EUROPEAN COMMISSION

Community Research

ERICA

(Contract Number: FI6R-CT-2004-508847)

FREDERICA DATABASE MANUAL

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PU	Public	PU
RE	Restricted to a group specified by the partners of the [ERICA] project	
CO	Confidential, only for partners of the [ERICA] project	

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ERICA (Environmental Risk from Ionising Contaminants: Assessment and Management) will provide an integrated approach to scientific, managerial and societal issues concerned with the environmental effects of contaminants emitting ionising radiation, with emphasis on biota and ecosystems. The project started in March 2004 and is to end by February 2007.

Erica tetralix L.

Contract No: **FI6R-CT-2004-508847**
Project Coordinator: **Swedish Radiation Protection Authority**

Contractors:

Swedish Radiation Protection Authority	SSI
Swedish Nuclear Fuel and Waste Management Company	SKB
Facilia AB	Facilia
Södertörn University College	SUC
Norwegian Radiation Protection Authority	NRPA
Research Centre in Energy, Environment and Technology	CIEMAT
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1 Summary

The FRED database was originally created for Work Package 3 (Effects of low dose rate chronic irradiation of native wild organisms) of the FASSET (Framework for the Assessment of Environmental Impact) project. Its main use was to gather literature data to help summarise dose-effect relationships between radiation and selected organisms. The work was supported by, and forms part of, the EC's FASSET programme, FIGE-CT-2000-00102. The FRED database was then merged with the Russian EPIC database (FI6R-CT-2004-508847) to form FREDERICA. FREDERICA has been created for Work Package 1 of the ERICA (Environmental Risk from Ionising Contaminants: Assessment and Management) project. The work was supported by, and forms part of, the EC's FASSET programme, FI6R-CT-2004-508847. This manual provides information on the use of the database, detailing how the information should be input and describes the search/report functions and capabilities of the database. The database options are selected from a series of menus, which should be self-explanatory but the help page will indicate what each option can do. This manual illustrates the different screens and discusses the options that can be taken. The manual also provides information on the format that data should be entered in although wherever possible drop down lists have been provided to ensure consistency in the data entry.

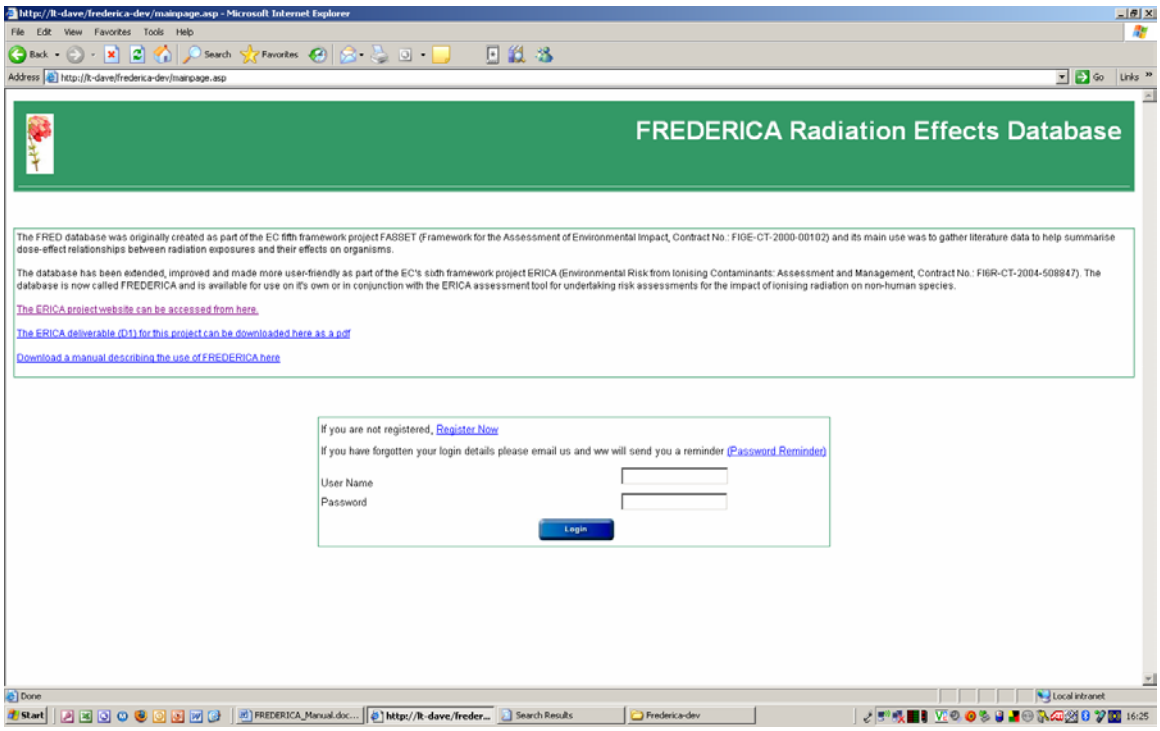
Please report any difficulties to David Copplestone (david.copplestone@environment-agency.gov.uk)

Contents

This database is online and may be accessed via:

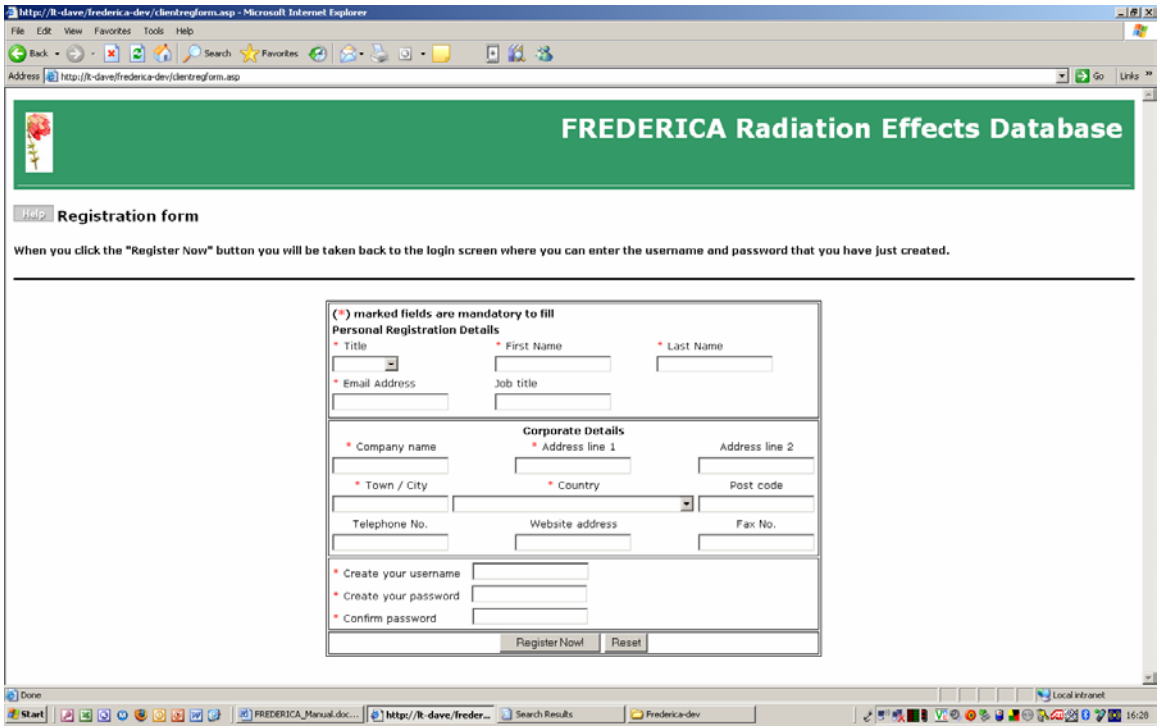
www.frederica-online.org

A login splash screen detailing the rationale behind the database will appear at which point you may exit the database completely, enter a password or register. You may also access the ERICA project website, download this manual and other related ERICA deliverables as PDF documents.



Registration

Click on the **Register Now** hyperlink and you will be directed to the registration form:



The above form will appear and allows you to enter in your details. Fields marked with a star are mandatory. Note you are able to choose your own username and password. Once the form has been completed press the **Register Now** button. Once submitted you will be taken back to the login splash screen where you can enter the login name and password that you have just created. If you need help registering please click the help button near the left hand side of the screen, this will allow you to communicate with someone from the FREDERICA team to assist in resolving any difficulty that you may have.

Basic Navigation

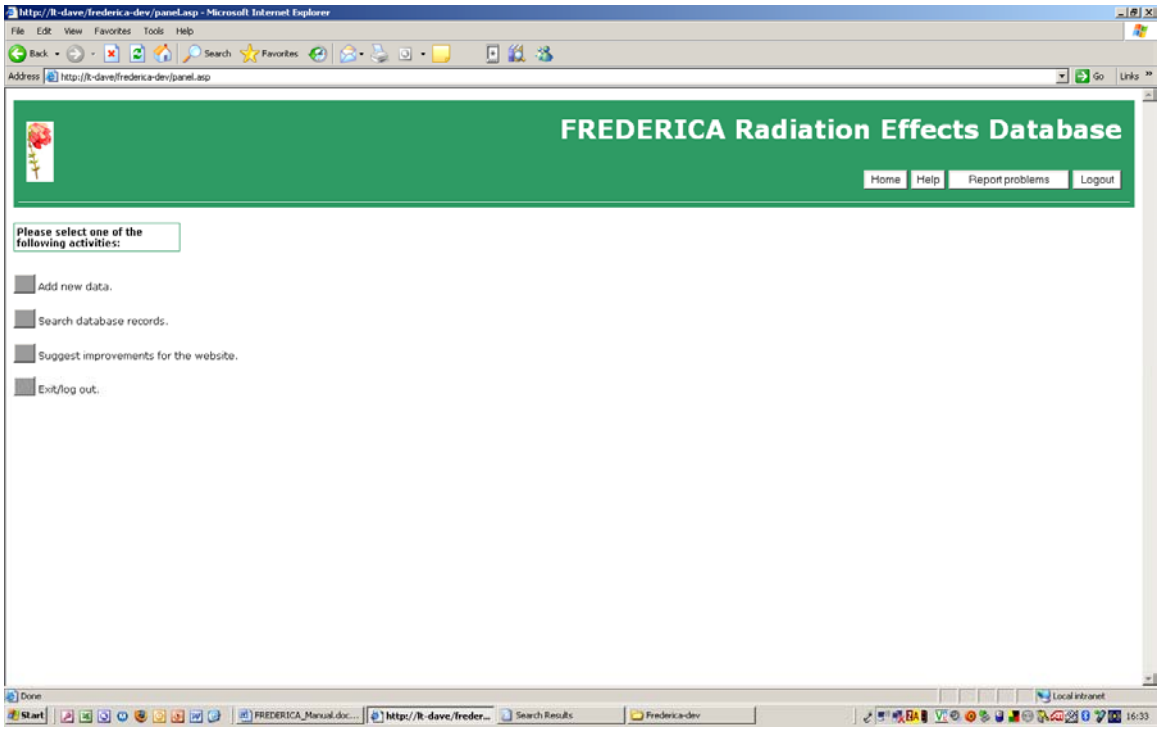
You will also notice that every screen within the database has the following four buttons in the top right hand corner: Home, Report Problems, Help and Logout:

The **Home** button always takes you to the following main menu page:

The **Help** button will currently take you to the following page:

The **Report Problems** button will load an email for you to complete a description of the problem that you have encountered and this will be submitted to one of the FREDERICA team for action.

The **Logout** button will take you to the following page:



Main Menu Screen

Once logged in you have three options:
Add new data
Search database records
Suggest improvements to the website
Exit/log out

Add New Data

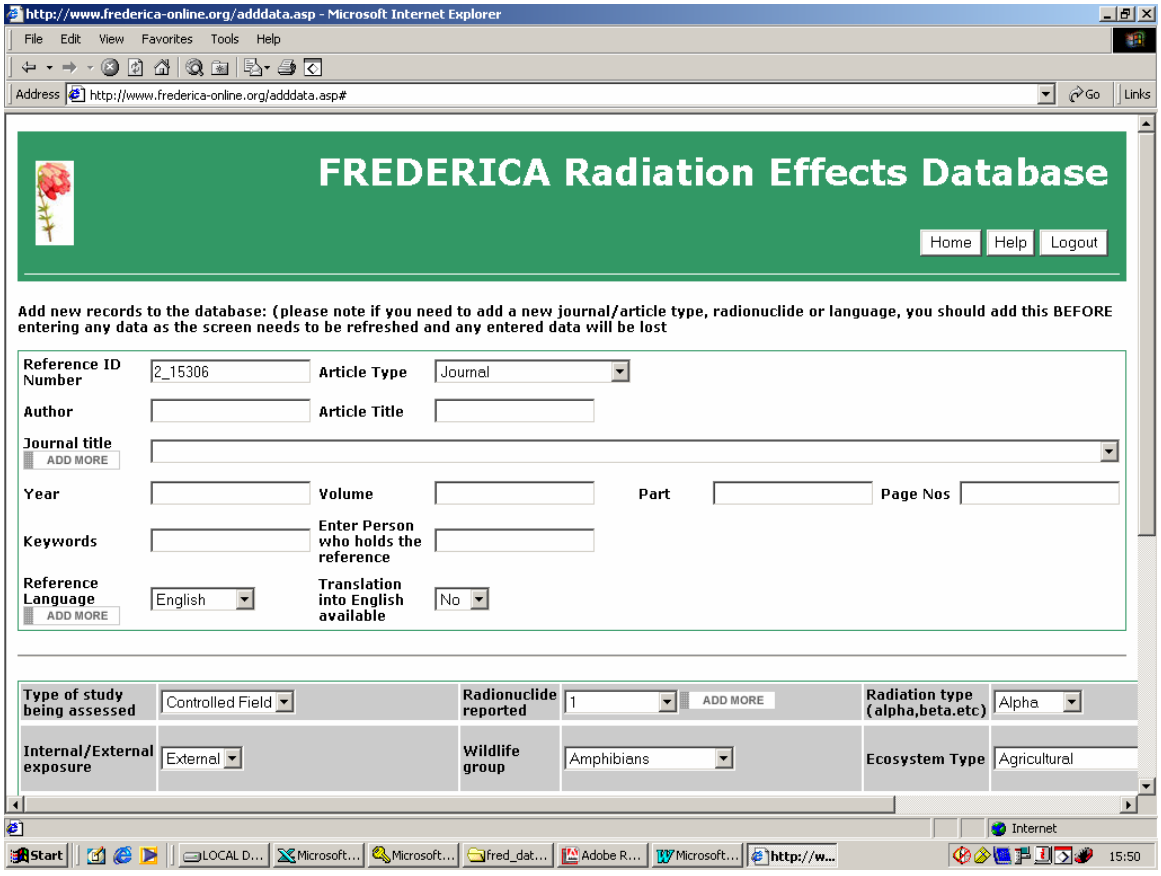
Selecting the **Add new data** option will bring up the following window where the tab button or mouse should be used to move around the screen.

Please note the English spelling should be used into the database except where specified in the guidance.

You are advised that pressing the TAB key will move the cursor around the screen in a logical order based on the options in the screen. SHIFT+TAB will move you back along the entry boxes. You can also use the mouse to move around the screen by clicking in the entry box or on the drop down box of choice.

Please note that you can not use TAB, RETURN or SHIFT RETURN for formatting purposes in any of the entry boxes.

Firstly you should check to see if the journal/article type, radiouclide or language is included in the options drop down list before proceeding with data entry as adding new data to these fields will cause the screen to be refreshed resulting in the loss of any data that you have entered.



Reference ID Number

Automatically generated

Article type

Select from list. Note **journal** is the default option

The review article option should be selected to enter information from an article which either review's or reports data from other workers. The reference information should be completed and entered on to this form but no effects data should be added, instead efforts to obtain the

original reference should be made and this should be added in full to the database. If you do not know the type of article then enter 'unknown'.

Authors; format as:

single author: "*Cadwell, L.L.*"
two authors: "*Smith, A.G., and Gize, I.*"
three or more authors as: "*Copplestone, D., Bielby, S.B. & Wood, D.S.*"
Note that there should be one space between the surname/comma and the author's initial and one space around the 'and' or the '&' when there are two or more authors.

Title; format as:

Use a capital on the first word: "*Colony formation of the western harvester ant in a chronic radiation field*". When entering a book title, add the editors name(s) after the title e.g. "*Book Title. Eds (name)*". Note the title should be entered exactly as given on the reference. The convention is to use the spelling (e.g. American or English) as used by the authors. For all other entries the English spelling should be used into the database.

Year

Format as: "*2000*" note that this is a prescribed format and can not be altered

Volume

Format as: "*2*"

Number

Format as: "*20*"

Page numbers

Format as: "*20-100.*" note the full stop and do not enter 'pp'.

Keywords

Add a keyword or phrase to each box up to a maximum of 6 keywords or phrases.
Do use any keywords that are given in the original paper.
Do not use any keywords that duplicate those given elsewhere in the add new data form (for example, the species name, or acute/chronic exposure, radionuclide name) as these are recorded anyway.
Do add any information relating to the geographical location of the field studies and use terms such as monitoring, background concentration, LD_{50} experiment, etc.
You are advised to use rodent or non-rodent as one of the key words when entering papers on the effects of ionising radiation on mammalian species as this is a major classification of the types of species used.

Enter Person who holds the reference

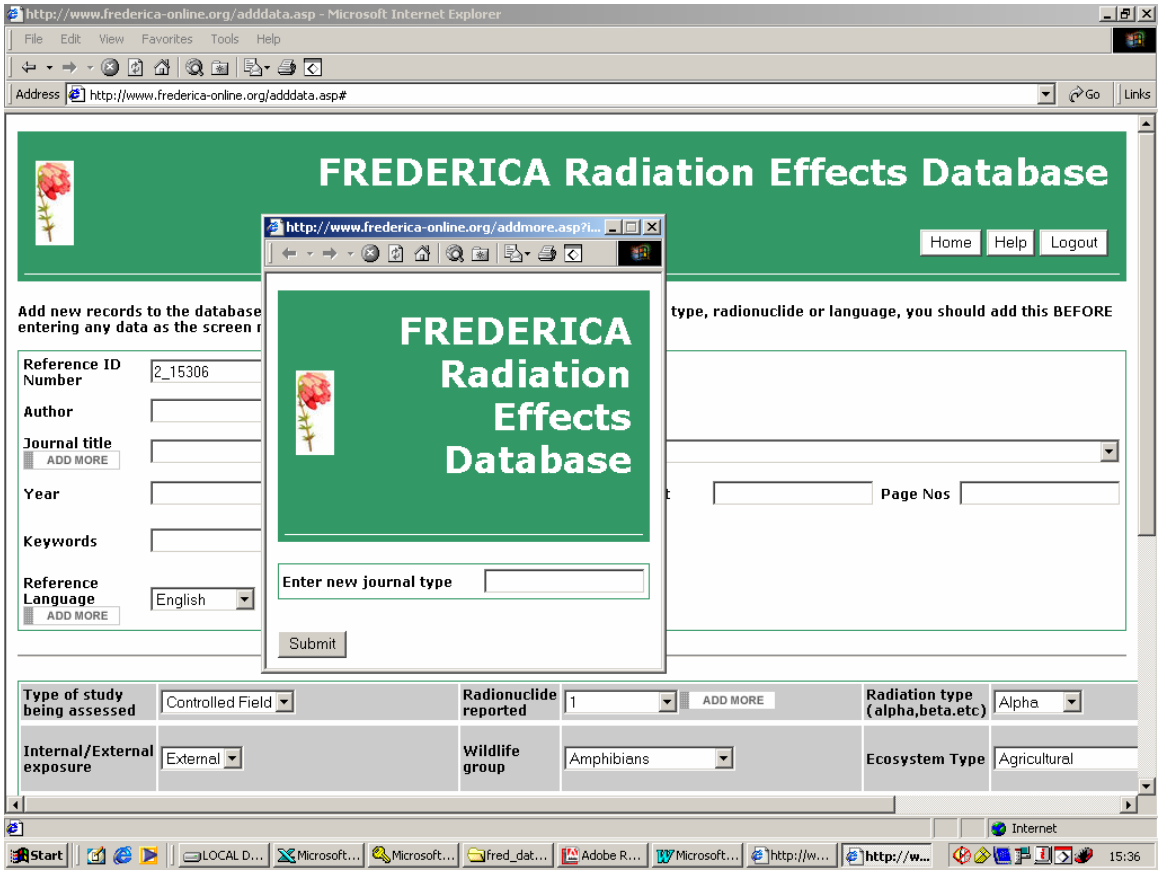
Enter your name. This is so we can contact you should we have any queries or need to obtain the paper for scoring purposes.

Language of the publication

Select from list. Note that there is the option to add additional information to the drop down list (which can not be edited directly) by clicking on the button which states **ADD MORE**. This will bring up a new form in which the additional language can be entered. Click the **Submit** button on this form to return to the Add new data Screen. The language will appear automatically in the list and can now be selected. Note that this should be done BEFORE entering other data into the form.

Journal:

Select from list. Note that there is the option to add additional information to the drop down list (which can not be edited directly) by clicking on the button which states **ADD MORE** new journal/book name". This will bring up a new form in which the title can be entered. Click the **Submit** button on this form to return to the Add new data Screen. The phrase/word will appear automatically in the list and can now be selected. Note that this should be done BEFORE entering other data into the form.



T**ranslation in English available**

Enter yes or no.

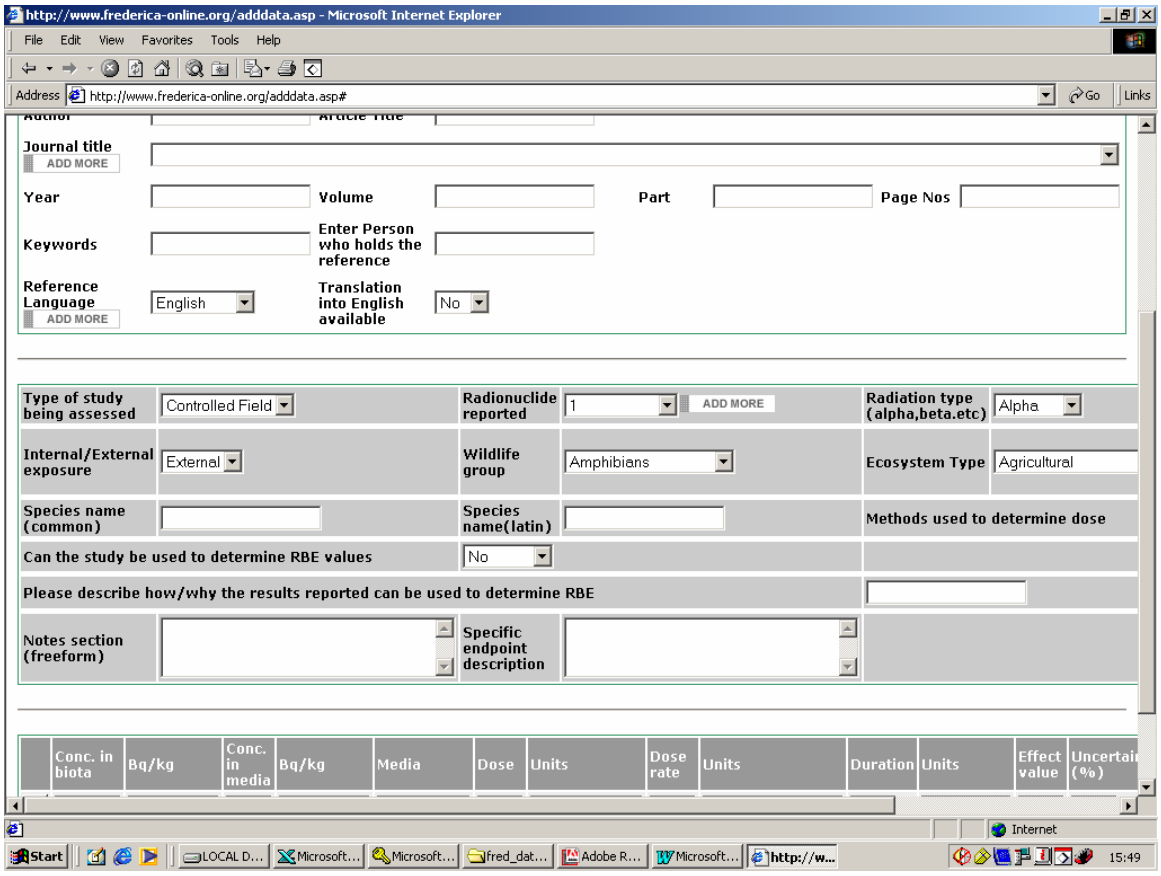
Then enter the exposure details as follows:

Type of study being assessed;

Select from list. Please note that a controlled field experiment differs from a field experiment in that a source of ionising radiation is usually used (i.e. field irradiation studies) as opposed to environmental contamination arising from an accident or routine discharge.

Radionuclide reported;

Select from list. Note that there is the option to add additional information to the drop down list (which can not be edited directly) by clicking on the button which states "add new radionuclide". This will bring up a new form in which the additional phrase/word can be entered. The phrase/word will appear automatically in the list and can now be selected. The radionuclide should be entered and used in the following format: Cs-137, Pu-239+240 etc. If you select mixed, then list all radionuclides in the note section (see below).



Radiation type;

Select from list

Type of exposure;

Select from list.

Acute exposure is exposure to high concentration of pollutant, received within a short period of time. Normally used to refer to exposure of sufficiently short duration that the resulting dose can be treated as instantaneous (e.g. less than an hour).

Chronic exposure is exposure persisting in time. Normally used to refer to continuous exposures to low concentrations of pollutants.

Transitory exposure is exposure that is too protracted to be described as acute, but does not persist for years.

Internal/External exposure;

Select from list.

Wildlife Group;

Select from list. Note that the categories should be used to distinguish between aquatic and terrestrial organisms. For example, although a woodlouse is a Crustacean it should be added to the soil fauna category because the Crustaceans category is for aquatic organisms.

Ecosystem Type;

Select from list.

Umbrella Effect;

Select from list. More than one endpoint can be selected by holding down the shift key (to select a range) or CRTL key (to select multiple endpoints from the list but which are not listed next to each other) whilst making the choices.

- Morbidity - including effects such as reduced immune function, damage to the central nervous system, reduced mobility, reduced growth rate;
- Mortality - including change to the death rate, usually as an increase;

- Reproduction - including change to gamete production, fertilisation rate, embryonic and/or larval survival rates, increases in sterility;
- Mutation - including increases in DNA damage, genetic effects in both somatic and germ cells;
- Stimulation – where organisms appear to be more successful due to exposure to radiation, often this is where a challenge dose is given first, then the animals exposed a second time where the impacts are less;
- Adaptation – where the organisms appear to be adapting to the presence of the radiation;
- Ecological – such things as measures of biodiversity etc.

Further details of these last three endpoints may be found in the EPIC project.

Species name (common);

Type in the common name for the species name.

Species name (latin);

Type in the latin name for the species. Note that in the Latin the Genus name should start with a capital as follows: "*Apodemus sylvaticus*".

Methods used to determine dose;

Select from list.

Can the study be used to determine RBE values;

An indication of whether the information can be used to derive relative biological effectiveness values for different radiation types. There is a yes, no, possibly question and then a freeform box to enter information in about how the data may be used in this regard.

Please describe how/why the results reported can be used to determine RBE;

It is possible to enter information on RBE here.

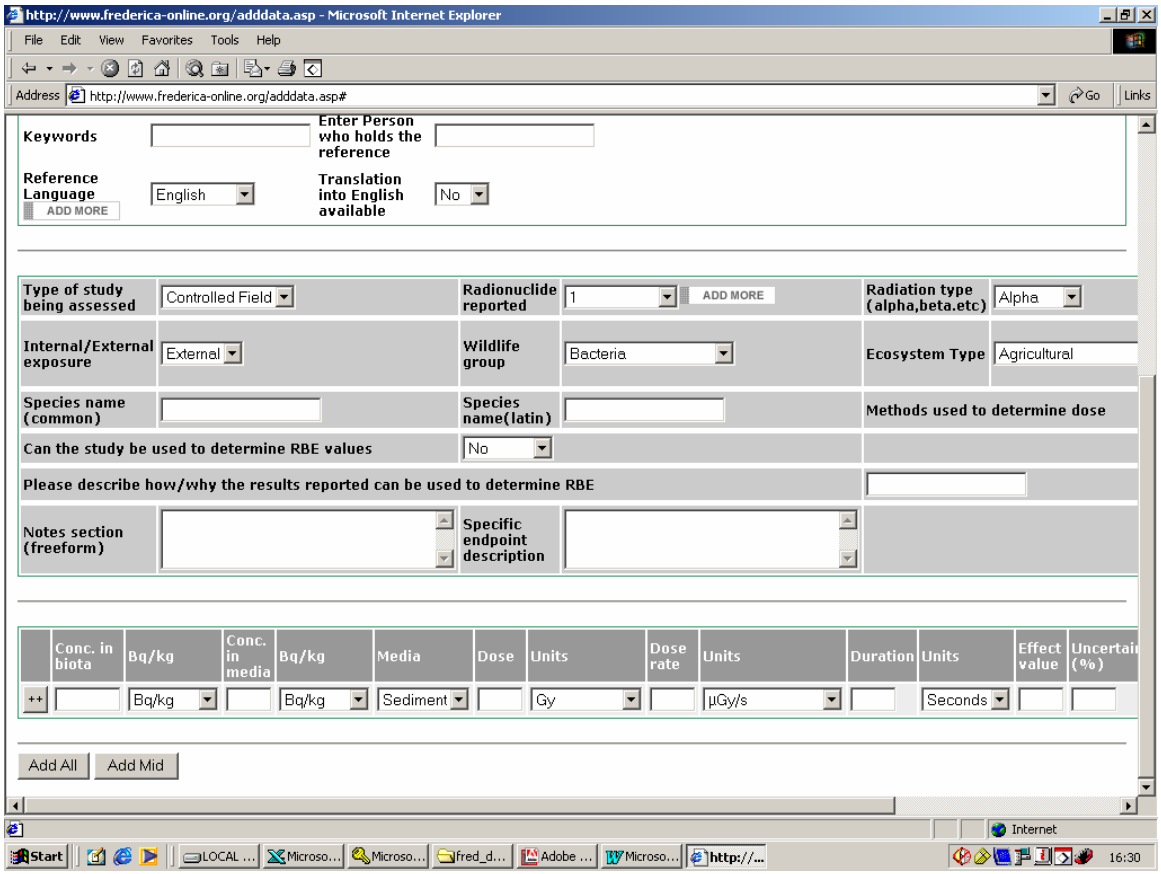
Notes section (freeform);

It is possible to enter an extensive commentary on the information being entered into the table. The dialog box will expand to contain the information you wish to enter but please note that it is not possible to use TABs or RETURNs within the freeform box.

Specific endpoint description (freeform);

It is possible to enter the exact endpoint title here.

Finally enter the effect details (see bottom of the splash screen below)



Concentration in biota

Enter activity concentration in biota.

Biota concentration units

Select units of activity concentration in biota from list.

Concentration in media

Enter activity concentration in media.

Media concentration units

Select units of activity concentration in media from list.

Media

Select media type from list (typically soil, water or air).

Dose

Enter the dose here.

Units

Enter units of dose here.

Dose rate

Enter the dose rate here.

Units

Enter units of dose rate here.

Duration

Enter the number of days, hours etc.

Units

Enter units of duration here. This is the length of the experiment in units of time.

Effects value; Uncertainty

The database input factor will be used to generate a dose response curve when combined with additional information stored for the individual reference. An indication of the uncertainty associated with the dose response effect should be given as a percentage.

LOEDR; HNEDR; Background

Using the check boxes, indicate whether:

- LOEDR (Lowest Observable Effect Dose (or Dose Rate): the dose (rate) at which the effects are first observed at a level considered to be significant (ideally this should be based on the author's assessment and/or statistical data);
- HNEDR (Highest No Effect Dose (or Dose Rate): the highest dose (rate) at which no effects are observed;
- Background: the dose response relationship reported is for the background/control dose (rate) (if this given as a value).

Notes

It is possible to enter an extensive commentary on the information being entered into the table. The dialog box will expand to contain the information you wish to enter but please note that it is not possible to use TABs or RETURNs within the freeform box. The freeform notes section should be used to record information such as LD_{50} values, conversion factors (for example dry:wet weights), but criticisms of the paper should be avoided. Other useful information might be the number of animals used in an experiment or words/phrases that describe the effects of the radiation exposure as observed by the author(s). An example of the kind of entry anticipated might be:

- "All fish sterile at 150 days"
- "time to first breed 90 days"
- "mean brood size +- 2"
- "mean brood interval 293 +- 2.7 days"

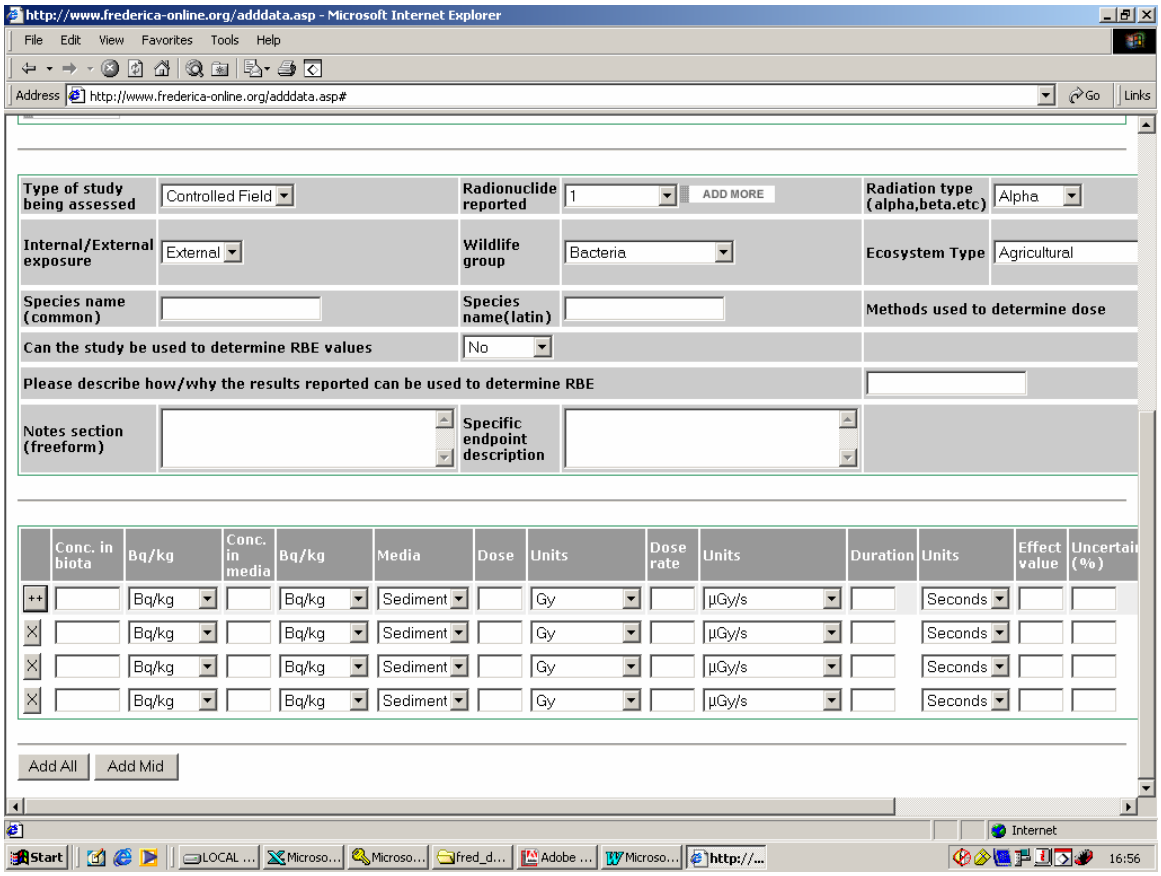
Additional Notes

Please note that all the number fields on this form (activity concentration, dose, dose rate, effect measurement value and the uncertainty) are all reported on screen using scientific format to 1 dp. However the number should be entered as in the reference because the database will round the number up and down but the full information is stored in the table.

Please also note that the units for both the dose and dose rate are pre-defined and can not be added to. This is because of the calculations which are hard wired into the database for converting the dose or dose rate to a standardised unit. Therefore if the units you have when entering the information are different from those available please convert the unit to Gy or µGyh-1 and make a note of the original units in the Notes box.

To add an extra row of data press the button marked **++.** In the example below ++ was pressed three times
To remove a row of data press the X button preceding it.

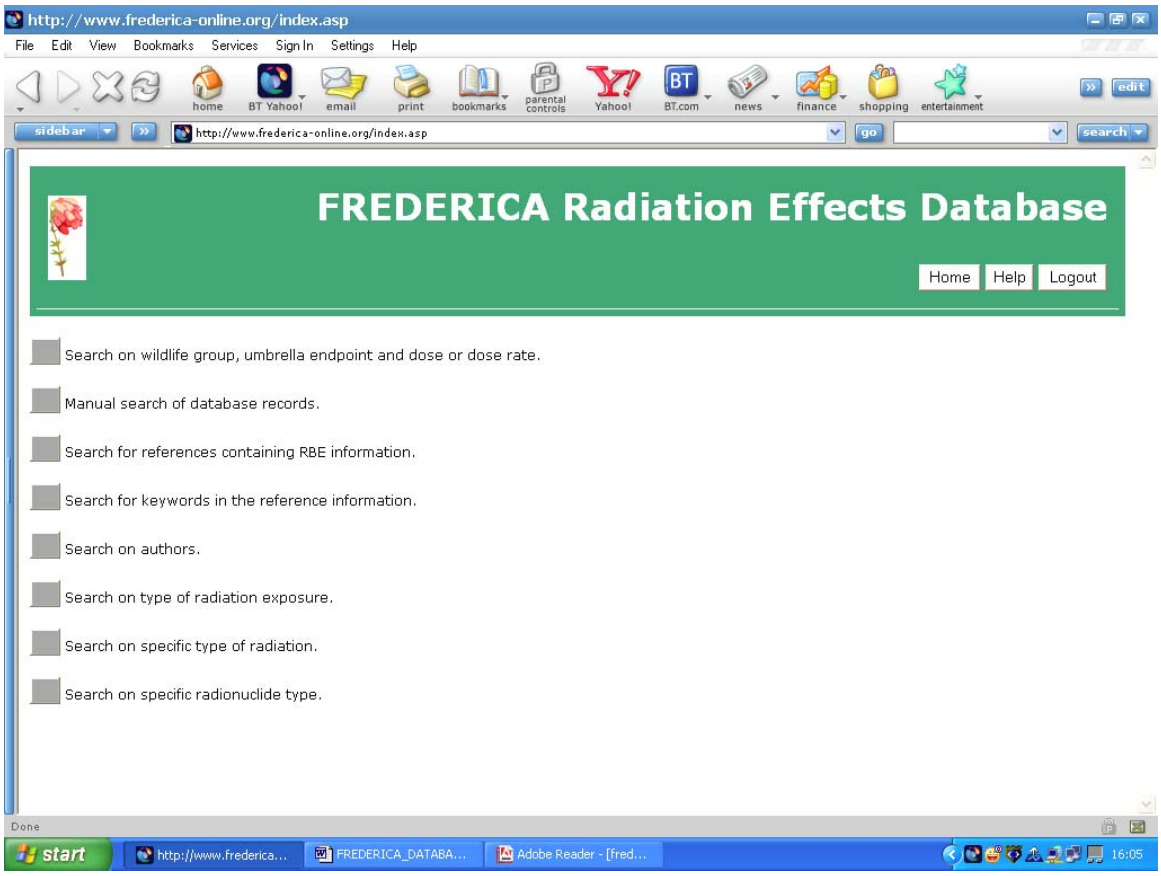
If you wish to add a new set of experimental details to the same reference, you can press **Add Mid** and this will duplicate the information in the reference details section and the middle of the table, allowing you to modify it and to then enter additional effects data.



Once you have completed all data entry press **Add All** to add the reference to the database.

Search Database Records

Selecting the **Search Database Records** option will bring up the following screen.



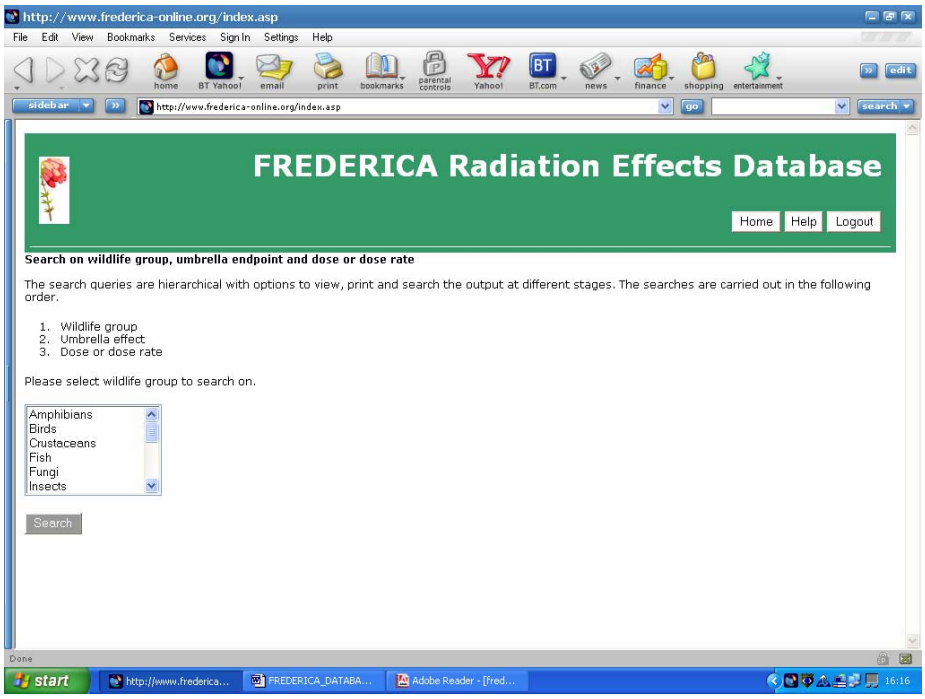
There are eight search options as shown above:

- Search on wildlife group, umbrella endpoint and dose or dose rate;
- Manual search of the database;
- Search for references that may be used to generate RBE information.
- Search for keywords in the reference information
- Search on authors
- Search on type of radiation exposure
- Search on specific type of radiation
- Search on specific radionuclide type

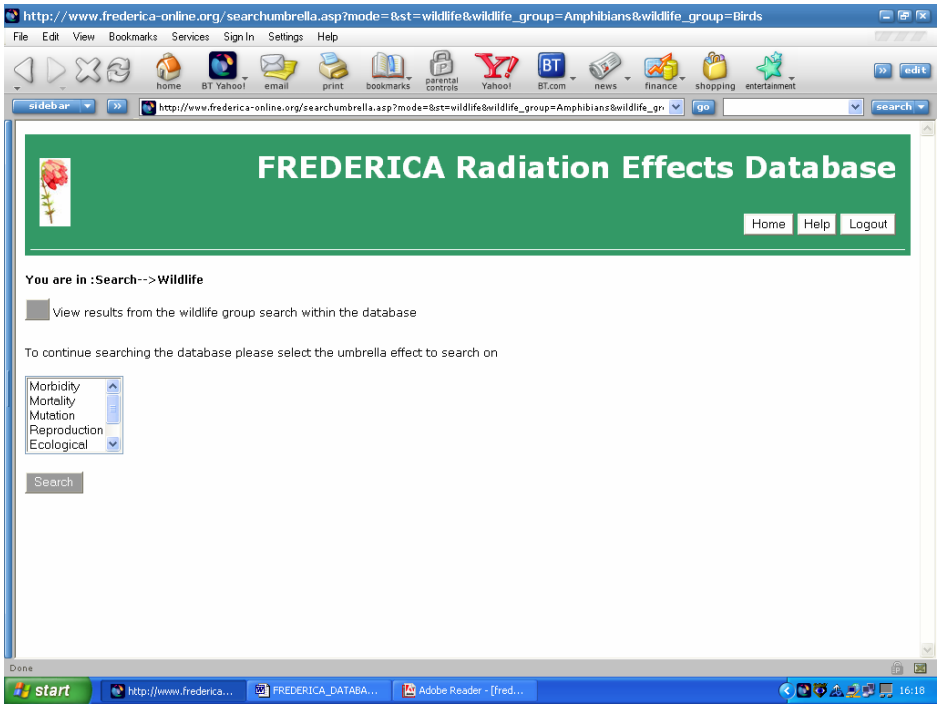
Search on wildlife group, umbrella

By clicking on the first option (wildlife group, umbrella endpoint and dose or dose rate) a hierarchical search query can be developed based on the order given above. In other words the database will be searched for records on, for example, birds, and then on mortality, and then on a given dose or dose rate range. After each search, the records obtained may be viewed on screen or exported to excel by clicking on the appropriate option buttons.

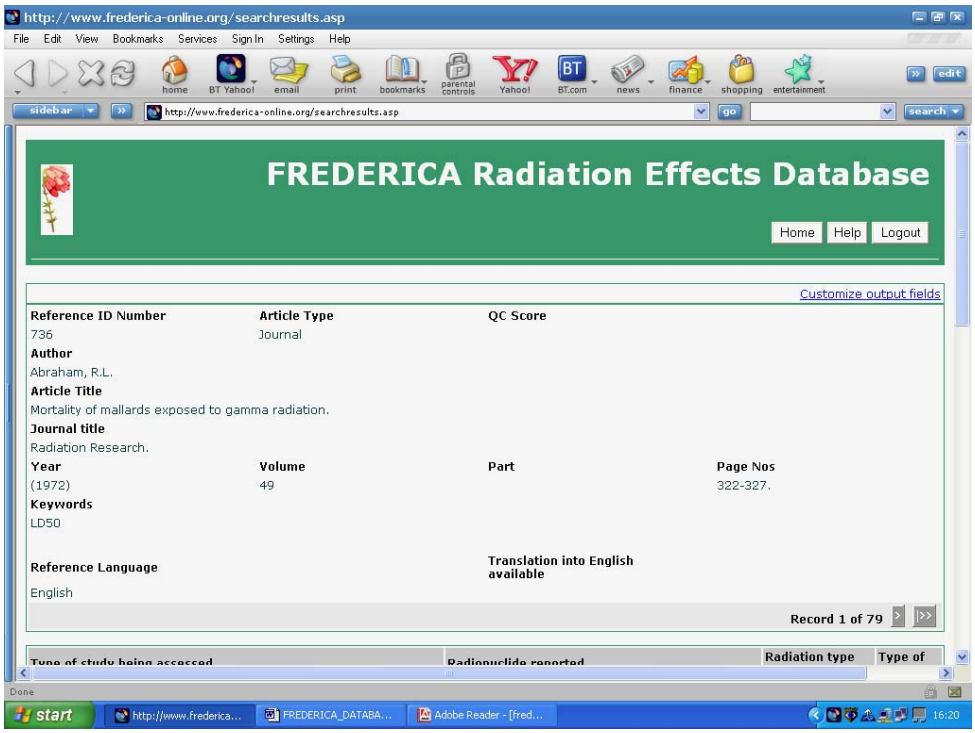
A series of example screens are given below:



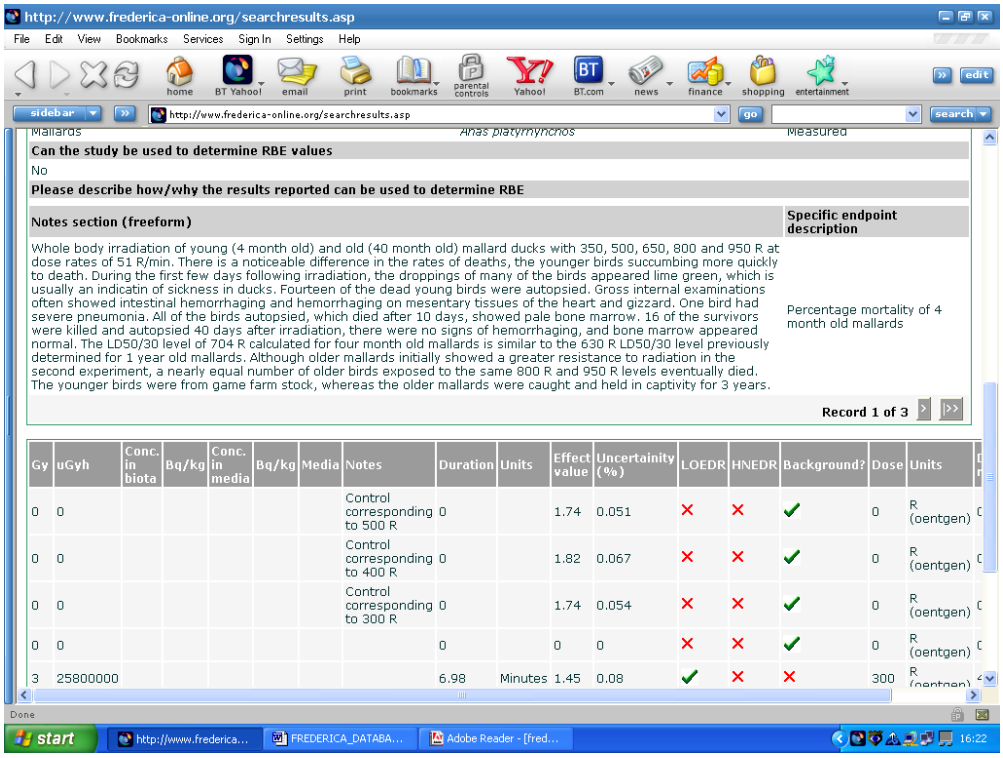
Enter the wildlife group search term (select from the list by scrolling up and down. Select two or more wildlife groups simultaneously by pressing the shift key (for a range) or by pressing the CTRL key (to select items that are not adjacent to each other)) and click the search button. This brings up the following screen. Here you can continue to refine the search or you can view the data.



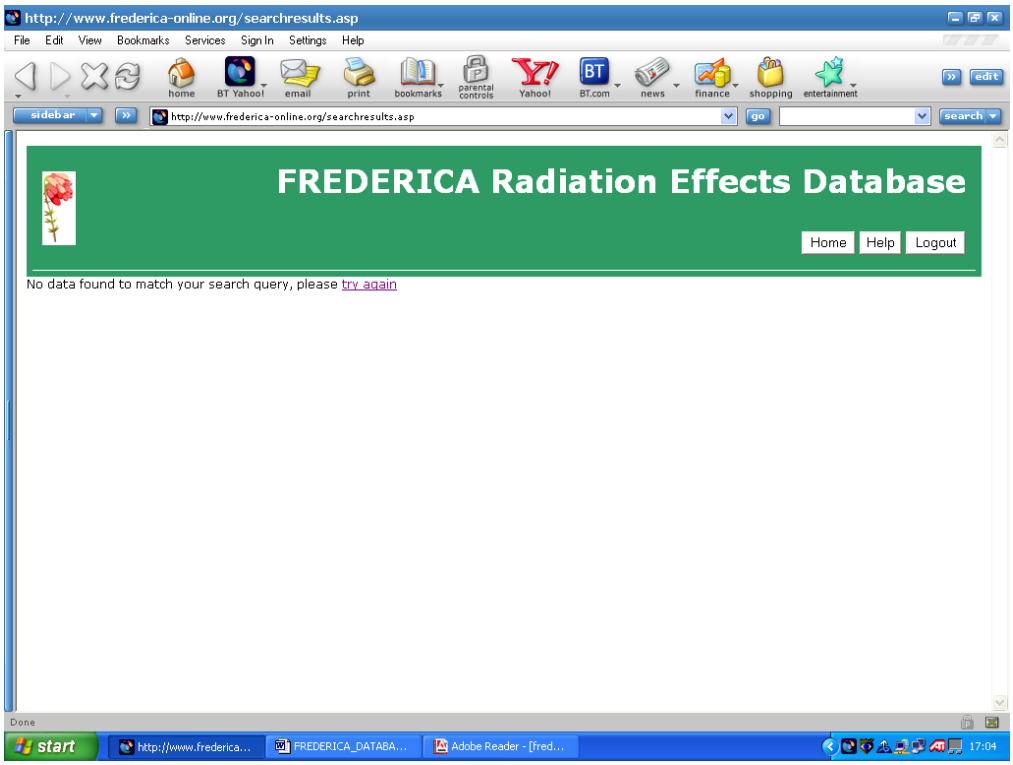
Click the **View results from the wildlife group search within the database** button to get the following screen:



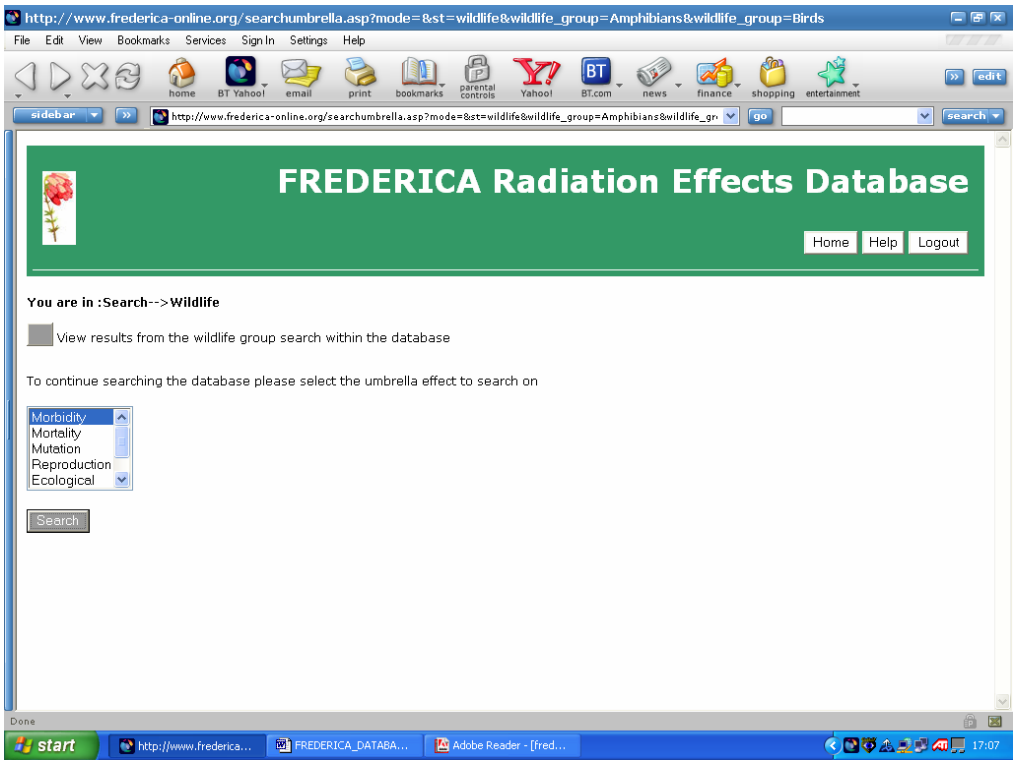
From here you can scroll through the records in the subset of data which corresponds to the search output using the navigation buttons. There are two sets of navigation buttons, the upper set can be used to select records from within the main data records and the lower set can be used to scroll through the effects sub records.



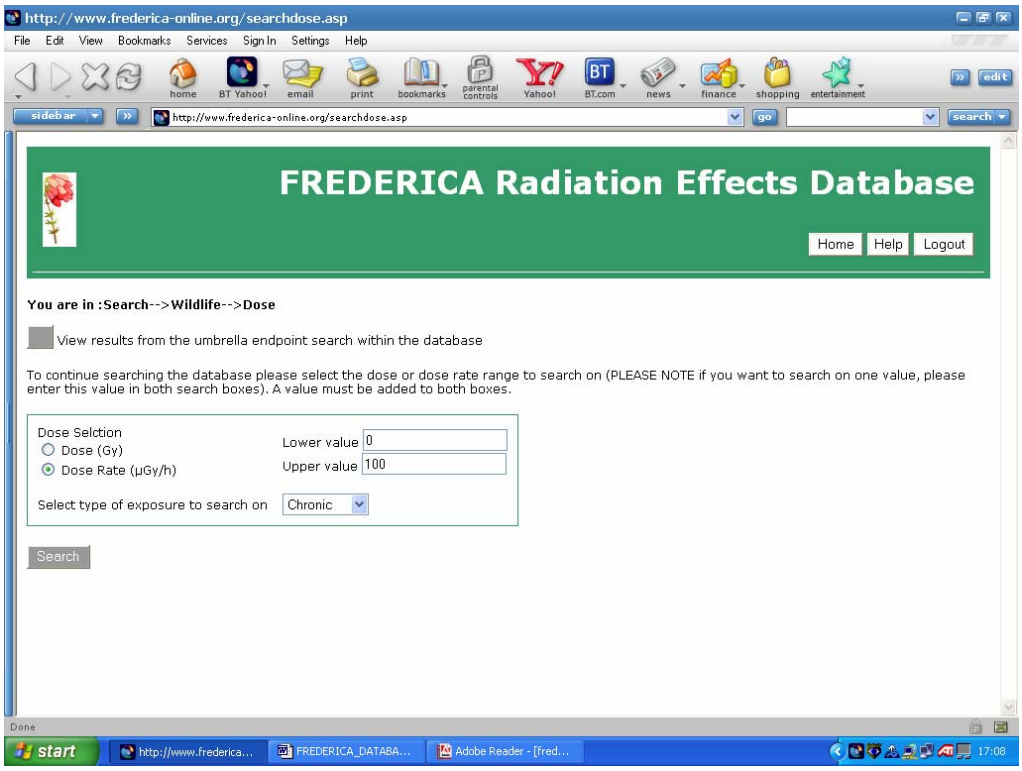
Please note that in the event that your search term does not find any relevant information in the database, when you click the **View results from the wildlife group search within the database** button you will find the following message:



To refine the search further, select the umbrella endpoint required from the drop down menu and click the search button.



For example, select mortality from the list, which will bring up the following screen:

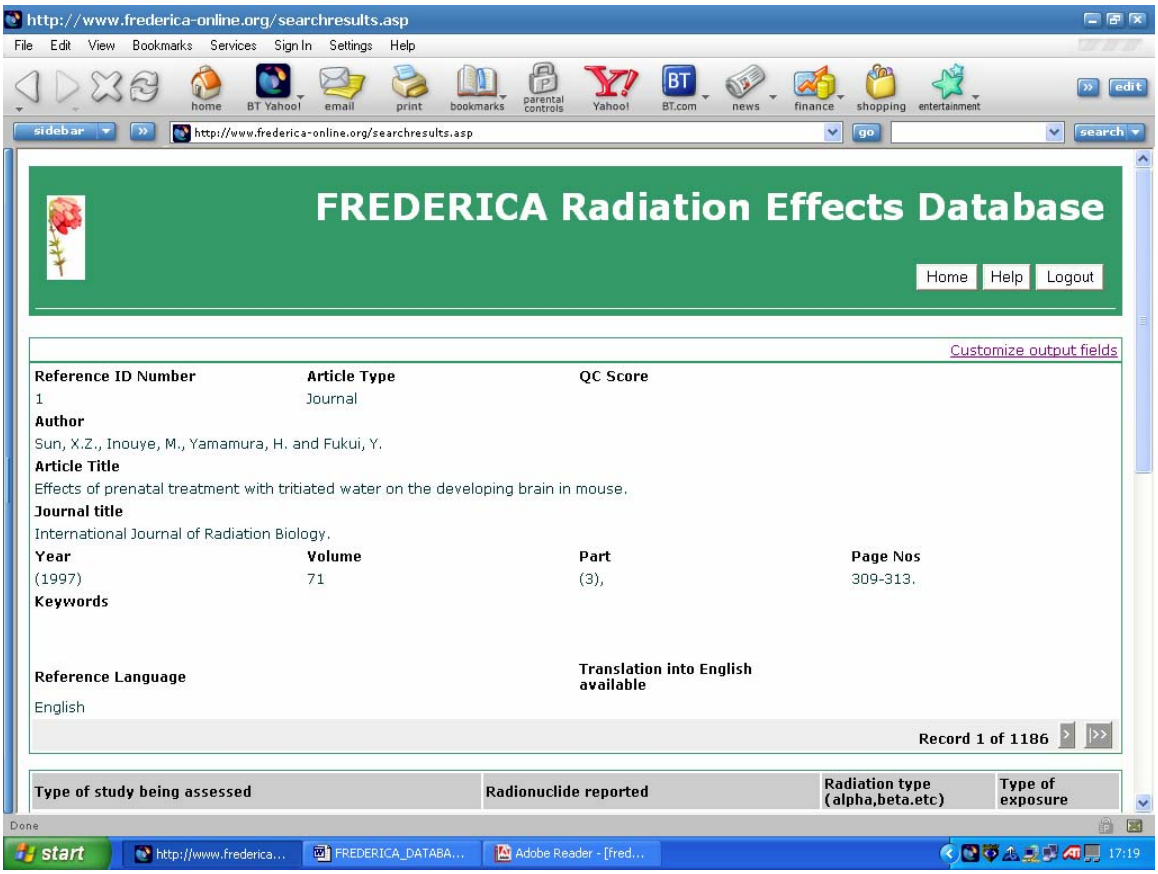


As before the top button will allow you to view the results of the search on screen.
The lower part of the form allows you to then search on a dose or dose rate value or range. You must select either dose or dose rate from the options box to search on and then the search will be carried out on the values entered into the text boxes. If you want to search on one dose value (e.g. 10 Gy) you must select the Dose (Gy) option and then type 10 into BOTH the lower and upper value box. If you want to search on a dose range of 0-1 μGyh^{-1} then you must select the Dose Rate (μGyh^{-1}) option and enter 0 in the lower value and 1 in the upper value box. The default settings are Dose Rate (μGyh^{-1}) and 0-100. Finally select the type of exposure papers that you are interested in. This is a list box where you can only select one option. Click acute, chronic or transitory and then click the search button to perform the search. The default option is “acute”.

Once the **Search** button is pressed the number of records related to the search criteria will become available:

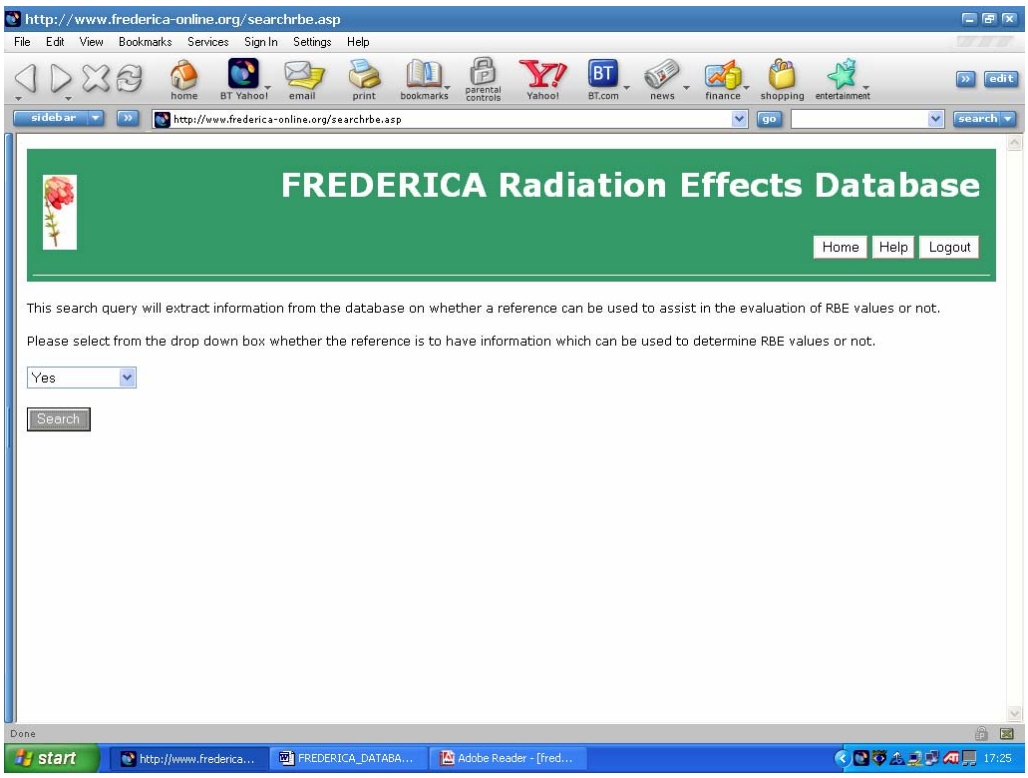
Manual search of database

It is also possible to undertake a manual search of the database contents using the second option on the search menu – 'Manual Search of Database records'. Selecting this option will bring up the following window:



By using the navigation buttons provided it is possible to move around the reference information and view the effects data. The navigation buttons provide a way of scrolling through the records sequentially.

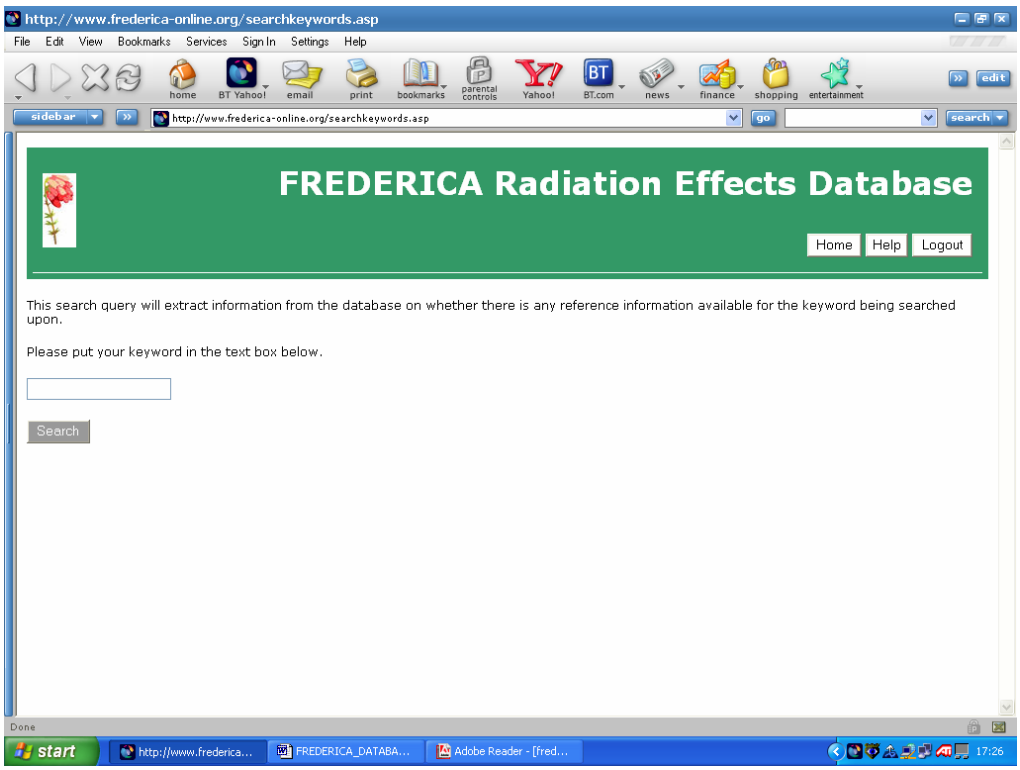
Search for references that may be used to generate RBE information
This option is to view those references where the information they contain may be useful in determining RBE values. The following screen demonstrates the search form that you will see:



To undertake the search select the term required from the drop down list. The options are YES, POSSIBLY, YES + POSSIBLY. Click the SEARCH button to undertake the search. The output screen is as for the previous searches.

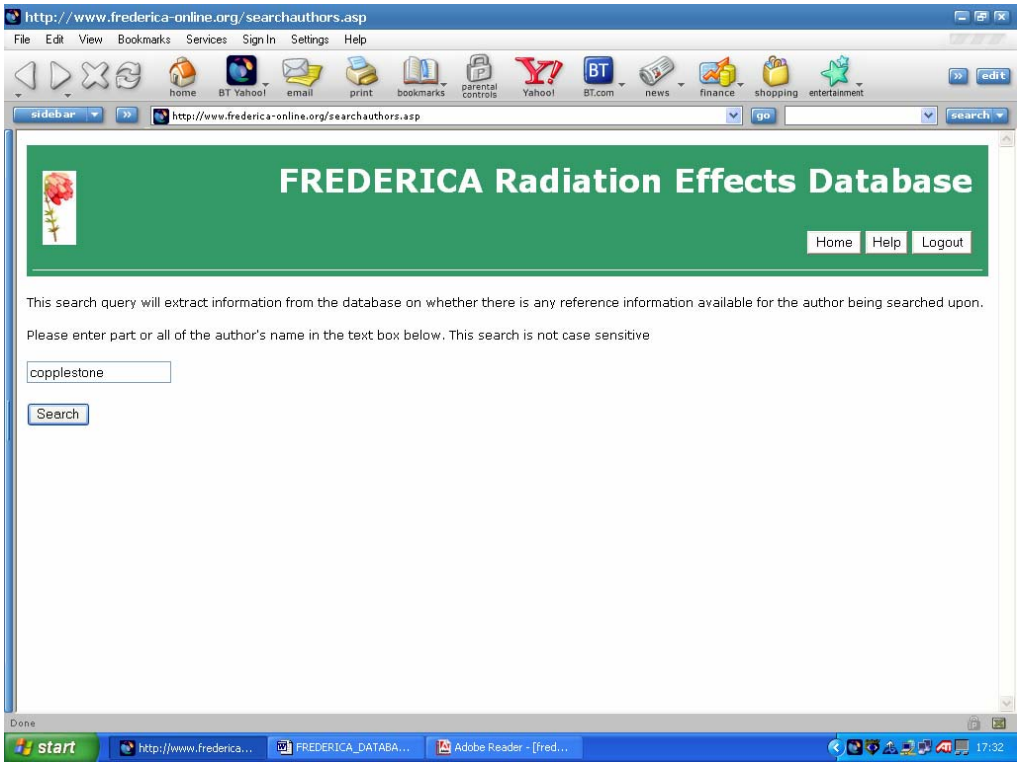
Search for keywords in the reference information

This option is to allow you to search the references based on a keyword. The following screen demonstrates the search form that you will see:



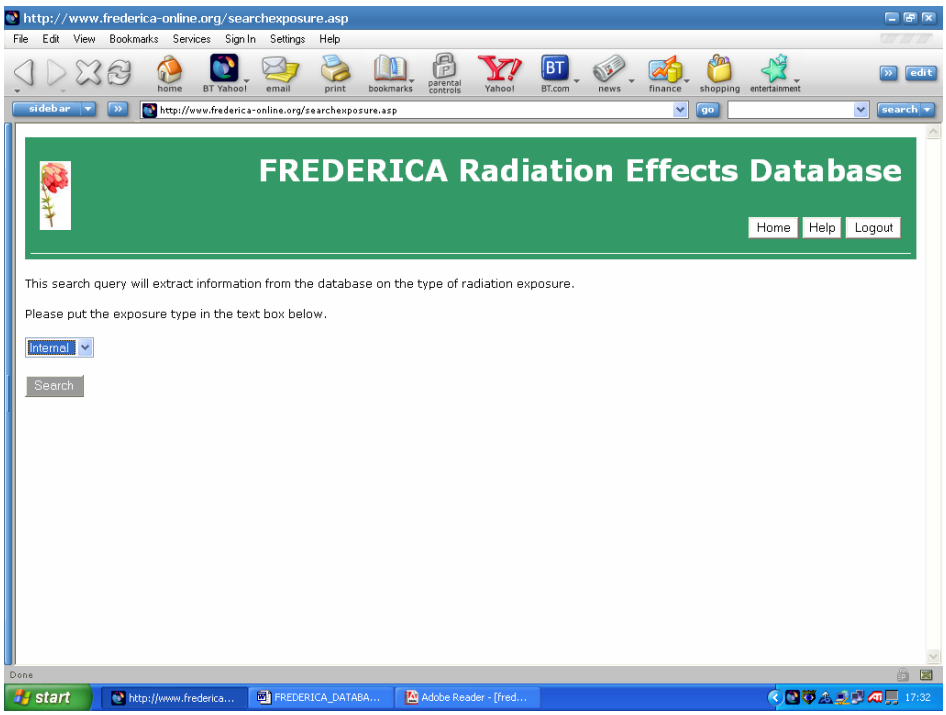
Search on authors

This option is to allow you to search the references based on an author. The following screen demonstrates the search form that you will see:



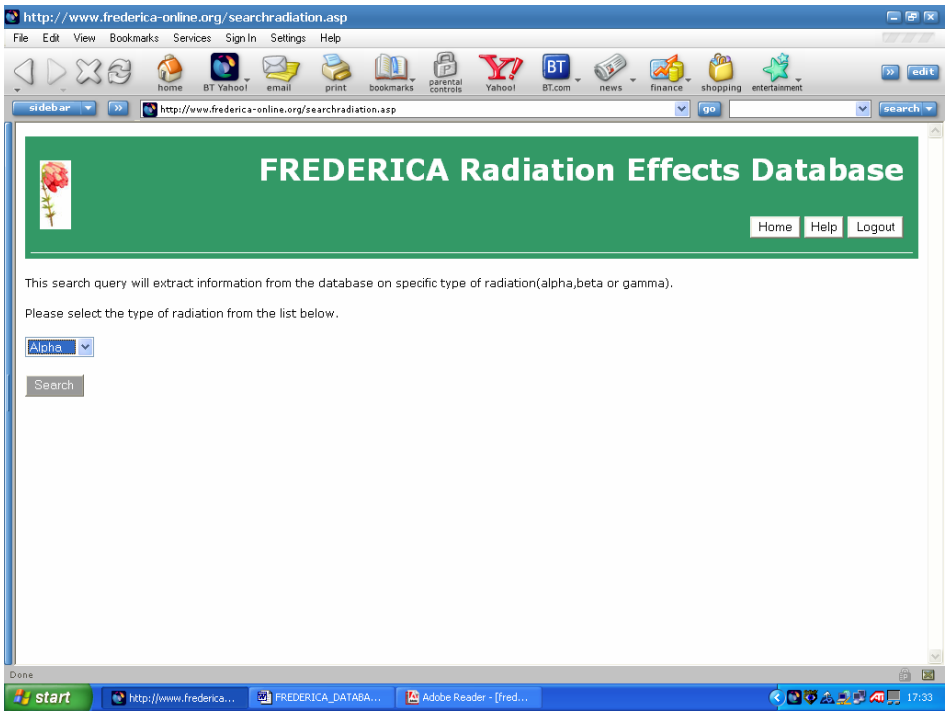
Search on type of radiation exposure

To undertake the search select the term required from the drop down list. The options are **Internal, External, Mixed**.



Search on specific type of radiation

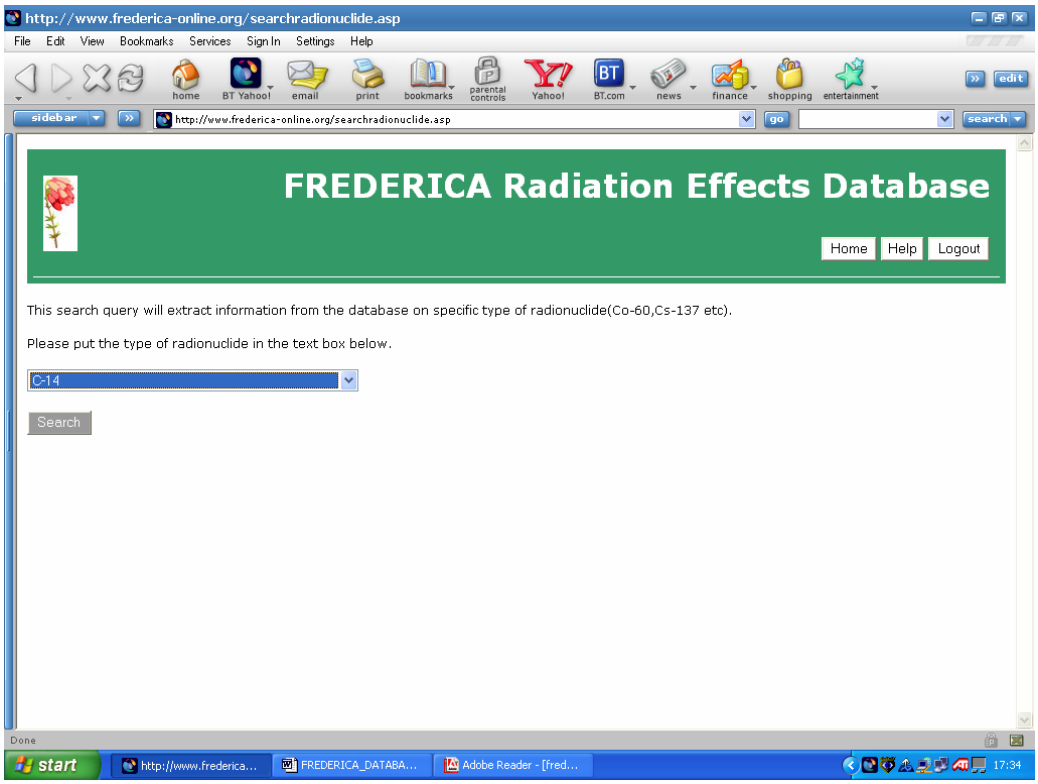
To undertake the search select the term required from the drop down list. The options are **Alpha, Beta, Gamma, Mixed, X-ray**.



Click the **Search** button to undertake the search. The output screen is as for the previous searches.

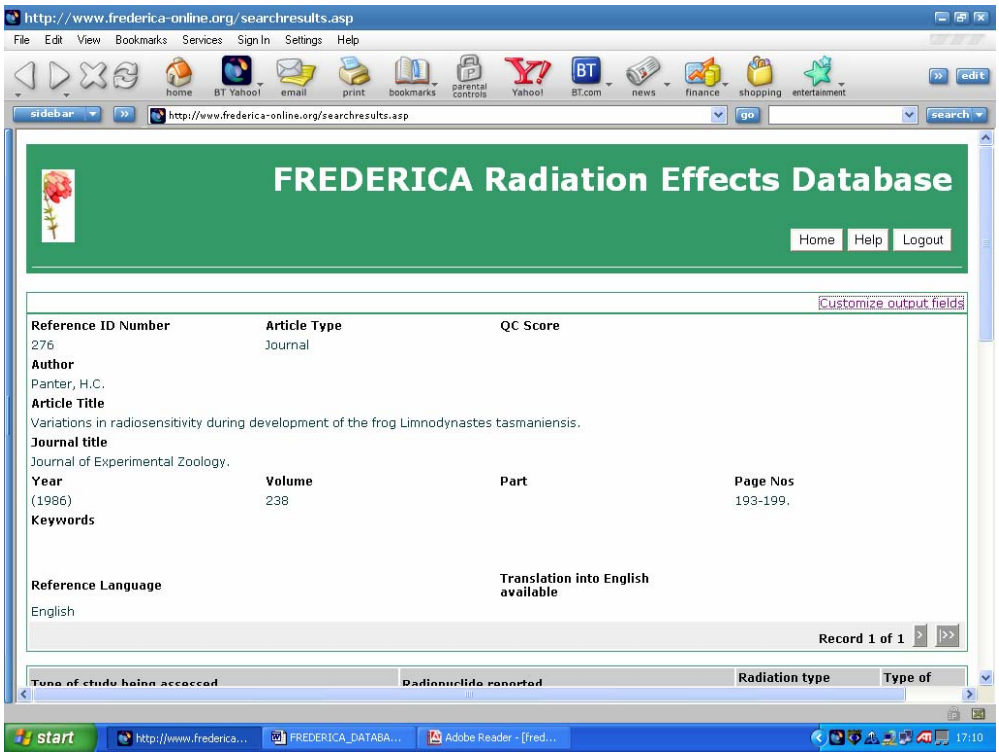
Search on specific radionuclide type

To undertake the search select the term required from the drop down list. For example: C-14.

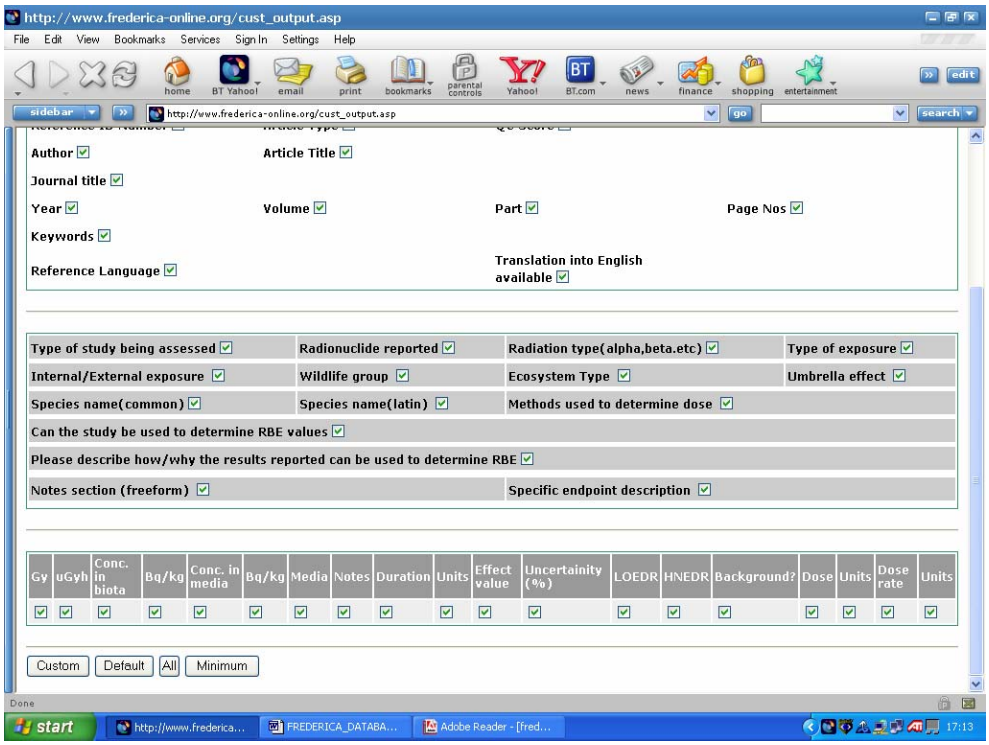


Click the **Search** button to undertake the search. The output screen is as for the previous searches.

Exporting data from the database



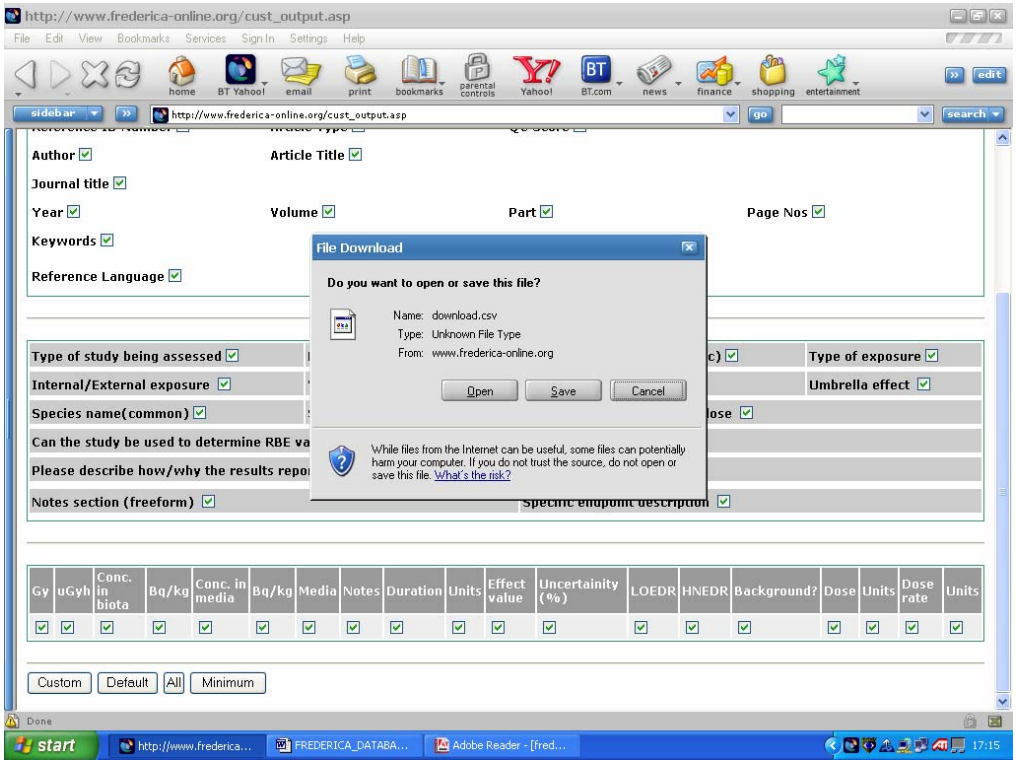
On each search output form, you have the option to output the results by pressing the **Customize output fields** link in the top right hand corner of the screen. The following screen will then appear. Check the boxes for which information you want reported.



You can then:

- Press the **Custom** button to begin export of data as defined using the checkboxes to mark the data fields required for the records matching your search criteria;
- Press the **Default** button to export a standard set of information from the database for the records matching your search criteria;
- Press the **All** button to extract all the data fields for the records matching your search criteria;
- Press the **Minimum** button to export the most basic set of information screens from the database for the records matching your search criteria.

You will be given the option to open or save the output file. The output file is in a comma delimited format and can be opened in excel or other databases.



Exit/Logout

Selecting the **Exit/Logout** option will bring up the following screen: