ECOTOX User Guide

ECOTOXicology Database System

Version 2.0

Prepared for

U.S. Environmental Protection Agency
Office of Research and Development
National Health and Environmental Effects Research Laboratory
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WARNING

Researchers and managers using ECOTOX for analyses or summary projects should consult the original publication. This will ensure an understanding of the context of the data retrieved from ECOTOX.

ECOTOX attempts to be comprehensive, but due to funding gaps, data from recent publication years may not appear in the database. Researchers should conduct literature searches for additional relevant data to supplement ECOTOX retrievals for PHYTOTOX and TERRETOX.

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INTRODUCTION

In the development and implementation of ecosystem management decisions there is the need to establish scientifically credible risk assessments for chemical stressors. Ecological assessments are required to characterize and diagnose the relative risk of chemical pollutants and to predict future risk as a function of environmental management options.

ECOTOX (ECOTOXicology Database System) is a comprehensive computer-based system that provides single chemical toxic effect data for aquatic life, terrestrial plants, and terrestrial wildlife. This data is useful in developing consistent ecosystem management decisions within EPA and other Federal, state, local, tribal and international governmental agencies. ECOTOX provides a means to cost-effectively collect standardized and critically needed effects data for a wide variety of ecological risk assessments.

ECOTOX, developed at the U.S. EPA MED-Duluth, integrates three previously independent databases - AQUIRE, PHYTOTOX, and TERRETOX - into a unique system which includes unique toxicity data derived predominately from the peer-reviewed literature, for aquatic life, terrestrial plants, and terrestrial wildlife, respectively. The U.S. EPA Office of Pesticide Program's Environmental Effects Database (EEDB) toxic effects data for registered pesticides is also included within ECOTOX. Not all data published in the peer review ecotoxicology literature are included in ECOTOX. You should refer to the Limitations section of this document to understand test results that are not considered for inclusion in the database.

AQUIRE, the aquatic toxicology database was developed in 1981. The aquatic toxicity data compilation spans the publication years from 1915 through to the present time. As of June 2000, the aquatic data component of ECOTOX contains 181,978 toxicity tests from 13,500 references for more than 6,800 chemicals and4,000 aquatic species.

Retrieval, review, and encoding of terrestrial plant toxicology literature into PHYTOTOX began in 1981. Data are available from the publication year 1926 through to the present time. Terrestrial animal toxicology literature has been retrieved, reviewed and entered into TERRETOX since 1983. Data are available from the publications year 1969 to the present time. As of June 2000, the terrestrial animal and plant data component of ECOTOX contains 2,900 publications, 2,306 chemicals and 1,481 terrestrial species.

The EEDB (Ecological Effects Database), U.S. EPA Office of Pesticide Programs, is integrated into ECOTOX via periodic updates from the Office of Pesticide Programs. The EEDB includes toxicity data for aquatic and terrestrial life. These data have been reviewed

and categorized as acceptable for fulfillment of pesticide registration and re-registration guideline requirements as explained under FIFRA Subdivision E, Parts 158.145 and 158.150.

Researchers or managers using ECOTOX for analyses or summary projects should consult the original scientific paper to ensure an understanding of the context of the data retrieved from ECOTOX.

For more information on the ECOTOX database contact:

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GETTING STARTED

Access

To access the ECOTOX Web site, you will need a computer equipped with a World Wide Web browser and a means of connecting to the Internet. Start your browser and type in the Internet address http://www.epa.gov/ecotox/ and you will be connected to the ECOTOX home page. The page provides a general overview of the ECOTOX database with links to System Documentation, Frequently Asked Questions (FAQ), and Limitations to the System. The home page allows you to select one of two ways to search ECOTOX. The Quick Search form allows a simple search for a limited number of chemicals, species, effects and publication years. The Advanced Search is menu driven and uses navigation links to direct you through multiple search criteria pages. The Advanced Search utilizes all search and output features.

If the COMMENTS option does not work, check your browser software to ensure that you have defined your E-mail address and server.

To conduct a search, click on either the “Use ECOTOX Quick Search” or “Use ECOTOX Advanced Search” option. The search page will then load.

Cookies

The ECOTOX site stores your last search criteria for seven days upon exiting. It can only store the search if you accept cookies. The use of cookies in the ECOTOX site is optional. After you run a search, our site will place a cookie (or ask, depending how your browser is set up) on your browser which stores the last search strategy used. When you leave ECOTOX and wish to come back to the last search you performed, the computer will recognize this and bring up the search conditions. You may choose to run the search if you wish.

Cookies are information stored on your personal web browser. The web normally has no way of telling if you had previously been to the web site. The use of cookies allows the site you are accessing to “remember” you. If you wish to learn more about cookies, please check http://www.whatis.com.

ECOTOX LIMITATIONS

Data Limitations

The following restrictions are placed on published data. Data not satisfying these requirements are excluded from the ECOTOX databases:

- The author(s) must report valid species and chemical information. If the ECOTOX staff cannot verify the species Scientific and common names or locate the chemical's Chemical Abstract Services (CAS) Registry number and a Collective Indices name, the data record is not included in the database.

- Only single chemical exposures are included in ECOTOX, therefore results for chemical mixtures are excluded.

- The author(s) must identify the exposure duration associated with the observed effect.

- Bacteria and virus studies are not included.

- The author(s) must report either a chemical concentration or application rate and the associated observed effect.

- *In vitro* exposures are not included in the ECOTOX database.

- Toxicity test data for chemical exposures where only sediment concentrations are reported are excluded from the AQUIRE database.

- In general, tests conducted with petroleum (fuel oils) products are excluded from ECOTOX.

Version 2.0 Limitations

The following limitations exist for the Web version of ECOTOX.

- The ECOTOX Search page requires that your browser support JavaScript and this feature must be activated in your browser preferences.

- The ECOTOX Web page does not function properly when using Windows 3.1.

- The ECOTOX Web site supports Netscape Navigator 4.02 (or higher) and Explorer 4.x releases. Older browser versions are not supported and will require upgrade.

- Internet Explorer 5.0 has some problems in the lower versions. Please use Build 5.00.2919.6307 (Under Help->About Explorer) or higher. Upgrade if necessary.

- There is a maximum number of 500 terrestrial and/or 5000 aquatic records that can be retrieved in one browser viewable search. The delimited export file will retrieve up to 10,000 terrestrial or aquatic records.

- If your computer has a smaller monitor (e.g., 13"), you should increase your resolution using your PC setting and/or your web browser font to fit more information on your screen.

ONLINE HELP

Press the help icon on the Web search page at any time for online help. Prior to using ECOTOX, you should take some time to familiarize yourself with these documents:

- **How to Search** Find information on how to navigate through a search and produce output reports.

- **Search Planner** View or print this form to assist you in planning your search strategy.

- **Data Fields Definitions** Locate definitions of the data fields found in ECOTOX.

- **Code List** Lists and definitions of all codes used in the ECOTOX data fields and reports.

- **Frequently Asked Questions (FAQ)** Many questions can be answered by consulting commonly asked questions.

- **Glossary** Definitions of acronyms and terms.

- **Other Ecotoxicology Sites** Helpful web sites related to ecotoxicology.

- **Comments** If you have a question that can't be answered through this help system, please write us with your question.

SEARCH FORMS

Using Quick Search

This search form is limited to searches on habitat, kingdom, species, chemicals, effect group and publication year. The only output format available is the default browser

viewable report (See Appendices C and D). You may clear searches and perform the search by clicking on the appropriate button at the bottom or top of the search form. If your sear ch requirements are more extensive, please go to the Adv anced Search page.

Quick Search Button Bar

In the selection boxes for chemical and species, you must select an input category to the right of each chemical and species entry.

For information on Quick search strategy and how to search each field, go to Conducting a Search section. Within the Conducting a Search, you will find search strategies for specifying a database, chemical searches, species searches and publication year searches. Some search strategies may only be used in the Advanced Search pages.

Using Advanced Search

The Advanced search form is designed to lead you through a search session using multiple forms. Each page provides a menu bar, button bar and navigational hotlinks that will take you to various locations within the ECOTOX search. Within each search page, the Menu bar options available are:

- **Search Criteria** (Specify Database, Chemical, Species, Test Conditions, Test Results, Publications)
- **Report Options** (Report Content, View Current Search, Clear Current Search, Perform Search)
- **Tools** (Browse Chemicals, Browse Species, Browse Effects, Other Ecotoxicology Sites, ECOTOX Quick Search)
- **Help** (Overview, How to Search, Data Field Definitions, Code List, Search Planner, Limitations, Glossary, FAQ Page, Contact Us)

Advanced Search Button Bar

Each search page will display the current search form you are viewing. You may also navigate around the search forms by using the "Go to:<search form name>" at the top right hand corner of the page to move through the ECOTOX search pages. By clicking on a hotlink, you will move directly to the next search selection screen.

You may need to move within an ECOTOX search screen by using the scroll bars at the right and bottom of the monitor. The right scroll bar moves up and down, the bottom moves left and right.

Advanced Search Selection Boxes

Creating a search in the ECOTOX database requires that you enter information about the chemicals and/or species that you are interested in as well as selecting other criteria (e.g., endpoints, effects, publication year etc.) from predefined lists. The majority of these selection boxes consist of two lists side-by-side, one containing items not selected and the other containing those items that have been selected. Positioned in between the lists are two arrows, one pointing to the left and the other to the right, which are used to transfer items between the lists. To add an item to the list of selected items, click on an item, using your mouse, in the list of items not selected and then click on the arrow that points to the right in order to transfer it to the selected items list. You should now see the item appear in the selected items list. Note that if the selected list already has many items in it, you may have to use the scroll bar on the list to scroll down and see your selection. Removing items from the selected items list and returning them to the unselected items list is exactly the same procedure only you select the item that you want to remove and use the left arrow to move it back to the unselected items list.

Multiple Selection

Sometimes in the case of very long lists such as publication year, you may wish to select multiple items from one list and move them to the other. This can be accomplished in two different ways, each useful for different situations. The first method is useful when you wish to select multiple items from the list that are not necessarily contiguous in the list. For example, if you wish to search on publication years 1998, 1996 and 1970, you can hold the control key (ctrl) down on your keyboard while you click on each item. Each item that you click on, while the control key is held, will be highlighted and can be transferred to the other list using the appropriate arrow button. The second method is useful when you wish to select a series of contiguous items in a list such as a range of publication years. For example, if you wish to search on all data from documents published between 1994 and 1998, you first select 1994 with your mouse and then select

1998 while holding the shift key down. You will see that all years 1994-1998 are now selected and you can move them to the opposite list using the appropriate arrow button.

The publication year option also allows users to enter a range of data. This option appears directly below the Selection Boxes. You should enter the bordering inclusive years of your range in the "Starting Year" and "Ending Year" boxes (e.g., 1994 through 1998).

Moving Up/Moving Down within Selection Boxes

Some of the selection boxes which contain order dependent information, such as Output Selections, may have two additional buttons on the right side marked *Move Up* and *Move Down* which can be used to change the order of the selected items list.

For example, if you wish to make a field under the Using Output Selections screen appear in a different position/column of your report, you should highlight the item in the list using your mouse and then click either the *Move up* or *Move Down* button. You will see that it moves within the list, yet the order of all other entries is preserved. This feature is very useful when you wish to customize your output or sort orders. Note that multiple selection using the control and shift keys does not apply to this feature, only one item may be moved at a time.

CONDUCTING A SEARCH

Search Strategy

The search forms are designed to search on all data, unless you restrict the search by adding search criteria (e.g., clicking on clickboxes, enter text in an input field). You may perform the search at any time you have added all the search criteria you wish. You do not have to enter something in every search criteria area.

The search strategy for ECOTOX includes two basic elements: combination/union and intersection. Within a search category (e.g., species), the search will combine all your search selections. Between each search field the search will intersect your selections. You may also want to use the ECOTOX Search Planner located in Appendix A to plan your searches. Appendix B describes some sample searches to assist you in learning the ECOTOX software.

Each Advanced search performed is divided into several search screens: specify database, species, chemicals, test conditions (test location, exposure type, exposure media, chemical analysis method), test results (calculated endpoint, observed effect, documentation code) publication criteria (reference number and publication year). These search screens map to the navigational options (menu bar, button bar or Go to) available

at the top of each search page. Each search screen and each search element are combined into a set that includes all the data records that contain information on the search parameters for that search element. For example, if you select the species *fathead minnow* and *Daphnia magna*, the species result set will be the combination, or set union, of the record numbers that contain information on those species. If you also select the Mortality Group Effect and Population Group Effect, the results of those two searches would be combined into a single set of record numbers.

Once all search elements are selected and the search is performed, the resulting sets of database records are then intersected to determine which records they all have in common and these are the records that are placed in the final report.

Specify Databases

Habitat Type

This allows you to select the ECOTOX database(s) from which to extract data in either Quick or the Advanced search form. The AQUIRE database is represented by the aquatic habitat for both plant and animal kingdoms. The PHYTOTOX data set is included in terrestrial habitat and plant kingdom. TERRETOX is selected by choosing terrestrial habitat and the animal kingdom.

To eliminate a currently selected habitat or kingdom or to select a database that is not currently active, click the appropriate check box and the status of the selected database will change.

Species Type/Kingdom

Species kingdom level searching is available on both the Quick and Advanced search forms. The plant kingdom search also includes species representing Monera and Fungi. Some test results report both plant and animal species as one effect measurement (e.g., aquatic community, plankton, soil community). These results will be included when plant, animal or both kingdoms are selected.

Independently Compiled Data

ECOTOX includes several independently compiled data sets. Data sets from the Organization for Economic Cooperation and Development (OECD), Russia, Office of Pesticide Programs and MED-Duluth are included as subsets of the ECOTOX database. For further information on these data files, refer to the ECOTOX Data Field Definition document. The default within ECOTOX is that all data sets are included in your search result. You may override the default and selectively search up to five specific data sets. To search on one or more independently compiled data sets, use your mouse button to select one or more of the data sets.

Evaluated Data Sets

ECOSSL (Ecological Soil Screening Level) and EVISTRA (EValuation and Interpretation of Suitable Tests in AQUIRE) are not currently available options. There are links the additional background information located at the bottom of every search page. Check the "What's New" on the ECOTOX web site for updates on availability.

Recent Modifications and Additions

You may search for data that has been modified or added to the system within the last twelve months by selecting the number of months back that you wish to include in your search. The default is that all data, regardless of the date they were added to ECOTOX, are included in your search result. This feature permits searches for data that were added or significantly modified through any of the months that you have selected. To make a choice, click the appropriate checkbox. Clicking on another checkbox deselects the previous selection.

Chemical Searching

The Chemical criteria search screen allows several ways to search for chemicals using CAS Registry numbers or Collective Index chemical names as well as options to search on some pre-built lists of chemicals. ECOTOX does not include a chemical synonym file, therefore it is recommended that users search using the CAS registry number or chemical lists. The default is that all chemicals are selected for searching.

Using the Browse Chemical Utility

By clicking on the 'Browse Chemical' button under the Tools menu at the top of the search screen (Advanced search) or to the left of the Chemical Selection box (Quick Search), a new browser window will open and you will have access to the ECOTOX chemical information index file. This utility will assist you in planning your chemical search strategy by allowing you to enter different chemical names or name sub-strings to determine whether or not your chemical name is in the ECOTOX database and what other chemicals will be included if your sub-string is used. The Browse Chemical search result provides a list of the CAS Registry number(s) and all instances where your text string was included in an ECOTOX chemical name. For example, if you were to enter 'xylene' as a chemical string within ECOTOX, the following chemicals would be included in your search result:

81152 Trinitro-t-butyl xylene
89587 Nitro-p-xylene
881992 alpha,alpha'-Hexachloro-m-xylene
1074244 2,5-Dibromoxylene
1330207 Xylene
13209159 a,a,a',a'-Tetrabromo-O-xylene

You can then either use the resulting chemical names in your search or conduct your search using the CAS Registry numbers that are displayed using the Browse Chemicals utility, under Tool menu bar. Remember that you can cut and paste from this screen into the ECOTOX search screen.

To conduct a search on a particular chemical you must identify the compound one of three ways:

CAS Number - Enter the CAS numbers you wish to search on, placing each number in a separate field in the CAS Numbers section. You may enter the CAS number with or without hyphens and leading zeros.

Chemical Name - Enter the names of the chemicals you wish to search on, placing each name in a separate field. After entering the chemical name identify whether you wish to search on the exact name (Chemical Name (exact)) or searching on a substring (Chemical Name). If Chemical Name is selected from the Choose Category list, any chemical names including the text string(s) entered will be included in your search results. For the most part, ECOTOX uses the Collective Index name for chemical searching and does not currently have a synonym file. If you want to restrict the search to only search on a specific term, you may choose the exact match category. For example, if you enter the term *benzene* selecting the exact match category, you will only search for the specific chemical benzene, not all the benzene derivatives. It is recommended that users search on CAS numbers, if they are unsure of the Collective Index name.

Select from Chemical Lists - This option is only available in the Advanced Search option. Chemical lists have been provided to effectively search chemicals important to the U.S. EPA, other Federal agencies and regional and state offices. Lists include U.S. EPA priority lists, lists of regional concern, metal compounds, and organic compounds. Individual components of the lists are available by clicking on View the Chemical List above the Chemical List selection box. . See the section on “Using Selection Boxes” if you need help selecting a chemical list or lists.

Example Chemical Selection Strategies

By clicking on the ‘Chemical’ button at the top of the Advanced search page, you will move to the Chemical Search screen. The following examples will provide some guidance when conducting a chemical search.

- In the case of metal compounds, it may be easier to search by chemical name. Suppose you want to search for copper compounds. Entering *cupr* and *copper* as chemical names will find copper and several copper compounds with fewer keystrokes than typing all the individual CAS Registry numbers. You may also search a group of copper compounds using the ECOTOX chemical list feature.

- In some cases, organic compounds may be searched by chemical name. Suppose you want to search on all dioxin compounds. Entering *dioxin* as a chemical name will be more efficient than entering all the specific dioxin chemical names or CAS numbers. Remember, though, entering some chemical names may identify many non-applicable chemicals (e.g., benzene will result in all compounds with the sub-string benzene in the chemical name). You may want to use the Collective Index (exact) search category for very specific names (e.g., benzene, xylene) when you do not want all the chemical derivatives.

- For pesticides, most synonym names are not in the Browse Chemical index file and using the CAS Registry number is the only method to search ECOTOX. Chemical CAS Registry numbers may be located in chemical company catalogs or other chemical indexing resources. For example, searching chemicals by the common name, such as lindane, diazinon, atrazine or malathion will not locate any records in ECOTOX unless you locate the CAS Registry number for each and then perform a CAS number search. If you are unsure of a CAS Registry number or chemical name, you may interactively use the Browse Chemicals index to search on chemical names or fragments of names.

Species Searching

The default within ECOTOX is that all species are selected for searching. To conduct a search on a particular species you must identify the organism one of four ways: kingdom, species number, Scientific name or common species name. Although it is faster and more efficient to search by species number this may not always be a realistic option, in which case, searching by Scientific name and common name may be necessary. See the examples below for further explanation.

Using the Browse Species Names

By clicking on the 'Browse Species' option to the left of the Species Selection search box (Quick Search) or under the Tools menu at the top of the search screen (Advanced Search), a new browser window will open and you will have access to the ECOTOX species information file. This utility will assist you in planning your species search strategy by allowing you to enter different Scientific and common species names or name sub-strings to determine whether or not your species is in the ECOTOX database and what other species will be included if your sub-string is used. For example, by entering the species Scientific name '*Ceriodaphnia reticulata*' the following species numbers and Scientific names will be included in your search results:

963 *Ceriodaphnia reticulata*

2371 *Ceriodaphnia dubia - Ceriodaphnia reticulata dubia (Historical Name)*

You can then use the names provided in the output to perform your searches, or use the species numbers listed by each name.

Scientific name: All data records within ECOTOX include a scientific name for the test species. All names have been verified in reliable taxonomic sources. You can conduct an exact search on the scientific name (Scientific name (exact)) or search on fragments of scientific names, genus, or species names (Scientific name) by selecting the proper search option from the 'choose category' list. ECOTOX includes links to scientific name synonyms, therefore searches will retrieve all records associated with the selected scientific name including old taxonomic terminology.

Common name: All data records within ECOTOX include a common name for each species. You can conduct an exact search on the common name (Scientific name (exact)) or search on fragments of common names (Scientific name) by selecting the proper search option from the 'choose category' list.

Species Number: All species in the ECOTOX database have been assigned a unique number. Numbers can be located by using the 'Browse Species' option.

Example Species Searches

By clicking on the ‘Species’ on the button bar at the top of the search page, you will move to the Species Search screen. The following examples will provide some guidance when conducting a species search.

Scientific Name Searches

- Entering *Pimephales promelas* in the Scientific name search will result in only data for fathead minnows. If you consistently use a limited number of species names, you may want to use the species number for searching as it results in faster more efficient searches.

- Using the genus name may be helpful when interested in a broader search. Entering *daphnia* in the Scientific name search will result in all Daphnia and Ceriodaphnia species.

- You may also enter a historical Scientific name and still retrieve data for a species. For example, if you enter *Salmo gairdneri* and retrieve the data, the output will display the currently accepted name, *Oncorhynchus mykiss*.

Common Name Searches

- Common names may be efficient, if there is a unique common name for that organism. Entering *mallard* in the common name field will result in only mallard duck results.

- Entering the term *duck* will output results for *duck* and *duckweed*. In this case, searching using the common name (exact) or selecting only on the terrestrial habitat will eliminate the duckweed from the search.

- Entering *bird* in the common name field will result in *bird* and *ladybird beetle* data. In addition, using the term *bird* will not ensure that all bird data in the system will be extracted because the species name may not use the term *bird* in the common name.

Species Number Searches

- The species number is the unique indexing number assigned to each species in ECOTOX and is the most computationally efficient method of searching for species data. Use of species number may be useful if you consistently search on the same set of species. The best way to determine species numbers is to use the Browse Species search utility.

Test Conditions

The options for searching by test conditions are briefly described below. These options are only available in the Advanced Search option. For additional information about these fields, please refer to the ECOTOX Data Field Definition document. Many of the test conditions require the use of selection boxes on the search form, for help in using these see "Using Selection Boxes."

Test Location

The valid entries for test location are Lab (laboratory), Field (all outdoor field tests, artificial, natural or undeterminable) and Not Reported (i.e., the author(s) did not present sufficient information to determine test location). The default within ECOTOX is that all data, regardless of test location, are included in your search result. You may override the default and selectively search up to five specific test locations. To selectively search on a specific test location, use your mouse button to mark the appropriate checkbox.

Media Type

The default within ECOTOX is that all data, regardless of test media, are included in your search result. To selectively search on a specific exposure type, use your mouse button to mark the appropriate checkbox.

Aquatic freshwater tests include those conducted in freshwater, reconstituted water, distilled water, or tap water. Saltwater tests include those conducted in natural or artificial seawater, brackish water, or estuarine water. Not Report (NR) is used if a determination cannot be made regarding the use of either freshwater or saltwater.

Terrestrial exposure media selections are focused on tests using a substrate (e.g., soil or artificial media). If the terrestrial organism habitat does not utilize a substrate for nutrition (e.g., birds, mammals), do not select any exposure media types.

Exposure Type

You can select the exposure type by clicking the items in the menu box. Organisms are typically exposed to toxicants through aqueous, diet, injection, inhalation, topical or environmental routes. Occasionally, an exposure may be through multiple routes (e.g., such as topical and oral).

ECOTOX includes chemical exposures on whole living organisms. *In vitro* assays are not included. The terrestrial plant database contains some studies using excised organs and cell cultures from plants, however these types of studies are not actively coded at this time.

Chemical Analysis Method

Select the appropriate checkbox using the following options:

Measured - Exposure and/or observation concentrations or doses are quantitative; analysis methods may be reported; note that exposure concentrations may be analyzed but observations could be reported in terms of nominal, unmeasured values. This distinction must be noted when coding.

Unmeasured - Exposure and/or observation concentrations or doses are clearly identified as nominal values; or when the author does not report any information whether the concentrations were measured or nominal, I.e., unmeasured is used as a default value when there is no information provided about the chemical concentrations.

Not Reported - Exposure and/or observation concentrations or doses are reported as both the measured and the unmeasured values but it is not clear whether observation/response dose is a measured or nominal value.

Test Results

Endpoint

For the purposes of the ECOTOX database, an endpoint (e.g., LC50) is defined as "the quantification of an observed effect obtained through statistics or other means of calculation for the express purpose of comparing equivalent effects." The default is that all endpoints are selected for searching. To conduct a search on a particular endpoint you must go to the Endpoint search section (Advanced Search) and move the desired endpoint(s) to the Endpoint Selected box.

The bottom of the Endpoints Selection box has a checkbox 'Report Endpoints Only' Selecting the “Endpoints Only” option restricts the output to include only those test records that have an associated endpoint.

Effect

The default is that all effects are selected for searching. To conduct a search on a particular effect you must go to the Effect search and check on the desired effect(s). Use Browse Effects to locate Effect Groups and associated effect measurements. The Advanced Search Effect menu allows you to search by Effect Groups, Effects and Measurements.

Effect Group: The ECOTOX database categorizes all observed effects under at least one of ten major effect group codes (accumulation, behavior, biochemical, growth, histology, mortality, physiology, population, reproduction, and ecosystem). You may select all effects associated with a major effect grouping by clicking the box to the left of the appropriate major effect group. For example, by selecting *Mortality* from the menu will retrieve all data from all selected databases with effect codes categorized as mortality effects.

Effect: (Advanced Search only) For the purposes of the ECOTOX database, a toxicological effect (e.g., mortality) is defined as "the observation of a response resulting from the action of a chemical stressor." The ECOTOX Code List provides definitions of each effect code used in ECOTOX.

Effect Measurement: (Advanced Search only) For further refinement, you may click on the Effect Measurement Search button within the Effect Search menu to open a window listing specific measurements for each effect group you selected. Measurements include quantitative observations that describe and evaluate biological responses to toxicants. Each effect (e.g., Growth) can have several associated measurements (e.g., length, weight).

Recovery Results

Within the Effects menu (Advanced Search) the 'Include Recovery Results' option allows you to include in your search results responses observed during a post exposure period. This is only available for aquatic test results. If this option is not selected, your ECOTOX search results will only include effects observed during the direct exposure period of the study. The Recovery Results are included by clicking on the checkbox. Recovery results are indicated in the aquatic report by the placement of a tilde(~) character before the effect code (e.g., ~MOR).

Documentation Code

The ECOTOX documentation codes indicate the completeness of methods documentation and results presentation accompanying the data. Documentation code assignments range from Complete (C) to Moderate (M) to Incomplete (I). The default within ECOTOX is that all data, regardless of documentation code, are included in your search result. You may override the default and selectively search up to two specific documentation codes. To selectively search on a specific documentation code in the Advanced Search, click to mark the appropriate checkbox.

Publications

Reference Number

Each publication abstracted for the ECOTOX database effort is assigned a unique reference number. These reference numbers appear in all default ECOTOX outputs. You may conduct searches on specific reference numbers for aquatic and terrestrial habitats. If no entries appear in the boxes, the default is that all reference numbers are included in your search strategy. To selectively search on a specific reference number, enter the specific reference/publication numbers in the boxes provided. This option is only available in the Advanced Search page.

Publication Year

The aquatic component of ECOTOX contains data from publication years 1915 through 2000; the terrestrial plant component of ECOTOX contains data from publication years 1926 through 2000; terrestrial animal component of ECOTOX contains data from publication years 1969 through 2000. The default within ECOTOX is that all data, regardless of publication year, are included in your search result. You may override the default search by either selecting years from the 'Publication Years Available' box and moving them to the 'Selected Box', or by entering a range of years in the 'Starting Year' and 'Ending Year' boxes.

SORT ORDER

The data are sorted within the aquatic and terrestrial reports in a predefined way. Sort order modifications are not available within the ECOTOX software. If you require a more specific sort, download your search in a delimited file format (under Report Content) and upload the file into a spreadsheet or database on your PC. Use the spreadsheet or database software to sort your data.

For the aquatic test result outputs, the default sort order is Test Location, Level of Calculated Results Reported, CAS Registry number, Species Scientific name, Endpoint, Effect, and Exposure Duration. Due to the default Level of Calculated Results sort, data with calculated endpoints, will be presented first, followed by data with statistical analysis or percent (%) effects reported and finishing with ranged data or observed effect results that were not analyzed further by the authors. The Test Locations sort separates the report into records not reporting a test location, Laboratory studies and Outdoor Field results.

The terrestrial report is sorted into multiple pages by Chemical Name, Species Scientific Name, Publication Year, and Reference Number fields. Remember, the Sort Order does not change the data, it just changes the ORDER in which the data appear in the report.

REPORT CONTENT

Report content modifications are only available in the Advanced Search page. This section allows you to change the output fields as they appear in the report. The individual default fields vary for each database. Output field selections are set at a default which will print the data in a table format with headings. The report width is defined by the data fields and the Web browser settings selected, so carefully modify the output fields to fit within your preferences.

To obtain full citations for a delimited file, you need to repeat the search selecting the Browser Viewable Report performing the same search. After the report displays, click on the References link in the output, then view or save the full citations.

Report Format: Above each output selections box, is a checkbox that allows the user to modify the format of the report output. The default option is a web browser display of the data, but a delimited file format is also available. Each data field in the delimited file format is separated by the '|' character (usually located on the \ key). Delimited ASCII files can be saved to your hard drive and uploaded into your local spreadsheet or database.

Aquatic Report

The aquatic default output fields for test records reporting a test location as 'not reported' or laboratory are Test Location, CAS Registry Number/Chemical Name, Scientific Name/Common Name, Endpoint, Effect, Trend/Effect %, Water Type, Duration/Exposure

Type, Concentration Type/Value, Significance/Level, and Tissue/BCF, Reference Number and Reference Citation. See Appendix C for a sample of the aquatic default report.

For outdoor field exposures, the aquatic default output fields are Test Location, CAS Registry Number/Chemical Name, Scientific Name/Common Name, Endpoint, Effect, Trend/Effect %, Exposure Type, Duration/Exposure Type, Concentration/Application Rate, Application Type, Application Frequency/Date, Significance/Level, Site/BCF, Reference Number and Reference Citation.

Note that inclusion of the Reference Citations field will add a separate section to the end of the report, which contains a bibliography of all the references associated with the reported data records. Reference Citations, even if selected, will not appear in the delimited data format files, only the reference number will appear in the report.

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Terrestrial Report

The default terrestrial report includes most available terrestrial fields. You may only modify the output fields in the delimited file report format. You may need to reformat your web browser software to landscape format or modify your font when you print a hard copy of your report. View Appendix B to view the terrestrial report default fields and Appendix D for a sample terrestrial default report.

PERFORM SEARCH

View Current Search

Before submitting your entries you may want to review them by clicking the View Current Search from the Report Options menu, Review Selections button or navigate back through the search form(s) in your Advanced search. Finally, before submitting your search strategy for retrieval, be sure you have selected the Report Content and Format you desire. For documentation purposes, you may print the View Current Search information and attach it to the reports that are generated using that criteria.

Output Selection

Two output formats are available; browser viewable report and exporting a delimited data file. The default is set to interactively view the output in the report format. Upon submission of the search, a separate browser window will be opened where your search results will be displayed.

Browser Viewable Report

This option will display the formatted/tabular report in a separate browser window after the search has completed. The report may then be viewed, printed or saved to a file using the File menu option on your browser. Your first page of data records are always displayed below the report header information.

You can move through the report in a number of ways. To view a page from the report, scroll through it by using the scroll bar on the right side of the window. The output window will provide hotlinks to each page of the report. The output window will also provide hotlinks to the first pages of the laboratory, outdoor field and reference sections of the report. String searches may also be performed by clicking the Web browser Edit menu on the top window Tool bar and using the Find In Page option. Note that the size of the report window can be increased or decreased in size at any time.

To print a report, select the browser File menu and select the Print option. To save the report as a file, use this same File menu and choose the Save As option. It should be noted that each page identified in the browser window may actually contain several printable pages (i.e., page 1 when printed may result in 18 printed pages), and that the user must click each page identified in the browser window in order to view, print or save all downloaded records.

The ECOTOX software cannot control your web browser print function and field width. Successfully printing output is dependent upon your web browser preferences and/or your printer capabilities. These options can help to fit your report on a printout:

- Reduce your web browser font size.
- If your report width is wider than a portrait page size, you can modify your web browser print option to a landscape orientation
- Some web browsers have a Print Preview option to see how your output will print out.
- You may want to consider using the delimited file option, then merging/adjusting the columns or selecting fewer output fields.
- If you are using Internet Explorer, choose *View->Fonts->Smallest* from the menus and then print in landscape mode. This will work for very wide reports. Note that Netscape allows you to reduce the font size as well, but when it prints it reverts to the original font size and truncates the right side of the report.
- Some printers have advanced settings available from the print window that allow you to "scale" the print image. If this feature is available try different values to determine which one works best for your reports.
- Save the browser report as a ".htm" file and open it with a word processing application where the font size can be reduced and columns sizes adjusted.

The data file will contain data representing the specific Search Criteria and Report Options you have selected. Each report will include contact information for the Scientific Outreach Program, date of the search, number of records in the report and number of separate browser window pages.

Generate the Entire Report

Generate the entire report on a single viewable/printable page. This option is generally used when you what to electronically save the entire data report. Reference citations are viewed/saved as a separate page. Large reports may overload your browser causing instability in your browser or computer.

Delimited Report

When you retrieve the results of your search in a delimited format a message box will appear on your screen. Select 'Save file.' A 'save as' window will appear. Select the appropriate directory on your hard drive. You may change the file name as this time. Although **.tsv* stands for Tab Separated Values, the report is actually a vertical bar (|) delimited file. A help window for using the delimited file will automatically open when you are saving a delimited file from ECOTOX. You may wish to print this out for later use when importing the data into a spreadsheet/database.

Each field will be separated by a vertical bar ("|") and each record will appear on a separate line. Using the vertical bar as a delimiter between fields is typically not the default method supported by applications that import data (e.g., spreadsheets) and hence you may have to specify the vertical bar as the delimiter when you import the data. The vertical bar key is usually found on the same key as the "\" (backslash) character on most keyboards and may appear as two shorter vertical lines with a gap between them.

To obtain full citations for a delimited file, you need to repeat the search selecting the Browser Viewable Report performing the same search. After the report displays, click on the References link in the output, then view or save the full citations.

To import this file into a Microsoft Excel spreadsheet, you can do the following steps:

1. Start the Spreadsheet
2. Go to the menu choice File->Open
3. Change the file types to "All file types (*.*)"
4. Select the file
5. Choose a delimited file format
6. Choose a vertical bar (|) as the field delimiter
7. Click Finish

Your file should now be imported into the spreadsheet for your analysis.

Perform Search

Click the Perform Search button when you are ready to initiate your search strategy and report/output creation. While the system is performing the ECOTOX database search, a separate window is created indicating that an ECOTOX database search is taking place. When the search is complete, the appropriate results (report contents or data file name) for aquatic and/or terrestrial report(s) will appear in this separate window.

As the search is being conducted, the system will display the number of records located for aquatic and/or terrestrial species. If the number of records is larger than you would like to view, you may click the 'Stop Search' button at the top of the search window and return to the search window and refine your search strategy. If you have selected the default outputs format (web browser view screen) the number of data records that can be included in the reports are 5000 for aquatic data and 500 for terrestrial data. The delimited export file will retrieve up to 10,000 terrestrial or aquatic records.

Once each report is completed, the banner at the top of the window will become visible with the words 'the aquatic / terrestrial report is ready.' Click on either the aquatic or terrestrial header to view the respective reports. Depending on the report format you selected under 'Report Content', your prompt in the search window will differ.

The number of hits you retrieve is based on test records and not references. Your output may span several pages with multiple test records within each page. The reference citations for your entire search will be located on the last page of your report.

Clear Search

Once you have completed your search, and closed the search window, you will be returned to the original search window. The search strategy will remain intact, so you may go back and refine your search if you wish. If you want to conduct another search, you may clear the search by either clicking the 'Clear Search' button at the top of the search window, or selecting 'Clear Search' from the Report Options under the Advanced Search screen. Clearing the search will return all search options to their original default values.

OTHER ECOTOXICOLOGY SITES

Under the Help Overview and the Tools menu bar in the Advanced Search, is an option to look at other ecotoxicology sites on the World Wide Web. Providing links to these sites does not imply endorsement by the U.S. EPA.

EXIT FROM ECOTOX

Exiting your Web browser or visiting another Web site will leave the program. Exiting the Web browser will save the last search strategy you set up prior to leaving for seven days, if your browser is configured to accept Cookies.

APPENDIX A: ECOTOX SEARCH PLANNING FORM

Use this form to simplify the planning of your searches or to document searches for others to perform.

Search Options
Habitat(s): AQUATIC _____ TERRESTRIAL ____
Taxonomic Group(s): ANIMALS ____ PLANTS ____

Chemical(s):
CAS Numbers: _____
Chemical Names: _____
Chemical List: _____

Species:
Species Numbers: _____
Scientific Names: _____
Common Names: _____

Endpoint(s): _____

Effect Group(s):
___ Accumulation
___ Behavior
___ Biochemical
___ Cellular
___ Growth
___ Mortality
___ Physiology
___ Population
___ Reproduction
___ Ecosystem

Additional Effects and Measurements_____
Recovery Results: ___ Include Recovery Results for aquatic data

Test Location(s):
___ Lab ____ All Field Tests
___ Field Artificial
____ Field Natural
____ Field Undeterminable

Exposure Media(s):
WATER: ___ Freshwater ___ Saltwater __ Unknown
SOIL: ___ Artificial __ Humus __ Litter __ Manure __ Mineral Soil __ Mixture __ Natural Soil ___Unspecified Soil
ARTIFICIAL: __ Hydroponic __ Other __ No Substrate

Exposure Type(s):
__ Diet
__ Injection
__ Topical
__ Environmental (terrestrial)
__ Inhalation (terrestrial)
__ Multiple Entry (terrestrial)
___ Flow-through (aquatic)
___ Leaching (aquatic)
___ Intermittent (aquatic)
___ Renewal (aquatic)
___ Static (aquatic)
___ Tidal (outdoor aquatic)
___ Lentic (outdoor aquatic)

___ Lotic (outdoor aquatic)

Chemical Analysis Method:
___ Measured ___ Unmeasured __ Not Reported

Documentation Code(s):
___ Complete ___ Moderately Complete __ Incomplete

Publication Year(s): _____

Reference Number(s):
Aquatic: _____
Terrestrial: _____

Report Options

Output Format:

___ Browser Viewable Report - Multiple viewable pages
___ Browser Viewable Report - Single viewable/printable page
___ Delimited Report - used for importing into other software applications (e.g. Excel, Lotus etc.)

Modifications to Output: Standard default output elements are listed in bold.. Some aquatic output options are available for Field Data only, and are indicated by (Field Data Only). Modifications to report options are only available in the Advanced Search.

Aquatic Output Elements (default report items are in bold)	**Terrestrial Output Elements** (default for browser viewable or delimited are in bold) (modify for delimited output only)
___ **Test Location**	___ Author
___ **CAS Number/Chemical Name**	___ **Application Frequency**
___ **Scientific Name/Common Name**	___ **Bases of measurement (wet/dry)**
___ **Endpoint**	___ **CAS Number**
___ **Effect**	___ **Chemical Analysis Method**
___ **Trend**	___ **Chemical Name**
___ **Exposure Type**	___ Chemical Comment
___ Exposure **Duration**	___ Chemical Formulation
___ **Media Type**	___ Chemical Grade
___ **Concentration Type**	___ Chemical Purity
___ **Concentration/Application Rate** (Field Data only)	___ **Concentration/Dose**
___ **Application Type** (Field Data Only)	___ Control Type
___ **Application Frequency** (Field Data Only)	___ **Documentation Code**
___ **Application Season/Date** (Field Data Only)	___ Dose Number
___ **Significance/ Level**	___ Dose Statistical Method
___ **Response Site**	___ **Effect**
___ **Reference Number**	___ **Effect Measurement**
___ Application Rate (Field Data Only)	___ **Endpoint**
___ Alkalinity	___ **Exposure Dose**
___ **BCF Value**	___ **Exposure Duration**
___ Chemical Analysis Method	___ **Exposure Number**
___ Chemical Comments	___ Exposure Comment

___ Control Type	___ **Exposure Type**
___ Documentation Code	___ Gender
___ **Effect Percent**	___ **Ionic Fraction**
___ EE Comment	___ **Lifestage**
___ Experimental Design	___ **Media Type**
___ GEO Code (Field Data Only)	___ **Observation Duration**
___ Geographic Location (Field Data Only)	___ **Observed Response**
___ Habitat Code	___ **Organism Age**
___ Habitat Description (Field Data Only)	___ Organism Comments
___ Hardness	___ **Organism Source**
___Test Number	___ **Publication Year**
___ Longitude/Latitude (Field Data Only)	___ **Reference Citation**
___ Organic Carbon	___ **Reference Number**
___ Organic Carbon Type	___ **Response Site**
___ Organism Comments	___ Result Comment
___ pH	___ Result Percent Lipid
___ Publication Year	___ Result Percent Dry/Wet Weight
___ **Reference Citation**	___ **Result Record Number**
___ Salinity	___ Result Statistical Method
___Species Number	___ Reviewer Assigned Endpoint
___ Study Type	___ Sample Number
___ Substrate Code (Field Data Only)	___ **Significance/ Level**
___ Temperature	___ **Soil Cation Exchange Capacity**
	___ **Soil Concentration Measured**
	___ **Soil Moisture**
	___ **Soil Organic Matter**
	___ **Soil pH**
	___ **Soil Clay %**
	___ **Soil Sand %**
	___ **Soil Silt %**
	___ **Species Common Name**
	___ **Species Scientific Name**
	___ Species Number
	___ **Study Duration**
	___ Test Comments
	___ **Test Location**
	___ **Test Number**
	___ Title

APPENDIX B: EXAMPLE SEARCHES

Use this form to simplify the planning of your searches or to document searches for others to perform. After each example search, remember to click on "Clear Search" before proceeding to the next search. These examples are for you to try in the Advanced Search pages.

Example A

You want to locate all reproductive effects data for mercury compounds. What types of reproductive effects were measured ?

1. Click on Chemical button bar. Scroll down to Chemical List. Select **MERCURY** from the metals list, then click on right arrow graphic to move "Mercury" to the selected list.
2. Click on tool bar Test Results Criteria button. Scroll to Effects list. Click on Group Effect **REPRODUCTION**. This will display and select all the reproductive effects within ECOTOX.
3. For Aquatic data, click on button bar Report Content button. Select **EE COMMENT** from the Aquatic laboratory and field selection lists, then click on right arrow graphic to move "EE Comment" to the selected list. The Terrestrial data report the specific measurement in the default report.
4. Click on **"Perform Search"**

Example B

You want to locate LC50 data on freshwater organisms exposed to malathion.

1. Click Specify Database on the button bar. Select **AQUATIC** habitat checkbox.
2. Click Chemical on the button bar. Type in CAS Number: **121755.**
3. Click Test Results on the button bar. In the Endpoint menu, select **LC50** from the list, then click on right arrow graphic to move "LC50 " to the selected list.
4. Click Test Conditions on the button bar. Scroll down to the Exposure Media menu and click on **FRESHWATER** checkbox.
5. Click on **"Perform Search"** button.

Example C

You want to locate recently published, well documented lethality endpoint only studies on Daphnia magna.

1. Click Specify Database on the button bar. Select **AQUATIC** habitat checkbox.
2. Click Species Criteria on the button bar. Type in **DAPHNIA MAGNA** and select the Scientific name category.

3. Click on tool bar Test Variables button. In the Endpoint menu, select the **REPORT ENDPOINTS ONLY** checkbox**.**
4. Scroll down to the Effects menu and click on the **MORTALITY** Effect Group checkbox.
5. Scroll down to the Documentation Code menu and click on the checkbox for **COMPLETE** to obtain all well documented publications.
6. Click on tool bar Publication Criteria on the button bar. Scroll down to publication year search. Select **1998, 1997, 1996, 1995, 1994** from the list, then click on right arrow graphic to move them to the selected list. Another method of searching multiple publication years is to type in the range of years (**1994** to **1998)** at the bottom of this menu.
7. Click on **"Perform Search"** button.

Example D

You want to locate toxicity data for frog tests performed in an outdoor location. You would like to move these data records into your own database.

1. Click Species on the button bar. Enter 'Frog' in the species selection box, and select 'Common Name' from the 'Choose Category' list. Note: If you only want larval aquatic lifestage, specify the aquatic habitat; adult terrestrial lifestage specify the terrestrial lifestage.
2. Click Test Conditions on the button bar. In the Test Location menu, select the checkbox **ALL FIELD TESTS** from the list.
3. Click Report Content on the button bar. Scroll down and click on the **DELIMITED REPORT** option.
4. Click on **"Perform Search"** button.

Example E

You want to use the SARA Title III Toxic Emissions Inventory chemical list and locate data that are in the EPA Fathead Minnow Database.

1. Click on Specify Database button. Select the **FATHEAD MINNOW DATABASE** checkbox within the Independently Compiled Database selection box.
2. Go to the Chemical search screen. Scroll down to Chemical List. Select **SARA TITLE III TOXIC EMISSIONS INVENTORY** from the list, then click on right arrow graphic to move it to the selected list.
3. Click on **"Perform Search"** button.

APPENDIX C: AQUATIC REPORT FORMAT

ECOTOX: Ecotoxicology Database
U.S. Environmental Protection Agency
Office of Research and Development
National Health and Environmental Effects Research Laboratory
Mid-Continent Ecology Division
Contact: Scientific Outreach Program
218-529-5225 or FAX 218-529-5003
E-mail: ecotox.support@epa.gov

Researchers and managers using ECOTOX data for analysis or summary projects should consult with the original scientific paper to ensure an understanding of the content of the data retrieved from ECOTOX

Report Generated: Wed Dec 2 14:12:02 1999

Records found: 1
1 2 NEXT > >
Laboratory Data References

Page 1 of 2

Scientific name, Common name	Endpoint	Effect Group	Water Type	Dur (days) Exp Typ	Conc (ug/L)	Signif Level	Tissue BCF	Ref #
Test Loc: LAB								
CAS #/Chemical: 8001352, Toxaphene								
Pimephales promelas Fathead minnow	NR-LETH	MOR	FW	1.00 S	A 10			4777

Scientific name, Common name	Endpoint	Effect	Trend Effect %	Water Type	Dur (days) Exp Typ	Conc (ug/L) Appl Rate	Appl Type	Appl Freq Date/Season	Signif Level	Tissue BCF	Ref #
Test Loc: FIELDN											
CAS #/Chemical: 298000, Phosphorothioic acid, O,O-Dimethyl-O-(p-nitrophenyl)ester											
Bufo marinus Giant toad		MOR	INC 63	FW	0.007 - 0.08 O	A 280 0.32 AI kg/ha	AS	1X			17983
Tilapia mossambica Mozambique tilapia	NR-ZERO	MOR	NEF 0	FW	0.007 - 2.00 O	A 2.3 - 280	AS	2X			17983

APPENDIX D: TERRESTRIAL REPORT FORMAT

ECOTOX: Ecotoxicology Database

U.S. Environmental Protection Agency

Office of Research and Development
National Health and Environmental Effects Research Laboratory
Mid-Continent Ecology Division

Contact: Scientific Outreach Program
218-529-5225 or FAX 218-529-5003
E-mail: ecotox.support@epa.gov

Researchers and managers using ECOTOX data for analysis or summary projects should consult with the original scientific paper to ensure an understanding of the content of the data retrieved from ECOTOX

Report Generated: Mon Feb 7 11:31:39 2000

Terrestrial records found: 4 **Page 1 of 2**

1 2 Next >>

References

NR = Not Reported

A study of **12 week(s)** duration using **Natural soil** media was conducted in a **Laboratory, indoor** site location with **NR** obtained ***Lumbricus rubellus*** (**Earthworm**). The **adult** (age: **NR** and organism characteristics of: **~700 mg**) were exposed for a duration of **12 week(s)** to a **NR** application of **Cadmium chloride** (CAS #: **10108642**) in **NR** carrier or a(n) **NR** positive control through a(n) **direct application** exposure route. The reported chemical concentrations are the result of **Measured** analysis of chemical solutions and are based on the **NR** ion. The **Natural soil** was comprised of **NR** sand, **NR** silt, and **NR** clay, pH **7.3**, and **8 % Organic Matter** , **35% - 40%** moisture and **NR** CEC. The concentrations are based on **DRY** soil weight and are the result of **unmeasured** analysis of the chemical concentration in soil. (Reference 6015, Ma, 1982, Test Number 4082).

Effect of **Cadmium chloride** on ***Lumbricus rubellus*** **Mortality**

			Concentration / Dose
Measurement	Response Site	Observation Duration	

			0.5 mg/kg soil	20 mg/kg soil	150 mg/kg soil	1000 mg/kg soil	3000 mg/kg soil
ENDPOINT: 6 week(s) LC50 of mg/kg soil (NR: 150 - 1000) on Measurement: Mortality; Response Site: NR							
Mortality	Not Reported	6 week(s)	4 %	0 %	3 %	100 %	100 %
Mortality	Not Reported	6 week(s)	-	-	3 %	100 %	100 %
Mortality	Not Reported	12 week(s)	12 %	12 %	-	-	-

A study of **17 day(s)** duration using **Artificial soil** media was conducted in a **Laboratory, indoor** site location with **NR** obtained ***Avena sativa*** (**Common oat**). The **seed** organisms (age: **0 day(s)** and organism characteristics of: **NR**) were exposed for a duration of **17 day(s)** to a **Dosed 1 time(s) per study period** application of **Cadmium chloride** in **NR** carrier or a(n) **NR** positive control through a(n) **direct application** exposure route. The reported chemical concentrations are the result of **Unmeasured** analysis of chemical solutions and are based on the **CD** ion. The **Artificial soil** was comprised of **90.5%** sand, **5.8%** silt, and **NR** clay, pH **5.1**, and **3.7 % Organic Matter** , **80** moisture and **NR** CEC. The concentrations are based on **DRY** soil weight and are the result of **unmeasured** analysis of the chemical concentration in soil. (Reference 6169, Adema, 1989, Test Number 5160).

Effect of **Cadmium chloride** on ***Avena sativa*** **Growth**

Endpoint Data Only
ENDPOINT: 17 day(s) EC50/ of 305 mg/l (NR: NR) on Measurement: Biomass; Response Site: Aboveground portion
ENDPOINT: 17 day(s) NOEC of 10 mg/kg soil (NR: NR) on Measurement: Biomass; Response Site: Aboveground portion
ENDPOINT: 17 day(s) EC50 of 97 mg/kg soil (NR: NR) on Measurement: Biomass; Response Site: Aboveground portion

TERRESTRIAL DEFAULT OUTPUT FIELD IDENTIFIERS

Bold and underline is the field name.

A study of **STUDY DURATION MEAN (MIN-MAX) UNIT** duration using **EXPOSURE MEDIA** media was conducted in a **TEST LOCATION** site location with **ORGANISM SOURCE** (if NR appears in this field it should be out put) obtained ***SCIENTIFIC NAME***. The **LIFESTAGE** organisms (age: **ORGANISM AGE AGE UNIT** and organism characteristics of: **ORGANISM COMMENTS**) were exposed for a duration of **EXPOSURE DURATION MEAN (MIN-MAX) UNIT** to a **APPLICATION FREQUENCY** application of **CHEMICAL NAME** (CAS# **CAS NUMBER)** in **CARRIER CHEMICAL NAME** (CAS# **CAS NUMBER)** carrier or a **POSITIVE CONTROL CHEMICAL NAME** (CAS# **CAS NUMBER)** positive control through a(n) **EXPOSURE TYPE** exposure route. The reported chemical concentrations are the result of **METHOD** analysis of chemical solutions and are based on the **IONIC FRACTION** ion. The **EXPOSURE MEDIA** was comprised of **SOIL SAND MEAN (MIN-MAX)**% sand, **SOIL SILT MEAN (MIN-MAX)**% silt, and **SOIL CLAY MEAN (MIN-MAX)**, % clay, pH **PH MEAN (MIN-MAX)**, and **SOIL ORGANIC MATTER MEAN (MIN-MAX)ORGANIC MATTER UNITS ORGANIC MATTER TYPE** , **SOIL MOISTURE MEAN (MIN-MAX)**% moisture and **SOIL CEC MEAN (MIN-MAX) UNITS** CEC. The concentrations are based on **BASIS OF MEASUREMNT DRY-WET** soil weight and are the result of **SOIL CONCENTRATION MEASURED** analysis of the chemical concentration in soil. (Reference **REFERENCE #, AUTHOR, PUBLICATION YEAR**, **TEST NUMBER,** Documentation Code = **DOCUMENTATION CODE**).

Effect of **CHEMICAL NAME** (CAS# **CAS NUMBER)** on ***SCIENTIFIC NAME*** **EFFECT** **The RESULT STATISTICAL METHOD FIELD is inserted into the () of the min-max or +-value.**

Effect Measurement	Response Site	Obs. Duration	EXPOSURE 1 Mean (Min-Max) OR (+-Value) & Unit	EXPOSURE 2 Mean (Min-Max) OR (+-Value) & Unit	EXPOSURE 3 Mean (Min-Max) OR (+-Value) & Unit	EXPOSURE 4 Mean (Min-Max) OR (+-Value) & Unit	EXPOSURE 5 Mean (Min-Max) OR (+-Value) & Unit	EXPOSURE 6 Mean (Min-Max) OR (+-Value) & Unit	EXPOSURE 7 Mean (Min-Max) OR (+-Value) & Unit
ENDPOINT: **Observation duration ENDPOINT** of **RESPONSE VALUE MEAN (MIN-MAX) UNIT** on Measurement: **EFFECT MEASUREMENT**; Response Site: **RESPONSE SITE**									
Effect Measurement	**Response Site**	**Obs. Duration Mean (Min-Max) OR (+-Value) & Unit**	**RESPONSE VALUE Mean (Min-Max) OR (+-Value) & Unit**	**RESPONSE VALUE Mean (Min-Max) OR (+-Value) & Unit**	**RESPONSE VALUE Mean (Min-Max) OR (+-Value) & Unit**	**RESPONSE VALUE Mean (Min-Max) OR (+-Value) & Unit**	**RESPONSE VALUE Mean (Min-Max) OR (+-Value) & Unit**	**RESPONSE VALUE Mean (Min-Max) OR (+-Value) & Unit**	**RESPONSE VALUE*(SIGNIF) Mean (Min-Max) OR (+-Value) & Unit**

* **LEVEL**