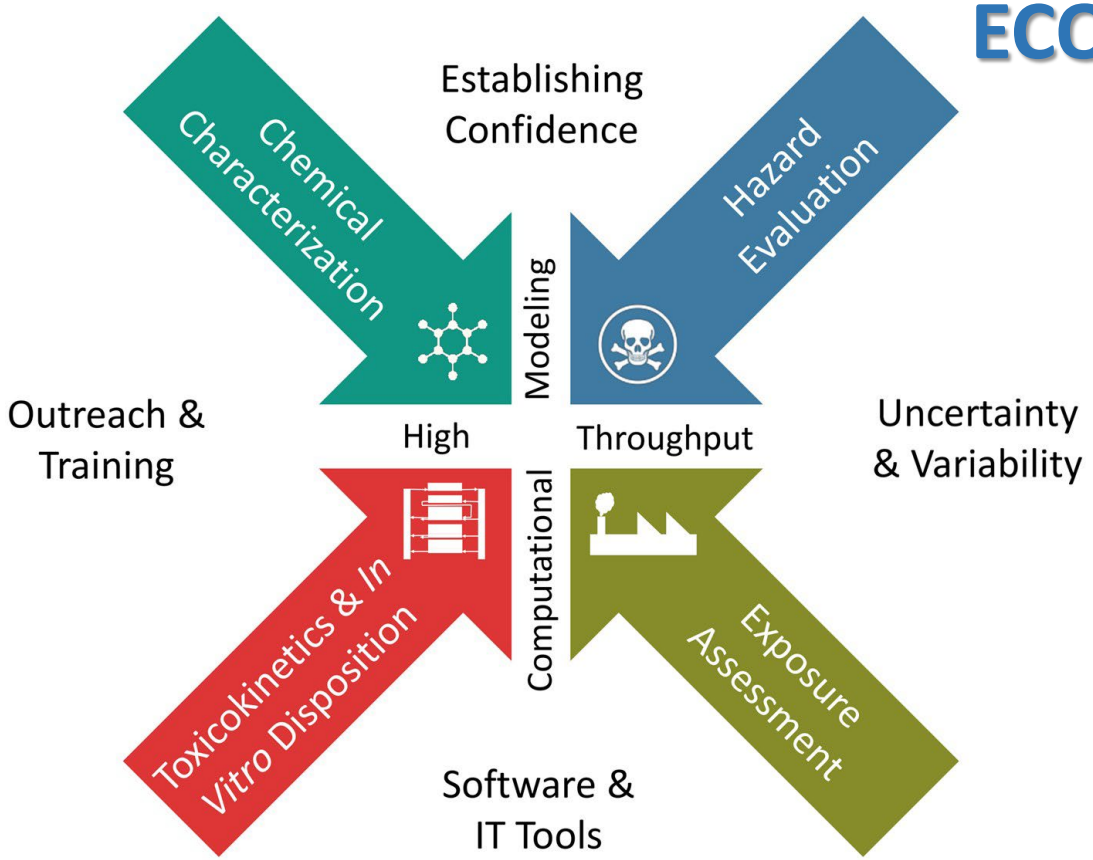
Background of ECOTOX

History of ECOTOX



- Developed to meet the need for—
  - Authoritative source of toxicological data
  - Document literature searches of data
  - Development and validation

ECOTOX and the next generation of chemical safety evaluation



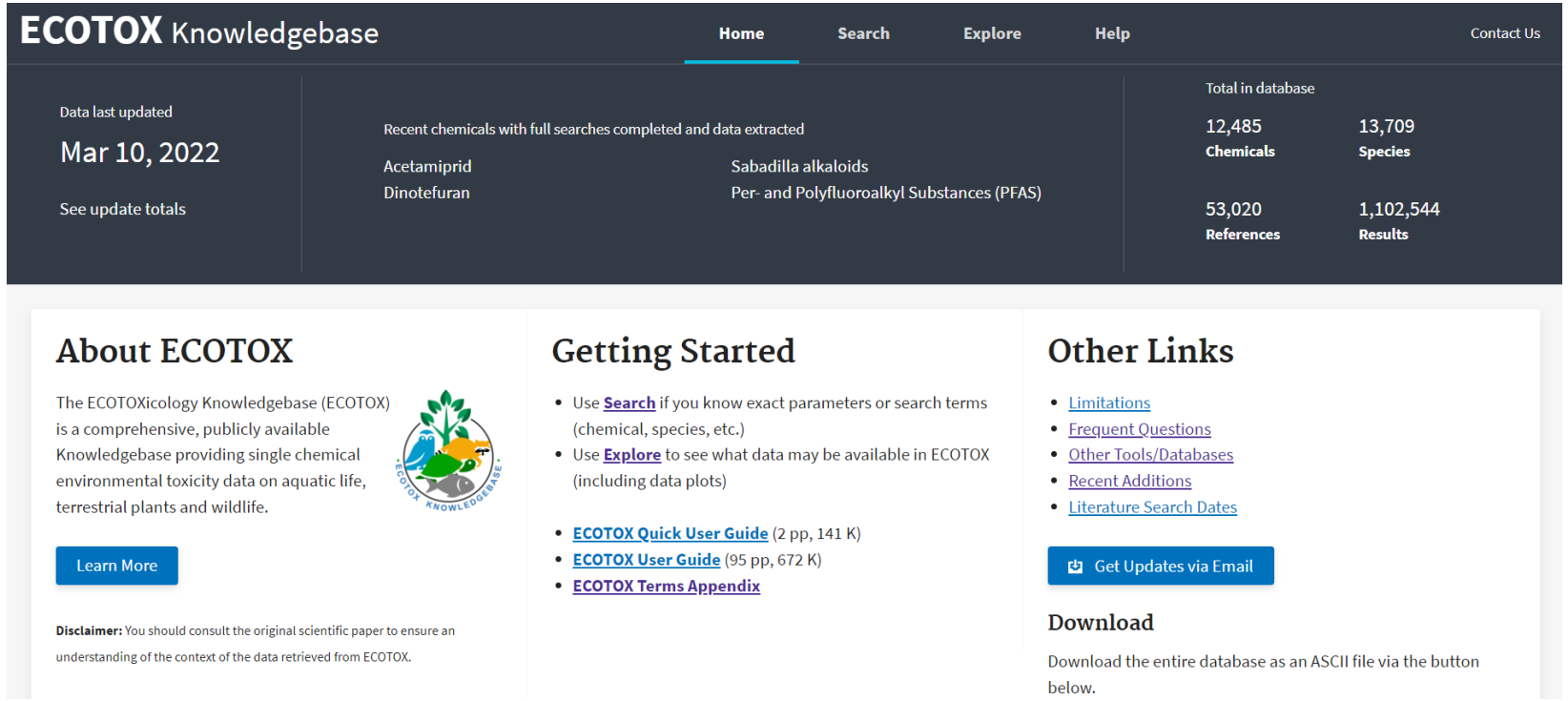
Thomas et al. 2019 10.1093/toxsci/kfz058

ECOTOX Accessible, structured empirical data from *in vivo* toxicity tests

- Chemical risk assessments
- Identify data gaps and guide targeted testing
- Development of computational models
- Support development, evaluation, and adoption of new approach methodologies

What is the ECOTOX Knowledgebase?

- From comprehensive search and review of open and grey literature
- Updated quarterly to public website
- 30+ year history
- 8,000 distinct hosts search the Knowledgebase each month



www.epa.gov/ecotox

EPA Program and Regional Office Applications

United States Environmental Protection Agency

United States Environmental Protection Agency | Office of Water 4304T | EPA 822-R-16-006 June 2016

Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016

U.S. Environmental Protection Agency
Office of Water
Office of Science and Technology
Washington, D.C.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Search Site

Home Air Land Water Licenses Permits Reporting

Data
Forms
Maps
Public Notices

Home / Remediation / Eco / Useful Links for Developing Ecological Risk Assessments

>> Questions or Comments techsup@tceq.texas.gov

Useful Links for Developing Ecological Risk Assessments

Links to pages on this and other sites that have useful information for developing ecological risk

U.S. EPA

- **Integrated Risk Information System (IRIS)**
- **ECOTOX Database** (aquatic and terrestrial toxicological data)
- **EPA Office of Water** (links to sediment guidance, water quality standards, and other useful topics)
- **EPA People Locator**
- **EPA Region 4 Ecological Screening Values**
- **Combustion Guidance for Human Health** (some defaults in here used at times)
- **Superfund Risk Assessment** (variety of links)
- **Superfund: Natural Resource Damages and Ecological Risk Assessments**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C., 20460

MEMORANDUM **March 26, 2008**

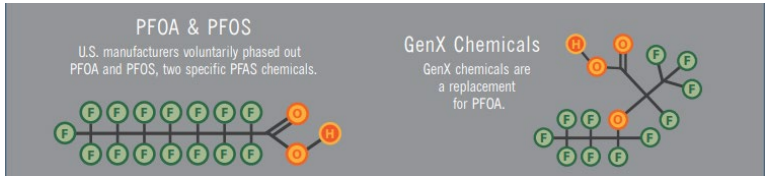
Subject: Registration Review –Preliminary Problem Formulation for Ecological Risk and Environmental Fate, Endangered species and Drinking Water Assessments for Diazinon (PC Code 057801; DP Barcode D349527)

To: Jude Andreasen, Chemical Review Manager
Laura Parsons, Team Leader
Special Review Branch
Special Review and Reregistration Division (SRRD)

From: Kristina Garber, Biologist
Thomas Steeger, Senior Biologist
Environmental Risk Branch 4
Environmental Fate and Effects Division
Office of Pesticide Programs

Through: Elizabeth Behl, Chief
Environmental Risk Branch 4
Environmental Fate and Effects Division
Office of Pesticide Programs

The Environmental Fate and Effects Division (EFED) has completed the preliminary problem formulation (attached) for the ecological risk, environmental fate, endangered species, and drinking water assessments to be conducted as part of the Registration



Overview of TSCA Work Plan Methodology

Maria Doa
U.S. EPA, Office of Pollution Prevention and Toxics
December 11, 2017

Ecological Hazard

Ecological hazard data are extracted from the EPA ToxValDB database where it had been compiled from the EPA ECOTOX database. Although data are available for a variety of species, only data for aquatic species are used in the current illustration. The data can come from any of the following study types: mortality:acute, mortality:chronic, reproductive:acute, reproductive:chronic, growth:acute, growth:chronic (all from ECOTOX). The types of effect levels are LDxx/LCxx/ECxx/EDxx where xx can range from 1% to 100%, and LOEL/NOEL/LOEC/NOEC. Values must be in units of mg/L. For each chemical, the lowest toxicity value was separately determined for acute and chronic studies, regardless of species. The

Applications of ECOTOX

Chemical environmental toxicity data for aquatic and terrestrial organisms

Provides data to

EPA Program Offices and Regions, States, Tribes, Other Federal Agencies and International Entities

Ecological Risk Assessments
Ambient Water Quality Criteria
Ecological Screening Values
Chemical Prioritization
Emergency Response

Data used for

Tools and Applications

Species Sensitivity Distributions
Predicted No-Effect Concentrations and Eco-Thresholds for Toxicological Concern
Quantitative Structure–Activity Relationships
Bioaccumulation Factor Modeling and Validation
Adverse Outcome Pathway Development

Data linked to

Databases/Resources

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Poll Question!

ECOTOX Pipeline

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Identification
- Chemical verification and development of search terms
- Conduct literature searches

Screening
- Identify and acquire potentially applicable studies

Eligibility
- Review literature for applicability to ECOTOX

Included
- Data extraction
- Study quality evaluation

Chemical-based Search Terms

- Chemical name and CASRN
- Synonyms, tradenames
- Other relevant forms

Sources include—
- STN
- Pesticide Action Network (PAN)
- EPA's Pesticide Fate Database (PFATE)
- EPA's Chemicals Dashboard

Literature Search

Use chemical-specific search terms to query multiple literature search engines.

Citations from:	ProQuest/ CSA	Science Direct	ToxNet	Dissertation Abstracts	Agricola	Current Contents (WoS)	Already in Unify*
n =	5,631	11,178	317	234	4,861	15,347	333

*Internal USEPA ECOTOX database

~37,000 citations downloaded → Initial removal of duplicates

Title and Abstract Screening
n = 8,653 references → Not applicable (excluded):
n = 8,265 references
- Chem Methods: 3,462
- Human Health: 1,797
- False Hit: 1,333
- Fate: 510
- Survey: 287
- Bacteria: 233
- No Toxicant: 221
- Duplicate: 153
- Review: 50
- Mixture: 12
- Other: 121

For Review (Full Text Screening)
n = 388 references → No CoC in reference:
n = 85 references

→ Did not meet acceptability criteria (excluded):
n = 142 references

Data Extracted from Acceptable Papers
n = **245** references with 7,496 total records → **Awaiting Review and Data Extraction**
n = **1** reference

Data from High-Quality Studies
n = ___ references

Adapted from Olker et al. 2022 https://doi.org/10.1002/etc.5324

Chemical Search Terms: ID, Test and QA

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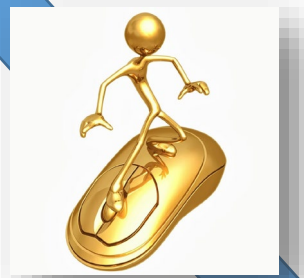
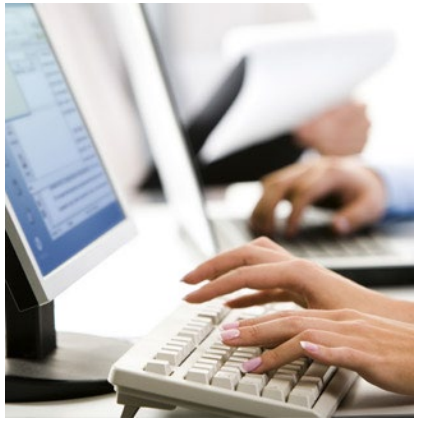
- **Included**
  - Data extraction
  - Study quality evaluation

Chemical Requested by Program Office or Research Project

Verify CASRN, search various sources for chemical terms and synonyms, and eliminate poor search terms.



Tak (Acilid OR Albrass OR Bexton OR "CP 31393" OR "Kartex A" OR Muharicid OR Niticid OR Propachlor OR Propachlore OR Ramrod OR Satecid OR "US EPA PC Code 019101")



Enter chemical terms into template for abstracting databases.

** Web-based tool to identify and document relevant search terms*

Literature Searches

Identification
- Chemical verification and development of search terms
- Conduct literature searches

Screening
- Identify and acquire potentially applicable studies

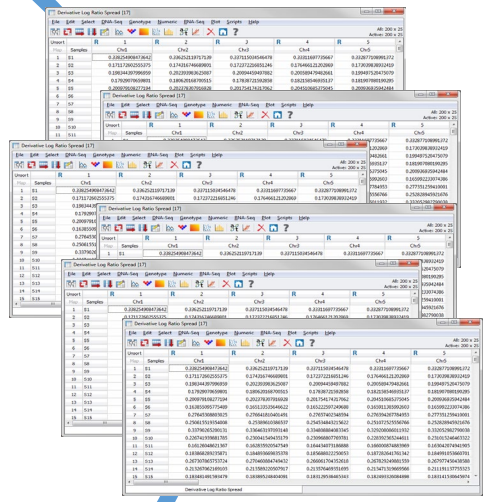
Eligibility
- Review literature for applicability to ECOTOX

Included
- Data extraction
- Study quality evaluation

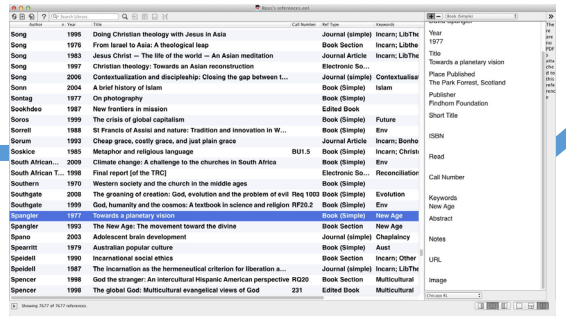
Chemical-based literature searches
(using terms from chemical verification step)
OR
Monthly electronic searches
of 11 highly relevant journals

Search Engines
1. Scopus/Science Direct
2. ProQuest
3. Web of Science
4. PubAg/AGRICOLA
5. PubMed Toxline/TOXNET
6. Dissertation Abstracts

** Semi-automated batch searches with Abstract Sifter Plus*



Collate data and remove duplicates.



100,000–400,000 references screened for applicability each year

Skimming for Applicability: Title and Abstract

United States Environmental Protection Agency

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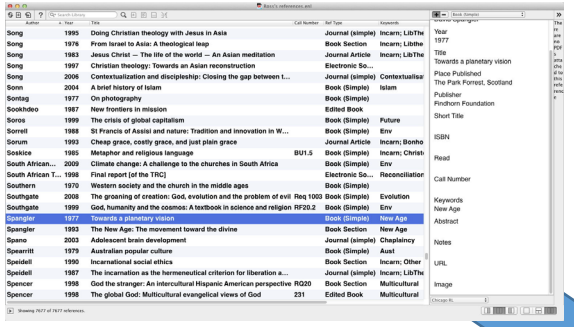
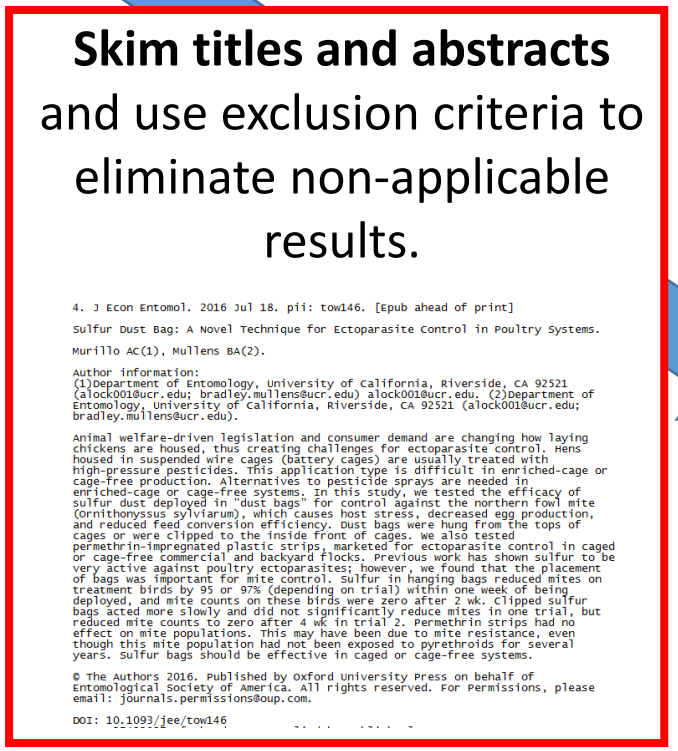
Literature Search Results



Skim titles and abstracts and use exclusion criteria to eliminate non-applicable results.



4. J Econ Entomol. 2016 Jul 18. pii: tow146. [Epub ahead of print]

Sulfur Dust Bag: A Novel Technique for Ectoparasite Control in Poultry Systems.

Murillo AC(1), Mullens BA(2).

Author information:
(1)Department of Entomology, University of California, Riverside, CA 92521 (alock001@ucr.edu; bradley.mullens@ucr.edu) alock001@ucr.edu. (2)Department of Entomology, University of California, Riverside, CA 92521 (alock001@ucr.edu; bradley.mullens@ucr.edu).

Animal welfare-driven legislation and consumer demand are changing how laying chickens are housed, thus creating challenges for ectoparasite control. Hens housed in suspended wire cages (battery cages) are usually treated with high-pressure pesticides. This application type is difficult in enriched-cage or cage-free production. Alternatives to pesticide sprays are needed in enriched-cage or cage-free systems. In this study, we tested the efficacy of sulfur dust deployed in "dust bags" for control against the northern fowl mite (Ornithonyssus sylviarum), which causes host stress, decreased egg production, and reduced feed conversion efficiency. Dust bags were hung from the tops of cages or were clipped to the inside front of cages. We also tested permethrin-impregnated plastic strips, marketed for ectoparasite control in caged or cage-free commercial and backyard flocks. Previous work has shown sulfur to be very active against poultry ectoparasites; however, we found that the placement of bags was important for mite control. Sulfur in hanging bags reduced mites on treatment birds by 95 or 97% (depending on trial) within one week of being deployed, and mite counts on these birds were zero after 2 wk. Clipped sulfur bags acted more slowly and did not significantly reduce mites in one trial, but reduced mite counts to zero after 4 wk in trial 2. Permethrin strips had no effect on mite populations. This may have been due to mite resistance, even though this mite population had not been exposed to pyrethroids for several years. Sulfur bags should be effective in caged or cage-free systems.

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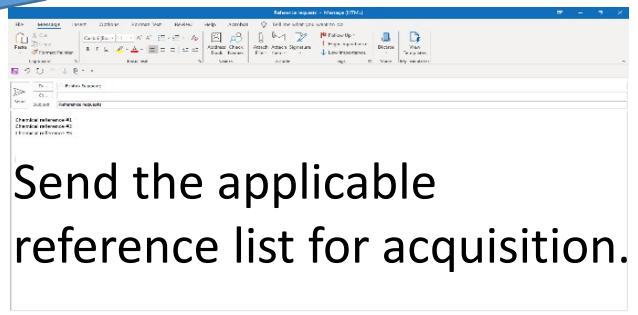
DOI: 10.1093/jee/tow146



Send the applicable reference list for acquisition.

** Recently incorporated filtering and AI tools*

Review for Applicability: Full text

United States Environmental Protection Agency

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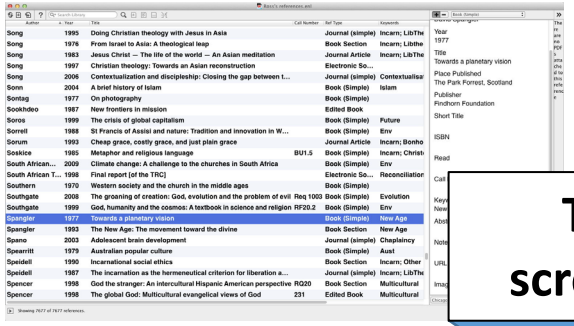
Literature Search Results



Title and abstract screening = applicable

Review full text

Ecotoxicology **2**, 93–120 (1993)

The impact of the Cyanamid Canada Co. discharges to benthic invertebrates in the Welland River in Niagara Falls, Canada

MIKE DICKMAN and GRAZYNA RYGIEL

Biological Sciences Department, Brock University, St. Catharines, Ontario, Canada L2S 3A1

Received 15 July 1992; accepted 6 December 1992

In 1986, the International Joint Commission (IJC) recommended that the Niagara River watershed should be declared an Area of Concern (AOC). This IJC recommendation was ratified by the 4 signatories of the Great Lakes Water Quality Agreement. In order to delist an AOC, it is necessary to locate any areas of impairment within the watershed and carry out remediation projects that permit uses that were previously impaired. To this end we attempted to determine whether or not the sediments at 7 study sites near the Cyanamid Canada (Chemical) Co. were contaminated at levels that would result in the impairment of the natural biota which inhabit the watershed.

The Cyanamid Canada (Chemical) Co. discharges ammonia wastes, cyanide, arsenic and a variety of heavy metals into treatment systems which ultimately discharge to the Welland River, the major Canadian tributary to the Niagara River. This portion of the Welland River near the factory was designated a Provincially significant (Class one) wetlands by the Ontario Ministry of Natural Resources. In 1986, the mean discharge to a creek from Cyanamid Canada Co. was 27,342 m^3 per day (MOE, 1987). Similar discharge volumes occurred in 1989. In 1991, the total discharge was 25,000 m^3 per day (MOE, 1991).

The majority of the benthic invertebrates collected from the study area were pollution tolerant taxa (e.g., sludge worms constituted 68% of all the organisms collected). The lowest chironomid densities were observed at stations 1, 2, and 4, which were the only stations situated close to Cyanamid's discharge pipes. The absence, of clams and mayflies which burrow to greater depths than do chironomids and sludge worms, probably reflects the inability of the deeper dwelling burrowers to tolerate the contaminants which we recorded at these 3 stations. The absence of all crustaceans from these same 3 stations (stations 1, 2 and 4) when coupled with their low biotic diversity and the elevated heavy metal concentrations in the sediments were cause for concern. In addition, stations 2 and 4 displayed the highest frequency of chironomid mentum deformities.

Stations 1 and 2 were located near a pipe which was one of Cyanamid Canada Company's major discharge point sources to the Welland River until a court order in 1980 stopped the company from discharging toxic material to the Welland River via that pipe. Elevated levels of cobalt (10 times above background), molybdenum (6 times above background), nickel (8 times above background), tungsten (284 times above background) and zinc (20 times above background) near the abandoned discharge pipe were correlated with the presence of pollution tolerant chironomid taxa such as *Polypedilum* and *Procladius*. The highest sludge worm densities were also observed at the abandoned pipe site which was the only site where oily wastes were found in the sediments.

Among the 1,275 chironomids taken from the seven Cyanamid Canada stations, the great majority were pollution tolerant taxa. The low biotic diversity and the presence of considerable numbers of pollution tolerant benthic macroinvertebrates in combination with the chemical

Moves on to be curated into ECOTOX.

1,100–2,500 references are added to the public website each year.

ECOTOX Applicability Criteria

Key Area	Data Requirement
Species	• Taxonomically verifiable, ecologically relevant organisms (including cells, organs, gametes, embryos, plant cuttings) [NOT bacteria, humans, monkeys, viruses or yeast]
Chemical	• Single, verifiable chemical toxicants, administered through an acceptable route
Exposure Amount (Concentration)	• Exposure amount is quantified, either as a concentration in the environment when administered via soil or water or as a dosage when introduced directly into or on the organism, via injection, orally or topically
Exposure Duration	• Known duration from the time of initial exposure to the time of measurement
Control	• Must have a control treatment
Effect	• Biological effect measured • Effect concurrent with associated chemical exposure
Publication Type	• Primary source of the data [NOT a Review] • Study must be a full article in English

Exclusion Documentation

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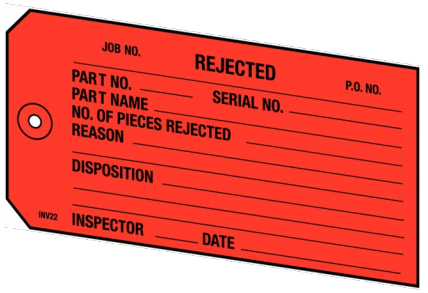
All Excluded and Non-Applicable studies are tagged with the reason for rejection.

- Abstract – published as an abstract
- Bacteria – only test organism is a bacteria
- CAS # Unavailable – could not verify/locate chemical CAS Registry number
- Chemical method – description of chemical analysis procedures
- Fate – only report chemical distribution in media
- Human Health – data on human subjects of surrogate animal subjects for human health risk assessment
- Incident – reports death of animal by poison, but does not provide concentration/duration of exposure
- Method – paper only reports methods for conducting a toxicity test or other aspect of an experiment
- Mixture – paper reports results from mixture of chemicals; no single-chemical exposure results
- Modeling – results of the development of a model; no primary data available
- No Conc – the authors report a response in an organism but do not provide conc/dose/app rate
- No Duration – duration of exposure is not presented
- No Effect – paper does not report observed responses adverse of otherwise
- No Toxicant (ozone, CO_2)
- Non-English
- Nutrient – in situ chemical tested as nutrient
- PUBL AS – duplicate data published elsewhere
- Retracted – paper retracted by Journal
- Review – primary data published elsewhere
- Sediment – only sediment concentration presented
- Survey – chemical measured in organism, but lack quantification of exposure (dose/duration)
- Virus – virus is only test organism
- Yeast – yeast is only test organism



Data Extraction

- **Identification**
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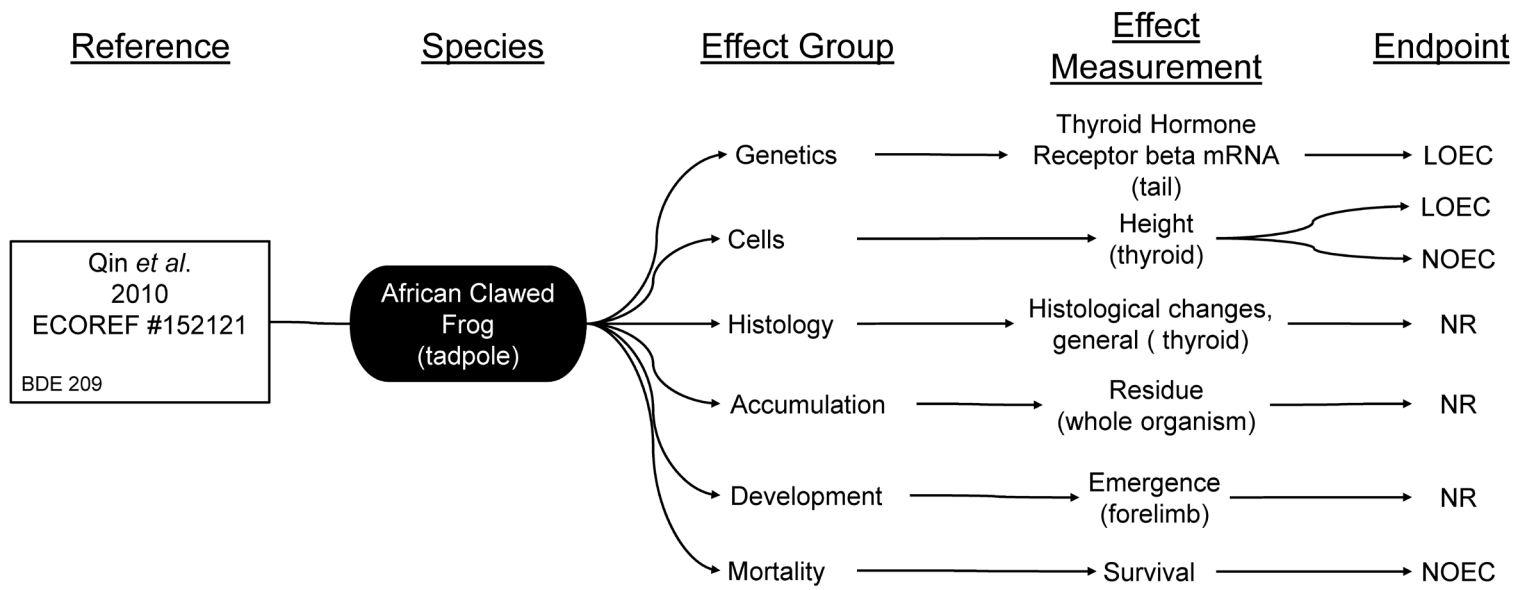
Thyroid disruption by technical decabromodiphenyl ether (DE-83R) at low concentrations in *Xenopus laevis*



LOEC = Lowest Observed Effect Concentration NOEC = No Observed Effect Concentration NR = Not Reported

Data Extraction

EPA United States Environmental Protection Agency

Identification

Chemical verification and development of search terms

Conduct literature searches

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Identify and acquire potentially applicable studies

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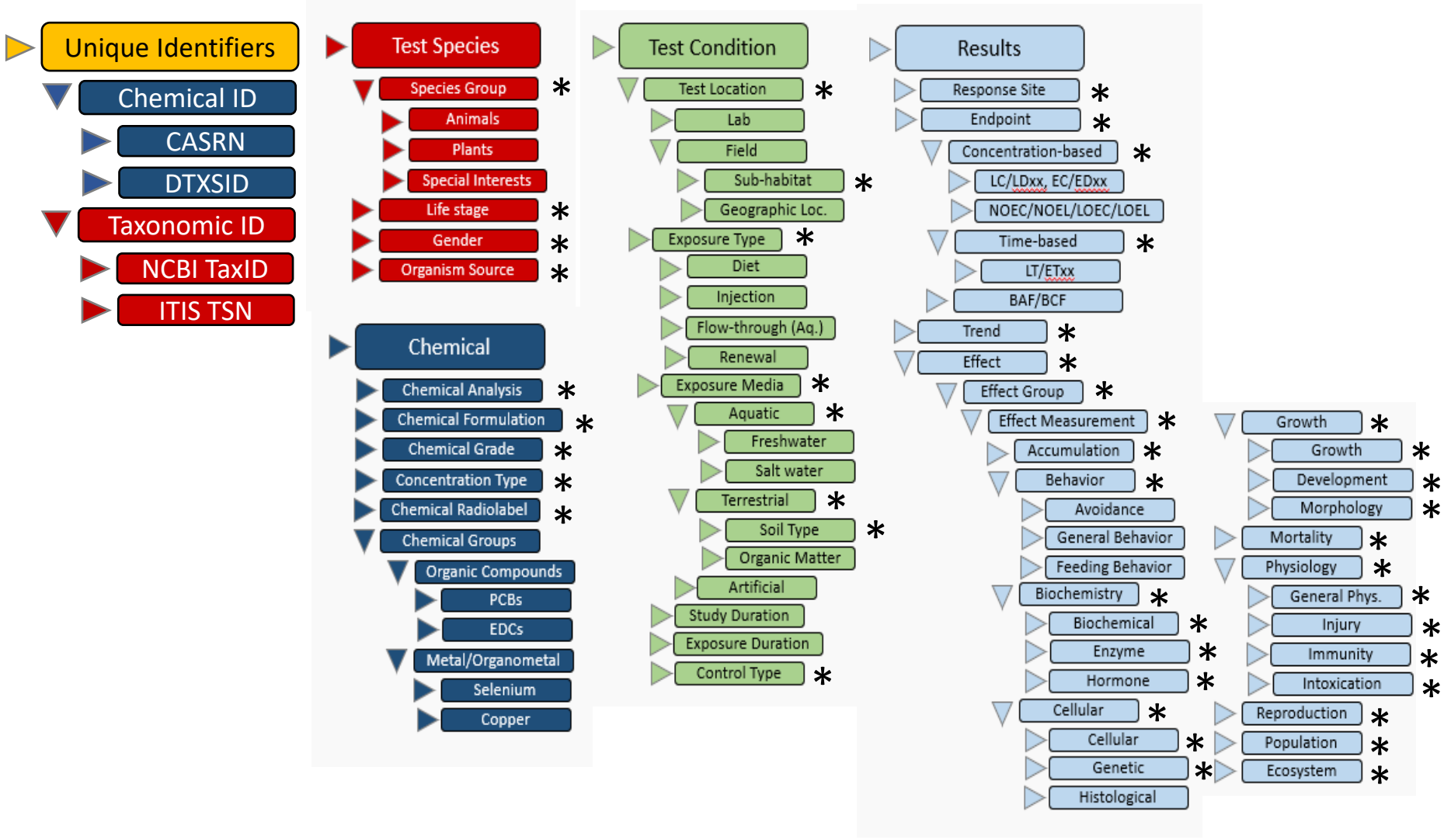
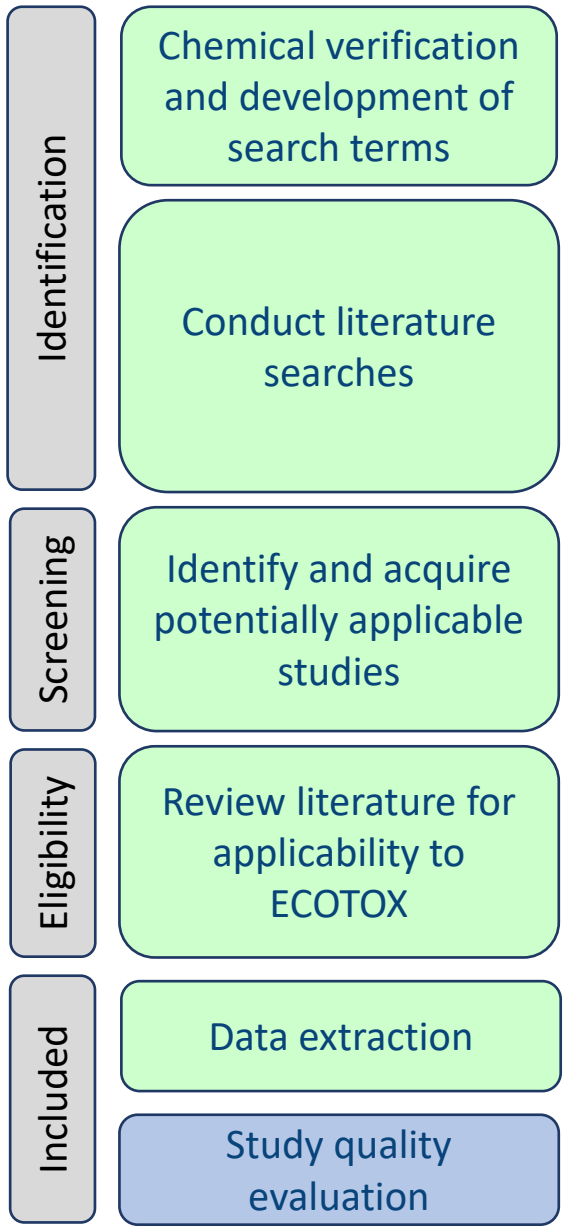


* ECOTOX Vocabularies: https://cfpub.epa.gov/ecotox/help.cfm?sub=term-appendix

Study Quality Evaluation



Many fields in ECOTOX can inform study evaluation.

Category	Select study evaluation questions with relevant ECOTOX field(s)
Chemical	• Is the test substance identified? **Required for inclusion in ECOTOX** • Is the purity of the test substance reported? **Chemical Purity** • Were chemical concentrations verified? **Chemical Analysis** (e.g., nominal versus measured concentrations)
Species	• Is the species given? **Verifiable species (Scientific Name, etc.) required for inclusion in ECOTOX** • Are the organisms well described? **Organism Source**, **Lifestage**, **Age**, **Gender**, **Initial** and **Final Weight**
Test Conditions	• Are appropriate controls performed? **Control required for inclusion in ECOTOX**, type described in **Control** • Is a guideline method (e.g., OECD) used? **Test Method** • Are the experimental conditions appropriate and acceptable for the test substance and organism? **Test Method**, **Media Type**, **Test Location**, **Experimental Design**, Physical and Chemical Soil and Water Parameters (e.g., **pH**, **Temperature**, **Dissolved Oxygen**)
Test Results	• Are the reported effects and endpoints appropriate for the purpose, test substance and organism? **Effect Measurement**, **Endpoint** • Is the response/effect statistically significant? **Statistical Significance**, **Significance Level**

EPA United States Environmental Protection Agency

Basic Features

Search Planner

EPA United States Environmental Protection Agency

ECOTOX Knowledgebase

Home | Search | Explore | **Help** | Contact Us

Table of Contents

Starting Out

- Web Site Information
- Recent Additions
- Navigating this Web Site
- Frequent Questions

How do I...

- Learn Basics
- **Select Search Parameters**
  - Taxonomic
  - Chemicals
  - Test Conditions
  - Test Results
  - Publications/Updates
- Select Report Format/Sort Order
- Navigate/View Reports

Select Search Parameters

Search Planner (PDF) (5 pp, 133 K, About PDF)

Taxonomic Searching

Within ECOTOX you may conduct a search by entering the Species Name or number(s), Genus/Species Name(s), or Common Name or Other Taxonomic Name(s). The Contains and Exact Match radio buttons allow for partial or exact name matches. You can also search by Species Group. All data records within ECOTOX include a Scientific name for the test species. All names and predefined groups have been verified in reliable taxonomic sources.

The ECOTOX species file includes historical synonyms for the species. If a search is conducted using a species name that is noted as a taxonomic synonym in our system, ECOTOX will present the results using the currently acceptable genus and species name.

Taxonomic Entry

Species Number: All species in ECOTOX have been assigned a unique number. You can include numbers and text information (either Scientific or common names) in one search. Species numbers are always searched as an exact match.

Example Taxonomic Search

The example below is the correct method of entering query text. You can enter a mix of numbers and species terms. Number will always be treated as exact matches by the ECOTOX query.

Example Genus/Species Name Query

ECOTOX SEARCH PLANNING FORM

Use this form to help plan your searches or to document searches for yourself or others to perform.

Chemicals

Chemical Names	CAS Numbers	Predefined Groups	
		Metal Compounds	**Organic Compounds**
		Aluminum	Conazoles
		Antimony	Cyanotoxins
		Arsenic	DDT and metabolites
		Barium	Dibenzofurans
		Beryllium	Explosives
		Cadmium	Glycol Ethers
		Chromium	Major Ions
		Cobalt	Neonicotinoids
		Copper	Nitrosamines
		Iron	Perchlorates
		Lead	Phthalate Esters
		Manganese	Polyaromatic Hydrocarbons (PAH)
		Mercury	Polychlorinated Biphenyls (PCB)
		Nickel	Polybrominated Diphenyl Ethers (PBDE)
		Organotin	Pharmaceutical Personal Care (PPCP)
		Selenium	Strobins
		Silver	
		Vanadium	Per- and Polyfluoroalkyl Substances (PFAS)
		Zinc	

Species

Scientific Names/ Taxonomic Levels	Common Names	Species ECOTOX Numbers or NCBI TaxIDs	Predefined Taxonomic Groups
			All Animals
			Amphibians
			Insects/Spiders
			Molluscs
			Birds
			Other Invertebrates
			Reptiles
			Crustaceans
			Mammals
			Worms
			Fish
			All Plants
			Algae
			Moss/Hornworts, Fungi,
			Flowers, Trees, Shrubs, Ferns
			Special Interest
			Standard Test Species
			US Threatened/Endangered Species
			US Exotic/Nuisance

EPA
United States
Environmental Protection
Agency

Poll Question!

Help and Contact Us

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ECOTOX Knowledgebase | Home | Search | Explore | Help | Contact Us

Table of Contents | Web Site Information

Starting Out

- **Web Site Information**
  - About ECOTOX
  - Disclaimer & Limitations
- Recent Additions
- Navigating this Web Site
- Frequent Questions

How do I...

- Learn Basics
- Select Search Parameters
- Select Report Format/Sort Order
- Navigate/View Reports

Welcome to the U.S. EPA ECOTOX Web site!

The ECOTOXicology knowledgebase (ECOTOX) is a source for locating single chemical toxicity data for aquatic life, terrestrial plants and wildlife. ECOTOX was created and is maintained by the U.S.EPA's Center for Computational Toxicology and Exposure's (CCTE's) Great Lakes Toxicology Ecology Division (GLTED).

ECOTOX integrates three previously independent databases - AQUIRE, PHYTOTOX, and TERRETOX - into a unique system which includes toxicity data derived predominately from the peer-reviewed literature, for aquatic life, terrestrial plants, and terrestrial wildlife, respectively.

You should review the limitations of ECOTOX data retrieval and system requirements prior to performing searches on this site.

You should consult the original scientific paper to ensure an understanding of the context of the data retrieved from ECOTOX.

ECOTOX Documentation

- **ECOTOX User Guide** (89 pp, 663 K)

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Demonstration

Demo of ECOTOX: www.epa.gov/ecotox

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ECOTOX Knowledgebase

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Data last updated

Mar 10, 2022

See update totals

Recent chemicals with full searches completed and data extracted

Acetamiprid
Dinotefuran
Sabadilla alkaloids
Per- and Polyfluoroalkyl Substances (PFAS)

Total in database

12,485 **Chemicals**	13,709 **Species**
53,020 **References**	1,102,544 **Results**

About ECOTOX

The ECOTOXicology Knowledgebase (ECOTOX) is a comprehensive, publicly available Knowledgebase providing single chemical environmental toxicity data on aquatic life, terrestrial plants and wildlife.

Learn More

Disclaimer: You should consult the original scientific paper to ensure an understanding of the context of the data retrieved from ECOTOX.

Getting Started

- Use **Search** if you know exact parameters or search terms (chemical, species, etc.)
- Use **Explore** to see what data may be available in ECOTOX (including data plots)

- **ECOTOX Quick User Guide** (2 pp, 141 K)
- **ECOTOX User Guide** (95 pp, 672 K)
- **ECOTOX Terms Appendix**

Other Links

- Limitations
- Frequent Questions
- Other Tools/Databases
- Recent Additions
- Literature Search Dates

Get Updates via Email

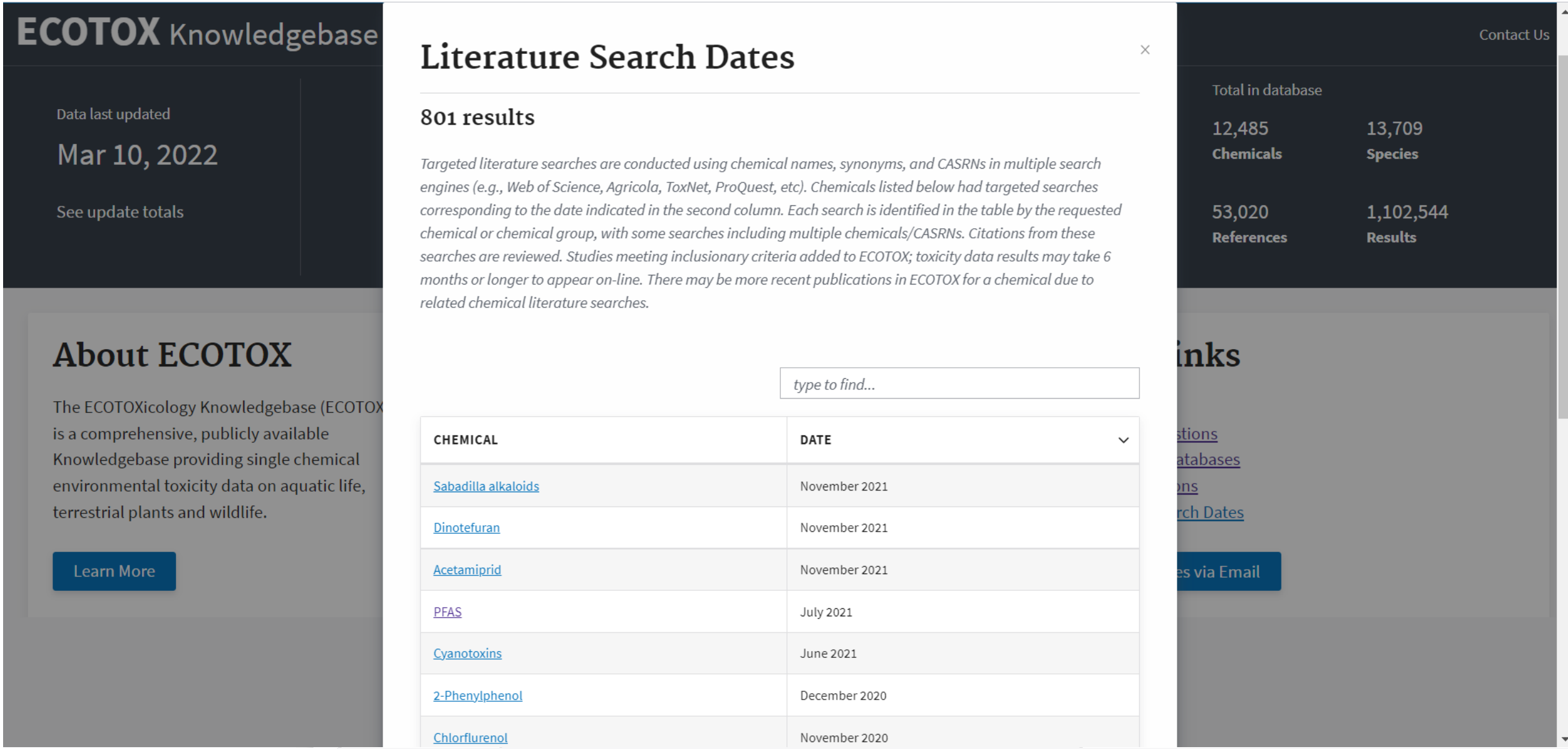
Download

Download the entire database as an ASCII file via the button below.

Download ASCII Data

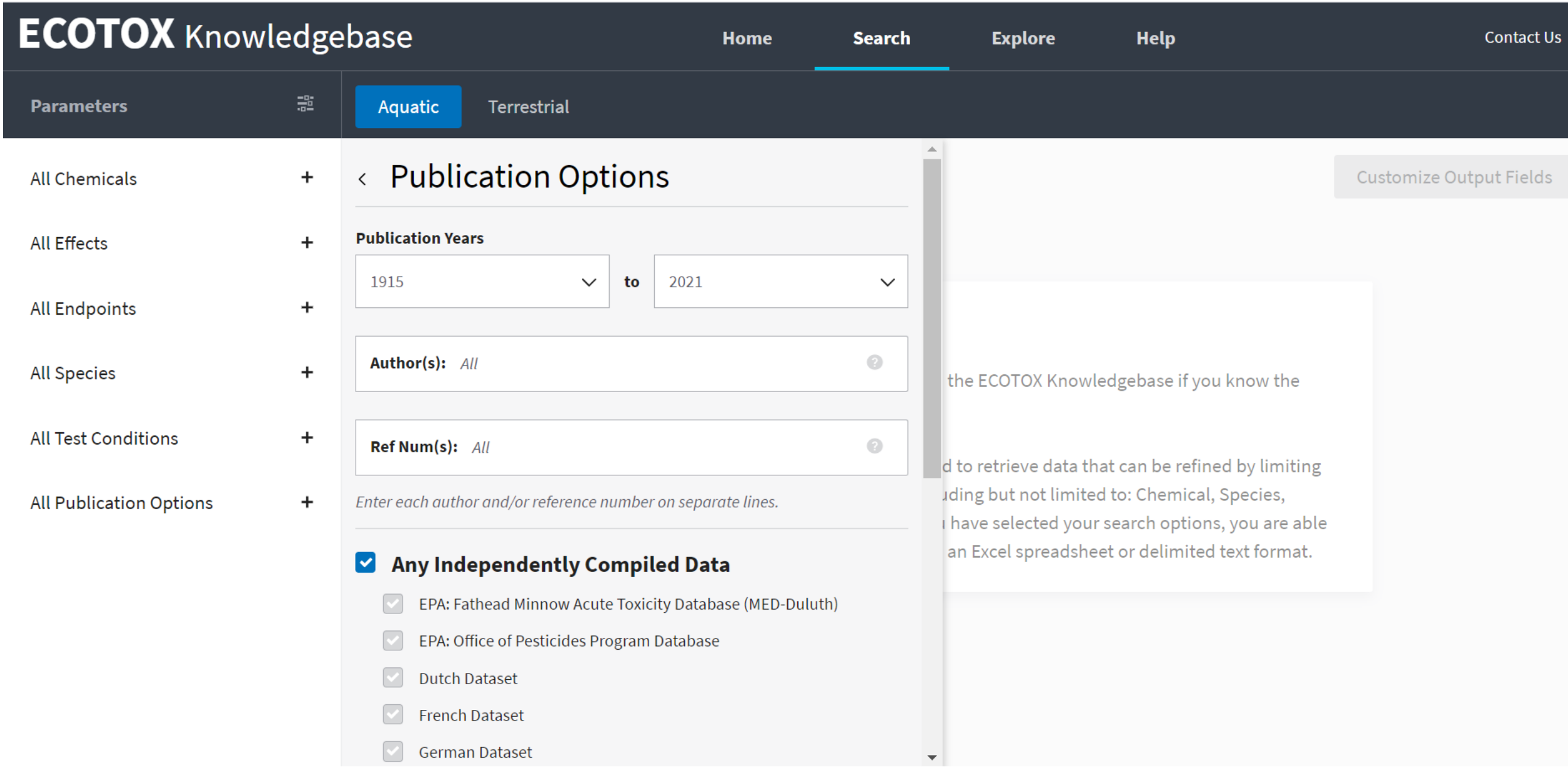
Recent Additions and Literature Search Dates

EPA United States Environmental Protection Agency



Search: Exact Parameters or Search Terms

EPA United States Environmental Protection Agency



Explore: Interactive Filters and Visualization

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ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Explore | Effects

Custom Group

Create a custom effects group by browsing available effect measurements or entering a list of effect and measurement terms.

Create Custom Group...

Defined Groups

Select one or more categories from the graph to filter groups in the table.

23 Effect Groups

Select one or more groups then click "Explore Data" to continue.

× Reset All

Export CSV

Explore Data >

EFFECT GROUP	RECORDS	PUBLICATIONS	YEAR MIN	YEAR MAX
Accumulation	47626	7217	1915	2020
Avoidance	4394	579	1947	2020
Behavior	18751	2591	1946	2020
Biochemistry	76629	9784	1931	2020
Cell(s)	12786	2306	1935	2020
Development	32771	3904	1925	2020
Ecosystem process	743	161	1963	2018
Enzyme(s)	47201	6323	1931	2020
Feeding behavior	10281	2304	1937	2020

Explore by Species: Filter and Visualize

EPA United States Environmental Protection Agency

ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Explore | Species | Amphibians

Aquatic | Terrestrial

Query Filters

Select one or more of each filter to reduce the records.

Chemical Group (22)

All

Chemicals (216)

All

Class (1)

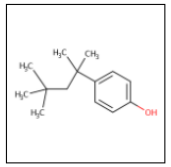
All

Order (1)

Odontophrynus

comptox.epa.gov/dashboard/dsstoxdb/results?search=DTXSID9022360

EPA United States Environmental Protection Agency | Home | Advanced Search | Batch Search | Lists | Predictions | Downloads | Copy | Share | Submit Comment | Search all data



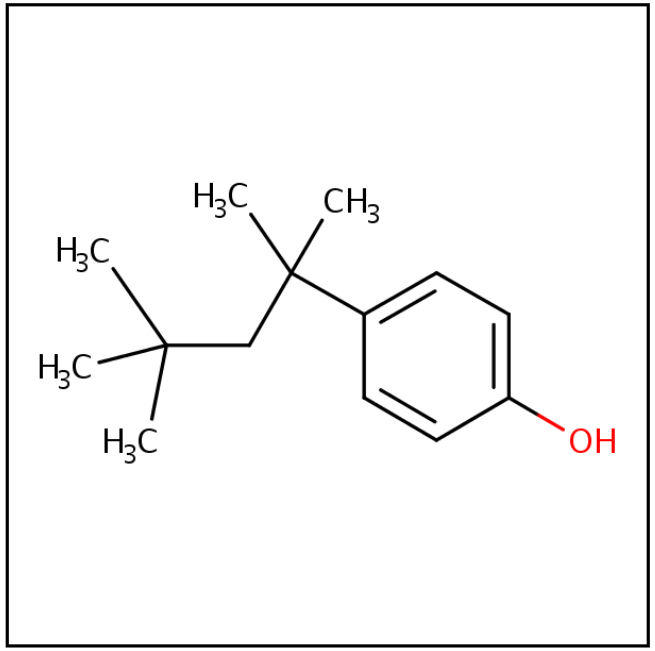
4-(1,1,3,3-Tetramethylbutyl)phenol

140-66-9 | DTXSID9022360

Searched by DSSTox Substance Id.

DETAILS

- EXECUTIVE SUMMARY
- PROPERTIES
- ENV. FATE/TRANSPORT
- HAZARD
- SAFETY
- ADME
- EXPOSURE
- BIOACTIVITY
- SIMILAR COMPOUNDS
- GENRA (BETA)



Quality Control Notes

Intrinsic Properties

Molecular Formula: $C_{14}H_{22}O$ | Mol File | Find All Chemicals

Average Mass: 206.329 g/mol | Isotope Mass Distribution

Monoisotopic Mass: 206.167065 g/mol

Structural Identifiers

Linked Substances

Presence in Lists

Record Information

https://epa.gov

Explore by Species: Send to Search

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ECOTOX Knowledgebase

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Parameters | Aquatic | Terrestrial

Chemicals +

Groups

- DDT and Metabolites
- Neonicotinoids
- Perchlorates

All Effects +

All Endpoints +

Species +

Groups

- Amphibians

All Test Conditions +

All Publication Options +

Per- and Polyfluoroalkyl Substances (PFAS)

759 results

Customize Output Fields | Export as...

Results shown in condensed table. Use "Customize Output Fields" to view expanded data results.

CAS NUM / CHEM. NAME	CHEM. GRADE	CHEM. ANAL.	CHEM. PUR.	SPEC. SCI. NAME / SPEC. COMMON NAME	SPEC. GROUP	ORG. LIFESTG.
50293 / 1,1'-(2,2,2-Trichloroethylidene)bis[4-chlorobenzene]	Not reported	Unmeasured	NR	Rana cyanophlyctis / Skipping Frog	Amphibians	Not reported
50293 / 1,1'-(2,2,2-Trichloroethylidene)bis[4-chlorobenzene]	Not reported	Unmeasured	NR	Rana cyanophlyctis / Skipping Frog	Amphibians	Not reported
50293 / 1,1'-(2,2,2-Trichloroethylidene)bis[4-chlorobenzene]	Not reported	Unmeasured	NR	Bufo bufo ssp. japonicus / Toad	Amphibians	Tadpole

Search: Refine Query Parameters

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ECOTOX Knowledgebase

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Parameters | Aquatic | Terrestrial

Chemicals +

Groups

- DDT and Metabolites
- Neonicotinoids
- Perchlorates

Effects +

Groups

- Development
- Growth
- Morphology
- Mortality

All Endpoints +

Species +

Groups

- Amphibians

50 references

Export as...

type to find...

Ade,C.M., M.D. Boone, and H.J. Puglis. *Effects of an Insecticide and Potential Predators on Green Frogs and Northern Cricket Frogs*. J. Herpetol.44(4): 591-600, 2010. ECOREF #166535

Search Google Scholar EXIT

Boone,M.D.. *An Amphibian with a Common Species*. Environ. To

Search Google Scholar EXIT

Brausch,J.M., M. Wages, R.D. Shannahan, G. Perry, T.A. Anderson, J.D. Maul, B. Mulhearn, and P.N. Smith. *Surface W Anti-Metamorphic Effects of Perchlorate in New Mexico Spadefoot Toads (Spea multiplicata) and African Clawed laevis)*. Chemosphere78(3): 280-285, 2010. ECOREF #152198

Search Google Scholar EXIT

Google Scholar allintitle: "Effects of an Insecticide and Potential Predators on Green Frogs an

Articles 1 result (0.03 sec)

Any time
Since 2021
Since 2020
Since 2017
Custom range...

Sort by relevance
Sort by date

Effects of an insecticide and potential predators on green frogs and northern cricket frogs

CM Ade, MD Boone, HJ Puglis - Journal of Herpetology, 20

Worldwide amphibian population declines have occurred in been attributed to a range of factors including introduced sp contamination. Anuran species may differ in their susceptibil history characteristics, leading to different probabilities of de In this experiment, we looked at two anuran species, Northe and Green Frogs (Rana clamitans), reared in mesocosms c

Cited by 24 Related articles All 5 versions

Journal of Herpetology, Vol. 44, No. 4, pp. 591–600, 2010
Copyright 2010 Society for the Study of Amphibians and Reptiles

Effects of an Insecticide and Potential Predators on Green Frogs and Northern Cricket Frogs

CATHERINE M. ADE, MICHELLE D. BOONE,[1] AND HOLLY J. PUGLIS

212 Pearson Hall, Department of Zoology, Miami University, Oxford, Ohio 45056 USA

ABSTRACT.—Worldwide amphibian population declines have occurred in the last few decades and have been attributed to a range of factors including introduced species and chemical contamination. Anuran species may differ in their susceptibility to declines based on life-history characteristics, leading to different probabilities of decline and conservation statuses. In this experiment, we looked at two anuran species, Northern Cricket Frogs (*Acris crepitans*) and Green Frogs (*Rana clamitans*), reared in mesocosms containing a common invasive or introduced potential predator (Rusty Crayfish, Bluegill Sunfish, or triploid Grass Carp) and imidacloprid, a common insecticide. We found that anurans differed in their sensitivity to these factors. Cricket Frog survival was significantly reduced with imidacloprid exposure, whereas Green Frogs were not. Abundance of both amphibian species was reduced in the presence of predators, particularly the fish. Our study suggests that Cricket Frogs may be especially sensitive to the insecticide imidacloprid, as well as fish predators, and that these factors could contribute to their population declines.

Search: Export Toxicity Data and References

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Home | Search | Explore | Help | Contact Us

Parameters | Aquatic | Terrestrial

Chemicals +

Groups

- DDT and Metabolites
- Neonicotinoids
- Perchlorates

Effects +

Groups

- Development
- Growth
- Morphology
- Mortality

All Endpoints +

Species +

Groups

- Amphibians

50 references

Export as...

CSV

RIS

type to find...

REF. NUMBER	AUTHOR	TITLE	SOURCE	PUB. YEAR	CITATION
166535	Ade,C.M., M.D. Boone, and H.J. Puglis	Effects of an Insecticide and Potential Predators on Green Frogs and Northern Cricket Frogs	J. Herpetol.44(4): 591-600	2010	Ade,C.M., M.D.
179050	Boone,M.D.	An Amphibian with a Contracting Range is not more Vulnerable to Pesticides in Outdoor Experimental Communities than Common Species	Environ. Toxicol. Chem.37(10): 2699-2704	2018	Boone,M.D.. An
152198	Brausch,J.M., M. Wages, R.D. Shannahan, G. Perry, T.A. Anderson, J.D. Maul, B. Mulhearn, and P.N. Smith	Surface Water Mitigates the Anti-Metamorphic Effects of Perchlorate in New Mexico Spadefoot Toads (Spea multiplicata) and African Clawed Frogs (Xenopus laevis)	Chemosphere78(3): 280-285	2010	Brausch,J.M., M.
58050	Clark,E.J., D.O. Norris, and R.E. Jones	Interactions of Gonadal Steroids and Pesticides (DDT, DDE) on Gonaduct Growth in Larval Tiger Salamanders, Ambystoma tigrinum	Gen. Comp. Endocrinol.109(1): 94-105	1998	Clark,E.J., D.O. N
156168	Conners,D.E., E.D. Rogers, K.L. Armbrust, J.W. Kwon, and M.C. Black	Growth and Development of Tadpoles (Xenopus laevis) Exposed to Selective Serotonin Reuptake Inhibitors, Fluoxetine and Sertraline, Throughout Metamorphosis	Environ. Toxicol. Chem.28(12): 2671-2676	2009	Conners,D.E., E.
2784	Cooke,A.S.	The Effects of DDT, Dieldrin and 2,4-D on Amphibian Spawn and Tadpoles	Environ. Pollut.3:51-68	1972	Cooke,A.S.. The

Brausch,J.M., M. Wages, R.D. Shannahan, G. Perry, T.A. Anderson, J.D. Maul, B. Mulhearn, and P.N. Smith. *Surface Water Mitigates the Anti-Metamorphic Effects of Perchlorate in New Mexico Spadefoot Toads (Spea multiplicata) and African Clawed Frogs (Xenopus laevis)*. Chemosphere78(3): 280-285, 2010. ECOREF #152198

Search Google Scholar EXIT

Export Close

United States Environmental Protection Agency

Example

Example: Selenium

EPA United States Environmental Protection Agency

ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Parameters | Aquatic | Terrestrial

Chemicals +

Groups

- Selenium

All Effects +

All Endpoints +

All Species +

All Test Conditions +

All Publication Options +

× Reset All

View All Applied

‹ Species

Specific Species

Enter each species name on separate lines.

Species name(s)

(•) Contains ( ) Exact Match

Kingdom

( ) Animals
( ) Plants
(•) Both

For Name Searches

(•) Genus/Species Name
( ) Common Name
( ) Other Taxonomic Names

OR: Select from Species Groups below, with the option to limit results by Special Interest groups.

☑ **Any Species Group**

Animals

☑ Amphibians ☑ Other Invertebrates

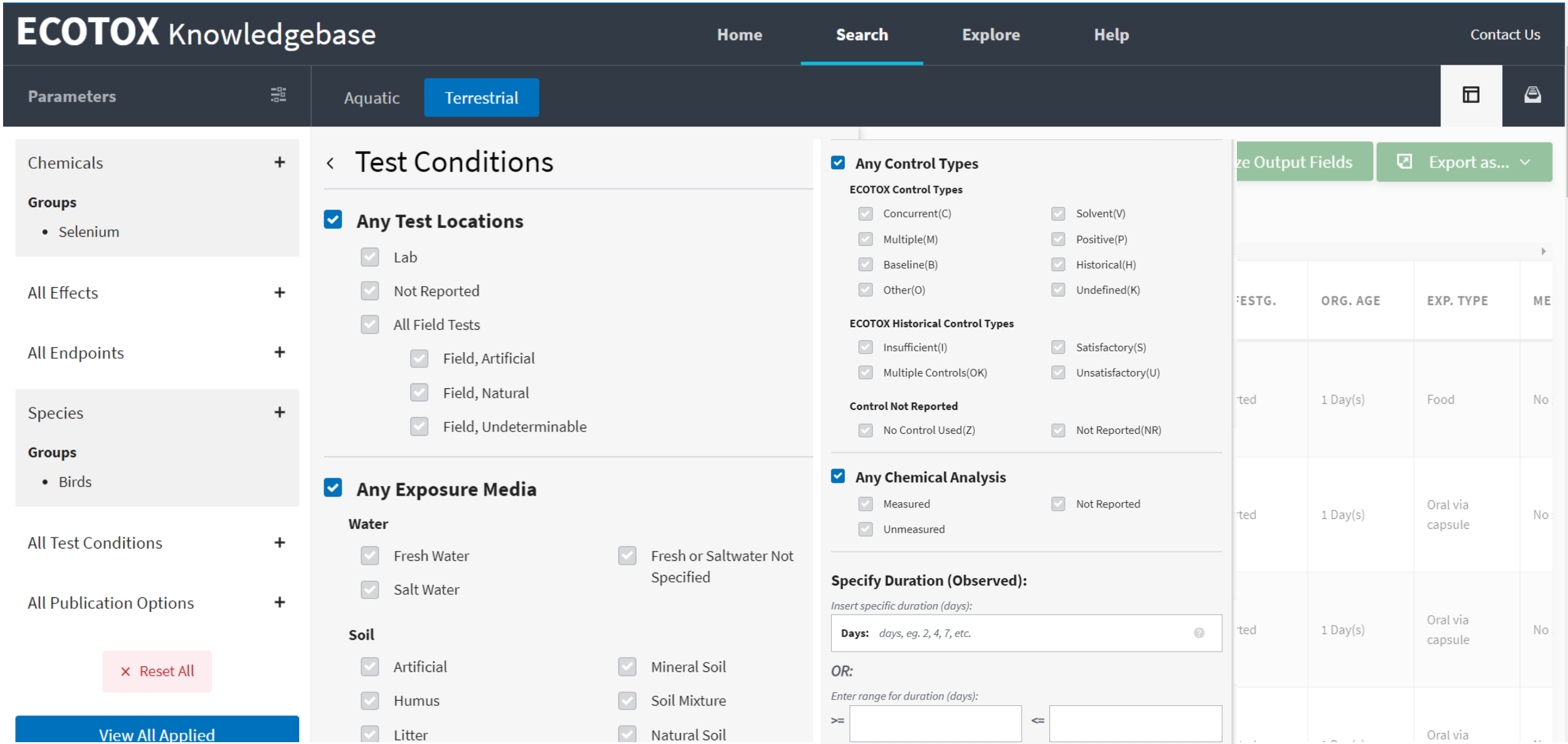
Customize Output Fields | Export as...

d data results.

CHEM. PUR.	SPEC. SCI. NAME / SPEC. COMMON NAME	SPEC. GROUP	ORG. LIFESTG.	ORG
NR	Mus musculus / House Mouse	Mammals; Standard Test Species	Juvenile	7 Day(s)
NR	Mus musculus / House Mouse	Mammals; Standard Test Species	Juvenile	7 Day(s)
NR	Acheta domesticus / Cricket	Insects/Spiders	Not reported	NR
NR	Acheta domesticus / Cricket	Insects/Spiders	Not reported	NR

Example: Selenium

EPA United States Environmental Protection Agency



Example: Selenium

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ECOTOX Knowledgebase | Home | Search | Explore | Help | Contact Us

Explore | Chemicals | Selenium

Aquatic | Terrestrial

Group Summary | Records | Plot View

Send Query Filters to Search

Query Filters

Select one or more of each filter to reduce the records.

Chemicals (35)

All

Species Group (15)

Birds

- All
- --- Animals ----------
- Amphibians
- Birds
- Crustaceans
- Fish
- Insects/Spiders
- Other Invertebrates
- Mammals
- Molluscs

35 Chemicals

Export CSV

Chemicals are ordered by **CAS Number**.

*Showing **all** 35 chemicals from **144343** to **1238388561***

CAS	CHEMICAL NAME	RECORDS	PUBLICATIONS	YEAR MIN	YEAR MAX
type to filter...	...	...	...	...	...
144343	**Methyl selenac** Chemicals Dashboard	7	3	1963	1969
1313855	Sodium selenide	2	1	1987	1987
1464422	**Selenomethionine (Unspecified)** Chemicals Dashboard	1075	61	1971	2014
2697612	**Selenocystamine** Chemicals Dashboard	6	1	2000	2000
	Zinc	30867	3270	1915	2021

Example: Selenium

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ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Explore | Chemicals | Selenium

Aquatic | Terrestrial

Group Summary | Records | Plot View

Send Query Filters to Search

Query Filters

Select one or more of each filter to reduce the records.

Chemicals (10)
All

Species Group (1)
Birds

Class (1)
All

Order (5)
All

CAS NO.	CHEMICAL N...	SPECIES...	COMMO...	EFFECT	MEASUREM...	ENDPOINT	DUR (STD)	CONC. T...	CONC. M...	CONC. U...	PUB. YEAR	REFERENCE
type to filter.	...	...	...	...	mo	...	...	...	...	...	...	...
10102188	Sodium selenite (Na_2SeO_3) Chemicals Dashboard	Gallus gallus	Chicken	Biochemistry	Molybdenum content	NOEL	40	Total				Combs,G.F.,Jr., Q. S... Google Scholar EXIT

Combs,G.F.,Jr., Q. Su, C.H. Liu, and S.B. Combs. Effects of Dietary Selenite, Copper, and Zinc on Tissue Trace Mineral Levels in Chicks. Biol. Trace Elem. Res.11:51-64, 1986. ECOREF #100471

Export

Google Scholar

allintitle: "Effects of Dietary Selenite, Copper, and Zinc on Tissue Trace Miner

Articles

1 result (0.07 sec)

Any time
Since 2022
Since 2021
Since 2018
Custom range...

Sort by relevance
Sort by date

Any type
Review articles

Effects of dietary selenite, copper, and zinc on tissue trace mineral levels in chicks

GF Combs, Q Su, CH Liu, SB Combs - Biological trace elemen

Studies were conducted to determine whether nutritional selen
nutritional status of the chick with respect to other trace elemer
and Zinc (Zn). Severe Se deficiency was produced in chicks by
contained exceedingly low contents (less than 0.010 ppm) of S
amounts of all other known essential nutrients. This diet was ba
meal produced in areas of China with endemic Se deficiency o

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Original Articles | Published: December 1986

Effects of dietary selenite, copper, and zinc on tissue trace mineral levels in chicks

G. F. Combs, Q. Su, C. H. Liu & S. B. Combs

Biological Trace Element Research **11**, 51–64 (1986) | Cite this article

37 Accesses | **4** Citations | Metrics

Showing all 1,009 records

Example: Selenium

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Test Number	CAS Number	Chemical Name	Author	Reference Number	Title	Source	Publication Year
2156245	1464422	2-Amino-4-(methylseleno)butanoic acid	Heinz,G.H., and M.A. Fitzgerald	58951	Overwinter Survival of Mallards fed Selenium	Arch. Environ. Conta	1993
2155067	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, C.M.	58954	Subchronic Hepatotoxicity of Selenomethionine Ingestion in Malla	J. Toxicol. Environ. H	1991
2164321	1464422	2-Amino-4-(methylseleno)butanoic acid	Heinz,G.H., and D.J. Hoffman	40269	Comparison of the Effects of Seleno-L-Methionine, Seleno-DL-Me	Environ. Pollut.91(2)	1996
2156295	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	58953	Interactive Effects of Selenium, Methionine, and Dietary Protein c	Arch. Environ. Conta	1992
2156295	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	58953	Interactive Effects of Selenium, Methionine, and Dietary Protein c	Arch. Environ. Conta	1992
2157062	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., and G.H. Heinz	39729	Embryotoxic and Teratogenic Effects of Selenium in the Diet of M	J. Toxicol. Environ. H	1988
2250263	1464422	2-Amino-4-(methylseleno)butanoic acid	Fairbrother,A., and J. Fowles	35152	Subchronic Effects of Sodium Selenite and Selenomethionine on S	Arch. Environ. Conta	1990
2155067	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, C.M.	58954	Subchronic Hepatotoxicity of Selenomethionine Ingestion in Malla	J. Toxicol. Environ. H	1991
2157083	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., and G.H. Heinz	39729	Embryotoxic and Teratogenic Effects of Selenium in the Diet of M	J. Toxicol. Environ. H	1988
2155941	1464422	2-Amino-4-(methylseleno)butanoic acid	Heinz,G.H., and D.J. Hoffman	58949	Methylmercury Chloride and Selenomethionine Interactions on He	Environ. Toxicol. Che	1998
2155067	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, C.M.	58954	Subchronic Hepatotoxicity of Selenomethionine Ingestion in Malla	J. Toxicol. Environ. H	1991
2156361	1464422	2-Amino-4-(methylseleno)butanoic acid	Heinz,G.H., D.J. Hoffman, and L.J. LeCaptain	40189	Toxicity of Seleno-L-Methionine, Seleno-DL-Methionine, High Sele	Arch. Environ. Conta	1996
562708	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	39733	Interactive Effects of Boron, Selenium, and Dietary Protein on Sur	Arch. Environ. Conta	1991
2156902	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, and A.J. Krynitsky	39873	Hepatic Glutathione Metabolism and Lipid Peroxidation in Respon	J. Toxicol. Environ. H	1989
2156245	1464422	2-Amino-4-(methylseleno)butanoic acid	Heinz,G.H., and M.A. Fitzgerald	58951	Overwinter Survival of Mallards fed Selenium	Arch. Environ. Conta	1993
2155067	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, C.M.	58954	Subchronic Hepatotoxicity of Selenomethionine Ingestion in Malla	J. Toxicol. Environ. H	1991
2156902	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, and A.J. Krynitsky	39873	Hepatic Glutathione Metabolism and Lipid Peroxidation in Respon	J. Toxicol. Environ. H	1989
2156802	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, J.D. E	50242	Toxicity and Oxidative Stress of Different Forms of Organic Seleni	Arch. Environ. Conta	1996
2156902	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, and A.J. Krynitsky	39873	Hepatic Glutathione Metabolism and Lipid Peroxidation in Respon	J. Toxicol. Environ. H	1989
562713	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	39733	Interactive Effects of Boron, Selenium, and Dietary Protein on Sur	Arch. Environ. Conta	1991
2155067	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, C.M.	58954	Subchronic Hepatotoxicity of Selenomethionine Ingestion in Malla	J. Toxicol. Environ. H	1991
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Poll Question!

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Case Studies

Case Studies

- Breakout groups are assigned based on your familiarity with and level of ECOTOX use.
- Each breakout group has a moderator to help participants and answer questions.
- There is a beginner and advanced case study. Each case study has an associated worksheet to guide the breakout group.
- Use the associated worksheet to complete the case study.
- If you finish early, notify your breakout group moderator. They can provide you other activities to complete.
- After the time is up, we will debrief the case studies.

Debrief: Level 1 Case Study

- In what case example from your work environment would ECOTOX be useful?
- What have you learned about the process and workflow used to find information and papers in ECOTOX?
- What challenges did you encounter, and how did you solve them?

Debrief: Level 2 and Additional Case Studies

- What process did you follow in ECOTOX to explore the information presented in the initial publication?
- What challenges did you encounter? How did you solve them?
- In what case example from your work environment would ECOTOX be useful?

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Summary

Summary

- Systematic and transparent procedures to identify and curate ecological toxicity data
- 30+ year history, with major recent updates and evolution in the near future
  - Maintain comprehensive and quality review of toxicity data
  - Enhance ease of data access and clarity
  - Meet the demands for increased pace of chemical assessments
  - Expand to reflect shifts in toxicity testing paradigm
- Curated data are on the public website (www.epa.gov/ecotox), readily available for exploration, querying and export for risk assessments, risk management and research

Thank You!

ECOTOXicology Knowledgebase Team

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Jason Berninger, GLTED

Colleen Elonen, Scientific Computing and Data Curation Division (SCDCD) (previous ECOTOX Coordinator)

Sara Vliet, SCDCD (liaison to ECOTOX)

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General Dynamics Information Technology (GDIT)
SpecPro Professional Services (SPS)

Senior Environmental Employment (SEE) staff

Training Breakout Room Moderators

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Anita Pomplun – GDIT
Brian Kinziger – GDIT
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Future NAMs Trainings: Potential Topics

Topic Area	Specific Products, Including Web Applications, Databases, Tools and Workflows
CompTox Chemicals Dashboard	CompTox Chemicals Dashboard: overview, all sub-modules and their functionality tailored to be a chemical specific case study approach that is trainee/user-defined.
Ecotoxicology	ECOTOX Knowledgebase, SeqAPASS
Exposure	CPDat (CPCat, CPCPdb, Ingredient Lists, Functional Use Data, Measured Data), Expocast/SEEM3; SHEDS HT
Databases relevant to toxicity and bioactivity	ToxCast, ToxRefDB, ToxVal, TEST; invitroDB
Toxicokinetics and dosimetry	High-Throughput Toxicokinetics R-Package (HTTK)
Chemical safety proof-of-concept (POC) workflows	Toxic Substances Control Act (TSCA) POC, Bioactivity:Exposure Ratio
Chemistry	GenRA; phys-chem properties (OPERA models); ENTACT; Non-Targeted Analysis (NTA)

For more information: www.epa.gov/chemical-research/new-approach-methods-nams-training

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To cite ECOTOX or read more details: Olker et al. 2022 https://doi.org/10.1002/etc.5324

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