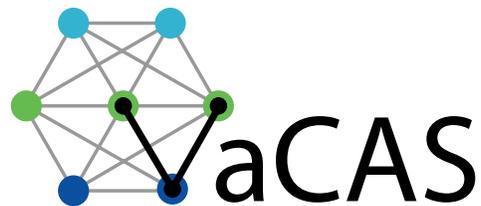


USER MANUAL FOR BIOFLYER DATABASE

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Summary

In order to compare the results of the new integrated morphology and gait optimization to diverse examples from biology, a comprehensive and easily accessible database is required. Unfortunately, no such database is publicly available, so one was developed. This database includes data from various sources. In addition, a text-based interface that utilizes MATLAB was developed that allows for easy access and editing the database. Additionally this interface can be used to create plots. These plots allow for the data to be sorted so that trends can be observed. These trends can be used to identify trends that form commonalities between diverse species as well trends that show difference between different flight strategies.

Contents

1	Introduction	1
1.1	System Requirements	1
1.2	File Structure	1
1.3	Included Data	2
2	Operation	3
2.1	Initializing the Database	3
2.2	Interacting with the Database	4
3	Known Issues	16

List of Figures

1	An example plot made by the animal database.	15
---	--	----

List of Tables

1	Files required for the Animal Database	2
---	--	---

1 Introduction

Although there are numerous sources for the physical characteristics of flying animals (see section 1.3 for a few examples), there are no data sets that are both publicly available and easily accessible. To remedy this situation, a database of various physical properties of flying animals were developed.

1.1 System Requirements

From the start this database was designed to be as platform agnostic as possible. It has been tested on Windows (7, 8, and 8.1), Max OSX (Mavericks and Yosemite), and Linux (Elementary OS 0.3 Freya, an Ubuntu 14.04 LST derivative). It requires MATLAB 2014b, or later. This database will **NOT** run on MATLAB 2014a or earlier, due to a change in how graphics are handled*.

1.2 File Structure

All of the files are attached to this PDF in a single zip archive. The files included are protected MATLAB files (p-files). Since they are p-files, they cannot be edited, but they can be run. Download this archive and extract it to a single directory. This directory should contain all of the files contained in Table 1. All of the files required to run the database are attached to this document. Most modern PDF readers can download these files. Save the Zip archive to your computer, then extract to a convenient location.

*The only issue with earlier versions is when it comes to switching the axes to semi-log or log-log. The rest of the program should work and will produce a plot without logarithmic axes. The axes can be change to log-log or semi-log manually using plot tools.

Table 1: Files required for the Animal Database

Filename	Description
<code>AnimalDatabase.p</code>	This is the primary script for interacting with the animal database. When run, it prompts the user for input and provides on-screen instructions in the command window.
<code>AnimalData_v3.mat</code>	This file contains all of the animal data. If you choose to, <code>AnimalDatabase.p</code> will modify the contents this database, but by default changes will not be saved. The “v3” refers to modifications made in order to improve the formatting of the database. There are no functional differences, so previous versions are not included.
<code>appendEntry.p</code>	This function is called by <code>AnimalDatabase.p</code> and is used to add an additional entry to the database. This entry is added to the end of the database.
<code>accessEntry.p</code>	This function is called by <code>AnimalDatabase.p</code> and is used to display all of the data for a chosen entry. This does not change the entry, merely displays all of the data. Also includes a list of data not contained in the entry,
<code>addToEntry.p</code>	This function is called by <code>AnimalDatabase.p</code> and is used to add data to an already extant entry. Cannot edit data already in the entry.
<code>editEntry.p</code>	This function is called by <code>AnimalDatabase.p</code> and is used to edit the data in an already extant entry. Cannot add missing data to an entry.
<code>extract2Ddata.p</code>	This function is called by <code>AnimalDatabase.p</code> and is used to extract data from the database. It sorts the data according to the parameters chosen by the user. Can exclude data based on type or taxonomical class.
<code>create2DPlot.p</code>	This function is called by <code>AnimalDatabase.p</code> and is used to create a 2D plot. This function calls <code>extract2Ddata.p</code> to sort the data. Prompts user for type of plot (linear, semi-log, or log-log).

1.3 Included Data

The data comes from several sources, which were chosen to attempt to get a sufficient diversity of data. This database is not a complete database and should be updated in the future. All of the data was found in tables and copied, by hand, into a database. A few obvious errors in the original (e.g. a misplaced decimal point) were corrected, but there may be unidentified errors. Fortunately the size of the database is large enough that any minor errors should not affect overall trends. One possible source of error is that some sources average data over several animals in the same species while other sources include only individual animals. Furthermore, there is not a way to separate male from female (or sexless in the case for some insects) animals.

To identify the source of the data, a “Source” is listed with a number identifying the source of the data. The numbers refer to the following sources

- [1] Jepsen, G. L., Baker, R. J., Vaughan, T. A., Orr, R. T., Griffin, D. R., Davis, W. H., Rosenbaum, R. M. (1970). *Biology of Bats: Volume I.* (W. A. Wimsatt, Ed.) (1st ed.). New York, New York, USA: Academic Press.
- [2] Greenwalt, C. H. (1962). Dimensional Relationships for Flying Animals. *Smithsonian Miscellaneous Collections*, 144(2), 146. Retrieved from <http://www.biodiversitylibrary.org/item/79674>
- [3] Hazlehurst, G. A., & Rayner, J. M. V. (1992). Flight Characteristics of Triassic and Jurassic Pterosauria: An Appraisal Based on Wing Shape. *Paleobiology*, 18(4), 447-463. Retrieved from <http://www.jstor.org/stable/2400829>
- [4] Norberg, U. M., Allometry of Bat Wings and Legs and Comparison with Bird Wings, *Philosophical Transactions of the Royal Society B: Biological Sciences*, vol. 292, Jun. 1981, pp. 359-398.
- [5] Warham, J., Wing loadings, wing shapes, and flight capabilities of procellariiformes, *New Zealand Journal of Zoology*, vol. 4, Mar. 1977, pp. 73-83.
- [6] Farney, J., and Fleharty, E. D., Aspect Ratio, Loading, Wing Span, and Membrane Areas of Bats, *Journal of Mammalogy*, vol. 50, May 1969, pp. 362-367.

As previously stated, each of these sources were chosen to attempt to increase the diversity of data. The majority of the data comes from Source 2, which was a similarly motivated publication, although, given its publication date, it is not particularly accessible by modern standards.

2 Operation

The purpose of this chapter is to describe how to operate the database. It starts with basic set-up and continues through on interact with the database and extract data and plots from the database. Additionally, it will be demonstrated how to add data to the database.

2.1 Initializing the Database

Before beginning, ensure that all of the files listed in Table 1 are in the current directory. To start the database, enter “AnimalDatabase” into the command window (or run the file any other way) and the following message appears:

```
This is the interface for the animal database. The purpose of this interface is
to enable rapid access and analysis of the animal database, primarily focusing
on plotting the data and discovering trends. Please answer the following questions
for intialization. Please answer "Y" or "N" (without quotes). If something is
entered other than "Y" or "N" the answer is assumed to be "N".
```

You will then be asked a series of questions about initializing the script. These questions are:

```
Do you wish to clear your worksapce (recommened)? (Y/N)
```

```
Do you wish to close your figures (recommened)? (Y/N)
```

```
Do you wish to save changes to the database (NOT recommened)? (Y/N)
```

Respond to these questions by entering “Y” or “N”. If an unrecognized character is entered, the recommended choice is selected, i.e. the workspace is cleared, figures are closed, and changes will not be saved. After the database is initialized, a menu of operations is presented. It should be noted that “saving” refers to saving data to the permanent database, a temporary data structured (called DATA) will be in the workspace after the database is closed, which includes all of the changes that were made while accessing the database.

2.2 Interacting with the Database

The primary means of interacting with the database is by entering numbers corresponding to options in various menus. This section will describe the purpose of every option in the menu.

2.2.1 Main Menu

This menu calls the other functions to perform requested tasks. After the other tasks are complete, you are return to this menu. If you choose not to save changes, the main menu appears as[†]

Please choose from the following options:

- 0: Exit
- 1: Access entry
- 2: Edit entry
- 3: Add data to entry
- 4: Append entry to database
- 5: Extract a 2D dataset
- 6: Create 2D plot

Choose task:

To choose an operation, simply enter the number corresponding the desired operation. When you are done, enter “0” to exit. Upon exit you will receive confirmation that the database was closed successfully (and that data was/wasn’t saved, if applicable).

2.2.2 Access Entry

If the user desires to view a particular entry in the database, he/she will select option “1” at the main menu. This does not allow the editing of the entry, merely access. This presents the user with a prompt asking

Which entry do you wish to access (0 to cancel)?

The number here corresponds to a particular entry in the database. These entries are not sorted in any particular order. If “0” is entered, the user is immediately returned to the main menu. If

[†]If you did choose to save changes to the database, the first option will instead appear as “0: Exit and save. -1 to exit without saving”.

an entry number is entered that is not in the database[‡], the database returns “Selected entry outside of range” and prompts the user to press any key to continue back to the main menu.

When a valid entry is requested, the database returns all of the data in the desired entry, as well as a listing of data not included for the particular entry. For more information about the data, refer to section 1.3. For the sake of example, if the user requests entry “1066” (a house wren) the database will display

Data Summary for entry 1066

ID: 1066
 Source: 2
 Latin Name: Troglodytes a. aedon
 Common Name: House wren
 Sex: m
 Table Number: 14
 Table Comments: Wing length measurements from different sources
 Phylum: Chordata
 Superclass/ Subphylum: Tetrapoda
 Class: Aves
 Order: Passeriformes
 Family: Troglodytidae
 Common Name of Type of Animal: Passerines
 Mass, mg: 11000
 Mass, g: 11
 Wing Length, mm: 50.7
 Wing Length, cm: 5.07
 Wing Area, mm²: 4840
 Wing Area, cm²: 48.4
 Wing Loading, mg/mm²: 2.2727
 Wing Loading, g/cm²: 0.22727

Missing Data:

- Comments
- Suborder/ Subclade
- Wing Model from source 3
- Flight Mode
- Flight Mode (French)
- Primary Food Source
- Wing-beat Rate, Hz
- Hind Wing Length, mm
- Length of both wings, mm
- Length of both wings, cm
- Wing Mass, mg
- Wing Mass, g
- Percent Wing Weight

[‡]As of November 30, 2015, there are 1655 entries.

Moment of Inertia of Wings, mg*mm2
 Wing Span, mm
 Wing Span, cm
 Wing Span, m
 Mass of muscle, mg
 Mass of muscle, g
 Percent Muscle Mass
 Large Pectoral Muscle Mass, g
 Percent Large Pectoral Mass
 Small Pectoral Muscle Mass, g
 Percent Small Pectoral Mass
 Ratio Large/Small Pectoral
 Mass of heart, mg
 Mass of heart, g
 Percent Heart Mass
 Aspect Ratio

Press any key to continue

Press any key to return to the main menu. This operation makes no changes to the database.

2.2.3 Edit Entry

Choosing option "2: Edit entry" at the main menu allows you to access one particular entry for editing. The database will prompt you for the entry number that you want to edit. For example, if "1066" is chosen, the output will database will display

Editing data for entry 1066

This operation is for editing and deleting extant data only. Use the "Add Data to entry" operation to add data to a missing category.

What would you like to edit?

- 1) Source; Current Value: 2
- 2) Latin Name; Current Value: Troglodytes a. aedon
- 3) Common Name; Current Value: House wren
- 4) Sex; Current Value: m
- 5) Table Number; Current Value: 14
- 6) Table Comments; Current Value: Wing length measurements from different sources
- 7) Phylum; Current Value: Chordata
- 8) Superclass/ Subphylum; Current Value: Tetrapoda
- 9) Class; Current Value: Aves
- 10) Order; Current Value: Passeriformes
- 11) Family; Current Value: Troglodytidae
- 12) Common Name of Type of Animal; Current Value: Passerines
- 13) Mass, mg; Current Value: 11000

- 14) Mass, g; Current Value: 11
 - 15) Wing Length, mm; Current Value: 50.7
 - 16) Wing Length, cm; Current Value: 5.07
 - 17) Wing Area, mm²; Current Value: 4840
 - 18) Wing Area, cm²; Current Value: 48.4
 - 19) Wing Loading, mg/mm²; Current Value: 2.2727
 - 20) Wing Loading, g/cm²; Current Value: 0.22727
- Enter number of data you want to edit (0 to exit):

Entering "0" returns to main menu and entering the number corresponding to the value you wish to change brings up the following ("10) Order; Current Value: Passeriformes" is chosen as an example)

Editing "Order"

Entry Instructions:

- 10) Order; Current Value: This is a testChange: Enter a new value (must be same data
- Cancel: Enter 0
- Delete: Enter -1

Current Value: Passeriformes

New Value:

There are three options for entry: if "0" is entered, the entry will not change and you will be back to the editing menu, -1 deletes value[§], and if a value is entered, the new value replaces the old value. For example if "This is a test" is entered at the prompt above, the database will replace "Passeriformes" with "This is a test" and display

What would you like to edit?

- 1) Source; Current Value: 2
- 2) Latin Name; Current Value: Troglodytes a. aedon
- 3) Common Name; Current Value: House wren
- 4) Sex; Current Value: m
- 5) Table Number; Current Value: 14
- 6) Table Comments; Current Value: Wing length measurements from different sources
- 7) Phylum; Current Value: Chordata
- 8) Superclass/ Subphylum; Current Value: Tetrapoda
- 9) Class; Current Value: Aves
- 10) Order; Current Value: This is a test
- 11) Family; Current Value: Troglodytidae
- 12) Common Name of Type of Animal; Current Value: Passerines
- 13) Mass, mg; Current Value: 11000
- 14) Mass, g; Current Value: 11
- 15) Wing Length, mm; Current Value: 50.7
- 16) Wing Length, cm; Current Value: 5.07

[§]One caveat is if the value is deleted, it can no longer be edited. To add a value to the (now nonexistent) entry use the process described in section 2.2.4.

- 17) Wing Area, mm²; Current Value: 4840
 - 18) Wing Area, cm²; Current Value: 48.4
 - 19) Wing Loading, mg/mm²; Current Value: 2.2727
 - 20) Wing Loading, g/cm²; Current Value: 0.22727
- Enter number of data you want to edit (0 to exit):

Notice that the tenth entry not reads "10) Order; Current Value: This is a test". You can continue to edit this entry by repeating the previous process, or you can enter "0" to return to the main menu.

2.2.4 Add data to entry

Choosing option "3: Add data to entry" at the main menu allows data that is currently missing from an entry. For example, if entry "1066" is selected, the following is displayed,

Adding data to entry 1066

This operation is for adding absent data only. Use the "Edit Data" operation to edit or delete extant data in the database. This program will accept either text or numbers.

What would you like to add?

- 1) Comments
- 2) Suborder/ Subclade
- 3) Wing Model from source 3
- 4) Flight Mode
- 5) Flight Mode (French)
- 6) Primary Food Source
- 7) Wing-beat Rate, Hz
- 8) Hind Wing Length, mm
- 9) Length of both wings, mm
- 10) Length of both wings, cm
- 11) Wing Mass, mg
- 12) Wing Mass, g
- 13) Percent Wing Weight
- 14) Moment of Inertia of Wings, mg*mm²
- 15) Wing Span, mm
- 16) Wing Span, cm
- 17) Wing Span, m
- 18) Mass of muscle, mg
- 19) Mass of muscle, g
- 20) Percent Muscle Mass
- 21) Large Pectoral Muscle Mass, g
- 22) Percent Large Pectoral Mass
- 23) Small Pectoral Muscle Mass, g
- 24) Percent Small Pectoral Mass
- 25) Ratio Large/Small Pectoral

26) Mass of heart, mg
 27) Mass of heart, g
 28) Percent Heart Mass
 29) Aspect Ratio
 Select data you want to add (0 to exit):

Selecting one of the missing entries (for example 10) brings up the following menu

Adding "Length of both wings, cm"
 Entry Instructions:
 Add: Enter a new value
 Cancel: Enter 0

New Value:

Entering "0" returns the user to the previous menu and entering a value adds the data to the database[¶]. For example, if "100" is entered, the database returns

What would you like to add?
 1) Comments
 2) Suborder/ Subclade
 3) Wing Model from source 3
 4) Flight Mode
 5) Flight Mode (French)
 6) Primary Food Source
 7) Wing-beat Rate, Hz
 8) Hind Wing Length, mm
 9) Length of both wings, mm
 10) Wing Mass, mg
 11) Wing Mass, g
 12) Percent Wing Weight
 13) Moment of Inertia of Wings, mg*mm2
 14) Wing Span, mm
 15) Wing Span, cm
 16) Wing Span, m
 17) Mass of muscle, mg
 18) Mass of muscle, g
 19) Percent Muscle Mass
 20) Large Pectoral Muscle Mass, g
 21) Percent Large Pectoral Mass
 22) Small Pectoral Muscle Mass, g
 23) Percent Small Pectoral Mass
 24) Ratio Large/Small Pectoral
 25) Mass of heart, mg

[¶]This accepts both strings and numbers. It is highly recommended that you only enter numbers where appropriate. Failure to do so may lead to errors when plotting or extracting data.

26) Mass of heart, g
27) Percent Heart Mass
28) Aspect Ratio
Select data you want to add (0 to exit):

Notice that option 10 is now “10) Wing Mass, mg” and the option “Length of both wings, cm” is no longer present. The value entered can now be accessed or edited as previously described^{||}.

2.2.5 Append entry to database

Choosing option 4 adds a new entry to the database. This entry will be added to the end of the database. Selecting this operation brings up the following menu

This function will append a new entry to the database. This entry can either be left blank or populated with data. In either case, the entry can be edited later using the other database tools.

Options:

- 0) Cancel
- 1) Create blank entry
- 2) Create and populate entry

What would you like to do?

Enter “0” to return to the main menu, “1” to append a new entry to the end of the database, but return to the main menu without populating it^{**}, and “2” creates a new entry and immediately redirects the user to the “Add data to Entry” operation^{††}.

2.2.6 Extract a 2D dataset

Selecting the option “5: Extract a 2D dataset” will extract a set of data from the database that will be sorted as the user desires there are many options on selecting and categorizing data. The data will be appended data structure under a new category called “extracted”. Selecting “5” from the main menu brings up the following menu

Extracting a 2D dataset.

What 2D dataset do you wish to extract?

- 1) Wing-beat Rate, Hz
- 2) Mass, mg
- 3) Mass, g

^{||}See sections [2.2.2](#) and [2.2.3](#), respectively.

^{**}Data can be added to this entry later using the method describe in section [2.2.4](#).

^{††}See section [2.2.4](#) for instructions on how to add data this entry.

- 4) Wing Length, mm
 - 5) Wing Length, cm
 - 6) Hind Wing Length, mm
 - 7) Length of both wings, mm
 - 8) Length of both wings, cm
 - 9) Wing Area, mm²
 - 10) Wing Area, cm²
 - 11) Wing Mass, mg
 - 12) Wing Mass, g
 - 13) Percent Wing Weight
 - 14) Moment of Inertia of Wings, mg*mm²
 - 15) Wing Span, mm
 - 16) Wing Span, cm
 - 17) Wing Span, m
 - 18) Mass of muscle, mg
 - 19) Mass of muscle, g
 - 20) Percent Muscle Mass
 - 21) Large Pectoral Muscle Mass, g
 - 22) Percent Large Pectoral Mass
 - 23) Small Pectoral Muscle Mass, g
 - 24) Percent Small Pectoral Mass
 - 25) Ratio Large/Small Pectoral
 - 26) Mass of heart, mg
 - 27) Mass of heart, g
 - 28) Percent Heart Mass
 - 29) Aspect Ratio
 - 30) Wing Loading, mg/mm²
 - 31) Wing Loading, g/cm²
- Desired x data:

The user first chooses what data will be on the x-axis (option "2" is chosen in this example), which brings up the following prompt

Desired y data:

The user will now enter what number corresponding to the data on the y-axis (option "4" is chosen for this example). The program will extract the 2D data automatically and return a menu similar to

Collecting Data. This may take a few moments.

Collection Complete. There are 997 entries with the desired data.

How would you like to categorize the data?

- 0) Cancel (and exit)
- 1) Do not categorize
- 2) Class (e.g. avians or insects)

3) Type (e.g. butterflies or albatrosses)

Enter the number corresponding to the desired categorization:

Notice that it informs the user of the number of data points that include the requisite data. This prompt is asking the user how they want data categorized, which will determine what is include in the legend. For this example, option “2” is selected. This brings up the following prompt

Do you wish to exclude data based on class? (Y/N)

If the user enters “Y”, they will be prompted with all of the classes included in the extracted data and ask whether they want to be included. For this example, only insects, birds, and bats will be included, which is done through the following inputs

Do you wish to exclude data based on class? (Y/N) Y

For the following classes enter 1 to include or 0 to exclude.

Insecta: 1

Mammalia: 1

Actinopterygii: 0

Aves: 1

Notice that the user is not asked whether to include reptiles (pterosaurs) because the database does not include reptiles with the requisite data. They user is then prompted if they wish to exclude data based on type by the prompt

Do you wish to exclude data based on type? (Y/N)

For this example, I will not exclude based on type, but the process is identical to excluding data based on type.

The data is now extracted and the user is prompted to enter any key to return to the main menu. It should be noted that there is not any data return to the user through this operation, nor is there a plot a generated. The change appears in the data structure itself. A new entry in the structure is created, which contains all of the extracted datasets as part of a cell array of separated data structures. This data can then be used offline for further analysis. Accessing the structure displays (for the options chosen previously) yield

```
xDataLabel: 'Mass, mg'
           yDataLabel: 'Wing Length, mm'
categorizationCriteria: 'Class'
           Classes: [1x1 struct]
           Types: [1x1 struct]
           all: [1x1 struct]
           grouped: {[1x1 struct] [1x1 struct] [1x1 struct]}
```

where “Classes” and “Types” contains lists of all of the included and excluded classes and types, respectively, “all” contains arrays of the chosen x and y data along with lists of the class and type of each data entry, and “grouped” contains separate data structures for each of the included categories. The “grouped” data structures include a string identifying the categorization as well as arrays containing the desired x and y data.

2.2.7 Create a 2D plot

Selecting the option “6: Create 2D plot” will create a plot with user selected data. This operation utilizes the same structure as extracting a 2D dataset, described in section 2.2.6. Entering “6” brings up the following menu

This operation creates a 2D plot of user selected data. Using this operation, the user chooses what data to categorize the data by and MATLAB will separate and plot the chosen data.

Extracting a 2D dataset.

What 2D dataset do you wish to extract?

- 1) Wing-beat Rate, Hz
- 2) Mass, mg
- 3) Mass, g
- 4) Wing Length, mm
- 5) Wing Length, cm
- 6) Hind Wing Length, mm
- 7) Length of both wings, mm
- 8) Length of both wings, cm
- 9) Wing Area, mm²
- 10) Wing Area, cm²
- 11) Wing Mass, mg
- 12) Wing Mass, g
- 13) Percent Wing Weight
- 14) Moment of Inertia of Wings, mg*mm²
- 15) Wing Span, mm
- 16) Wing Span, cm
- 17) Wing Span, m
- 18) Mass of muscle, mg
- 19) Mass of muscle, g
- 20) Percent Muscle Mass
- 21) Large Pectoral Muscle Mass, g
- 22) Percent Large Pectoral Mass
- 23) Small Pectoral Muscle Mass, g
- 24) Percent Small Pectoral Mass
- 25) Ratio Large/Small Pectoral
- 26) Mass of heart, mg
- 27) Mass of heart, g
- 28) Percent Heart Mass
- 29) Aspect Ratio
- 30) Wing Loading, mg/mm²
- 31) Wing Loading, g/cm²

Desired x data:

The user first chooses what data will be on the x-axis (option “2” is chosen in this example), which brings up the following prompt

Desired y data:

The user will now enter what number corresponding to the data on the y-axis (option “4” is chosen for this example). The program will extract the 2D data automatically and return a menu similar to

Collecting Data. This may take a few moments.

Collection Complete. There are 997 entries with the desired data.

How would you like to categorize the data?

- 0) Cancel (and exit)
- 1) Do not categorize
- 2) Class (e.g. avians or insects)
- 3) Type (e.g. butterflies or albatrosses)

Enter the number corresponding to the desired categorization:

Notice that it informs the user of the number of data points that include the requisite data. This prompt is asking the user how they want data categorized, which will determine what is include in the legend. For this example, option “2” is selected. This brings up the following prompt

Do you wish to exclude data based on class? (Y/N)

If the user enters “Y”, they will be prompted with all of the classes included in the extracted data and ask whether they want to be included. For this example, only insects, birds, and bats will be included, which is done through the following inputs

Do you wish to exclude data based on class? (Y/N) Y

For the following classes enter 1 to include or 0 to exclude.

Insecta: 1

Mammalia: 1

Actinopterygii: 0

Aves: 1

Notice that the user is not asked whether to include reptiles (pterosaurs) because the database does not include reptiles with the requisite data. They user is then prompted if they wish to exclude data based on type by the prompt

Do you wish to exclude data based on type? (Y/N)

For this example, I will not exclude based on type, but the process is identical to excluding data based on type. Now that the final dataset has been extracted, a plot can be made. The user is prompted what type of plot they wish to generate with the following prompt

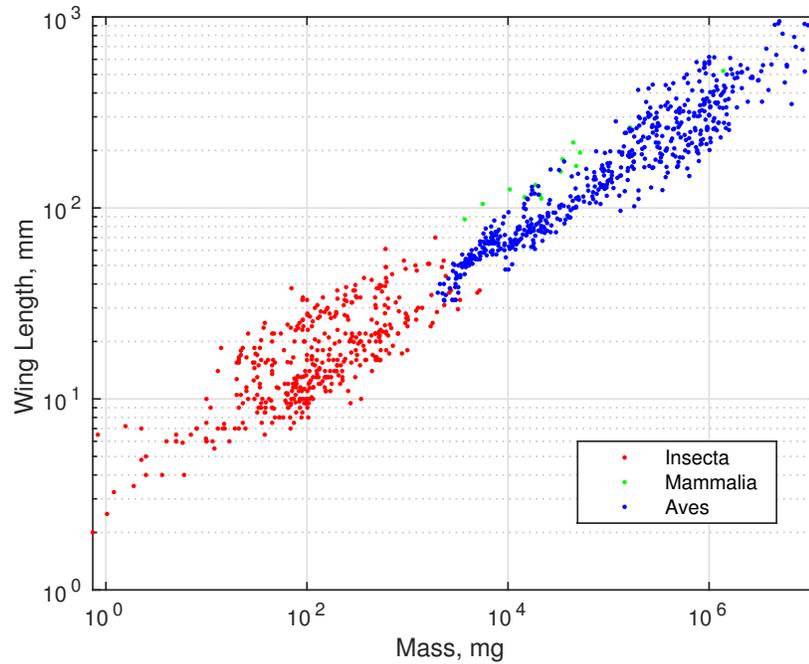


Figure 1: An example plot made by the animal database.

What type of plot do you wish to create?

- 1) Linear
- 2) Semi-Log x
- 3) Semi-Log y
- 4) Log-Log

Plot type:

For this example, option “4” (a log-log) plot is chosen. This generates the following plot shown in figure 1.

3 Known Issues

The following is a list of known issues as of November 30, 2015.

Issue	Solution/Work Around	Status
Entering a value of “0” or “-1” not possible while editing the data in an entry	No solution proposed, limitation of structure of database. This is not considered to be an important issue as the physical parameters cannot have values of “-1” or “0”, so the only concern is that such a value may want to be entered as a comment. Simply adding comma (or any other character) after the value will allow it to be entered.	No planned change
When excluding by class or type, if all data is excluded, the program will crash. Any changes will be lost.	No solution. A try catch structure may be added in a future release to improve error handling. Since this operation is not part of normal operation, it is not a major issue.	Solution known. Will be implemented in the future.

References

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