

Omnibat User Guide

version 0.94

About Omnibat

Omnibat is a multi-purpose tool for analyzing large volumes of bat recordings. Omnibat can browse through a large dataset of bat recordings, automatically determining which species are found within each file. But as with all automatic systems, Omnibat can make mistakes and therefore the user is able view the datafiles and assign correct species labels where Omnibat has made an incorrect decision. Omnibat can also be used solely for manual analysis operations.

One of the really great things with Omnibat is that the information about what recording contains which species is managed inside Omnibat. No more Alt-tabbing. The species information is saved when you exit the Omnibat.

Omnibat helps you arrange your data in a practical way, to store metadata about specific sites, and to process data across several variables. When you have finished analysing your data Omnibat provides reports for use in a spreadsheet software or as a html report.

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Installing Omnibat

Omnibat is developed for PC, Linux and Mac OS X but is currently only available for PC and Linux.

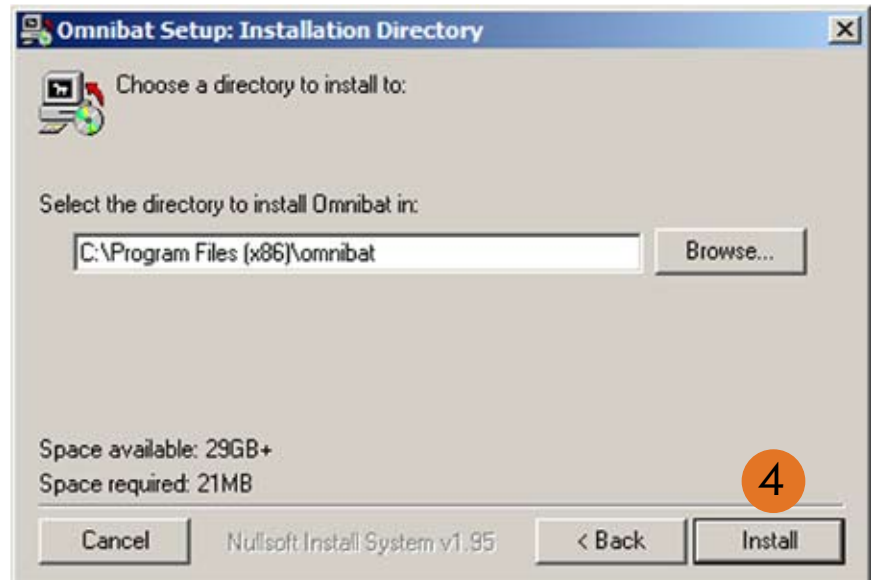
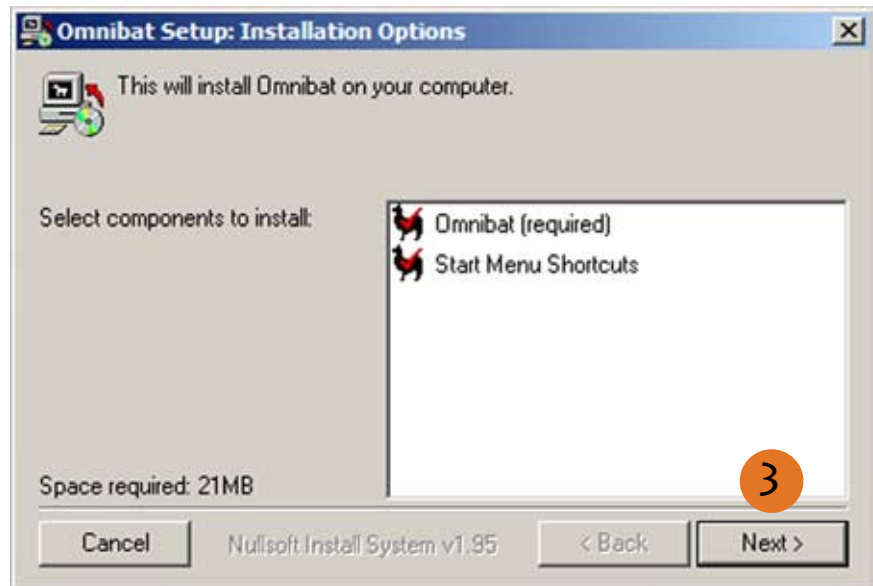
Order

To order Omnibat navigate to:
www.omnibat.se/order.htm

Installation for PC

Omnibat works with windows XP/Vista/Windows 7. Installation details may vary depending on your operating system.

1. Go to the Omnibat website and download Omnibat: www.omnibat.se/download.htm
2. Save the file on your harddrive and then doubleclick the installation file.
3. Click next
4. Agree with the default installation path or change according to your needs. Click Install.
5. Omnibat will now be installed on your hard drive at the designated path.
6. Start Omnibat with the Omnibat icon that will appear on your desktop after installation.
7. Enter your licence number



Process overview

Input data

Omnibat supports all full spectrum recordings and automatically transforms the recorded file to a suitable frequency and time. No changes are made to the original file in this process.

Time expanded recordings should be at x10 time expansion. If the files have been recorded at very high frequency Omnibat automatically converts the recordings to 10x time expansion.

Supported file formats

Omnibat supports most common file formats:

- Mp3
- Wav
- Ogg
- Flac
- Aiff
- Pettersson D500x internal Wav
- And a few others

Supported species

The official species databases cover the following species:

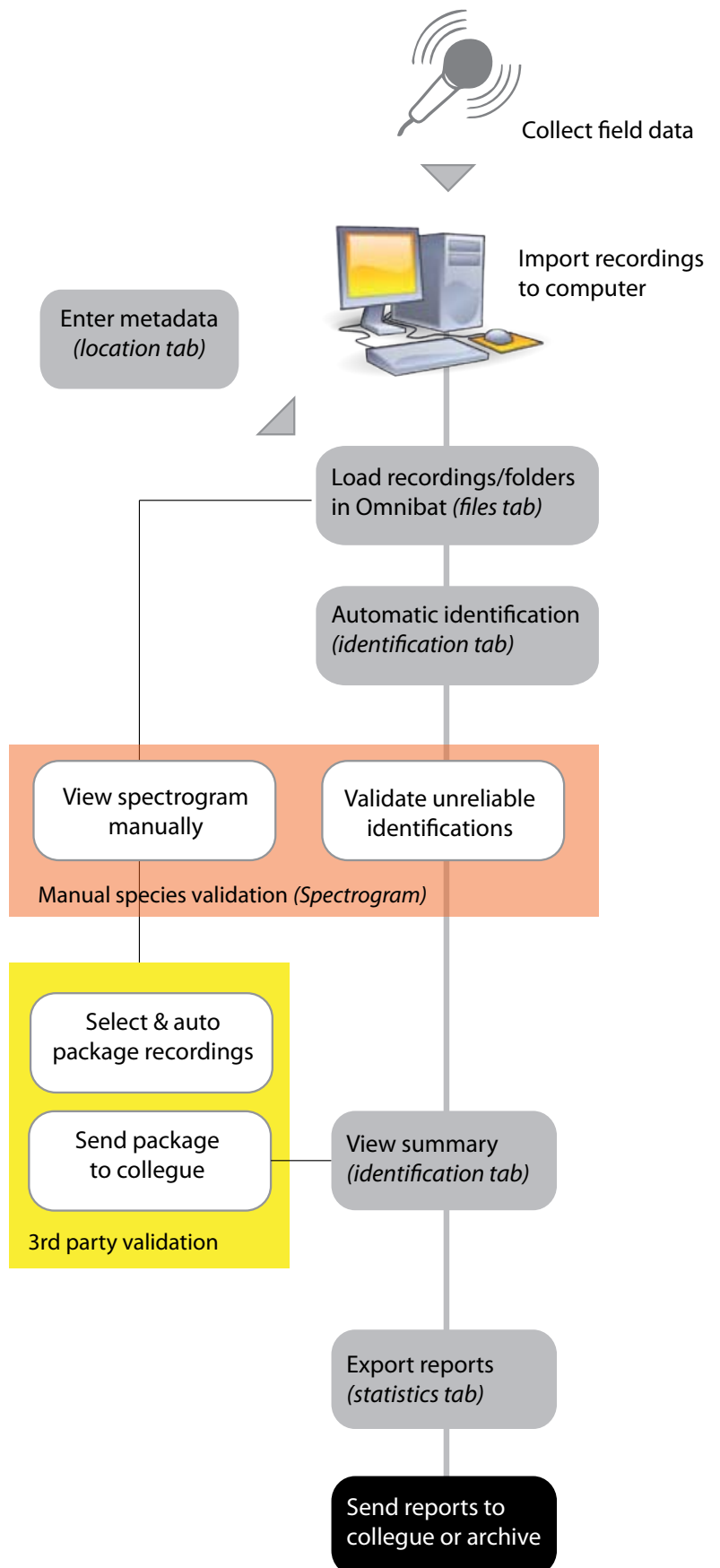
- Pipistrellus pygmaeus
- Pipistrellus pipistrellus
- Pipistrellus nathusii
- Nyctalus noctula
- Plecotus auritus
- Barbastella barbastellus
- Eptesicus serotinus
- Eptesicus nilssonii

Databases in development

- Nyctalus leislerii
- Vespertilio murinus

Automatic database updates

When Omnibat is run the software automatically tries to update the species databases. The automatic update requires an internet connection.



Quickstart

After installation, the Omnibat icon that will appear on your desktop. Double click the icon to run Omnibat.

The first time you start Omnibat you will be required to enter your licence key.

Omnibat will now try to update the species databases. This process requires an internet connection. Update time will vary depending on the speed of your Internet connection.

After the databases have updated they will load into memory. This may take a few seconds up to a minute depending on your computer speed.

The summary

When Omnibat has finished loading you will see a summary (figure 1). Since no recordings are loaded into memory at this stage the screen will be blank.

To load some recordings press the Files tab (figure 2) at the top of the window, then click on the text “Load new directories”. You can now browse to the folders containing bat recordings that you wish to analyse. To load the sounds press enter or press OK at the bottom of the window (figure 3).

Now press the Identification tab to get back to the summary. If the files in the folders you loaded have already been identified with Omnibat you will now see that the figures in the summary has been updated. If the files had not previously been identified you have two options.

Automatic identification

The first option is to use the automatic identification function in Omnibat. Omnibat will then go through all the loaded files and “match” them against a database containing reference sounds. This may take some time depending on the number of files and the speed of your computer. You can always cancel the automatic identification by pressing cancel or hitting the esc key.

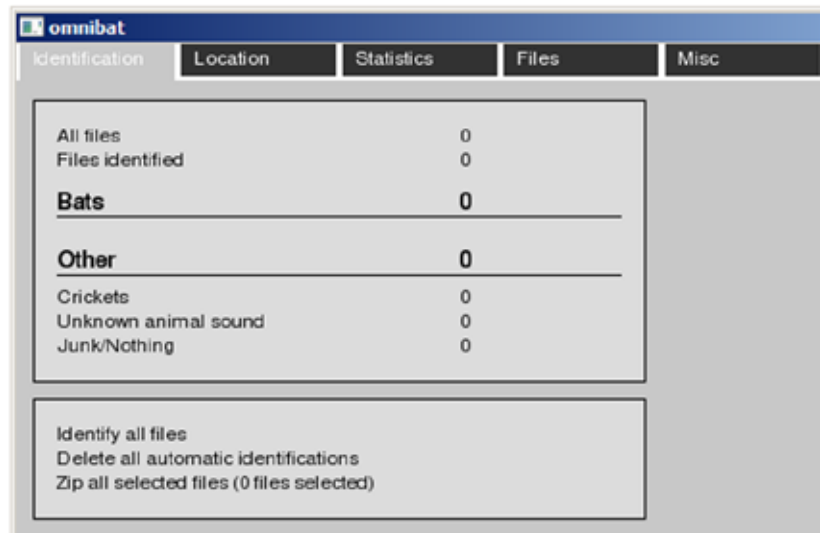


Figure 1. The summary on the identification tab is displayed at startup.

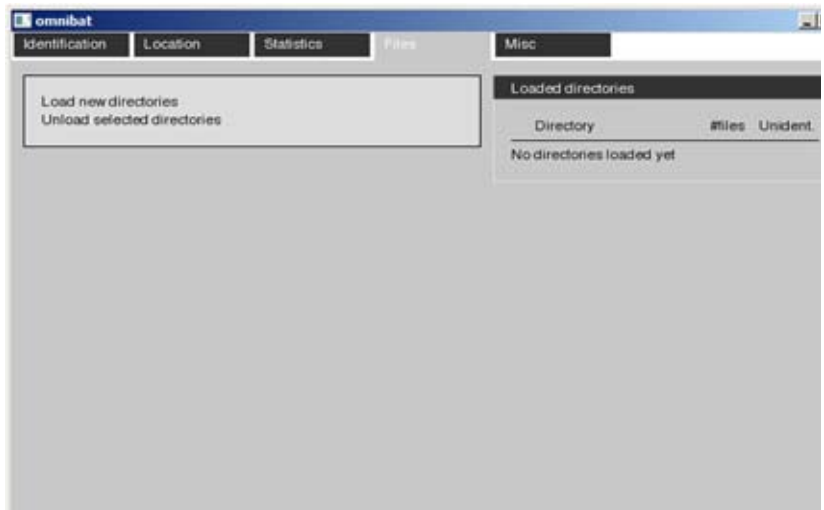


Figure 2. The files tab is where you load and unload files.

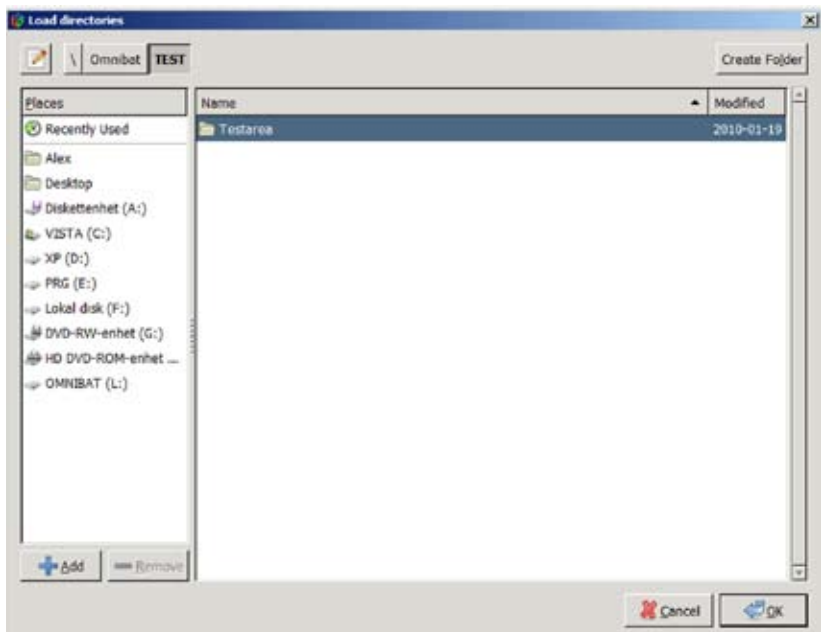


Figure 3. In the file browser you select files and/or folders to load in Omnibat.

Manual identification

The second option is to view the loaded sounds manually. Just press the text “All files” at the top left of the screen, and all the loaded files will appear in the right section. Then click on a file with the left mouse button to go to the spectrogram of that file.

The spectrogram

You can move to the next file by pressing n and to the previous file by pressing b.

TIP: Holding down shift when pressing n or b makes you jump 10 files ahead or back.

From here on you can explore on your own or read about the details in Omnibat below.

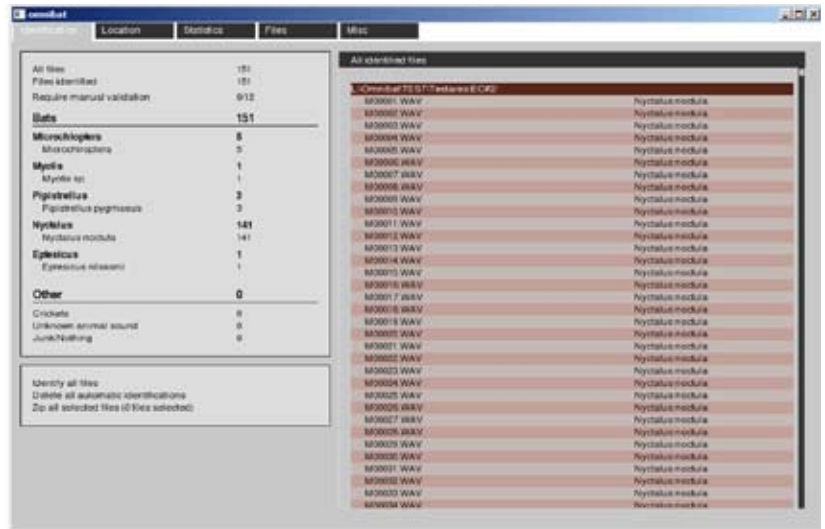


Figure 4. The result of running the automatic identification, clicking on a species name or view all files. The file list is filtered depending on which category you choose. Clicking on a file to the right will take you to the spectrogram of that file.

Tabs in Omnibat

Omnibat is divided into five different thematic tabs. You can switch between the tabs by clicking on the tab name at the top of the window.

The Identification tab displays information of files that have been identified automatically or manually. In the summary to the left is an overview of identified species and the number of species found. To the right is a list that displays the individual files within a selected category. Clicking of a filename brings up the the spectrogram of that file.

On the identification tab you can also begin and stop the automatic identification and export reports and selecte files.

The location tab keeps track of metadata about the sites where you have recorded your files. On this tab you can input information such as project name, coordinates and information about the habitat where the recording took place. You can also add images. The data entered in the location tab is used to generate statistics on the statistics tab.

The statistics tab provides a quick overview of the numer of species found at different sites, the activity in different biotopes (provided you have entered metadata under the location tab for the recording sites) and hourly over the night. This is the tab you use when you want to drill down into the data while making an initial analysis of abundance patterns.

The files tab is where you load and unload files and folders. To be able to run the automatic identification or to view files manually they first have to be loaded in Omnibat. In this respect Omnibat works like any other software, with the difference that you usually load a lot of files/ folders at the same time.

In the misc tab your change setting for how Omnibat operates and is displayed.

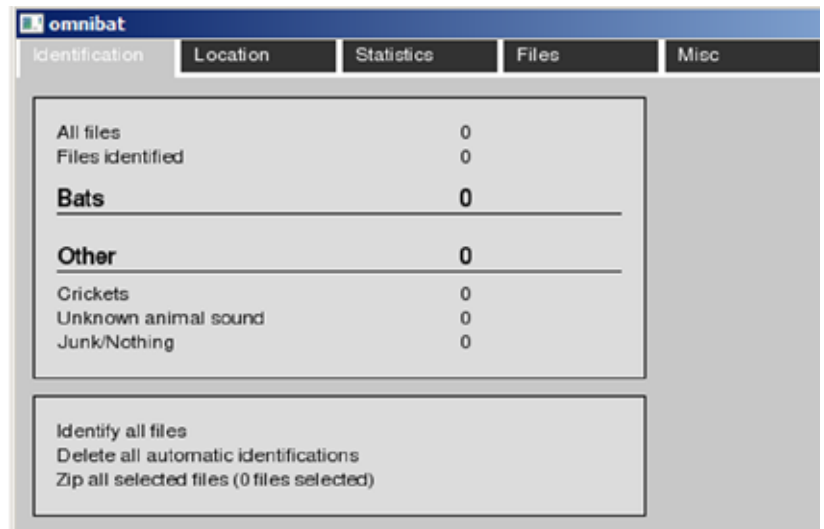


Figure 5. Omnibat has five tabs.

The spectrogram

If you are new to Omnibat and have not read the Quickstart section above you should do this before you continue. It explains how you load your soundfiles and move to the spectrogram of a recording.

Zooming and moving around

Omnibat has two zoom modes. In the default zoom mode the entire recording is visible. The other zoom mode is more detailed. You switch between the two modes by left and right clicking with the mouse on the upper part of the screen, in the time-amplitude graph. The white line in the time-amplitude graph represents the midpoint of the spectrogram in view below.

In the zoomed in mode you can pan the view by using the left and right arrowkeys or by holding down the left mouse button on the time-amplitude plot and moving left or right.

Playing a sound

To play the sound press space. To stop the playback press space again. To play the sound in real-time (that is 10-times faster) press CTRL+space.

Basic measurements

Pressing the left mouse button anywhere on the spectrogram will display the frequency on the selected coordinate, x_1, y_1 . Pressing the right mouse button (to the right of the first point) places another coordinate, displaying the frequency at x_2, y_2 . Together the lines of the coordinates forms a box, the length of which is indicated on top by a value in milliseconds (ms). In the same manner the frequency range is indicated to the right.

The selection tool is useful when measuring individual pulses, distance between pulses and pulse intervals. The maximum amplitude in the selected area is indicated by a thin horizontal line. The frequency at maximum amplitude is visible to the right of this line.

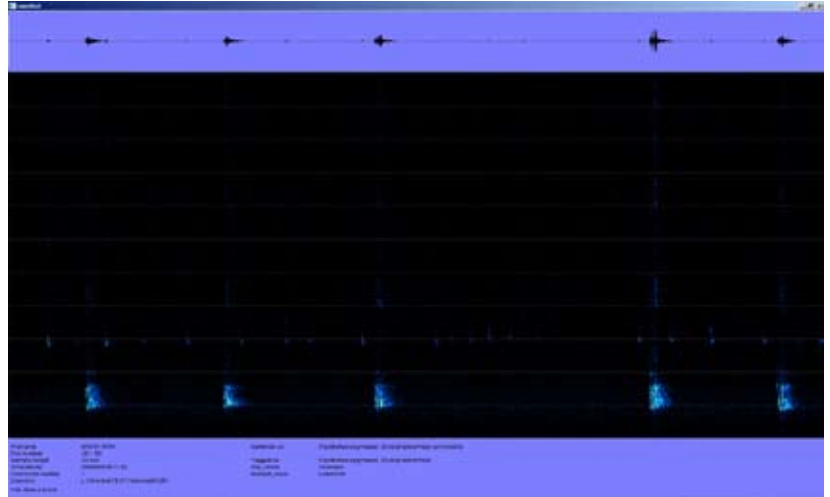


Figure 6. Basic spectrogram overview. Initially the recording is displayed in full length. You can zoom in by clicking with the mouse in the upper section (the oscillogram). To zoom out again click with the right mouse button in the same area.

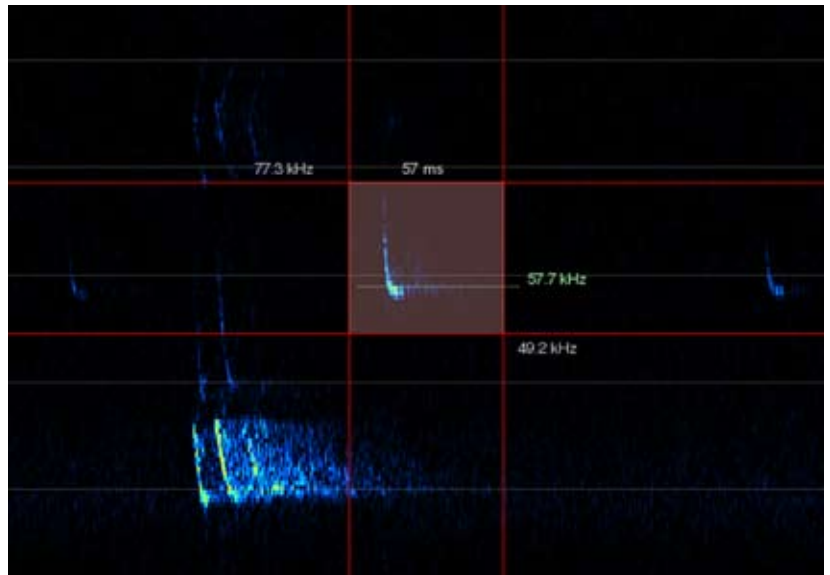


Figure 7. Closeup of a portion of a recording where the selection tool is used for making measurements. The thin line in the middle displays the amplitude maximum within the selected area. The line only appears if there is a clear amplitude maximum. Should the line not appear try changing the selection area. To clear a selection press "a".

Pulse interval measurement

Make a box around the area (using the selection tool outlined above) where you wish to measure pulse intervals. Preferably the area should include at least a few pulses and as little noise as possible. Make sure the thin horizontal line appear, that shows where the maximum amplitude is. When you are done, press y.

Omnibat will now place yellow vertical lines on the bat pulses. You can also add yellow vertical lines manually by holding down control and clicking with the left mouse button where you wish to set the line.

Once you have set the lines pressing i will bring up a pulse space graph. For a numerical result, press the text “View detailed result” below. The default categories of the graph are set to 20ms, but this is possible to change in the preferences tab.

File data

The bottom of the window displays the filename, the file number, number of loaded directories, the current directory and the sample length (time-expanded). A timestamp is also shown. Omnibat retrieves the creation date and time for the file. In some cases this information can change, due to copying or editing the file. For files where the date and time are saved separately – inside the file – the timestamp is always correct and do not change when the file is copied.

To prevent that the wrong date/time is used due to copying and editing, it is possible to disable the timestamps that are not from inside the file.

Navigating between recordings

To skip to the next file press n. To go back to the previous file press b. To jump 10 files ahead or back. Hold down the shift key while pressing b or n. To jump to a different folder, hit g, select the appropriate folder and press OK.

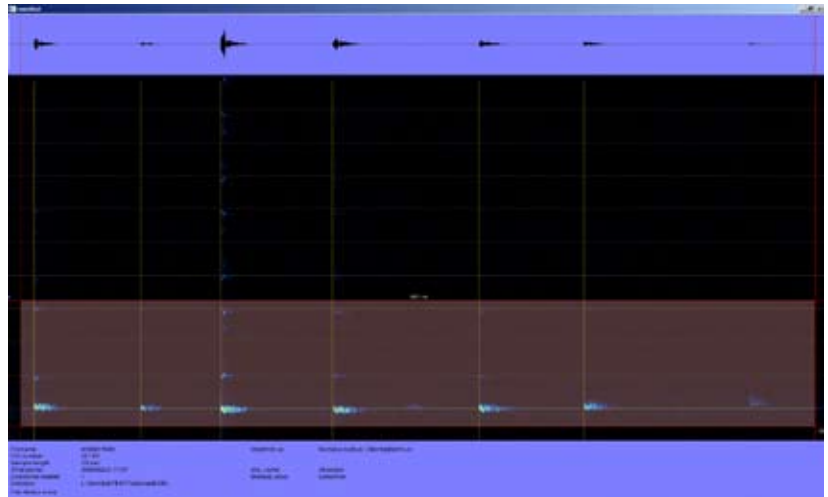


Figure 7. Using the automatic pulse interval measurement tool. A selection has been made that displays the mean amplitude maximum within the selected area. Pressing “i” brings up the pulse interval graph.

Filename	M00023.WAV
File number	23 / 203
Sample length	3.0 sec
Time stamp	20090620 22:52:08
Directories loaded	1
Directory	C:\Users\Alex\Desktop\tmpob\Box_A\
Filter Mode (z to exit)	

Figure 8. File data for the current recording.

Match and Tag information

If the file has been matched against the database the identification result will appear after the text: “Identified as”. Omnibat can (so far) only identify one species within the same file. If the file has not yet been matched, the text “Not identified yet” will appear. You can match this file – right now – by hitting the key m.

Currently, if there are multiple bat species within a recording, Omnibat identifies the recording as the species with the highest match score. To complement Omnibat you can tag the file with additional species, see below.

The automatically matched file can become unreliable for a number of reasons. Unreliable files will appear on the identification tab with red numbers, indicating that the files should be validated manually. To correct a faulty match by Omnibat, or an unreliable match, press the key t (as in tag). You can now choose between a number of species. It is possible to tag several species in one recording. The tag list contains all European and American bat species. You can remove and add species to displayed in the preferences tab.

After a file has been tagged it is considered to have been user validated and the red text “unreliable” will disappear. The text “unreliable” will remain in parenthesis after the identification to display that the database did not contain sufficient information to classify the recording. Tagging a file will override automatic matches.

Spectrogram settings

You can turn on and off gridlines, set the grid space, alter the maximum frequency and other options on the preferences tab.

Hotkey	Function
<i>Navigation</i>	
n	Next (moves to next recording)
b	Back (moves to previous recording)
N	Jump 10 files ahead
B	Jump 10 files back
g	Goto specific folder
<i>Playing recordings</i>	
Space	Play recording from beginning. (time expanded). Pressing SPACE again cancels the playback
SHIFT+Space	Play recording from beginning of selection
CTRL+Space	Play recording in real time (not time expanded)
<i>Selection & measurement</i>	
a	Deselect all selections
Left mouse	Place upper left crosshair coordinate
Right mouse	Place lower right crosshair coordinate
i	Use automatic pulse interval tool (requires a selection around the relevant area)
CTRL+i	Place manual pulse interval measurement point
<i>Matching</i>	
m	Match the file in the spectrogram against the database
r	Display the match results
<i>Tagging (manual validation)</i>	
t	Tag the current file by selecting species from a menu
CTRL+<	Tag the file with previous choice
CTRL+x	Tag file as junk
CTRL+y	Tag file as unknown animal sound
CTRL+a-y	Tag file as a bat species (quicker than the menu option)
CTRL+c	Clear current tags in the recording
<i>Database</i>	
d	Display database content / reload database
f	Enable filter. This is basically the data that will input into the database, when adding recordings.
<i>Miscellaneous</i>	
F5	Run external sound editor (you first have to set path to the software in the preferences dialogue).
F10	Preferences dialogue
esc	Cancel or return to the identification screen

Identification tab

Clicking on the Identification tab in the upper part on the Omnibat window will bring up the identification view. This is your overview of which recordings contain which species.

Overview

The left part of the screen is a summary. If you have not loaded any sounds or if the sounds have not yet been matched, this view will contain little information. At the top of the summary you will see the number of loaded files, how many of these have been identified (by either matching or tagging) and how many are in need on manual validation (considered unreliable by Omnibat).

Automatic identification

If you have a lot of unidentified files, the first thing to do is usually to click on the text “Identify all files” at the bottom of the screen. Omnibat will then start going through all unidentified files and match them against the database. As Omnibat works its way through your recordings you will see how the summary continually updates to reflect which species have been found. You can always abort the automatic identification process by clicking on the text “cancel” or hitting the escape key.

The speed of the automatic matching process is highly dependent on your hardware. On an older computer with little RAM or a slow CPU the automatic matching may be a slow process. For further information, see the section about hardware requirements.

Summary

When Omnibat has matched a folder you will find that the summary is updated. It now – most likely – contains at least one or several bat species. Unless you canceled the matching process you will find that “Identified files” now equals “All files”. You will also see how many files have been considered as unreliable – and ac-

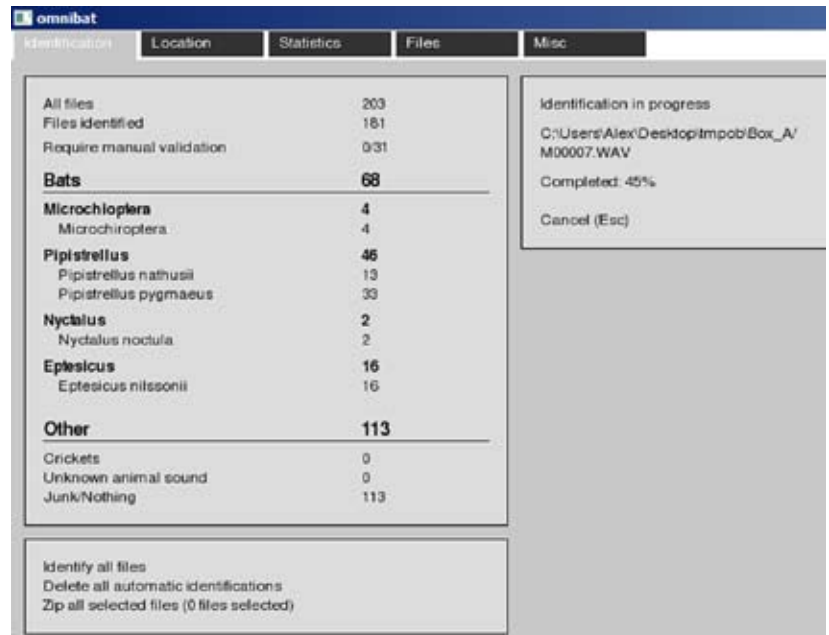


Figure 9. Automatic identification in progress. The summary is updated continuously. Red figures represent matches that are unreliable and should be manually validated. Click on a species name in the summary to browse the files for that species in the spectrogram view.

ording to Omnibat need further validation. Within each subgroup the unreliable files are indicated with red numbers. To browse all unreliable files, click the text “Require further validation”. To the right you will now see a list of relevant files. To jump to the spectrogram of a recording, just click on the row of that file. To return to the Identification tab hit esc or click on the Identification tab. If you wish to continue and manually validate the unreliable files, read on under the heading: The spectrogram view.

Browsing categories

We are now back at the Identification tab, looking again at the summary. In the same way as when we clicked the “Require manual validation”-text and could browse just those files, clicking on any subcategory e.g a species, will display the recordings within this category in a list to the right. To view the individual recordings within a category, just click on the first filename to move to the spectrogram, and use the keys n and b on the keyboard to move to the next or the previous recording.

The files tab

Clicking on the Files tab in the upper part of the Omnibat window will bring up the file manager. This is where you load and unload the folders that you wish to analyze.

To load some recordings press the files tab at the top of the window, then click on the text "Load new directories". You can now browse to the folders containing bat recordings that you wish to analyse. To select a folder click on name of the folder with the left mouse button. To select several folders hold down shift while clicking on the names. To load the sounds press enter or press OK at the bottom of the window. It is also possible to unload folders if they are not needed anymore. Just select the folders by clicking on the names and click on the text "Unload selected directories".

It is also possible to load sounds in Omnibat by drag and drop. This way you can start Omnibat by dragging a folder (or a single file) to the Omnibat icon. Omnibat will start with the selected folders/files loaded.

When a folder has been loaded Omnibat displays the number of files in that folder and also the number of unidentified files. An unidentified file has neither been tagged or matched.



Figure 10. The files tab is your overview of the files and folders you are working with. All operations in Omnibat, e.g the automatic matching of all files, will only affect files or folders previously loaded. If you have a lot of files loaded the automatic matching can take a lot of time. Try unloading a few less prioritised folders to speed up the matching of the important ones.

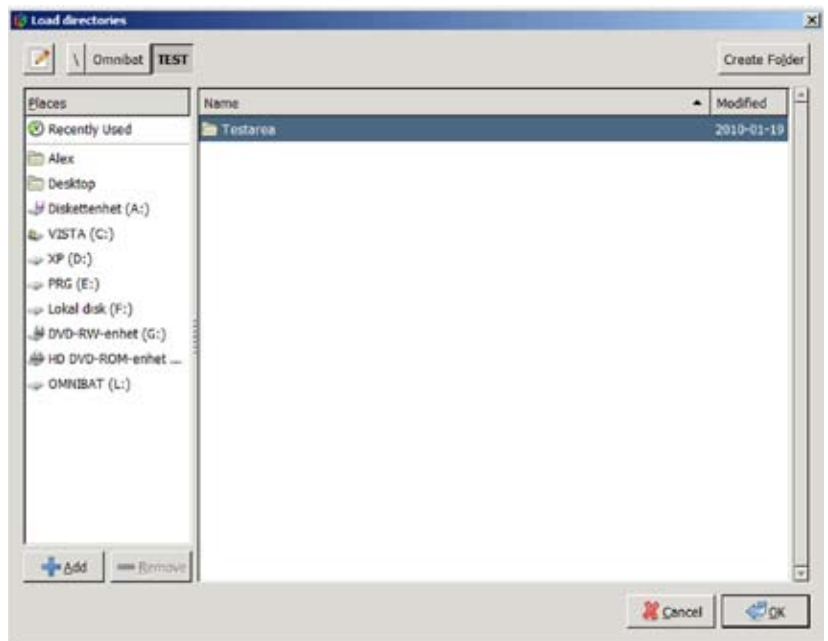


Figure 11. The browser helps you load files and folders. Click the folder you wish to load and then press OK. To select several files or folders hold down SHIFT or CTRL while clicking.

The location tab

Clicking on the location tab in the upper part on the Omnibat window will bring up the location view. This is the area where you manage your data about the survey sites. Omnibat is primarily developed for handling large volumes of recordings, likely produced by use of automated recording equipment. The location tab reflects this.

To the left on the location tab is a list of currently loaded folders. Clicking on a folder will bring up metadata for that site. You can edit the metadata by simply clicking in the table with the mouse.

Adding metadata is optional but can help you keep track of the conditions under which the recordings were made. Classifying the biotope is very useful since the `biotope_class` is used in the statistics tab to analyse activity across several

datasets. This enables you to quickly assess the bat activity for different biotopes. Of course bat activity is not the same thing as abundance, since many factors affect activity patterns.

Metadata is saved in a texfile called “location.info” in the folder containing the recordings. If the location.info file is placed in a parent folder containing many sub folders, all the subfolders inherit the metadata settings of the parentfolder. Data in the location.info file in a subfolder has precedence over data in the corresponding file in the parentfolder.

Images can currently only be added by writing the pathname to the image in the image metadata row. Metadata is only displayed for folders that has previously been added to memory. To load or unload folders or recordings, go to the files tab.

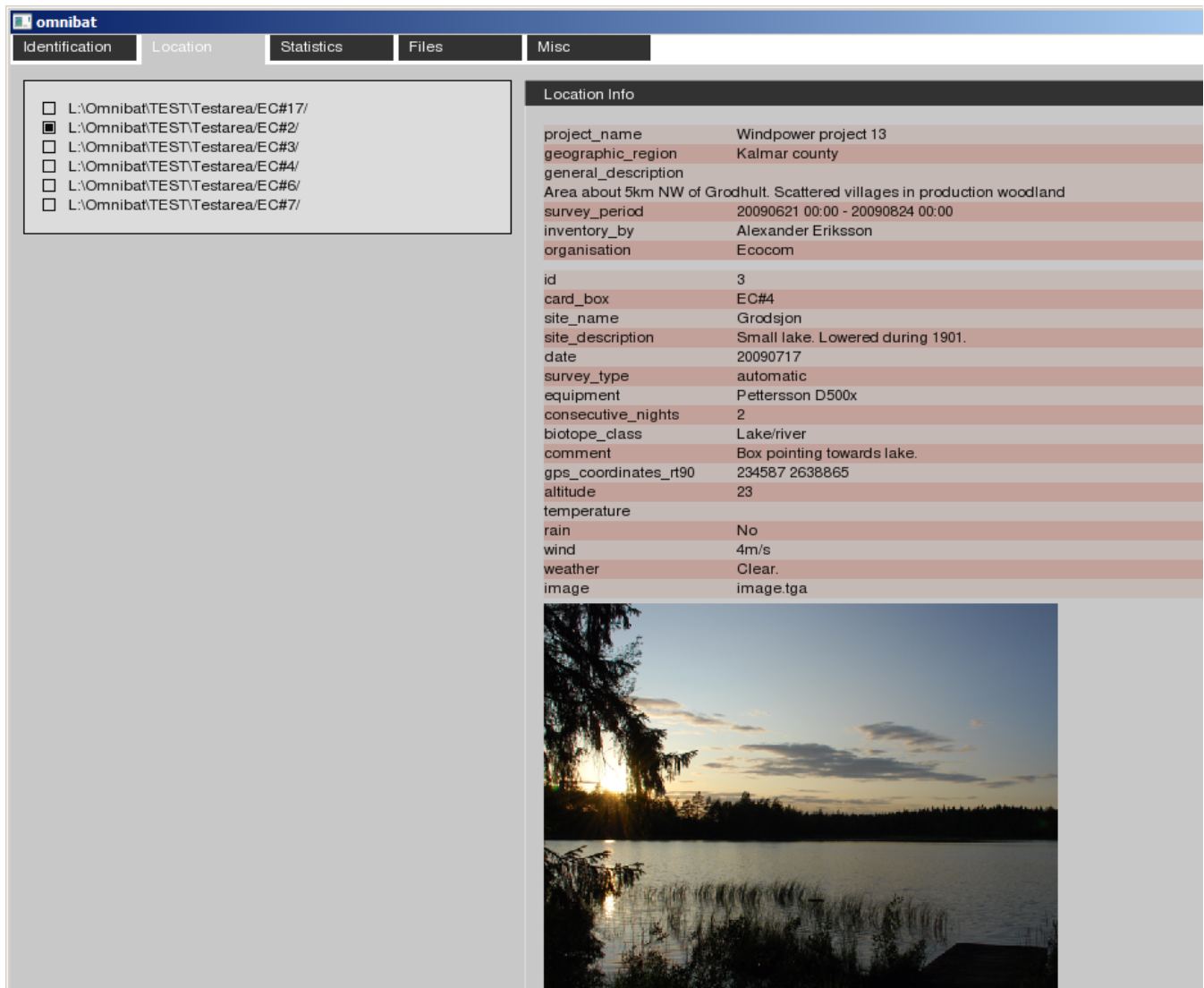


Figure 12. Adding metadata enables you to save information about the site where the recordings were made.

The statistics tab

Clicking on the statistics tab in the upper part on the Omnibat window will bring up the statistics view.

The statistics tab provides basic tools for analysing your data. You can quickly merge data for different sites and make an initial analysis across habitats and view temporal activity distribution.

The statistics tab is not intended to give an in-depth analysis, but provides export functions as tab delimited data (for further use with e.g spreadsheet software) and html.

In the upper left section the folders that have previously been loaded into memory can be selected and deselected. To load additional folders go to the files tab.

In the lower left part the it is possible to select

which species are to be included. The distribution of the selected recordings are presented in the right part.

To export reports press the text in the lower left part of the screen.

In the activity table data is presented per biotope and species. In the activity table the relative number of recordings per species and night are presented in each row. The column “Activity” provide aimple index of relative activity.

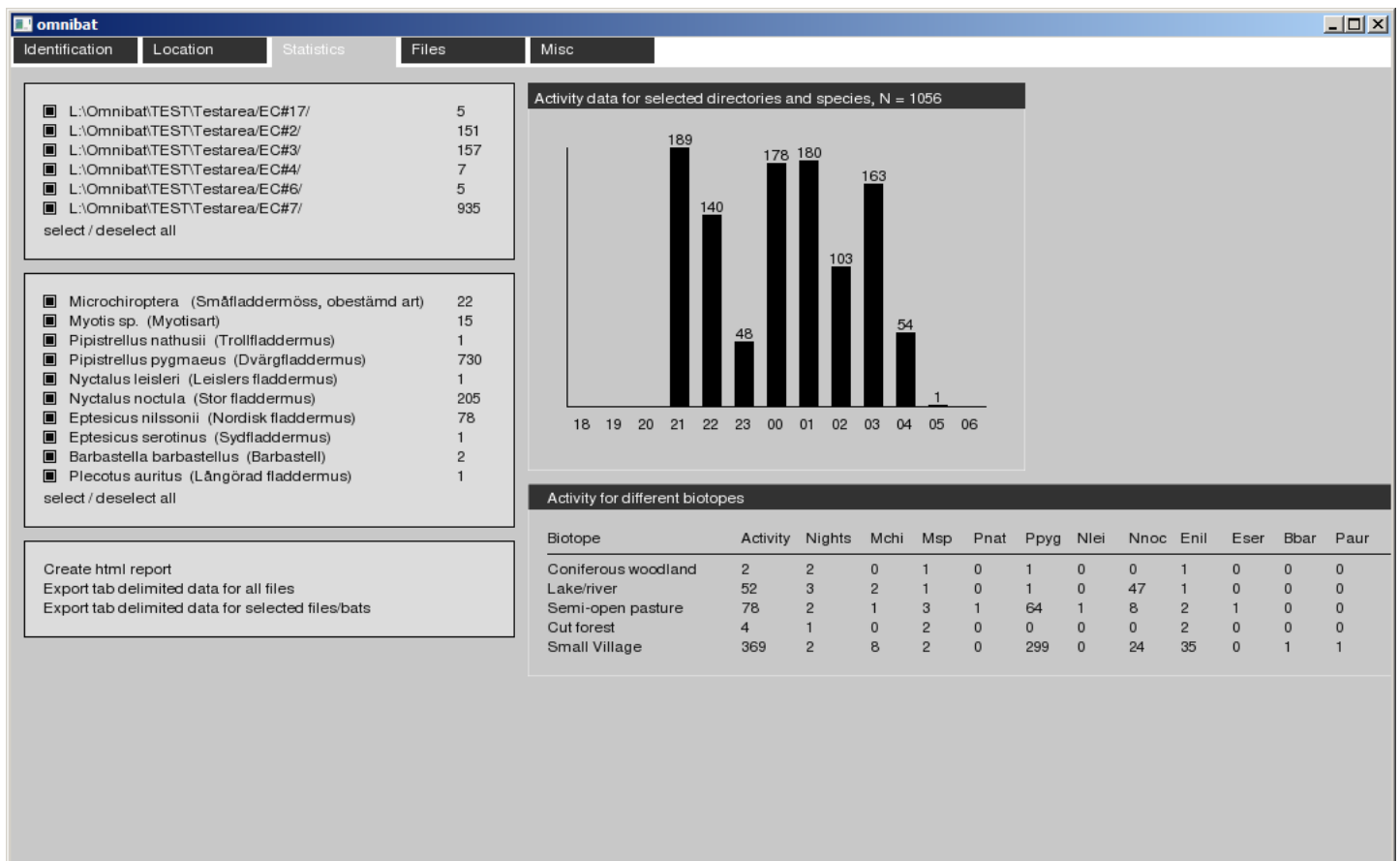


Figure 13. The statistics tab can provide a quick overview of activity in different biotopes.

