United States Environmental Protection Agency

EPA Tools & Resources Training Webinar: ECOTOX Knowledgebase

Colleen Elonen and Jennifer Olker
US EPA Office of Research and Development

February 4, 2021

Presentation Outline

- Background and History of the ECOTOX Knowledgebase
- ECOTOX Pipeline: Literature Search, Systematic Review, and Data Curation
- Demonstration of ECOTOX Knowledgebase
- Summary

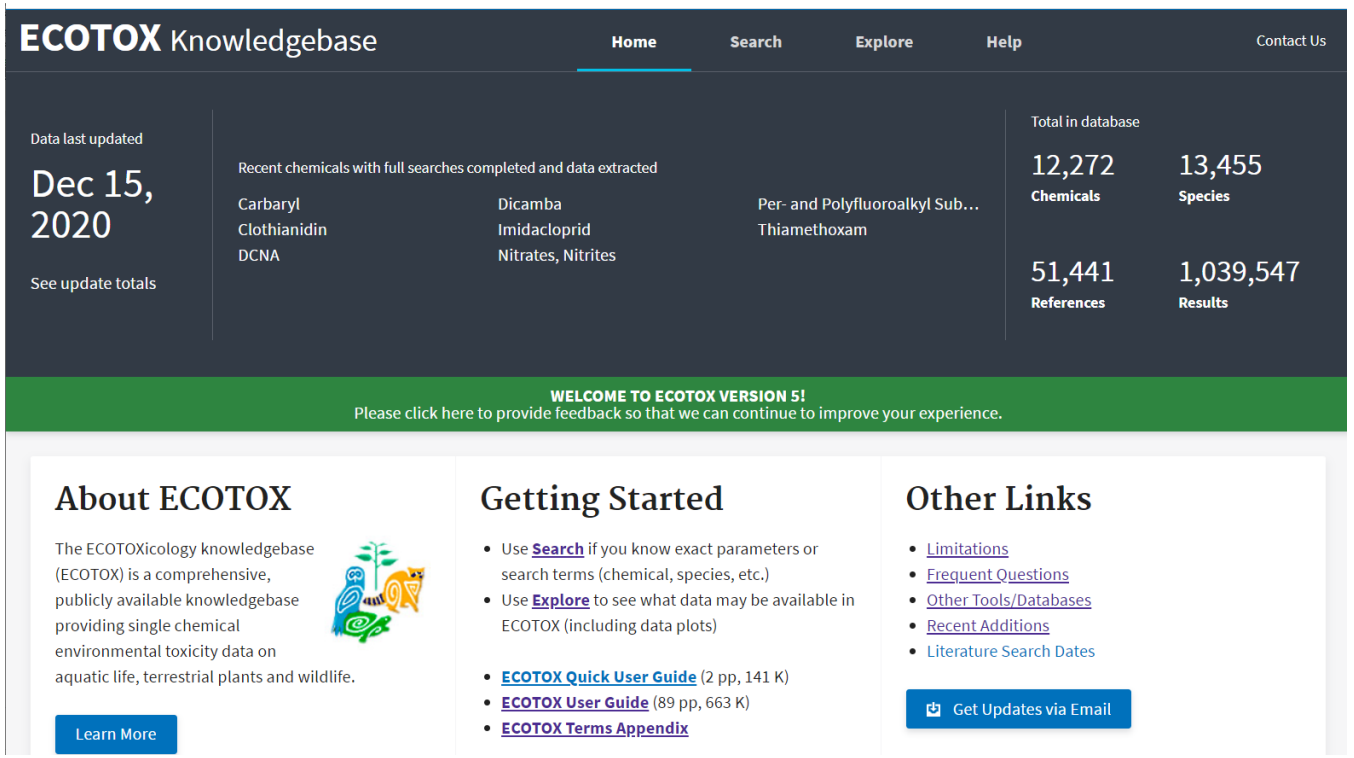
Problem

- Risk assessors needed a cost-effective means of locating high quality ecological effects data to use in prioritizing chemical cleanup at hazardous waste sites and assisting in the assessment of potential hazards of pollutants through the Clean Air Act, the Clean Water Act, the Federal Insecticide, Fungicide and Rodenticide Act and the Toxic Substances Control Act.
- Duplicative efforts for data gathering wastes resources across state and federal agencies.
- ECOTOX was developed to meet the need for:
  1) an ***authoritative source of toxicological data*** for regulators
  2) an efficient way for the regulated community and researchers to ***document literature searches and acquisition of data*** used for risk assessments, risk management and research
  3) empirical data for the ***development and validation*** of in vitro and modeling methods for risk assessment

What is the ECOTOX Knowledgebase?

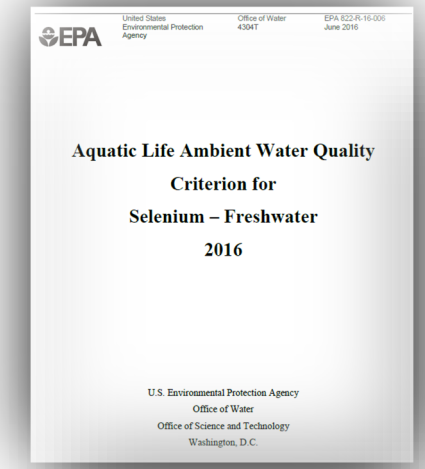
Publicly available, curated database providing toxicity data from single-chemical exposure studies to aquatic life, terrestrial plants and wildlife

- From comprehensive search and review of open and grey literature
  - Data extracted from acceptable studies, with up to 250 fields
  - Updated quarterly to public website
- 30+ year history
  - Originated in the early 1980s
  - Developed at US EPA's Office of Research and Development in Duluth
- Current user statistics
  - 8,000 distinct hosts search the Knowledgebase each month



www.epa.gov/ecotox

EPA Program and Regional Office Applications: Use in environmental decision making

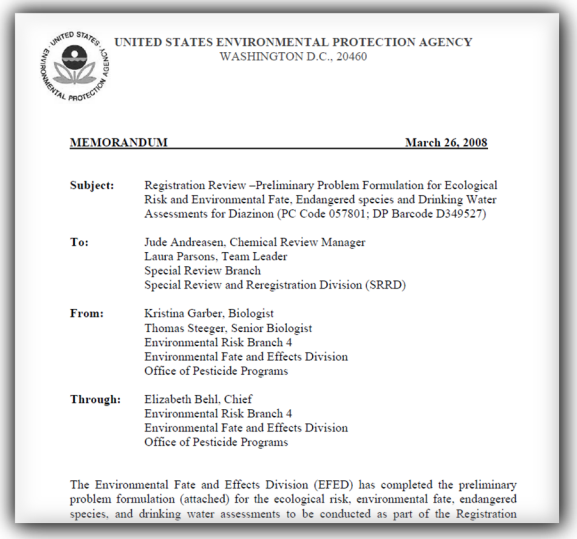

United States Environmental Protection Agency | Office of Water 4304T | EPA 822-R-16-006 June 2016

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.

Used for every Ambient Water Quality Criteria for Aquatic Life since 1985.

Used for every Ecological Risk Assessment for Office of Pesticides for chemical registration and re-registration (FY20 – 27 chemicals).


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)

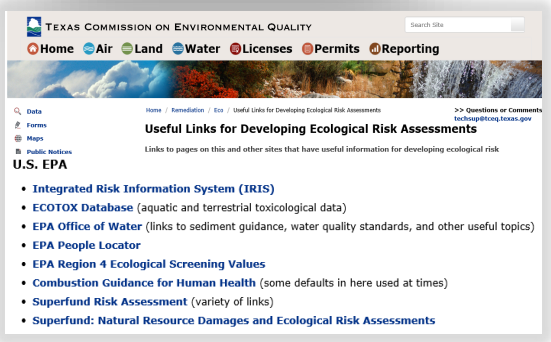
To: Jude Andreasen, Chemical Review Manager
Laura Parsons, Team Leader
Special Review Branch
Special Review and Reregistration Division (SRRD)

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

Used by Office of Land and Emergency Management (Superfund and ORCR), HQ, Regions and States for site assessments and in emergency response.


TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Home | Air | Land | Water | Licenses | Permits | Reporting

Useful Links for Developing Ecological Risk Assessments

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

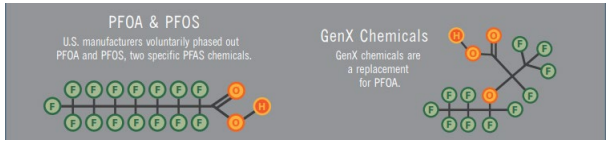
U.S. EPA

- 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

Providing ecological hazard data for the prioritization and assessment of chemicals for TSCA/Lautenberg Act.

Overview of TSCA Work Plan Methodology

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



Providing ecological toxicity data for PFAS to researchers, EPA Eco Risk Assessment Forum, DoD Tri-Services ERA Work Group and others.

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

ECOTOX Knowledgebase

Chemical environmental toxicity data for aquatic life, terrestrial plants and wildlife

Interoperability with databases/tools

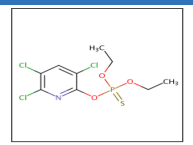
DTXSID/CASRN

Species ID; Protein ID

Integrated ontology

Reference ID

Chemicals Dashboard



SeqAPASS

Adverse Outcome Pathway WIKI

HERO
Health & Environmental Research Online

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

Tools and Applications

Species Sensitivity Distributions
(e.g., US EPA's WebICE, NOAA's CAFÉ)
PNECs and Eco Thresholds for Toxicological Concern
QSAR (e.g., ECOSAR, TEST, OECD QSAR Toolbox)
Bioaccumulation Factor modeling and validation
Adverse Outcome Pathway (AOP) development

ECOTOX Pipeline: Systematic Review/Data Curation

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

Extract data into ECOTOX Knowledgebase

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	No Toxicant: 221
Human Health: 1,797	Duplicate: 153
False Hit: 1,333	Review: 50
Fate: 510	Mixture: 12
Survey: 287	Other: 121
Bacteria: 233	

For Review (Full Text Screening)
n = 388 references

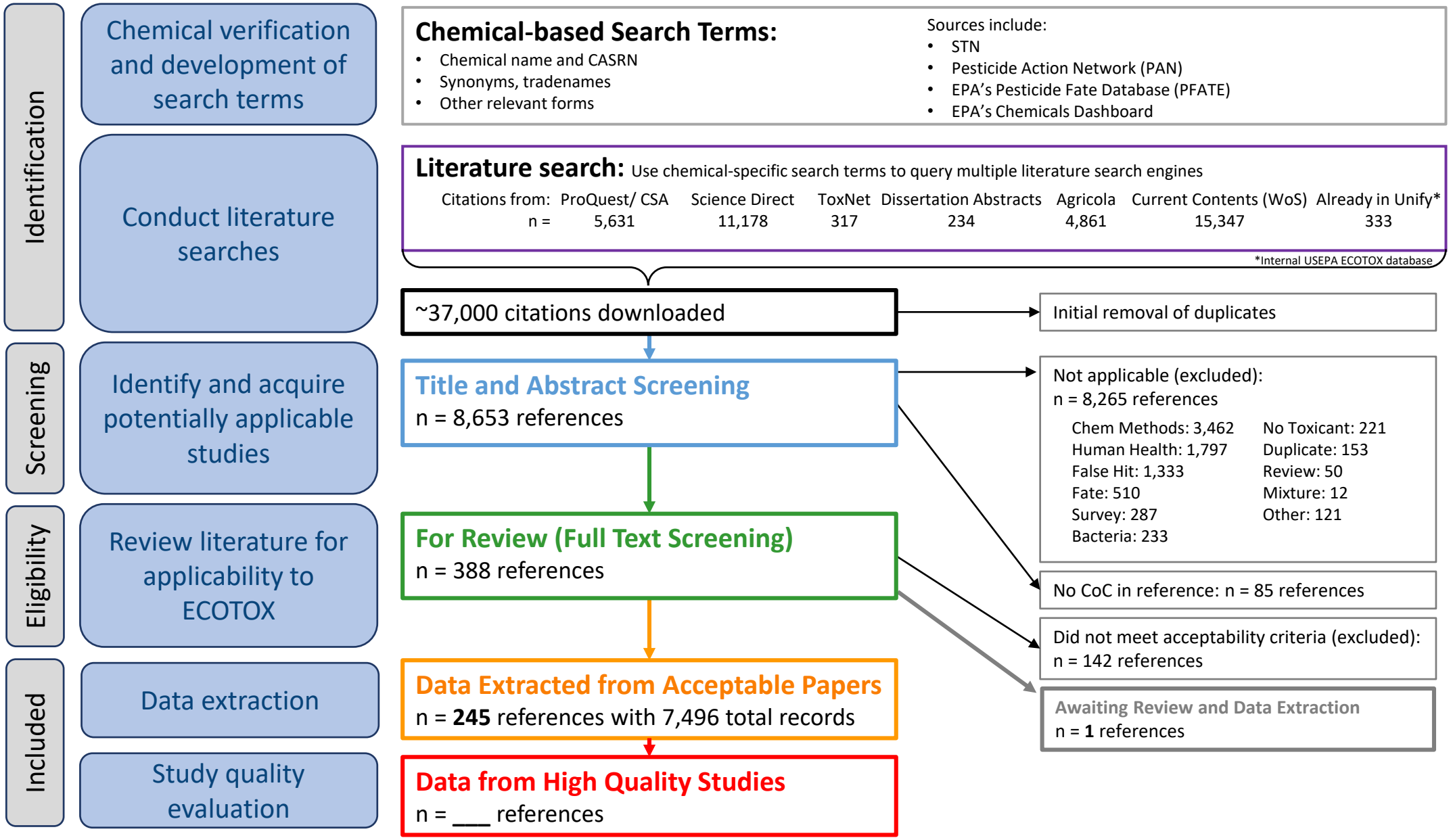
→ No CoC in reference: n = 85 references

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

→ Awaiting Review and Data Extraction
n = **1** references

Data Extracted from Acceptable Papers
n = **245** references with 7,496 total records

ECOTOX Pipeline: Systematic Review/Data Curation



Chemical Search Terms: ID, Test and QA

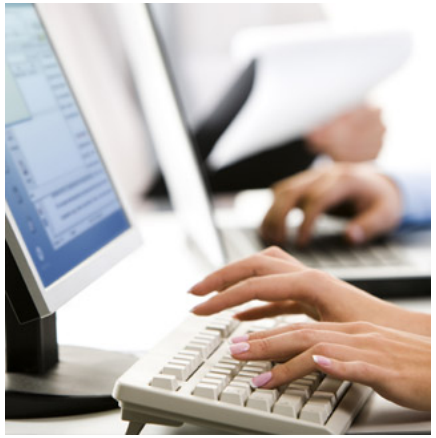
Identification	Chemical verification and development of search terms
	Conduct literature searches
Screening	Identify and acquire potentially applicable studies
Eligibility	Review literature for applicability to ECOTOX
Included	Data extraction
	Study quality evaluation

Search various sources for chemical terms, Synonyms, verify CAS, 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")

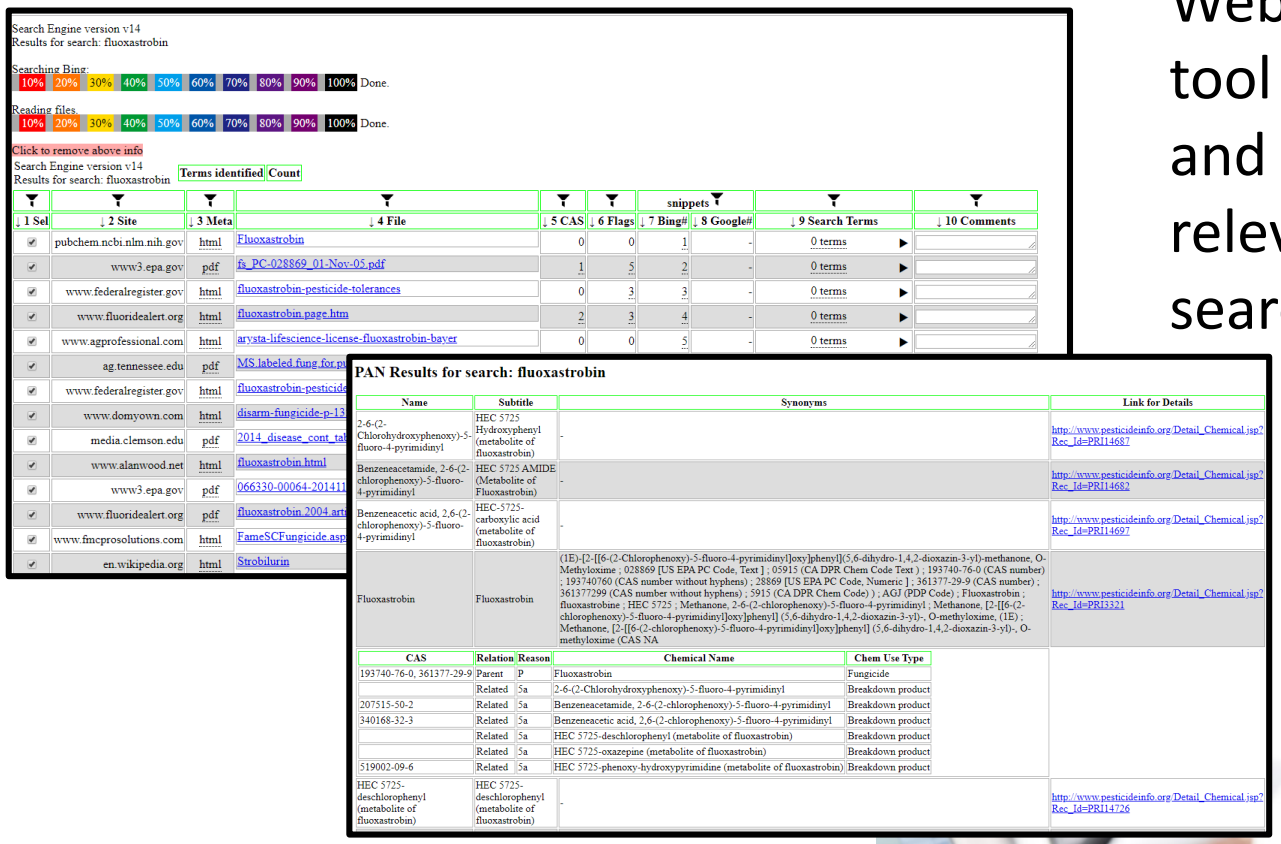
Couple hour process

Enter chemical terms into template for abstracting databases



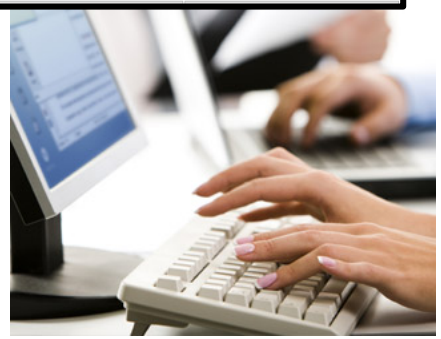
Chemical Search Terms: ID, Test and QA

- **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



Web-based tool to identify and document relevant search terms

Chemical terms automatically formatted for abstracting databases



Literature Searches

Identification

Chemical verification and development of search terms

Conduct literature searches

Screening

Identify and acquire potentially applicable studies

Eligibility

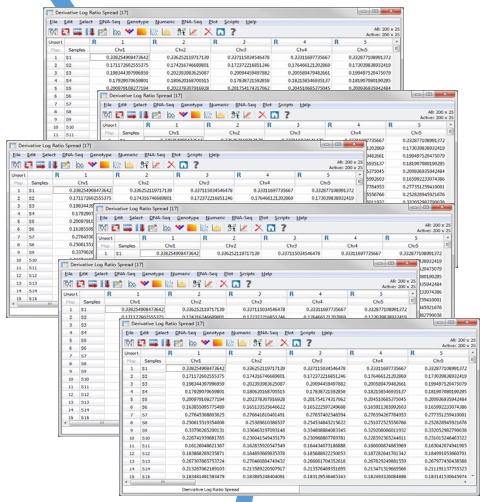
Review literature for applicability to ECOTOX

Included

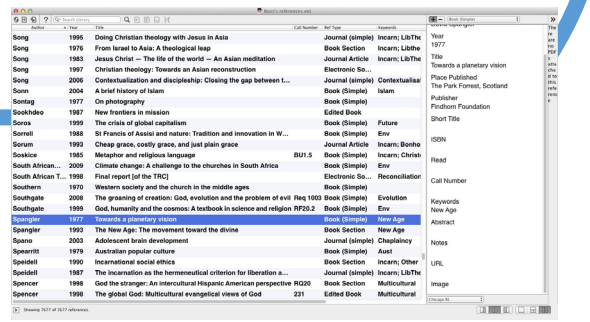
Data extraction

Study quality evaluation

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



In 2020: 208,000 references were manually skimmed for applicability



Collate data and remove duplicates

Search Engines

1. Science Direct
2. AGRICOLA
3. TOXNET
4. ProQuest ESPM
5. ProQuest Dissertation Abstracts
6. Web of Science/ Current Contents

Skimming for Applicability: Title and Abstract

- **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

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

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

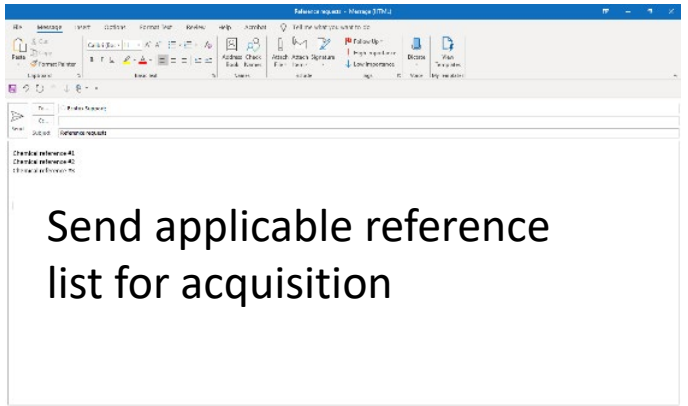
Sulfur Dust Bag: A Novel Technique for Ectoparasite Control in Poultry Systems.

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.

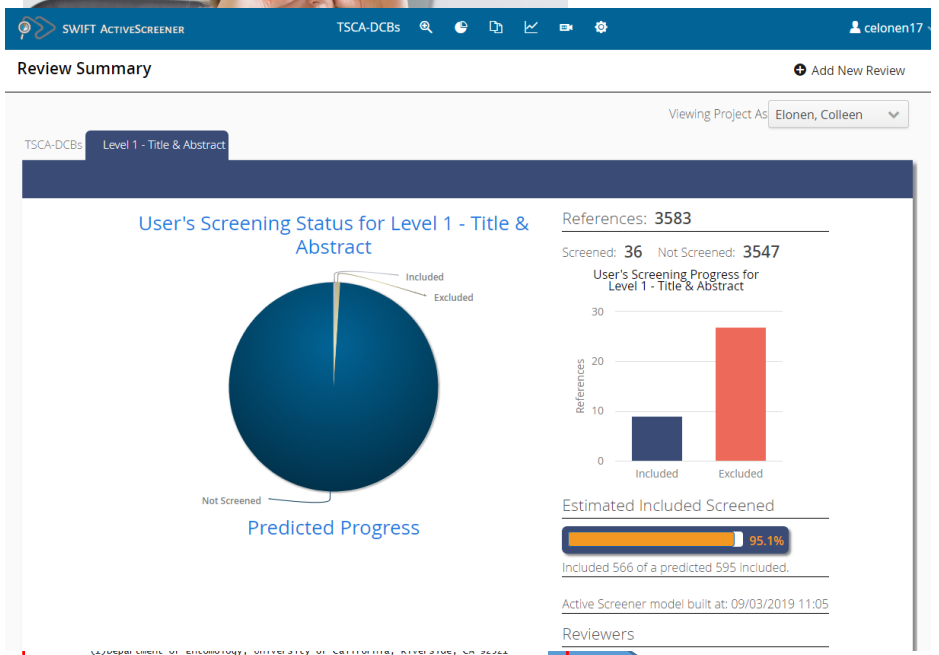
DOI: 10.1093/jee/tow146

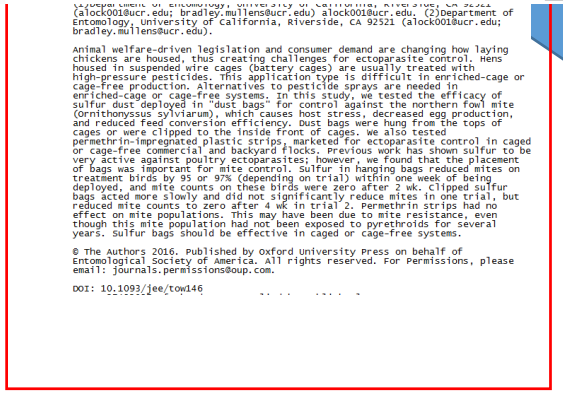


Send applicable reference list for acquisition

Skimming for Applicability: Title and Abstract

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

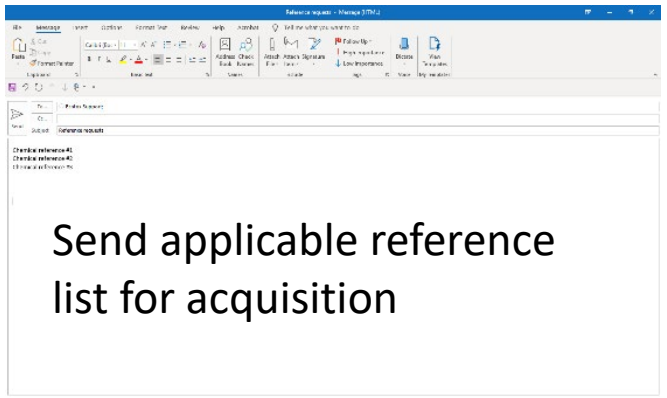




Animal welfare-driven legislation and consumer demand are changing how laying chickens are housed, thus creating challenges for ectoparasite control. Hens housed in suspended wire cages (battery cages) are usually treated with high-pressure pesticides. This application type is difficult in enriched-cage 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.

© The Authors 2016. Published by Oxford University Press on behalf of Entomological Society of America. All rights reserved. For Permissions, please email: journals.permissions@oup.com.

DOI: 10.1093/jee/tow146

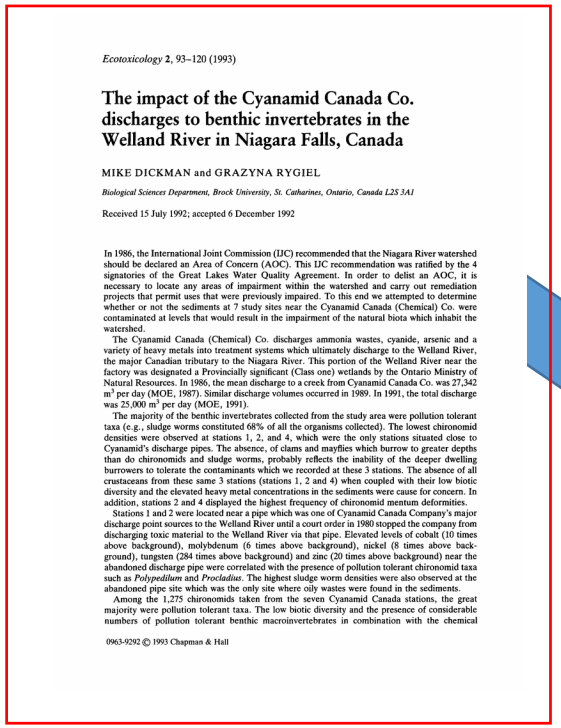


Send applicable reference list for acquisition

Partnering with EPA colleagues and others to develop language learning tools for skimming and prioritizing abstracts

Skimming for Applicability: Full Text

- **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



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.

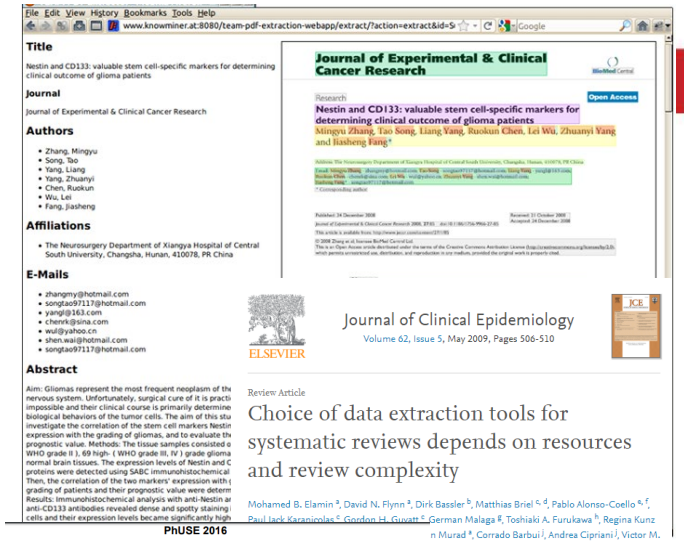
Among the 1,275 chironomids taken from the seven Cyanamid Canada stations, the great majority were pollution tolerant taxa. The low biotic diversity and the presence of considerable numbers of pollution tolerant benthic macroinvertebrates in combination with the chemical

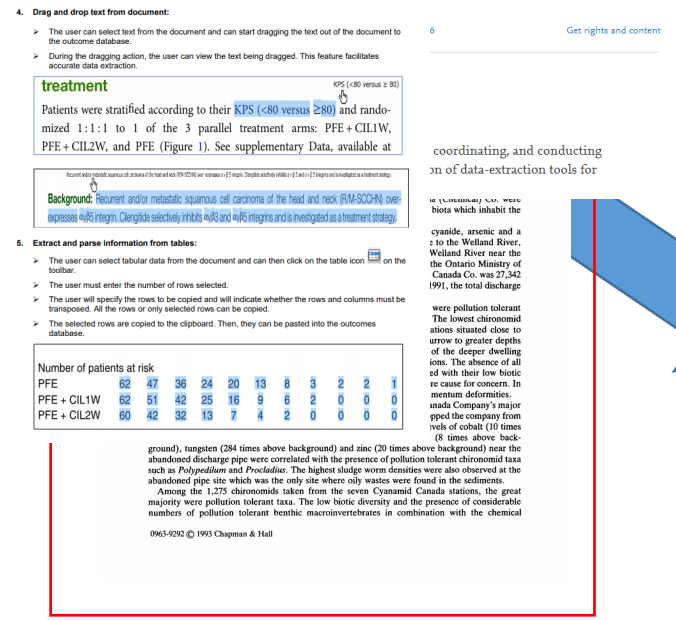
Moves on to be curated into ECOTOX.

Dec. 2019 – Dec. 2020
1,676 references were added to the public website

Skimming for Applicability: Full Text

- **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





Exploring options for data mining and extraction of information from a variety of sources

Moves on to be curated into ECOTOX.

Dec. 2019 – Dec. 2020
1,676 references were added to the public website

ECOTOX Applicability Criteria

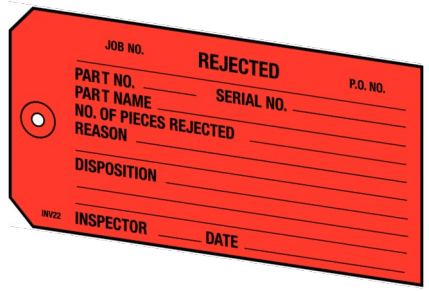
- Paper must meet these criteria
  - Single chemical exposure
  - Ecologically-relevant species
  - Must be able to verify CAS registry numbers
  - Must be able to verify taxonomic information for test species
  - Exposure to live organism, viable tissue or cells
  - Report concurrent exposure concentration, dose or application rate
  - Report duration of exposure
  - Must have a control treatment
  - Primary source of the data
  - Study must be a full article in English
- The following studies are excluded
  - Air pollution studies related to CO2 and ozone
  - Studies on humans, monkeys, bacteria, viruses and yeast
  - Review and summary articles
  - Terrestrial studies with an inhalation route of exposure
  - Non-English publications and abstracts

Review literature for applicability to ECOTOX

ECOTOX Applicability Criteria

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, CO2)
- 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**
  - 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

Unique Identifiers
- Chemical ID
- Taxonomic ID
- NCBI taxid
- ITIS TSN

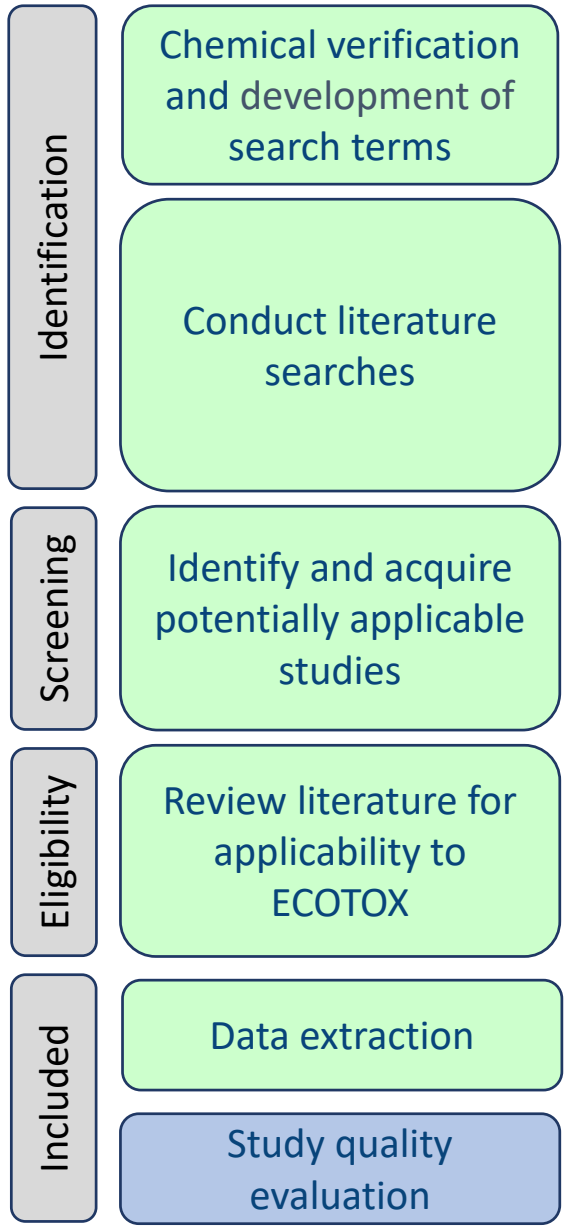
Test Species
- Species Groups
  - Animals
  - Plants
  - Special Interests
- Lifestage
- Gender
- Organism source

Chemical
- Chemical Analysis
- Concentration type
- Chemical Formulation
- Chemical Grade
- Chemical ions
- Chemical Radiolabel
- Chemical Groups
  - Organic groups
    - EDCs
    - PCBs
    - *Example groups*
  - Metal / organometal
    - Antimony
    - Arsenic
    - *Example groups*

Test Condition
- Test Method
- Test Location
  - Lab
  - Field
    - Sub-habitat
    - Geographic text
    - Depth units
- Duration Units
- Exposure Type
  - Diet
  - Injection
  - Multiple application
  - Aquatic only
    - Aquatic lab
    - Aquatic Field
  - Topical Application
  - Environmental Exp.
    - Application Type
    - Exposure Type
    - In vitro
- Application Frequency
- Application Type
- Exposure media
  - Media Type
    - Aquatic Media
    - Terrestrial Media
      - Soil Type
      - Organic Matter
  - Exp. Media Character.
- Control Type
- Sample Unit
- Exposure Dose Units

Results
- Response Site
- Endpoint
  - Terrestrial
  - Aquatic
  - Both
- Trend
- Effect
  - Effect Groups
    - Effect Measurement
      - Accumulation
      - Behavior
        - Avoidance
        - General Behavior
        - Feeding Behavior
      - Biochemistry
        - Biochemical
        - Enzyme
        - Hormone
        - Reproduction
      - Cellular
        - Cellular
        - Genetic
        - Histological
      - Growth
        - Growth
        - Development
        - Morphology
      - Mortality
      - Physiology
        - General Phys
        - Injury
        - Immunity
        - Intoxication
      - Reproduction
        - General Repro
        - Egg
      - Population

Study Quality Evaluation



- Many fields in ECOTOX can inform study evaluation

Category	Select study evaluation questions with relevant ECOTOX field(s)
Chemical	• Is test substance identified? **Required for inclusion in ECOTOX inclusion** • Is the purity of 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? **A control is 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**

DEMO of ECOTOX: www.epa.gov/ecotox

EPA United States Environmental Protection Agency

ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Data last updated

Dec 15, 2020

See update totals

Recent chemicals with full searches completed and data extracted

Carbaryl
Clothianidin
DCNA
Dicamba
Imidacloprid
Nitrates, Nitrites
Per- and Polyfluoroalkyl Subst…
Thiamethoxam

Total in database

12,272 **Chemicals**

13,455 **Species**

51,441 **References**

1,039,547 **Results**

WELCOME TO ECOTOX VERSION 5!
Please click here to provide feedback so that we can continue to improve your experience.

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.

Getting Started

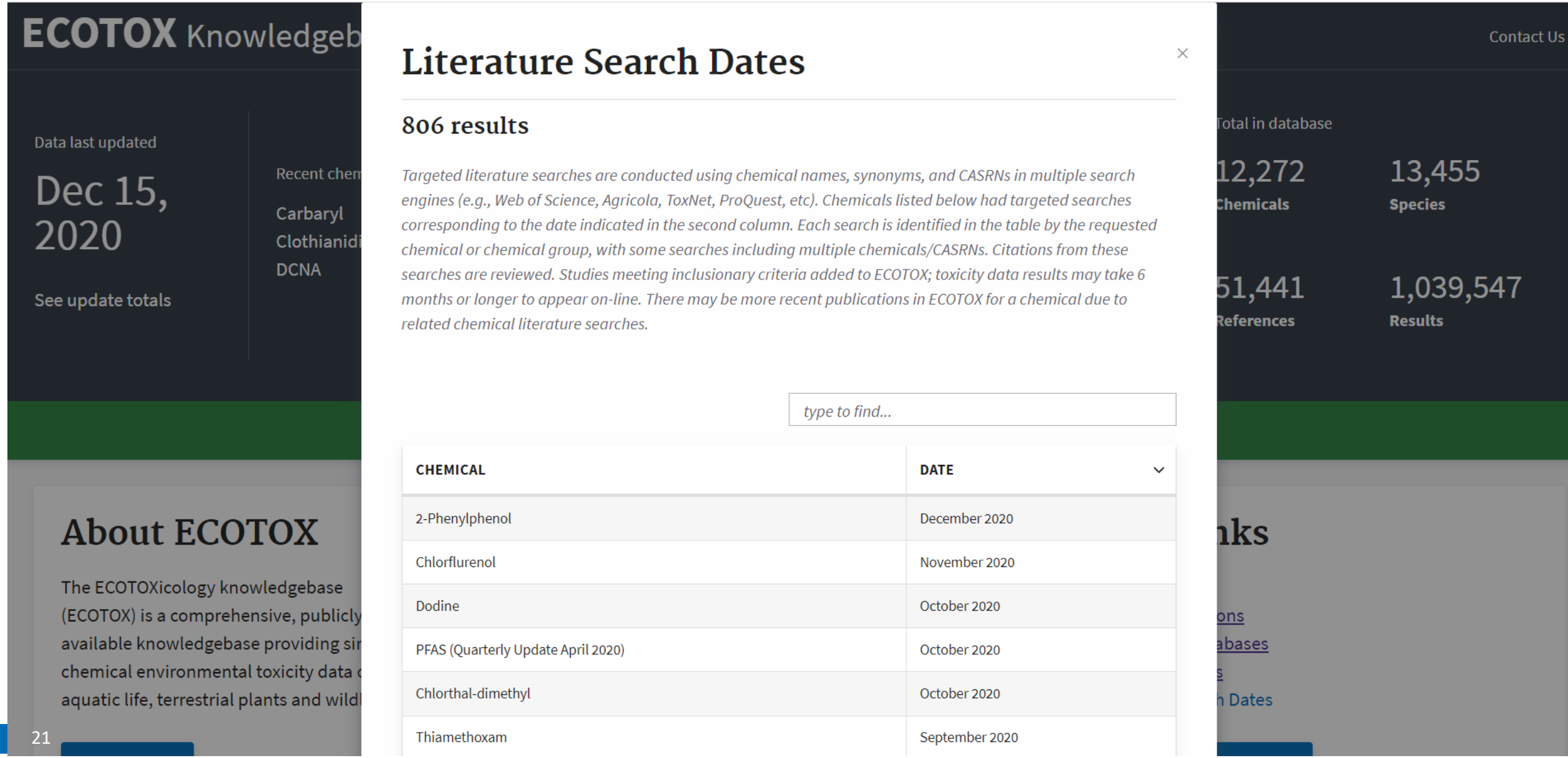
- Use **Search** if you know exact parameters or search terms (chemical, species, etc.)
- Use **Explore** to see what data may be available in ECOTOX (including data plots)

- **ECOTOX Quick User Guide** (2 pp, 141 K)
- ECOTOX User Guide (89 pp, 663 K)

Other Links

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

Recent Additions & Literature Search Dates



Help and Contact Us

Contact Us About the ECOTOX Knowledgebase

EPA welcomes your comments on this version of ECOTOX. We are specifically interested in feedback from users about the new functionality and usability. What, if any, issues did you experience? Please be as specific as possible in your comments. If you or your team would like training on how to use and find information in ECOTOX, please indicate that in the Feedback box below.

For technical questions about the scientific information and data interpretation, you may use the comment form below, or the contact information in the right-side bar, to contact the ECOTOX Support Staff.

Please help us answer your request by including a correct e-mail address. If you are referring to a specific page within the ECOTOX web site, please include a URL or title for the page.

Your Name

First Last

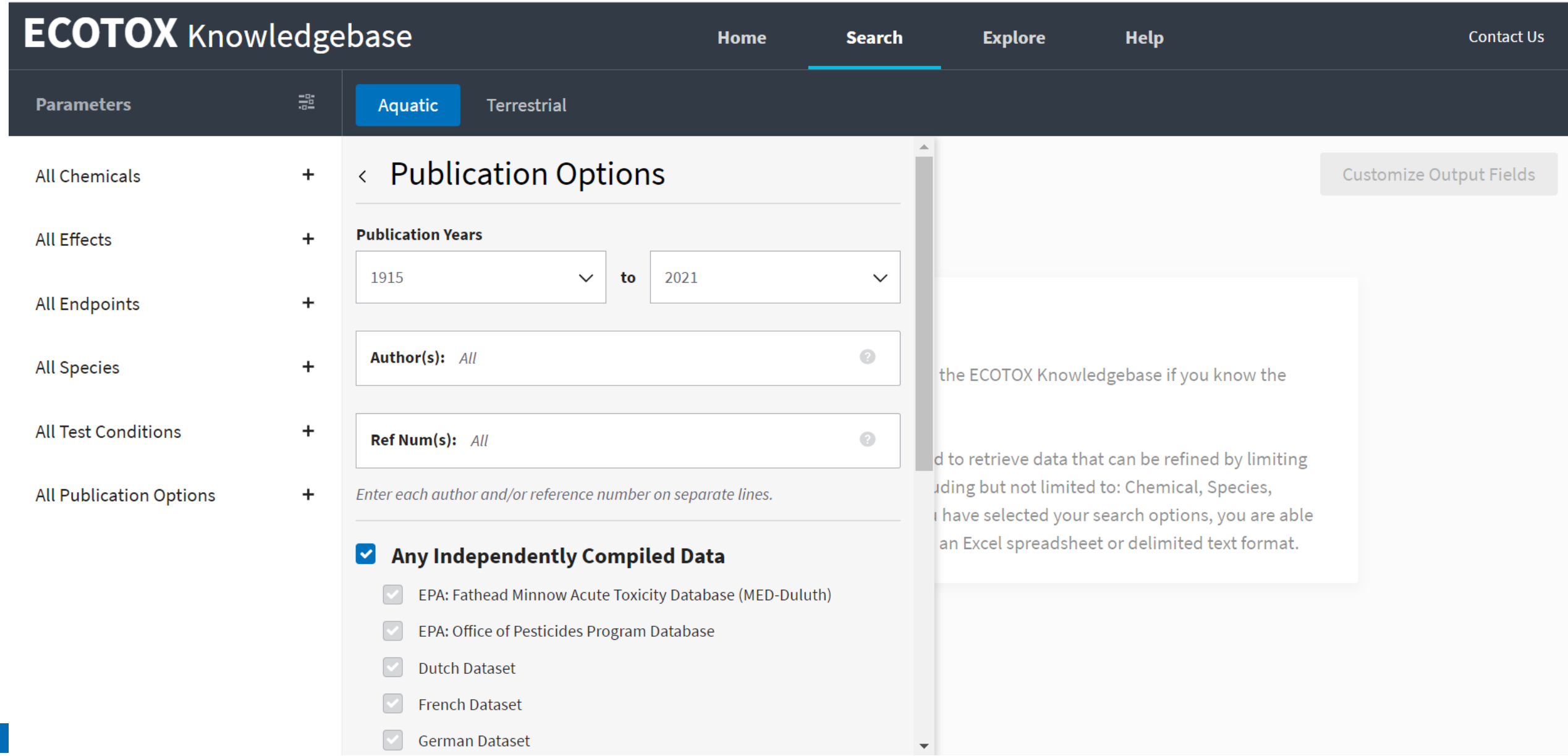
Your Organization *(Optional)*

Get Updates via Email

Telephone: 218-529-5225
Fax: 218-529-5003
E-mail: ecotox.support@epa.gov

Mailing address:
ECOTOX Support
Great Lakes Toxicology Ecology Division
6201 Congdon Boulevard
Duluth, MN 55804

Search: for exact parameters or search terms



Explore: interactive filters & visualization

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

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

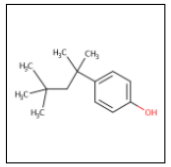
Class (1)
All

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

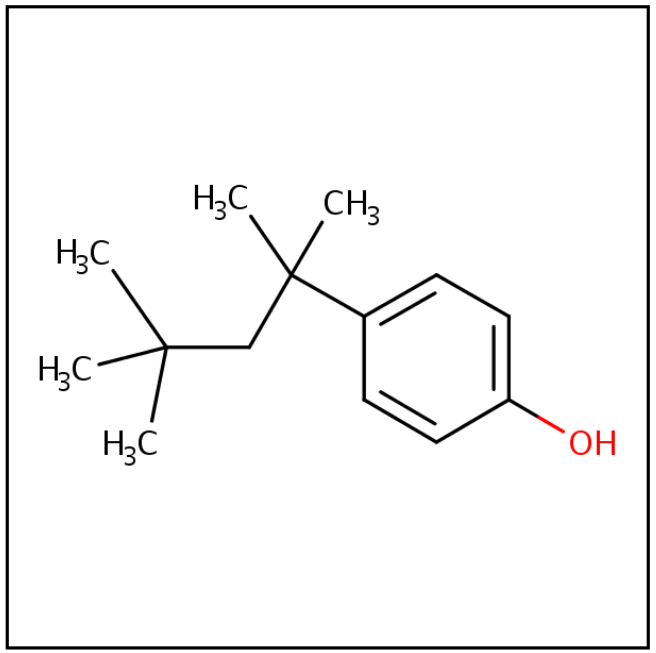


4-(1,1,3,3-Tetramethylbutyl)phenol

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

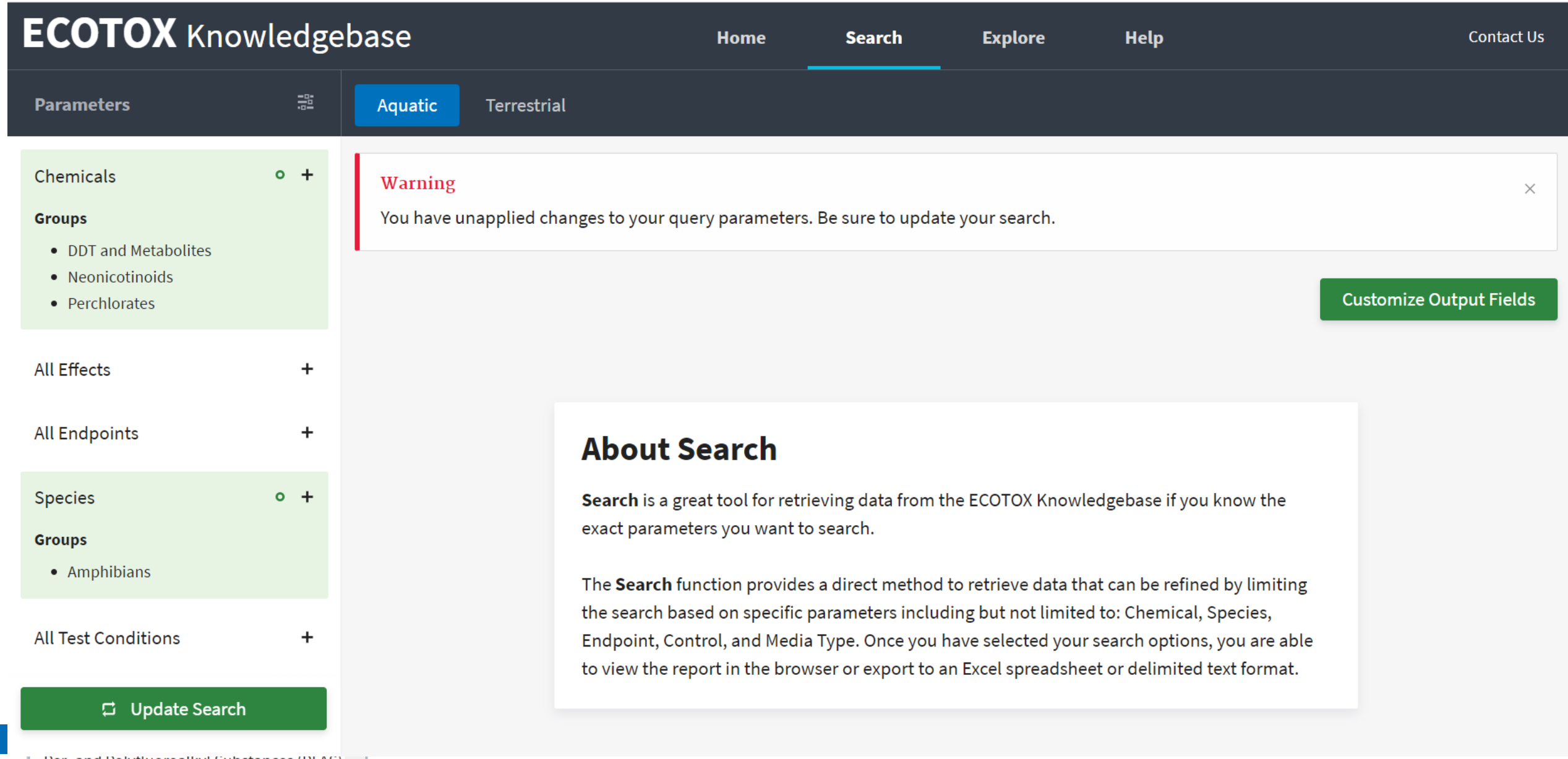
Linked Substances

Presence in Lists

Record Information

https://epa.gov

Explore by Species: Send to Search



Search: Refine Query Parameters

ECOTOX Knowledgebase

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...

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

ECOTOX Knowledgebase

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

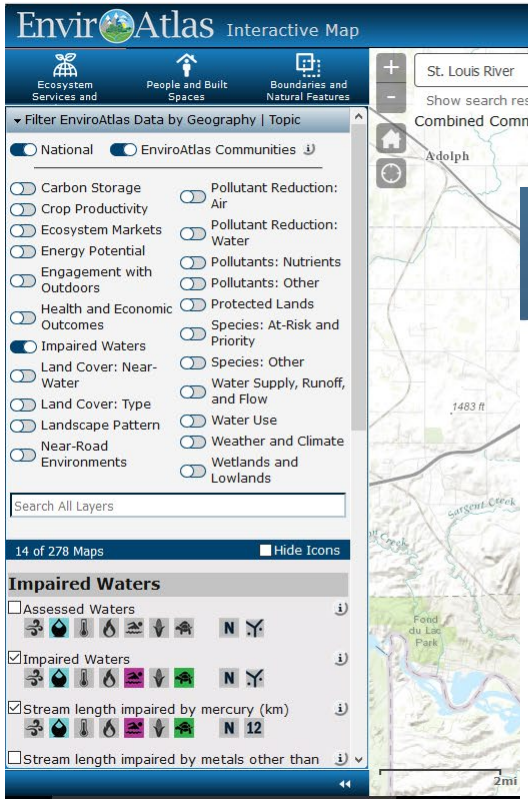
Brausch,J.M., M. Wages, R.D. Shannahan, G. Perry, T.A. Anderson, J.D. Maul, B. Mulhearn, and P.N. Smith. *Surface Water Mitigates the Anti-Metamorphic Effects of Perchlorate in New Mexico Spadefoot Toads (Spea multiplicata) and African Clawed Frogs (Xenopus laevis)*. Chemosphere78(3): 280-285, 2010.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

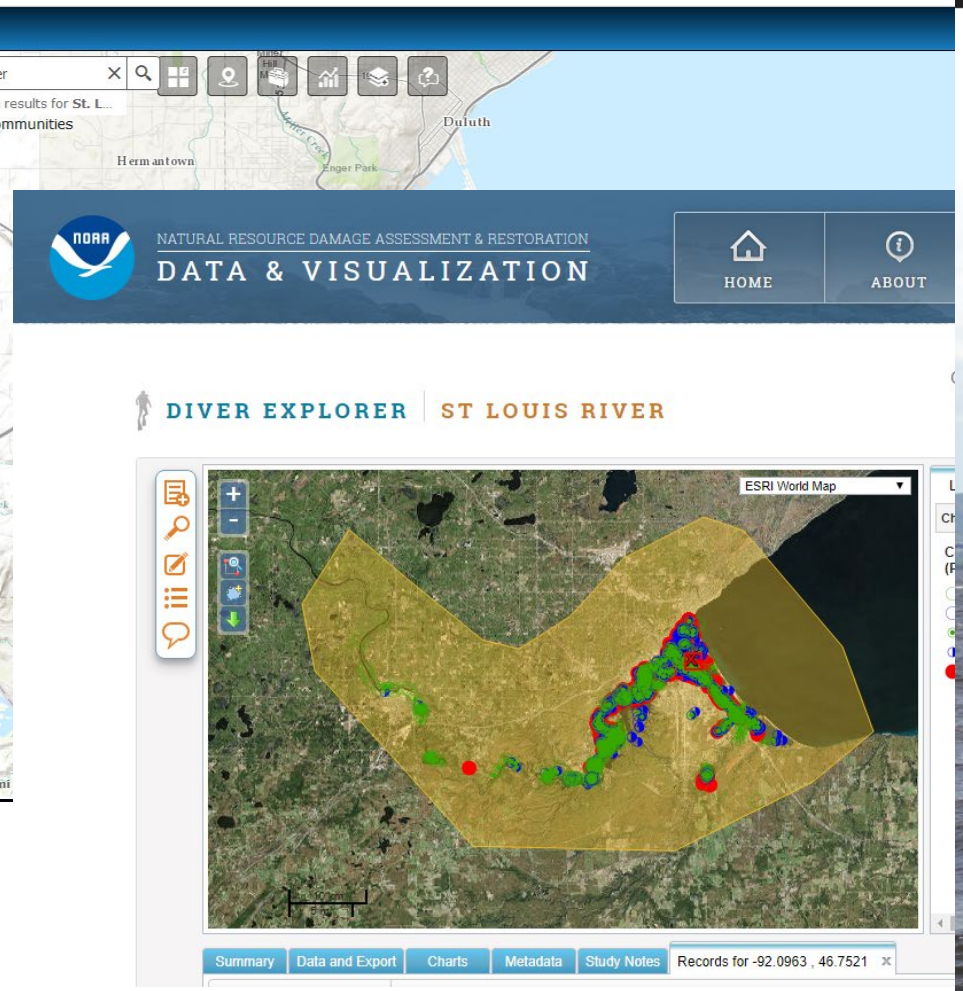
Search Google Scholar EXIT

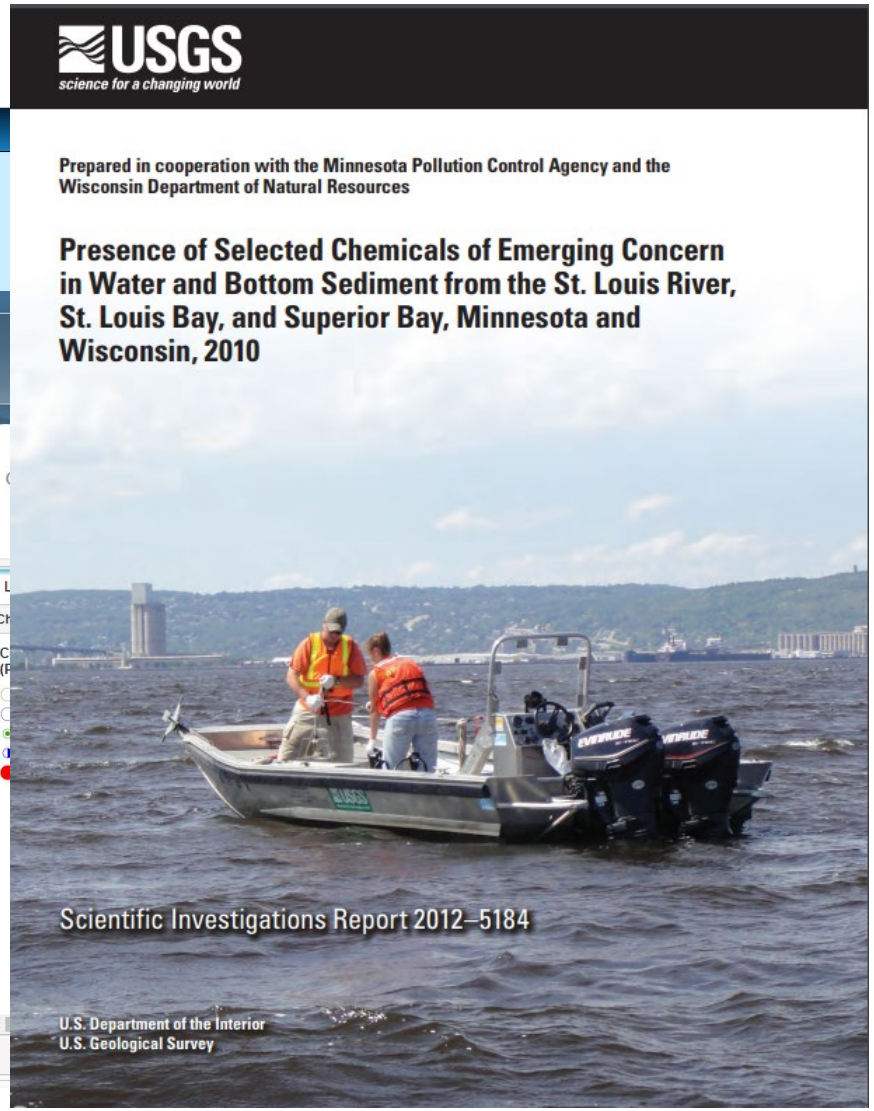
Export Close

Linking Environmental Contaminants to Effects Data

- **Examples of Environmental Contaminant Databases**







Linking Environmental Contaminants to Effects Data

- **USGS Report 2012-5184: Presence of Selected Chemicals of Emerging Concern in Water and Bottom Sediment from the St. Louis River, St. Louis Bay, and Superior Bay, Minnesota and Wisconsin, 2010**

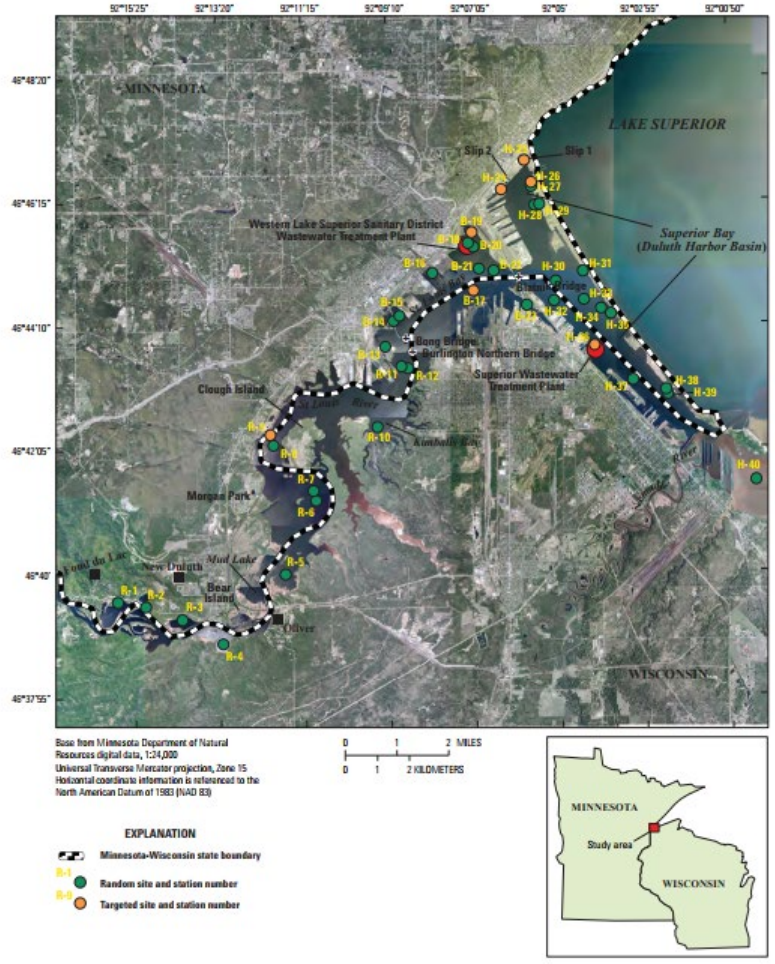
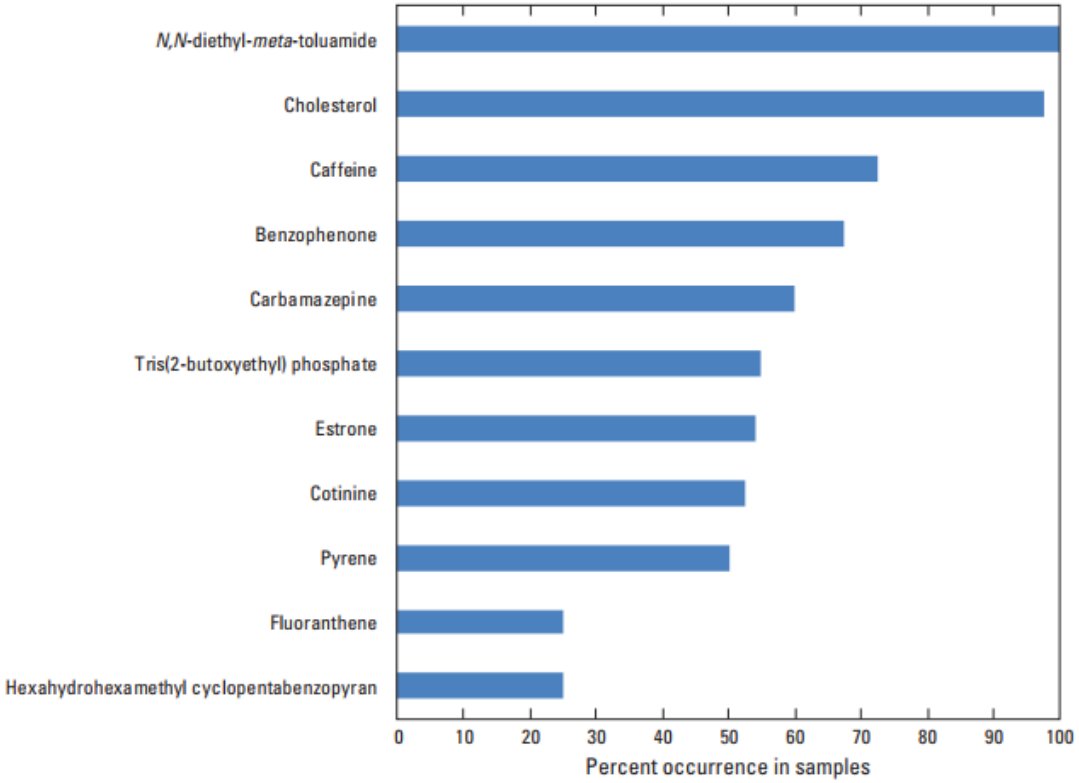


Figure 2. St. Louis River, St. Louis Bay, and Superior Bay study area and sampling sites, Minnesota and Wisconsin.

Occurrence of selected chemicals of emerging concern detected in a least 25 percent of water samples from the St. Louis River, St. Louis Bay, and Superior Bay sites, Minnesota and Wisconsin, 2010.



Link from CompTox Chemicals Dashboard

ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Explore | Chemicals | Custom Group

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 (1)

DEET - 134623

Species Group (6)

All

Class (9)

All

Order (18)

1 Chemicals

Export CSV

Chemicals are ordered by **CAS Number**.

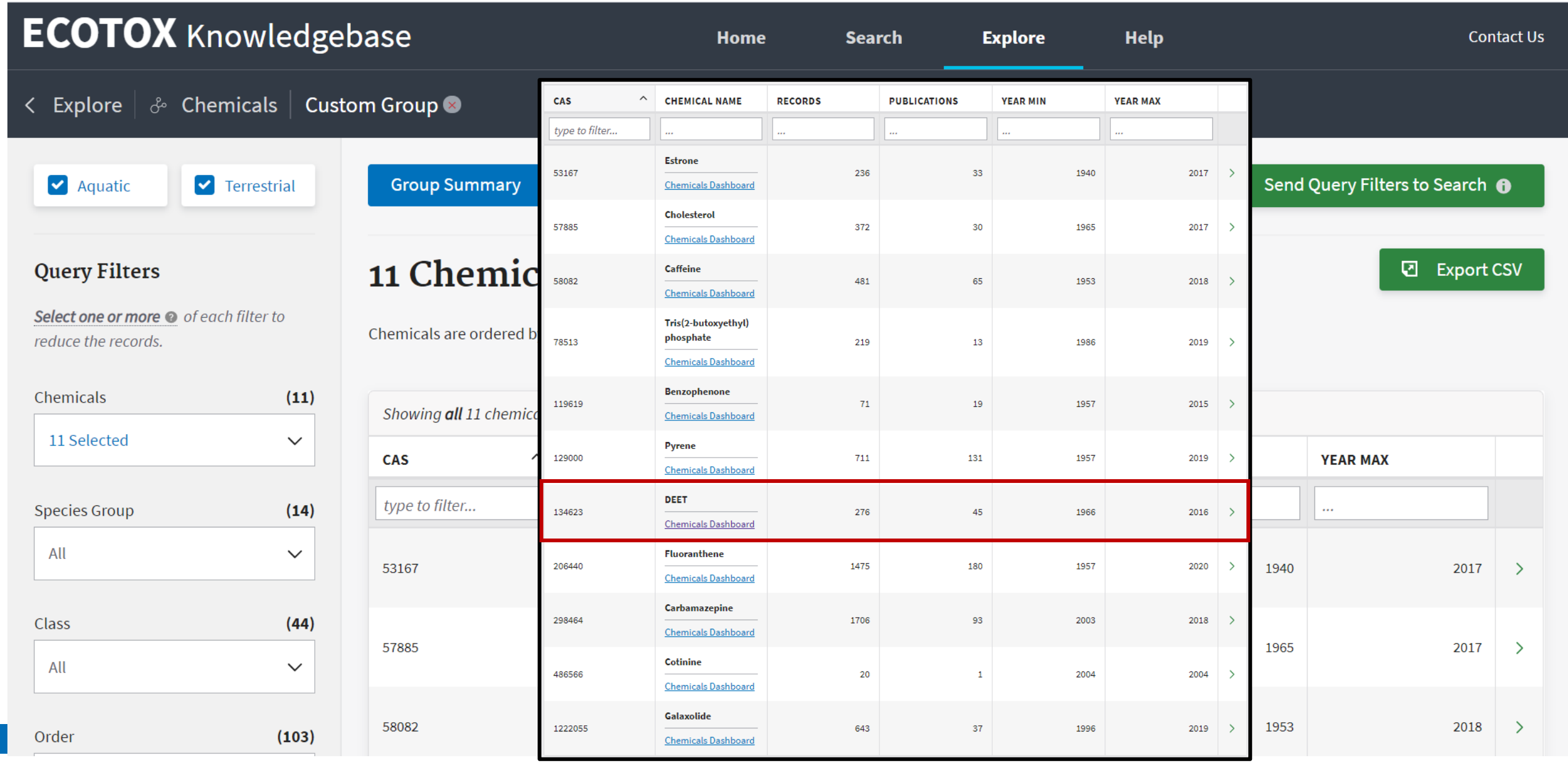
*Showing **all** 1 chemicals from **134623** to **134623***

CAS	CHEMICAL NAME	RECORDS	PUBLICATIONS	YEAR MIN	YEAR MAX
type to filter...	...	...	...	...	...
134623	**DEET** Chemicals Dashboard	276	45	1966	2016

Rows per page: 20 | 1-1 of 1 | Previous 1 Next

CAMEO Chemicals

ECOTOX Explore to find Effects Data



CAS	CHEMICAL NAME	RECORDS	PUBLICATIONS	YEAR MIN	YEAR MAX
type to filter...	...	...	...	...	...
53167	Estrone Chemicals Dashboard	236	33	1940	2017
57885	Cholesterol Chemicals Dashboard	372	30	1965	2017
58082	Caffeine Chemicals Dashboard	481	65	1953	2018
78513	Tris(2-butoxyethyl) phosphate Chemicals Dashboard	219	13	1986	2019
119619	Benzophenone Chemicals Dashboard	71	19	1957	2015
129000	Pyrene Chemicals Dashboard	711	131	1957	2019
134623	DEET Chemicals Dashboard	276	45	1966	2016
206440	Fluoranthene Chemicals Dashboard	1475	180	1957	2020
298464	Carbamazepine Chemicals Dashboard	1706	93	2003	2018
486566	Cotinine Chemicals Dashboard	20	1	2004	2004
1222055	Galaxolide Chemicals Dashboard	643	37	1996	2019

Linking Environmental Contaminants to Effects Data

EPA United States Environmental Protection Agency

ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Explore | Chemicals | Custom Group

Aquatic | Terrestrial

Query Filters

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

Chemicals (1)

DEET - 134623

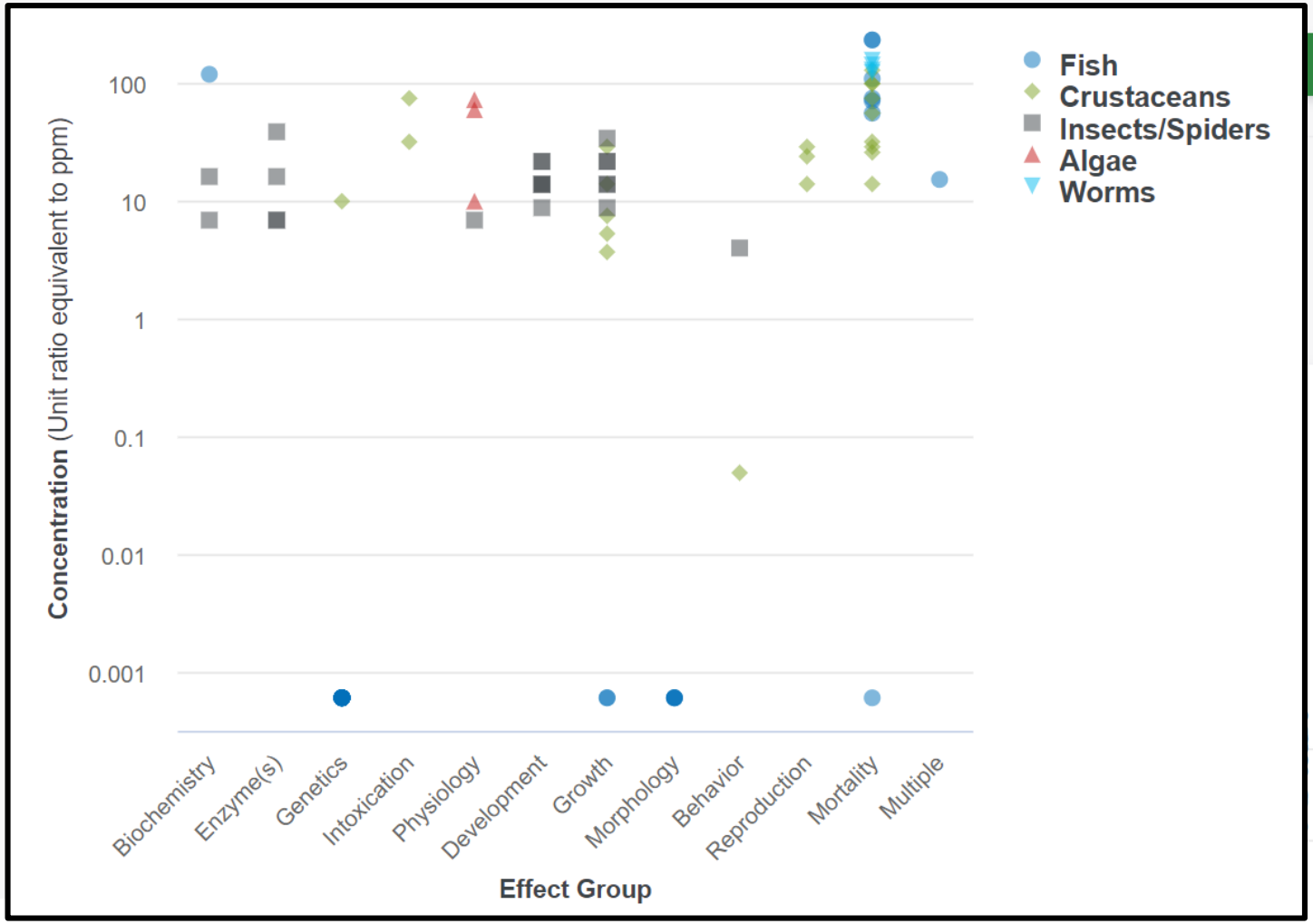
Species Group (5)

All

Class (6)

All

Order (8)



Send Query Filters to Search

Export

134623 **DEET**

Linking Environmental Contaminants to Effects Data

EPA United States Environmental Protection Agency

ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Explore | Chemicals | Custom Group

Aquatic | Terrestrial

Query Filters

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

Chemicals (1)

DEET - 134623

Endpoints (1)

LOEC

LOEC/LOEL, NOEC/NOEL

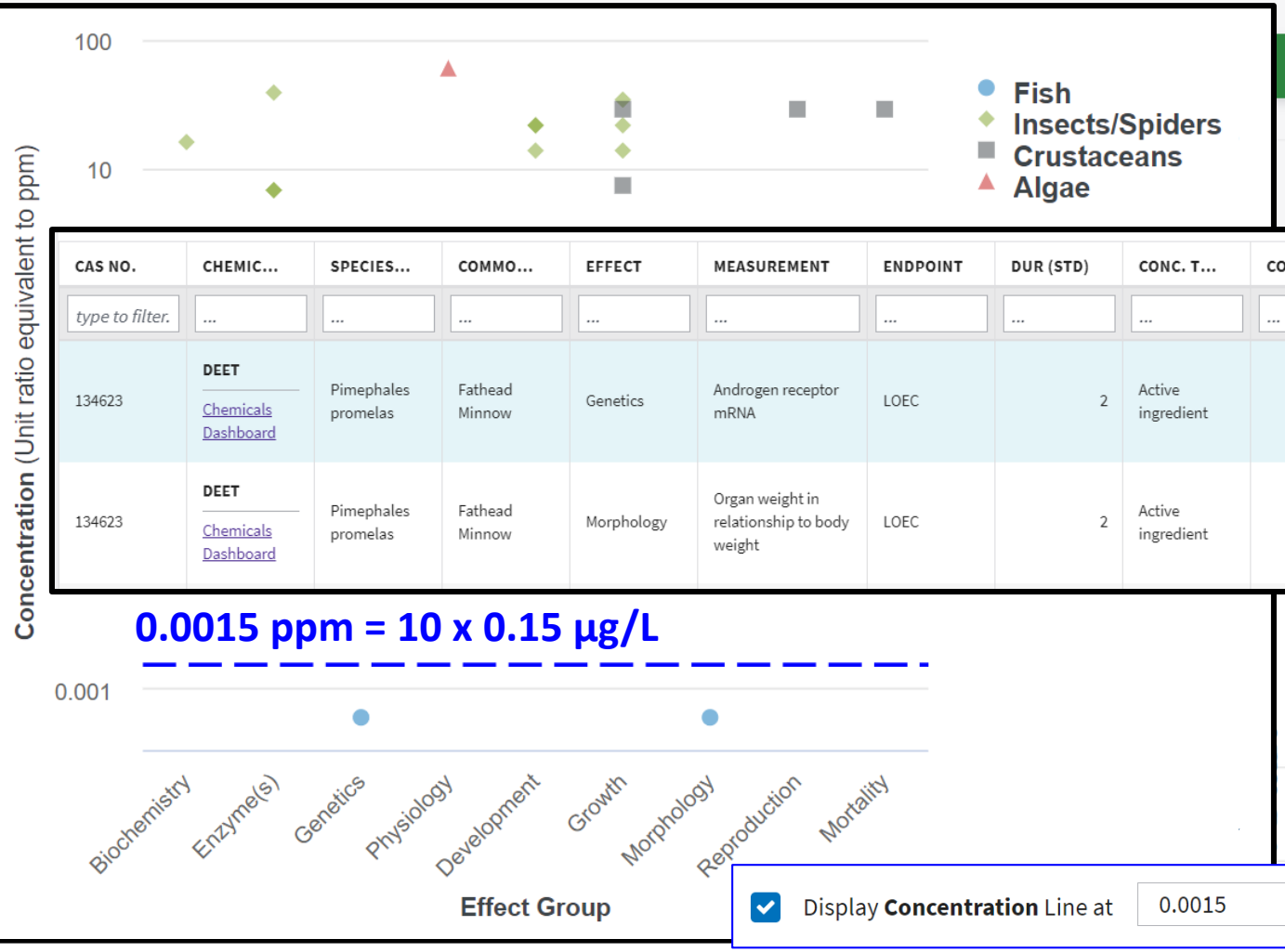
EC05

EC50

LC50

LOEC

Send Query Filters to Search



CAS NO.	CHEMIC...	SPECIES...	COMMO...	EFFECT	MEASUREMENT	ENDPOINT	DUR (STD)	CONC. T...	CONC. M...	CONC. U...	PUB. YEAR	REFEREN
type to filter.	...	...	...	...	...	...	...	...	...	...	...	...
134623	DEET Chemicals Dashboard	Pimephales promelas	Fathead Minnow	Genetics	Androgen receptor mRNA	LOEC	2	Active ingredient	0.0006	Al mg/L	2014	Zenobio,. B.C. S... Google Sc EXIT
134623	DEET Chemicals Dashboard	Pimephales promelas	Fathead Minnow	Morphology	Organ weight in relationship to body weight	LOEC	2	Active ingredient	0.0006	Al mg/L	2014	Zenobio,. B.C. S... Google Sc EXIT

Summary

- Systematic and transparent procedures to identify and curate ecological toxicity data
- Standard Operating Procedures for all components of the curation pipeline
- Strive for comprehensive review of toxicity data
  - Continual review to increase comprehensiveness and identify most applicable sources
- Immense amount of data captured quarterly
- Curated data on public website (www.epa.gov/ecotox), readily available for exploration, querying, and export for risk assessments, risk management and research

Summary

- 30 year plus 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

- Continually looking for ways to increase efficiencies within the bounds of available resources
  - Automate processes
  - State-of-the-science in text mining

Contact

Colleen Elonen
ECOTOX Coordinator
Great Lakes Toxicology and Ecology Division
US EPA ORD Center for Computational Toxicology and Exposure
Elonen.Colleen@epa.gov

Jennifer Olker, PhD
Postdoctoral Researcher
Great Lakes Toxicology and Ecology Division
US EPA ORD Center for Computational Toxicology and Exposure
Olker.Jennifer@epa.gov

Dale Hoff, PhD
Director, Great Lakes Toxicology and Ecology Division
US EPA ORD Center for Computational Toxicology and Exposure
Hoff.Dale@epa.gov

www.epa.gov/ecotox

ECOTOX Support:

218-529-5225

ecotox.support@epa.gov