

ECOTOX Knowledgebase

History and Demonstration of New Tools and Data Visualization

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CSRA contract staff

SEE staff



What is the ECOTOX Knowledgebase?

- Publicly available, curated database providing chemical environmental toxicity data on aquatic life, terrestrial plants and wildlife
 - Curated data > 47,000 publications
 - From comprehensive search and review of open literature
 - Updated quarterly, with an average of 16,000 new records added each quarter
- 30+ year history:
Originated in the early 1980s,
maintained by ORD/NHERRL/MED

Number of Species, Chemicals and Results added each year

Year	Unique Species	Unique Chemicals	Result Records
2007	1974	900	43441
2008	2522	1013	61028
2009	2762	1170	58412
2010	2023	1811	67787
2011	1359	1764	46923
2012	1674	1353	42038
2013	2215	1347	48913
2014	2037	1456	53083
2015	1915	1307	60463
2016	2216	1007	44401
2017	1883	1449	37919

Why was ECOTOX developed?

- An identified need for authoritative source of toxicological data for regulators and researchers to document literature searches and acquisition of data used in risk assessment, risk management and research.
- 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 CAA, FIFRA, CWA and TSCA.
- Need for documented systematic and transparent literature searching, acquisition and curation.
- Duplicative efforts for data gathering wastes resources across state and federal agencies.

ECOTOX Pipeline: Systematic Review and Data Curation

Chemical
verification
and ID
relevant
search terms

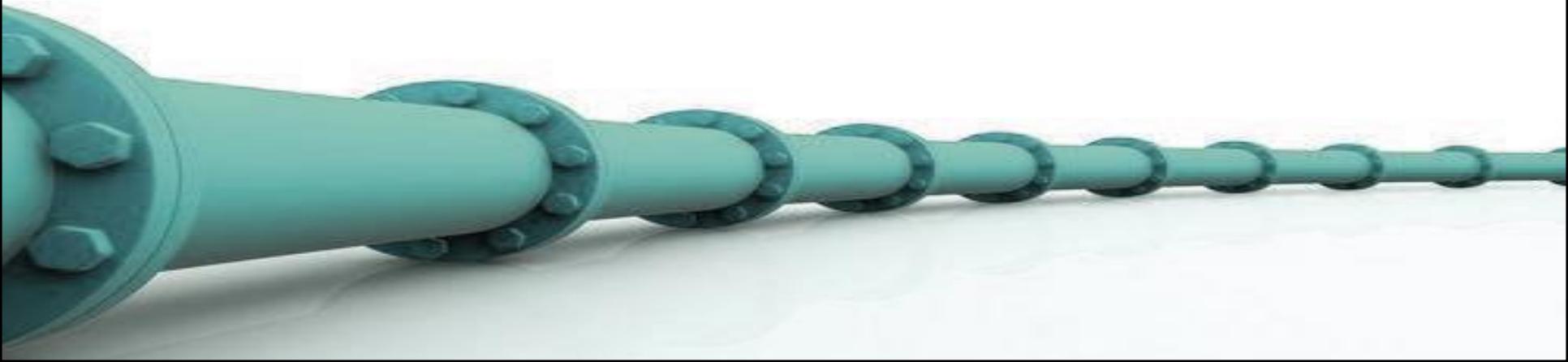
Literature
searches

Identify
potentially
applicable
studies

Acquire
potentially
applicable
studies

Review
literature
and apply
ECOTOX
applicability
criteria

Extract data
and code
into ECOTOX



Targeted Chemical Searches and Monthly Literature Searches

- Targeted Chemical Searches (Manual)
 - 35-50 chemicals requested
 - Dictated by EPA ORD and Program Office needs
 - From relevant papers, all chemicals coded into ECOTOX
 - In 2017, over 90,000 references skimmed
- Electronic Literature Searches (Monthly)
 - 26 journals queried
 - Determined based on historical applicability rates
 - In 2017, approximately 18,540 references skimmed;
2,160 applicable (1-76% per journal)
- Initial Systematic Review: Inclusion/Exclusion Criteria
 - ~15-30 % of literature identified ends up being curated

Literature Searches

Literature searches

Identify potentially applicable studies

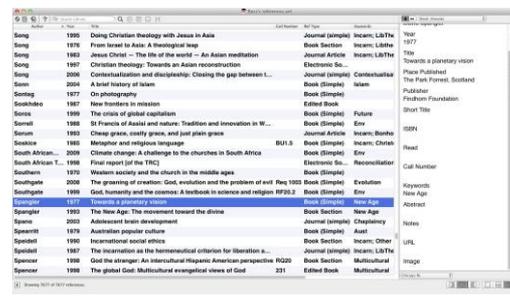
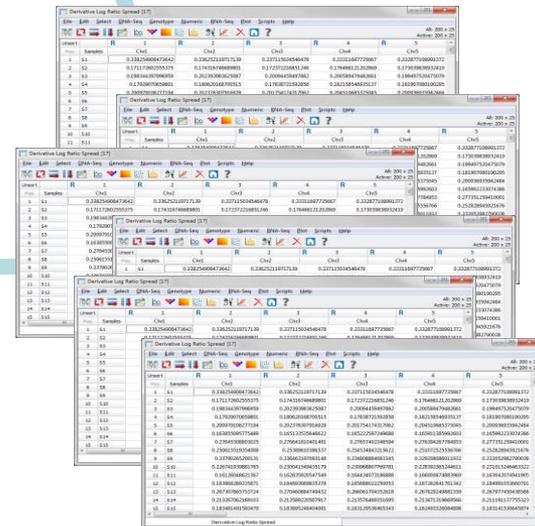
Acquire potentially applicable studies

Chemical specific searches (using terms from chemical verification step)
OR
Monthly electronic searches of 26 relevant journals



Search Engines

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



In 2017:
References/
Abstracts
~44,000

Collate data and remove duplicates

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

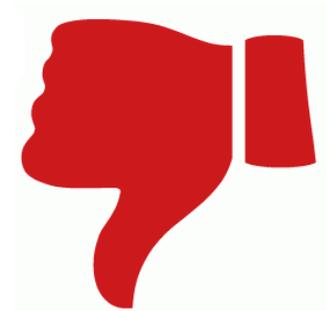
Review
literature
and apply
ECOTOX
applicability
criteria



Applicability Criteria

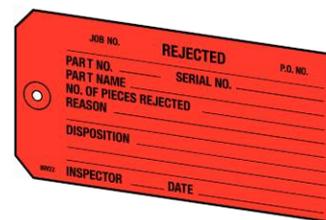
Review
literature
and apply
ECOTOX
applicability
criteria

- 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



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
 - Effluent – tests conducted with sewage or polluted runoff - mixtures
 - Fate – only report chemical distribution in media
 - Human Health – data on human subjects of surrogate animal subjects for human health risk assessment
 - In vitro – only in vitro study designs
 - Incident – reports death of animal by poison, but does not provide concentration/duration of exposure
 - Inhale – study is a terrestrial mammal paper with an inhalation route 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
 - Monkey – only test organism is a monkey
 - 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 Species – used for dead organisms
 - No Toxicant (ozone, CO2)
 - Non-English
 - Nutrient – in situ chemical tested as nutrient
 - PUBL AS – duplicate data published elsewhere
 - QSAR – modeled data
 - 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 – only test organism a virus
 - Yeast – only test organism is a yeast



Literature Review and Data Extraction

Fields Coded into the ECOTOX Knowledgebase

Chemical	Species	Methods	Results	Source of Data	
CAS Registry No.	Common Name	Route of Exposure	Chemical Analysis Info	Major Effect Category (e.g., Enzyme)	Author
Collective Indices Name	Scientific Name	Exposure Media	Application Frequency / Season / Date / Rate	Observed Effect Measurements (e.g., P450 Enzyme Response)	Publication Year
Synonyms	Taxonomic Hierarchy	Study / Exposure Duration	Habitat Description for Field Studies	Calculated Endpoints (e.g., EC50)	Reference Number
Chemical Grade	Organism Age	Application Frequency	Longitude / Latitude for Field Studies	Dose Response (Terrestrial Studies only)	Full Citation Presented for Each Test Result
Chemical Formulation	Organism Sex	Study Location	Water / Soil Chemistry	% Effect Response	Independently Compiled Data Set
Chemical Purity	Organism Source	Control Type	Chemical Concentration Information	Statistical Info	Database Update
Solvent / Vehicle Used	Initial Weight and Length	Comments on Experimental Design			
Chemical Radiolabel	Initial Life Stage				
Other Comments on Chemical Noted by Author	Other Comments on Organism Noted by Author				

Why update the ECOTOX Knowledgebase?

- Immense amount of single chemical toxicity data
 - Queries can be cumbersome
 - Output is overwhelming and time consuming to translate/interpret
 - Not easy to explore the data
- Demand for easy, efficient access to essential toxicology literature so that end users can rapidly identify critical data
- Need for interoperability across tools and databases
 - Provide end users easy access to wealth of information
 - Increases efficiency
- New applications for data in ECOTOX Knowledgebase
 - Development of Adverse Outcome Pathways



Next Generation ECOTOX Knowledgebase



Beta release February 2018



Improved data accessibility and end user experience



Risk assessor default output focused on critical data



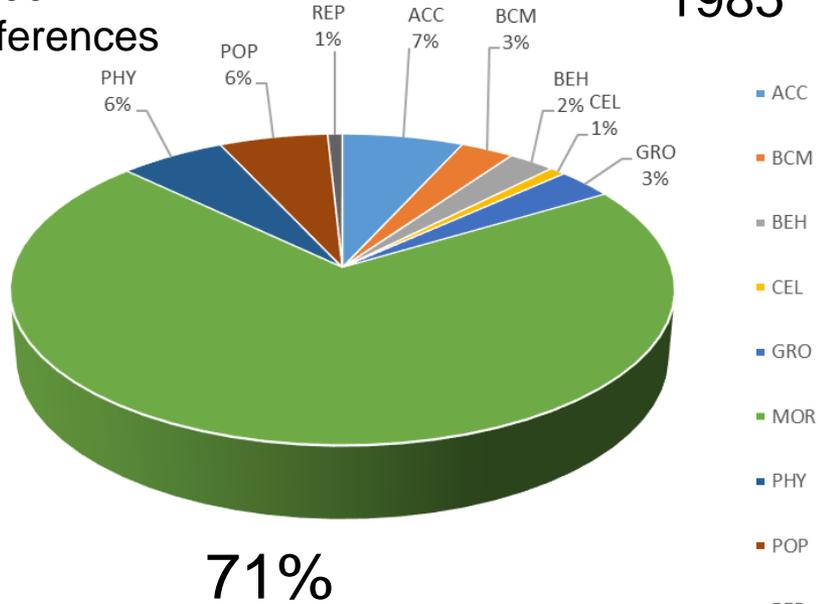
Graphical Data Visualization tools



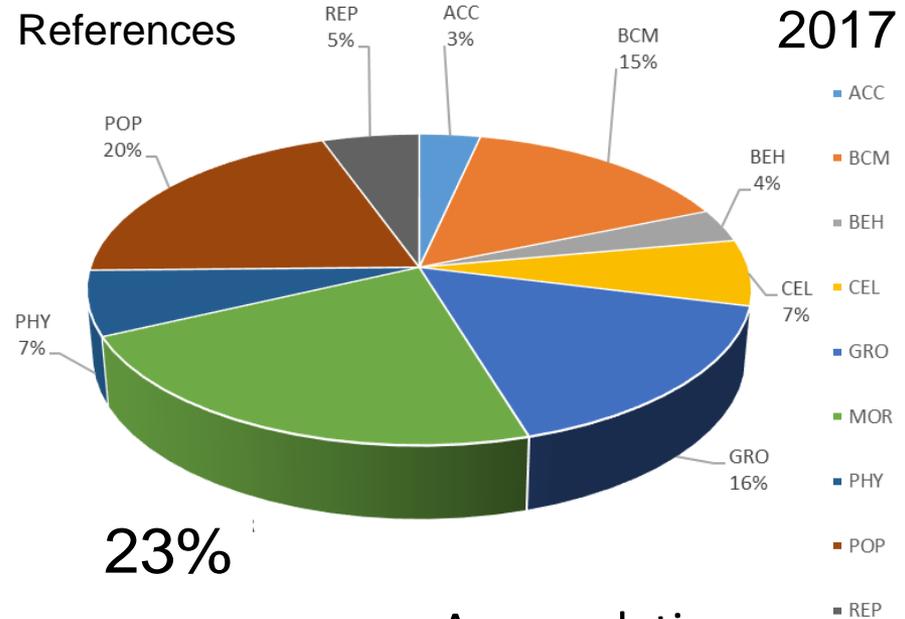
Direct linkages to other chemical knowledgebases

Ecological Effects in ECOTOX

4,000
References



47,000
References



- Mortality
- Physiology
- Population
- Reproduction
- Accumulation
- Biochemical
- Behavior
- Cellular
- Growth

Customizable Output

Display Fields ×

Please select which fields you would like to display in the search results. Full descriptions of certain display fields can be found on the [Data Field Definitions and Codes](#) help page.

When you have completed your selections, click on the **Save** button.

<input type="checkbox"/> Alkalinity	<input type="checkbox"/> Media Type
<input type="checkbox"/> Application Date (field only)	<input checked="" type="checkbox"/> Media Type | Test Location
<input type="checkbox"/> Application Date | Season (field only)	<input type="checkbox"/> Chemical Analysis
<input type="checkbox"/> Application Frequency	<input checked="" type="checkbox"/> Number of Doses
<input type="checkbox"/> Application Rate (field only)	<input type="checkbox"/> Observed Duration (Author)
<input type="checkbox"/> Application Type (field only)	<input checked="" type="checkbox"/> Observed Duration (Days)
<input type="checkbox"/> Author	<input type="checkbox"/> Organic Carbon Type/Value
<input type="checkbox"/> BCF Value	<input checked="" type="checkbox"/> Organism Age
<input type="checkbox"/> CAS Number	<input type="checkbox"/> Organism Comment
<input checked="" type="checkbox"/> CAS Number | Chemical Name	<input type="checkbox"/> Organism Initial Weight
<input type="checkbox"/> Calcium	<input checked="" type="checkbox"/> Organism Lifestage
<input type="checkbox"/> Chemical Carrier	<input type="checkbox"/> Exposure Sample Number
<input type="checkbox"/> Chemical Comment	<input type="checkbox"/> Organism Source
<input type="checkbox"/> Chemical Formulation	<input type="checkbox"/> Other Effects
<input checked="" type="checkbox"/> Chemical Grade	<input type="checkbox"/> pH
<input type="checkbox"/> Chemical Half Life (field only)	<input type="checkbox"/> Potassium
<input type="checkbox"/> Chemical Name	<input type="checkbox"/> Publication Year

Display lookup codes instead of descriptions

[Restore Defaults](#)

Cancel

Save

From: The Current ECOTOX User Interface

ECOTOX Knowledgebase

Recent Additions | Contact Us Search: All EPA This Area

You are here: EPA Home » ECOTOX

ECOTOX V5 BETA IS NOW AVAILABLE !

Click this link to preview the new Beta version of ECOTOX:
<https://cfpub.epa.gov/ecotox-new>



Recent Additions



Quick User Guide

Getting Started (PDF, 2 p. 244 KB)

Welcome to ECOTOX

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

MARCH 2018

With the March 15, 2018 ECOTOX update, data has been added for the following Recent Chemicals of Interest to EPA:

- Atenolol
- Beta-Sitosterol
- DCPMU (Monomethyl/diuron)
- Dichlorprop-p
- Dimethyl Disulfide
- Fluroxypyr
- Formetanate HCl
- Hydramethylnon
- Isoxaflutole
- Perfluorooctane sulfonates

SEARCH TIP: Refining Searches by Chemical and Effect Groups.

To review genetic effect data for Polybrominated Diphenyl Ethers (PBDEs) effects, the following ECOTOX query can be completed by searching the Effect Group 'Genetics' and the Chemical group 'Polybrominated Diphenyl Ethers (PBDEs)' in the ECOTOX Advanced Query.

1. Open Advanced Database Query
2. On the Chemical tab, click on 'Predefined Chemical Groups', select 'Polybrominated Diphenyl Ethers' (PBDEs) under 'Organic Compounds' list.
 - a. This selection can be further refined by selecting 'View/Edit List Entries' and removing chemicals. For this example all chemicals were searched.
3. On the Test Results tab, click on 'Effect Measurements', select 'Genetic' from the 'Cellular' group.
 - a. To refine Effect Measurement group, select 'View/Edit Effect Measurements'.
 - b. Select Measurements to remove. In this example no measurements were removed.
4. Select 'Perform Query for Aquatic Data'.

Eighty (80) records will be retrieved. An example of the Aquatic browser report is below.



- Home
- About ECOTOX
- Limitations
- Help Center
- Frequent Questions
- Other Tools/Databases
- Quick Database Query
- Advanced Database Query
- Data Downloads
- Browse Authors
- Browse Chemicals
- Browse Effects
- Browse Species
- Browse Taxonomic Info
- Send Comments

To: The New ECOTOX User Interface

ECOTOX Knowledgebase BETA Home Search Explore Help Contact Us

<p>Data last updated</p> <h2 style="margin: 0;">Mar 15, 2018</h2> <p>See update totals</p>	<p>Recent chemicals with full searches and coding completed</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">Atenolol</td> <td style="width: 33%;">Dimethyl Disulfide</td> <td style="width: 33%;">Isoxaflutole</td> </tr> <tr> <td>Beta-Sitosterol</td> <td>Fluroxypyr</td> <td>Perfluorooctane sulfonates</td> </tr> <tr> <td>DCPMU (Monomethyldiur...</td> <td>Formetanate HCl</td> <td></td> </tr> <tr> <td>Dichlorprop-p</td> <td>Hydramethylnon</td> <td></td> </tr> </table>	Atenolol	Dimethyl Disulfide	Isoxaflutole	Beta-Sitosterol	Fluroxypyr	Perfluorooctane sulfonates	DCPMU (Monomethyldiur...	Formetanate HCl		Dichlorprop-p	Hydramethylnon		<p>Total in database</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">11,506 <small>Chemicals</small></td> <td style="width: 50%; text-align: center;">12,583 <small>Species</small></td> </tr> <tr> <td style="width: 50%; text-align: center;">47,661 <small>References</small></td> <td style="width: 50%; text-align: center;">905,267 <small>Results</small></td> </tr> </table>	11,506 <small>Chemicals</small>	12,583 <small>Species</small>	47,661 <small>References</small>	905,267 <small>Results</small>
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THIS IS THE UPGRADED VERSION OF THE ECOTOX HOMEPAGE, CURRENTLY IN BETA!
Please click here to provide feedback from now through May 2018, so that we can consider your input before this update becomes final.

About ECOTOX

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[Learn More](#)

Getting Started

If you know the exact search term(s) you are looking for, you can head straight to the [Search](#) page. However, if you'd like to explore the ECOTOX system and its available search parameters, use the [Explore](#) page. Utilize the [Help](#) page for more information and how to's.

New Data Visualizations!



Using the ECOTOX Knowledgebase EXPLORE feature allows you to browse data within ECOTOX and use the data plotting option to view your results. You can interact with the data plots by hovering over specific data points or scrolling to zoom in on specific sections of data.

[Start Exploring](#)

💡 Search Tip

Exploration by Chemical and Effect Groups

The following example illustrates Exploration by Chemical and Effect groups.

[Get Updates via Email](#)

[Download ASCII Data](#) ⓘ

Search ECOTOX

Chemistry Dashboard

Aa ▼ Aa Aa ▲

761 Thousand Chemicals



Identifier substring search

See what people are saying, read the dashboard [comments!](#)

Latest News

[Read more news](#)

ALL PUBLICATION OPTIONS



Animals

- Amphibians
- Birds
- Crustaceans
- Fish
- Insects/Spiders
- Other Invertebrates
- Mammals
- Molluscs
- Reptiles
- Worms

Plants

- Algae, Moss, Fungi
- Flowers, Trees, Shrubs, Ferns

Special Interests

- Standard Test Species
- U.S. Threatened/Endangered Species
- U.S. Exotic/Nuisance Species

Note: The Endangered Species List is current as of September 2016.

options, you are able to view the report in the
an excel or delimited format.

Search ECOTOX

Parameters



Filter

AQUATIC

TERRESTRIAL

CHEMICALS

○ +

Groups

- Mercury

ALL EFFECTS

+

ENDPOINTS

○ +

- LC/LD xx (all % values)
- LC50
- LD50

ALL SPECIES

+

ALL TEST CONDITIONS

+

ALL PUBLICATION OPTIONS

+

× RESET ALL

🔄 UPDATE SEARCH

< Endpoints

× RESET

Any Endpoints

Concentration Based Endpoints

- | | |
|---|--|
| <input checked="" type="checkbox"/> LC/LD xx (all % values) | <input type="checkbox"/> LOEL |
| <input checked="" type="checkbox"/> LC50 | <input checked="" type="checkbox"/> LD50 |
| <input type="checkbox"/> EC/ED xx (all % values) | <input type="checkbox"/> NOEC |
| <input type="checkbox"/> EC50 | <input type="checkbox"/> NOEL |
| <input type="checkbox"/> IC/ID xx (all % values) | <input type="checkbox"/> MATC |
| <input type="checkbox"/> IC50 | <input type="checkbox"/> LETC/ATCN |
| <input type="checkbox"/> BMC/BMD xx (all % values) | <input type="checkbox"/> LETH (100% mortality) |
| <input type="checkbox"/> LOEC | <input type="checkbox"/> ZERO (0% mortality) |

Time Based Endpoints

- | | |
|---|---|
| <input type="checkbox"/> LT xx (all % values) | <input type="checkbox"/> ET xx (all % values) |
| <input type="checkbox"/> LT50 | <input type="checkbox"/> ET50 |

- T 1/2 (terrestrial data only)

Bioaccumulation/Bioconcentration Factor

- | | |
|--|---|
| <input type="checkbox"/> BCF (based on wet wt. or unknown) | <input type="checkbox"/> ER xx (all % values) |
| <input type="checkbox"/> LOEB | |

Search

CHANGE DISPLAY FIELDS

ing data from the ECOTOX

xact parameters you want to search.

irect method to retrieve data that can be

ed on specific parameters including but

Endpoint, Control, and Media Type.

ch options, you are able to view the

an Excel spreadsheet or delimited text

Search ECOTOX

ECOTOX K

Parameters

CHEMICALS

Groups

- Mercury

ALL EFFECTS

ENDPOINTS

- LC/LD xx (all % values)
- LC50
- LD50

ALL SPECIES

ALL TEST CONDITIONS

ALL PUBLICATION OPTIONS

✕ RESET ALL

VIEW ALL APPL

Displ

Please s

Definitio

When yo

REST

All Applied Parameters

Habitat

Aquatic

Chemicals

Metal or Organometal Compounds

Mercury

Effect Measurements

Endpoints

Concentration Based Endpoints

LD50

LC50

LC/LD xx (all % values)

Species

Test Conditions

Publication Options

Export

Close

ECOTOX_Search_Parameters_20180508_142032.txt - Notepad

File Edit Format View Help

All Applied Search Parameters

Query run at: 05.08.2018 14:20:32

** Habitat **

Aquatic

** Chemicals **

Metal or Organometal Compounds
Mercury

** Effect Measurements **

** Endpoints **

Concentration Based Endpoints
LD50
LC50
LC/LD xx (all % values)

** Species **

** Test Conditions **

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[Download ASCII Data](#)





Group Filters

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



- 1 Accumulation Group
- 3 Behavior Group
- 3 Biochemical Group
- 3 Cellular Group
- 1 Ecosystem Group
- 3 Growth Group
- 1 Mortality Group
- 1 No Effect Group Coded
- 4 Physiology Group
- 1 Population Group
- 2 Reproduction Group
- 1 Not Reported

24 Effect Groups

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

[✕ RESET ALL](#)
[EXPORT CSV](#)
[EXPLORE DATA >](#)

<input checked="" type="checkbox"/>	EFFECT GROUP ^	RECORDS	PUBLICATIONS	YEAR MIN	YEAR MAX
<input type="checkbox"/>	Accumulation	43681	6805	1915	2017
<input type="checkbox"/>	Avian/reptilian egg	888	212	1964	2015
<input type="checkbox"/>	Avoidance	3877	519	1947	2017
<input type="checkbox"/>	Behavior	15036	2270	1946	2017
<input type="checkbox"/>	Biochemistry	61962	8819	1931	2017
<input type="checkbox"/>	Cell(s)	9975	2036	1935	2017
<input type="checkbox"/>	Development	27073	3352	1925	2017
<input type="checkbox"/>	Ecosystem process	648	157	1963	2014
<input type="checkbox"/>	Enzyme(s)	37093	5619	1931	2017
<input type="checkbox"/>	Feeding behavior	8379	2073	1937	2017
<input type="checkbox"/>	Genetics	28176	2619	1938	2017
<input type="checkbox"/>	Growth	76868	10887	1925	2017
<input type="checkbox"/>	Histology	7020	2270	1937	2017
<input type="checkbox"/>	Hormone(s)	8111	1399	1938	2016
<input type="checkbox"/>	Immunological	2755	590	1948	2017

Explore with Data Visualization



AQUATIC TERRESTR...

GROUP SUMMARY

RECORDS

3,833 Total Records — 1,942 Distinct Records

EXPORT CSV

Query Filters

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

Chemicals (7)

All

Species Group (13)

All

Species (526)

All

Effect Groups (20)

All

Effect Measurements (144)

All

Endpoints (31)

All

Distinct Records selected by Effect & Endpoint and ordered by CAS Number (low-high)

Showing all 1,942 records from CAS Number 50293 to 3424826

CAS NUMBER ^	CHEMICAL ...	SPECIES COMM...	EFFECT	EFFECT MEAS...	ENDPOINT	YEAR	RECORDS	REFERENCE ...
type to filter...	...	...	...	...	...	...	...	...
50293	DDT	Crayfish/Crab Order	Accumulation	Residue	NR	1968	1	2926
50293	DDT	African Clawed Frog	Development	Deformation	EC50	2004	1	81628
50293	DDT	Crayfish	Population	Abundance	NR	1948	1	50237
50293	DDT	African Clawed Frog	Growth	Length	NOEC	2004	1	81628
50293	DDT	Crayfish	Mortality	Mortality	NR	1960	1	17488
50293	DDT	African Clawed Frog	Physiology	Physiology, general	NR	1971	1	9443
50293	DDT	Crayfish	Mortality	Mortality	LC50	1972	1	948
50293	DDT	Aholehole	Mortality	Mortality	LC50	1970	3	6038
50293	DDT	Daggerblade Grass Shrimp	No effect coded	Multiple effects reported as one result	EC50	1980	2	14574
50293	DDT	Algae	Accumulation	Residue	BCF	1971	2	16088
50293	DDT	Cyclopoid Copepod	Population	Abundance	NR	1983	1	12237
50293	DDT	Algae	Accumulation	Residue	BCF	1980	1	5948
50293	DDT	Cyclopoid Copepod	Mortality	Mortality	NR	1960	1	17488

Explore with Data Visualization



AQUATIC

TERRESTR...

Query Filters

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

Chemicals (7)

All

Species Group (13)

Fish

All

— Animals —

Amphibians

Crustacean

Fish

Insects/Spi

Other Invert

Molluscs

Worms

— Plants —

Algae, Mos

Flowers, Tre

— Special Tr

Standard Tr

U.S. Threat

U.S. Exotic/

invasives

1,728 Total Records — 1,382 Plottable Records

Plottable Records selected by Standardized Concentration Units and ordered by Concentration (low-high)

DUR - CHEM

DUR - ENDPT

EFFECT - CHEM

EXPORT

Reduced to 969 records

RESET

Click and drag to zoom in. Hold down shift key to pan.



CAS NO.	CHEMICAL	SPECIES	COMMON	EFFECT	MEASURE	ENDPOINT	DUR (STD)	CONC. TY	CONC. ME	CONC. UN	PUB. YEAR	REFERENC
type to filter...	Perthane	...	...	...	...	...	...	...	...	...	...	...
72560	Perthane	Oncorhynchus mykiss	Rainbow Trout	Mortality	Mortality	LC50	4	Active ingredient	0.0044	AI mg/L	1986	6797
72560	Perthane	Oncorhynchus mykiss	Rainbow Trout	Mortality	Mortality	LC50	2	Formulation	0.007	AI mg/L	1965	2871
72560	Perthane	Oncorhynchus mykiss	Rainbow Trout	Mortality	Mortality	LC50	1	Active ingredient	0.009	AI mg/L	1986	6797
72560	Perthane	Lepomis macrochirus	Bluegill	Mortality	Mortality	LC50	4	Active ingredient	0.02	AI mg/L	1986	6797
72560	Perthane	Poecilia reticulata	Guppy	Mortality	Mortality	NR-LETH	5	Formulation	0.1	AI mg/L	1957	935

Case Example in Interoperability

Question:

What are the effects of pharmaceuticals on aquatic organisms?

Detections in environmental samples

Need:

- Chemical information
- Potential molecular target
- Effects at cellular, tissue, and organismal levels
- Species applicability

Pharmaceuticals of interest

Name	CAS Num
Trenbolone	10161-33-8
Ketoconazole	65277-42-1
Acetaminophen	103-90-2
Ranitidine	66357-35-5
Diphenhydramine	58-73-1
Spironolactone	52-01-7
Sulfamethoxazole	723-46-6
Propranolol	525-66-6
Venlafaxine	93413-69-5
Dexamethasone	50-02-2
Sertraline	79617-96-2

Aquatic

Terrestrial

660 Total Records — 376 Plottable Records

Plottable Records selected by **Standardized Concentration Units** and ordered by **Concentration (low-high)**

Query Filters

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

Chemicals (1)

17beta-Trenbolone - 101613...

Species Group (6)

All

Species (12)

All

- Caenorhabditis elegans (Nematode)
- Cyprinodon variegatus (Sheepshead Minnow)
- Danio rerio (Zebra Danio)
- Gambusia affinis (Western Mosquitofish)
- Gambusia affinis ssp. affinis (Mosquitofish)
- Gambusia holbrooki (Eastern Mosquitofish)
- Gasterosteus aculeatus (Threespine Stickleback)
- Oncorhynchus mykiss (Rainbow Trout)
- Oryzias latipes (Japanese Medaka)
- Pimephales promelas (Fathead Minnow)
- Xenopus tropicalis (Clawed Frog)

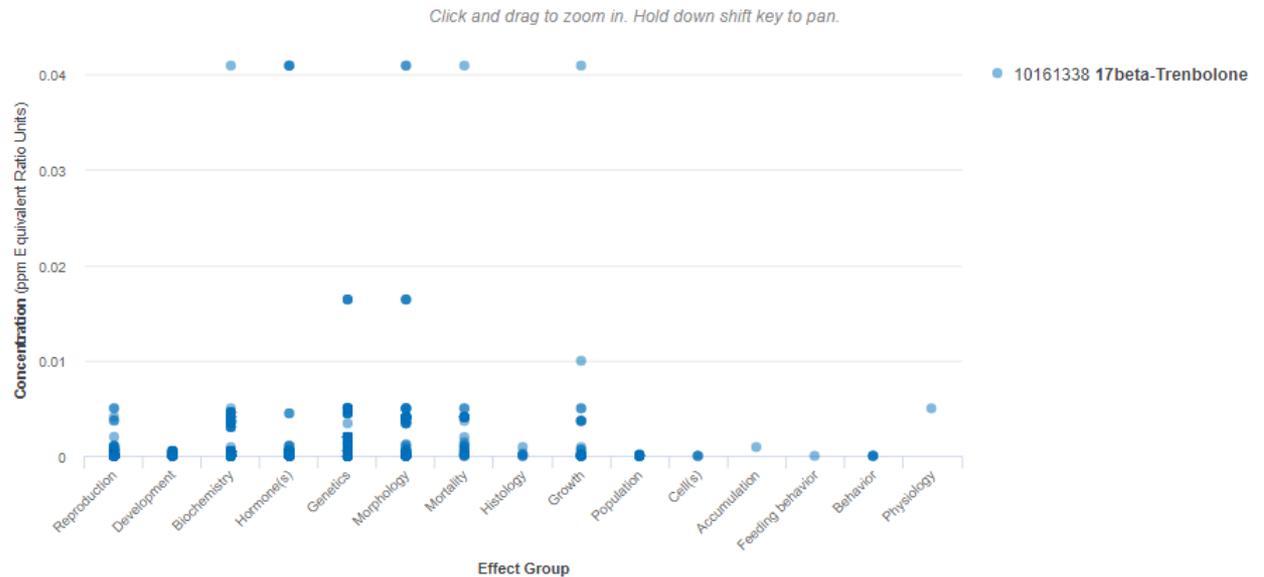
Dur x Chem

Dur x Endpt

Effect x Chem

 Export

Showing all 504 records from 5E-008 to 0.041



Chemistry Dashboard

Submit Comment

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Copy ▾

Aa ▾

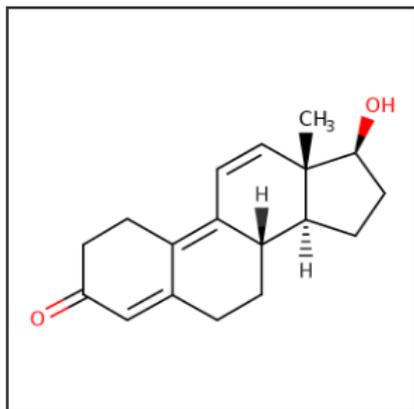
Aa

Aa ▴

17beta-Trenbolone

10161-33-8 | DTXSID0034192

© Searched by Expert Validated Synonym: Found 1 result for 'Trenbolone'.



Wikipedia

Trenbolone is an androgen and anabolic steroid (AAS) of the nandrolone group which itself was never marketed. Trenbolone ester prodrugs, including trenbolone acetate (brand names Finajet, Finaplix, others) and trenbolone hexahydrobenzylcarbonate (brand names Parabolan, Hexabolan), are or have been marketed for veterinary and clinical use. Trenbolone acetate is used in veterinary medicine in livestock to increase muscle growth and appetite, while trenbolone hexahydrobenzylcarbonate...[Read more](#)

Intrinsic Properties

Structural Identifiers

Linked Substances

Presence in Lists

Record Information

Quality Control Notes

Executive Summary (Beta)

Chemical Properties

Env. Fate/Transport

Hazard

ADME (Beta)

Exposure

Bioassays

Similar Compounds

Related Substances

Synonyms

Literature

Links

Comments

General

Toxicology

Publications

Analytical

Prediction

EPA Substance Regis...

ECOTOX

Toxline

RSC Analytical Abstra...

2D NMR HSQC/HMB...

Aquatic

Terrestrial

Query Filters

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

Chemicals (1)

17beta-Trenbolone - 101613...

Species Group (6)

All

Species (12)

All

Effect Groups (16)

All

Effect Measurements (81)

All

Endpoints (8)

All

660 Total Records — 376 Plottable Records

Plottable Records selected by **Standardized Concentration Units** and ordered by **Concentration (low-high)**

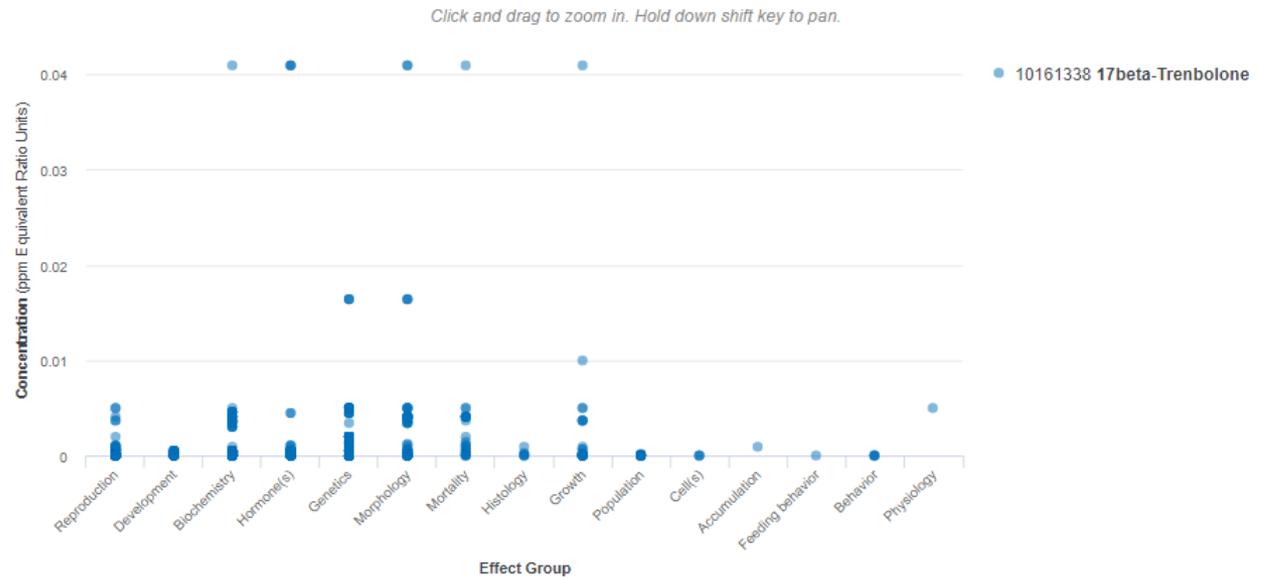
Dur x Chem

Dur x Endpt

Effect x Chem

Export

Showing all 504 records from 5E-008 to 0.041



ToxCast *In Vitro* Assays

Chemistry Dashboard

Submit Comment

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Aa

Aa

Aa

Executive Summary (Beta)

Chemical Properties

Env. Fate/Transport

Hazard

ADME (Beta)

Exposure

Bioassays

Similar Compounds

Related Substances

Synonyms

Literature

Links

Comments

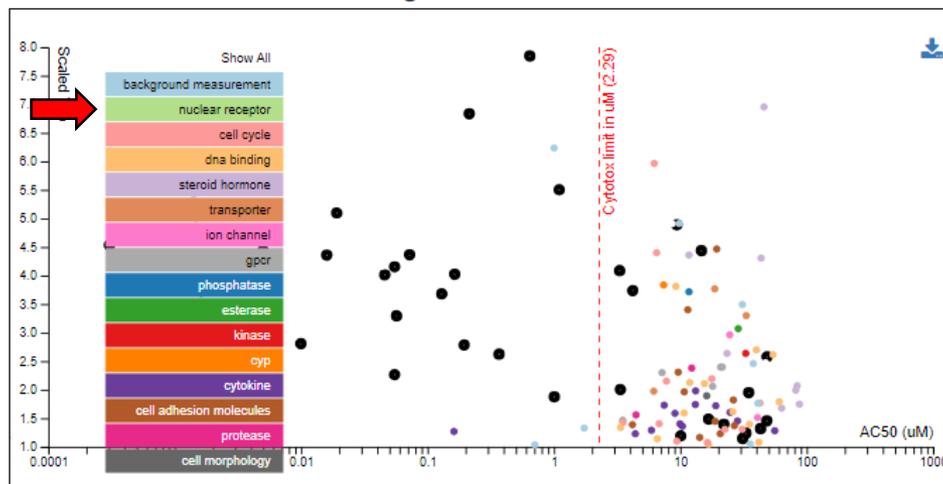
ToxCast: Summary

PubChem

Chemical Activity Summary

ToxCast Data

Assay Details



Select a data point in the plot to see associated details

Download as: TSV Excel Show: Inactive Background

Assay Name Assa... SeqA... AOP Link AOP Ev... Hit Call ... Scale... log ... Target Family

i TOX21_AR_BLA_Agoni st_ratio	761	P10275.2 	187	1134	ACTIVE	122	3.73	0.00162-2.79	nuclear receptor
i TOX21_AR_BLA_Antag onist_ratio	762	P10275.2 	187	1134	ACTIVE	91.5	1.95	34.8 1.54	nuclear receptor

ToxCast *In Vitro* Assays

Download as: Show:

 AC50 lowest to highest conc.

Assay Name	Hit Call	Top	Scaled Top	AC50 ↑	log AC50	Intended Target Family
TOX21_AR_LUC_MDAKB2_Agonist	ACTIVE	143	7.17	0.0000100	-5.00	nuclear receptor
TOX21_p53_BLA_p2_viability	ACTIVE	79.6	1.16	0.0000472	-4.33	cell cycle
NVS_NR_hAR	ACTIVE	101	4.53	0.000304	-3.52	nuclear receptor
OT_AR_ARSRC1_0480	ACTIVE	119	5.93	0.000554	-3.26	nuclear receptor
OT_AR_ARSRC1_0960	ACTIVE	101	5.04	0.00147	-2.83	nuclear receptor
TOX21_AR_BLA_Agonist_ratio	ACTIVE	122	3.73	0.00162	-2.79	nuclear receptor
NVS_NR_hPR	ACTIVE	104	4.44	0.00500	-2.30	nuclear receptor

Androgen
Receptor

Linked to AOPs:

- **Androgen receptor antagonism leading to adverse effects in the male foetus (mammals)**
- **Androgen receptor agonism leading to reproductive dysfunction (in repeat-spawning fish)**

Adverse Outcome Pathway Wiki

[AOPWiki](#) [AOPs](#) [Key Events](#) [KE Relationships](#) [Stressors](#)

[sign in](#) [sign up](#)

Aop: 23

AOP Title 

Androgen receptor agonism leading to reproductive dysfunction

Key Events 

Title
Reduction, Gonadotropins, circulating concentrations
Reduction, Testosterone synthesis by ovarian theca cells
Reduction, 17beta-estradiol synthesis by ovarian granulosa cells
Reduction, Plasma 17beta-estradiol concentrations
Reduction, Vitellogenin synthesis in liver
Reduction, Plasma vitellogenin concentrations
Reduction, Vitellogenin accumulation into oocytes and oocyte growth/development
Reduction, Cumulative fecundity and spawning

Life Stage Applicability 

Life stage

Adult, reproductively mature

Taxonomic Applicability 

Term

Pimephales promelas

Sex Applicability 

Sex

Female

Snapshots

All AOPs

View history

Discussion

1. AOP Title
2. Abstract
 1. Background
3. Summary of the AOP
 1. Stressors
 2. Molecular Initiating Event
 3. Key Events
 4. Adverse Outcome
 5. Relationships Between Two Key Events
 6. Network View
7. Life Stage Applicability
8. Taxonomic Applicability
9. Sex Applicability
4. Graphical Representation
5. Overall Assessment of the AOP
 1. Domain of Applicability
 2. Essentiality of the Key Events
 3. Weight of Evidence Summary
 4. Quantitative Considerations
6. Considerations for Potential Applications of the AOP
7. References

Aquatic

Terrestrial

Query Filters

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

Chemicals (1)

17beta-Trenbolone - 101613...

Species Group (1)

Fish

Species (9)

All

Effect Groups (11)

All

Effect Measurements (49)

All

Endpoints (1)

LOEC

Publication Years

184 Total Records — 120 Plottable Records

Plottable Records selected by Standardized Concentration Units and ordered by **Concentration (low-high)**

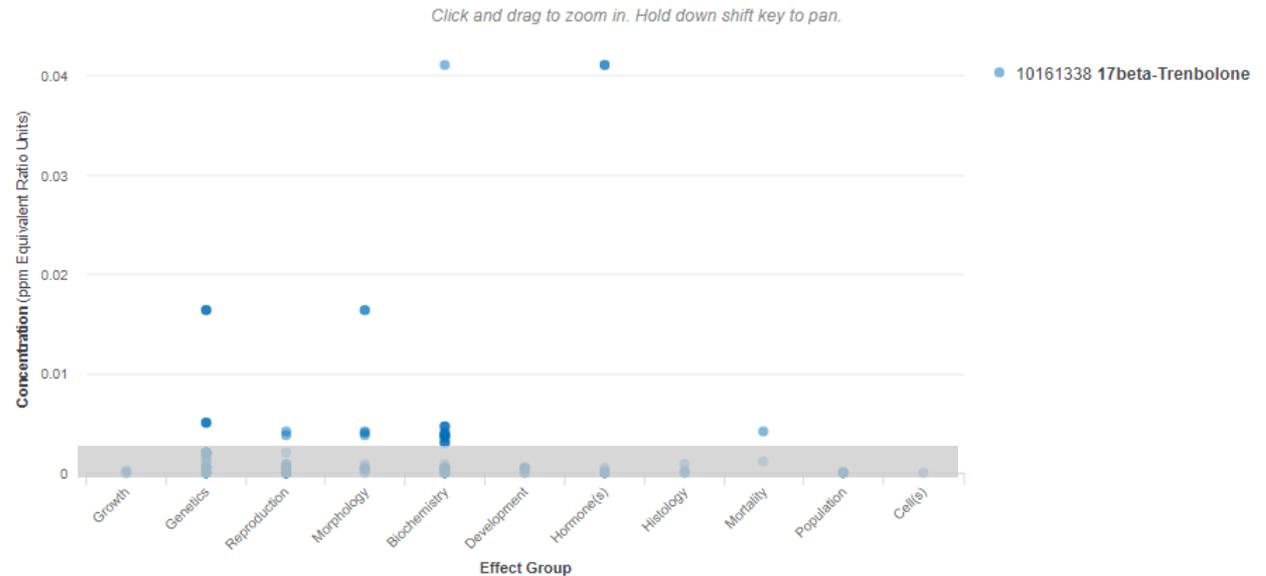
Dur x Chem

Dur x Endpt

Effect x Chem

Export

Showing all 153 records from 7E-006 to 0.041



Aquatic

Terrestrial

184 Total Records — 120 Plottable Records

Plottable Records selected by Standardized Concentration Units and ordered by **Concentration (low-high)**

Query Filters

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

Dur x Chem

Dur x Endpt

Effect x Chem

Export

CAS NO.	CHEMICA...	SPECIES	COMMON	EFFECT	MEASURE...	ENDPOINT	DUR (STD)	CONC. TY...	CONC. ME...	CONC. UN...	PUB. YEAR	REFERENC...
type to filter...	...	...	...	Biochemistry	...	...	...	...	...	...	...	...
10161338	17beta-Trenbolone	Danio rerio	Zebra Danio	Biochemistry	Vitellogenin	LOEC	60	Formulation	1E-005	Al mg/L	2013	166320

Species (9)

All

Effect Groups (11)

All

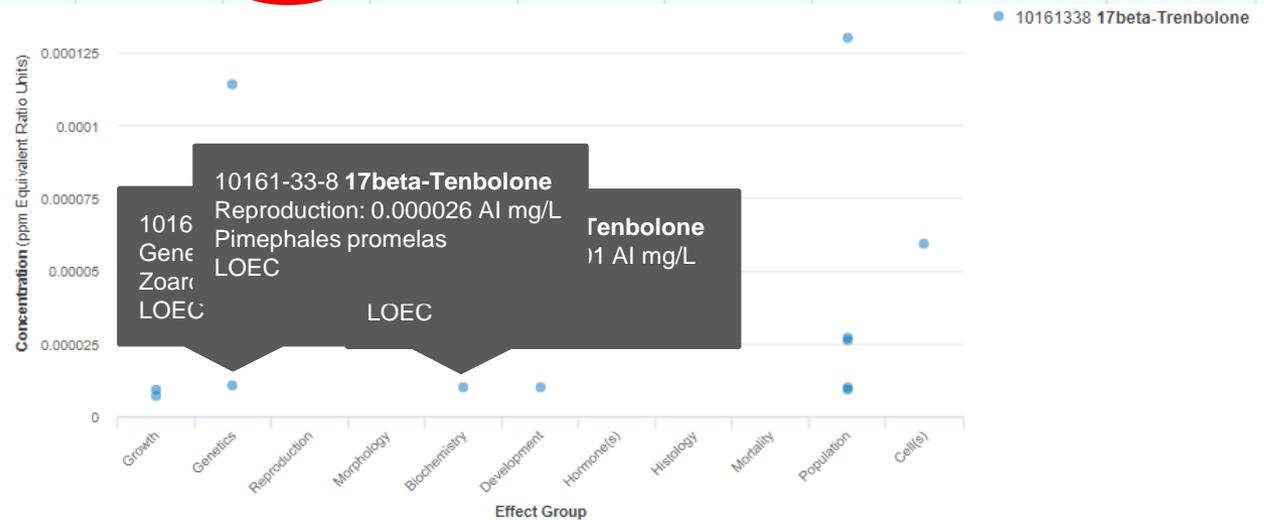
Effect Measurements (49)

All

Endpoints (1)

LOEC

Publication Years



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](#)

What Is...

[Data Field Definitions and Codes](#)

Welcome to the U.S. EPA ECOTOX Version 5 Beta 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, [Office of Research and Development \(ORD\)](#), and the [National Health and Environmental Effects Research Laboratory's \(NHEERL's\) Mid-Continent Ecology Division \(MED\)](#).

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 this site.

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

PDF Documentation

- [ECOTOX User Guide \(PDF\)](#) (92 pp, 843 K, [About PDF](#))
- [ECOTOX Quick User Guide \(PDF\)](#) (2 pp, 244 K, [About PDF](#))
- [ECOTOX Code Appendix \(PDF\)](#) (672 pp, 5294 K, [About PDF](#))

Aquatic

Terrestrial

Group Summary

Records

Query Filters

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

Chemicals (16)

16 Selected 

Species Group (15)

All 

Family (99)

All 

Genus (154)

All 

Species (200)

All 

Effect Groups (19)

All 

Effect Measurements (149)

All 

Endpoints (31)

16 Chemicals

 Export CSV

Records are plotted if they can be converted to null. Ordered by CAS Number (low-high).

Showing all 16 chemicals from 120365 to 865363399

CAS	CHEMICAL NAME	RECORDS	PUBLICATIONS	YEAR MIN	YEAR MAX	
<input type="text" value="type to filter..."/>	<input type="text" value="..."/>	<input type="text" value="..."/>	<input type="text" value="..."/>	<input type="text" value="..."/>	<input type="text" value="..."/>	
120365	Dichlorprop	209	40	1945	2017	>
120832	1,3-Dichloro-4-hydroxybenzene	884	151	1952	2017	>
553822	2,4-Dichloroanisole	2	2	1952	1953	>
3757764	2,4-Dichlorophenol, Sodium salt	3	1	1986	1986	>
5746178	Sys #7 Prop	19	5	1972	2014	>
15165670	Dichlorprop-P	82	5	1992	2017	>
15165692	S-Dichlorprop	25	4	2011	2017	>
23844577	(Rac)-Dichlorprop methyl	3	1	2008	2008	>
28631358	2-(2,4-Dichlorophenoxy)propionic acid, Isooctyl ester	8	3	1963	1992	>
39104308	Dichlorprop sodium salt	3	1	1974	1974	>
53404312	Dichlorprop butoxyethanol ester	72	3	1989	1992	>
53404323	2,4-DP Dimethylamine salt	2	1	1992	1992	>
104786870	2,4-DP-p, DMA salt	73	1	1992	1992	>
122674957	(S)-Dichlorprop methyl	3	1	2008	2008	>
122674968	(R)-Dichlorprop methyl	3	1	2008	2008	>

Aquatic

Terrestrial

Group Summary

[Records](#)

Query Filters

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

Chemicals (16)

16 Selected ⌵

Species Group (15)

All ⌵

Family (99)

All ⌵

Genus (154)

All ⌵

All

Abies

Aleochara

Algae

Allium

Allorchestis

Amelanchier

Anabaena

Anacystis

Anas

Ankistrodesmus

Apis

Arabidopsis

Arctostaphylos

16 Chemicals

[Export CSV](#)

Records are plotted if they can be converted to null. Ordered by **CAS Number (low-high)**.

Showing all 16 chemicals from 120365 to 865363399

CAS	CHEMICAL NAME	RECORDS	PUBLICATIONS	YEAR MIN	YEAR MAX	
<input type="text" value="type to filter..."/>	<input type="text" value="..."/>	<input type="text" value="..."/>	<input type="text" value="..."/>	<input type="text" value="..."/>	<input type="text" value="..."/>	
120365	Dichlorprop	209	40	1945	2017	>
120832	1,3-Dichloro-4-hydroxybenzene	884	151	1952	2017	>
553822	2,4-Dichloroanisole	2	2	1952	1953	>
3757764	2,4-Dichlorophenol, Sodium salt	3	1	1986	1986	>
5746178	Sys 67 Prop	19	5	1972	2014	>
15165670	Dichlorprop-P	82	5	1992	2017	>
15165692	S-Dichlorprop	25	4	2011	2017	>
23844577	(Rac)-Dichlorprop methyl	3	1	2008	2008	>
28631358	2-(2,4-Dichlorophenoxy)propionic acid, Isooctyl ester	8	3	1963	1992	>
39104308	Dichlorprop sodium salt	3	1	1974	1974	>
53404312	Dichlorprop butoxyethanol ester	72	3	1969	1992	>
53404323	2,4-DP Dimethylamine salt	2	1	1992	1992	>
104786870	2,4-DP-p, DMA salt	73	1	1992	1992	>
122674957	(S)-Dichlorprop methyl	3	1	2008	2008	>
122674968	(R)-Dichlorprop methyl	3	1	2008	2008	>

New and Upcoming Changes

Aquatic

Terrestrial

Query Filters

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

Chemicals (16)

16 Selected

Species Group (15)

All

Family (99)

All

Genus (154)

All

Species (200)

All

Effect Groups (19)

All

Effect Measurements (149)

All

Endpoints (31)

897 Plottable Records — 1,445 Total Records

Records are plotted if they can be converted to [Standardized Concentration Units](#). Ordered by **Concentration (low-high)**.

Effect x Chem

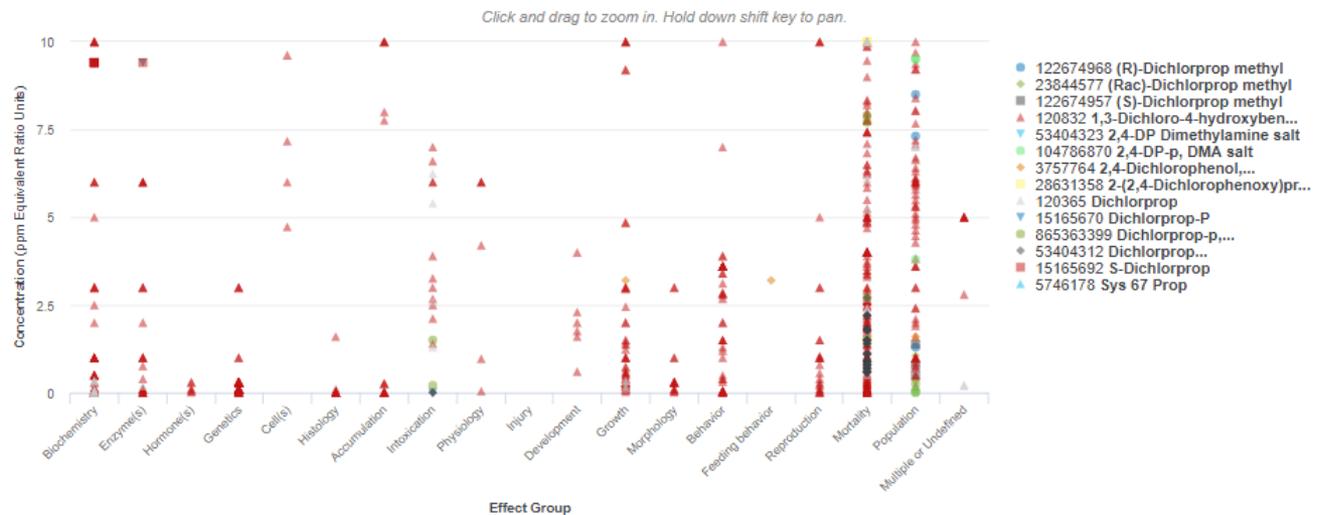
Dur x Chem

Dur x Endpt

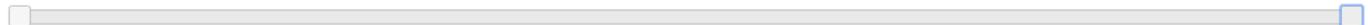
Export

Reduced to 744 records

Reset



Concentration Range: 0.00 to 10.00 in [Standardized Concentration Units](#)



Click and drag slider endpoints to zoom in by concentration value. Click 'Reset' to restore original values.

New and Upcoming Changes

Aquatic

Terrestrial

897 Plottable Records — 1,445 Total Records

Records are plotted if they can be converted to [Standardized Concentration Units](#) . Ordered by **Concentration (low-high)**.

Effect x Chem

Dur x Chem

Dur x Endpt

Export

Showing **all** 997 records from 0 to 774,000

Click and drag to zoom in. Hold down shift key to pan.



Chemicals (16)

16 Selected

Species Group (15)

All

Family (99)

All

Genus (154)

All

Species (200)

CAS NO.	CHEMICAL NAME	SPECIES NAME	COMMO...	EFFECT	MEASUREMENT	ENDPOINT	DUR (STD)	CONC. T...	CONC. M...	CONC. U...	PUB. YEAR	REFERENCE
5746178	Sys 67 Prop	Cyprinus carpio	Common Carp	Mortality	Mortality	LC50	2	Formulation	774000	AI mg/L	1972	Tscheu-Schluter, M. D. et al. (1972)
120832	120-83-2 1,3-Dichloro-4-hydroxybenzene			Population	Abundance	EC50	3					Andreozzi, R., I. Di Somma, R. Marotta, G. Pinto, A. Pollio, and D. Spasiano. Oxidation of 2,4-Dichlorophenol and 3,4-Dichlorophenol by Means of Fe(III)-Homogeneous Photocatalysis and Algal Toxicity Assessment of the Treated Solutions. <i>Water Res.</i> 45(5): 2038-2048, 2011. Ecoref #176326
53404312	butoxyethanol ester	Anas platyrhynchos	Western Duck	Mortality	Mortality	LC50	8					U.S. Environmental Protection Agency (1972)
53404312	Dichlorprop butoxyethanol ester	Colinus virginianus	Northern Bobwhite	Mortality	Mortality	NOEL	8					U.S. Environmental Protection Agency (1972)

View in Chemistry Dashboard

Contact Us

EPA welcomes your comments on this beta version of ECOTOX. We are particularly interested in feedback from users about how the new functionality and usability compare to your experience with the current version. Did the new functions work well? Were they easy to use? If not, what issues did you experience? Please be as specific as possible in your comments.

For technical questions about the scientific information and data interpretation, you may also 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)*

Select an option

Name of Organization

Your E-mail Address

email@example.com

 [Get Updates via Email](#)

Telephone: 218-529-5225

Fax: 218-529-5003

E-mail: ecotox.support@epa.gov

Mailing address:

ECOTOX Support

Mid-Continent Ecology Division

6201 Congdon Boulevard

Duluth, MN 55804

[Privacy and Security Notice](#)



Thank you!

Questions?

Colleen Elonen, Carlie LaLone, Jennifer Olker & Dale Hoff

US EPA Office of Research and Development

National Health and Environmental Effects Research Laboratory

Mid-Continent Ecology Division

Duluth, MN

218-529-5000

<http://cfpub.epa.gov/ecotox>

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ecotox.support@epa.gov